



## **ACRN Finance and Risk Perspectives Series**



### **Proceedings in Finance and Risk Perspectives '12**

**Dr. Othmar M. Lehner, Dr. Heimo Losbichler (Editors)**

**© 2012 ACRN Cambridge Publishing House**

**Enns, Austria**

**ISBN 978-3-9503518-0-4 (electronic)**

## Foreword from the Editors

VUCA, an acronym for Volatility, Uncertainty, Complexity and Ambiguity has its origins in military operations. Influential speakers such as Alan Webber, former editor of Harvard Business Magazine and Fast Company, apply VUCA to describe today's environment after the several crises that hit the markets during the last decade. Volatility has since risen enormously, traditional planning and forecasting tools proved erroneous, complexity caused fatal and unforeseen impacts, risk once again became uncertainty, and ambiguity invalidated formerly reliable deterministic models on the micro and macro level. In order to cope with this changing environment, business leaders are forced to adopt their planning and decision models. We therefore invited scholars from a multitude of disciplines to contribute and (re)build theory of Finance, Risk and Treasury in times of VUCA.

Topics came from a broad variety, from one the following fields:

Corporate Finance	Economics and Global Finance
Behavioural Finance	Banking, Treasury and Liquidity
Financial- and Enterprise Risk Management	Accounting and Reporting
Mathematical & Computational Finance	Investments & Portfolio Management
Strategic Management & Entrepreneurship	Banking and the Finance Industry Sector

Our Finance and Risk Perspectives series of international academic conferences, invites scholars from many disciplines and backgrounds to gather for a week of intense exchange of current research issues. 2012 the conference was held in Steyr, Austria and saw over 100 contributions. The keynotes were held by Prof. Dr. Wim A. Van der Stede, LSE, London School of Economics and Political Sciences, and Prof. Dr. Matthew Haigh, SOAS, University of London, UK. Inspiring speakers from 40 nations, workshops on publishing and research as well as a great social side program, including our Welcome networking dinner, the KPMG panel on risk reporting; evening excursion to a big vehicle manufacturing plant (BMW), a PDW on Islamic Banking and Finance and a PhD students' school made this annual conference a very rewarding journey to Austria for many participants. The 2013 Finance and Risk Perspectives Conference will take place in November in Cambridge, UK (<http://www.acrn.eu>)

Dr. Othmar Lehner,      Dr. Heimo Losbichler  
Responsible Editors

### Academic Sponsors of the 2012 conference:

University of A. Sciences, Upper Austria – University of Jyväskylä, Finland – ACRN research network, Enns, Cambridge UK – CUNY City University New York – LSE London School of Economics - SOAS, University of London – BIBS International Business School Czech Republic – Routledge Journals London.

ACRN, the academic collaboration and research network – Enns Austria, Cambridge UK, is an extra-university research institution in the field of social and managerial sciences. A social enterprise promoting academic collaboration and research in social and managerial sciences, through partnering with leading universities from all over the world, contributing to the 7<sup>th</sup> European Union framework on cooperation in further education. All excess profit is used for grants and scholarships.

## PROCEEDINGS IN FINANCE AND RISK PERSPECTIVES '12

(2012), Dr. Othmar Lehner, Dr. Heimo Losbichler (Editors), 650 p.,  
ACRN Cambridge Publishing House: Enns, Austria., ISBN: 978-3-9503518-0-4 (electronic).

Available for free at Google bookstore and online. Indexed.

More info: <http://www.acrn.eu>

### TABLE OF CONTENTS

<b>SECTION 1: Entrepreneurship Perspectives.....</b>	<b>1</b>
The Role of Leadership in Sustainable Public Sector Performance Outcome Adi Budiarmo and Monir Mir .....	2
Cross-border Mergers & Acquisitions by Emerging Market Firms: A Review and Future Direction Min Du and Agyenim Boateng .....	25
The Impact of Business Group Characteristics on Location Choice and Firm Performance in China Sui-Hua Yu .....	56
Financial Supply Chain Management – Challenges and Obstacles Peter Kristofik, Jenny Kok, Sybren de Vries and Jenny van Sten-van't Hoff .....	77
<b>SECTION 2: Finance and Risk Perspectives .....</b>	<b>89</b>
A Comparison of Different Families of Put-Write Option Strategies Lucia Del Chicca and Gerhard Larcher .....	90
Applying Macro Prudence in Financial Standard Setting Diana Festl-Pell .....	104
The Nexus of Enterprise Risk Management and Value Creation Verena Kraus and Othmar Lehner .....	121
Managing Risk in Financial Market in Shipping Industry Vegard Elvenes and Dimas Mukhlas .....	193
Firm's Financing Constraints and Investment-Cash flow Sensitivity: Evidence from country legal institutions Ahmed Marhfor, Bouchra M'Zali and Jean-Claude Cosset.....	211
Fair Value Accounting in Times of Financial Crisis Natascha Jarolim and Carina Öppinger .....	228
<b>SECTION 3: Accounting and Risk Perspectives .....</b>	<b>252</b>
Quality and Determinants of Risk Reporting - Evidence from Germany and Austria Susanne Leitner-Hanetseder .....	253
The Effects of Global Financial Crisis on the Behaviour of European Banks: A Risk and Profitability Analysis Approach Mehmet Hasan Eken, Huseyin Selimler , Suleyman Kale and Veysel Ulusoy.....	269
Is the Price Kernel Monotone? Giovanni Barone-Adesi, Hakim Dall'O and Volodymyr Vovchak.....	295

Measuring the Impact of Intangible Asset Investment toward Company Financial Health and Company Agency Problem Dimas Mukhlas .....	321
A Dynamic Inflation Hedging Trading Strategy using a CPPI Nicolas Fulli-Lemaire .....	341
Option Market Overreaction to Stock Price Changes Eric Gettleman, Brandon Julio and Elizabeth A. Risik .....	365
<b>SECTION 4: Miscellaneous Perspectives .....</b>	<b>383</b>
Legal Aspects of Project Finance in International Trade Ali Rezaee.....	384
Factors Contributing to Audit Lags of Zakat Institutions in Malaysia Asmah Abdul Aziz, Muslimah Mohd Jamil, Huzaimah Ismail and Nafisiah Abdul Rahman .....	408
A Study of Audit Lags in Northern Malaysia Local Authorities Asmah Abdul Aziz and Amal Hayati Aziz .....	427
Risk coverage in the top companies in the D/A/CHa countries – Development and future challenges in the external risk reporting in the corporate practice Christian Theuermann .....	438
Investment Decisions under Uncertainty: Example of Russian Companies Andrey Aistov and Ekaterina Kuzmicheva.....	455
Relation between Market Value Added and Earning Per Share and Price to Earnings Ratio Farzaneh Heidarpour, Rezvan Hejazi and Hamid Eskandari .....	470
Beyond Stress Testing: Modelling Liquidity and Interest Rate Risks for (real) Corporate Measures Filippo Antonio Dal Prà and Guido Max Mantovani.....	479
The Impact of Adopting IASs on Social, Economic and Political Environment of Iran Rezvan Hejazi.....	502
Carbon Markets in Times of Economic Uncertainty: A Weak-form Efficiency Investigation of the Phase II EU ETS Scott J. Niblock.....	515
Turkish Experience in Bank Solution in Last Two Decades; Fraud and Corruption of Shareholders and Managers in Turkish Banking System Ayse Hayali, Selin Sarili and Yusuf Dinc .....	537
The external auditor’s view on risk disclosure – empirical evidence from Austria Waltraud Öller, Korona Sylvester and Dorothea Greiling .....	562
Financial Inclusion in India: Do microfinance institutions address access barriers? Savita Shankar .....	586
The Relationship between IFRS, Earnings Losses Threshold and Earnings Management Hui-Sung Kao .....	612
Mergers and Acquisitions: Revisiting the issue of value creation in the New Member States of European Union Darius Saikevicius .....	639

***Section 1:***  
***Entrepreneurship Perspectives***

# THE ROLE OF LEADERSHIP IN SUSTAINABLE PUBLIC SECTOR PERFORMANCE OUTCOME

Adi Budiarmo<sup>1</sup>, Monir Mir<sup>2</sup>

<sup>1,2</sup> University of Canberra, Australia

***Abstract.** Indonesian public sector has been implementing various reforms to enhance its accountability and transparency for performance outcomes since 1999. These reforms have similarities with the new public management style reforms introduced in many developed economies decades ago. One of the reform agendas is the implementation of the outcome-based strategic performance management. Three out of four pilot units for bureaucratic reform implemented balanced score card (BSC) as a holistic tool to achieve sustainable performance outcome. Literature in the private sector context provides evidence that leadership plays crucial roles in implementing successful changes within an organisation. However, there is a dearth of literature that explores the role of leadership in public sector especially in the context of developing countries. Drawing on transformational and strategic leadership frameworks in the midst of global finance volatility and the complexity of the public sector reform agenda, this study finds that leadership traits contributed substantially in implementing successfully the BSC framework in the Indonesian Ministry of Finance. The study also finds that the leader who was responsible for implementing the BSC had to come out from his traditional bureaucratic shells and better manage multifaceted stakeholders to achieve sustainable public sector performance outcomes.*

***Keywords:** Leadership, Balanced Scorecard, Sustainable Performance Outcome*

## Introduction

After the era of the New Public Management, focus on citizens is becoming an increasingly important perspective in developing capacity of leadership to achieve the government performance outcomes (Stoker 2006, Evans 2009). The exploratory study about leadership roles and the implementation of balanced performance management system is necessary to capture to what extent several developments in the research on leadership and performance management systems. It also to capture its impact on the agenda of public sector reform and contextualizing the leadership accountability for better governance in sustaining public sector performance outcome in the 21 century. The full application of an effective leadership framework may promote leadership accountability for sustainable performance excellence in public sector. The result of the study also enhances the existing theory on leadership effectiveness; promotes balanced performance management system in public sector; and finally promotes alignment and engagement model to support high performance governance culture in public service organisation.

The paper is structured in several parts as follows: the introduction, background, rationale and context; the literature review; the leadership accountability: a conceptual framework; methodology; methods and data collections; case analysis and conclusion. The

proposed leadership accountability framework is a synthesis of the leadership roles in implementing the performance management system based on the BSC approach. It is developed and then used as a model for analysis. Finally, the ultimate research outcome for this study is to provide comprehensive analysis based on the strategic leadership framework in implementing the performance management system in the context of study.

## **Background, Rationale and Context**

The leadership roles in public sector reform under the New Public Management paradigm places a strong emphasis on how to manage public sector performance based on the result/outcome (Hood 1995, Rose and Lawton 1999). Pollitt and Bouckaert (2004) define public sector reform as intentional changes in the structure and processes of a public sector organisation. It is necessary to enable organisations to achieve high level of performance in terms of better public services. Especially in times with high levels of volatility, uncertainty, complexity and ambiguity, the demand leadership accountability for sustainable performance outcomes has been becoming a key issue in leading and managing public sector organisation around the world.

Meanwhile, there are research findings argue that accountants can become a useful partner in the reform process in public sector especially in the process of changing objectives and promoting holistic accounting management control system for performance (Mir and Rahaman 2006, CIPFA 2011). The demand for the leadership accountability framework for performance outcome has been noted by the emergence of innovative and multidimensional performance management systems/frameworks which works reasonably well in the private sector. Now, literature findings that those systems also applicable for improving public sector performances (Rhodes et al. 2008, Michalska 2008, Brignall and Modell 2000). Those frameworks include the European Foundation for Quality Model and the Business Excellence Model (Michalska 2008), the Malcolm Baldrige National Awards Framework (MBNA 2009) and the Balanced Scorecard (Rhodes et al 2008; Kaplan & Norton, 2004; 2004a; 2001; 1996). Implementing these approaches requires strong leadership roles to better serve broad organisation's stakeholders by focusing and aligning the whole organisation to manage high value standard financial and non-financial performance indicators (Brignall and Modell 2000).

Moreover, to enhance leadership accountability at all levels and as one of the management accounting tools for balanced control, BSC can become not only as a measurement system, but also as a strategic performance management tool to achieve competitive advantage and sustain performance excellence (Kraines 2002, Kaplan and Norton 2004a, Kaplan 2009). In the hand of leaders, BSC is a set of performance measures that gives them a fast and comprehensive view of strategic business performance (Kaplan & Norton 1996; 2001). It includes financial measures that tell the results of actions already taken and also non-financial or operational measures, such as customer satisfaction, the internal process, and the organisation's innovation and improvement activities. Operational measures are also known as the drivers of future financial performance.

Reform in the Indonesian public sector may be defined as government's respond to criticism of the way its bureaucracy behaves, miss-match of the policy and the personnel practices especially on recruitment and remuneration, problematic financial management; and complex relations with outside groups and all kinds of "too much" procedures (Toha,1987;Yudhiatara, 1997; Hughes, 2003; Gregory, 2003;Effendi, 2009). The Indonesian bureaucratic reform strategy essentially is an effort to eliminate of decades of deeply rooted corruption practices and to change the foundation of the government delivery service to

achieve three main organizational outcomes: organization modernization, business process improvement, and improvement on managing human resource apparatus. (Effendi, 2007).

Firstly, Indonesian Ministry of Finance (IMOF), as one of the pilot units for the Indonesian bureaucratic reform agenda, has been successfully changing its HR Department focus and practices from personnel bureaucracy towards more strategic HRM management. Moreover, it has been modernizing its public delivery offices, particularly tax, customs and treasury offices throughout Indonesia by cutting off red tapes and accelerating business processes of various public services deliveries; and improving its remuneration system simultaneously. One obvious achievement is its 2007 implementation of a strategic performance management system based the BSC approach. The former minister, Dr. Sri Mulyani Indrawati, represents a leader whose high level integrity and strong commitment to achieve better organizational outcomes. She was put high standard of discipline to managers who committed to be unfaithful and corrupt. She successfully lead the ministry to create strategy maps and identify key performance indicators based on the ultimate stakeholders' perspective as the centre of the BSC performance management system.

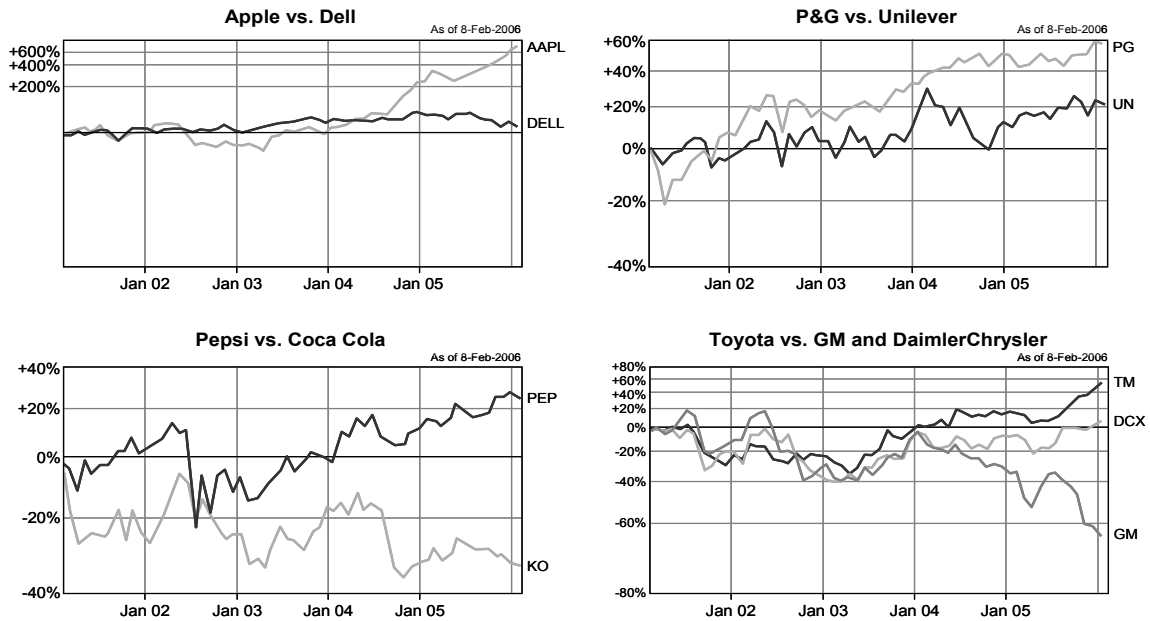
As many private sector and advance public sector government units got benefit from BSC as a holistic performance management tool (Kaplan and Norton 2004a, Mathys and Thompson 2006, Umashev and Willet 2008), IMOF decided to use BSC, for its better implementation of the strategic performance management system. Various factors contributed in successful implementation of BSC, but the major role was played by the leadership in the organisation. Under such circumstances, the main objective of this study is to explore how leadership role contributed in the implementation of BSC.

## Literature Review

There is a growing confidence that leadership is a determinant of sustainable organisational success (Draft & Pirola-Merlo 2009; Dubrin et al. 2006). However, the study on the leadership-performance relationship is not conclusive, especially on how the leadership role facilitates improvement in organisational performance (Jing & Avery 2008). Many practitioners and researchers support the notion that, at the organisational level, leadership contributes to a critical relationship between organisational effectiveness and people performance. Nevertheless, study on the extent to which leadership styles and behaviors facilitate the improvement of organisational performance is still developing (Bass & Stogdill 1990, Jing & Avery 2008).

The role of leadership in implementing change in private sector in developing world based on his comparative study by Jonash (2006) supported the strong conceptual relationship between innovations done by strategic leaders in selected companies and the organization success in terms of competitive advantages in the future. Jonash (2006) clearly shows how innovations done by the effective leadership qualities gained future organisation success in terms of shareholder return index. There are four sets of comparative companies performance of Apple vs Dell; Pepsi vs Coca Cola; Proctor and Gamble (P&G) vs Unilever and Toyota vs General Motor & Daimler Chrysler for the period 2002 to 2005 (Figure 1).





Sources: Jonash (2006) Innovation Management Inc.  
 Figure 1. Beyond R&D Driven Sales to Innovation Driven Shareholder Returns.

However, there are still only a limited number of studies which un-wrap the role of leadership in implementing change in the public sector, and what determines effective leadership in the public sector (Van Mart 2003). Debate still exists on what specific leadership style or paradigms which are superior in the process of achieving sustainable performance excellence in the public sector (Van Mart 2003).

Even though discussion on which leadership style is the most effective is still developing, ultimately, the strategic leadership paradigm (Draft & Pirola-Merlo 2009; Ireland & Hitt 2005) promotes effective leadership practices for sustainable good results in the 21<sup>st</sup> century (Table 1). The strategic leadership concept has also improved the previous literature discussion about leadership theories that tend to focus merely on the individual leadership perspectives (Bolden et al, 2003). The more holistic approach offered by the strategic leadership theory is needed to promote a better framework that links stakeholders' perspectives in achieving sustainable performance in the organisation. It will also provide better perspectives and prevent organisational bias towards leadership capacity-building that may not be in line with the process of achieving improved organisational outcomes.

In line with the strategic leadership concept (Ireland & Hitt 2005) and based on a synthesis analysis on the four major roles of the strategic leaders in an organisation (Table 1), there are four major elements that should be explored to support the analysis of the leadership role in sustaining public sector performance, as follows: leadership effectiveness, the Strategic Management and HRM "fit", the balanced performance management system, and the performance governance.

No.	Strategic Leadership Characteristic	Strategic Leadership Roles	Elements of The Conceptual Framework
<b>1</b>	<b>Personal Mastery</b>		
a	Personal Qualities	Combination of both visionary and managerial type leader	Leadership Effectiveness
b	Orientation	Marshalling long-term and short term viability of the organisation	
c	Leadership style	Make vision work with alignment of strategy throughout organisation	
<b>2</b>	<b>Organisational Mastery</b>		
a	Process and Structure	In the paradox of leading and managing: nurturing mix of managers leaders and strategic leaders	Strategy &HRM Fit
b	Agility	Flexible, adaptive to the shocking change and challenges	
c	Followership succession	Embraces leadership succession	
d	Followership: staff's empowerment	Need professional and knowledge workers in dynamic, chaotic situations	
<b>3</b>	<b>Performance Mastery</b>		
a	Performance (Advantages)	Maintaining competitive advantage and sustaining performance excellence	Performance Management System
b	Innovation	Innovation is become part of the culture supported with continuous leadership capacity building	
<b>4</b>	<b>Social Mastery</b>		
a	Ethical & Values Driven	Values and vision shared by all the members in the organisation	Performance Governance
b.	Promote governance	Promote strategic alliance with Stakeholders and community, environment	

Source: (Draft &Pirola-Merlo 2009 ; Jing & Avery 2008 ; Bouckaert&Halligan 2008; Graetz 2006; Ireland and Hitt 2005; Van Mart 2003)

Table 1. Synthesizing the Conceptual Framework Based on Strategic Leadership Theory

Firstly, finding an effective leader for every organisation at the right time is not always easy. A leader in the organisation is the one who is willing to take responsibility for leading any organisational change initiatives and achieving performance excellence (Michalska 2008). The first important role of the strategic leader is to determine clearly the organisation's vision and develop strategic direction involving the whole component of organisation (Hamel & Prahalad, 1989; Ireland & Hitt, 2005). To promote leadership effectiveness in public sector, leaders with full set of characteristics on personal, organisational, performance and social mastery are needed to lead and fully engage in the process of achieving sustainable performance outcomes (Graetz, 2006; Ireland & Hitt 2005; Van Mart 2003; see Table 1 above).

Secondly, the concept of strategic management and HRM "fit" represents concern about how to align the business strategy with the human resources strategy/practices (Shields 2007). In a further study on the development of a basic model of "best fit" strategy alignment, Shields (2007) also strongly suggests that in developing the performance management system, organisations must involve the development of an appropriate remuneration system which will correlate systematically with the process of managing business strategy, the organisational structure, and the shaping of the organisational culture.

So, by including the strategic management and HRM "fit" as part of the element of the leadership accountability framework will support leaders in managing change, achieving mission priorities (Oakland & Tanner 2008). In addition, as a result of persistent attention by leadership to making strategic planning an integral part of the strategic management process, the effective strategic planning processes will contribute to the process of achieving organisational performance outcomes in terms of public value (Oakland & Tanner 2008). Kamarck (2007) noted that the government preference to focus more on process rather than a high degree of control triggered the reform of its traditional accountability and performance management framework. This will also increase the capacity to integrate sound emergent strategy into the organisation's more deliberative strategy making process (Oakland & Tanner 2008). Moreover, in line with the reinvigoration of the strategic leadership concept can be considered as the key success factor for any change initiatives especially on developing human capital and reshaping current organisational culture to "fit" with the organisational strategy (Ireland & Hitt, 2005; Shields, 2007).

Furthermore, Bryson (2003) demonstrated comprehensively that the use of performance management tools and techniques as a product of a sound PMS under the perspective of strategic planning and management theory will directly support organisational effectiveness by increasing the system thinking. In addition, it will indirectly support the organisational effectiveness by promoting the alignment of the strategic and operational concerns simultaneously.

As one of the best leadership tools for managing performance in both the private and the public sector (Kaplan & Norton, 2004; Estis 1998), BSC promotes the adoption of a holistic and comprehensive approach to strategic planning, performance measurement and evaluation (Graetz 2006). The strength of the BSC approach lies in its balanced focus on internal-external and financial-non financial perspectives, in its strategic design; its simplicity and the alignment of its strategic vision with operational measurements (Graetz 2006; Kaplan 1996; 2001; 2004a).

BSC, as a successful performance management system also provides a basis for leaders to better manage change or execute strategy (Sitawati 2009; Rohm nd; Martello et al. 2008). In the Indonesian context, bringing the best western-type strategic performance management framework to the Indonesian public sector suggests some caution in terms of the national/organisational culture, leadership styles and HRM practices (Rhodes et al. 2008). For instance, the Indonesian leadership focus on the longer horizon for public sector strategic

planning is still in question (Crawford & Hernawan 2002; Crawford 2003). In addition, with regards to the individual performance culture, based on the study of the existing public sector performance evaluation based on the current individual work performance indicators, nonetheless the current focus is not on promoting individual performance but rather on measuring personal loyalty (Sutiyono 2007).

According to McLeod (2006), there are currently three major areas that need to be reformed in HRM in Indonesia; firstly, the mechanistic and rigid organisational structure; secondly, the mismatch of professional skills and qualifications to the tasks; and thirdly, the weak incentives for good performance and a lack of competition for best leader candidates from outside. In terms of leadership practices, McLeod (2006) concluded that the current leadership promotion system promotes no incentive for good performance. There is no competition either from inside (below) or from outside to be able to attract the most competent figure for managerial positions in the Indonesian public sector. Moreover, to the extent that there is no competition for positions, there are also no transparent or participative rules of the game for leadership succession, such that it triggers unethical practices such as seeking promotion not by demonstrating professional competence or superior performance but by approaching superiors or by bribing officials who have authority with regards to leadership appointments (McLeod 2006).

At the local level, Turner, Imbaruddin and Sutiyono (2009) reveal major fundamental problems in the Indonesian public sector in terms of a very complex reward system and the highly bureaucratic personnel policy held by central agencies as well as very low remuneration, especially for senior officials. In terms of individual performance appraisal, Turner et al. (2009) also argued that local government and most of the ministries lack a disciplined formal process for individual performance evaluation.

Thirdly, a solid public sector performance management/measurement system should be developed to integrate performance information in coherence with the organisational strategy (Kaplan & Norton, 1996; 2001; Niven, 2003; Bouchaert & Halligan, 2008). It is the leadership role in the public sector reform under the New Public Management paradigm that places a strong emphasis on how to lead and manage public sector performance based on the result/outcome by establishing balanced organisational controls to promote excellence on performance (Hood, 1995; Ireland & Hitt, 2005; Rose & Lawton, 1999).

With regard to the potential use of the BSC approach in the public organisation, more attention needs to be paid to the current dynamic of the BSC. As an approach that previously only served leaders in an organisation as a performance measurement system (Kaplan & Norton 1996) and then as strategic performance management system tool (Kaplan & Norton 2001), currently the BSC approach seems capable to serve as the organisation's total strategy management tool (Kaplan & Norton 2004). With a focused and persistent leadership to maintain and improve the performance outcome achieved, the BSC approach can lead public sector institutions to a sustained culture of quality and improve organisational performance (Mathys and Thompson 2006). For example, based on their recent study from the implementation of the BSC approach in two public services in the US (Postal Service and the Defense Finance and Accounting Service), dramatic improvements were observed in the performances of both organisations as a result of the process that successfully transform led to a fact-based performance improvement culture (Mathys and Thompson 2006).

Another study on the implementation of the BSC in the Australian government department, Centrelink, found that the journey to introduce the new system internally consumed more than four years between 1997 and the introduction of the online BSC in 2003. The prominent notion here is that individual performance agreements should be linked to the business planning. In addition, ongoing feedback and coaching at the individual level should

take place to make sure the alignment of individual key performance indicators are updated to reflect role changes and stay focused on the organisation strategy. In addition, more care needs to be put into motivating employees, assessment and capacity-building and recognition to encourage organisational performance excellence (Centrelink, 2009; Halligan, 2008). A further case study in the Queensland Government on managing priorities based on the BSC approach, the Department of Primary Industries (2000) revealed that the change initiative has apparently increased pressure on agencies to see more holistic and broader stakeholder concerns in exercising approaches to managing its portfolio.

Furthermore, access to the leadership decision making process in the implementation of effective PMS in the public sector seems to be difficult. For instance, a recent case study of the implementation of the BSC in a multi-objectives-large government institution, which was conducted based on the perceptions of the senior level officials, has found that several factors challenge the effectiveness of the implementation of the BSC. Those factors are cascading problems which are largely due to problems in the cascading of the performance indicators, and an inflexible top-down approach to the implementation process. The study also identified communication problems in the midst of leadership change during the implementation of the BSC (Umashev & Willett 2008). Moreover, the study also revealed that leadership may face problems in the process of aligning the performance measurement system, providing proper training, empowering employees and in providing incentive programs, and maintaining good communication to support the implementation process in the organisation (Umashev & Willett 2008).

For instance, the implementation of such performance management system in the public sector, especially in Indonesia, faced great challenges in regard to leadership engagement and the commitment to cascading the organisational performance up into the individual level, particularly due to the bureaucratic leadership style and non performance based organisational culture (Rhodes et al. 2008; Sutiyono 2007; Turner et al. 2009). Moreover, several BSC projects in particular organisations in Indonesia have been regarded as ineffective due to the failure of leaders to use the BSC as a tool for continuous improvement and change management (Tjahjadi 2007).

Fourthly, the performance governance concept promotes the public sector organisation's responsiveness to the current global issues and the dynamics of stakeholder interests. It also promotes a comprehensive and collaborative approach to the decision making process to sustain public sector performance. This ultimately leads to the enhancement of the existing performance governance system by incorporating systematically all organisation internal and external stakeholders (Bouckaert & Halligan 2008).

It should be noted that in the era of governance, NPM is limited in several ways in providing better outcomes in terms of public value (Evans 2009; Stoker 2006). For example NPM has too much focus on the customer and the market rather than on the citizen. Moreover, NPM still promotes the dominance of the public servant role, and gives less consideration to the influence of politics and deliberative public policy making (Evans 2009).

So, the new concept of creating public value then emerged and was promoted for the next public sector reform agenda by reforming governance norms, values and operational rules themes in the new millennium (Evans 2009; Stoker 2006). Governance studies in the 21<sup>st</sup> century emphasize leadership accountability and performance as the two main principles of governance (Graham et al. 2003). Leadership accountability deals with how decision making by leaders in government, the private sector and civil society is made accountable and transparent to the public and its stakeholders (Graham 2003; UNDP 1999; UNESCAP 1997). Performance principle aims to promote the responsiveness, effectiveness and efficiency of institutions in making best use of resources to produce results and serve all stakeholders (Graham 2003; UNDP 1999; UNESCAP 1997).

To improve governance, public sector leaders should also improve public service capacity for efficiency in government spending, and promote shared understanding of value for money principle of public services (Chou 2008, CIPFA 2011). Overall, the obstacles to the effective application of good governance in some countries (China, Japan, and some European countries) have been identified. The obstacles include political problems (leadership resistance or lack of political will), resource constraints and complexity problems (Evans 2009; Chou 2008; Yamamoto 2008; Ding 2005). Therefore to achieve reform in a country where the administration is not protected from political influence, leaders should aim for more structural reform in the government to improve public service capacity, efficiency and considering service standards and outcomes expected by the community (Chou 2008, CIPFA 2011).

A governance system can be understood as “a process whereby societies or organizations make their important decisions, determine whom they involve in the process and how they render account” (Graham et al. 2003). The governance system requires leadership accountability and performance as two of the five principles of good governance in the 21<sup>st</sup> century (Graham et al. 2003). This philosophy also promotes so-called ‘performance leadership’ in the public sector; encourages strong emphasis on a customer-focus strategy; adopts private sector performance management tools in the public sector; designs better budgeting, and promotes clear individual and departmental/organisational accountability (Behn 2006). Additionally, there is growing evidence that, with regard to public financial management within the UK and Australia, the public sector is now linked to the achievement of externally imposed performance targets (Propper and Wilson, 2003; Halligan 2008).

If leaders are able to maintain governance principles and stay focused on their stakeholders, it is likely that the organisation will be able to meet their expectations and achieve sustainable results (Bossert, 1997). Performance principles in a good governance context promote institutional responsiveness to the need to focus on the process to serve all stakeholders effectively and efficiently in producing results that meet the needs while making the best use of resources (Graham et al 2003).

The concept of governance in the public sector can also be associated with accountability and the responsibility for achieving better public value (Crawford & Helm 2009; Evans 2009). Embedding governance principles in performance management can also improve how organisations are directed and controlled and pays particular attention to organisational structure, management and policies (Evans 2009; Yamamoto 2008). It triggers the need to consider the enhancement of the existing leadership accountability model by engaging the process of inviting stakeholders to participate and contribute to finding the best possible answer to difficult questions.

Based on the study literature on the leadership-performance relationship, little research has been conducted to uncover the leadership-performance relationship in the process of achieving sustainable performance excellence in the public sector. Some researchers reveals some insights in the more developed countries (Umashev & Willet 2008, Halligan 2008, Mathys and Thompson 2006), but not many done under developing countries context including Indonesia. A research gap exists in current study on the relationship between the whole leadership characteristic: personal, organisational performance and social mastery with organisational performance outcomes (Table 1). So, the study on “The Role of Leadership in Sustainable Public Sector Performance Outcomes” in the IMOF is imperative to fill the gap on the current literature on leadership-performance relationship, and because of the limited empirical study on the BSC implementation in Indonesian public sector.

## The Leadership Accountability: a Conceptual Framework for Performance Outcome

In order to provide criteria for designing research questions and analysis, a leadership accountability framework is developed based on the strategic leadership theory. The proposed framework contains key elements that should be explored to support the analysis of the leadership role in sustaining public sector performance, as follows: leadership effectiveness, the Strategic Management and HRM “fit”, the balanced performance management system, and the performance governance (Jing & Avery 2008; Bouckaert & Halligan 2008; Shields 2007; Sutiyono 2007; Kaplan & Norton 1996; 2004a; see Table 1).

In line with the current study literatures, synthesizing those elements represent fundamental dimensions in constructing a conceptual model for analysis so-called model of “The Leadership Accountability Framework in Sustaining Public Sector Performance Governance”. The model is centrally derived from the literature that maintains that leadership is a determinant of organisational outcomes. Nevertheless, there is still only a limited amount of research that uncovers specific leadership concept that fits with this framework in practice, or ways of supporting leaders in sustaining performance outcomes in terms of sustainable public value (Evans 2009; Halligan 2008; Jing & Avery 2008; Nutt & Backoff 1993). Therefore through an in-depth case study methodology in the IMOF, the analysis can be done to explore the role of leadership in sustaining public sector performance outcomes.

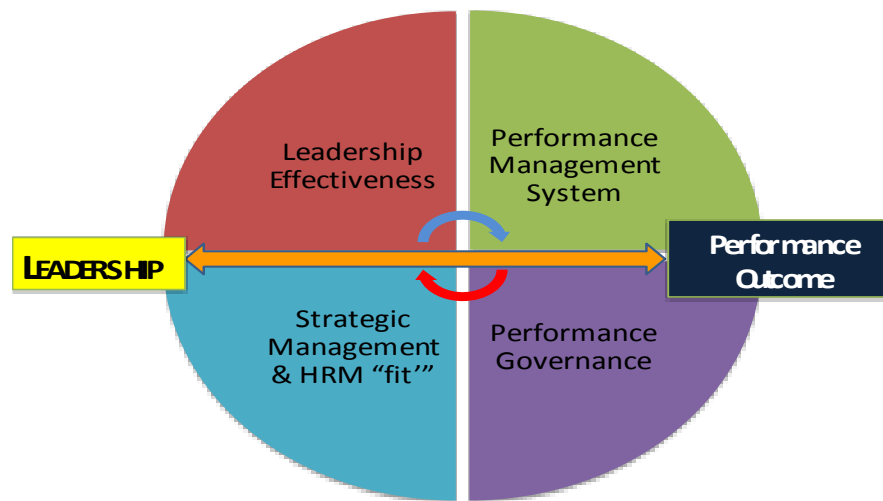


Figure 2. The Leadership Accountability – a Conceptual Framework for Performance Outcome

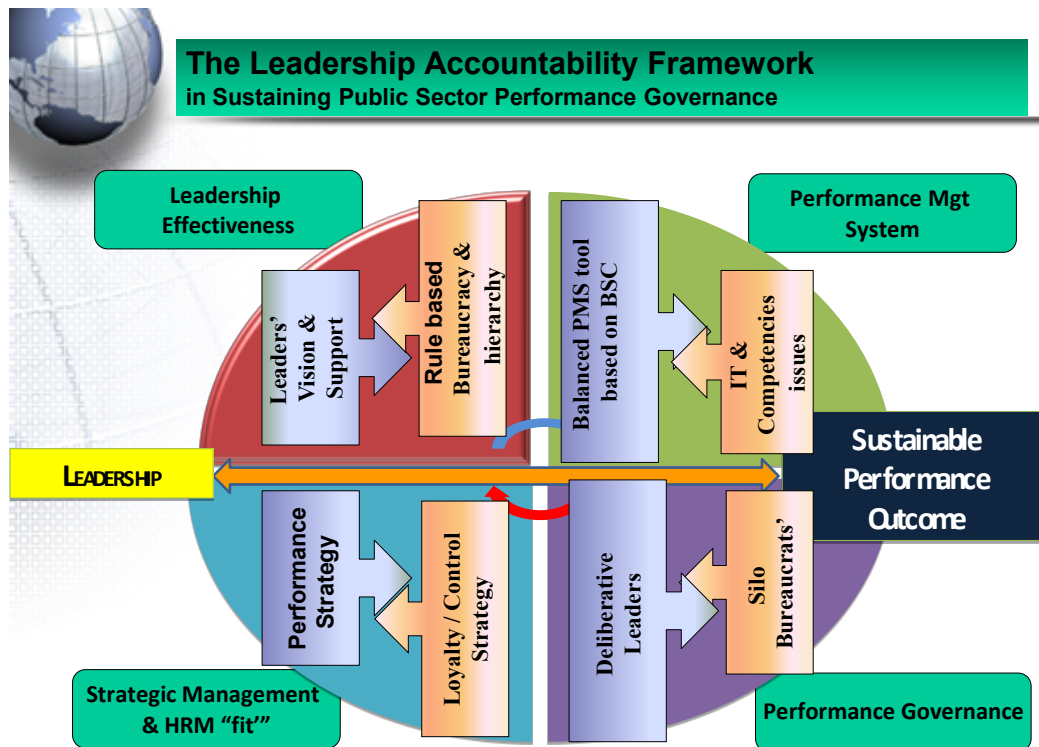


Figure 3. The Leadership Accountability Framework (refined)

## Methodology, Methods and Data Collections

The study of the IMOF reform is treated as an exploratory explanatory study on the single case of the IMOF bureaucracy reform agenda (Gerring 2007, Yin 2003). The scope of the reform in the Ministry of Finance covers 12 large and multi-objective portfolios - comparable to more than two ministerial portfolios in Australia (i.e. the Treasury and the Department of Finance and Deregulation) and comprises more than 62,000 employees in the bureaucracy. The single qualitative case study methodology is therefore ideally suited to the research project proposed.

The selection of the IMOF as the case for study was based on its readiness in terms of the bureaucratic reform process; its complexity in representing a wide range of public service institutions; and the remarkable commitment and engagement of the top leadership its commitment to implementing BSC in all units under the Ministry. In addition, due to the tacit nature of much leadership knowledge in the IMOF, it is best studied through qualitative research means.

The term 'research method' is a particular way or technique for approaching a research question. A range of methods are used under qualitative methodology, such as participant observation, in-depth interviews, focus groups and collection of organisational records, participants' diaries and all possible data and collection of images (Carter et al. 2007; Blackman et al. 2005).

This study involves explanatory analysis based on semi-structured interviews with the elites and key staff in the strategy management office across 12 units under the IMOF portfolios. The study also involves descriptive analysis, utilising three main methods of



document analysis of the leadership role in the implementation of BSC, observation during the process of implementation of the BSC in the Ministry and documents/data during 2006 - 2009. In addition, in-depth interviews of key staff representing a member of a working team who responsible to manage the performance data and reporting in all Echelons I (portfolios) under the ministry. This engagement aims to gather comprehensive perspective in regards to the whole process of leading and managing performance and bureaucratic reform in the ministry.

This study will not rely on the use of statistics as criteria for interpreting the study's findings. Instead, a different strategy will be developed i.e. by identifying and addressing rival explanations for the findings. The challenge is to specify important rivals as part of the case study's research design work (Yin 2003). Considering the implementation of the BSC as part of the reform agenda in the IMOF as an attempt by the current leadership to initiate successful organisational change, so the rival theory of this proposition will also be exploring the probability of failure in realising organisational change/reform.

## **Case Analysis**

The bureaucratic reform program in the IMOF officially has been initiated based on the Minister Decision No. 30/KMK.01/2007 about IMOF Bureaucratic Reform and also the starting point of the implementation of IMOF performance management based on the balanced scorecard (BSC) to improve performance, public service delivery and good governance. The BSC development process in the IMOF can be described first of all by the leadership process of revisiting and redefining IMOF vision, mission and strategy: secondly, the ministry entered into process of translating strategy into objectives and activities in terms of key performance indicators, target and trajectories as a base for allocating resources, budget and monitoring the result/performance outcome.

BSC is used as a leadership tool to better translate IMOF vision and mission into strategic objectives and presented in a strategy maps. Strategic objectives are the main ingredients of the IMOF BSC strategy maps, which based on it then the measurement and target were created. Furthermore, activities are then initiated to achieve the targets. Finally, the allocation of resources can be made to perform activities and achieve the targeted output/outcomes. All trajectories and result in the implementation stages will be reported and monitored for a feedback towards strategies that had been developed. IMOF-wide strategy maps were cascaded down to all levels in every unit under the IMOF. A set of IMOF BSC strategy at the top level is labeled as the IMOF-Wide strategy map and at the level Echelon I, it is called an IMOF-One strategy map and at the level Echelon II, it is called an IMOF-Two strategy map respectively.

The implementation of the BSC in IMOF can also be regarded as an expose on how leadership in coping with volatility in global finances during 2007-2009 at the same time the ministry had to manage the complexity of the public sector reform agenda. Three out of the four pilots for the Indonesian bureaucratic reform program implements BSC as a leaders' initiative to install the new strategic performance management tool in public sector reform. With 12 Echelons I (portfolios under the minister) including major directorates for tax, treasury, budget and customs, IMOF is leading the implementation of the reform in terms of leadership commitment and support. The implementation of BSC in the public sector, especially in Indonesia, faced great challenges in terms of leadership engagement and commitment, particularly with regards to the leadership style and bureaucratic culture at the national and organizational levels. However, the implementation of BSC in the IMOF during 2006-2009 has shown some promising results.

To provide an analysis of the issues based on the leadership perspectives on the achievements of sustainable performance outcomes in the midst of the global challenges during 2006-2009, the proposed leadership accountability framework, as a result of the literature review, is used as a conceptual framework for the analysis on how does the leadership role and performance management system based on the BSC influence the public sector performance. To some extent, the Indonesian bureaucratic reform objectives to improve government delivery services, performance and sustain governance have been achieved through three effective leadership strategies in developing office modernisation, business process improvement, and improvement in the human resource apparatus management. The BSC system has been contribute in providing balanced perspectives in planning and evaluating organisation performance. However, in coping with the continuous effort to eliminate decades of deeply-rooted culture of corruption, the existing performance management system needed to be upgraded to the higher stage by developing the performance governance system in the ministry. Overall, the following analysis exposes how the business type of leadership framework derived from the extensive used of BSC approach assisting the leaders in promoting change and innovation in IMOF strategic performance planning and evaluation in the midst of the Indonesian bureaucratic culture.

#### *Leadership Effectiveness: Clear Vision vs Rule Based Bureaucracy*

What can be learned from the leadership-performance management in the IMOF reform agenda is basically the effusion of an innovative leader in promoting leadership effectiveness by clearly defining the direction for the organisation to achieve its objectives in the long term and short term period and in imposing an innovative strategic performance governance system based on the BSC approach. In terms of achieving the targeted result, based on the findings, during the 2007-2009 there is a clear result in reforming IMOF business process by eradicating systemic corruption in practice especially in the DG Tax and DG customs (the biggest directorate generals in the IMOF).

Reform in the IMOF has been proven by the significant role of change enactors in forms of leadership effectiveness initiated by the era of three high calibre ministers: Dr. Boediono (2000-2004), Dr. Sri Mulyani Indrawati (2005-2010), and Mr. Agus Martowardojo (2010-current) and all the committed echelons in the ministry. An interview with several echelons I in the IMOF revealed that:

Under the former minister Dr.Boediono, IMOF leadership clearly initiated the modernisation of the Indonesian tax office in 2002 and designed the reform on the public financial management in 2003/2004 by the enactment of the law on the state public finance; the law on audit of the state public finance; andthe law on state treasury management.

The comparative analysis shown on the Table 3 clearly reflects an evolution of three types of leadership styles needed in the several phases of the reform process initiated by leader in the IMOF. Arguably, the change in the IMOF leadership perceived by respondents as also the process of change needed in the leadership styles from the managerial type, changing to the transformational style, and currently moving towards the strategic leadership style in the ministry.

<b>No.</b>	<b>Dimension</b>	<b><i>Managerial Leadership</i></b>	<b><i>Visionary (Transformational) Leadership</i></b>	<b><i>Strategic Leadership</i></b>
<b>a.</b>	<b>Personal Mastery</b>	<b>Relates people according to roles and decision making process</b>	<b>Proactive, creative, innovative and idea generators; influence the thinking process of the organisation and its people</b>	<b>Make vision work with alignment of strategy throughout organisation</b>
		<b>With too much focus on formal roles and structure, the leader can be too mechanistic</b>	<b>With innovative mind leaders should be aware of influence that may be beyond his/her territory</b>	<b>To have balanced perspectives in mind is difficult</b>
<b>b.</b>	<b>Organisational (process) Mastery</b>	<b>Rule bound, processed based structure</b>	<b>Not constrained by the present structure, systems or process or people</b>	<b>In the paradox of leading and managing</b>
		<b>The managerial leader tend to be too bureaucratic</b>	<b>The visionary leader is willing to take risk and breach formal legacy for better purpose</b>	<b>This type of leader is capable to balance the role as manager and leader</b>
<b>c.</b>	<b>Performance Mastery</b>	<b>Excellence on managing an organisation</b>	<b>Well equipped to propel supernormal growth; innovative</b>	<b>Sustaining performance excellence</b>
		<b>Too much reliance in managing process can make leaders less innovative</b>	<b>Transformational leaders might form an exhaustive bureaucracy to achieve superior performances</b>	<b>More focus on developing performance culture</b>
<b>d.</b>	<b>Stakeholder Relations</b>	<b>Hierarchical relationship with stakeholder</b>	<b>Adequate focus on stakeholders perspectives</b>	<b>Promote strategic alliance with Stakeholders and community, environment</b>
		<b>Managerial leaders focus on building strong internal relationship</b>	<b>Sometimes visionary leaders can be too much inclusive</b>	<b>Sharing same values and vision by all the members in the organisation and with all stake holders is almost impossible task</b>

Source: Analysis of the Leadership IMOF during the reform process – see Table 1

Table 3. Analysis of the MOF Leadership Qualities

The analysis is based on the qualities of the leaders to cope with leadership and management issues in four general qualities: personal mastery (personal qualities, orientation and style), organisational mastery (process and structure, agility and followership), and performance mastery (performance and innovation), and social mastery (ethics and value driven and governance). The strategic leaders shows both visionary (transformational) and managerial (transactional) types of leader's personality. They inspire people with big dreams and a vision for the future and exhibit managerial capability. They marshal the long-term and the short term viability of the organisation and capable of aligning the vision with nurturing organisational competencies. Strategic leader qualities are superior compare to other leadership paradigms in exemplifying organisational mastery qualities. Strategic leaders are not constrained by the current structure, systems or process and people, and are capable of initiating breakthrough in the rule-bound or processed-based structure, agile and adaptive to the shocking changes and challenges, and well-equipped to achieve performance excellence. Strategic leaders are also capable of initiating and facilitating innovation and producing superior growth. In terms of followership, strategic leaders are superior in nurturing leadership qualities among all the members of the organisation, and in making sure that shared vision and values drive professional actions and shared commitments to realise the vision in dynamic or even chaotic situations.

From the interview, regarding the first phase of reform one of echelon I who involved in the Indonesian tax administration reform summarized that:

During 2002-2004, the ministry elegantly led and managed the process of changing of the law of Indonesian public financial management, treasury and audit in public financial management: the minister strongly directed the reform, the Director General gave the green light and the selected and committed echelon II and III at the lower level introduced massive change in modernising taxation administration and services based on the pilot project, nurtured it and run the large tax offices.

According to the former Indonesian Minister of Finance, Dr. Sri Mulyani Indrawati (2008), who led the bureaucratic reform process (the second phase of reform), the expectation is that the bureaucratic reform process in the IMOF will ultimately provide a range of benefits that go beyond just having more satisfied and better rewarded staff. The IMOF should reduce the level of corruption in government, provide better services for stakeholders, decentralise the authority, make the organisation more transparent and accountable, and result in more efficient, effective and productive government (Indrawati, 2008).

In terms of leadership vision and support, most Key Performance Indicators (KPI) managers in the IMOF considered the leadership roles in improving performance to be quite strong. One of the KPI Managers in the IMOF commented:

In the midst of the Indonesian paternalistic culture, the IMOF leadership role is a highly significant (more than 70%) factor in improving organisational performance. In the early stages of implementing the BSC, a top down approach is imposed to enable performance to be measured quantitatively. In the past, it was difficult to measure performance outcomes, but now all units under the Ministry have defined the unit's key performance indicators and measured its target achievements quarterly and reported to the Minister's board meeting.

Early in her appointment as the Minister, knowing that there were embedded cultural issues in terms of the IMOF leadership bureaucracy; Dr. Sri Mulyani Indrawati committed to become the champion of the BSC implementation and developed the Minister's strategic leadership and delivery unit, Pushaka (Pusat Analisis and Harmonisasi Kebijakan) in November 2006. One of the deputy directors of Pushaka commented:

Pushaka enhanced and promoted better governance in managing the Minister's meeting and the private office's functions, and developed the Minister's delivery unit and strategy management office. As part of its main tasks, Pushaka provided leadership support in delivering major changes in strategic planning and aligning leadership practices in term of speeding up leadership communication and coordination, better monthly board meeting management to promote a cohesive and participative decision-making process in the Ministry top level meetings. It also involves the use of advanced information technology to monitor the implementation of the Minister's decisions and support responsive accountability and communication with stakeholders.

The IMOF reform agenda is quite clear. Two of the prominent agenda items, reforming the national budgeting process and IMOF bureaucratic reform have been initiated. In the battle to reform existing Indonesian budget processes, the minister remains vigilant in regard to fiscal resilience and sustainability. However, the rule-based bureaucracy and hierarchy seem to be a real handicap for leaders in developing or adjusting necessary roles in the bureaucracy. Practically, the leadership succession laws and regulations are too rigid and fail to provide enough power for the leaders in an agency or department to hire competent managers/staff or fire incompetent managers/staff if necessary for their own organisation. One echelon I in the IMOF indicated:

We currently have difficulties in getting rid of employees or middle level managers with very low performance and very low standards in terms of behavior; for example, We don't have a final solution how to get rid of many incompetent employees that has been identified by the reform agenda.

Another director general (echelon I) in the IMOF who was interviewed commented:

"We found that the Indonesian bureaucracy apparatus system is too rigid, the same structural leadership positions/patterns are designed for all ministries. For example one directorate will only have a certain level or maximum number of divisions and for a division there must be a maximum level of sub divisions. We don't have flexibility in designing or redesigning our current leadership structure to better manage our public services".

### *Strategic HRM "fit": Performance Strategy vs Loyalty/Control Strategy*

In terms of leadership role in the human resource management, Indonesian bureaucracy still inherited and widely practice loyalty based/control strategy rather than performance based strategy. For instance, the strategic management and HRM practices in the Indonesian public sector, the leadership focus for the longer performance horizon for the public sector strategic planning is still in question (G. Crawford, 2003; G. Crawford & Hermawan, 2002). However, the top-down approach of the implementation of the BSC in the IMOF introduced the reform in terms of performance based strategy in practices. This is an innovative agenda in terms of strategic management and HRM practices in the IMOF. In fact, as a performance leadership tool, BSC promotes better strategy for improving public service and performance. Regarding the importance of leadership influence in the strategic management, one prominent director general maintained that "*If you fail to plan then you plan to fail*". In addition, most of the key performance managers as prime movers of the BSC implementation at the middle level perceived that:

The BSC offers a basis for leaders to better manage change or execute strategy in the IMOF. Not to mention that in the early stages of the implementation, with professional facilitators from reputable consultants, all echelon Is and the Minister had a series of meetings to design the Ministry strategy map as the first step in the development of a strategic performance management framework in the IMOF.

With regard to the national laws and regulations Indonesian Human Resource Management, the fact seems to confirm McLeod (2006) who observed that the current

leadership promotion system promotes no incentive for good performance. In addition, in opposite direction to implement performance based culture, there is a multi-based remuneration policy. In the Indonesian public sector, the very complex reward system and the highly bureaucratic personnel policy held by cultural agencies are perceived as fundamental problems, as well as low remuneration especially for senior officials. According to an echelon I interviewed in the IMOF:

A multi based remuneration dilemma exists. Units may create other source of income in addition to their current salary budget. Moreover, it is common practice to get extra remuneration from allocating budget to provide honorarium for staff. In addition it is possible to appoint senior public sector officials as a state-owned company' commissioner which according to the some people it may result in potential conflict of interest and increasing problematic issues in salary iniquity among echelons in the IMOF.

And in terms of individual performance appraisal, local government and most ministries lack a formal discipline process for individual performance evaluation, and there is no reward based on performance in practice. The salary system then has weakened the motivation to perform well in the government's offices and lowered the productivity of many competent civil servants (Turner et al., 2009).

One echelon I interviewed commented:

The current performance management system needs to be broken down to the personal level. Performance indicators should be cascaded down to the lowest level of the managerial structure or at the individual level. Currently, I don't have an objective tool to make a decision based on individual performance.

In response to these strategic management and HRM issues, under the reform program, the IMOF has applied a pilot remuneration package, based on the 27 grades of all the positions in the ministry (as a result of professional job analysis done by consultant). Basically, this improves the lowest salary of the positions in the Ministry by more than 100% (from IDR 760,500 to IDR 1,330,000) and improves the remuneration for the highest position in the Ministry by more than 5 times (from IDR 5,500,000 to IDR 46,950,000). This initiative has been approved by the Indonesian House Representative as a model for a remuneration package which will later be applied to all ministries in Indonesia under the bureaucratic reform program (IMOF, 2008a, 2008b).

In addition, the Ministry has also strengthened its HR management, developed an assessment centre, and encouraged competition to fill vacancies by advertising them internally rather than continuing to rely on promotion by seniority. In addition, it has improved communication and coordination within directorates/agencies under the Minister's portfolio. The Ministry has also initiated the appointment of a special "chief officer" in the structural position known as "Plt" (Pelaksana Tugas – acting leader). This was a breakthrough policy as prescribed in the old bureaucracy and by the endorsement of minister regulation number 117/PMK.01/2009 regarding the Appointment of Chief Officer in the Structural post in the Ministry of Finance. It is now possible to accelerate the appointment of young and competent officials to hold the leadership role in the IMOF bureaucracy based on their competencies and performance. Another important initiative was an attempt to match remuneration to skill requirements and responsibilities, and to align the pay structure more closely with that of in the private sector.

To make structural alignments with regard to the agenda of modernising its major offices, especially tax, customs and treasury offices throughout Indonesia, the IMOF leadership was successful in accelerating and improving the management of its business processes. The

Ministry published clear improvement in more than 35 initiatives in 2007 and many more in 2008 on cutting the administration processes for delivering key public services. Examples include acceleration of the Tax File Number registration from 3 working days to 1 working day only; the tax appeals procedure from 12 months to 9 months; and refunds for custom duties from no specific time to a maximum in 30 days (Budiarso, 2010).

#### *Performance Management System: BSC vs IT & Competency issues*

Eventually, the BSC has served as the strategic performance management system for the IMOF. The implementation of reform in 2007, especially on the strategic performance management system in the IMOF based on the BSC, was enabled by introducing massive training and agency capacity building to define better strategic mission, vision and strategy objectives as mandated by the reform of state financial management law since 2003/2004.

At the end of 2007, the development and implementation of the BSC to promote sound strategic-bureaucratic performance management and governance was enforced by the appointment of several key performance managers to act as liaison officers in every echelon I in the Ministry. It was their job to work together to run another reform initiative which took in place as part of the public financial management reform. Pushaka supports quarterly senior-level meeting that directly led by the minister to do high level observation and evaluation of the current performance and achievement of the ministerial strategic outcomes.

In line with previous studies (Rhodes et al., 2008; Sutiyono, 2007; Turner et al., 2009; Umashev & Willett, 2008), The implementation BSC in the IMOF posed great challenges to the leadership engagement and commitment to cascading the BSC up into the individual level, especially with regards to leadership style and national/organisational culture. In fact, the recent development of the BSC implementation was evident from the signing of the key performance indicators contract with all 12 Echelon Is for the first time in early 2008. The former Minister, Dr. Sri Mulyani Indrawati stated to the board meeting as follows:

What the ministry has done so far basically was a milestone and achievement for such a big institution with 62,000 employees and several portfolios including treasury, taxation, budgeting and fiscal balance, customs, capital market oversight and state asset management.

Another echelon I in the IMOF confirmed that the current performance management system can be used to improve organisational performance, commenting:

Apparently, there is growing concern in the quarterly performance meetings of the minister and all Echelon I under the IMOF. People are getting serious about paying attention to missing the organisational performance target. Awareness of performance improvement is also increasing.

However, the development of the organisational performance information management system and infrastructure in all 12 IMOF portfolios is not conclusive. An IT special expert of the Indonesian Minister of Finance who was interviewed noted:

Several subsystems exist in the IMOF performance information system. Among those sub-systems are the treasury information system, the tax and customs information system, the budget information system and the BSC information system. Unfortunately these systems potentially create silos in the management of the IT infrastructure and policies in the Ministry. This has become top priority to be solved in the IMOF over the last 5 years.

#### *Performance Governance: Deliberative Leaders vs Silo Bureaucrats*

In fact, the strategic leadership practice in the IMOF has become well known as a good example of driving reform in the Indonesian bureaucracy. This was apparent in the way the

IMOF leadership committed to total concern for the promotion of governance and sound practices in the national bureaucracy. In terms of public financial management, Indonesian economic reform leads to its clear performance. Based on comparative study by the independent researcher in 2007, 2008, and 2009, the Ministry of Finance reform was gaining significant progress across the year based on customer satisfaction. This was counted on average per unit under the Ministry portfolio and throughout the major cities in Indonesia. Overall, this reflects levels of more than 74% in 2008 and more than 71% in 2009 in terms of public confidence and satisfaction with the bureaucratic reform outcomes. It seems that the pilot of Indonesian bureaucratic reform progress in the Ministry of Finance 2007-2009 is on the right track. Its preliminary successful bureaucracy reform apparently indicated by the cutting red tape, systems move towards accountability for achieving results, putting customers first, and empowering public service to get results.

In 2010, the newly appointed minister, Mr. Agus Martowardojo has endorsed further institutional reform and organisation culture transformation in the IMOF leading to more accountable and better deliberative performance governance practices in the bureaucracy. One among other agenda is the continuation process of cascading the organisational performance and into the individual level as it is targeted to be fully implemented in the next two years. During the interview he emphasized:

Performance management in the IMOF is based on the holding type of accountability system. However the current performance achievement is still limited due to the centralistic decision making process. In practice, less coordination between directorate generals/units under the Minister is apparent. The holding type system in the IMOF probably is not the ideal for the Ministry performance management. To supervise this big organisation, there is a need to enhance the existing risk management, HRM, management of information and technology infrastructure. Introducing the concept of the entire IMOF for a better decision making process with respect to the stakeholders is still a big challenge for the IMOF.

Additional attempts to promote performance based rewards and the strengthening of HR management should be initiated in line with the effort to enhance internal control and risk management and integrated information technology to improve IMOF capability to focus on broaden stakeholders and sustain the Ministry's performance governance outcomes. Moreover, reforming the less integrated leadership practices among agencies in the bureaucracy seems to become the continuing challenge for the Indonesian public sector. It seems that more strategic leaders are needed to sustain reform in the IMOF and all Indonesian government agencies. The Minister directly observed that:

There are apparent silo bureaucrats between echelons under the IMOF and government formed a weak coordination among several government agencies within which the IMOF should take active coordinating roles as evidenced by the failure of the Public-Private-Partnership for infrastructure project in Indonesia.

In linking leadership effort with the corruption eradication in Indonesia, the ranking of corruption perception index that representing international perspective towards leadership effort of the country to eradicate corruption showed that Indonesia index of performance has been increasing from 2.3 in 2007 to 2.8 in 2010. The success particularly noted by the media as follows:

“Bold reform in the tax and custom administration and the ability of Corruption Eradication Commission to bring forward high profile cases have recently bolstered the perception that corruption is being addressed more aggressively...”(Transparency International 2008)



In summary, the following refined leadership accountability framework basically answers the research question on how IMOF leaders frame the roles of leadership and performance management system in sustaining public sector performance governance and outcome. This updated model is developed based on findings perceived by IMOF leaders that leadership is the key determinant for superior organisational performance outcome. Moreover, the relationship is strengthened by four main key enabler elements: leader's clear vision & support, performance based strategy, balanced performance management system; and deliberative leadership practices. On the other hand there are four continuous challenges to sustaining organisational performance outcomes in terms of rule based bureaucracy and hierarchy; a loyalty/control based HRM, IT and competency issues in implementing BSC; and silos bureaucrats in the midst of the deliberative leadership practices. To cope with those issues and to excel in delivering public services in the 21 century, more strategic leaders needed to be installed in the bureaucracy.

## Conclusion

Literature on leadership indicates much of offered theory focuses on effective leadership either at individual or organizational level. Little stress is positioned on the whole system result, and less concern is put on both leader/manager and performance. The conceptual framework developed and discussed addresses this inadequacy, presenting an integrative perspective of leadership that focuses on leadership process on both people and performance. In the era VUCA (volatility, uncertainty, complexity and ambiguity) and in the midst of the reform agenda, leaders in public sector organisations need to practice an effective leadership framework in implementing balanced performance management system to lead organisations to achieve sustainable performance outcomes. Findings from the application of the strategic leadership style in implementing a business type of strategic performance management system based on the BSC, indicate that with strong personal, organisational, performance and social mastery, public sector leaders in the IMOF are capable of leading and promoting viable strategic intentions to reform the bureaucracy and achieve superior performance. In addition, it is also an expose of gaining benefit from the implementation of the advance management control system like BSC in the process of reforming the bureaucratic/mechanistic culture in public sector.

The application of the refined Leadership Accountability Framework in the IMOF (Figure 3) provide awareness about leadership challenges in era of VUCA and at the same time promote leadership focus towards effective leadership practices, strategic management and HRM fitness and balanced performance management system and control. Moreover, it also promotes sound performance governance for the organisation to achieve superior performance in terms of gaining public value and sustainable performance improvement.

## References

- AGRAGA. (2010). *Ahead of the Game, Blueprint for the Reform of Australian Government Administration*. Australian Government Department of the Prime Minister and Cabinet: Advisory Group on Reform of Australian Government Administration (AGRAGA).
- Avolio, B.J. (2007). Promoting more integrative strategies for leadership theory-building. *American Psychologist*, 62(1)
- Bass, B. M.(1999). Two Decades of Research and Development in Transformational Leadership [Article].*European Journal of Work & Organizational Psychology*: Psychology Press (UK).
- Bass, B. M., & Stogdill, R. M. (1990). Bass & Stogdill's handbook of leadership: Theory, research, and managerial applications. New York and London: Free Press.

- Behn, R. D. (2006). Performance Leadership: 11 Better Practices That Can Ratchet Up Performance, *IBM Center for the Business of Government: Managing for Performance and Result Series* (Vol. 2 edition 2006).
- Bolden, R., Gosling, J., Marturano, A., & Dennison, P. (2003). A Review of Leadership Theory and Competency Frameworks. *Centre for Leadership Studies*, University of Exeter.
- Bouckaert, G., & Halligan, J. (2008). Managing Performance, International Comparisons. New York: Routledge.
- Brewer, P. (2008). Promoting 4 Pillars of Our Profession [Electronic Version]. *Strategic Finance*, March 2008.
- Brignall, S., & Modell, S. (2000). An Institutional Perspective on Performance Measurement and Management in the "New Public Sector". *Management Accounting Research*, 11(2), 281-306.
- Bryson, J. (2003). Strategic Planning and Management, *Handbook of Public Administration*: SAGE Publications
- Budiarso, A. (2010). *Promoting Governance and Accountability Leadership Model for Public Sector*, Paper presented at the ANU Asia Pacific Week Conference.
- Carter, et al. (2007). Justifying Knowledge, Justifying Method, taking Action: Epistemologies, Methodologies, and Methods in Qualitative Research, *Qualitative Health Research*, Vol.17 (10).
- Centrelink. (2009). *Centrelink's Strategic Balanced Scorecard: Aligning Performance with Strategic Goals*. Paper presentation, Canberra, Australia.
- Chou, B. K. P. (2008). Does "Good Governance" Matter? Civil Service Reform in China. *Intl Journal of Public Administration*, 31, 54-75.
- CIPFA (2011). *Leading in hard times, Guidance for the public sector*. The Chartered Institute of Public Finance and Accountancy, joint publication with Institute of Chartered Accountants in Australia and New Zealand Institute of Chartered Accountants.
- Cohen, W. A. (2008). Effective Leadership. *Leadership Excellence*, 25(8), 7-7.
- Crawford, G. (2003). Partnership or power? Deconstructing the 'Partnership for Governance Reform' in Indonesia. *Third World Quarterly*, 24, 139-159.
- Crawford, G., & Hermawan, Y. P. (2002). Whose Agenda? "Partnership" and International Assistance to Democratization and Governance Reform in Indonesia. *Contemporary Southeast Asia: A Journal of International & Strategic Affairs*, 24, 203.
- Crawford, L. H., & Helm, J. (Writer) (2009). Government and governance: The value of project management in the public sector [Article], *Project Management Journal*: John Wiley & Sons, Inc.
- Detrich, B. (2009). Accountable Leadership. *Leadership Excellence*, 6 June 2009.
- Dimmock, C., & Walker, A. (2004). A new approach to strategic leadership: Learning- centredness, connectivity and cultural context in school design. *School Leadership and Management*, 24(1), 39-56.
- Ding, G. (Writer) (2005). Developing a multicriteria approach for the measurement of sustainable performance [Article], *Building Research & Information*: Routledge.
- Draft, R. L., & Pirola-Merlo, A. (2009). *The Leadership Experience* (1st ed. Vol. 1st Asia Pasific Edition): Cengage Learning Australia Pty Limited.
- Dror, S. (2008). The Balanced Scorecard versus quality award models as strategic frameworks. *Total Quality Management & Business Excellence*, 19, 583-593.
- Dubrin, A., Dalglish, C., & Miller, P. (2006). *Leadership* (2 ed.). Australia: John Wiley & Sons.
- Effendi, T. (2007). 'Reformasi Birokrasi' *Indonesian States Ministry of State Apparatus Empowerment website* (Kementerian Negara Pendayagunaan Aparatur Negara) viewed on 13 September 2009 on [http://www.menpan.go.id/index.php?option=com\\_content&task=view&id=134&Itemid=2](http://www.menpan.go.id/index.php?option=com_content&task=view&id=134&Itemid=2).
- Estis, A. A. (1998). *The Balanced Scorecard - Applying a Private Sector Technique to the Public Sector*. Paper presented at the Conference of the Association for Public Policy Analysis and Management.
- Evans, M. (2009). Gordon Brown and public management reform - a project in search of a 'big idea'? *Policy Studies*, 30(1), 33-51.
- Farneti, F., & Guthrie, J. (2008). Italian and Australian local governments: balanced scorecard practices. A research note. *Journal of Human Resource Costing & Accounting*, 12 (1), 4-13.
- Finney, R. Z., Campbell, N., & Orwig, R. (2004). From Strategy to Sustainable Competitive Advantage: Resource Management as the Missing Link [Article], *Marketing Management Journal*: Marketing Management Journal.
- Gerring, J. (2007). *Case Study Research: practices and principles*, Cambridge University Press, Cambridge.
- Graen, G.B. & Uhl-Bien, M. (1995). Development of leader-member exchange (LMX) theory of leadership over 25 years: Applying a multi-level domain perspective? *The Leadership Quarterly*, 6(2), 219-247.
- Graetz, F., Rimmer, M., Lawrence, A., & Smith, A. (2006). *Managing Organisational Change*, Australasian edition. (2<sup>nd</sup> ed.). Milton, Qld: John Wiley & Sons.
- Graham, J., Amos, B., & Plumptre, T. (2003). Principles for Good Governance in the 21st Century. *Policy Brief Institute on Governance No. 15 August 2003*, 15.

- Halligan, J. (2008). Performance Management in Government: International Perspectives on the Challenges in *Holy Grail or Achievable Quest - International Perspective on Public Sector Performance Management*: KPMG.
- Hamel, G., & Prahalad, C. (1989). Strategic Intent. *Harvard Business Review*, May-June 1989, 63-76.
- Hood, C. (1995). The New Public Management in the 1980s: Variations on a Theme. *Accounting, Organization and Society*, 20(2/3), 93-109.
- Hughes, O. (2003). *Public Management and Administration: an Introduction* (3<sup>rd</sup> edition): Houndmills: Palgrave Macmillan.
- Hughes, R. L., & Beatty, K. C. (2004). Strategic Leadership: An Organizational Imperative [Electronic Version]. *Center for Creative Leadership*.
- IMOF. (2008). *Presentation Materials to the Indonesian Minister of Finance*. Indonesian Ministry of Finance Reform Team. Jakarta, Indonesia.
- Indrawati, S. M. (2008). *Keynote Speech of the Minister of Finance for the Oxford University Global Economic Governance Lecture*.
- Ireland, R. D., & Hitt, M. A. (2005). Achieving and maintaining strategic competitiveness in the 21st century: The role of strategic leadership [Article], *Academy of Management Executive*: Academy of Management.
- Jing, F. F., & Avery, G. C. (2008). Missing Links In Understanding The Relationship Between Leadership And Organizational Performance *International Business & Economics Research Journal* 7(5), 12.
- Jonash, R. (2006). Business Innovation covers much more than R&D and New Product Development [Electronic Version]. *Innovation Management Inc. (IMI) and The Monitor Group*. Retrieved 28 October 2009 from [www.innovation-management.com/.../Power\\_of\\_Innovation\\_Investment.doc](http://www.innovation-management.com/.../Power_of_Innovation_Investment.doc) <[http://www.innovation-management.com/.../Power\\_of\\_Innovation\\_Investment.doc](http://www.innovation-management.com/.../Power_of_Innovation_Investment.doc)>.
- Kamarck, E.C. (2007). *The end of government ... as we know it : making public policy work / Elaine C. Kamarck* Lynne Rienner Publishers, Boulder, Colo, <http://www.loc.gov/catdir/toc/ecip0618/2006024835.html>.
- Kaplan, R. S. (2009). Lead and Manage. *Leadership Excellence*, 26(10), 7-8.
- Kaplan, R. S., & Norton, D. P. (1996). *The Balanced Scorecard: Translating Strategy into Action*: Harvard Business School Press.
- Kaplan, R. S., & Norton, D. P. (2001). *The Strategy Focused Organization*: Harvard Business School Press.
- Kaplan, R. S., & Norton, D. P. (Writer) (2004a). Measuring the Strategic Readiness of Intangible Assets. (cover story) [Article], *Harvard Business Review*: Harvard Business School Publication Corp.
- Kaplan, R. S., & Norton, D. P. (2004b). *The Strategy Maps*: Harvard Business School Press.
- Kraines, G. A. (2002). Accountability Leadership. *The System Thinker*, 13(10), 1-5.
- Mallarangeng, A., Van Tuijl, P. and Crawford, G. (2004). Partnership for governance reform in Indonesia, *Third World Quarterly*, vol. 25, no. pp. 919-942.
- Martello, M., Watson, J. G., & Fischer, M. J. (2008). Implementing A Balanced Scorecard In a Not-For-Profit Organisation. *Journal of Business & Economic Research*, 6(9), 67-80.
- Mathys, N.J. and Thompson, K.R.(2006) 'Using the Balanced Scorecard: Lessons Learned from the U.S. Postal Service and the Defense Finance and Accounting Service', *IBM Center for The Business of Government: Managing for Performance and Results Series*.
- MBNA. (2009). 7 Areas Of Success: The Key Elements of Baldrige. *Industrial Maintenance & Plant Operation*, 70(7), 10-10.
- McLeod, R. H. (2006). Private Sector Lessons for Public Sector Reform in Indonesia. *Agenda*, 13(3), 275-288.
- Michalska, J. (2008). Using the EFQM Excellence Model to the Process Assessment. *Journal of Achievements in Materials and Manufacturing Engineering*, 27(2).
- Mir, M.Z and Rahaman A.S. (2006). Leadership, Accounting, and the Reform Process of a Public Sector Agency: A Narrative Analysis. *Journal of Financial Accountability & Management*, 22(2), May 2006, 0267-4424.
- Niven, P. (2005). *Balanced Scorecard Diagnostics: Maintaining Premium Performance*. New Jersey: John Wiley & Sons, Inc.
- Nutt, P. C. (1995). Transforming Public Organizations with Strategic Leadership. *Public Productivity Through Quality & Strategic Management*, 1, 61-82.
- Nutt, P. C., & Backoff, R. W. (1993). Transforming Public Organisations with Strategic Management and Strategic Leadership. *Journal of Management*, 19(2), 299-347.
- Oakland, J. S., & Tanner, S. J. (2008). The relationship between Business Excellence and Performance - An empirical study using Kanji's Leadership Excellence Model [Article], *Total Quality Management & Business Excellence*: Routledge.
- Pollitt, C. & Bouckaert, G. (2004). *Public Management Reform a Comparative Analysis*, 2 edn, New York, Oxford University Press.

- Propper, C., & Wilson, D. (2003). The Use and Usefulness of Performance Measures in the Public Sector. *Oxford Review of Economic Policy*, 19(2), 250-267.
- Quong, T., & Walker, A. (2010). Seven Principles of Strategic Leadership. *International Studies in Educational Administration (Commonwealth Council for Educational Administration & Management (CCEAM))*, 38, 22-34.
- Rao, T. (2008). Lessons from Experience: A New Look at Performance Management Systems. *Vikalpa*, 33(3).
- Rhodes, J., Walsh, P., & Lok, P. (2008). Convergence and divergence issues in strategic management - Indonesia's experience with the Balanced Scorecard in HR management. *International Journal of Human Resource Management*, 19, 1170-1185.
- Rohm, H. (2008). Using the Balanced Scorecard to Align Your Organization [Electronic Version], January 2008. Retrieved 16 April 2010.
- Rose, A., & Lawton, A. (1999). *Public Services Management*, Essex: Pearson Education, Ltd.
- Schacter, M. (2000). *Public Sector Reform In Developing Countries: Issues, Lessons And Future Directions* Retrieved. from www.Iog.Ca.
- Schall, E. (1997). Public-sector succession: A strategic approach to sustaining innovation. *Public Administration Review*, 57(1), 4-10.
- Shields, J. (2007). *Managing Employee Performance and Reward*. Melbourne: Cambridge University Press.
- Sitawati, R., Manaf, S., & Winarti, E. (2009). The Application of Human Resource Scorecard: A Case Study of Public Hospitals in NTT Province, Indonesia. *International Bulletin of Business Administration*, 4.
- Stoker, G. (2006). Public Value Management: A New Narrative for Networked Governance? *American Review of Public Administration*, 36, 41-57.
- Sutiyono, W. (2007). Human Resource Management in State-Owned and Private Enterprises in Indonesia. *Bullertin of Indonesian Economic Studies*, 43(3), 377-394.
- Transparency International (2008). *Corruption Perceptions Index: Regional Highlights: Asia-Pacific*. [Electronic Version] Retrieved 29 May 2012 from <http://www.transparencia.org.es/INDICE%20DE%20PERCEPCI%C3%93N%202008/Asia-Pac%C3%ADfco.pdf>.
- Toha, M. (1987). *Perspektif Prilaku Birokrasi*. Jakarta: Rajawali Pers.
- Turner, M., Imbaruddin, A., & Sutiyono, W. (2009). Human resource management: the forgotten dimension of decentralisation in Indonesia. *Bulletin of Indonesian Economic Studies*, 45, 231-249.
- Umashev, C., & Willett, R. (2008). Challenges to Implementing Strategic Performance Measurement Systems in Multi-Objective Organizations: The Case of a Large Local Government Authority. *Abacus*, 44, 377-398.
- UNDP. (1999). *Public Administration Reform Practice Note* [Electronic Version]. Retrieved 24 March 2010 from [www.undp.org/governance/docs/PARPN\\_English.pdf](http://www.undp.org/governance/docs/PARPN_English.pdf)
- UNESCAP. (1997). *What Governance is?* [Electronic Version] from <http://www.unescap.org/pdd/prs/ProjectActivities/Ongoing/gg/governance.asp>
- Van Wart, M. (2003). Public-sector Leadership Theory: an Assessment. *Public Administration Review*, 63(2), 214-228.
- Voelpel, S. C., Leibold, M., & Eckhoff, R. A. (2006). The tyranny of the Balanced Scorecard in the innovation economy. *Journal of Intellectual Capital*, 7(1), 43-60.
- Vroom, V.H. & Jago, A.G. (1988). *The new leadership: Managing participation in organisations*. Englewood Cliffs, NJ: Prentice Hall.
- Wong, L., Gerras, S., Kidd, W., Pricone, R., & Swengros, R. (2003). *Strategic Leadership Competencies*. Retrieved. from [www.au.af.mil/au/awc/awcgate/ssi/wong.pdf](http://www.au.af.mil/au/awc/awcgate/ssi/wong.pdf).
- Yamamoto, K. (2008). Has Agencification Succeeded in Public Sector Reform? Realities and Rhetoric in the Case of Japan. *Asian Journal of Political Science*, 16(1), 24-40.
- Yee-Ching Lilian, C. (2009). How strategy map works for Ontario's health system. *International Journal of Public Sector Management*, 22, 349-363.
- Yin, R.K. (2003). *Case Study Research: Design and Methods* 2ed. Beverly Hills, CA Sage.
- Yudhiantara, I. M. (1997). Memahami Performance Biro Rasional Kita Dari Perspektif Model. *Jurnal Sarathi*, No.08 Th IV (Juli 1997).

# CROSS-BORDER MERGERS & ACQUISITIONS BY EMERGING MARKET FIRMS: A REVIEW AND FUTURE DIRECTION

Min Du<sup>1</sup>, Agyenim Boateng<sup>2</sup>

<sup>1,2</sup> Nottingham University Business School, University of Nottingham

***Abstract.** The purpose of this paper is to examine how academic research on cross-border mergers and acquisitions (CBM&As) from emerging economy firms (EEFs) have evolved over the past decade (2000-2012). Focusing on articles published in major scholarly journals during the period 2000-2012, the authors develop a framework in respect of the areas where emerging research streams have been concentrated namely, (i) motivation for acquisitions by EEFs; and (ii) the consequences/outcomes. We identified issues which have not been examined and provide recommendations for future research for finance and international business scholars.*

## Introduction

Over the past two decades, cross-border merger and acquisition (CBM&A) activities from countries with emerging economies have paralleled economic reforms in these countries and their integration into the world economy (Aybar and Ficici, 2009). Outward M&As of emerging economy firms (EEFs) from countries such as India, China, Brazil, South Africa and Russia have accelerated. CBM&A by EEFs is in sharp contrast to the past when firms from developed countries dominated the global corporate marketplace and developing countries were merely recipients of international investment. For example, between 1990 and 2003, the average share of CBM&A purchases as a percentage of FDI outflows of developing countries reached 40%. Since then, the pace of CBM&As from developing countries has continued to increase. In 2008, FDI from China alone was 52 billion USD, of which 42 billion was via M&As (UNCTAD, 2010). In a similar vein, the rapid rise of CBM&A activities by EEFs has prompted academic literature on this new phenomenon. While the volume of CBM&A literature is considerable with a diverse range of findings that encompass finance and international business strategy, the overall literature lacks theoretical integration. Theoretical explanations and empirical findings concerning the

development of CBM&A activities from emerging economies remain fragmented with virtually no work synthesising prior literature towards a more integrated understanding of CBM&A activities. This lack of research is an important omission, and this review attempts to address this issue. In this paper, we ask the following questions: What are the motives behind the surge in CBM&A activities by EEFs and do the received theories explain the rising trends in CBM&A activities by EEFs. Do CBM&As create value for EEFs? What areas of research should future studies focus on? Answering these questions are important for a number of reasons: (i) Bruton and Lau (2008) and Macpherson and Jones (2010) note that the timely synthesis and consolidation of extant literature provides a basis to build and extend theories in an area of interest. Therefore, given the fragmented nature of acquisitions literature that considers emerging economies, it is imperative that we review and synthesise the existing literature. (ii) We believe that this type of review will reveal the notable contributions of EEFs and further our understanding of the performance of emerging market multinationals' investments. (iii) The identification of the key issues in the extant literature can create a framework for additional research (see Child, 2009).

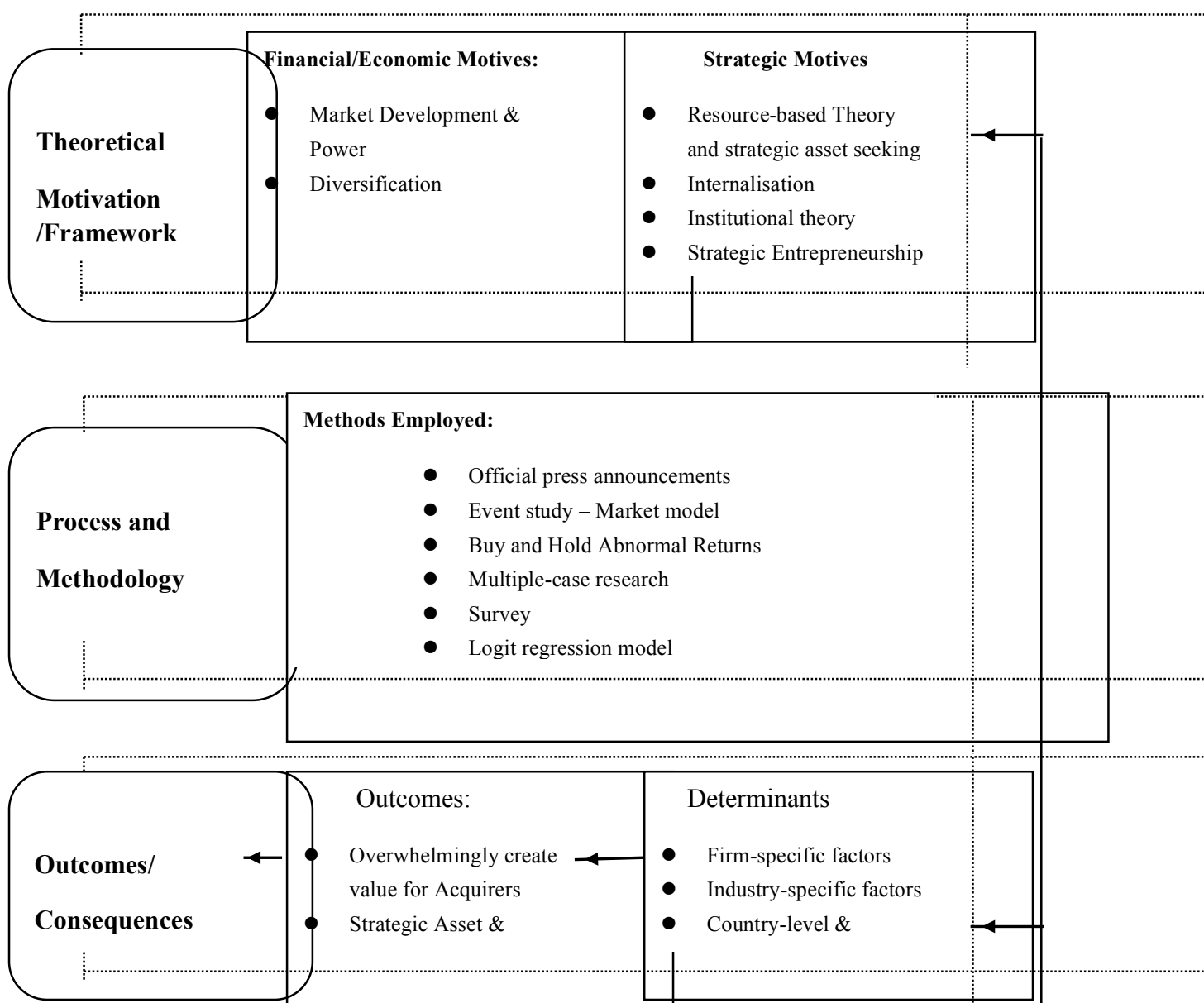
## Methodology Overview

To address the above questions, we followed five steps to manage the scope of our review and ensure comprehensive coverage of relevant studies in the sample. First, we focused on only peer-reviewed, English-language journal articles, excluding books, edited volumes, book chapters, teaching cases, working papers, conference papers and other non-refereed publications. Second, the selected publications discuss CBM&A from emerging markets and were published in finance and management journals. Third, given that the body of acquisition literature in respect of emerging markets are of recent phenomenon, our sample covers all published articles from 2000 to the present. Our fourth step consisted of a search of titles and abstracts from the following search engines: ProQuest/ABI/Inform, Ingenta, JSTOR and Business Source Premier Publications. Our keyword phrases were *mergers by developing countries*, *acquisition by developing countries*, *mergers and acquisitions*, *acquisitions from emerging economies*, and *acquisition by Indian AND Chinese firms*. Using these keywords, we expected that all of the relevant articles in the subject area would be found. Although the search was conducted with the best effort, the possibility of missing articles remains. Ultimately, the search resulted in 102 articles. After a ten-day review of these articles, we excluded 80 articles that did not specifically discuss outward mergers and acquisitions by EEFs, leaving 22 articles in the final sample. After the article search and selection process, we categorized the articles by year of publication, theoretical framework, methodology and key findings.

Further analysis of the sample articles provided us with two current taxonomies that are used to analyse CBM&As from emerging economies: (i) the motivation, i.e., the factors that drive firms to undertake acquisitions abroad, and (ii) the

consequences/outcomes, i.e., whether acquisitions by these firms create value for acquiring firms and what factors influence value creation.

Figure 1: Framework for Derived from Content-analysis of the Emerging Economy Literature



Consistent with our findings from the content analysis, we structured our paper as follows: The next section presents the theoretical motivations for CBM&As, i.e., what drives emerging economy firms to undertake acquisitions, as identified in the literature. Section three examines the acquiring firms' performance and the factors that influence value creation. The fourth section leverages the current state of acquisition knowledge to propose an agenda for future research.

## **Motivation: Which Theories?**

Understanding the motivation that drives CBM&A activities continues to elicit interest among academics and practicing managers. This interest stems from the various empirical findings that suggest that more than two-thirds of all merger deals are financial failures, when measured in terms of their ability to deliver profitability (Ravenscraft and Scherer, 1987; Hudson and Barnfield, 2001). Previous studies suggest that the ability for mergers and acquisitions to create value for acquiring firms' shareholders is, at best, mixed, with studies reporting both value destruction and abnormal returns (Kang, 1993; Markides and Ittner, 1994; Kiyamaz, 2003; Eun, Kolodny and Scheraga, 1996; Datta and Puia, 1995; Aw and Chatterjee, 2004; Erez-Rein et al., 2004 and Careleton, 1997). If studies from advanced market economies are used as the basis for comparison, then emerging countries should not engage in acquisitions at the alarming rate observed over the past two decades. Despite the mixed evidence of M&As meeting the expected goals, we continue to see a rising trend in CBM&A activities by emerging economy firms. It is, therefore, not surprising that numerous studies have devoted significant effort to unravel the motives behind acquisitions by emerging market multinationals. Two prominent motivations identified in the literature are strategic and economic/financial motives. We summarise the motives discussed in the papers in the literature in Table 1.



<b>Authors</b>	<b>Purpose</b>	<b>Theoretical Perspective</b>	<b>Methodology</b>	<b>Key findings</b>
Boateng et al. (2008)	Examine the strategic motives and performance of Chinese cross-border M&As	Resource-based View	Event study: CAR  Sample of 44 firms during 2000 to 2004 by Chinese firms	The pre-dominant motive for Chinese firms is international expansion and diversification, which is followed by increasing market power and share and acquire strategic resources.
Nayyar (2008)	Examines outward FDI and international acquisitions by Indian firms	Institutional theory	Measures of summary: Frequency distribution tables – trends & sectoral analysis  Sample of 10873 deals for 2000-2005, sample of 306 deals for 2000-2006, and sample of 143 deals for 2001-2006 from various sources	The rapid expansion of FDI, especially outward acquisitions of Indian firms is driven by two main factors: the liberalization of the policy regime and the greater access to financial markets.
Rui & Yip (2008)	Use strategic intent perspective (SIP) to analyse Chinese outward acquisitions	Resource-based View	In-depth interview  Sample of three Chinese firms: Lenovo, Nanjing Automobile & Huawei Technology	Chinese firms tend to gain strategic capabilities to offset their competitive disadvantage and make use of institutional stimulus while lowering institutional constraints through outward acquisitions.
Deng (2009)	Rationale for Chinese asset-seeking	Institutional theory	Multiple-case study  Sample of three	Chinese institutional environment affects the asset-seeking outward M&As

<b>Authors</b>	<b>Purpose</b>	<b>Theoretical Perspective</b>	<b>Methodology</b>	<b>Key findings</b>
	outward M&As		leading Chinese firms: TCL, BOE and Lenovo	by Chinese firms.
Knoerich (2010)	Examine the reason why firms from developed countries are sold to emerging economies firms	strategic assets seeking	Case study & Interview  Sample of five German firms sold to Chinese acquirers from 2004 to 2006	Emerging economy firms' acquisitions in industrialised countries are motivated by geographical and vertical expansion and the desire to enter into previously inaccessible market segments.
Pradhan (2010)	Analyse strategic asset-seeking foreign acquisitions by Indian Pharmaceutical MNES	Resource-based View	Poisson Regression  Sample of 139 deals during the period 2000-2009	The role of host market size, intensity of patenting, skill and liberal FDI policy regime are the key determinants of the geographical distributions of Indian pharmaceutical acquisitions. Indian pharmaceutical firms use acquisition as a mixed strategy for accessing foreign markets and strategic assets/resources.
Das & Kapil (2011)	Analyse domestic and cross-border M&As in Technology sector in India and China	Resource-based View	Chi-Square tests	The proportions of deal volume in inbound, outbound and domestic space do vary significantly between these two countries. Deal types of M&A transactions vary for inbound and domestic space but for the outbound deals, the acquirers from both the countries follow similar pattern.
Zhang, Zhou & Ebbers (2011)	Examines the completion of Chinese outward acquisitions	Institutional theory	Logistic Regression  Sample of 1324 announced	Chinese firms are likely to succeed in an outward acquisition when the target country has a better

Authors	Purpose	Theoretical Perspective	Methodology	Key findings
			Chinese cross-border acquisitions over the 1982-2009 period	institutional quality; the target industry is not state-owned and not sensitive to national security.
Madhok & Keyhani (2012)	Examine what explains the phenomenon of internalization by emerging economy firms through acquisitions in advanced economies	Asymmetries and strategic entrepreneurship	Review the existing literature and discussion	The argument of internationalisation of emerging economies firms shifts the central focus from advantage to asymmetries as the starting point for internationalization. It highlights the role of learning agility rather than ability as a potential ‘asset of emergingness. Conclude that acquisitions as an act and form of entrepreneurship. Researchers need to go beyond mere verification and extension of existing theories and build new theory.

Table 1: Summary of Studies on Motives for cross-border M&As by Emerging Economy Firms

## Strategic Motives

### *Internalisation*

An internalisation framework is premised on the contention that firms extract above-normal returns from CBM&A investment by internalising host country imperfections when their firm-specific assets cannot find comparable value elsewhere (Buckley and Casson, 1976; Caves, 1971; 1998; Morck and Yeung, 1991; 1992). The resulting economic rents derived from internalisation are expected to be converted into a higher value for the firm (Aybar and Ficici, 2009). Internalisation perspective, which was developed largely in the context of the advanced market economies of North America and Western Europe, has been used to explain emerging economy firms’ acquisitions abroad (Boateng et al., 2008; Aybar and Ficici, 2009; Gubbi et al., 2010; and Kohli and Mann, 2011). This is consistent with the views of researchers

such as Lall (1983) and Wells (1983), who first pointed to the limited applicability of internalisation theory in the context of firms from one developing country entering into other developing countries. Lall (1983) and Wells (1983) argued that firms from developing countries primarily expand into similar or less-developed countries using proprietary advantages, such as low input costs, inexpensive labour, managerial skills, and other advantages associated with conglomerate ownership. Gubbi et al. (2010) point out that these advantages helped emerging economy firms to expand predominantly into other, similar emerging economies. The above is in line with the conclusion drawn by Morck and Yeung (1992), who examined both the stock market reaction to the announcement of foreign acquisitions and the possession of intangible assets by acquiring firms. They found that acquisitions yield significant announcement returns when the acquiring firms have intangible assets. In a study of Chinese CBM&As, Boateng et al. (2008) also emphasise the internalisation of the acquiring firm's intangible assets and the target's intangible assets by way of reverse internalisation to avoid misappropriation of intangible assets and reduce transaction costs.

#### *Resource-based Theory*

A number of studies examining the reasons that emerging economy firms go abroad have been approached from the perspective of resource-based theory (Boateng et al., 2008; Deng, 2009; Rui and Yip, 2008). These studies argue that EEFs are motivated by the search for strategic assets embodied in other firms and that they increasingly use CBM&A as a foreign entry mode. Makino et al. (2002) noted that Asian firms are most interested in acquiring qualities that are unavailable domestically, such as superior assets and skills, by means of acquisitions in advanced countries. UNCTAD (2006) supports this argument and indicates that it is common among emerging economy firms to use CBM&As to obtain and control strategic assets. A firm's strategic asset is defined as "a set of difficult to trade and imitate, scarce, appropriable and specialized resources and capabilities that bestow the firm's competitive advantage" (Amit and Schoemaker, 1993:36). These assets include reputation, tacit knowledge, buyer-supplier relationship, research and development (R&D) capability, brand name, knowledge and proprietary technologies (Teece, Pisano and Shuen, 1997). Wesson (2004), Deng (2009), Rui and Yip (2008), and Boateng et al. (2008) emphasise that emerging economy firms, as latecomers, lack resources and that they actively attempt to reduce the gaps in their technological capabilities by acquiring innovative firms to supply the necessary resources. Rui and Yip (2008), in an attempt to explain Chinese foreign acquisitions, used a strategic intent perspective first employed by Hamel and Prahalad (1989), where Japanese firms relentlessly pursued specific, long-term objectives to become global leaders. Rui and Yip (2008) argue that Chinese firms strategically use CBM&As to achieve specific goals, such as acquiring strategic capabilities to offset their competitive weaknesses and leveraging their unique ownership advantages, while using institutional incentives and minimising institutional constraints. Mainstream international business literature identifies strategic intent as one of the most important motivations for firms to invest abroad.

However, this perspective has been discussed in the context of resource-based theory and is, therefore, can be subsumed under this theory. However, studies such as Boateng et al. (2008) and Deng (2007; 2009) have provided unequivocal support for the resource-seeking behaviour of EEFs. For example, in their study of Chinese firms, Boateng et al. (2008) found that one of the main motives for Chinese firms' acquisitions abroad is to acquire strategic assets.

### *Institutional Theory*

Newly emerging body of theoretical work focuses on the institutional-based view of strategy, known as institutional theory (North, 1990; Peng, 2002; Wright et al., 2005; Kornai et al., 2008). A number of researchers suggest that firms need to consider wider influences from sources such as the state and society when crafting and implementing their strategies (DiMaggio & Powell, 1991; Oliver, 1997). These influences are broadly considered part of an institutional framework (North, 1990; Peng, 2002). Oliver (1997), Peng (2003), Tsui et al. (2004), and Scott (2005) argue that the institution framework within an economy exerts a substantial impact on a firm's strategic choice. North (1990) expresses a similar point of view and asserts that it is necessary to understand the institutions in which firms are embedded when examining firms' strategic choices. For example, Hitt et al. (2004) noted that in emerging economies such as that in China, economic reforms have focused on improving firms' innovatory capacity as part of the institutional transition from planned to market economy. Deng (2009), in his multiple case study, showed how Chinese firms undertake strategic asset-seeking M&As to mitigate domestic institutional constraints and respond to the unique institutional characteristics of China, such as complying with the government's "go global" strategy. Using an institutional theory, Zhang, Zhou and Ebberts (2011) examined the institutional influences on the likelihood of Chinese CBM&A deals being completed and found that host and home institutions exert significant influence on completion rates.

### *Asymmetries and Strategic Entrepreneurship Perspectives*

The predominant theoretical view of multinational enterprises (MNEs) is premised on an asset-exploitation perspective. From this perspective, firms make the most of their rent-yielding proprietary resources and knowledge-based capabilities by internalising resources within the firm when expanding into overseas markets (Buckley and Casson, 1976; Hymer, 1976). Subsequent studies by Anand and Delios (2002) and Dunning (1993) have expanded the traditional view to incorporate exploration as an important motivation for the international expansion of MNEs. Yet, Mathews (2006), Luo and Tung (2007) and Li (2007) argue that this extension may not be sufficient, as emerging economy firms' pursuit of internationalisation is not only about learning or asset seeking but also about overcoming the distinctive challenges that face these firms. In this vein, Madhok and Keyhani (2012) conceptualise foreign acquisitions by emerging economy firms as an act and form of entrepreneurship aiming to overcome

the “liability of emergingness” incurred by these firms and to serve as a mechanism for competitive catch-up through opportunity seeking and capability transformation activities. Ramamurti and Singh (2009) suggest that emerging economy firms suffer from a number of disadvantages when they enter more competitive global markets because these firms are characterised by underdeveloped markets, unsophisticated customers, weak suppliers, infrastructure bottlenecks, limited exposure to global competition and lower managerial standards. These factors (termed as liabilities of emergingness) collectively create an institutional deficit that erodes competitiveness (Luo and Tung, 2007). Therefore, Madhok and Keyhani (2012) argue that acquisitions in advanced countries by emerging economy firms help these firms to overcome the “liability of emergingness” and access valuable opportunities that build on their asymmetries. Thus, these firms are able to transform their capabilities and consequently obtain entrepreneurial rent. At the heart of the argument put forward by Madhok and Keyhani (2012) is a type of entrepreneurship that moves beyond exploration to a form of discovery entrepreneurship, defined as “pursuing opportunities regardless of resources under control” (Stevenson and Jarillo, 1990: 24). Madhok and Keyhani (2012) argue that acquisitions by EEFs not only enable access to and learning from advanced economy firms but also provide opportunities that build upon the asymmetries of the new relationships and transform EEF capabilities beyond what is known or what can be predicted ex ante.

## **Economic/Financial Motives**

### *Diversification*

Diversification, a well-documented strategy for the expansion of a firm, has been suggested as one of the dominant reasons for CBM&As (Denis, Denis and Yost, 2002; Markides and Ittner, 1994; Seth, 1990; Shleifer and Vishny, 1992). It is argued that international acquisitions provide firms with an opportunity to reduce the costs and risks of entering into new foreign markets (Seth, 1990). Others point out that diversification is a source of value in CBM&As. For example, Manzon, Sharp and Travlos (1994) and Morck and Yeung (1992) note that sources of value unique to CBM&As include exchange rate differences, market power conferred by the international scope and the ability to arbitrage tax regimes. In their examination of the motives for CBM&As acquisitions, Boateng et al. (2008) found diversification to be the most important motive for Chinese firms’ acquisitions abroad. In another study on the acquisition activities of firms in eight emerging economies, Bhagat, Malhotra and Zhu (2011) suggest that, if the cash flows of the acquiring firm and the target firm are less than correlated, the combined company’s cash flow will have a smaller variance, have a lower cost of debt and, ultimately, capture the benefits of diversification for the acquiring firm.

### *Market Development and Power*

Boateng et al. (1998) found that one of highest ranked motive for CBM&As by Chinese firms is to increase market share and power. Market share and power were first explored in the finance literature in the context of rival firms' stock price reactions to horizontal mergers. However, studies such as Eckbo (1983) and Stillman (1983) found no support for market power. UNCTAD (2000) indicates that CBM&As provide the fastest means to access new markets and expand a firm's market for its current goods. Boateng et al. (2008) reinforces this point by indicating that the search for market share and power is a constant concern for emerging economy firms in an increasingly competitive environment. Firms from emerging economies may use acquisitions in foreign markets to help overcome trade barriers.

## Performance

Research on post-acquisition performance has been examined from two main research streams. The first research stream, which is common in the finance literature, examines the issue of shareholder wealth creation. This line of research examines the stock market's reaction to CBM&A announcements. The second stream uses a multiple-case approach and a cross-sectional quantitative approach to analyse one or more factors that may influence post-acquisition performance. We summarise the performance-related papers in Table 2

Authors	Purpose	Theoretical Perspective	Methodology	Key findings
Boateng et al. (2008)	Examine the strategic motives and performance of Chinese cross-border M&As	Resource-based view, Diversification, Efficiency theory.	Event study: CAR Sample of 27 cross-border M&As during 2000 to 2004 by Chinese firms	Chinese cross-border M&As create value for acquiring firms.  Cumulative abnormal returns (CARs) for the overall sample of acquiring firms averaging 1.32% for a two-day period (0, +1) and the acquiring firms enjoy an overall average positive  CAR of 4.4274%.
Aybar & Fici (2009)	Examine the firm value of cross-border acquisitions by	Internalization framework	Event study: CAR and Cross-sectional Regression of 433	On average, EMM acquisitions do not create value but destroy value for more than half of the

<b>Authors</b>	<b>Purpose</b>	<b>Theoretical Perspective</b>	<b>Methodology</b>	<b>Key findings</b>
	firms from emerging market		acquisitions in 58 emerging-market multinationals (EMM).	transactions analysed. Cross-sectional analysis indicates that target size, ownership structure of the target and structure of the bidder positively affect the bidder value. High-tech nature of the bidder and pursuit of targets in related industries negatively affect the bidder value but not international experience and enhanced corporate governance.
Chen & Young (2010)	Examine the performance of Chinese cross-border M&As	Intuitional theory	Event Study: CAR. Government ownership Sample of 39 Chinese cross-border M&A deals from 2000 to 2008	The increased government ownership in the acquiring firms is related with investors viewing cross-border M&As in less favourable terms.
Deng (2010)	Using absorptive capacity to explain performance of Chinese cross-border M&As	Resource-based view	Case study. Firms' absorptive capacity Sample of two high-profile Chinese cross-border M&As: Lenovo and TCL	The performance of Chinese firms' outward M&As is substantially influenced by the acquiring firms' absorptive capacity at multiple dimensions.
Gubbi et al. (2010)	Examine the value creation from international acquisitions in	Resource-based view, Institutional theory	Event Study of 425 Indian firms over 2000-2007 period; OLS Regression	International acquisitions facilitate internalization of tangible and intangible resources that are difficult to access in market transactions. Value creation



Authors	Purpose	Theoretical Perspective	Methodology	Key findings
	India			is higher when the target firms are from advanced economic and institutional environments.
Soongswang (2010)	Examine the value creation of M&A in Thailand	Economies of scale and scope, Diversification	Event Study: CAR & BHAR market-adjusted and market models  Sample of 39 acquisitions from 1992 to 2002	Takeovers are wealth-creating for bidding firms' shareholders. Takeovers are good news in the market four and three months prior to the announcement month, resulting in positive abnormal returns of approximately 17% and 10% for the bidders.
Wu & Xie (2010)	Examine the factors influencing Chinese cross-border M&As	Institutional theory	Survey  Sample of 165 cross-border acquisitions in the period of 2000-2006	The pre-acquisition performance and proportion of the state shares have a positive impact on performance of acquiring firms.
Bhagat, Malhotra & Zhu (2011)	Examine the characteristics and acquirer returns for emerging country cross-border acquisitions	diversification, operational efficiency and market power	Event study: CAR & BHAR.  Sample of 698 acquisitions over 1991-2008 period  Cross-sectional regression	Emerging country acquirers experience a positive and a significant market response of 1.09% on the announcement day. Cross-section regression results indicate that acquirer returns are positively correlated with (better) corporate governance measures in the target country.

<b>Authors</b>	<b>Purpose</b>	<b>Theoretical Perspective</b>	<b>Methodology</b>	<b>Key findings</b>
Kohli & Mann (2011)	Analyse determinants of value creation in Indian domestic and cross-border acquisitions	Internalization theory	Event study: CAR & Regression  Sample of 202 cross-border acquisitions and 66 domestic acquisitions by Indian firms	Cross-border acquisitions have created significantly higher wealth gains than domestic ones.  Cross-border acquisitions in technology intensive sectors create superior wealth gains.
Malhatra, Sivakumar & Zhu (2011)	Analyse the role of national culture on foreign market acquisitions by US firms and emerging countries firms	Culture distance affects the selection of international markets	Poisson Regression  Sample of more than 100,000 cross-border acquisitions from 1976 to 2008	Firms from both the United States and emerging countries target countries that are culturally closer to their home countries. a strong interaction effect occurs between market potential and cultural distance for emerging country firms as the market potential increases.  Different cultural dimensions affect the market entry strategies of US firms and firms from emerging countries.
Mann & Kohli (2011)	Examine the target shareholders' wealth gains of Indian domestic and cross-border acquisitions	Industrial organizational theory & Bid-specific factors theory	Event Study: CAR & Cross-sectional regression analysis  Sample of 63 domestic acquires and 43 foreign acquirers during 1997 to March 2008 in India	Both domestic and cross-border acquisitions have created value for the target company shareholders on the announcement while the value creation is higher for domestic acquisitions compared to cross-border acquisitions due to the influence of various bid-specific factors. Thus,

Authors	Purpose	Theoretical Perspective	Methodology	Key findings
				in India, bid-related variables are the fundamental drivers of the target's announcement wealth gains irrespective of the nationality of the acquirer.
Bertrand & Betschinger (2012)	Investigates long term operating performance of domestic and international acquisitions by Russian firms	Market power and diversification	GMM Sample of 600 domestic firms & 120 Russian foreign acquisitions	Domestic and international acquisitions tend to reduce the performance of acquirers compared to non-acquiring firms. Russian foreign acquisitions suffer from their inability to leverage value due to low M&As experience and capability.
Rahahleh & Wei (2012)	Performance of frequent acquirers from 17 emerging firms		Event study: CAR Sample of 2340 merger deals in 17 emerging markets during 1985 to June 2008	Our primary findings are as follows. Serial acquirers in emerging countries on average experience a declining pattern in returns with subsequent deals, but the pattern is not strong. However, conditional on successful initial deals, the declining pattern is strong for the majority of countries, is large in terms of the magnitude, and is significant in the multivariate regression analysis.
Sun, et al. (2012)	Develop a new comparative ownership advantage framework to	Comparative advantage theory	Preliminary test by basic comparisons Sample of 1526 Chinese and Indian	A mature comparative ownership advantage framework characterized by national-industrial factor endowments,

Authors	Purpose	Theoretical Perspective	Methodology	Key findings
	be applied in emerging economies outward M&As		firms	dynamic learning, value creation, reconfiguration of value chain and institutional facilitation and constraints is needed to explain emerging country outward M&As.

Table 2: Summary of Studies on Performance of cross-border M&amp;As by Emerging Economy Firms

### *Value Creation*

Acquisitions studies that examine the value creation of acquiring firms from emerging economies have approached the subject using stock market-based performance measures and event study methodologies (see Boateng et al., 2008; Aybar and Ficici, 2009; Kohli and Mann, 2011; Bhagat, Malhotra and Zhu, 2011; Gubbi et al., 2010). The majority of the studies have reported significant positive returns for acquiring firms (Boateng et al., 2008; Wu and Xie, 2010; Bhagat, Malhotra and Zhu, 2011; Kohli and Mann, 2011; Gubbi et al., 2011), and one study, Aybar and Ficici (2009), documents the value destruction. Using a sample of 27 acquiring firms from China, Boateng et al. (2008) found that Chinese firms experience significant, positive wealth gains for shareholders. Similarly Bhagat, Malhotra and Zhu (2011) examined 678 firms from eight emerging countries, namely, Brazil, China, India, Malaysia, Mexico, Philippines, Russia and South Africa, and documented positive and significant returns for acquiring firms. However, a similar study by Aybar and Ficici (2009) of 14 emerging economies, using a sample of 433 acquisitions over the period from 1991 to 2004 reported that, on average, CBM&As of emerging economies do not create value but destroy value for more than half of the transactions analysed over a two- and three-day event window. The study by Gubbi et al. (2011) of Indian firms reported mean cumulative abnormal returns (CARs) of 2.58 per cent over an 11-day event window. It is worth noting that these studies only analysed the acquiring firm's returns, and no study has investigated the target firm's returns; the paucity of research may be due to the difficulty of collecting data on target firms. An important distinction in this review is that, overwhelmingly, EEFs that engage in CBM&As tend to create value, which is in sharp contrast to their counterparts from advanced market economies, where several researchers have documented mixed results for acquiring firms (Markides and Ittner, 1994; Cakici, Hessel and Tandon, 1996; and Kiymaz, 2003; Datta and Puia, 1995; Eun et al., 1996; Corhay and Rad., 2000; Aw and Chatterjee, 2004), specifically, positive and negative abnormal returns for the shareholders of acquiring firms.

### **Factors influencing Value Creation of Emerging Economy Firms**

Regarding the factors influencing the value creation of emerging economy firms, a number of firm and industry-specific factors are prominent. We discuss these factors below.

### *Firm-specific Factors*

The finance and international business literature provides ample evidence of an array of factors that the value creation of acquiring firms. For EEFs, these factors include firm size, leverage, the acquiring firm's international experience, the stake acquired in the target and the acquiring firm's corporate governance, firm relatedness and absorptive capacity.

#### Firm Size

The finance literature documents that small and large acquiring firms have different characteristics that may influence the value creation of acquiring firms. It is argued that the size of a firm is associated with operating economies, leading to economies of scale in management, marketing, production and distribution. For example, large firms may be able to muster the resources required to undertake the acquisition at a lower cost compared with small firms. On the other hand, Moeller et al. (2004) argue that the agency cost of free cash flows is more severe for large firms than small firms. They found that managers of large firms pay more for acquisitions compared with small acquiring firms. In their study of emerging economy firms, Aybar and Ficici (2009) find that large size positively influences abnormal returns on the announcement of a CBM&A. On the other hand, in the study of Indian CBM&As, Kohli and Mann (2011) find that small and mid-sized acquiring firms tend to create value on the announcement of a CBM&A. These results suggests that the few studies that have investigated CBM&As by EEFs appear inconclusive.

#### Level of International Experience

International experience is one of the widely discussed factors in both international business and finance literature and is believed to be a source of value creation for acquiring firms. With international experience, the "liability of foreignness" is reduced, and the acquiring firms have a better chance of survival (Delios and Beamish, 2001; Li and Guisinger, 1991; McCloughan and Stone, 1998; Pan and Chi, 1999) in the foreign market at the post-acquisition stage. Doukas and Travlos (1988) find that the acquisition announcements of firms with an established presence in the target country generate positive and statistically significant abnormal returns. In their examination of the impact of prior experience on the value creation of emerging economy firms, Aybar and Ficici (2009) failed to find a strong correlation between international experience and value creation. They find weak support for the significance of prior presence in one of the two multivariate models at the event window (-5, +5).

### Good corporate governance

Good corporate governance practices in the acquiring firm are expected to contribute to the acquiring firm's value (Aybar and Ficici, 2009). This factor is particularly important for emerging economy firms because of the poor corporate governance practices that are prevalent in these markets. Poor governance practices include lax disclosure requirements, a lack of proper monitoring systems, and underdeveloped local equity markets, which tends to increase managerial discretion, with serious implication for value appropriation. Despite the well-documented implications of poor governance on firm value in the extant literature, Aybar and Ficici (2009) find no strong empirical support for the above argument. The results of their univariate analysis suggest negative standard cumulative abnormal returns (SCAR), which indicate value destruction for acquiring firms in enhanced governance. However, on the other hand, their logistic regression results indicate positive coefficients for larger event windows (up to -5,+1) and negative coefficients for narrower event windows.

### Public versus Private Target

The nature and form of target firms (public or private) may influence the performance of acquiring firms. Fuller, Netter and Stegemoller (2002) suggest that acquiring firms earn significantly negative returns when buying public targets and earn significantly positive returns when buying private targets. Draper and Paudyal (2006) suggest that managerial motives may be one of the reasons for higher returns of acquiring firms that acquire private targets. For example, public companies may be larger in size and may have better reputations in the market than private firms. Therefore, managers may be willing to pay more for those targets, leaving their shareholders in a vulnerable position. On the other hand, acquisitions of private targets may not enjoy a similar reputation and may not result in overpayment, thereby enhancing the acquiring firm's shareholder wealth. Aybar and Ficici (2009) suggest that, because of the inexperienced nature of EEFs, acquiring firms may pay significantly higher premiums for public targets to reduce the resistance of current shareholders. Aybar and Ficici (2009) find the acquisition of publicly owned targets to be more value destructive than privately owned targets.

### Absorptive Capacity

Our literature review suggests that one of the most important motives for CBM&As by EEFs is to acquire strategic assets. Seth et al. (2002) and King et al. (2004) argue that, while the acquisition of strategic assets provides EEFs with the opportunity for significant value creation, it is important to note that high performance and strong competitive positions cannot be automatically assumed. High performance and strong competitive positions depend on the absorptive capacity of the firms. Absorptive capacity emphasises the importance of taking in external knowledge, combining it with internal knowledge and absorbing it for commercial use (Cohen and Levinthal, 1990; Zahra and George, 2002). Lane et al. (2001) and Zahra and George (2002)

argue that the ability to diffuse knowledge acquired within the organisation, to integrate it with the organisation's activities, and to generate new knowledge from the absorbed knowledge is crucial. Therefore, Lane et al. (2006) and Zollo and Singh (2004) have demonstrated that analysing an acquiring firm's post-acquisition strategies can help distinguish between potential success and failure. This view is consistent with Amit and Schoemaker (1993) who argue that using M&As for resolving knowledge deficiencies does not necessarily result in superior returns because strategic assets are often tacit, specific and complex. Applying absorptive capacity to Chinese CBM&As, Deng (2010) used a comparative analysis of two CBM&A deals to confirm that the extent to which Chinese firms can achieve superior firm performance is dependent on the level of its absorptive capacity of strategic assets acquired from other firms. Deng (2010: p. 522) concluded that "differences in absorptive capacity may therefore provide an insightful explanation for why acquiring firms facing similar competitive landscape may achieve substantially different outcomes".

#### *Industry-specific Factors*

Our review suggests that relatively few industry-specific factors, such as sector of operation, firm relatedness and tax liability, have been examined in comparison with firm-specific factors in the context of emerging economy firms.

#### Sector of operation

The extant literature suggests that the type of industry has implications for value creation (Markides and Ittner, 1994; Shimizu et al., 2004). Focusing on a high-tech/non high-tech dichotomy by industry type, Aybar and Ficici (2009) examined the impact of industry type on value creation of acquiring firms and found negative market reactions to emerging economy high-tech CBM&As. Further cross-sectional regression analysis confirms the negative impact for acquiring firms in high-tech acquisitions. Aybar and Ficici (2009) attributed the negative reaction and value destruction to information asymmetries associated with the assets acquired, their compatibility and the high premiums often paid for assets in the high-tech industry.

#### Related and unrelated acquisitions

The M&A literature suggests that the relatedness between the target and acquiring firm may affect the performance of the acquiring firm. Singh and Montgomery (1987) noted that value creation in related acquisitions may arise from economies of scale, economies of scope and market power. Moreover, it is argued that the benefit of market power is more prevalent in the case of related acquisitions, where the size of the firm may be increased through horizontal acquisition to exert pressure on the market and attract economic rent (Seth, 1990; Morck, Shleifer and Vishny, 1990; Walker, 2000). On the other hand, there is evidence in the M&A literature that

unrelated acquisitions may also be value creating events. The main sources of value in the case of unrelated acquisitions come from the possibility of a diversification effect. Diversification brings additional advantages, such as a co-insurance effect, where combined cash flows will be less unstable than that of diversified or non-diversified firms of a similar size (Stultz, 1990). Testing the relatedness of emerging firms involved in CBM&As, Aybar and Ficici (2009) and Bhagat, Malhotra and Zhu (2011) find that firms that acquire related targets experienced deeper value destruction than firms that diversified through unrelated targets. The study by Bhagat, Malhotra and Zhu (2011) in EEF context also suggests the value destruction of related acquisitions but the results were not statistically significant.

### *Host Country Characteristics*

#### Host Country's economic and institutional Advancement

International acquisitions by emerging economy firms provide them with ready access to key strategic resources and downstream assets that may not be available in their home market. These key resources include market-based relational assets, such as relationships with customers and suppliers, and intellectual assets, such as knowledge about the environment and new growth opportunities (Srvastava et al., 1998). These resources are crucial to emerging economy firms, as such firms are known to suffer from "liabilities of foreignness" and "newness" when operating in developed countries. In particular, emerging economy firms are perceived to be of poor quality, making it difficult to compete against the resource-rich local competitors in advanced countries (Aulakh et al., 2000). Cuervo-Cazurra et al. (2007) and Guillen (2002) argue that acquisitions help scale the reputation barrier and overcome the dual liabilities of foreignness and newness in international markets, thereby creating value for the acquiring firms. Uhlenbruck et al. (2006) and Vermeulen and Barkema (2001) similarly note that international acquisition provides emerging economy firms' with access to resources that facilitate a quicker change of status and reputation, thereby leading to enhanced capability and value creation. In an attempt to test the above concept, Gubbi et al. (2010) highlight acquisitions by emerging economy firms as a unique strategic and important lever for value creation. They posit that the extent to which emerging economy firms create value is contingent on the location of the target firm and the level of host country economic and institutional advancements. Using a sample of 425 Indian CBM&As between 2000 and 2007, Gubbi et al. (2010) find that a country's level of economic and institutional advancement correlate with the market's expectations of an acquisition's performance.

#### Geographic and Cultural Proximity

Hughes and Mester (1998), Berger et al. (2000) and Demsetz and Strahan (1997) suggest that geographically diversified institutions improve the risk-return trade-off. However, Barkema et al. (1996) contend that geographic and cultural proximity drastically reduces information acquisition costs. Ghemawat (2001) argues that



technological innovation has not eliminated the very high cost of distance. This is consistent with transaction cost literature that indicates that the greater the cultural differences between the acquiring and target firms, the higher the transaction costs will be. Analysing the geographic and cultural proximity in an emerging economy context, Aybar and Ficici (2009) find that average SCARs for geographically and culturally close-proximity targets are negative and statistically significant. They find higher percentages of positive outcomes for transactions between distant acquiring and target firms (37.8–58.44 per cent) for various event windows. Cultural proximity does not enhance an acquiring firm's prospects of success.

Prior studies of emerging economies have approached M&As from a perspective of antecedents and consequences, and these studies have used event study methodology (see Boateng et al., 2008; Aybar and Ficici, 2009). Given the substantial volume of outward M&A from emerging economies, it is surprising that no systematic review of the CBM&A research has been published in the past decade. Consequently, it is difficult to evaluate the extensiveness of the literature and what the future research should focus on. The present study attempts to fill this gap by reviewing over twenty-two research articles published between 2000 and 2012. In reviewing these articles published in the field of CBM&As, this study attempts to address this important gap.

## **Future Directions**

Our critical review and qualitative content analysis highlights that the finance and international business literature has concentrated on CBM&A by EEFs over the past two decades. In a similar vein, we have identified areas that are currently underdeveloped, providing opportunities for scholars in finance and international business to explore.

## **Motivation**

Our review suggests that internalisation theory, resource-based views, diversification, market development and power, strategic intent, institutions and strategic entrepreneurship drive the theoretical motivation of emerging economy firms to engage in acquisitions. Although numerous prior studies have utilised internalisation theory and resource-based views, the primary motives for CBM&As by emerging economy firms remain unclear. Apart from the study of Boateng et al. (2008), which attempted to rank the motives that drive Chinese firms abroad, other studies (Deng, 2009; Rui and Yip, 2008) have only used case studies to analyse a single motive, such as a resource-based view and strategic intent. However, as noted by Boateng et al. (2008), firms that undertake acquisitions are not motivated by a single reason but a set of motives. We therefore suggest that researchers should conduct further research to

uncover the primary motives and their relative importance for EEFs that undertake acquisitions abroad.

We also suggest the need to fully examine the often cited motivation for acquisition by EEFs “to acquire strategic assets”. The strategy literature well documents the resource-based view that the need to acquire resources drives emerging economy firms abroad. It will therefore be intriguing to uncover the nature of the strategic assets that these firms acquire, how they integrate and absorb these assets into their operations, spillover effects from CBM&A to the parent companies at home and whether CBM&As, as an entry mode, constitute an effective means to enter a market. Another important issue is the institutional drivers of CBM&As. Scott (1995) argues that firms require legitimacy and economic efficiency to survive and succeed. A number of authors examining the drivers of foreign investments have pointed out the important role of the emerging economy institutions in CBM&As (Deng, 2009; Peng, 2002, 2003; Hitt et al., 2004). DiMaggio and Powell (1983) introduced the typology of coercive, normative and mimetic institutionalisation pressures. The question is as follows: which of these pressures are more likely to drive EEFs’ acquisitions abroad? The extant literature does not specifically address this question; however, we see more value in examining specific institutional influences, such as the role of government and market norms, as drivers for acquisitions by EEFs.

Although traditional theories of MNEs, and more recently the research by Anand and Delios (2002) and Dunning (1993), have highlighted asset exploitation and exploration as important motivations for the international expansion of MNEs, the research of Madhok and Keyhani (2012) and Li (2009) indicates that the existing theories do not sufficiently explain the internationalisation of EEFs, and they have called for either the extension of existing theories or the development of new theories to explain this phenomenon. It is argued that the speed, scope and characteristics of EEFs raise serious questions regarding the applicability of extant theories to these firms. For example, the traditional theories of MNEs are premised on exploiting a firm’s superior resources abroad (Dunning, 1988; Rugman, 1981); however, EEFs are resource deficient, begin with weak advantages and tend to go abroad to access these resources (Mathews, 2006). In fact, EEFs are laggards and are far behind the value leaders in global competition. Madhok and Keyhani (2012: 37) argue that “such a situation questions some basic tenets of extant theory, such as firm-specific advantage as a precondition for a firm to invest abroad”. We argue that there is no doubt that the speed, scope and characteristics of EEF acquisitions challenge the explanatory power of existing theories of MNEs. We therefore suggest that researchers in international business and finance either extend their scope or take a step beyond the extant theories, considering the impact of home country institutions and the “liability of emergingness” of these firms.

## **Methodology**

With regard to the methodology for CBM&As, our review identified a number of issues. First is the predominant use of stock market based performance measurement, i.e. standard event study methodology. Most studies employ market model and calculate the cumulative abnormal returns over short event windows around announcement period of 2- to 5-day in order to measure shareholder wealth changes. For example, Boateng et al., 2008; Aybar and Ficici, 2009; Gubbi et al., 2010; Chen and Young, 2010; Bhagat, Malhotra and Zhu, 2011; Kohli and Mann, 2011 used short-run market based performance measures to analyse performance. While, it is argued that short-run market model represents a direct measure of stock-holder value (Lubatkin and Shrieves, 1986), it is important to point out that, it measures investors' expectations and not realized performance (Montgomery and Wilson, 1986; Schoenberg, 2006). Given the concerns surrounding the short-term perform, a number of researchers such as Lougran and Vijh (1997) or accounting measures (see Agrawal and Jaffe, 2003; Agrawal et al., 1992; Healy et al., 1992). However, to the best of our knowledge, Soongswang (2010) and Bhagat et al., (2011) have used Buy and Hold Abnormal Returns in the context of emerging markets with no study using long-term accounting based performance measures such as cashflows; and return of assets. For example, long-term accounting based measures recognise the synergies obtained in the long-term and are a direct opposite to short-term cumulative abnormal returns (Hitt et al., 1998). Given that the predominant motives for undertaking CBM&As are 'to acquire strategic assets' and 'develop the market' which take time to achieve, the use of long-term performance measures appear to be the most appropriate. Using both long-term accounting, ex post assessment of senior managers after acquisition and stock market based measures to evaluate performance would be very useful in capturing long-term synergies accruing from the acquisitions. Moreover such triangulation is very rare in the finance and strategy literature and the result may lead to more robust results.

Although, relative few studies have investigated CBM&As using subjective assessment of the senior managers. For example, Deng (2009, 2010); Rui and Yip (2008); Knoerich (2010) used multiple case studies while Wu and Xie (2010) and Nayyar (2006) used survey in their studies. The use of survey and multiple cases take into account the fact that M&As have multiple motives which appear more realistic. To get deeper insights into why emerging economy firms undertake CBM&As, the use senior managers assessment appears a promising line to proceed.

## **Consequences of Acquisitions**

Regarding the performance of EEFs, we observed that, consistent with the reviewed articles (Haleblian et al., 2009; Shimizu et al., 2004), the analysis of the CBM&A activity of emerging economies has concentrated on value creation using event study methodology and economic determinants (i.e., firm and industry-specific factors) of value creation. Our review suggests that the factors used in the studies of CBM&A

activity of developed country firms should be used in studies on EEFs. However, it is pertinent to note that emerging economy firms are different from advanced country firms in terms of their motivation to undertake CBM&As. For example, emerging economy firms are motivated predominantly by the need to acquire strategic assets and increase market development. Second, governments in emerging economies exert considerable influence over businesses, as compared with their counterparts in advanced countries. This is consistent with the view of Shimizu et al. (2004), who note that government authority over business in emerging economies is more pervasive and pronounced. Tsui et al. (2004) also note that strategic corporate decisions are, to a greater extent, governed by a mix of political and economic motives. In light of the above findings, we suggest that the performance of EEFs should be based on the extent to which M&A assets have been acquired and absorbed to help overcome the acquiring firm's competitive disadvantage as a latecomer.

Our review suggests that previous literature has largely ignored institutional factors and concentrated on traditional economic factors in analysing the factors that influence performance. We argue that it would be surprising if corporate managers in emerging economies did not respond to changes in institutional rules, with their potential effects on performance. It is important to employ a set of factors peculiar to EEFs, such as cultural distance, government ownership, and the impact of state policies, social capital, the ability to integrate the strategic assets acquired in developed countries and the ability to translate these assets into increased performance, in future analysis.

## References

- Agrawal, A., & Jaffe, J. F. (2003). Do takeover targets underperform? Evidence from operating and stock returns, *Journal of Financial and Quantitative Analysis*, 38, 721–746.
- Agrawal, A., Jaffe, J. & Mandelker, G. (1992). The post-merger performance of acquiring firms: A re-examination of an anomaly, *Journal of Finance*, 47, 1605-1621.
- Amit, R. & Schoemaker, P.J.H. (1993). Strategic assets and organizational rent, *Strategic Management Journal*, 14, 1, 33-46.
- Anand J, Delios A. (2002). Absolute and relative resources as determinants of international acquisitions. *Strategic Management Journal* 23(2): 119–134.
- Aulakh, P.S., Kotabe, M. & Teegen, H. (2000). Export strategies and performance of firms from emerging economies: Evidence from Brazil, Chile, and Mexico, *The Academy of Management Journal*, 43, 3, 342-361.
- Aw, M. & Chatterjee, R. (2004) “The performance of UK firms acquiring large cross-border and domestic takeover targets”, *Applied Financial Economics*, Vol. 14, pp. 337-349.
- Aybar, B. & Ficici, A. (2009). Cross-border acquisitions and firm value: An analysis of emerging-market multinationals, *Journal of International Business Studies*, 40, 1317-1338.
- Barkema, H.G., Bell, J.H. & Pennings, J.M. (1996). Foreign entry, cultural barriers, and learning, *Strategic Management Journal*, 17, 151-166.

- Berger, A.N., DeYoung, R., Genay, H., & Udell, G.F., 2000. The globalization of financial institutions: Evidence from cross-border banking performance. *Brookings-Wharton Papers on Financial Services* 3, 23–125.
- Berger, A.N., Seth, D.B., Lawrence, G., Goldberg, & Lawrence, J.W. (2000). The dynamics of market entry: The effects of mergers and acquisitions on entry in the banking industry, *The Federal Reserve Board Finance and Economic Discussion Series*, No. 99-41.
- Bhagat, S., Malhotra, S., & Zhu, P.C. (2011). Emerging country cross-border acquisitions: Characteristics, acquirer returns and cross-sectional determinants, *Emerging Markets Review*, 12, 3, 250-271.
- Boateng, A., Wang, Q. & Yang, T.L. (2008). Cross-border M&As by Chinese firms: An analysis of strategic motives and performance, *Thunderbird International Business Review*, 50, 4, 259-270.
- Bruton, G. & Lau, C.M. (2008). Asian management research: Status today and future outlook, *Journal of Management Studies*, 45, 3, 636-659.
- Buckley, P.J. & Casson, M.C. (1976). *The Future of the Multinational Enterprise*, Homes & Meier: London.
- Buckley, P.J., Clegg, L.J., Cross, A.R, Liu, X., Voss, H and Zheng, P. (2007). The Determinants of Chinese Outward Foreign Direct Investment, *Journal of International Business Studies*, 38, 499-518.
- Buckley, P.J., Forsans, N. & Munjal, S. (2009). Foreign acquisitions by Indian multinational enterprises: A test of the eclectic paradigm, paper presented at the 2009 Cambridge Symposium on International Manufacturing, Moller Centre, Cambridge, Sep. 24-25, 2009.
- Cakici, N., Hessel, C. and Tandon, K. (1996) “Foreign acquisitions in the United States: Effect on shareholder wealth of foreign acquiring firms”, *Journal of Banking & Finance*, Vol. 20, pp. 307-329.
- Carleton, J.P. (1997). Cultural due diligence: A concept long overdue, *Training*, 67-75.
- Caves, R.E. (1971). International corporations: The industrial economics of foreign investment, *Economica*, 38, 149, 1-27.
- Caves, R.E. (1998). Industrial organization and new findings on the turnover and mobility of firms, *Journal of Economic Literature*, 36, 4, 1947-1982.
- Chen, Y.Y. & Young, M.N. (2010). Cross-border mergers and acquisitions by Chinese listed companies: A principle-principle perspective, *Asia Pacific Journal of Management*, 27, 523-539.
- Child, J. (2009). Context, comparison and methodology in Chinese management research, *Management and Organization Review*, 5, 57-73.
- Child, J. and Rodrigues, S.B. (2005). The internationalization of Chinese firms: A case for theoretical extension, *Management and Organisation Review*, 1, 3, 381-410.
- Cohen, W. & Levinthal, D. (1990). Absorptive capacity: A new perspective on learning and innovation, *Administrative Science Quarterly*, 35, 128-152.
- Corhay, A. and Rad, A.T. (2000) “International Acquisitions and Shareholder Wealth: Evidence from the Netherlands”, *International Review of Financial Analysis*, Vol. 9(2), pp. 163-174.
- Cuervo-Cazurra, A., Maloney, M.M. & Manrakan, S. (2007). Causes of the difficulties in internationalization, *Journal of International Business Studies*, 38, 5, 709-725.

- Das, A. & Kapil, S. (2011). Analysis of cross-border and domestic M&A deals in Technology sector in India and China, *Transnational Corporations Review*, 3, 2, 148-163.
- Datta, D.K. and Puia, G. (1995) "Cross-border acquisitions: An examination of the influence of relatedness and cultural fit on shareholder value creation in US acquiring firms", *Management International Review*, Vol. 35(4), pp. 337-359.
- Delios, A., & Beamish, P. W. (2001). Survival and profitability: The roles of experience and intangible assets in foreign subsidiary performance. *Academy of Management Journal*, 44(October), 1028-1038.
- Demsetz, R.S. & Strahan, P.E., 1997. Diversification, size, and risk at bank holding companies. *Journal of Money, Credit, and Banking* 29, 300–313.
- Deng, P. (2007). Investing for strategic resources and its rationale: The case of inward FDI from Chinese companies, *Business Horizons*, 50, 1, 71-81.
- Deng, P. (2009). Why do Chinese firms tend to acquire strategic assets in international expansion? *Journal of World Business*, 44, 1, 74-84.
- Deng, P. (2010). What determines performance of cross-border M&As by Chinese companies? An absorptive capacity perspective, *Thunderbird International Business Review*, 52, 6, 509-524.
- Denis, D.J., Denis, D.K. & Yost, K. (2002). Global diversification, industrial diversification, and firm value, *Journal of Finance*, 57, 1951-1979.
- DiMaggio, P.J. & Powell, W.W. (1983). The iron cage revisited: institutional isomorphism and collective rationality in organization fields, *American Sociological Review*, 48, 147-160.
- Doukas, J. & Travlos, N. G. (1988). The effect of corporate multinationalism on shareholders' wealth: Evidence from international acquisitions, *Journal of Finance*, 43, 1161-1175.
- Dunning JH. (1988). The eclectic paradigm of international production: a restatement and some possible extensions. *Journal of International Business Studies* 19(1): 1–31.
- Dunning JH. (1993). *Multinational Enterprises and the World Economy*. Addison-Westley: Wokingham, U.K.
- Draper, P. & Paudyal, K. (2006). Acquisitions: Private versus public, *European Financial Management*, 12, 1, 57-80.
- Eckbo, B. (1983). Horizontal mergers, collusion, and stockholder wealth, *Journal of Financial Economics*, 11, 241-273.
- Erez-Rein, N., Erez, M. & Maital, S. (2004). Mind the gap: Key success factors in cross-border acquisitions, In M. Hitt, M. Javidan & A. Pablo (Eds.), *Mergers and Acquisitions: Crating Integrated Knowledge*, 20-42, Oxford: Blackwell.
- Eun, C.S., Kolodny, R. and Scheraga, C. (1996) "Cross-border acquisitions and shareholder wealth: Tests of synergy and internalization hypotheses", *Journal of Banking and Finance*, Vol. 20, pp. 1559-1582.
- Fuller, K., Netter, J. & Stegemoller, M. (2002). What do returns to acquiring firms tell us? Evidence from firms that make many acquisitions, *Journal of Finance*, 57, 1763-1794.
- Ghemawat, P. (2001). Distance still matters, *Harvard Business School*, 79, 8, 1-13.
- Gubbi, S., Aulakh, P., Ray, S., Sarkar, M.B. & Chittoor, R. (2010). Do international acquisitions by emerging economy firms create shareholder value? The case of Indian firms, *Journal of International Business Studies*, 41, 397-418.
- Guillen, M.F. (2002). Structural inertia, imitation, and foreign expansion: South Korean firms and business groups in China, 1987-85, *Academy of Management Journal*, 45, 3, 509-525.

- Haleblian, J., Devers, C.E., McNamara, G., Carpenter, M.A. & Davison, R.B. (2009). Taking stock of what we know about mergers and acquisitions: A review and research agenda, *Journal of Management*, 35, 3, 469-502.
- Hamel, G. & Prahalad, C.K. (1989). Strategic Intent, *Harvard Business Review*, May-June, 63-78.
- Healy, P.M., Palepu, K.G. and Ruback, R. (1992). Does corporate performance improve after mergers? *Journal of Financial Economics*, 31, 135-175.
- Hitt, M.A., Ahlstrom, D., Dacin, M.T., Levitas, E. & Svobodina, L. (2004). The institutional effects on strategic alliance partner selection in transition economies: China vs. Russia, *Organization Science*, 15, 2, 173-185.
- Hitt, M.A., Harrison, J.S., Ireland, R.D. & Best, A. (1998). Attributes of successful and unsuccessful acquisition of U.S. firms, *British Journal of Management*, 9, 91-114.
- Hudson, J. & Barnfield, E. (2001). Mergers and Acquisitions require social dialogue, *Strategic Communication Management*, 5, 2, 130-145.
- Hughes, J.P. & Mester, L.J. (1998). Bank capitalization and cost: Evidence of scale economies in risk management and signaling, *Review of Economics and Statistics*, 80, 314-325.
- Hughes, J.P. & Mester, L.J., (1998). Bank capitalization and cost: Evidence of scale economies in risk management and signaling. *Review of Economics and Statistics* 80, 314-325.
- Hymer S. (1976). *The International Operations of National Firms: A Study of Direct Foreign Investment*. MIT Press: Cambridge, MA.
- Kang, J.K. (1993). The international market for corporate control, *Journal of Financial Economics*, 34, 345-371.
- King, R., Dalton, R., Daily, M. & Covin, J. (2004). Meta-analyses of post-acquisition performance: Indicators of unidentified moderators, *Strategic Management Journal*, 25, 187-200.
- Kiyamaz, H. (2003). Wealth effect for US acquirers from foreign direct investment, *Journal of Business Strategies*, 20, 1, 7-21.
- Kiyamaz, H. and Mukherjee, T.K. (2000) "The impact of country diversification on wealth effects in cross-border mergers", *The Financial Review*, Vol. 35(2), pp. 37-58.
- Knoerich J. (2010). Gaining from the global ambitions of emerging economy enterprises: an analysis of the decision to sell a German firm to a Chinese acquirer. *Journal of International Management* 16(2): 177-191.
- Kohli, R. & Mann, B.J.S. (2011). Analyzing determinants of value creation in domestic and cross-border acquisitions in India, *International Business Review*, in Press
- Kornai, J.K., Matyas, L. & Roland, G. (2008), *Institutional Change and Economic Behaviour*, Palgrave Macmillan, NY.
- Kumar, N. (2008). Internationalization of Indian enterprises: Patterns, strategies, ownership advantages and implications, *Asian Economic Policy Review*, 3, 242-261.
- Lall, S. (1983). *The New Multinationals; The Spread of Third World Enterprises*, Chichester: Wiley.
- Lane, P.J., Koka, B.R. & Pathak, S. (2006). The reification of absorptive capacity: A critical review and rejuvenation of the construct, *Academy of Management Review*, 31, 4, 833-863.
- Lane, P.J., Salk, J.E. & Lyles, M.A. (2001). Absorptive capacity, learning, and performance in international joint ventures, *Strategic Management Journal*, 22, 1139-1161.

- Li, P.P. (2007). Toward an Integrated theory of multinational evolution: The Evidence of Chinese multinational enterprises as latecomers, *Journal of International Management*, 13, pp. 296-318.
- Li, J., & Guisinger, S. (1991). Comparative Business Failures of Foreign-Controlled Firms in the United States. *Journal of International Business Studies* (2 nd Quarter), 209-224.
- Liu, X, Buck, L. and Shu, C. (2005). Chinese economic development, the next stage: Outward FDI? *International Business Review*, 14 (1), 97-115.
- Loughran, T. and Vijh, A.M. (1997). Do long term shareholders benefit from corporate acquisitions?, *Journal of Finance*, 52, 1759–1790.
- Lubatkin, M., & Shrieves, R. E. (1986). Towards reconciliation of market performance measures to strategic management research, *Academy of Management Review*, 11, 497—512.
- Luo Y.D & Tung R. L. (2007). International expansion of emerging market enterprises: a springboard perspective. *Journal of International Business Studies* 38(4): 481–498.
- Macpherson, A. & Jones, O. (2010). Editorial: Strategies for the development of International Journal of Management Reviews, *International Journal of Management Reviews*, 12, 2, 107-113.
- Madhok, A. & Keyhani, M. (2012). Acquisition as Entrepreneurship: Asymmetries, opportunities, and the internationalization of multinational from emerging economies, *Global Strategy Journal*, 2, 26-42.
- Makino, S. Lau, C. & Yeh, R. (2002). Asset-exploitation versus asset-seeking: Implications for location choice of foreign direct investment from newly industrialized economies, *Journal of International Business Studies*, 33, 3, 403-421.
- Malhotra, S., Sivakumar, K. & Zhu, P. (2011). Curvilinear relationship between cultural distance and equity participation: An empirical analysis of cross-border acquisitions, *Journal of International Management*, In Press.
- Mann, B.J.S. & Kohli, R. (2011). Target shareholders' wealth creation in domestic and cross-border acquisitions in India, *International Journal of Commerce & Management*, 21, 1, 63-81.
- Manzon, G. B., Sharp, D. J. & Travlos, N. G. (1994). An empirical study of the consequences of US tax rules for international acquisitions by US firms, *Journal of Finance*, 49, 1893-1904.
- Markides, C. and Ittner, C.D. (1994) "Shareholders benefit from corporate international diversification: Evidence from US international acquisitions", *Journal of International Business Studies*, Vol. 25(2), pp. 343-366.
- Mathews, J.A (2006). Dragon multinationals: New players in 21 century globalization, *Asia Pacific Journal of Management*, 23 (1), 5-27.
- McCloughan, P., & Stone, I. (1998). Life duration of foreign multinational subsidiaries: Evidence from UK northern manufacturing industry 1970–93. *International Journal of Industrial Organisation*, 16, 719-747.
- Moeller, S.B., Schlingemann, F.P. and Stulz, R.M. (2004), "Firm size and the gains from acquisitions", *Journal of Financial Economics*, Vol. 73, pp. 201-228.
- Montgomery, C. and V. Wilson (1986). Mergers that last: a predictable pattern?, *Strategic Management Journal*, 7, 91-96.
- Morck, R. & Yeung, B. (1991). Why investors value multinationality, *Journal of Business*, 64, 2, 165-187.
- Morck, R. & Yeung, B. (1992). Internalization: An event study test, *Journal of International Economics*, 33, August, 41-56.



- Morck, R., Shleifer, A. & Vishny, R. W. (1990). Do managerial objectives drive bad acquisitions, *Journal of Finance*, 45, 1, 31-48.
- Nayyar, D. (2008). The interantionalization of firms from India: Investment, mergers and acquisitions, *Oxford Development Studies*, 36, 1, 111-131.
- Nayyar, D. (2006). India's unfinished journey: Transforming growth into development, *Modern Asian Studies*, 40, 3, 797-832.
- North, D.C. (1990). *Institutions, Institutional Change and Economic Performance*, Cambridge University Press, Cambridge.
- Oliver, R.L. (1997). *Satisfaction: A Behavioral Perspective on the Consumer*, New York: The McGraw-Hill Companies, Inc.
- Pan, Y., & Chi, P. S. K. (1999). Financial performance and survival of multinational corporations in China. *Strategic Management Journal*, 20, 359-374.
- Peng, W.M. (2002). Towards an institution-based view of business strategy, *Asia Pacific Journal of Management*, 19, 2/3, 251-267.
- Peng, W.M. (2003). Institutional transition and strategic choices, *Academy of Management Review*, 28, 275-296.
- Powell, W.W. & DiMaggio, P.J. (1991). *The New Institutionalism in Organizational Analysis*, Chicago: University of Chicago Press.
- Pradhan, J.P. (2010). Strategic asset-seeking activities of emerging multinationals: Perspectives on foreign acquisitions by Indian Pharmaceutical MNEs, *Organizations and Markets in Emerging Economies*, 1, 2, 9-31.
- Ramamurti R and Singh J.V. (2009). *Emerging Multinationals in Emerging Markets*. Cambridge University Press: Cambridge, UK
- Ravenscraft, D.J. & Scherer, F.M. (1987). *Mergers, Sell-Offs, and Economic Efficiency*, Brookings Institution, Washington, DC.
- Rui, H.C. & Yip, G.S. (2008). Foreign acquisitions by Chinese firms: A strategic intent perspective, *Journal of World Business*, vol. 43, 213-226.
- Rugman AM. 1981. Inside the Multinationals: The Economics of Internal Markets. Columbia University Press: New York.
- Schoenberg, R. (2006). Measuring the performance of corporate acquisitions: An empirical comparison of alternative Metrics, *British Journal of Management*, 17, 4, 361-370.
- Scott, W.R. (1995). *Institutions and Organizations*, Sage, Thousand Oaks, CA.
- Scott, W.R. (2005). Institutional theory: Contributing to a theoretical research program, In Smith, KG & Hitt, MA (eds.), *Great Minds in Management: The Process of Theory Development*, Oxford University Press, Oxford.
- Seth, A. (1990). Sources of value creation in acquisitions: An empirical investigation, *Strategic Management Journal*, 11, 431-446.
- Seth, A., Song, K.P. & Pettit, R.R. (2002). Value creation and destruction in cross-border acquisitions: An empirical analysis of foreign acquisitions of US firms, *Strategic Management Journal*, 23, 921-940.
- Shimizu, K., Hitt, M.A., Vaidyanath, D. & Pisano, V. (2004). Theoretical foundations of cross-border mergers and acquisitions: A review of current research and recommendations for the future, *Journal of International Management*, 10, 3, 307-353.

- Shleifer, A. & Vishny, R. W. (1992). Liquidation values and the debt capacity: A market equilibrium approach, *Journal of Finance*, 47, 4, 1343-1366.
- Singh, H. & Montgomery, C. A. (1987). Corporate acquisitions strategies and economic performance, *Strategic Management Journal*, 8, 4, 377-386.
- Soongswang, A. (2010). M&A for value creation: The experience in Thailand, *Interdisciplinary Journal of Contemporary Research in Business*, 1, 11, 28-50.
- Srivastava, R.K., Shrivani, T.A. & Fahey, L. (1998). Market-based assets and shareholder value: A framework for analysis, *Journal of Marketing*, 62, 1, 2-18.
- Stevenson H.H. & Jarillo J. C. (1990). A paradigm of entrepreneurship: entrepreneurial management. *Strategic Management Journal*, Summer Special Issue 11: 17–27.
- Stillman, R. (1983). Examining antitrust policy towards horizontal mergers, *Journal of Financial Economics*, 11, 225-240.
- Stulz, R. (2009). Managerial discretion and optimal financing policies, *Journal of Financial Economics*, 26, 3-27.
- Sun, S.L., Peng, M.W., Ren, B. & Yan, D. (2012). A comparative ownership advantage framework for cross-border M&As: The rise of Chinese and Indian MNEs, *Journal of World Business*, 47, 1, 4-16.
- Teece, D.J., Pisano, G. & Shuen, A. (1997). Dynamic capabilities and strategic management, *Strategic Management Journal*, 18, 7, 509-533.
- Tsui, A.S., Schoonhoven, C.B., Myers, M.W., Lau, C.M. & Milkovich, G.T. (2004). Organization and management in the midst of societal transformation, The People's Republic of China, *Organization Science*, 15, 2, 133-144.
- Uhlenbruck, K., Hitt, M. A., & Semadeni, M. (2006). Market value effects of acquisitions involving Internet firms: A resource-based analysis, *Strategic Management Journal*, 27, 10, 899–913.
- United Nations Conference on Trade and Development (UNCTAD) 2006. *World Investment Report 2006: cross-border mergers and acquisitions and development*, United Nations, NY and Geneva.
- United Nations Conference on Trade and Development (UNCTAD) 2010. *World Investment Report 2010: cross-border mergers and acquisitions and development*, United Nations, NY and Geneva.
- Vermeulen, F., & Barkema, H. (2001). Learning through acquisitions. *Academy of Management Journal*, 44, 3, 457–476.
- Walker, M. (2000). Corporate takeovers, strategic objectives and acquiring firm shareholder wealth, *Financial Management*, 20, 53-66.
- Wells, L.T.J. (1983). *Third World Multinationals: The Rise of Foreign Direct Investment from Developing Countries*, Cambridge, MA: MIT Press.
- Wesson, TJ 2004, *Foreign Direct Investment and Competitive Advantage*, Edward Elgar Publishing, Cheltenham, UK.
- Wright, M., Filatotchev, I., Hoskisson, P.E. & Peng, M.W. (2005). Strategy research in emerging economies: Challenging the conventional wisdom, *Journal of Management Studies*, 42, 1, 1-33.
- Wu, C. & Xie, N. (2010). Determinants of cross-border mergers and acquisitions performance of Chinese Enterprises, *Procedia Social and Behavioural Sciences*, 2, 6896-6905.

- Zahra, S. & George, G. (2002). Absorptive capacity: A review, reconceptualization, and extension, *Academy of Management Review*, 27, 2, 185-203.
- Zhang, J., Zhou, C. & Ebbers, H.A. (2011). Completion of Chinese overseas acquisitions: Institutional perspectives and evidence, *International Business Review*, 20, 2, 226-238.
- Zollo, M. & Singh, H. (2004). Deliberate learning in corporate acquisitions: Post-acquisition strategies and integration capability in U.S. bank mergers, *Strategic Management Journal*, 25, 1233-1256.

# THE IMPACT OF BUSINESS GROUP CHARACTERISTICS ON LOCATION CHOICE AND FIRM PERFORMANCE IN CHINA

Sui-Hua Yu<sup>1</sup>

<sup>1</sup> Department of Accounting, National Chung Hsing University, Taiwan, R.O.C.

***Abstract:** This study examines how business group characteristics affect location choice and firm performance in the emerging market. Using data of 275 Taiwanese investments in China, this study finds that being affiliated with business groups does not necessarily help firms to create the competitive advantage in the host country. Instead, firms affiliated with business groups having higher technological capability and having greater network size are most likely to achieve superior performance. On the other hand, firms affiliated with business groups offering less technological support and fewer network resources will be more likely to cluster with peer firms from the same industry while entering a foreign market. The results provide critical insights on the relation between business group characteristics and location choice and enrich our understanding of the value of business group affiliation in emerging economies. Moreover, this study indicates that firms in the industrial clusters have different characteristics from those that are not clustered.*

***Keywords:** Business group characteristics, Location choice, Firm performance, Emerging market.*

## Introduction

It is generally believed that foreign firms, compared to domestic firms, are more likely to encounter unfamiliarity and discrimination costs and face competitive disadvantages in a host country (Hymer 1976, Miller and Eden 2006, Zaheer 1995). Zaheer (1995) defined these additional costs of doing business abroad as the liability of foreignness. Prior studies suggest that foreign firm performance decreases with the increase in the liability of foreignness unless they take offsetting actions or acquire superior resources to overcome these additional costs (Dunning 1977, Zaheer and Mosakowski 1997).

In emerging economies, institutions are often underdeveloped, which can further increase the costs of doing business abroad (Hoskisson, Eden, Lau and Wright 2000, North 1990, Lu and Ma 2008, Wan and Hoskisson 2003). Understanding what activities and resources can overcome liability of foreignness is thus important for foreign firms in an emerging market. Wright, Filatotchev, Hoskisson and Peng (2005) indicate that organizational arrangements such as business groups and networks can deal with problems of underdeveloped market institutions. From a transaction cost perspective, these arrangements have been perceived as responses to market weaknesses. Through internalizing transactions, business groups can fill institutional voids and reduce transaction costs (Khanna and Palepu 1997). In addition, weak property rights in many emerging economies may increase the costs of negotiating enforceable contracts for firms. It is widely believed that business groups have better access to government privileges and thus can enforce contracts more efficiently and incur lower costs.

Several empirical studies suggest that business groups bring value to their affiliated firms in emerging economies (e.g., Khanna and Palepu 1997, Leff 1978, Peng and Delios 2006). For example, Khanna and Rivkin (2001) found that the profitability of group affiliates was higher than that of unaffiliated firms in six emerging economies. Keister (2000) has found similarly positive effects of group affiliation in China. Several studies find similar results in South Korea (Chang and Choi 1988, Chang and Hong 2000), and India (Khanna and Palepu 2000). However, some other studies found a negative relationship between group membership and firm performance (e.g., Nokatani 1984, Khanna and Yafeh 2005). Besides, most of prior studies have treated business groups as a unified set of businesses. Some recent studies, therefore, argue that the value of business group affiliation is tied to the resources and capabilities provided (Lu and Ma 2008). That is, those factors that influence the value creation of business groups have been ignored in previous studies and thus restrict our understanding of group-performance relationships. This study, therefore, would like to fill the gap by investigating how business group resources and capabilities affect firm performance in China from the resource-based and network theoretical perspectives.

On the other hand, it is generally observed in the emerging markets that foreign firms cluster together in locations that offer agglomeration economies and abundant resources. Location is actually a strategy that firms often use to increase their exposure to potential knowledge or resources. Being geographically concentrated in specific areas, firms can reap the benefits of local resources and localized knowledge spreading across firms through common buyers, suppliers, and employees (Alcacer and Chung 2007). These benefits can assist firms to decrease liability of foreignness and improve their performance in the host country.

However, localized competition might decrease the benefits arising from clustering in locations. Alcacer (2006) summarized that there are actually two opposing forces determining

whether firms are geographically concentrated or dispersed. They are agglomeration benefits and competition costs. Based on economics and organizational theory, agglomeration benefits drive firms together but competition costs drive firms apart. Moreover, the impact of competition costs and agglomeration benefits on location are found to be moderate by firm-specific capabilities (Alcacer 2006). Given firm capabilities are closely related to the business groups they are affiliated with, we argue that business group characteristics might affect affiliated firms' location choice. So, the second research question in this paper is to explore the linkages between business group characteristics and location choice, hoping to refine our understanding of how group-affiliated firms react differently to competition and agglomeration forces.

We focused our investigation on Taiwanese investments in China, which is the largest emerging economy (Child and Tse 2001). In this market, business groups play critical roles (Keister 2000), and foreign investment is extensive (Huang 2003). Specifically, 45% of foreign direct investment in China was from Hong Kong, Macao and Taiwan, and 11% from US and EU respectively in year 2000 (Wei and Balasubramanyam 2004). In addition, Taiwanese investment in China has an extensive geographic and industrial distribution. These features of Taiwanese investment in China provided ideal conditions for us to test the effects of business group characteristics on firm performance in emerging economies.

Drawing on the data from Taiwanese manufacturing firms in China, our study shows that being affiliated with business groups is not necessarily help firms to create a competitive edge in a host country. Instead, firms affiliated with business groups with higher technological capability and greater network size are most likely to prosper. On the other hand, firms affiliated with business groups offering less technological support and less network resources will be more likely to locate in the clusters. The results indicate that group-level resources and capabilities will affect performance of group-affiliated firms in the emerging market. In addition, firms' location choice is closely related to the characteristics of business groups they are affiliated with. Significantly, the importance of business group affiliation for firms in the emerging market is evident but the importance varies with the resources and capabilities of business groups.

This paper extends extant research and makes a number of contributions. First, this study refines our understanding of group-performance relationships and provides possible explanations for the mixed empirical findings on the relation between business group affiliation and firm performance. Second, this study views business groups as collections of resources, rather than treating business groups as a uniform sets of firms with given characteristics. It is the ability of business groups to configure different types of resources that contributes to their affiliates' success, but not business group affiliation only. Third, this study implies that business groups can help affiliated firms to reduce the costs of doing business abroad and decrease liability of foreignness. Fourth, this study suggests that foreign

firms bridge ties through investment locations to tap information and opportunities in the emerging markets when they cannot obtain the requisite capabilities and resources from group networks. Finally, our findings indicate that the characteristics of a business group might influence competition costs and agglomeration benefits and thus affects their affiliated firms' location choice.

The remainder of this paper is arranged as follows. Relevant literature is reviewed in the next section. Then, we discuss how group characteristics impact firm performance and location choice from different theoretical perspectives and develop five testable hypotheses. This is followed by a description of research methodology and then a discussion of empirical results. Finally, some concluding marks with implications are raised.

## **Literature review**

In the business group literature, business group can be defined as a collection of legally independent firms that are linked to each other through formal (such as ownership, financial, commercial) and informal (such as family, friendship, ethnicity) ties (Granovetter 1995, Khanna and Rivkin 2001, Khanna and Rivkin 2006). These ties are often embedded in specific social structures that provide norms and a moral basis for within-group regulation and transactions (Granovetter 2005). The shared norms and morality embedded in these ties usually drive affiliated firms within business groups to coordinate resources, strategy, and behavior to a greater extent and further reduce transaction costs.

It is generally believed that business groups are more prevalent and play a more prominent role in emerging economies than in developed countries (Delios 2006, Guillen 2000, Khanna and Rivkin 2001, Peng and Lu and Ma 2008). Institutional economics are most often used to provide ground explanations of the prevalence of business groups in emerging markets. Specifically, institutions in a society, including formal rules and informal constraints, assist firms to complete complex inter-firm transactions (North 1990). The greater the institutional voids, the higher the transaction costs in a market. For institutions in the emerging markets are less developed than in developed markets, inter-firms transactions are more costly for firms to complete. To respond to market failures and associated transaction costs, firms intend to form business groups through relationships such as political party, kinship or ethnicity (Granovetter 1994) and use internal transactions to fill institutional voids caused by poorly performing or nonexistent institutions in emerging economies (Khanna and Palepu 1997, Leff 1978). On the other hand, resource-based theory also indicate that business group affiliation can increase an affiliate's competitiveness by giving its access to group-level resources, especially capital, technology, human talent, and complementary products and services (Mahmood and Mitchell 2004).

Despite the general belief that within-group coordination can reduce transaction costs in the emerging economies, empirical evidence about the beneficial effects of business groups on the affiliated firm performance has remained mixed (Caves and Uekusa 1976, Chang and Choi 1988, Goto 1982, Khanna and Palepu 2000). Some studies have shown that business groups helped to create positive effects for affiliated firm performance. For example, Chang and Choi (1988) empirically showed that business groups with a multidivisional structure result in superior performance. Perotti and Gelfer (2001) also provided evidence that group members have higher values of Tobin's Q than otherwise comparable independent firms in Russia. Khanna and Rivkin (2001) found that the profitability of group affiliates was higher than that of otherwise comparable unaffiliated firms in 6 out of 14 emerging economies. Similarly positive effects of group affiliation have been found in China (Keister 2000, Ma, Yao and Xi 2006). Khanna and Palepu (2000) claim that Indian firms affiliated with such business groups outperform firms that are not affiliated. To the contrary, Caves and Uekusa (1976) and Nakatani (1984) both found a negative relationship between group membership and firm performance in the Japanese keiretsu. Khanna and Yafeh (2005) also supported the negative relationship between group membership and firm performance. Chacar and Vissa (2005) report that firms affiliated with business groups tend to have longer persistence of poor performance compared with independent firms. The mixed empirical findings on group-performance indicate that current understanding of business group in the emerging economies has remained insufficient. Richer theoretical examinations might be needed to understand what impact affiliated firms' operations and performance. In addition, most researches have considered business groups as a unified set of businesses and neglected the different factors that influence the value creation of business groups (Yiu, Bruton and Lu 2005). To fill the research voids, this study empirically examines the impact of business group characteristics on location choice and firm performance in the emerging market. Specifically, three research questions have been studied. First, do group-affiliated firms perform better than the independent firms in China? Second, how do business group capabilities and resources affect firm performance in China? Third, how do business group capabilities and resources affect location choice in China?

## **Hypotheses development**

### *The impact of business group affiliation on firm performance*

Emerging economies are characterized by greater weaknesses in the markets for products, labor, and capital, which lead to so-called "institutional voids" (Khanna and Palepu 2000). It offers an opportunity for those firms that have necessary resources and capabilities to fill the institutional voids (Yiu, et al. 2005). Business groups represent collections of legally



independent firms that are bound together by economic and social ties (Khanna and Palepu 1997; Yiu, et al. 2005). In a business group, capital, products, labor and information can be shared internally among the group members (Khanna and Rivkin 2001). Firm affiliated with business groups thus are able to perform better in such a market. From institutional economics perspective, business groups can reduce transaction costs by substituting for market institutions that are nonexistent or malfunctioning in emerging economies (Khanna and Palepu 1997, Leff 1978). Specifically, firms in emerging economies having difficulty raising external capital can rely on the internal capital market within a business group and enjoy lower capital costs. In addition, compared to independent firms, group affiliates can more easily raise external capital at lower rates due to lower bankruptcy risks (Khanna and Yafeh 2005). Besides, weak property rights in many emerging markets may increase the costs of negotiating enforceable, arms-length contracts between firms. Business groups can protect property rights and reduce transaction costs by enforcing contracts more efficiently (Amsden and Hikino 1994, Khanna and Palepu 1999, Kock and Guillen 2001). With support from the groups, affiliates also have better access to government privileges and research facilities in the host country. Moreover, business groups can use internal labor markets to counteract the inefficiency of the external labor market in emerging economies. Labor turnover within groups also facilitates the sharing of technological knowledge among affiliates. Through internal labor markets, affiliates can also reduce costs of employee recruiting and reap the benefits of employee training provided by groups. Taken together, we expect that business group affiliation is positively related to firm performance. Hence, the following hypothesis is developed.

**H1: Business group affiliation is positively related to firm performance in China.**

*The impact of business group characteristics on firm performance*

There have been a variety of theoretical perspectives employed to investigate the value of business groups. Institutional theory is considered a relevant one but has its limitations. Specifically, the institutional perspectives assume that business groups are seeking for lower transaction costs while making strategic choices. Besides, it is also assumed that the impact of business group affiliation is uniform. Resource-based theory argues that business groups add value to affiliated firms by pooling and distributing heterogeneous resources and thus the value-creating potential of a business group vary depending on the resources and capabilities the groups are able to obtain. So, the benefits of business group affiliation are largely dependent on the resources and capabilities provided by business groups. Studies using network analysis also suggest that the influences of interorganizational networks on firms are dependent on network characteristics (Almeida and Phene 2004). Therefore, we integrate a resource-based view with the network perspective to investigate how the technological

capability and network resources of business groups affect the performance of affiliated firms in China.

From a resource-based view, it has been argued that a firm's competitive advantages are based on the unique bundles of tangible and intangible resources, which are difficult or costly for competitors to duplicate (Barney, 1991). Specifically, if a firm has valuable, rare, inimitable, and unsubstitutable resources, it will be able to sustain competitive advantage. Guillén (2000) suggested that group-affiliated firms could build an inimitable capability by integrating internal and external resources. This enable firms to enter the market more quickly and to operate more cost-effectively in emerging economies. Since business groups have more resources, they are more likely to help improve their affiliates' competitiveness. In addition, knowledge transfer and sharing is easier among affiliates within the same business group (Encaoua and Jacquemin 1982). Technological support within business groups can help affiliates to increase knowledge resources and to speed rate of learning. On the other hand, business groups can substitute for markets for technology in emerging economies to reduce the risk of intellectual property being expropriated.

From the network perspective, business groups can be viewed as a network of knowledge and connections that their affiliates can tap to exploit opportunities (Elango and Pattnaik 2007). Previous studies suggest that how much firms can benefit from interfirm networks is related to the attributes of the networks, such as network position, and the amount of resources available in the networks (Galaskiewicz and Zaheer 1999). Gulati (1999) suggest that the greater the extent of knowledge resources in the network, the greater the opportunity set is presented to firms. However, networks are not equally rich in knowledge. Given all else being equal, firms in resource-rich networks can access more resources and knowledge and thus have greater opportunities to figure out novel ideas. This helps firms to achieve better performance. In addition, most Taiwan electronic companies invest in China to acquire an abundant supply of low-cost factors. They largely adapt existing technology provided by their parent companies to local needs. So, they are more dependent on technological knowledge within groups. A strong technological support within groups is thus critical for foreign market success. Therefore, we expect that firms affiliated with business groups offering more rich technological resources have superior performance in China. Hence, the second hypothesis is developed as follows.

**H2: The technological capability of a business group is positively related to firm performance in China.**

From another perspective, business groups can be seen as a strategic network providing affiliated firms with access to information, knowledge, resources, markets, and technologies (Gulati, Nohria and Zaheer 2000). Based on the concept of 'social embeddedness', business

ties are likely to take place within the context of pre-existing social relationships (Granovetter 1985). Therefore, these networks can provide affiliated firms with important connections facilitating local operations in the emerging market (Welch, Welch, Young and Wilkinson 1998). For instance, affiliated firms can easily utilize their parent companies or other affiliated firms' relationships with customers, suppliers, and government officials (Welch and Welch 1996). Such network ties are crucial for the success in the emerging markets. On the other hand, research confirms the importance of linkages between organizations in influencing firm performance. Inter-organizational relationships not only allow firms to establish trust and reciprocal favored exchanges (Granovetter 1992) but also inspire knowledge sharing and collaboration among firms (Powell, Koput and Smith-Doerr 1996, Rogers and Larsen 1984). The number of relationships that an organization has with other firms may result in differential access to resources (Powell, Koput and Smith-Doerr 1996). Within business groups, a range of regulation and integration mechanisms is available to link various entities. Having a large number of linkages within the business groups is expected to increase both the amount and variety of knowledge available to a firm and is expected to lead to better firm performance. Hence, the following hypothesis is developed.

**H3: The network size of a business group is positively related to firm performance in**

**China.**

*The impact of business group characteristics on location choice*

Foreign firms in the emerging markets have the potential to access resources from two knowledge contexts. One is the business group with which firms are affiliated. The other is the investment region where foreign firms are located, which embraces social and technological relationships among firms and allows inter-firm knowledge flows (Almeida and Phene 2004). Resources from the two contexts are believed to be interdependent (Forsgren 2000). In other words, a firm's location choice in the host country is closely related to the characteristics of the business group it is affiliated with. Thus, this study further investigates the effect of business group characteristics on firms' location choice.

Prior researches suggest that two opposing forces determine whether firms cluster in a given geographic market, including agglomeration benefits and competition costs (Baum and Haveman 1997, Hannan and Freeman 1977). Specifically, competition forces drive firms apart geographically, and agglomeration forces drive them together. Researchers from the organization theory and industrial economics have also assumed that all firms faced with competition or agglomeration will flee competition and flock to agglomerate (Marshall 1920, Weber 1929).

Anecdotal evidence suggests that competition costs vary across firms though most companies favor locations with low competitive pressures. The benefits of agglomeration

appear varied, too. Alcacer (2006) empirically verified that firms react differently to competition and agglomeration forces. The location behavior of firms depends on the trade-off between competition costs and agglomeration benefits. That is, firms facing higher competition costs or/and lower agglomeration benefits will be less likely to cluster with other firms and otherwise firms will be more likely to locate in the clusters.

Recent research has challenged the assumption that agglomeration economies are positive for all firms. Shaver and Flyer (2000) suggest that firms not only benefit from agglomeration economies, but also contribute to them. Therefore, firms decide to geographically cluster based on net benefits from agglomeration economies. We argue that business group-specific capabilities influence the impact of competition costs and agglomeration benefits on location choice. Previous research has suggested that positive externalities prompt firms to cluster. Three sources of positive externalities from agglomeration have been identified in Marshall (1920) and have been widely recognized in previous literature, including inter-firm technological spillovers, access to specialized labor, and access to specialized intermediate inputs (Alcacer 2006).

To begin with, knowledge is often tacit and requires frequent interactions to transfer (Kogut and Zander 1992). When firms cannot acquire technological capability from internal networks, they intend to locate geographically close to external knowledge sources. In addition, benefits from specialized workers are especially important when firms enter new geographic markets. Because a foreign entrant is at a disadvantage against local firms, it often competes by using skills and technologies that are not available in the host country. Larger community of foreign firms in the host country can reduce information uncertainty (Martin, Mitchell and Swaminathan 1995) and help new entrants to find workers meeting their requirements more easily (Caves 1996). Moreover, previous empirical and theoretical researches indicate that less-capable firms are less likely to enter geographic markets that are blocked by stronger incumbents and thus are more vulnerable to competition (Alcacer 2006, Tirole 1997).

On the contrary, a firm that is more capable would receive little benefits from clustering, and may possibly lose when competitors duplicate its capabilities (Alcacer 2006). In other words, firms having leading technologies concern that their technology might spill over to existing firms and would avoid to be clustered with competitors. Chung and Alcacer (2002) found that foreign firms with more advanced technologies choose to locate apart from existing industrial clusters in the United States to protect their technological advantage. Specifically, firms affiliated with more technologically advanced groups might benefit less from the clusters but even fall victim to technological spillover. So, the potential for negative agglomeration economies is larger. For these firms, the costs of clustering exceed the benefits. They thus cluster less.

In summary, firms affiliated with more capable business group benefit the least from agglomeration effects while they are effective at blocking rivals from entering markets. Consequently, they are geographically dispersed. As for firms affiliated with less capable business groups, they rely more on agglomeration benefits and are more vulnerable to competition pressures. So, they are more likely to cluster with peer firms in specific location. Hence, we have the following hypothesis:

**H4: Firms affiliated with less technologically capable business groups will be more likely to locate in the industrial clusters in China.**

On the other hand, competition costs and agglomeration benefits may have different impacts if firms are affiliated with business group having different network resources. Previous studies suggest that production activity is less likely to be affected by competition and thus more likely to be geographically concentrated. Similarly, agglomeration benefits are more relevant for some activities, such as production and R&D activities than others (Alcacer 2006). For Taiwanese electronic companies in China, they mostly engage production activities and choose a cost-based strategy so that the agglomeration benefits are more significant. In addition, firms have the potential to develop knowledge linkages within two types of networks, which are internal networks and external networks (Almeid and Phene 2004). From network perspective, resources provided by the two networks are interdependent. The less the resources are available within groups (i.e. internal networks), the more likely the firms seek and acquire requisite resources through industrial clusters (i.e. external networks). Hence, we have the following hypothesis:

**H5: Firms affiliated with business groups having smaller network size will be more likely to locate in the industrial clusters in China.**

## **Research methodology**

### *Data*

This study collected data of Taiwan electronics firms in China for the year 2005. Performance data were collected from *Top 1000 Largest Taiwanese Corporations in China* surveyed by China Credit Information Service (CCIS), which is the oldest and most prestigious credit checking agency in Taiwan and is also an affiliate of Standard & Poor's. CCIS publishes financial information about largest Taiwanese corporations in China periodically and identifies their group affiliations. Group characteristics data were collected from the directory, *Business Groups in Taiwan* (BGT), which is compiled by CCIS as well. This directory is the most comprehensive and reliable source for business groups and has

been used in previous studies (Chang, Chung and Mahmood 2006, Claessens, Djankov and Lang 2000, Hamilton and Biggart 1988, Khanna and Rivkin 2001). It constructs the database of business groups by examining the overlaps of shareholders, directors, auditors, or decision makers with the focal firm who has a substantial proportion of shares held by other group members. CCIS use some important criteria for defining business groups, including common shareholders and common administrative coordination (Chang et al. 2006). The final sample includes 275 firms in total, including independent firms and group-affiliated firms.

### *Variables*

#### Dependent Variables

Firm performance (denoted as *PF*) is measured by firm-level pretax income. Net income is a common measure of firm performance in both accounting and finance literatures. Location choice (denoted as *LC*) is measured by a dummy variable, which is 1 if a firm is located in the industrial cluster and 0 otherwise. Following Bell (2005), we coded the variable '1' if the firm is located in the cluster identified as the region where most Taiwanese peers in the same industry are located, and '0' otherwise. Specifically, Taiwanese peers are identified based on the industry classifications of Taiwan Economic Journal (TEJ). According to TEJ's classifications, the electronic industry can be divided into seven sub-industries, such as photoelectric industry and computer periphery industry etc. The province in which most firms in the same sub-industry are located is defined as the region of industrial clusters.

#### Independent Variables

Business group affiliation (*GRP*) is measured by a dummy variable, Group Dummy, which is 1 if a firm is affiliated with a group and 0 otherwise. The technological capability of a business group (*TECH*) is measured in terms of the number of successful Taiwan patent applications submitted by parent companies. This measurement is designed for the following reasons. First, in the case of Taiwan manufacturing companies, the technological knowledge is transferred primarily from parent companies to group affiliates in China. Second, firm capabilities in strategy field are closely associated with absolute-cost advantages in industrial organization (Alcacer 2006). Researchers in industrial organizations suggest that absolute-cost advantages stem from a firm's superior production techniques (Bain 1956), which are reflected in the number of process innovations. The network size of a business group (*NET*) is measured in terms of the number of linkages between group affiliates operating in China.

#### Control Variables

In this study, we include several control variables. These variables are believed to have important influence on firm performance and thus need to be controlled. First, six dummy measures were used to control for the industry-specific influences. This variable ( $IND_j$ ) took a value of 1 if a firm was in specific industry  $j$ , such as photoelectric industry, computer periphery industry respectively and 0 otherwise. Second, firm size ( $FSZ$ ) was included to control for the influence of firm size on performance. We measured size as the amount of total assets. Third, the number of global affiliates ( $GSZ$ ) and the amount of group sales ( $GSA$ ) were used to control for the size of each business group. Further, previous studies indicate that institutional factors are an important determinant of firm performance in China (Miller and Eden, 2006), so two dummy variables were designed to account for the institutional differences across regions. One is  $ECA$ , the other is  $SCA$ .  $ECA$  took a value of 1 if a firm is located in the East China area, and 0 otherwise.  $SCA$  took a value of 1 if a firm is located in the South China area, and 0 otherwise. To test the impact of group capabilities and resources on location choice, we further include another two control variables. They are extremely large group ( $TP$ ) and firm age ( $AGE$ ). For affiliates' embeddedness in the host country come with age, we include firm age as a control variable. This variable is measured by the number of days till now since the first investment has been made in China.  $TP$ , a dummy variable, which is 1 if a firm is affiliated with those business groups listed in the top 100 big business groups and 0 otherwise. It is used to control for the scale effect.

### *Empirical results*

#### Descriptive statistics and correlations

Table 1 provides descriptive statistics of the variables used in the empirical tests. As this table shows, each business group on average has 85.01 business affiliates worldwide and has 17.24 business affiliates operating in China, suggesting that these firms have large intra-group networks. The average number of successful Taiwan patent applications submitted by parent companies is 596.91, indicating that these firms are actively engaged in innovation activities. 81% of the sample firms are located geographically concentrated with their peer firms. The average pre-tax income of sample firms is \$54,056.84 thousands RMB dollars and the average assets are \$1,096,989.67 thousands RMB dollar.

Table 1. Descriptive Statistics

Variable	N	Mean	Std. Err	Min	Max
TECH	292	596.91	1676.55	0	7609
NET	254	17.24	23.32	1	90
LC	285	0.81	0.39257	0	1
FSZ	297	1096989.67	2495613	8232	30434171

Variable	N	Mean	Std. Err	Min	Max
PF	298	54056.84	222336.08	-109083	2569717
GSZ	228	85.01	97.50	4	357
GSA	232	214699.75	324245.32	2108	1463719

Table 2 presents a correlation matrix for this study's variables. The magnitude of correlations between independent variables is in the range of low to medium, suggesting that multicollinearity could not be a serious problem. We further used variance inflation factors (*VIF*) to ensure that multicollinearity does not have harmful effect.

Table 2. Correlation matrix

	TECH	NET	LC	FSZ	PF	GSZ	GSA
TECH	1	0.790**	-0.239**	0.269**	0.368**	0.753**	0.715**
NET	0.526**	1	-0.213**	0.169*	0.292**	0.960**	0.888**
LC	-0.204**	-0.094	1	-0.041	0.010	-0.209**	-0.307**
FSZ	0.248	0.181**	0.038	1	0.737**	0.192**	0.259**
PF	0.025	0.064	0.021	0.533**	1	0.280**	0.301**
GSZ	0.499**	0.864**	-0.117	0.261**	0.088	1	0.891**
GSA	0.548**	0.776**	-0.227**	0.412**	0.225**	0.852**	1

Pearson coefficient in the upper triangle; Spearman coefficient in the lower triangle

+ : 10% significant level; \* : 5% significant level; \*\* : 1% significant level

### *The impact of business group affiliation on firm performance*

The results on the effect of business group affiliation on firm performance are reported in Table 3. While Hypothesis 1 predicts that the effect of business group affiliation on firm performance is positive, the coefficient on group affiliation (*GRP*) is insignificant, suggesting that firm performance does not vary significantly across independent firms and group-affiliated firms. Hypothesis 1 is not supported.

Table 3. The impact of business group affiliation on firm performance

Independent Variables	Predicted Sign	Coefficients	t-value
Intercept		-34042.365	-0.699
GRP	+	-30413.360	-1.284
LC	+	50649.179**	2.150
FSZ	+	0.418***	26.370
ECA	-	-32678.919	-0.702
SCA	-	-26555.045	-0.540
IND <sub>1</sub>	+/-	-34596.300	-0.671
IND <sub>2</sub>	+/-	-34309.104	-1.511
IND <sub>3</sub>	+/-	56495.643**	2.400
IND <sub>4</sub>	+/-	6570.273	0.210



Independent Variables	Predicted Sign	Coefficients	t-value
IND <sub>5</sub>	+/-	1121.598	0.021
IND <sub>6</sub>	+/-	-24785.820	-1.243
N		275	
Adj. R <sup>2</sup>		0.733	
F-statistics (significance)		69.332 (0.000)	

\*: 10% significant level; \*\*: 5% significant level; \*\*\*: 1% significant level.

*The impact of business group characteristics on firm performance*

As shown in Table 4, the coefficient for the technological capability (*TECH*) is significantly positive, indicating that business group capability is helpful in improving firm performance. Hypothesis 2 is supported. Besides, the coefficient on network size (*NET*) is significantly positive, indicating that firms affiliated with business groups having larger network size have better financial performance. Hypothesis 3 is supported as well. Taken together, these results support the notion that business group affiliation does not necessarily assist firms to improve operating performance. It is the resources and capabilities of business groups that enable group affiliated firms to improve performance in the host country.

Table 4. The impact of business group characteristics on firm performance

Independent Variables	Predicted Sign	Coefficients	t-value
Intercept		58815.510	0.801
TECH	+	17.395*	1.659
NET	+	3581.239*	1.858
LC	+	82011.397**	2.186
GSZ	+	-641.386	-1.452
FSZ	+	0.064***	14.694
GSA	+	-0.039	-0.431
ECA	-	-207688.217***	-2.701
SCA	-	-189191.054**	-2.348
IND <sub>1</sub>	+/-	64821.902	0.636
IND <sub>2</sub>	+/-	60421.978	1.649
IND <sub>3</sub>	+/-	54934.856	1.263
IND <sub>4</sub>	+/-	12012.861	0.238
IND <sub>5</sub>	+/-	145272.696*	1.759
IND <sub>6</sub>	+/-	34421.120	1.058
N		208	
Adj. R <sup>2</sup>		0.586	
F-statistics (significance)		21.896 (0.000)	

\* : 10% significant level; \*\* : 5% significant level; \*\*\* : 1% significant level.

*The impact of business group characteristics on location choice*

To test Hypotheses 5 and 6, we first used logistic regression to investigate how business group characteristics impact location choice and then compared firms that were geographically concentrated with those that were not. As shown in Table 5, the coefficients for the technological capability (*TECH*) and network size (*NET*) are both significantly negative. These results support that firms affiliated with less-capable business groups will be more likely to cluster with peer firms and those firms affiliated with business groups having larger network size be more likely to be geographically dispersed.

Table 5. The impact of business group characteristics on location choice

Independent Variables	Predicted Sign	Coefficients	Wald Chi-Square statistics
Intercept		-27.290	1.093
TECH	-	-0.850*	3.604
NET	-	-0.017**	4.867
TP	-	-0.783*	2.842
AGE	+	0.000	1.536
ECA	-	-2.144***	17.846
N		208	
Nagelkerke R <sup>2</sup>		0.261	
-2 log likelihood		174.107	
$\chi^2$ -statistics		37.883	

\* : 10% significant level; \*\* : 5% significant level; \*\*\* : 1% significant level.

We further divided sample firms divided into two groups. Firms that choose to locate in clusters are classified as cluster group, and otherwise noncluster group. Results for the comparison between cluster group and noncluster group are reported in Table 6. As this table shows, firm size (*FSZ*) and pretax profit (*PF*) were not statistically different between cluster group and noncluster group. But, business groups with which firms in noncluster group are affiliated have statistically higher technological capability (*TECH*), network size (*NET*), group size (*GSZ*) and group sales (*GSA*). That is, business group capability and network size of noncluster group is significantly higher than that of cluster group, indicating that firms affiliated with more capable business groups rely more on intra-group support and benefit the least from agglomeration benefits and consequently they locate less in clusters. Thus, Hypothesis 4 and Hypothesis 5 are supported.

Table 6. The comparisons between non-cluster firms and cluster firms

Variables	Code	N	Mean	Std. err	T-test
TECH	0	44	1706.16	2853.69	2.536**
	1	164	573.36	1540.91	
NET	0	44	29.61	35.75	2.321**
	1	164	16.56	20.63	
FSZ	0	44	1628745.07	2745799.02	0.616
	1	164	1336575.73	2964219.11	
GSZ	0	44	126.95	138.39	2.364**
	1	164	75.13	86.24	
GSA	0	44	411431.93	431732.27	3.588***
	1	164	165800.98	272018.37	
PF	0	44	66818.55	169879.61	0.857
	1	164	72916.93	282524.64	

\* : 10% significant level; \*\* : 5% significant level; \*\*\* : 1% significant level.

## Conclusions and Discussions

The objective of this study is to examine how business group characteristics affect location choice and firm performance in the context of emerging economy. Institutional theoretical arguments were made for the importance of business group affiliation in international operations (e.g., Granovetter 1994, Khanna and Palepu 1997, Leff 1978). While support was found for the assertions, we suggest that additional perspectives be incorporated in the analysis of the benefits of business group affiliation. For instance, resource-based theory emphasizes that resources and capabilities of business groups can assist affiliates to accumulate their capabilities and sustain competitive advantages. Our findings suggest that the impact of business group affiliation on firm performance vary depending on the resources and capabilities of business groups. Specifically, being affiliated with business groups does not necessarily improve firm performance. It is the technological capability and network resources of business groups that help firms to outperform their peers. Besides, our findings indicate that firms affiliated with business groups offering less technological support and fewer network resources will be more likely to locate in the clusters. This supports that firms may choose a location to access resources that are not available within groups and further reveals that location strategy can be used to access requisite resources by firms (Alcacer and Chung 2007). Therefore, certain assumptions and notions of the institutional economics

perspective (i.e. uniform business groups) need to be extended to analyze the benefits of business group affiliation.

While the impact of business group affiliation on firm performance has been documented in the literature by several earlier fine-grained studies (e.g., Keister 2000, Khanna and Rivkin 2001, Ma, Yao and Xi 2006), this study integrates resource-based perspective with network theoretical perspective to further examine group-performance relationship. Significantly, the importance of business group affiliation in the emerging market is evident but the importance varies with the resources and capabilities of business groups. Results of the study also indicate that, while foreign firms affiliated with less-capable business groups lack technological support from the group in emerging markets, these firms will access the resources required through location choice. Applied in a broader context, the results of the study suggest that whether a firm choose to be geographically concentrated with peers depends on the characteristics of business groups they are affiliated with.

This study's findings offer several implications for firms in emerging markets seeking to increase their performance. First, this study calls for firms entering emerging market to integrate their own, as well as business groups' resources into strategic planning. That is, firms affiliated with business groups should take note of the importance of group-level capabilities and resources. They should capitalize on their resource base of technological knowledge, skills, and inter-firm relationships by making institutional efforts to internalize the resources within groups in emerging markets. This will reduce the chances of making mistakes due to liabilities of foreignness and decrease costs of doing business abroad. Second, for firms lacking parental or group-level support, an option could be to locate in the clusters with such resources. These clusters allow foreign firms to tap into potential networks belonging to other firms in the clusters and to reap the benefits of knowledge spillovers. Finally, firms affiliated with business groups with smaller network size need to recognize that they are less likely to benefit from internal network so effectively. Therefore, we call for firms that are affiliated firms of smaller groups to find ways to broaden their external networks to accumulate unimitable resources and capabilities. These findings suggest directions for future theoretical development in research on business groups.

In closing, several related avenues that will further our understanding of this topic are suggested as follows. First, while it is evident that group level resources and capabilities facilitate firm-level operations in the emerging market, it is not evident how this resources and capabilities are transferred from parental firm to the focus firm. Therefore, future researchers may want to look into how firms within a group transfer these resources and capabilities to other firms. Second, while this study's focus is on firms' choice of being in the clusters or not, it would be interesting to see whether there are other patterns in firms' location choice and how these patterns are related to business group characteristics. Finally, the underlying bias of this study has been specifically focuses on the beneficial aspects of

technological capability and network resources for firms operating in the emerging market. It would be interesting to investigate whether there are other resources and capabilities important for overseas operations and whether there are any pitfalls to relying on group level resources for operating in foreign countries.

## Acknowledgements

The author is grateful for the comments from the editor and two anonymous reviewers and also acknowledges the financial support from the National Science Council of Taiwan, Republic of China (NSC 96-2416-H-194-032-MY3).

## References

- Alcacer, J. (2006). Location choices across the value chain: How activity and capability influence collocation. *Management Science*, 52(10), 1457-1471.
- Alcacer, J., & Chung, W. (2007). Location strategies and knowledge spillovers. *Management Science*, 53(5), 760-776.
- Almeida, P., & Phene, A. (2004). Subsidiaries and knowledge creation: The influence of the MNC and host country on innovation. *Strategic Management Journal*, 25(8-9), 847-864.
- Amsden, A. H., & Hikino, T. (1994). Project execution capability, organizational know-how and conglomerate corporate growth in Late Industrialization. *Industrial and Corporate Change*, 3(1), 111-147.
- Bain, J. S. (1956). *Barriers to New Competition, Their Character and Consequences in Manufacturing Industries*. Cambridge, MA: Harvard University Press.
- Barney, J. B. (1991). Firm resources and sustainable competitive advantage. *Journal of Management*, 17(1), 99-120.
- Baum, J. A. C., & Haveman, H. A. (1997). Love thy neighbor? Differentiation and agglomeration in the Manhattan hotel industry, 1898-1990. *Administrative Science Quarterly*, 42(2), 304-338.
- Bell, G. G. (2005). Clusters, networks, and firm innovativeness. *Strategic Management Journal*, 26(3), 287-295.
- Caves, R. E. (1996). *Multinational enterprise and economic analysis*. New York : Cambridge University Press.
- Caves, R. E., & Uekusa, M. (1976). *Industrial Organization in Japan*. Washington, D. C.: Brookings Institution.
- Chang, S. J., & Choi, U. (1988). Strategy, structure and performance of Korean business groups: A transactions cost approach. *Journal of Industrial Economics*, 37(2), 141-58.
- Chang, S. J., Chung, C. N., & Mahmood, I. P. (2006). When and how does business group affiliation promote firm innovation? A tale of two emerging economies. *Organization Science*, 17(5), 637-656.
- Chang, S. J., & Hong J. (2000). Economic performance of group-affiliated companies in Korea: Intra-group resource sharing and internal business transactions. *Academy of Management Journal*, 43(3), 429-448.
- Chacar, A., & Vissa, B. (2005). Are emerging economies less efficient? Performance persistence and the impact of business group affiliation. *Strategic Management Journal*, 26(10), 933-946.

- Chung, W., & Alcacer, J. (2002). Knowledge seeking and location choice of foreign direct investment in the United States. *Management Science*, 48(12), 1534-1554.
- Child J., & Tse, D. K. (2001). China's transition and its implications for international business. *Journal of International Business Studies*, 32(1), 5-22.
- Claessens, S., Djankov, S., & Lang, L. H. P. (2000). The separation of ownership and control in East Asian corporations. *Journal of Financial Economics*, 58(1-2), 81-112.
- Dunning, J. H. (1977). *American Investment in British Manufacturing Industry*. London: Allen and Unwin.
- Elango, B., & Pattnaik, C. (2007). Building capabilities for international operations through networks: A study of India firms. *Journal of International Business Studies*, 38(4), 541-555.
- Encaoua, D., & Jacquemin, A. (1982). Organizational efficiency and monopoly power: The case of French industrial groups. *European Economic Review*, 19(1), 25-51.
- Forsgren, M. (2000). Some critical notes on learning in the Uppsala internationalization process model. *Working paper*, Uppsala University.
- Galaskiewicz, J., & Zaheer, A. (1999). Networks of competitive advantage. *Research in the Sociology of Organizations*, 16, 237-261.
- Goto, A. (1982). Business groups in a market economy. *European Economic Review*, 19(1), 53-70.
- Granovetter, M. (1985). Economic action and social structure: The problem of embeddedness. *American Journal of Sociology*, 91(3), 481-510.
- Granovetter, M. (1992). *Problems of Explanation in Economic Sociology*. Boston: Harvard Business School Press.
- Granovetter, M. (1994). Handbook of Economic Sociology. In N. J. Smelser & R. Swedberg (Eds.), *Business Groups* (Chapter 18). Princeton NJ: Princeton University Press, and New York: Russell Sage Foundation.
- Granovetter, M. (1995). Coase revisited: Business groups in the modern economy. *Industrial and Corporate Change*, 4(1), 93-130.
- Granovetter, M. (2005). The impact of social structure on economic outcomes. *Journal of Economic Perspectives*, 19(1), 33-50.
- Gulati, R. (1999). Network location and learning: The influence of network resources and firm capabilities on alliance formation. *Strategic Management Journal*, 20(5), 397-420.
- Gulati, R., Nohria, N., & Zaheer, A. (2000). Strategic networks. *Strategic Management Journal*, 21(3), 203-215.
- Guillen, M. F. (2000). Business groups in emerging economies: A resource-based view. *Academy of Management Journal*, 43(3), 362-380.
- Hamilton, G. G., & Biggart, N. W. (1988). Market, culture, and authority: A comparative analysis of management and organization in the Far East. *American Journal of Sociology*, 94(Supplement), S52-S94.
- Hoskisson, R. E., Eden, L., Lau, C. M., & Wright, M. (2000). Strategy in emerging economies. *Academy of Management Journal*, 43(3), 249-267.

- Huang, Y. (2003). *Selling China: Foreign Direct Investment During the Reform Era*. New York: Cambridge University Press.
- Hannan, M. T., & Freeman, M. (1977). The population ecology of organizations. *American Journal of Sociology*, 82(5), 929-964.
- Hymer S. H. (1976). *The International Operations of National Firms*. Cambridge, MA: The MIT Press.
- Keister, L. A. (2000). *Chinese Business Groups: The Structure and Impact of Interfirm Relations During Economic Development*. Oxford University Press.
- Khanna, N., & Palepu, K. (1997). Corporate scope and institutional context: An empirical analysis of diversified Indian business groups. *Working Paper*, Harvard University.
- Khanna, N., & Palepu, K. (1999). Policy shocks, market intermediaries, and corporate strategy: The evolution of business groups in Chile and India. *Journal of Economics and Management Strategy*, 8(2), 271-310.
- Khanna, N., & Palepu, K. (2000). Is group affiliation profitable in emerging markets? An analysis of diversified Indian business groups. *Journal of Finance*, 55(2), 867-891.
- Khanna, T., & Rivkin, J. W. (2001). Estimating the performance effects of business groups in emerging markets. *Strategic Management Journal*, 22(1), 45-74.
- Khanna, T., & Rivkin, J. W. (2006). Interorganizational ties and business group boundaries: Evidence from an emerging economy. *Organization Science*, 17(3), 333-342.
- Khanna, T., & Yafeh, Y. (2005). Business groups and risk sharing around the world. *Journal of Business*, 78(1), 301-340.
- Kock, C. J., & Guillén, M. F. (2001). Strategy and structure in developing countries: Business groups as an evolutionary response to opportunities for unrelated diversification. *Industrial and Corporate Change*, 10(1), 77-113.
- Kogut, B., & Zander, U. (1992). Knowledge of the firm, combination capabilities, and the replication of technology. *Organization Science*, 3(3), 383-397
- Leff, N. H. (1978). Industrial organization and entrepreneurship in the developing countries: The economic groups. *Economic Development and Cultural Change*, 26(4), 661-675.
- Lu, J. W., & Ma, X. (2008). The contingent value of local partners' business group affiliations. *Academy of Management Journal*, 51(2), 295-314.
- Ma, X., Yao, X., & Xi, Y. (2006). Business group affiliation and firm performance in a transition economy: A focus on ownership voids. *Asia Pacific Journal of Management*, 23(4), 467-483.
- Mahmood, I. P., & Mitchell, W. (2004). Two faces: effects of business groups on innovation in emerging economies. *Management Science*, 50(10), 1348-1365.
- Marshall, A. (1920). *Principles of Economics*. London: Macmillan Press.
- Martin, X., Mitchell, W., & Swaminathan, A. (1995). Recreating and extending Japanese automobile buyer-supplier links in North America. *Strategic Management Journal*, 16(8), 589-619.
- Miller, S. R., & Eden, L. (2006). Local density and foreign subsidiary performance. *Academy of Management Journal*, 49(2), 341-355.

- Nakatani, I. (1984). Economic Analysis of the Japanese firm. In M. Aoki (Ed.), *The economic role of financial corporate grouping*. New York: Elsevier.
- North, D. C. (1990). A transaction cost theory of politics. *Journal of Theoretical Politics*, 2(4), 355-367.
- Peng, M. W., & Delios, A. (2006). What determines the scope of the firm over time and around the world? An Asia Pacific perspective. *Asia Pacific Journal of Management*, 23(4), 385-405.
- Perotti, E. C., & Gelfer, S. (2001). Red barons or robber barons? Governance and investment in Russian financial-industrial groups. *European Economic Review*, 45(9), 1601-1617.
- Powell, W. W., Koput, K. W., & Smith-Doerr, L. (1996). Interorganizational collaboration and the locus of innovation networks of learning in biotechnology. *Administrative Science Quarterly*, 41(1), 116-145.
- Rogers, E. M., & Larsen, J. K. (1984). *Silicon Valley Fever: The Growth of High-Technology Culture*. Baker & Taylor Books.
- Shaver, J. M., & Flyer, F. (2000). Agglomeration economies, firm heterogeneity, and foreign direct investment in the United States. *Strategic Management Journal*, 21(12), 1175-1193
- Tirole, J. (1997). *The Theory of Industrial Organization*. Cambridge, MA: The MIT Press.
- Wan, W. P., & Hoskisson, R. E. (2003). Home country environments, corporate diversification strategies, and firm performance. *Academy of Management Journal*, 46(1), 27-45.
- Weber, A. (1929). *On the Location of Industries*. Chicago: University of Chicago Press.
- Wei, Y. A., & Balasubramanyam, V. N. (2004). *Foreign Direct Investment: Six Country Case Studies*. Northampton, Mass.: Edward Elgar Publishing.
- Welch, D. E., & Welch, L. S. (1996). The internationalization process and networks: A strategic management perspective. *Journal of International Marketing*, 4(3), 11-28.
- Welch, D. E., Welch, L. S., Young, L. C., & Wilkinson, I. F. (1998). The importance of networks in export promotion: policy issues. *Journal of International Marketing*, 6(4), 66-82.
- Wright, M., Filatotchev, I., Hoskisson, R. E., & Peng, M. K. (2005). Strategy research in emerging economies: Challenging the conventional wisdom. *Journal of Management Studies*, 42(1), 1-33.
- Yiu, D., Bruton, G. D., & Lu, T. (2005). Understanding business group performance in an emerging economy: Acquiring resources and capabilities in order to prosper. *Journal of Management Studies*, 42(1), 183-206.
- Zaheer, S. (1995). Overcoming the Liability of Foreignness. *Academy of Management Journal*, 38(2), 341-363.
- Zaheer, S., & Mosakowski, K. (1997). The dynamics of the liability of foreignness: a global study of survival in financial services. *Strategic Management Journal*, 18(6), 439- 463



## FINANCIAL SUPPLY CHAIN MANAGEMENT – CHALLENGES AND OBSTACLES

Peter Kristofik<sup>1</sup>, Jenny Kok, Sybren de Vries, Jenny van Sten-van't Hoff<sup>2</sup>

<sup>1</sup> Faculty of Economics, Matej Bel University in Banska Bystrica, Slovakia

<sup>2</sup> Rotterdam Business School, Netherlands

***Abstract.** Financial supply chain is all about the movement of money along the chain. To optimize these financial processes, Financial Supply Chain Management (FSCM) helps companies looking from a more external point of view to the whole chain. This holistic approach is focusing on collaboration with other parties within the chain. The paper is aimed at finding differences in Working Capital Management (WCM) between Small and Medium sized Enterprises within the Dutch and Slovakian construction industry. Furthermore, the focus of the research is on finding a way a Small and Medium sized Enterprise can improve its WCM. A Case Study research method is used, because a rich understanding of the context of the research is gained. The primary data of this research is obtained via questionnaires whereas the secondary data is collected and gathered via databases. Research has shown that there are big differences in the way working capital is optimized between SMEs within the Dutch and Slovakian construction industry as well as opportunities for application of FSCM.*

*Keywords: working capital, financial supply chain, construction industry*

### Introduction

The current global economic unpredictability and the resulting tightening of credit is impacting trade flows and extending financial pressure not only on global buyers, but also on a growing number of global suppliers. The result is an increase in risk that firms need to proactively manage. Financial supply chain programmes get more popular as a way for large buying entities to protect strategic components of their supply chain.

Many companies recognize the importance of working capital management to support their business in difficult times, and many have begun to look across the financial supply chain for opportunities to improve processes and unlock trapped cash. To achieve long-term cash optimization, companies need an integrated and sustainable approach to liquidity management, including measurable objectives and key performance indicators. This requires a systematic and consistent approach offered by financial supply chain management.

The goal of financial supply chain management is to obtain visibility over processes, such as purchase-to-pay and order-to-cash cycles, as well as processes involved in ordering, invoicing, reconciliation and payment. Companies often overestimate their ability to extend payment terms with their suppliers. They lack awareness of financing opportunities which may add value to the firm, and most SME's do not know how working capital is optimised.

---

<sup>1</sup> The paper was prepared partially within the research project VEGA 1/0967/11 "Innovative approaches to the system of company's performance measurement".

The paper starts with discussing the concept of financial supply chain management, to be followed by the research method and the findings, exploring practices in the Dutch and Slovak SME's in the construction industry.

## Theoretical background

### *Financial supply chain*

Financial Supply Chain Management is about looking at how to optimise working capital of a company, not only from an internal point of view, but also from an external point of view (from the point of view of other parties within the chain). This optimisation can be achieved by collaboration in managing accounts payable, accounts receivable, cash and risk. Eventually, the goal is to obtain visibility over the purchase-to-order and order-to-cash processes. This can lead to efficiencies and cost savings throughout the chain. The better the parties know how and where the cash flows throughout the chain (in other words, better visibility), the better companies may optimise these flows and may need less working capital resulting in less credits to be obtained from banks. This will lead to cost savings for all parties (Treasury Today, 2007), and consequently, to more investment opportunities.

Companies generally focus on their supply chains when they are interested in the following issues (Krištofik, 2010):

- Obtaining visibility over all the processes involved in the financial supply chain.
- Increasing efficiencies throughout the chain.
- Reducing costs throughout the chain.
- Freeing up working capital by obtaining a clearer picture of where funds are required.
- Adopting a collaborative approach towards other parties in the chain.

Appropriate financing techniques are needed to benefit from the collaborative approach. That also counts for right liquidity structures. If liquidity structures are all different within the chain, it can affect the benefits of FSCM in a negative way by not working as optimal as possible. Besides, efficient internal processes are required to optimise a financial supply chain, because, if the internal processes are not efficient, the total chain cannot be efficient. Efficient internal processes are therefore a requirement to optimise a financial supply chain. Furthermore, effective collaboration with financial partners is a must, because all parties involved depend on each other to achieve optimisation (Cronie, 2008).

Cronie (2008) describes the following limitation of a Financial Supply Chain: “An optimised financial supply chain requires efficient internal processes, effective collaboration with financial partners, the right liquidity structures and the use of appropriate financing techniques.” Cronie (2008) wants to prove with this statement that many factors are important for an optimised Financial Supply Chain. If one of the factors is lacking, the Financial Supply Chain may not be as optimised as it could be. Stephenson and Hutter (2009) add another factor that is important in order to optimise the Financial Supply Chain: there is a “need to implement technology, for instance to ensure that files of approved payments can be routed from buyer to bank and from bank to suppliers”.

Furthermore, Cronie (2008) mentions the problem that different departments are holding responsibilities (e.g. treasury, trade finance, accounts payable and accounts receivable) that are all elements of the Financial Supply Chain. These different responsibilities among departments make it difficult for a Financial Supply Chain to function smoothly. Each

department has its own objectives and performance measurements which can be different from the overall Financial Supply Chain objectives and performance measurements.

### *Working Capital Management*

From an accounting point of view, Sanders (2006) defines working capital as “the difference between short-term assets and short-term liabilities. Cronie (2008) gives the following definition of working capital: “the amount of cash which a company requires to fund the difference between payment and collection”. Van Thienen (2011) criticises the definition of Cronie. He argues that working capital “represents the liquidity a business requires for day-to-day operations”.

Mathur (2002) defines WCM as “the management of current assets and the entire current liabilities, as also a portion of long-term or deferred liabilities, which go to meet the financial requirements of working capital“. Krištofik (2010) has another definition for WCM: “Working capital management is the part that sits between the purchase-to-pay and order-to-cash cycles “.

The goal of WCM is to keep working capital on an optimal level. This optimal level is the level needed in order to meet the obligations of the company without having excessive levels of cash. WCM is concerned with the cash flows moving around the company and it is a big advantage if a company has a clear picture of where funds are required. Nevertheless, it is important to know that working capital levels differ between industries. Working capital would not exist if every product sold was distributed on the same days as the invoice was raised and paid (Treasury Today, 2007).

The amount of necessary working capital depends on several factors. According to Mathur (2002) the amount of working capital a company requires largely depends on:

- Nature of business (e.g. automobiles)
- Seasonal character of industry (e.g. fans)
- Production policy (e.g. varying with peak and slack season)
- Market conditions (e.g. competition)
- Supply condition (e.g. materials)

However, WCM is not only concerned with payables and receivables. Inventory management and cash management are important aspects as well. The longer inventory is held, the longer cash is tied up and will not be directly available for the company (Treasury Today, 2007).

According to Cronie (2008), good WCM is providing the following benefits: “reducing the working capital requirement enhances the balance sheet and reduces the need for short term borrowing. Furthermore, it improves financial ratios and therefore increasing the ability to obtain financing for more strategic purposes “.

According to Bhattacharya (2008) a limitation concerning WCM is the “currentness of assets and liabilities that enter into the domain of WCM”. If some assets are not as current as the liabilities used in the WCM, it can lead to difficulties to make proper decisions. Furthermore, the maturity period of an item can be different from company to company. “In case of both current liabilities and current assets, there may be firms where maturity period of any of the items may be more than a year. If, therefore, we follow the logic of ‘natural business year’, then the true operating cycle of a business should be either the days of current assets or current liabilities whichever is higher. Only in such an operating cycle all current items will mature (Bhattacharya, 2008, p. 7).”

“Poor working capital performance is a symptom of a breakdown in business or financial processes that are also impacting on your ability to generate revenue and earnings (Sanders, 2006).” This means that poor WCM eventually has a negative effect on generating revenue and earnings.

### *Supply Chain Financing*

Supply Chain Financing (SCF) is a product offered by banks to realise lower prices for credits. This product is offered to the supplier on the basis of the creditworthiness of the buyer. Credits can therefore be offered at a lower rate of financing than the supplier would be able to negotiate on its own. The Aberdeen Group defines Supply Chain Financing as: “A combination of trade financing provided by a financial institution, a third-party vendor, or a corporation itself and a technology platform that unites trading partners and financial institutions electronically and provides the financing triggers based on the occurrence of one or several supply chain events (Kerle, 2009).”

Key performance indicators for financial flows include the following (Hausman, 2003):

- Days of working capital (DWC)
- Days of sales outstanding (DSO)
- Days of inventory (DIO) Days payables outstanding (DPO)
- Other important characteristics of financial flows are:
- Reliability of payment methods
- Predictability of payment inflows and outflows
- Information management (invoice-level data with financial data).

The financial flow management challenges such as slow processing, unreliable and unpredictable cash flows, costly processes, high DSO and suboptimal credit decisions require higher working capital than needed. If these challenges were removed, the cash saved could be shifted to more valuable users.

Underlying business arrangements between buyer and supplier need to be taken into account by banks. This will provide the bank a better insight of the risks the SCF packages are bringing along. According to the Bank of America “A SCF programme requires customised solutions tailored to a buyer’s business, systems and processes (Bank of America, 2009).” However, Jacquot (2011) does not agree with the statement of the Bank of America. He argues: “The corporate must avoid a custom-built SCF programme “.

Implementing SCF packages by banks is not always that easy. Wohlgeschaffen (2010) describes in his article the challenges of implementing a SCF package: “It was a challenge to make sure that the system was able to deal with credit notes and different currencies as well as individual limits for each supplier in order to mitigate or reduce risk to the buyer”.

When a buyer wants to implement a SCF programme, several objectives need to be taken into account. According to the Bank of America the objectives of SCF are:

- To improve a supply chain’s working capital:
- To enable a buyer to extend the payment terms of domestic and foreign suppliers.
- To give suppliers access to affordable liquidity by leveraging the buyer’s stronger credit rating.
- To create a value exchange that translates into extended DPO or lower COGS for the buyer and affordable access to liquidity for the seller.

According to Philipps (2007), this is the moment to improve relationships and loyalty by offering suppliers SCF packages: “Yet, this is an opportunity for buyers to develop strong reciprocal relationships of trust and loyalty by offering suppliers supplier finance packages”.

Main benefits of SCF are: “SCF enables sellers to reduce receivables as a lower-cost source of financing while lowering Days Sales Outstanding and limiting credit risk exposure (Bank of America, 2009).” Friede (2010) supports the statement of the Bank of America by mentioning something similar, “They can reduce unitisation of their own credit lines and optimise their own working capital through a reduction of Days Sales Outstanding”.

SCF brings several other benefits along. For instance, buyer, bank and supplier benefit from cost reduction as well as risk mitigation. Moreover, qualitative benefits can be achieved as well, for instance greater visibility and transparency in the trading process, which provides additional confidence for banks. It will be clearer for banks what amounts of money flow throughout the chain. Furthermore, it will provide the banks with more information about the current situation of the buyer (Wohlgeschaffen, 2010; Stephenson and Hutter, 2009).

Wohlgeschaffen (2010) agrees with the statement of the Bank of America by mentioning the benefit: “Conversion of accounts receivable to cash through attractively priced, true non-resource sale and cheaper cost of finance (based on buyer’s credit risk) and improvement of financial ratios (Wohlgeschaffen, 2010).” Cronie (2008) adds to this statement: “SCF has substantial potential to enhance cash flow and DPO for buyers and improve cash flow and finance costs for suppliers”.

Philipps (2009) argues that there are some conditions that need to be done before a SCF project can become a success. Without these conditions, the benefits of a SCF project will not be as successful as it might be. “In order for the supply chain financing project to be a success, a corporate, with its bank’s assistance, needs to get the major stakeholders on board, whether that is within the many different entities of the corporate or in its suppliers’ organisations. Without this buy-in, the project will not deliver the benefits to treasury operations that are needed in today’s economic climate.”

An online trade finance facility is necessary to make a SCF programme a success. “The launch of a successful online trade finance facility has – in recent years – proved to be the backbone to success in offering efficient supplier finance solutions for clients (Philipps, 2007).”

### *Purchase-to-pay Cycle*

The purchase-to-pay cycle deals with the payables of a company. Krištofik (2010) defines the purchase-to-pay cycle as follows: “The purchase-to-pay cycle is the trade cycle from the point of view of the company making a purchase. During the purchase-to-pay cycle, the company selects, receives and pays for the materials or other inputs needed in order for it to produce its goods or services”. To measure the average number of days taken by a company to pay its creditors in a given period, the Days Payables Outstanding (DPO) formula can be used.

In case of cash payment directly, a company has to take opportunity costs into account. According to Van Sten & Knapen (2009), “An opportunity cost is one that measures the opportunity that is lost or sacrificed when the choice of one course of action requires that an alternative course of action be given up...” If a company holds too many products in its warehouse, it will have high storage costs. Besides, if a company has a shortage of goods, it may face lost sales.

“From a working capital perspective, ideally DPO should be as high as possible as this means that the cash is available to the company for longer (Treasury Today, 2007).” A high DPO has the same effect as high Accounts Payable. However, there is some criticism on this statement. Negative consequences for high accounts payable can be “sacrificing early

payment discounts or adversely affecting the company's relationship with its existing and potential future suppliers (Treasury Today, 2007)." Cronie (2008) agrees with this criticism by stating: "In addition to processing, managing payments is also a strategic element of working capital to ensure that the company is able to take advantage of early payment discounts offered by suppliers where these are beneficial." Both authors focus on the early payment discount that companies forgo in case of late payment.

According to Mathur (2002) these are some limitations: "If we would be taking these figures from the balance sheet of the company, we may have to take the average by adding the closing balances of the two successive years divided by two. But, with a view to getting a more accurate and realistic picture, we may take the total of month-end figures for the last twelve months divided by 12, or better still, if we take the weekly figures for the last 52 weeks and divide the total by 52". Mathur (2002) describes clearly the problem of what figures to take when calculating.

### *Order-to-cash Cycle*

Bhattacharya (2008) defines accounts receivables as follows: "Accounts receivables are created by a firm when it sells its outputs on credit". The order-to-cash cycle relates to a company's receivables. The order-to-cash cycle is the same cycle as the purchase-to-pay cycle, however, from a supplier's perspective. Křištofik (2010) defines the order-to-cash cycle as follows: "It begins when a quote is prepared for a customer and ends when payment has been received and reconciled with the appropriate invoice".

To measure the average number of days taken by a company to collect payment from completed sale in a given period, the Days Sales Outstanding (DSO) formula can be used. "The lower the DSO, the faster payment is collected and the sooner cash can be used for other purposes (Treasury Today, 2007)."

According to Cronie (2008), prioritising collections is more valuable than payments, because benefits are more tangible and receivables are sometimes the largest or second largest asset on SME's balance sheets.

A criticism concerning accounts receivables is that selling on credit is more expensive than cash sales. "It involves more paperwork, more control and the risk involved is higher (van Sten & Knapen, 2009)." The limitations described by Mathur (2002) on accounts payables and the calculation of the DPO also counts for accounts receivables and the calculation of the DSO.

A company usually does not know beforehand which receivables will become uncollectible. "Accounts receivable are shown in the balance sheet at the estimated collectible amount, the net realisable value. An account receivable that has been determined uncollectible is no longer an asset (van Sten & Knapen, 2009)." So, receivables need to be shown at net value.

Furthermore, DSO is very sensitive to the pattern of sales. "If sales are decreasing, DSOs would tend to fall even if there is no change in the payment behaviour of the customers. Thus changes in DSOs may be misleading if sales vary, such as with seasonal sales (Kallberg and Parkinson, 1993, p. 271).

## **Research Method**

The research is an explanatory case study based on working capital management in SMEs in the Dutch and Slovak construction industry.

The primary data of this research are obtained via interviews and questionnaires. The secondary data are collected and gathered via databases, books, and journals. To ensure validity and reliability, the same questions were asked to all participants.

To obtain information concerning bank products related to FSCM, in-depth interviews were held with managers in the ING bank and the Royal Bank of Scotland.

The quantitative data obtained were used to support the qualitative data. The quantitative information gives an idea of the financial situation of the selected companies by using two liquidity ratios, the current and quick ratio, as well as the 'Days Sales Outstanding (DSO)', 'Days Payments Outstanding (DPO)' and the 'Days Inventory Outstanding (DIO)'.

However, using ratios for gathering the quantitative data brings along some limitations as outlined in previous section. The financial data (for the current ratio and quick ratio in the years 2008 – 2010) of the SMEs in the Dutch construction industry are gathered via the online database 'Company Info'. The financial data of SMEs in the Slovak construction industry is obtained via the questionnaire (years 2008 – 2010).

Fourteen interviews were held in SMEs in the Dutch construction industry. The selected companies were contacted by phone, after being selected on their industry (construction), size (SME) and location (province 'Zuid-Holland'). During these interviews, the questionnaire, which is the same for SMEs in the Slovak and Dutch construction industry, was discussed and filled in by the interviewee. Additional open questions were asked to find out more about strategies, knowledge of and experience with FSCM and SCF.

Five Slovak companies, selected in the database from The Association of Construction Entrepreneurs of Slovakia, submitted answers to the questionnaire.

Limitation of the research was the limited number of companies willing to participate. Moreover, the construction industry consists of all sorts of companies, such as constructors, subconstructors, etc.), some of which are really small and without inventories.

## Findings

The interviews revealed that working capital is a major concern for all parties involved in the financial supply chain. Suppliers want to receive their payments as fast as possible; while buyers want to wait as long as possible to do the payments. However, suppliers may have to increase prices due to extra costs they will face by extending the payment terms. Some suppliers may face so many financial difficulties that they will be driven out of business. This will automatically have a negative effect on the buyer, because he will lose one of his suppliers. Therefore, different parties within the chain should start collaborating with each other. Financial Supply Chain Management (FSCM) helps parties involved in the chain looking from a more holistic approach, as Oskam said in an interview.

A holistic approach helps companies to consider the processes associated with the movement of cash. The focus is on financial processes. FSCM can help SMEs obtaining credits easier, something that has, in general, been a problem for many SMEs since banks are more hesitant in giving loans after the crisis. In the pre-crisis period, SMEs have benefited from the relatively low financing costs: cash was available and cheap. However, after the crisis, SMEs were badly hit, because their financing costs increased. Collateral requirements increased and loan limits decreased. At the moment, SMEs still have difficulties to get enough credits. Therefore, collaborating with other parties in the financial supply chain may help to obtain credits at an attractive rate.

To make collaboration easier within the financial supply chain, automated business processes are key factors for success. Concerning invoices, companies are still using paper rather than electronic invoices. Paper invoices are much more sensitive for postal delays, data entry errors and the loss of paper invoices. Costs are not even mentioned. Electronic invoices (e-invoicing) are much faster, safer and easier to use, because details will be directly recorded in the system. However, companies are still quite reluctant to implement the e-invoicing

system, because of the general lack of consensus on standards and the difficulties it will face in persuading suppliers to change to an e-invoicing system as well. Due to the fact invoices are sometimes not used in the most optimal way, credits are held longer, which negatively affects the working capital.

The same problem counts for payments. Paper processing is often still used, which can cause huge delays. The solution will be electronic payments. Most of the Dutch companies already use electronic payments. However, for a well-functioning and effective financial supply chain management, all parties in the chain should use electronic payment systems.

By automating processes in the financial supply chain, a large collaborative platform will be necessary. This platform should span the entire financial supply chain, covering for instance, status updates, document matching, payments, purchase order distribution and invoice submission. A holistic approach to liquidity management enhances process efficiency due to the use of electronic invoices and electronic payments.

Supply Chain Finance products have existed for a while. The ‘Asset-Based Financing’ is the traditional and still the most used Supply Chain Finance variant in business. Examples include selling receivables at a discount to a financial institution or using different stages in the supply chain, such as inventory, receivables and purchase orders as assets for loan collaterals. This variant is known as ‘Factoring’. However, the ‘Buyer-Led Financing’ is the Supply Chain Finance variant in this research. It is led by buyers (customers) rather than sellers (suppliers). This variant is called ‘Supply Chain Financing’ (SCF) and is also known as ‘Reverse factoring’ or ‘Supplier finance’. The question is how to optimise the chain and make sure suppliers have possibilities to obtain credits at attractive rates.

SCF works as follows: companies with a strong credit rating can support their suppliers, which eventually will lead to benefits on both sides. The buyer will have longer payment terms which will provide them greater cash flexibility and reduce reliance on external sources of working capital. It will also extend the Days Payables Outstanding (DPO) of the buyer. The supplier will gain earlier payments and will benefit from a lower rate of financing from their buyer’s bank as well as access to immediate liquidity. Furthermore, it will lower the Days Sales Outstanding (DSO) of the supplier and it will limit credit risk exposure. Eventually this product will enhance the stability of the financial supply chain.

The use of e-invoicing is a need for companies that want to join a SCF programme. The main difference between SCF (Buyer-Led Financing) and factoring (Asset-Based Financing) is that the risk of the bank is concentrated on a single buyer, as with factoring it is concentrated on one seller (supplier), and many buyers. Nowadays, SCF programmes are mostly used in industries or companies in which working capital is relatively high.

A challenge for banks, when offering Supply Chain Finance products, is to know the creditworthiness of the supplier and the buyer. By focusing on the suppliers (which can be difficult, because there can be many) it is important to be aware of the risks. Problems or risks that banks face include a supplier already receiving cash from the buyers bank (part of the SCF programme), but the buyer not yet having received the products from the supplier. This means the bank takes a risk if the supplier goes bankrupt. Since the buyer has not yet received products, he may not pay the bank. Therefore, the creditworthiness of the suppliers is very important.

SCF programmes are always customised, because every buyer has its own, different, suppliers. No SCF programme is identical.

SCF is offered in the Netherlands by Royal Bank of Scotland, ING, CitiBank and BNP Paribas. ASYX is a Supply Chain Finance services company, helping companies to find supply chain finance solutions.

Factoring (‘Asset-based Financing’) is offered in the Netherlands by many banks and factors such as Rabobank, De Nederlandse Krediet- en Factormaatschappij and ABN-AMRO.



According to Mikoviny, working for the ING bank in the Slovak Republic, products related to Supply Chain Finance (SCF) are not yet offered in the Slovak Republic, because the country is not yet ready for these modern bank products. SCF or 'Reverse factoring' is a modern variant of traditional factoring. Traditional factoring ('Asset-based Financing') is offered by several banks and factors in the Slovak Republic (Slovenská sporiteľna, Tatra banka, Volksbank Slovensko and VUB Factoring, a.s.).

The Royal Bank of Scotland in the Netherlands offers liquidity and electronic services, such as electronic invoicing platforms that enable suppliers to send their invoices via this platform and the bank can automatically provide the credit to the supplier based on the e-invoice.

The costs of starting a SCF programme differ per buyer. If the buyer has a lot of suppliers, the costs will be higher. The bank has to evaluate suppliers' financial position to judge their creditworthiness and reliability.

#### *Experiences of SMEs within the Dutch construction industry*

FSCM is not well known within the Dutch construction industry, because the industry is very conservative and traditional. Competition is high and margins are low. Instead of collaboration, companies demolish each other. However, collaboration with preferred suppliers takes place.

The construction industry has the advantage that most companies have had long relationships with their banks (like the Royal Bank of Scotland has with its clients). Banks know the companies and companies know what to expect from the banks. However, a disadvantage is the volatility in demand, particularly at the moment when firms face a financial crisis.

#### *The SCF product and e-invoicing*

None of the companies that filled in the questionnaire and have been interviewed have a SCF programme. One of the conditions of implementing a SCF programme is to make use of e-invoicing with a XML standard. Since 2004, 'Sales in de bouw', an initiative of 'Bouwend Nederland', started to stimulate the whole construction chain to change to automated business processes like electronic invoicing (with the use of the XML standard). As an independent party they offer the guidance and help for a smooth implementation within the chain. All parties within the chain (e.g. subcontractors, constructors) can participate in this programme by paying a yearly fee.

Interviewees mentioned the following reasons for not using e-invoicing:

- Companies have to invest a lot.
- Companies do not see the benefits of e-voicing.
- Constructors do not want to use it (important party within the chain).
- Automation systems in use do not offer the possibility of implementing e-invoicing.

Due to the financial crisis, SMEs in the Dutch construction industry started to have difficulties in getting credits from banks. Banks became stricter and demand higher requirements. The role of the bank changed as well according to the interviewees. Companies first have to find ways to get money somewhere within the chain instead of going directly to the bank.

*Selected ratios concerning working capital*

## DSO (Days Sales Outstanding) ratios

Dutch industry:	Slovak industry:
2010 = 42 days	2010 = 35 days
2009 = 46.5 days	2009 = 39.5 days
2008 = 48.5 days	2008 = 33 days

The average number of days it takes before sales on credit are paid by buyers has been decreased over the last three years for SMEs in the Dutch construction industry. Within the Slovakian construction industry, the number of days decreased as well in 2010. However, it is still not on the level that companies had in 2008. In overall, SMEs in the Dutch construction industry need more days to receive their payments as SMEs in the Slovakian construction industry.

## DPO (Days Payables Outstanding) ratios

Dutch industry:	Slovak industry:
2010 = 41.5 days	2010 = 46.5 days
2009 = 44.5 days	2009 = 48 days
2008 = 47 days	2008 = 43 days

The average number of days it takes before invoices are paid by the companies that filled in the questionnaire has been decreased over the last three years for SMEs within the Dutch and Slovakian construction industry. This has mainly to do with the fact that many suppliers wanted their buyers to pay sooner. Therefore the payment periods became shorter. For both, SMEs within the Dutch and Slovakian construction industry, the number of days is more or less the same.

## DIO (Days Inventory Outstanding) ratios

Most constructors do not have inventories, because everything is ordered when needed and is sent directly to the place where it is needed (JIT principle). The only inventories they have are work-in-progress.

Dutch industry:	Slovak industry:
2010 = 30 days	2010 = 38 days
2009 = 31.5 days	2009 = 42.5 days
2008 = 34 days	2008 = 46 days

The average number of days it takes before inventory was changed into cash has been decreased over the last three years among the five Dutch and five Slovakian companies that filled in the DIO ratio. As mentioned before, many companies in the construction industry do not have inventories (or just a really small inventory, e.g. screws). They have only 'work in progress (the buildings which are still under construction).

## Outcomes CCC (Cash Conversation Cycle) ratios

Dutch industry:	Slovak industry:
2010 = 35 days	2010 = 27 days
2009 = 40 days	2009 = 34 days
2008 = 41 days	2008 = 35 days

The average number of days it takes to convert company's resources into cash has been decreased over the last three years among the five Dutch and five Slovakian companies that filled in the DIO ratio. The DIO ratio has to be known to calculate the CCC. Therefore of only five SMEs within the Dutch construction industry the CCC ratio is known.

## Conclusions

Effective supply chain management requires a different approach to doing business than many companies have had in the past. In particular, collaboration and transfer of information between different departments managing each element of the supply chain is a key.

A holistic approach to liquidity management may enhance process efficiency due to the use of electronic invoices and electronic payment. Finance divisions need to be more innovative in the ways they raise finance and manage liquidity.

By implementing electronic data transfer, companies can increase their competitiveness, freeing up working capital and reducing risk. Companies which ensure that their internal processes are aligned with the new opportunities are likely to derive the greatest benefits.

Since the financial crisis financial markets are failing with increasing number of distortions. Companies can use the financial crisis as an opportunity to rethink their business model. Both the Dutch and the Slovak construction industry may benefit by paying more attention towards their financial supply chain management. This requires also further development of research in the area of short term financial management and tools for a more accurate risk management.

## References

- Allman-Ward, M. & J. Sagner (2003). *Essentials of Managing Corporate Cash*. New Jersey: John Wiley & Sons.
- Arnold, G. (2008). *Corporate Financial Management*. Harlow: Pearson Education Ltd.
- Bhattacharya, H. (2008). *Working Capital Management: Strategies and Techniques*. New Delhi : 2n PHI Learning Private Ltd.
- Bragg, S. M. (2010). *Treasury Management: The Practitioner's Guide*. New Jersey: John Wiley & Sons, Inc.
- Bragg, S. M. (2007). *Business Ratios and Formulas: A Comprehensive Guide*. New Jersey: John Wiley & Sons, Inc.
- Brigham, E. F. & Ehrhardt, M. C. (2010). *Financial Management: Theory and Practice*. Mason: Nelson Education, Ltd. (p. 109)
- Dalmia, S. (2008). *Financial Supply Chain*. New Delhi: Tata McGraw-Hill Publishing Company Ltd.
- Hausman, W.H. (2003). *The Practice of Supply Chain Management*. Wolters Kluwer.
- Horcher, K. A. (2006). *Essentials of Managing Treasury*. New Jersey: John Wiley & Sons.
- Krištofik, P. (2010). *Challenges in the Financial Supply Chain*. In Conference Day 2010 proceedings. Aachen: Verlag GmbH.
- Mathur, S.B. (2002). *Working Capital Management and Control: Principles and Practice*. New Delhi: New Age International Ltd.
- McLaney, E. & Atrill, P. (2005). *Accounting: An Introduction*. Harlow: Pearson Education.
- Pardalos, P. M., Migdalas A. & Baourakis, G. (2004). *Supply Chain and Finance*. Singapore: World Scientific Publishing Co. Pte. Ltd.
- Sagner, J. (2011). *Essentials of Working Capital Management*. New Jersey: John Wiley & Sons, Inc.
- Siddiqui, S. A. (2006). *Managerial Economics and Financial Analysis*. New Delhi: New Age International Ltd.
- Sten, J. van & Knapen P. (2009). *Creating a business*. Groningen : Noordhoff
- Yin, R. B. (2009). *Case Study Research: Design and Methods*. 4th ed. Thousand Oaks: SAGE Publications, Inc.
- Electronic Media:  
Bank of America. (2009). *Supply Chain Finance*. Bank of America [Online]. Available from: <http://corp.bankofamerica.com/publicpdf/products/trade/scm-finance.pdf> [Accessed 2 May 2011].

- Cronie, G. (2008). ING Guide to Financial Supply Chain Optimisation. ING Wholesale Banking [Online]. Available from: <http://www.treasury-management.com/showarticle.php?article=1032> [Accessed 29 April 2011].
- Friede, M. (2010). Supplier Finance to Enhance Working Capital and Reduce Risk. Bayer Material Science [Online]. Available from: <http://www.treasury-management.com/showarticle.php?article=1472&pubid=1&issueid=165> [Accessed 2 May 2011].
- Hughes, M. (2010). Financial Supply Chain Management: Banking Relationships. Bottomline Technologies [Online]. Available from: <http://www.gtnews.com/financialsupplychain/default.cfm?s2=432> [Accessed 12 May 2011].
- Jacquot, F. (2011). Supply Chain Finance: The Recipe for a Financial Layer Cake. Corporate LinX [Online]. Available from: <http://www.gtnews.com/article/8263.cfm> [Accessed 12 May 2011].
- Jacquot, F. (2010). Supply Chain Finance in Europe. Corporate LinX [Online]. Available from: <http://www.gtnews.com/financialsupplychain/default.cfm?s2=438> [Accessed 12 May 2011]
- Kerle, P. (2007). The Role of Supply Chain Finance in Europe. Demica [Online]. Available from: <http://www.gtnews.com/article/6640.cfm> [Accessed 12 May 2011].
- Kerle, P. (2008). Trends in Supply Chain Finance. Demica [Online]. Available from: <http://www.gtnews.com/financialsupplychain/default.cfm?s2=438> [Accessed 2 May 2011].
- Kerle, P. (2009). The Growing Need for Supply Chain Finance. Demica [Online]. Available from: <http://www.gtnews.com/article/7625.cfm> [Accessed 12 May 2011].
- Lawson, P. (2009). Financial Supply Chain Management: Unleashing Capital to Make Gains. Lawson [Online]. Available from: <http://www.lawson.com/lpod/white+paper/english/13611> [Accessed 2 May 2011].
- McMahon, D., Vandenhaute D. & Böhme, M. (2011). The PwC European Working Capital Study, Cash release from the supply chain remains the biggest challenge. PwC [Online]. Available from: <http://www.treasury-management.com/showarticle.php?article=1656&pubid=4&issueid=189> [Accessed 21 June 2011].
- Philipps, F. (2009). Challenges and Elements of Success in Supply Chain Finance. Deutsche Bank [Online]. Available from: <http://www.gtnews.com/article/7591.cfm> [Accessed 12 May 2011].
- Philipps, F. (2007). Innovation Continues in Financial Supply-Chain Management. Deutsche Bank [Online]. Available from: <http://www.treasury-management.com/showarticle.php?article=395> [29 April 2011].
- Richman, J. and Schmand, D. (2010). Financial Supply Chain Solutions: Key Issues for Corporates. Deutsche Bank [Online]. Available from: <http://www.gtnews.com/article/7956.cfm> [Accessed 12 May 2011].
- Sanders, H. (2006). Cash down the Drain? Tap into Working Capital Optimization. TMI USA [Online]. Available from: <http://www.tmi.co/showarticle.php?article=200&pubid=4&issueid=3> [Accessed 2 May 2011].
- Stendevad, C., Shivdasani, A., Butt, S., Pakenham D., & Bequillard, A. (2009). Putting Working Capital to Work-Releasing Capital by Accelerating the Cash Conversion Cycle. Citi Investment Banking [Online]. Available from: <http://www.treasury-management.com/showarticle.php?article=1262> [Accessed 2 May 2011].
- Stephenson, M. & Hutter, L. (2009). Supply Chain Finance: Releasing working capital within the supply chain. Deloitte [Online]. Available from: [http://www.deloitte.com/assets/Dcom-Switzerland/Local%20Assets/Documents/EN/Consumer%20Business/Consumer%20packaged%20goods/UK\\_CB\\_SupplyChainFinance.pdf](http://www.deloitte.com/assets/Dcom-Switzerland/Local%20Assets/Documents/EN/Consumer%20Business/Consumer%20packaged%20goods/UK_CB_SupplyChainFinance.pdf) [Accessed 12 May 2011].
- Striano, R. (2010). Financial Supply Chain: Bringing Suppliers on Board. Deutsche Bank [Online]. Available from: <http://www.gtnews.com/article/8046.cfm> [Accessed 12 May 2011].
- Thienen, S. van. (2011). Working capital optimisation. Deloitte [Online]. Available from: [http://www.deloitte.com/view/en\\_BE/be/services/consulting-services/supply-chain-management/supply-chain-strategy/working-capital-optimization/index.htm](http://www.deloitte.com/view/en_BE/be/services/consulting-services/supply-chain-management/supply-chain-strategy/working-capital-optimization/index.htm) [Accessed 27 June 2011].
- Treasury Today. (2007). Introduction to Financial Supply Chain Management. Treasury Today [Online]. Available from: <http://treasurytoday.com/2007/01/introduction-to-financial-supply-chain-management> [Accessed 29 April 2011].
- Wohlgeschaffen, M. (2010). Financial Supply Chain & Working Capital Management. UniCredit [Online]. Available from: [www.gtb.unicredit.eu/sites/default/.../Supply\\_Chain\\_and\\_working\\_capital.pdf](http://www.gtb.unicredit.eu/sites/default/.../Supply_Chain_and_working_capital.pdf) [Accessed 29 April 2011].

***Section 2:***  
***Finance and Risk Perspectives***

## A COMPARISON OF DIFFERENT FAMILIES OF PUT-WRITE OPTION STRATEGIES

Lucia Del Chicca<sup>1</sup>, Gerhard Larcher<sup>2\*</sup>

<sup>1,2</sup>Institute of Financial Mathematics, University of Linz, Austria

\* supported by the Austrian Science Fund (FWF), Projects P21196 and P21943

**Abstract:** *In [5] the authors study and analyze the performance properties of certain put-write option strategies on the S&P500 index, and they find that these strategies show a systematic outperformance. This outperformance is a consequence of the observation that, in the past, the implied volatility often overestimated the actual volatility of the S&P500 index. The strategies studied in [5] are based on trading put spreads only. In the discussion following the publication of [5], the question frequently arose, if whether working with naked put short position instead of put spreads can even further increase the performance of these strategies. In this paper we study this question and can answer it in an essentially negative way.*

**Keywords:** *put options, trading strategies, Black-Scholes formula, outperformance, implicate volatility, historic volatility, sharpe ratio.*

### Introduction and Aim of the Paper

In [5] we have stated several assertions of different authors about the fact that put options on various underlyings with strikes in a certain out-of-the-money region seem to be systematically overpriced. We do not repeat these assertions here, we just give some references: See for example [1], [2], [3], [4], [7], [8] or [10]. Motivated by these assertions we define in [5] a class of special put-write option strategies, test these strategies under realistic conditions with historic option prices for the time period 1990 until 2010, and find that most of these strategies indeed showed a significant outperformance in the past. (Other investigations in this direction earlier were carried out for example in [6] or in [9].) Of course there are several different setup possibilities for put-write strategies which are of interest in this context. In [5], for the reasons stated below, our strategies consist not only of shortening of put options, but also contain long positions in certain put options. The following four priorities determine our concrete choice of the principal setup:

- No margin calls for the duration of the strategy (i.e., in any case, the possible losses must be limited by the actual investment sum);
- Trading short-term options, i.e., options terminating on the next third Friday of a month;
- Optimal utilization of the invested capital;
- Seeking to avoid total losses by limiting losses with the help of strict exit strategies.

These priorities result in the following rules for our strategies in [5]:

- Each short position in a put option is combined with a long position in a put option with the same maturity and with a strike  $\bar{K}_2$  lower than the strike  $\bar{K}_1$  of the short position. This construction guarantees that the maximum loss for one contract of such a long/short combination is limited by  $100 \cdot (\bar{K}_1 - \bar{K}_2)$ . Note that the contract size of S&P500 options is 100.
- Let  $I$  be a given total investment sum in US dollars. On the third Friday of each month, we invest in  $A = \lfloor \frac{I}{100(\bar{K}_1 - \bar{K}_2)} \rfloor$  contracts of short/long combinations of put options on the S&P500 with maturity on the third Friday of the next month. This choice of the number of contracts ensures that no margin call could be triggered.
- Gains will be reinvested in the next trading period (i.e., the next trading month).
- During the whole period, the available investment (in dollars, parked on a margin account) yield additional interest. We assume the following interest rate

$$\max[0, \min[7, 3 \text{ month } Libor - 0.5]].$$

- Each strategy is equipped with a mechanism (an “exit strategy”) which seeks to limit losses. We test two fundamentally different types of such mechanisms:
  1. Close all positions as soon as the S&P500 falls below a specified level (below  $\bar{K}_1$ , or below a certain percentage of  $\bar{K}_1$ );
  2. Close all positions as soon as the aggregated losses of these positions rise above a certain level (percentage of the investment sum  $I$ ).

After closing positions, we wait until the next third Friday and then we proceed with opening new positions on the next third Friday.

It is certainly necessary to give some further arguments for choosing to combine short positions with long positions instead of trading naked short positions only. In several of the papers cited above it was pointed out that out-of-the-money put options are the more overvalued the more out-of-the-money they are. At first glance, it may thus seem odd that a strategy that sells closer to the money puts and buys further out-of-the-money puts should be profitable. The main reason for such a strategy is that in many countries the regulations for fund management demand that, even in the worst case, the losses cannot exceed the invested sum. This demand is satisfied if each short position is combined with a long position in the way described above, whereas it is not satisfied if we use naked positions only.

Furthermore, in most cases, the combination of short with long positions, due to the usual margin regulations for options, allows us to trade substantially more short positions than naked positions only would allow. As already mentioned above, it protects in any case from margin calls and eventual necessary premature closing of contracts because of margin requirements (for more details on the negative impact of margin calls to the profitability of put short strategies see [9]).

Let us illustrate the situation with a concrete example: Assume a basis investment sum of \$100,000, for example, on July 23, 2007. The closing value of the S&P500 was at 1541 points. In one of the strategies considered in [5], we trade - according to the framework defined above - 20 contracts put short August 2007 with strike 1450 and 20 contracts put long August 2007 with strike 1400. The prices were

\$4.9 for the short positions and \$2.3 for the long positions. Hence, we obtain a premium of  $20 \times 260 = \$5,200$  (not taking transaction costs into account in this example). Without long positions (and assuming a realistic margin requirement of 15% of the strike per short position) it would have been possible to trade only 4 contracts of naked short positions, at a price of \$4.9. This would have resulted in a premium of only  $4 \times 490 = \$1,960$ . Assume now that the short position was overpriced by 10% and the long position even by 15%. That means that the fair prices of the positions were \$4.45 for the short position and \$2.00 for the long position. In this fair market, we would have obtained a premium of  $20 \times 245 = \$4,900$  for our 20 short/long combinations. Thus, although the long position is more overpriced than the short position, the premium of \$5,200 for the combinations is higher than the fair price.

On the other hand, of course, if positions must be closed, we would have to close more combinations than naked positions. It is, however, cheaper to close a combination than to close a naked position. This fact, together with the regularly substantially higher premiums obtained for combinations, seems to make combination strategies at least as profitable as the corresponding short-only strategies.

To investigate if this is indeed the case is the topic of this paper. We will, however, not give a full comparison of the short-only analogs of *all* the strategies analyzed in [5], but we take the most interesting (in different aspects) strategies of [5] and compare them with their naked position analogs. By analyzing these strategies we give an answer to the first open problem given in the collection of open problems in the final chapter of [5].

**We will show that - at least for these types of strategies - the naked position strategies still show a significant outperformance under realistic assumptions, but they do not perform as well as the put spread based versions.**

The “realistic assumptions” are based on (i) the depth of experience of the second author, who has been following such strategies in his asset management company since 2002 and (ii) historical option prices for the period January 1990 to May 2011. We use data from *MarketDataExpress* for European options on the S&P500 index traded at the Chicago Board Options Exchange. This dataset includes daily high, low, open, last, and last bid/ask prices for the period from January 1990 to May 2011.

In Section 2 we will give the setup of our tested strategies in more detail and in Section 3 we will give the results for the tested strategies, their comparison with the put spread based versions and a discussion of the results.

## The setup for testing the strategies

In [5] we have tested a whole universe of strategies. The strategies considered in this paper have the same structure as the strategies in [5], with the only difference being that we use naked put option positions only, wherever in [5] we use put spreads. This influences the number of positions that can be traded. For the case of put spreads the number of traded contracts is given - depending on the investment and on the strikes  $K_1$  and  $K_2$  - by the second rule in Section 1. For example, if we have an investment of \$100,000 and the difference between  $K_1$  and  $K_2$  is 50 points, then we can trade 20 put spread contracts in this case. If we do not use long positions but short positions only, then we have to meet margin requirements of the exchange. As can be seen below, in almost all cases, we will be invested in short positions with a strike lower than the



current value of the S&P500. Only in some situations we will have a value of the S&P500 which is at most 5% less than the strike of the short positions in the strategy.

In all cases of our strategy, therefore, the following rule for our margin management will meet the regulations of the CBOE: “For each traded short position in a put option we reserve 15% of the strike of this option as margin.”

So in the above example assume that the strike  $K_1$  is 1000. Then for each option contract we have to reserve \$ 15,000 as margin, i.e., we can trade 6 contracts of naked positions based on an investment of \$ 100,000.

For the sake of completeness we also repeat here the details of the setup. Given the basic framework explained above, the variable parameters of the short-only strategies are:

- Strike  $\bar{K}_1$  of the short option;
- The exit strategy.

The “realistic assumptions” are:

- Since our historical data provides the daily high, low, open, last, and the last bid/ask prices for each option on the S&P500 and for each trading day, we assume opening of contracts on each third Friday at the end of the trading day, based on the last price of the S&P500 and on the last bid/ask offer.

We assume opening prices

$$\frac{2}{3} \cdot \text{Bid} + \frac{1}{3} \cdot \text{Ask} \quad \text{for the short position}$$

and

$$\frac{1}{3} \cdot \text{Bid} + \frac{2}{3} \cdot \text{Ask} \quad \text{for the long position}$$

- Depending on the exit strategy chosen, it may be necessary to close positions during a trading day. To obtain the corresponding price for the particular option (in general we do not have historical tick prices for our options), we first use the Black-Scholes equation to calculate the implied bid/ask volatilities for this option from the last bid/ask offer of the options and the last price of the S&P500 on this trading day. Then we use these volatilities and again the Black-Scholes equation to compute the bid/ask prices for the particular option for other S&P500 values on this trading day.
- The transaction costs are adopted from the actual transaction costs of a particular international online broker, namely \$1.50 per option contract.
- Whenever a (mathematical) rule for the choice of a strike for a short position suggests a certain real number  $K_1$ , the actual available option with the largest strike  $\bar{K}_1$  less or equal to  $K_1$  is chosen. If such an option is not available at all, there is no trade in this trading month (the interest payment for the basic investment is simply accumulated).

As already pointed out above, the variable parameters in our strategies are:

- Strike  $\bar{K}_1$  of the short position ( $\bar{K}_1 \leq S_0 =$  the current price of the S&P500);
- The exit strategy.

We make several general remarks on the different parameter choices.

*Choosing the strike  $\bar{K}_1$  for the short position*

In [5] we consider five basic philosophies (note that, hereafter, we always give upper bounds  $K_1$  for  $\bar{K}_1$ ). For the present paper it is sufficient to define three of them:

- $K_1 = \text{fixed percentage} \cdot S_0$  ( $S_0$  is the current price of the S&P500). For example,  $K_1 = 0.9 \cdot S_0$ . This is the most “naive” type of strategy. The parameters we choose for  $K_1$  are:

$$K_1 = (1 - 0.02n_1) \cdot S_0,$$

$$n_1 \in \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$$

- $K_1 =$  a percentage chosen depending on (some) historical volatility of the S&P500  $\cdot S_0$ .

For example,  $K_1 = (1 - 0.3 \cdot hv) \cdot S_0$ , where  $hv$  is the annualized historical volatility estimated from the daily S&P500 returns (based on open prices) of the last 20 trading days. That means, the “risk-distance” depends on the volatility realized during the last trading period. The parameters we choose for  $K_1$  are:

$$K_1 = (1 - 0.1n_2 \cdot hv) \cdot S_0,$$

$$n_2 \in \{1, 2, 3, 4, 5, 6, 7\}$$

- $K_1 =$  a percentage chosen depending on the implied volatility of the S&P500 represented by the actual VIX-value  $\cdot S_0$ . For example,  $K_1 = (1 - 0.3 \cdot VIX) \cdot S_0$ . This means that, the “risk-distance” depends on the volatility anticipated by the market for the coming trading period. In this case the parameters we choose for  $K_1$  are:

$$K_1 = (1 - 0.1n_3 \cdot VIX) \cdot S_0$$

$$n_3 \in \{1, 2, 3, 4, 5, 6, 7\}$$

In this paper we test only these three classes of strategies in full detail. It seems to be not interesting to study the last two philosophies of [5] because one of them (*the minimum premium strategy*) yields very similar results as the VIX dependent strategy and the last one performs significantly worse among all the tested strategies.

*Choice of exit strategy*

In order to limit losses and avoid total losses, the trading strategies must be equipped with exit strategies. Each of our tested exit strategies consists of the directive to close all positions under specific conditions. We test two different exit strategies:

- Type I: We close all positions as soon as the S&P500 reaches  $K_1$  (or a specified percentage of  $K_1$ , e.g.,  $0.99 \cdot K_1$ ).
- Type II: We combine the type I exit directive with a defined boundary for the losses. For instance, during the trading month, the value of the whole portfolio is determined continuously. When this value falls below a certain percentage of the initial investment  $I$  for the actual trading month, all positions are closed. The directive is then, for example: Close all positions as soon as 'current portfolio value  $\leq 0.8 \cdot I$ '.

Type II exit strategies are thus always a combination of two closing directives, which means we must close all positions as soon as one of the two conditions is fulfilled.

For the exit strategies we choose the following parameters:

Any of the following 3 Type I exit-conditions:

- close all positions as soon as S&P500 reaches  $K_1 - 2\%$ ;
- close all positions as soon as S&P500 reaches  $K_1 - 1\%$ ;
- close all positions as soon as S&P500 reaches  $K_1$ ;

combined with any of the 6 Type II exit-conditions:

- no condition on the losses;
- close all positions as soon as the losses exceed 5% of  $I$  in the current trading month;
- close all positions as soon as the losses exceed 10% of  $I$  in the current trading month;
- close all positions as soon as the losses exceed 15% of  $I$  in the current trading month;
- close all positions as soon as the losses exceed 20% of  $I$  in the current trading month;
- close all positions as soon as the losses exceed 25% of  $I$  in the current trading month.

### **3 Concrete testing results and their discussion**

In [5] we created a Mathematica program for testing the put-write strategies for a total of 4,512 different parameter choices for the whole time period January/February 1990 until September/October 2010 (249 trading months) and for each of the following sub-periods:

- Jan. 1990 until Dec. 1999
- Jan. 2000 until Dec. 2010
- Jan. 1994 until Dec. 1996 (low volatility period)
- Jan. 2003 until Dec. 2006 (low volatility period)

- Jan. 2000 until Dec. 2002 (high volatility period)
- Jan. 2007 until Dec. 2010 (high volatility period, financial crisis).

In this paper we are first interested in the strategies tested in [5] with the “best performance properties” over the whole period January/February 1990 until September/October 2010 and over the period January/February 2000 until September/October 2010, and we will compare the properties of these best strategies with the properties of their analogs when using short positions only. In this paper the time period is longer (until May 2011) to use as much data as possible, but the results for the return per annum and for the Sharpe ratio can be compared with the results in [5].

The “best” strategies of [5] are given by the Tables 1, 2 and 3. Table 1 gives the best performing strategies over the whole period 1990 until 2010, Table 2 gives the best performing strategies over the period 2000 until 2010, and Table 3 shows the two best “easy manageable” strategies over the whole period.

What do we mean by “easy manageable”? The best strategies in terms of return p.a. were strategies for which the choice of  $K_1$  is based on a fixed distance from the S&P500 at trading day (0% or 2% distance) or on VIX (10% VIX distance) or on historical volatility  $h_v$  (10% distance), i.e., for choices of  $K_1$  near at-the-money. Choosing  $K_1$  near at-the-money seems to give the best results. However, these parameter choices are in some sense risky in practice. The value of such portfolios can vary extremely quickly, and necessary exit-reactions may in reality take effect too late. The probability of many successive losses is high and may lead to total loss for such choices of parameters. So in [5] we have defined classes of strategies which do not show this somewhat erratic behavior and we will call them “easy manageable”. In Table 2 we use  $E_2$  to denote a family of exit-strategies as follows:

$E_2 :=$  exit at  $0.99 \cdot K_1$ , or  $0.98 \cdot K_1$ , each combined with a 5% loss boundary.

In all tables, for our purposes (use of naked positions only) the choices of the parameter  $K_2$  (the strike of the long position in the put spread) is of no relevance.

In the following we now give the corresponding performance results for the above strategies when we use short positions only.

As we can see in Table 4 and 5, all strategies, also when carried out with short positions only, show a significant outperformance. However, in each case the performance results are, by far, not as good as in the corresponding put spread versions (both concerning return per annum as Sharpe ratio). Indeed, the strategies with best performance results for the put spread case, do not give the best results in the short-only cases. This is illustrated by Table 6 where we give the 10 best short-only results over the whole period 1990 - 2011 from our investigated universe of strategies. Again in the case of short-only strategies as in the case of spread strategies, we obtain the best results in terms of return p.a. for  $K_1$  near at-the-money. Since these strategies have the same disadvantages described for the put spread, we list the best “easy manageable” short-only strategies in Table 7.

All these numerical results support our conjecture stated at the end of Section 1. In this paper we can give only the pure performance values of the strategies. In

detailed studies, we have also investigated the behavior of the strategies in each single trading month. The detailed chronology of the single strategies tested above, with all trading parameters for each single trading month can be found under <http://www.finanz.jku/short-only/results>.

To explain the reasons for the better performance of the spread strategies in comparison with the short-only strategies let us consider one example in detail: In Table 5 we see that the strategy with parameters:

$$K_1 = (1 - 0.1 \cdot VIX) \cdot S_0,$$

$$K_2 = 0.97 \cdot K_1,$$

Exit at 15% loss or at  $0.98 \cdot K_1$

shows a return p.a. of 59.95% over 10 years in the spread case, whereas it has only 5.36% p.a. in the short-only case. In Table 8 we give more information on the characteristics of the two variants of this strategy (put spread and short-only). We choose to give details about this strategy because it shows the largest difference between the returns p.a. for the two variants, but the characteristics that we observe hold for all strategies as well.

It is interesting that the two variants behave quite similar in loss months. There are only few months in which one variant has a loss and the other variant does not. The average value of losses in the short-only case is even smaller than in the spread case. However: The returns in positive months are, on average, significantly higher for the spread strategy (SP) than for the short-only strategy (SO). (The highest monthly return in SO is higher than in SP, only because of an exceptional event in the trading month November/December 2008. Note that the second largest value for a monthly return in short-only strategies is 17.48%.) On average we trade 6.5 times more short positions relative to an available margin in SP than in SO. Although we have to pay premiums for opening the long positions in SP, the premiums obtained for opening the spreads in SP are on average 2.35 times the premiums for opening the short positions in SO. At a first glance it seems that this fact has, as a consequence, significantly more loss months in SP (or significantly higher losses in the case that positions are closed because the level  $K_1 - 2\%$  is hit). But, as can be seen in Table 8 this is not the case. The main reason why the number of losses (the height of losses) is not significantly higher for SP than for SO is, that in the moment when positions are closed in the strategies the index has decreased before, so that the open put option positions are much more at the money than in the moment of the opening, so that the proportion

$$\text{price of short positions} : \text{price of long positions}$$

now is much smaller than in the moment of the opening. This results in the fact that the costs of closing the many spreads are insignificantly higher than the costs of closing the fewer short positions only. So one has to close positions in strategy SP at an only slightly higher level of the S&P500 index than this is necessary in the strategy SO.

Concerning possible worst case scenarios, i.e., for example scenarios in which it is not possible to close positions and therefore not possible to carry out exit strategies at all, a total loss in SP happens earlier. So, if for example we consider the concrete example from the end on Section 1 once more: Here, without any closings, a total loss

of the actually invested amount would appear as soon as the S&P500 falls below 1400 and it stays here until the 3rd Friday of August. In SO a total loss occurs only when the S&P500 falls below approximately 1284 points (not taking into account possible additional margin calls) and it stays there until the third Friday of August. On the other hand in SP also in the worst case scenario the losses cannot exceed the invested capital, whereas in SO this indeed can happen.

Of course, a comprehensive study of the analogs of *all* strategies considered in [5] would give an even more complete picture. However, the results given above do not motivate such further investigations, since they clearly point out that working with put spreads give better performance results in the most interesting cases.

So, for us, the first open problem stated in [5] is answered. Nevertheless, there still remain several interesting open problems, which we state here again, thereby concluding this paper:

1. Immediate trade after closing:

In our tests, after the closing of positions as a consequence of an exit scenario, we proceed with a new trade on the next third Friday. Instead it would seem reasonable to use the usually high implicit volatility on a closing day to gain large premiums from an immediate new opening, either for the same trading month or the next trading month. Since, in such a case, we have a different maturity for this variant, we should also discuss adapted risk-distances.

It would be of considerable interest to analyze the advantages of this approach.

2. Preemptive closing of short positions:

In some cases (in the versions when we are working with put spreads), when it is necessary to close positions, it should be advantageous to just close the short positions first and the long positions later. The philosophy behind this variant is that a fast-falling market does not usually stop at the very moment when the first (short) positions are closed. We can therefore close the long positions with higher profit at a later time and an even lower value of the S&P500. Although this variant implies further risks, it seems more promising in the long run.

3. Longer maturity options:

Of course, it is not necessary to carry out our strategies with options of one month maturity only. A rather interesting variant seems to be the following: Invest 50% with a pre-determined strategy in 2-month options. After one month, invest the remaining 50% of the investment - obeying the same strategy - in 2-month options, and so on. This way it would be possible to react with the second trade to developments of the market during the first month.

Obviously, a lot of further aspects should be tested, for example, simultaneous trading of several short-strikes, or a dynamic strategy change for the choice of risk-distances depending on changing market conditions, several aspects of money management, or the use of futures in risk scenarios instead of only closing positions.

**Tables**

Rank	Choice of short strike	Choice of long strike	Exit Strategy	Return p.a.	Sharpe ratio
1	$K_1=S_0$	$K_2=0.97 \cdot K_1$	at 5% loss or at $0.98 \cdot K_1$	84.62%	1.59
2	$K_1=(1-0.1 \cdot VIX) \cdot S_0$	$K_2=0.97 \cdot K_1$	at 15% loss or at $0.98 \cdot K_1$	79.6%	1.54
3	$K_1=(1-0.1 \cdot VIX) \cdot S_0$	$K_2=0.97 \cdot K_1$	at 20% loss or at $0.98 \cdot K_1$	76.65%	1.34
4	$K_1=(1-0.1 \cdot hv) \cdot S_0$	$K_2=0.97 \cdot K_1$	at 15% loss or at $0.98 \cdot K_1$	76.01%	1.35
5	$K_1=(1-0.1 \cdot VIX) \cdot S_0$	$K_2=0.95 \cdot K_1$	at 10% loss or at $0.98 \cdot K_1$	73.2%	1.84
6	$K_1=(1-0.1 \cdot VIX) \cdot S_0$	$K_2=0.97 \cdot K_1$	at 10% loss or at $0.98 \cdot K_1$	72.36%	1.58
7	$K_1=(1-0.1 \cdot hv) \cdot S_0$	$K_2=0.95 \cdot K_1$	at 10% loss or at $0.98 \cdot K_1$	72.33%	1.67
8	$K_1=(1-0.1 \cdot VIX) \cdot S_0$	$K_2=0.95 \cdot K_1$	at 15% loss or at $0.98 \cdot K_1$	71.98%	1.6
9	$K_1=(1-0.1 \cdot hv) \cdot S_0$	$K_2=0.97 \cdot K_1$	at 20% loss or at $0.98 \cdot K_1$	71.74%	1.14
10	$K_1=(1-0.1 \cdot hv) \cdot S_0$	$K_2=0.97 \cdot K_1$	at 10% loss or at $0.98 \cdot K_1$	70.77%	1.41

Table 1: Best spread strategies in terms of return p.a. over the period 1990–2010

Rank	Choice of short strike	Choice of long strike	Exit Strategy	Return p.a.	Sharpe ratio
1	$K_1=S_0$	$K_2=0.97 \cdot K_1$	at 5% loss or at $0.98 \cdot K_1$	75.94%	1.38
2	$K_1=(1-0.1 \cdot hv) \cdot S_0$	$K_2=0.97 \cdot K_1$	at 5% loss or at $0.98 \cdot K_1$	64.77%	1.52
3	$K_1=0.98 \cdot S_0$	$K_2=0.97 \cdot K_1$	at 5% loss or at $0.98 \cdot K_1$	63.43%	1.56
4	$K_1=0.98 \cdot S_0$	$K_2=0.97 \cdot K_1$	at 5% loss or at $0.99 \cdot K_1$	62.3%	1.53
5	$K_1=S_0$	$K_2=0.95 \cdot K_1$	at 5% loss or at $0.98 \cdot K_1$	61.9%	1.29
6	$K_1=(1-0.1 \cdot hv) \cdot S_0$	$K_2=0.97 \cdot K_1$	at 5% loss or at $0.99 \cdot K_1$	61.52%	1.46
7	$K_1=(1-0.1 \cdot VIX) \cdot S_0$	$K_2=0.95 \cdot K_1$	at 10% loss or at $0.98 \cdot K_1$	60.34%	1.38
8	$K_1=(1-0.1 \cdot VIX) \cdot S_0$	$K_2=0.97 \cdot K_1$	at 15% loss or at $0.98 \cdot K_1$	59.95%	1.06
9	$K_1=(1-0.1 \cdot VIX) \cdot S_0$	$K_2=0.97 \cdot K_1$	$E_2$	58.81%	1.45

Rank	Choice of short strike	Choice of long strike	Exit Strategy	Return p.a.	Sharpe ratio
10	$K_1=(1-0.1 \cdot hv) \cdot S_0$	$K_2=0.95 \cdot K_1$	at 5% loss or at $0.98 \cdot K_1$ %	57.34%	1.53

Table 2: Best spread strategies in terms of return p.a. over the period 2000–2010

Rank	$K_1$	Choice of long strike	Exit Strategy	Return p.a.	Sharpe ratio
1	$(1-0.2 \cdot hv) \cdot S_0$	$K_2=0.95 \cdot K_1$	at 10% loss or at $0.98 \cdot K_1$ %	56.63%	1.65
2	$(1-0.2 \cdot VIX) \cdot S_0$	$K_2=0.95 \cdot K_1$	at 10% loss or at $0.98 \cdot K_1$ %	54.85%	1.96

Table 3: Best “easy manageable” spread strategies over the period 1990 - 2010

Rank	Choice of short strike	Choice of long strike	Exit Strategy	Return p.a. put spread	Sharpe ratio put spread	Return p.a. short only	Sharpe ratio short only
1	$K_1=S_0$	$K_2=0.97 \cdot K_1$	at 5% loss or at $0.98 \cdot K_1$	84.62%	1.59	18.34%	0.57
2	$K_1=(1-0.1 \cdot VIX) \cdot S_0$	$K_2=0.97 \cdot K_1$	at 15% loss or at $0.98 \cdot K_1$	79.6%	1.54	26.29%	0.77
3	$K_1=(1-0.1 \cdot VIX) \cdot S_0$	$K_2=0.97 \cdot K_1$	at 20% loss or at $0.98 \cdot K_1$	76.65%	1.34	17.37%	0.53
4	$K_1=(1-0.1 \cdot hv) \cdot S_0$	$K_2=0.97 \cdot K_1$	at 15% loss or at $0.98 \cdot K_1$	76.01%	1.35	22.48%	0.65
5	$K_1=(1-0.1 \cdot VIX) \cdot S_0$	$K_2=0.95 \cdot K_1$	at 10% loss or at $0.98 \cdot K_1$	73.2%	1.84	28.31%	0.88
6	$K_1=(1-0.1 \cdot VIX) \cdot S_0$	$K_2=0.97 \cdot K_1$	at 10% loss or at $0.98 \cdot K_1$	72.36%	1.58	28.31%	0.88
7	$K_1=(1-0.1 \cdot hv) \cdot S_0$	$K_2=0.95 \cdot K_1$	at 10% loss or at $0.98 \cdot K_1$	72.33%	1.67	25.36%	0.77
8	$K_1=(1-0.1 \cdot VIX) \cdot S_0$	$K_2=0.95 \cdot K_1$	at 15% loss or at $0.98 \cdot K_1$	71.98%	1.6	26.29%	0.77
9	$K_1=(1-0.1 \cdot hv) \cdot S_0$	$K_2=0.97 \cdot K_1$	at 20% loss or at $0.98 \cdot K_1$	71.74%	1.14	8.90%	0.33
10	$K_1=(1-0.1 \cdot hv) \cdot S_0$	$K_2=0.97 \cdot K_1$	at 10% loss or at $0.98 \cdot K_1$	70.77%	1.41	25.36%	0.77



Table 4: Comparison between return p.a. and Sharpe ratio for spread and short-only strategies over the period 1990–2010

Rank	Choice of short strike	Choice of long strike	Exit Strategy	Return p.a. put spread	Sharpe ratio put spread	Return p.a. short only	Sharpe ratio short only
1	$K_1 = S_0$	$K_2 = 0.97 \cdot K_1$	at 5% loss or at $0.98 \cdot K_1$	75.94%	1.38	22.87%	0.63
2	$K_1 = (1 - 0.1 \cdot hv) \cdot S_0$	$K_2 = 0.97 \cdot K_1$	at 5% loss or at $0.98 \cdot K_1$	64.77%	1.52	18.1%	0.60
3	$K_1 = 0.98 \cdot S_0$	$K_2 = 0.97 \cdot K_1$	at 5% loss or at $0.98 \cdot K_1$	63.43%	1.56	19.29%	0.62
4	$K_1 = 0.98 \cdot S_0$	$K_2 = 0.97 \cdot K_1$	at 5% loss or at $0.99 \cdot K_1$	62.3%	1.53	17.9%	0.58
5	$K_1 = S_0$	$K_2 = 0.95 \cdot K_1$	at 5% loss or at $0.98 \cdot K_1$	61.9%	1.29	22.87%	0.63
6	$K_1 = (1 - 0.1 \cdot hv) \cdot S_0$	$K_2 = 0.97 \cdot K_1$	at 5% loss or at $0.99 \cdot K_1$	61.52%	1.46	16.22%	0.55
7	$K_1 = (1 - 0.1 \cdot VIX) \cdot S_0$	$K_2 = 0.95 \cdot K_1$	at 10% loss or at $0.98 \cdot K_1$	60.34%	1.38	15.59%	0.49
8	$K_1 = (1 - 0.1 \cdot VIX) \cdot S_0$	$K_2 = 0.97 \cdot K_1$	at 15% loss or at $0.98 \cdot K_1$	59.95%	1.06	5.36%	0.24
9	$K_1 = (1 - 0.1 \cdot VIX) \cdot S_0$	$K_2 = 0.97 \cdot K_1$	at 5% loss or at $0.99 \cdot K_1$	58.81%	1.45	22.76%	0.76
10	$K_1 = (1 - 0.1 \cdot hv) \cdot S_0$	$K_2 = 0.95 \cdot K_1$	at 5% loss or at $0.98 \cdot K_1$	57.34%	1.53	18.1%	0.60

Table 5: Comparison between return p.a. and Sharpe ratio for put spread and short-only strategies over the period 2000–2010

Rank	Choice of short strike	Exit Strategy	Return p.a.	Sharpe ratio
1	$K_1 = S_0$	at $0.94 \cdot K_1$	43.02%	0.92
2	$K_1 = S_0$	at $0.93 \cdot K_1$	38.99%	0.86
3	$K_1 = S_0$	at $0.95 \cdot K_1$	38.11%	0.85

Rank	Choice of short strike	Exit Strategy	Return p.a.	Sharpe ratio
4	$K_1=(1-0.1 \cdot VIX) \cdot S_0$	at $0.98 \cdot K_1$	38.11%	1.11
5	$K_1=(1-0.2 \cdot hv) \cdot S_0$	at $0.98 \cdot K_1$	36.70%	1.2
6	$K_1=S_0$	at $0.96 \cdot K_1$	36.28%	0.85
7	$K_1=(1-0.1 \cdot hv) \cdot S_0$	at $0.98 \cdot K_1$	36.01%	1.02
8	$K_1=S_0$	at $0.97 \cdot K_1$	35.39%	0.88
9	$K_1=(1-0.3 \cdot hv) \cdot S_0$	at $0.99 \cdot K_1$	34.52%	1.45
10	$K_1=(1-0.2 \cdot VIX) \cdot S_0$	at $0.99 \cdot K_1$	34.27%	1.30

Table 6: Best short-only strategies in terms of return p.a. over the period 1990–2011

Rank	$K_1$	Exit Strategy	Return p.a.	Sharpe ratio
1	$(1-0.2 \cdot hv) \cdot S_0$	at $0.98 \cdot K_1$	36.70%	1.2
2	$(1-0.2 \cdot VIX) \cdot S_0$	at $0.98 \cdot K_1$	33.60%	1.18

Table 7: Best “easy manageable” short-only strategies over the period 1990 - 2010

Type of Strategy	short long spread	short-only
Performance from \$ 100,000 to	\$ 8,651,623	\$ 168,639
Return p.a.	59.97%	5.36%
Sharpe ratio	1.06	0.24
Positive months	74	81
Negative months	46	39
Highest monthly return	25.98%	30.01% (17.48%)
Average return in positive months	18.96%	8.06%
Average monthly loss	-14.71%	-12.35%
Common negative months	37	37

Table 8: Comparison of the strategy with  $K_1=(1-0.1 \cdot VIX) \cdot S_0$  and exit strategy at  $K_1$ -2% or at 15% loss for the short long spread case (with long strike =  $0.97 \cdot K_1$ ) and the short-only case over the time period 2000–2010

## References

- Bakshi, G. & Kapadia, N.(2003). Delta-hedged gains and the negative market volatility risk premium. *Review of Financial Studies* 16, 527 - 566.
- Christensen, B. & Prabhala, N.(1998). The relation between implied and realized volatility. *Journal of Financial Economics* 50, 125 - 150.
- Coval, J. & Shumway, T.(2001). Expected option returns. *Journal of Finance* 56, 983 - 1009.
- Day, Th. & Lewis, C.(1992). Stock market volatility and the information content of stock index options. *Journal of Econometrics* 52, 267 - 287.
- Del Chicca, L., Larcher, G. & Szölgényi, M.(2012). Modeling and Performance of Certain Put-Write Strategies. *Journal of Alternative Investments*. To appear.
- Hauer, F.(2010). Put Option Writing - Theoretische und praktische Analyse einer Hedge-Fonds-Strategie. *Dissertation, Abteilung für Asset Management, Universität Linz*.
- Jackwerth, J.(2000). Recovering risk aversion from option prices and realized returns. *Review of Financial Studies*, 433 - 451.
- Rubinstein, M.(1994). Implied binomial trees. *Journal of Finance* 49, 771 - 818.
- Santa-Clara, P. & Saretto, A.(2009). Option Strategies: Good Deals and Margin Calls. *Journal of Financial Markets* 12, 391 - 417.
- Ungar, J. & Moran, M.(2009). The cash-secured put write strategy and performance of related benchmark indexes. *The Journal of Alternative Investments* 11/4, 43 - 56.

# APPLYING MACRO-PRUDENCE IN FINANCIAL STANDARD SETTING

Diana Festl-Pell<sup>1</sup>

<sup>1</sup> PhD Student, University of Zurich, Department of Banking and Finance, Switzerland

**Abstract.** *The systemic crisis has shown that far from being an obscure and arcane debate about measurement, accounting issues take on a huge significance for financial stability. This paper presents a macro-prudential model outline of financial standard setting, i.e. the idea that fair value accounting's prior aim is no longer to correctly depict market values but to capture the broader impact of accounting on economic and financial systems. This approach differs from current accounting research in two ways: It addresses the possibility that fair value accounting can be, at least, a partial solution to the problem of systemic crises, rather than a mere problem contributor or crisis accelerator. Additionally, it questions the acclaimed role of accounting standard setters to provide decision-useful information and thereby concentrate solely on ensuring that accounting values reflect current terms of trade between willing parties rather than cooperating with the prudential regulators in their endeavor for financial stability. The paper is thus able to offer a vision for how a new bank accounting regime for systemic stability could be designed.*

**Keywords:** *macro-prudence, bank accounting, systemic, stability, fair value, prudential, regulation*

## Introduction

The International Monetary Fund (IMF) argued in 2008 that accounting standard setters will increasingly need to take into account the implications of their accounting practices and guidance for financial stability. Research should investigate the degree to which decision-making rules based on fair value may compound a crisis, and identify strategies that could mitigate these adverse effects. The IMF suggests that such strategies could involve defining decision rules on the basis of fair value milestones that trigger a review of the elements underlying fair value rather than compulsory sales. The results of such research should inform the decisions of banking regulators as well as the decisions of accountants and auditors. This will potentially require some fine-tuning of existing guidance. (IMF, 2008)

Sapra is one of the first researchers who have taken up on the IMF's demand. Yet his appeal that "much more formal economic modeling is needed" in this regards (Sapra, 2010), has up to now mainly been followed by economic researchers, such as Adrian and Shin in a paper from 2010, but only very few accounting researchers have taken interest in this issue (see Bleck and Gao, 2010 for an exception). This is not so much of a surprise when one takes into consideration that the primary objective of the accounting framework is defined as "to provide financial information about the reporting entity that is useful to existing and potential investors, lenders, and other creditors in making decisions about providing resources to the entity." (FASB Concepts Statement No. 8, Conceptual Framework for Financial Reporting, p. 1) Hence, the role of accounting is seen as a source of information and not as an enforcer of financial stability. Accounting standard-setters as well as most accounting academics view it

as the role of prudential regulation to strengthen the stability of the banking sector. Financial reporting therefore does not claim to detect and take measures against rising risk levels in the financial market. Nevertheless, the believe that ignoring market prices and only focusing on historical costs could provide a foundation for a more solid banking system is commonly regarded illusory. But most accounting researchers admit that the trade-off between transparency and financial stability as well as the interactions between accounting and prudential regulation need further analysis. (Landsman, 2005; Laux and Leuz, 2009)

Many economic and legal scholars have argued that a weakness of the existing framework is that it is largely micro-prudential (e.g. Kashyap and Stein, 2004; Hanson et al., 2011). As defined by Hanson et al. (2011) a micro-prudential approach is one in which regulation is a partial-equilibrium in its conception, and is aimed at preventing the costly failure of individual financial institutions. By contrast, a macro-prudential approach recognizes the importance of general-equilibrium effects, and seeks to safeguard the financial system as a whole. They thereby agree with the majority of policymakers that the overarching orientation of financial regulation needs to move in a macro-prudential direction. (Hanson et al., 2011, p. 4)

In order to operationalize the macro-prudential approach in a sensible way—i.e., to translate it into a set of specific accounting policy prescriptions—I am going to begin with a historical literature review of what goes wrong in a financial crisis. Moreover, this review is supposed to identify the key market failures at work: It must spell out why individual financial institutions, acting in their own interests, deviate from what a social planner would have them do. Once the market failures are clear, I will go on to propose various concrete steps to remedy them.

I am going to argue that in boom times, fair value accounting suffers from some serious conceptual flaws, such as an amplification mechanism resulting in pro-cyclicality, too many overpriced, low quality financial instruments as well as a too high reliance on one attained asset price as a price indicator for unsold assets. However, I am hypothesizing that in crisis times the flaws attributed to fair value accounting are actually mainly of an economic nature. So, fair value accounting discloses volatile and inefficient markets and reflects market overreaction (Sapra, 2008). In the same sense, the SEC comments in its study on mark-to-market accounting that from a systemic point of view, forced sales in illiquid or distressed markets “may further weaken the market for the securities and reduce the resulting price for the observed trades, compelling additional sales to raise capital”. (SEC, 2008, p. 182) Hence, I am going to show that accounting standard setters, up to now, may take the easy way out by playing down their own influence in the financial market's environment. As long as prudential regulation is founded on the output of financial accounting, accounting standard setting appears to be in the duty to include in their own focus the stability aspects of the financial markets.

The paper is structured as follows. The next section reviews the historical evolvement of the fair value accounting regime which was believed to overcome the flaws of the historical cost accounting regime. Section 3 sets out the conceptual flaws of fair value accounting in boom times, while Section 4 concentrates on the economic flaws of fair value accounting in crisis times. Section 5 presents the macro-prudential model outline for systemically sensitive prompt correction actions. Section 6 suggests some policy solutions for an effective cooperation between accounting standard setting and prudential regulatory bodies. Finally, Section 7 concludes by adumbrating why a macro-prudential bank accounting theory is capable of avoiding prudential relativism while still yielding informative suggestions for the betterment of society – and is thereby reforming fair value accounting so that it can avoid its major deficiencies.

## From Historical Cost to Fair Value and Back Again?

The systemic crisis, which started in 2007 as the so-called subprime crisis and still endures as the sovereign states' crisis, puts high demands on bank accounting in general and on the target setting of financial measurement in particular. This crisis has shown that far from being an obscure and arcane debate about measurement, accounting issues take on a huge significance for financial stability. Quality of fair value disclosure seems to have eroded precisely when regulations should have actually "bitten". And prudential regulators and standard setters have appeared happy to play along in recent years. It is no wonder then that never before in modern accounting history so many people and policy institutions have discussed the merits and faults of accounting measurement. Since the outbreak of the financial crisis the question whether fair value accounting, also called marking-to-market<sup>1</sup>, or historical cost accounting is the proper accounting method has almost become a war of creeds. The accounting standard-setters themselves still believe in the merits of fair value accounting. The former Chairman of the Financial Accounting Standards Board (FASB) commented: "I think it's hard to argue with the conceptual merits of fair value as the most relevant measurement attribute. Certainly, to those who say that accounting should better reflect true economic substance, fair value, rather than historical cost, would generally seem to be the better measure." (Reason, 2003, p.1) On the other side, insiders of many financial institutions such as the influential Steve Forbes not only doubt the panacea of fair value accounting but turn the argument upside down: "Marking-to-market accounting is the principal reason why our financial system is in a meltdown." (2009)

What is all the fuss about? The question on the boons and banes of the currently adopted fair value accounting evolves, so my contention, around the belief that fair value accounting closes the gap between the accounting equity and the value of the bank and thereby delivers the latest market valuation of the bank which is, in turn, decision-useful information. Under this view, which hinges on a considerable trust in market efficiency, fair value accounting should be fully implemented so that as much information as possible is provided to the public. Opponents, however, believe that fair value accounting provides some major obstacles to objectivity which have amplified the recent financial crisis. People favoring this second view – such as the already mentioned Steve Forbes – would like to get rid of fair value accounting mainly because they view the market as highly inefficient and see, hence, no use for an accounting standard that aims at reflecting market prices as closely as possible.

Critics of fair value accounting unavoidably argue for the method of historical cost accounting as this is the only viable alternative to fair value accounting. Historical cost accounting is not just a castle in the air but was the predominant accounting measurement in place for financial institutions until the middle of the 1980s. Hence it is necessary to investigate why it was at the time believed that historical cost accounting ought to be replaced as the predominant valuation measure. The idea of historical cost accounting is to measure assets at the cost by the time of their acquisition. This yields a gross capital value that is relatively easy to verify, however, when financial asset prices fluctuate it ceases to be a good price indicator. Even worse, when the market price of an asset rises above the historical cost of the asset, the manager of the financial firm has an incentive to sell the asset, in order to realize the capital gain. In other words, when the price of the asset *rises*, the incentive is to *sell* it. (Plantin et al., 2008a) For that reason it is a fair assumption that historical cost accounting was one of the major contributors to the downfall of the United States Savings &

---

<sup>1</sup> Unless indicated otherwise, I will use the phrases *mark-to-market accounting* or *fair value accounting* synonymously. While mark-to-market accounting is the use of observable market prices to measure the value of an asset, fair value accounting is a broader term than mark-to-market accounting in the sense that it may use both observable and/or unobservable inputs to measure the value of a claim.

Loans crisis in the mid-1980s as it hindered the recognition of interest rate risk, which in turn, allowed systematic over-reporting of the health of the thrifts. It is probable that the sales pressure induced by historical cost accounting has even increased in the meantime due to the evolution of high-frequency trading and loan securitizations.

Another reason for replacing historical cost accounting by fair value accounting is the latter's potential to minimize the manipulation of accounting numbers. Market-based values are, almost by definition, a non-management based referent and this is consistent with early standards on audit evidence quality hierarchies which prioritize sources of evidence which are independent of both auditee and auditor. So an important aspect of the 'fair value' concept is to establish distance from entity views of value and to locate reliability as far as possible in the collective judgment of the market. The International Accounting Standards Board Chairman even argues that the "current credit crisis has to a large extent been caused by a lack of transparency in the financial markets. Huge risks were allowed to be built up on and off the balance sheet without being noticed". (Hoogervorst, 2011, p. 3) Put in this way, the problem is not fair value accounting but – rather the opposite – that its scope was limited in that off-balance sheets (the notorious Special Purpose Vehicles) were allowed to grow. Moreover stakeholders, especially regulators, have been very enthusiastic about valuing firms to market prices. Many thought this would help a big deal against earnings management. The idea behind the fair value approach has been that the general public provides the correct valuation of an asset since it can base its valuation on a much broader basis than a single manager who, in addition, may be biased for his personal benefit. It was thought that the general public invests long-term and cares for the true value of the company, while the manager as the agent has very limited and short-term interests in the company, such as maximizing his earnings bonus.

So in abandoning fair value accounting and going back to historical cost accounting we might jump out of the frying pan into the fire, where we originally came from in the 1980s. We have the choice between fair value accounting which tries to reflect market prices, the biases of which accounting ought to correct in the first place and historical cost accounting which provides a huge incentive to manipulate asset values and to sell assets too early. Both accounting standards have arguably caused or at least worsened huge crises. A real dilemma.

## **Conceptual Flaws of Fair Value Accounting in Boom**

This section aims to study why accounting standard setters and prudential regulators disagree in their opinion about the role of mark-to-market (MTM) accounting<sup>2</sup> in the run-up to the recent financial crisis. Such disagreement, so my contention, has its origins in the diverging objectives of the two regulating bodies: The accounting standard-setters seek standards which incentivize the most efficient use of assets with regards to value maximization, while the prudential regulators seek a handling of assets which yields the least systemic risk. It seems as if the more efficient MTM gets in terms of the accounting conceptual framework (i.e. no inefficient sales for window-dressing reasons (Plantin et al., 2008b), the riskier the assessment based on MTM accounting becomes for the aims of the bank regulators. To address this potential trade-off, risks to welfare are considered which arise both on the level of individual inefficiency and on the level of the overall system.

According to Barth (2006), the IASB *Framework for the Preparation and Presentation of Financial Statements* (IASCB, 1989) states that the objective of financial reporting is to provide information useful to financial statement users in making economic decisions. She

---

<sup>2</sup> Here, the notion of mark-to-market (MTM) accounting is used instead of the more formal fair value accounting notion to make it clear that the majority of problems highlighted in the research apply to marking-to-market only, and would not apply to marking-to-model.

argues “It seems self-evident that financial statement amounts that reflect current economic conditions and up-to-date expectations of the future will be more useful in making those decisions, which are made in the current economic environment. However, it also seems self-evident that not all expectations of the future should be recognized in financial statements today, particularly those that do not arise from events or transactions that have occurred.” (Barth, 2006, p. 272) The extent to which bank regulators can rely on market discipline to perform their supervising role depends on the quality of information available to the capital markets. Thus, if accounting standard setters fail to keep the informational needs of capital markets as their first priority, an unintended consequence is that the effectiveness of market discipline as a regulatory tool could be undermined. (Barth and Landsman, 2010) Critics towards fair value accounting note the paradox of pursuing a close alignment of accounting and markets since, if this alignment were possible, accounting would become unnecessary (Power, 2010).

Even if one accepts the previous propositions, disagreement over appropriate accounting measures can still arise because the portrayal of the best (average) approximation to an unbiased view may generate tension with the objectives of other standard-setting authorities. For instance, it might be agreed that, for items for which liquid markets exist, fair value accounting is the most objective measure of realizable value. Nevertheless, this might be seen as generating excessive time variation in the recorded value of the firm from the perspective of financial stability, either at high frequencies (short-term volatility) or, arguably more importantly, at business cycle frequencies (“procyclicality”). (Borio and Tsatsaronis, 2005)

Adrian and Shin (2010) show that far from being passive, financial intermediaries adjust their balance sheets actively. This leads to high leverage during booms and low leverage during busts. Leverage is procyclical in this sense. “The accounting regime affects the degree to which such procyclical actions lead to amplification of the financial cycle. When balance sheets are marked to market continuously, changes in asset values show up immediately as increases in the marked to market equity of the financial institution, and elicit responses from them.” (Plantin et al., 2008a, p. 7) Hence, it is important to note that rising asset prices have the opposite — and equally procyclical — effect. As market values rise for homes, stocks, commodities, or any item that has a readily available price, more and more credit becomes available to carry these assets. As more credit is available, more money is chasing fewer assets and prices rise. From the standpoint of institutions, a rise in the value of assets is recognized in earnings under fair value principles if the assets were held for trading and recognized in the institution’s capital or equity position if the assets were treated as available for sale. In both cases, the growing earnings and strengthening capital induces more borrowing and the acquisition of more assets, so the upward spiral—also known as a bubble—continues. (Wallison, 2008, p. 6)

Existing literature mainly focuses on the amplifying effect of MTM accounting on market fluctuations in illiquid, declining markets, while there is relatively little research<sup>3</sup> on the potential inefficiencies of MTM accounting in liquid, booming markets. This little attention is consistent with the assumption that MTM is efficient (or at the very least, more efficient than historical cost (HC) accounting) in such markets. In contrast to this belief, I examine whether MTM accounting can nevertheless create a strategic behavior by financial institutions in which it is preferable to hold on to a liquid asset for window-dressing reasons only. If this strategic behavior is possible, MTM would result in higher valuation gains compared to HC accounting. The latter accounting regime can generate the same unrealized valuation gains as MTM only if the asset is first sold and then immediately repurchased (Laux

---

<sup>3</sup> Among those who do put their focus on booming markets are Adrian and Shin (2010). They show that MTM accounting can lead to an amplification mechanism in boom markets by adding more and more securities to the balance sheet as soon as their value increases (upward sloping demand curve).



and Leuz, 2009, p. 832). However, for these transactions to happen under HC accounting, all assets actually need to be sold and the quoted transaction price would correspond to a market clearing price built on total supply. The MTM quoted price, on the other hand, is higher since it is based on the proportionally scarce supply of actual transactions which take place under the MTM accounting regime.

Also, one major problem, the declining quality of assets, in the course of the business cycles, is often neglected in existing literature. Shin (2008) notes that for the banking sector, an increase in the balance sheet while maintaining the same high asset quality may not be a problem. However, if the accumulated surplus in assets would have been detected by the different stakeholders, the assets should have been rated much lower. Furthermore, for securities, the fair value accounting may become a bubble maker, instead of an instantaneous reflector of active markets. When one firm experiences a profit growth, its securities' price will rise. All other firms which hold this firm's securities will also earn an (unrealized) income because of the increase of the securities values based on the fair value accounting. Similarly, their securities' prices will also increase. (Yuan and Liu, 2011) As asset prices rise, agents may be more inclined, and find it easier, to take more risks (increase their leverage), as their perceived wealth increases and financing constraints are relaxed. This in turn tends to raise asset prices further. If this process goes too far, asset values and leverage are taken beyond sustainable levels, and the resulting overextension at some point has to be corrected, with the process going into reverse. Unless the system has built up sufficient cushions during the expansion phase, considerable financial strains and broader financial instability can emerge. (Borio and Tsatsaronis, 2005; Sinn, 2010)

Magnan (2009) brings forth another important problem concerning the use of fair value accounting in monopolistic seller markets. He notes that the Enron case illustrates the potential negative consequence from dropping conservatism and replacing it with mark-to-market accounting, with management strategically selecting bid or ask prices to value its energy contracts. Enron was a key market-maker or, sometimes, the only market-maker, in some markets, thus facilitating managerial discretion. (Magnan, 2009) Hence, if the purpose of the exercise is to assess the soundness of the aggregate balance sheet, then the marked-to-market value of the total stock (assessed at the current marginal transaction price) may not be a good indicator of the soundness of the aggregate balance sheet. Instead, it would be better to ask how much value can be realized if a substantial proportion of the stock were to be put up for sale. The value realized in such a sale would be much smaller than the current marked-to-market value. This is one instance in which marking to market gives a misleading indicator of the aggregate position. (Plantin et al., 2008a)

Lastly, existing literature does not fully account for the fact that a liquid market cannot by itself guarantee an efficient and correct pricing of MTM securities. MTM offers the advantage that a single instance of actual realization is sufficient proof for the realizability of the whole group of comparable securities. Hence, the entity characteristics and the competitive advantage of the actual selling bank are disregarded. Since the accounting rules merely ask for the management's intent on how long the fair-valued assets will be held on the balance sheet (trading vs. available-for-sale securities), the actual holding period will not influence the valuation basis of the assets. According to Credit Suisse's Annual Report 2010, 57% and 43% of their total assets and total liabilities, respectively, are measured at fair value (p. 60). These figures seem to point out that the aggregate degree of maturity transformation being performed by large banks has reached a tremendously high level in the past years. However, as soon as one takes a closer look, another picture arises. Most of these securities are available-for-sale and can be held for periods between one and five years, with 10% of all debt securities even only due in 10 years (p. 245). This indicates that the financial system has become extensively reliant on the assumption that a large amount of assets could be counted as liquid because they would theoretically be sellable in liquid markets (Turner, 2009). In

reality, it is common for an asset to be supplied exceeding the equilibrium trading volume. Many firms may not want to sell out all their assets, like financial assets and real estates, but continue to hold them for a better profit. A direct result of this decision is that the current market price could be maintained at a higher level than the clearing price at which all existing assets could be sold out. If the market price is taken as a reliable evidence of the fair value and the assets are measured based on MTM accounting, a large “income from changes in fair value” may be recognized. In fact, the market is efficient for every investor, but not efficient for all investors as a whole or for the whole society. Yuan and Liu (2011) comment that this gain can be regarded as a “fair value trap” because it cannot be changed into cash flow in the present circumstances in the near future.

## **Economic Flaws of Fair Value Accounting in Bust**

Nevertheless, it is commonly regarded an illusion to believe that ignoring market prices or current information provides a foundation for a more solid banking system. According to Ryan (2008) “amortized cost accounting raises three main issues, all of which arise from its use of untimely historical information about future cash flows and risk-adjusted discount rates.

1. Income typically is persistent for as long as firms hold positions, but becomes transitory when positions mature or are disposed of and firms replace them with new positions at current market terms. This can lull investors into believing that income is more persistent than it really is.
2. Positions incepted at different times are accounted for using different historical information and discount rates, yielding inconsistent and untimely accounting for the constituent elements of firms’ portfolios. This obscures the net value and risks of firms’ portfolios.
3. Firms can manage their income through the selective realization of cumulative unrealized gains and losses on positions, an activity referred to as gains trading.” (Ryan, 2008, p. 5)

Currently, banks are required to record the value of some of their financial instruments, specifically derivatives and marketable securities, at fair value, or the price (or estimated price) the asset would fetch upon sale in an orderly market. They are allowed to record the value of other financial instruments, including loans and some debt securities, at amortized cost—essentially the historical cost at which they were acquired or originated. These costs are adjusted only when management determines that credit losses are probable or that the assets are otherwise impaired. As a result, in both the most recent crisis and previous crises in the banking sector, credit and impairment losses—particularly on loan portfolios—have been consistently and dramatically underestimated. Historical cost accounting with impairment estimates provides insufficient warning of these changes. The longer those losses go unrecognized, the bigger the problem becomes as ailing banks continue to take on new risks and underwrite business they cannot support. (Linsmeier, 2011, p. 411) Ryan (2008) argues that the limitations of historical cost accounting become more significant in illiquid markets, because it is then that investors mostly need to be able to assess firms’ value and risks accurately and that firms’ incentives to manage their owners’ equity and net income through gains trading are highest. (Ryan, 2008, p. 17)

Bank bondholders differ from shareholders in that they have a fixed claim on the bank’s assets, without upside. As such, bondholders share with the government an interest in keeping the bank’s capital ratio high. Therefore, bondholders would be hurt if, as according to the regulatory forbearance hypothesis, the dominant effect of the fair value relaxation rule change

was to allow banks to mask a deteriorating capital ratio from regulators. Bondholders have an interest in a deteriorating capital ratio getting exposed to regulators as quickly as possible, because once that happens regulators force the bank to reduce leverage, benefiting bondholders. (Kolasinski, 2011, p. 176) Though historical cost accounting may benefit banks' shareholders, it can reduce bondholder wealth if the rule changes allow banks to continue operation and engage in asset substitution. This implies a negative market reaction by bank bonds. However, by increasing the likelihood of solvency, the accounting rule changes permit continued bank access to short-term credit and other government subsidies (e.g., access discount window borrowing and TARP), thereby exposing taxpayers to uncompensated financial risk. Thus the rule changes can transfer wealth from taxpayers to banks' shareholders and bondholders. This implies a positive market reaction by bank bonds. Given these offsetting effects, the market reaction for bank bonds is uncertain a priori. (Bhat et al., 2011, p. 157) In accordance with this theory, Bhat et al. (2011) empirically found an increase in stock and bond prices associated with the impairment rule relaxation which they label the "regulatory forbearance hypothesis"<sup>4</sup>. The rule change can help banks report higher earnings as long as they do not sell securities with unrealized losses. Consequently the newly amended mark-to-market rule could discourage banks from selling the distressed securities. (Bhat et al., 2011, p. 155)

Adrian and Shin (2010) suggest that there may be some relevance to capital structure after all. However, they do not explain the drastic differences in capital structure decisions between non-financial firms and banks. After all, similar tax and financial distress considerations apply to all types of firms. We would therefore expect them to behave similarly. So why do banks behave so differently? As a percentage of their assets, banks' capital cushions are extraordinarily thin both from a historical perspective and when compared to other industries. In other words, capital appears to be much more expensive for banks than for other non-financial firms. Diamond and Rajan (2000) assume that the decline in bank capitalization may be due to the decrease in the advantage of banks relative to arm's length lenders. They see the root cause for this declined advantage in the financial development because of improvements in information availability, the size of market, and the legal environment (p. 2444). Banks in recent years have bought assets using only a thin sliver of equity capital capable of absorbing losses and a huge amount of debt. Leverage ratios of 30 and more were common. But this means that even small variations in asset values turn into much larger fluctuations in the value of their equity. It is that risk which needs to be compensated for with a higher average return on equity (Miles, 2010). However, many economists claim that banks do not play at arm's lengths since they use deposit protection and the too-big-to-fail doctrine to lever up even more (e.g. Miller, 1995). From an overall economic point of view, banks may tend to hold too little capital. Miller (1995) prominently said about this issue: "An essential message of the M&M Propositions as applied to banking, in sum is that you cannot hope to lever up a sow's ear into a silk purse. You may *think* you can during the good times; but you'll give it all back and more when the bad times roll around." (p. 486).

As mentioned before, one major critique on fair value measurement is that financial intermediaries' economic leverage is procyclical, which could be a problem for the financial system. Since the fire sales become relevant "marks" for other banks, downward spirals as well as contagion have been blamed as being caused by fair value accounting. There are many sources of procyclicality for highly leveraged financial institutions, such as market-value-based bank management, haircuts and margin requirements or collateralization requirements. Therefore banks are forced to raise capital or sell assets in a financial crisis. Some market

---

<sup>4</sup> The changes proposed on March 16, 2009 to fair-value accounting would allow companies to use "significant judgment" in valuing assets and reduce the amount of write-downs they must take on so-called impaired investments, including mortgage-backed securities.

participants also hold the view that, in such markets, the unrealized losses recorded due to fair value accounting may create a loss of confidence in investors and analysts, adding uncertainty and a further decline to the market. In other words, “headline risk” from disclosure of “bad news” itself influences future behavior. (SEC, 2008). Increased use of fair values may also embody incentives for banks to modify their portfolio mix in a direction that may move them away from their traditional liquidity transformation role, thus reducing their contribution to intertemporal smoothing. Notwithstanding that the use of fair values may support increased recourse to securitization (and other risk transfer instruments), thus distributing risks more evenly throughout the economy, the shock-absorbing features of the financial system might be lost. Indeed, once a systemic disturbance unfolds, its macroeconomic effects are likely to be more direct and severe. (Sinn, 2010) As Adrian and Shin (2010) show asset price changes show up immediately on balance sheets when balance sheets are marked to market. This elicits response from financial market participants. Even if exposures are dispersed widely throughout the financial system, the potential impact of a shock can be amplified many-fold through market price changes. (Adrian and Shin, 2010) Theory suggests that banks can be forced to sell securities when prices fall in an illiquid market and that mark-to-market accounting can accentuate this “feedback” effect (Plantin et al., 2008a; Allen and Carletti, 2008). When liquidity shocks depress prices, mark-to-market accounting can force banks to recognize other-than-temporary impairments on securities holdings, leading to reduced earnings and regulatory capital. Because of the possibility of regulatory intervention or because of the focus on accounting performance, managers are concerned about these effects. Such concerns can prompt managers to sell securities into liquidity shocks to avoid these consequences. In the case of banks, relaxing mark-to-market accounting rules allows banks to reduce the amount of unrealized losses recognized in their income statements alleviating managers’ incentives to sell. (Bhat et al, 2011, p. 154)

While many view fair value as the best indicator of asset value at the time of measurement, taken on its own it may not be the best measure for making long-term, value-maximizing decisions. This arises because fair value reflects a single, point-in-time exit value for the sum of all the risks the market assigns to the asset, including credit and liquidity risks. If the market overreacts in its assessment of any risk component, then fair value will reflect this. Hence, the heavy discounting during the crisis of any asset containing securitized instruments produced fair values much lower than their underlying expected future cash flows would imply, even allowing for the possible impairment of subprime elements. (IMF, 2008) On the other hand, pro-cyclicality mainly arises from the market effects of deleveraging, which is an economic decision. For example, in addition to record rates of poorly performing assets as a result of the bursting of the housing bubble, a market aversion developed towards complex structured products, some of which may have been previously liquid, due to uncertainties about their continued performance and a flight to more conventional high-quality instruments. Further, institutions that were holding assets on an original short-term basis with the intent to securitize them found their holding duration increased due to the reduced demand for securitized products. However, Laux and Leuz claim that this is not a matter or a result of fair value accounting per se. They argue these things alone (without any specific accounting regulation) would have been sufficient to cause the downward spirals. (Laux and Leuz, 2009 and 2010)

Even though most accounting researchers now agree that fair value accounting may have its flaws in illiquid markets and crisis times, they nevertheless concur that fair value accounting helped to bring economic problems to light more easily and hence, was a mere “messenger of bad economic news”. (e.g. Barth and Landsman, 2010; Laux and Leuz, 2010) Accordingly, IASB Chairman, Hans Hoogervorst, argues that preventing a crisis through full risk transparency is much less costly than letting things go and cleaning up afterwards. He

also comments that accounting standard-setters are sometimes suspicious that they are being asked to put a veneer of stability on instruments which are inherently volatile in value. (Hoogervorst, 2011) Because of its timeliness and informational richness, fair value accounting and associated mandatory and voluntary disclosures should reduce uncertainty and information asymmetry faster over time than historical cost accounting would, thereby mitigating the duration of the credit crunch. (Ryan, 2008, p. 16)

Hence, it is not clear that procyclical lending should be addressed by adjusting the accounting rules. For instance, fair value accounting could be combined with dynamic prudential regulation, i.e., forcing banks to build up larger reserves in good times and to draw on them in bad times, in order to counter the procyclical effects of capital requirements on lending (e.g., Kashyap and Stein, 2004). Put differently, it might be more appropriate to adjust banking regulation, rather than the accounting system, given that accounting numbers are used in many other contexts. (Laux and Leuz, 2009) Barth and Landsman (2010) even comment that although bank regulators may choose to use general purpose financial reporting information in meeting their objectives, one should expect that bank regulators would not limit themselves to information contained in general purpose financial reports. Last but not least, a sharper distinction may have to be made than has been the case until now between the requirements of financial accounting, as they apply to listed companies in particular, and the prudential requirements imposed by supervisors on financial firms. The accounting measure of shareholders' equity has not proven to be the best way to track bank capital for prudential purposes. The procyclical effect of fair value accounting does not impair its relevance for the purposes of investors, who need a measure of a company's financial position at a given point in time under that moment's market conditions. (see e.g. Véron, 2008)

## **A Macro-Prudential Framework for Systemically Sensitive Prompt Corrective Action**

In the following, I will build a case for fair value accounting subject to severe revisions within this regime. My main direction of impact will be the avoidance of fair value accounting's one-sided and uncommented reflection of market prices by introducing a macro-prudential approach, i.e. the idea that fair value accounting's prior aim is no longer to correctly depict market values but to capture the broader impact of accounting on economic and financial systems. For this, both accounting standard setters and prudential regulators have to overcome their own tight responsibility understandings and need to cooperate closely in their endeavor for a stable financial system.

Since one can always argue against fair value in an imperfect real world, casting the debate in terms of whether fair values are "good" or "bad" is inappropriate. The more appropriate question to ask is whether fair value-based financial statements improve information investors receive relative to information provided by historical cost-based financial statements, and whether regulation of bank capital will be more efficient under one accounting system or the other. (Landsman, 2005) Hence, it is important to ask how the most efficient use of assets can be ensured on the one hand, and what the best choice of accounting system is with respect to least systemic risk on the other. For the former question, mainly accounting standard setter's expertise is needed, while for the latter, mainly prudential regulator's knowledge is required. In any case, both types of information are complementary.

Accounting standard setters prefer fair value accounting due to its capacity to provide investors with transparency and hence, an early warning mechanism in times of crisis. They argue that a fair value approach would highlight the economic downfall much earlier, and resolve a potential crisis at lower fiscal costs. In line with this string of argument, transparency should remain the priority aim of accounting standard setters, with financial

stability arising as a consequence of transparency. (Hoogervorst, 2011) It is believed that the best that accounting standard setters can contribute to the social goal of stability of financial markets is to provide as much transparency as possible so that active and potential investors can base their decisions on the provided information. Additionally, it is believed that also creditors prefer to have an undistorted picture of the firm's wealth and therefore, market values should be disclosed as quickly and as reliably as possible.

My model outline proposes that, if the bank as well as the regulating supervisor pay attention, e.g. via having current fair values at hand, they are enabled to manage positions better at the beginning of the crisis compared to willfully ignoring current market signs by applying historical cost accounting values. Hence, there will be differences in the credit risk, liquidity and capital positions of banks entering the crisis depending on the accounting measurement regime they apply and are supervised by. The crisis then originates from holding risky and opaque assets with insufficient capital against it. In case of fair value accounting, the capital regulation is binding. This can be equalized with a creditor control over the financial decisions in case of debt covenants which are linked to capital ratios. Hence, fair value accounting alleviates the inefficiencies arising from asset substitution. Creditor control in this case is efficient ex-ante since it will lead to an abandonment of the risky and negative NPV projects.

Moreover, I argue that two further possible outcomes of creditor control when applying fair value accounting should be taken into consideration as well. In my analysis, I am going to show the following: First, creditor control may lead to excessive abandonment due to "false alarms", which corresponds to the "fire sale" prices under fair value accounting. Since creditors cannot participate in the upside potential of high future cash flows (a high continuation value), they tend to abandon even positive NPV projects to be able to realize their maturity value securely. However, at the time of the binding capital regulation, abandonment values are estimated at the then-valid market conditions with stable demand and supply. In this calculation, it is not taken into consideration that all banks invest in similar assets, banks are interconnected and therefore, bank failures typically collude. Consequently, the assumed abandonment value will be calculated on too favorite assumptions. It would have been better to assume the so-called "market-clearing price" at which many assets are sold at the same time. Second, fair value accounting offers the advantage that a single instance of actual realization is sufficient proof for the realizability of the whole group of comparable securities. Hence the fair value abandonment price is quoted too high since it is based on the proportionally scarce supply of actual transactions which take place under the fair value accounting regime.

In order to make a compelling case for macro-prudential regulation, it is necessary to answer the two questions raised by Hanson et al. (2011): "First, what exactly are the costs imposed on society when many financial firms shrink their assets at the same time? And second, why do individual banks not properly internalize these costs? That is, why do they not choose to raise fresh capital ex-post when a bad shock hits, thereby alleviating the need to shrink?" (p. 6) I develop a theory of a financial institution to show how accounting measurement rules and prudential capital regulation interact to affect agency conflicts between shareholders and debtholders, as well as systemic risks. In my model environment – similar to the one of Lu, Sapra and Subramanian (2012) – shareholders may act opportunistically by engaging in asset substitution. The regulator imposes a solvency constraint to ensure that the institution's leverage does not become too high. If the prudential constraint is satisfied, shareholders maintain control in the second period and therefore could engage in asset substitution. If the prudential constraint is violated at an interim date, transfer of control to the regulator occurs. Hence, the regulator is able to mitigate the asset substitution, but demands the liquidation of the financial assets. Two different accounting regimes are

analyzed in the model: The historical cost regime in which the balance sheet and solvency constraint are measured using the origination or book values of claims; and the fair value regime in which the balance sheet and solvency constraint are “marked to market” every period.

From the model I derive that the solvency constraint has bite in the fair value regime so that a transfer of control to the regulator can occur if it is violated. Therefore, once the bank applies fair value, it has to question its valuations which generate a timelier initiative-taking by the fair valuing bank compared to the one applying historical costs. Furthermore, I intend to show that in order to offset the write-downs caused by fair value accounting for their investment securities, a bank may be compelled to sell securities in illiquid markets. The model outline also displays that relative to a historical cost accounting regime, fair value accounting could alleviate the inefficiencies arising from asset substitution, but exacerbate those arising from excessive abandonment due to conceptually as well as economically induced fire sales. Hence, it is not at all clear that the statement “anything one can do with historical cost, one can do strictly better with fair value by just setting the regulatory trigger so that it binds only in extreme circumstances” really holds. Asset substitution and excessive abandonment therefore work in opposing directions – the increase in one mitigates the other. Consequently, shutting down asset substitution via a change in control in the fair value regime has a significant negative impact on the efficient project continuation choice in the second period. These cases highlight the fact that transparency may be efficient ex-ante, but not necessarily ex-post, which challenges the accounting standard setter’s view that financial stability should arise as a consequence of transparency. Optimal choices of the prevailing accounting regime and prudential regulation should balance inefficiencies due to asset substitution and excessive abandonment. The model approach therefore intends to incentivize supervision by the regulator in different ways, e.g. by analyzing whether there is a better way of providing efficient continuation incentives than permitting asset substitution; or by allowing asset substitution, but not liquidating the financial institution inefficiently, but monitoring it more closely ex-post. Furthermore, the model intends to answer the question how a privately optimal debt covenant set by the creditors differs from a publicly optimal trigger set by the prudential regulator. The model may thus be able to offer a vision for how a new bank accounting regime for systemic stability could be designed.

## **Policy Suggestions for an Effective Supervisory Cooperation**

In the previous sections, it has been argued that in boom times, fair value accounting suffers from some serious conceptual flaws, such as the amplification mechanism resulting in procyclicality, too many “lemons” that are valued at ridiculously high prices and a too high reliance on “one” transaction price for a huge portfolio of similar assets in the books. However, in crisis times, the flaws attributed to fair value accounting have been detected to be mainly of economic nature. So, fair value accounting discloses volatile and inefficient markets, and reflects market overreaction. Nevertheless, in illiquid or distressed markets, forced sales may further weaken the market for securities and reduce the resulting price for the observed trades, compelling additional sales to raise capital. Hence, the above analysis has made clear that a close cooperation between the two supervisory bodies, the accounting standard setters on the one side and the prudential regulators on the other side, is needed to be able to overcome these deficiencies and build up an alternative bank accounting theory for financial stability.

Interestingly, Borio and Tsatsaronis already acknowledged in 2005 that accountants and prudential regulators give different weight to the different kinds of information. According to them, accountants have traditionally focused on information about the financial condition and

performance of firms while prudential regulators have naturally paid more attention to their risk profile. They conclude that both appear to have paid far less attention to the uncertainty that surrounds those estimates. (Borio and Tsatsaronis, 2005) In response to this critique, the IMF (2009) strengthens the point that accounting rules and valuation practices should be strengthened to reflect a broader range of available information on the evolution of risks through the cycle. So far, a natural division of labor seems to have emerged in the allocation of responsibilities for standard-setting in information, with accounting and securities regulators largely focusing on first moment information and prudential authorities de-facto advancing disclosure practices concerning risk information in the regulated segment of the financial sector. At the same time, as the previous analysis makes clear, the intimate relationship between risk measurement and valuation puts a premium on an intense dialogue between the two sets of standard-setters in elaborating the ideal information set. Accounting standard setters and prudential authorities should collaborate to achieve these objectives, with particular emphasis on enabling higher loan loss provisions during periods of rapid credit expansion, evaluating approaches to valuation reserves or adjustments when valuation of assets on the trading book are highly uncertain, and examining other ways to dampen adverse dynamics potentially associated with fair value accounting. (IMF, 2009)

In line with Borio and Tsatsaronis (2005), I have argued that the various types of information are complementary, and therefore it should be possible to overcome differences in perspective while at the same time not compromising the achievement of the objectives that each standard-setting authority is pursuing. To accomplish the reconciliation of different perspectives in this area, I suggest a broad strategy, based on three principles:

Firstly, if the bank as well as the regulating supervisor pay attention, e.g. via having current fair values at hand, they are enabled to manage positions better at the beginning of the crisis compared to willfully ignoring current market signs by applying historical cost accounting values. Hence, there will be differences in the credit risk, liquidity and capital positions of banks entering the crisis depending on the accounting measurement regime they apply and are supervised by. According to Epstein and Henderson (2009) risk matters less when assets are valued on the basis of historical cost, precisely because old information is not updated, for regulatory purposes, in response to the most recent events. Therefore, shocks are somewhat blunted by an accounting rule designed to tie formal, regulatory value to an old and somewhat arbitrary number. It is, of course, possible for regulators to look past accounting conventions to actual value, but in practice the prompt corrective action rules are not triggered in these cases. (Epstein and Henderson, 2009) Because the balance sheet is not re-measured in the historical cost regime, the institution automatically meets the solvency constraint at date 1 if it meets it at date 0. Because there is no possibility of a transfer of control at date 1, the solvency constraint has little bite. (Lu et al., 2012, p. 4) Consistent with the intuition expressed by proponents of fair value accounting that market prices play a disciplining role, Lu et al. (2012) show that the fair value regime on the other hand does alleviate the asset substitution inefficiency pervasive in the historical cost regime. Because claims are marked to market in the fair value regime, the solvency constraint has bite at the intermediate date 1 so that transfer of control to the regulator occurs if it is violated. Further, such transfer of control occurs when the institution's leverage is above a threshold. However, according to historical cost accounting asset substitution can continue unnoticed. (Lu et al., 2012, p. 5) To enable this systemically effective prompt corrective action, accounting needs to move beyond its traditional role of recording economic events and transactions and must eventually encompass and reflect underlying risks. Such an expanded role entails not just reporting traditional point estimates, but also estimates of risk profiles, and measures of the uncertainty surrounding transactions.



Secondly, inefficiencies from fair value accounting's conceptual flaws may be minimized by monitoring realized asset turnovers, for which mainly accounting standard setter's expertise is needed. The FASB defines "fair value" as "the price at which an asset or liability could be exchanged in a current transaction between knowledgeable, unrelated willing parties" (FASB, 2004). As the FASB notes, "the objective of a fair value measurement is to estimate an exchange price for the asset or liability being measured in the absence of an actual transaction for that asset or liability." As Landsman (2005) notes, implicit in this objective is the notion that fair value is well defined so that an asset or liability's exchange price fully captures its value. That is, the price at which an asset can be exchanged between two entities does not depend on the entities engaged in the exchange and this price also equals the value-in-use to any entity. For such a bank, Barth and Landsman (1995) note that this is a strong assumption to make, particularly if many of its assets and liabilities cannot readily be traded. According to current accounting standards about financial assets, both "trading financial assets" and "financial assets available for sale" should be measured by their fair values. Hence, the question arises why firms keep on holding financial assets available for sale but make ready to sell trading financial assets. The reason must be that the utility of holding financial assets available for sale continuously is larger than that of selling them out in the current period. Therefore, only trading financial assets are exchanged in the market and the market price is formed based on the supply of the trading financial assets only. Yuan and Liu (2011) conclude that, for financial assets, a "fair value trap" always exists due to the existence of "financial assets available for sale". A corresponding critique about fair value accounting claims that fair value misrepresents management's intent. However, empirical observations (e.g. Adrian and Shin, 2010) show that fair values allow users of financial reports to evaluate the effects of a decision to hold an asset or owe a liability. Accordingly, holding a financial asset to maturity that pays a below-market rate subjects the entity to an opportunity loss which is then recognized by fair value measurement. Hence, accounting standard setters may monitor the ratio of unrealized versus realized asset turnovers to be able to tell inflated selling prices due to an artificial shortage of supply as well as a rising systemic risk if a too high proportion of assets is not sold out to the market.

Thirdly, inefficiencies from fair value accounting's economic flaws may be minimized by monitoring counterparty risk, for which mainly prudential regulator's expertise is needed. Due to the long financial trading chains the counterparty risk wins in importance. The high interconnectivity of financial institutions has first resulted in a high liquidity and safety appearance since the counterparty could theoretically liquidate the collateral value even above its fundamental mark-to-market value. Hence, during the boom any worries about counterparty defaults did not exist. (e.g. Shin, 2008) A very good example of the markets' beliefs at that time is given by Chuck Prince, the then-CEO of Citigroup, in his interview to the Financial Times on July 9, 2007: "When the music stops, in terms of liquidity, things will be complicated. But as long as the music is playing, you've got to get up and dance. We're still dancing." Kolasinski (2011) comments on what actually happened when "things got complicated": If the involved financial institutions sell early enough, their loss could plausibly be less bad than the accounting "other-than-temporary-income loss" they would have to recognize if they did not sell, and hence the sale mitigates their deterioration in regulatory capital. Nevertheless, banks still destroy value by selling into negative liquidity shocks. Selling when liquidity is drying up necessarily involves selling at below fundamental value (e.g., Morris and Shin, 2004), which implies the banks are reducing the value of their assets and hurting shareholders. On the other hand, such sales do not in any way reduce the amount of creditor claims on the bank, so they effectively increase the bank's leverage, worsening the position of all creditors. (Kolasinski, 2011, p. 175) Hence, only months after Chuck Prince's open-hearted expression, many accounting researchers believe that cross-holding securities are the source of bubbles under fair value accounting. Accordingly, Yuan

and Liu (2011) would like the prudential supervisors to restrict the cross-holding securities proportion by listed firms.

With debt financing, there's an additional effect on the balance sheet of the lender, the bank. Moreover, as the bank is financed by other banks, or more generally, has obligations to other banks, there's also an effect on the balance sheets of other banks. In a banking system where all agents' balance sheets are interconnected, the effect of a change in the price of fundamental assets is transmitted to several agents' balance sheets. As a consequence, the value of their assets depends on "the level and seniority profile of debt, the structure of balance sheet interconnections, and (crucially) the current marginal transaction price of fundamental assets." (Shin, 2008, p. 317) In accordance to Shin's (2008) remark, Bleck and Gao (2010) claim that attempting to resolve accounting measurement problems via a market-based solution could lead to unintended and sometimes undesirable consequences. A firm's business model is viable only if it has some competitive advantage over the market in conducting its activities. As a result, the core assets and liabilities on a firm's balance sheet, dictated by its business model, are often subject to the same market frictions that sustain the business model. Market prices in these markets are thus endogenously linked to the firm's activities that are guided partially by accounting measurement. Both accounting standard setters and prudential regulators therefore should not only focus on the individual financial institution or firm, but take into consideration their complex and sometimes even unregulated business relation network.

## Conclusion

This analysis has made clear that some of the problems that arise with the introduction of fair value accounting are not due to the accounting rule in itself, but rather stem from the interaction of fair value accounting and the definition of capital requirements. Over time, capital requirements are periodically revised by bank regulators, as is the FASB's definition of capital, but the two types of regulatory action are not coordinated. In fact the recent trend towards more comprehensive fair value accounting does not seem to have been accompanied by a rethinking of capital requirements and how they should be harmonized with a fair value accounting regime. Heaton et al. (2010) conclude: "For any change in the FASB definition of capital it should be possible to specify an offsetting change in the definition of the capital requirement that makes the accounting change neutral with respect to economic outcomes. If fair value accounting has advantages in other contexts, then a sensible solution to the problems caused by the interaction of volatile capital measures and a static capital requirement is to redefine the capital requirement rather than to back away from a fair value accounting standard." (p. 73)

As I have argued, the pro-cyclical effect of fair value accounting in itself does not impair its relevance for the purposes of investors, who need a measure of a company's financial position at a given point of time under that moment's market conditions. However, it would make sense to correct certain multi-year-cycle effects when financial information is analyzed in a prudential framework. (Véron, 2008) The extent to which such fair value "triggers" are either encouraged or mandated in regulation and supervisory guidance would need to be re-evaluated. It is the role of prudential supervision to judge the reliability of various methods used to establish fair values, especially when a marked-to-model approach is used. In addition, accounting standard setters will increasingly need to take into account the financial stability implications in their accounting practices and guidance. (IMF, 2008)

Finally, accounting standards-setters and prudential supervisors should work together to identify solutions that are consistent with the complementary objectives of promoting the stability of the financial sector and of providing transparency of economic results in financial

reports (G20, 2009). My analysis strongly suggests that prudential authorities can have a very useful role in helping to develop not just risk and measurement error information, but also first-moment information, leveraging their expertise in risk measurement and validation. This dialogue is especially important now that accounting standard-setters have begun to pay closer attention to risk information, too. While the dialogue has intensified in recent years, a further intensification is desirable. This would serve multiple purposes. It could foster a greater common understanding of the issues. It could limit the risk of inconsistencies and excessive information burdens. And it could strengthen the “bite” of the disclosure practices encouraged by prudential authorities, at present confined to regulated financial institutions. In particular, the involvement of accounting standard-setters could help to spread sound information disclosure principles beyond currently regulated financial enterprises. (Borio and Tsatsaronis, 2005)

## References

- Adrian, T., & Shin, H.S. (2010). Liquidity and leverage. *Journal of Financial Intermediation*, 19(3), 418-437.
- Allen, F., & Carletti, E. (2008). Mark-to-market accounting and liquidity pricing. *Journal of Accounting and Economics*, 45(2-3), 358-378.
- Barth, M. E. (2006). Including estimates of the future in today's financial statements. *Accounting Horizons*, 20(3), 271-285.
- Barth, M. E., & Landsman, W. R. (2010). How did Financial Reporting Contribute to the Financial Crisis? *European Accounting Review*, 19( 3), 399-423.
- Barth, M. E., & Landsman, W. R. (1995). Fundamental issues related to using fair value accounting for financial reporting. *Accounting Horizons*, 9, pp. 97–107.
- Bhat, G., Frankel, R., & Martin, X. (2011). Panacea, pandora's box, or placebo: feedback in bank mortgage-backed security holdings and fair value accounting. *Journal of Accounting and Economics*, forthcoming.
- Bleck, A. & Gao, P. (2010). Where does the Information in Mark-to-Market Come From? *Chicago Booth Research Paper #10-06*.
- Borio, C., & Tsatsaronis, K. (2005). Accounting, Prudential Regulation and Financial Stability: Elements of a Synthesis. *BIS Working Papers*, No 180.
- Diamond, D.W., & R.G. Rajan (2000). A Theory of Bank Capital. *The Journal of Finance*, IV(6).
- Epstein, R. A., & Henderson, M. T. (2009). Do Accounting Rules Matter? The Dangerous Allure of Mark to Market. *U of Chicago Law & Economics*, Olin Working Paper No. 458, available at: SSRN: <http://ssrn.com/abstract=1385382>
- Financial Accounting Standards Board (FASB) (2004). Proposed Statement of Financial Accounting Standards – fair value measurements. Norwalk, CT: FASB.
- Financial Times (2007). Citigroup chief stays bullish on buy-outs. July 9, 2007.
- Forbes, S. (2009). Steve: End mark-to-market. *Forbes Magazine*, March 23, 2009, available at: <http://www.forbes.com/2009/03/20/steve-forbes-mark-to-market-intelligent-investing-market.html>
- G20 (2009). Enhancing Sound Regulation and Strengthening Transparency (Working Group 1). *Final Report March 2009*, available at: [http://www.g20.org/Documents/g20\\_wg1\\_010409.pdf](http://www.g20.org/Documents/g20_wg1_010409.pdf)
- Hanson, S. G., Kashyap A. K., & Stein, J. C. (2011). A Macro-prudential Approach to Financial Regulation. *Journal of Economic Perspectives*, 25, 3-28.
- Heaton, J. C., Lucas, D., & McDonald, R. L. (2010). Is Mark-to-Market Accounting Destabilizing? Analysis and Implications for Policy, Carnegie-Rochester Conference Series on Public Policy: Credit Market Turmoil: Implications for Policy. *Journal of Monetary Economics*, 57( 1), 64-75.
- Hoogervorst, H. (2011). Speech: Financial Reporting and Auditing - A time for change? The Objectives of Financial Reporting. *Conference organised by the European Commission, Brussels*, Feb 9, 2011, 1-13, available at: <http://www.ifrs.org/NR/rdonlyres/5E4AA870-2E7C-469E-8175-177D073D4F5A/0/20110209speechHHBrussel.pdf>
- International Monetary Fund (IMF) (2009). Global Financial Stability Report: Responding to the Financial Crisis and Measuring Systemic Risks. April 2009, available at: <http://www.imf.org/External/Pubs/FT/GFSR/2009/01/index.htm>
- International Monetary Fund (IMF) (2008). Global Financial Stability Report: Containing Systemic Risks and Restoring Financial Soundness. April 2008, available at: <http://www.imf.org/External/Pubs/FT/GFSR/2008/01/index.htm>.
- Kashyap, A.K., & Stein, J.C. (2004). Cyclical Implications of the Basel-II Capital Standards. *Federal Reserve Bank of Chicago Economic Perspective*, 28, 18-31.

- Kolasinski, A. C. (2011). Mark-to-Market Regulatory Accounting When Securities Markets are Stressed: Lessons from the Financial Crisis of 2007-2009. *Journal of Accounting and Economics*, 52(2-3), 174-177.
- Landsman, W. (2005). Fair Value Accounting for Financial Instruments: Some Implications for Bank Regulation. BIS Working Papers, No. 209, available at: <http://www.bis.org/events/armpr05/landsman.pdf>
- Laux, C., & Leuz, C. (2010). Did Fair-Value Accounting Contribute to the Financial Crisis? *Journal of Economic Perspectives*, 24(1), 93-118.
- Laux, C., & Leuz, C. (2009). The Crisis of Fair-Value Accounting: Making Sense of the recent Debate. *Accounting, Organizations and Society*, 34, 826-34.
- Linsmeier, T. J. (2011). Financial Reporting and Financial Crises: The Case for Measuring Financial Instruments at Fair Value in the Financial Statements. *Accounting Horizons*, 25(2), 409-417.
- Lu, T., Sapa, H., & Subramanian, A. (2012). Agency Conflicts, Prudential Regulation, and Marking to Market. *Chicago Booth Working Paper*.
- Magnan, M. (2009). Fair Value Accounting and the Financial Crisis: Messenger or Contributor? *CIRANO - Scientific Publications*, Paper No. 2009s-27, available at: <http://ssrn.com/abstract=1504128>
- Miles, D. (2010). Banks fail to convince crying foul over Basel reforms. *Financial Times*, 23 November 2010.
- Miller, M. (1995). Do the M&M propositions apply to banks? *Journal of Banking and Finance*, 19, 483-489.
- Morris, S., & Shin, H.S. (2004). Liquidity Black Holes. *Review of Finance*, 8, 1-18.
- Plantin, G., Sapa, H., & Shin, H.S. (2008a). Fair Value Accounting and Financial Stability. *Chicago GSB Research Paper*, No. 08-15, available at: <http://ssrn.com/abstract=1275395>.
- Plantin, G., Sapa, H., & Shin, H.S. (2008b). Marking-to-Market: Panacea or Pandora's Box? *Journal of Accounting Research*, 46, 435-460.
- Power, M. (2010). Fair value accounting, financial economics and the transformation of reliability. *Accounting and Business Research*, 40(3), 197-210.
- Ryan, S. G. (2008). Fair Value Accounting: Understanding the Issues Raised by the Credit Crunch, in: *White Paper prepared for the Council of Institutional Investors - uic.edu*. July 2008.
- Reason, T. (2003). Questions of Value: Is fair-value accounting the best way to measure a company? The debate heats up. *CFO Magazine*, February 1, 2003, 1-4.
- Sapa, H. (2008). Do Accounting Measurement Systems Matter? A Discussion of Mark-to-Market and Liquidity Pricing. *Journal of Accounting and Economics*, 45 (2&3), 379-387.
- Sapa, H. (2010). The Economic Trade-Offs in the Fair Value Debate. *Chicago Booth Research Paper*, No. 09-35, available at: <http://ssrn.com/abstract=1481777>.
- Securities and Exchange Commission (SEC) (2008). Report and recommendations pursuant to Section 133 of the emergency economic stabilization act of 2008: Study on mark-to-market accounting. Technical Report, United States Securities and Exchange Commission.
- Shin, H.S. (2008). Risk and Liquidity in a System Context. *Clarendon Lectures in Finance*, London: Oxford University Press.
- Sinn, H.W. (2010). Kasino-Kapitalismus - Wie es zur Finanzkrise kam, und was jetzt zu tun ist. Berlin: Ullstein.
- Turner, A. (2009). The financial crisis and the future of financial regulation. The Economist's Inaugural City Lecture, 21 Jan 2009, available at: [http://www.fsa.gov.uk/pages/Library/Communication/Speeches/2009/0121\\_at.shtml](http://www.fsa.gov.uk/pages/Library/Communication/Speeches/2009/0121_at.shtml).
- Véron, N. (2008). Fair Value Accounting is the Wrong Scapegoat for this Crisis. *Comment Letter to SEC*, May 2008, available at: <http://www.sec.gov/comments/4-560/4560-3.pdf>.
- Wallison, P.J. (2008). Fair value accounting: A critique. *Financial Services Outlook*, July 2008, 1-8, available at: [finreg21.com](http://finreg21.com).
- Yuan, M. & Liu, H. (2011). The Economic Consequences of Fair Value Accounting. *Accounting, Economics, and Law*, 1(2), available at: <http://www.bepress.com/acl/vol1/iss2/1>.

# THE NEXUS OF ENTERPRISE RISK MANAGEMENT AND VALUE CREATION: A SYSTEMATIC LITERATURE REVIEW

Verena Kraus<sup>1</sup> and Othmar M. Lehner<sup>2</sup>

<sup>1</sup> University of Applied Sciences Upper Austria, <sup>2</sup> University of Jyväskylä, Finland

**Abstract.** *Enterprise risk management (ERM) has emerged as a new paradigm for managing the portfolio of risks that face organizations and delivers synergic value by exploiting natural hedges. Proponents of ERM claim that ERM is designed to enhance the shareholder value (SHV). Increasing numbers of researchers have studied the impact of ERM on a firms' value (value creation) and found a positive correlation, but ultimately fail to enlighten the entire picture because of the yet to be fully understood field of ERM as well as a missing conceptualization of the nexus between ERM and Value Creation (VC). The literature on ERM is still in a pre-paradigmatic state and executed quantitative studies are too early in the stage of the research field. This study proposes an updated research agenda to examine the nexus of ERM and VC and determines which quality articles and proxies for ERM and VC currently exist in literature. Therefore, the authors systematically reviewed 25 articles regarding the ERM and VC nexus by coding the articles and later using a qualitative thematic analysis. First, the study provides an overview of theoretical background regarding ERM development, frameworks and regulation. Then the authors describe the empirical methodology and introduce the findings of the study. The study found a lack of reliable proxies, authors struggling to find the influencing ERM determinants and, thus, the inability to make a general statement on the value creating effect of ERM programs. Resulting of the findings, the authors proposes the identification of specific components and processes of ERM that contribute to firm value and evaluation of added benefit of ERM, compared to TRM. The authors further suggest the solicitation of a same base and scrutini-zation of profitability based VC measures towards a cash flow based approach.*

**Keywords:** *Risk, Finance, Enterprise Risk Management, ERM, Value Creation*

## Introduction

Risk management, its processes, its measures as well as its instruments have been playing a major role in financial markets and a company's ability to avoid, reduce, offset or turn risks into opportunities for decades. A newly developed framework revolutionizes traditional silo-based concepts and drives risk management into a comprehensive, strategic and integrated system, called Enterprise Risk Management. Studies find evidence for a connection between the introduction of Enterprise Risk Management (ERM) and an increase in value for the corresponding companies (Hoyt & Liebenberg, 2011; Pagach & Warr, 2010). Based on hypotheses of possible correlations between proxies, such as the introduction of a chief risk officer (CRO) and Shareholder Value (SHV), it is argued in literature that a positive correlation exists and that ERM contributes to Value Creation (VC) (Beasley, Pagach, & Warr, 2007; Pagach & Warr, 2010). However, the studies so far fail to address and explore the actual contributing processes and factors, and literature falls short on finding a more holistic approach. Moreover, after a careful literature review, the authors came to the conclusion that the maturity of the body of knowledge on ERM is still in a pre-paradigmatic state (Kuhn, 1963) and, thus, the mentioned quantitative approaches are too early and may miss some important mediator and moderator variables between ERM and VC (Edmondson & Mcmanus, 2007). Hence, the mentioned studies can only present early evidence for such a connection. Yet many conceptual and explorative articles on the organization of ERM and its possible impact can be identified, presenting a much-varied picture. In an approach, now to identify the existing theories and find the blind spots in literature on the ERM/VC nexus, the authors embark on a qualitative journey of inductively coding existing literature, clustering and, finally, comparing the approaches to the existing body of knowledge on the phenomenon of ERM. Enterprise Risk Management enables firms to manage a wide array of risks in an integrated, enterprise-wide fashion (Hoyt & Liebenberg, 2011). ERM represents a radical paradigm shift from the traditional "silo-based" approach to managing risk holistically in a portfolio (Pagach & Warr, 2010). Studies use ERM synonymous with integrated risk management (IRM), holistic risk management, enterprise-wide risk management and strategic risk management. For consistency, the acronym ERM is used throughout this study. Value Creation includes all types of benefits, creating a better value for shareholders (Gluck, Kaufman, & Walleck, 1980). Much has been written in the fields of Enterprise Risk Management (ERM) and Value Creation (VC). Strategic Management sees Value Creation as the goal of its aggregated activities (Gluck et al., 1980) and ERM is placed in literature as an important variable within the respective causal chain (Meulbroek, 2002). Besides, ERM itself remains largely vaguely defined and unspecific (Miccolis & Shah, 2000b). Approaches from GARP (Global Association of Risk Professionals) (GARP, 2004) and COSO (Committee of Sponsoring Organizations of the Treadway Commission) (COSO, 2004) present ERM as a term for systemic, integrated approach to risk management that differs from traditional container based methods as well as delivers synergic value by exploiting natural hedges and portfolio effects, improve the stability and quality of earnings along with reducing external costs of capital (Meulbroek, 2002; Miccolis & Shah, 2000b; Nocco & Stulz, 2006). Explanatory studies found early evidence of a positive correlation of specific forms of risk management and firm value in form of Shareholder Value (SHV). However, only recently, more empirical studies emerged with a distinct focus on the specific contribution of a firm's overall or enterprise risk management to SHV (Hoyt & Liebenberg, 2011; Pagach & Warr, 2010). Hoyt and

Liebenberg (2011), for example, found a positive relation between firm value and the implementation of ERM. The study is based on publicly traded U.S. insurers (117). In their attempt to identify ERM activities for each firm of the initial sample (275), they encountered difficulties in finding suitable proxies and, therefore, ultimately, their search string for media evidence included “chief risk officer (CRO)” and “risk committee”, being used synonymously for enterprise risk management. Thus, a major obstacle of ERM related research is the difficulty in identifying signals for ERM engagement from publicly available data. Some authors (Beasley, Clune, & Hermanson, 2005; Liebenberg & Hoyt, 2003) determined the creation of a specialized managerial position, the CRO, as an expressive signal. Liebenberg and Hoyt (2003) state the CRO as being responsible for the implementation and coordination of ERM and, therefore, firms appointing CROs are more likely to actually implement a true form of ERM in the definition that was laid out before. Accordingly, Beasley et al (2005) find that the presence of a CRO is associated with a greater stage of ERM adoption. Pagach and Warr (2010) fail to find support for the proposition that ERM contributes to value creation. Although they reveal that some firms adopting ERM actually experience reduction in earnings volatility, overall, they see no significance in value enhancement. As a signal of a firm’s adoption of ERM, they focused on the hiring announcement of enterprise-level or chief risk officers (CRO). They studied (138) announcements of senior risk officers appointments made from 1992 to 2004, whereby the synonym enterprise-wide risk management appeared for the first time only in the Joint Australia / New Zealand Standard for Risk Management in 1995 (AS/NZs, 2004). The study of Beasley et al. (2007) examines the firm-specific equity market reactions surrounding the appointment of a CRO. The univariate result of the study suggests that a general statement about the benefits or costs of implementing ERM is not possible. However, the multivariate analyses reveal a significant relation between the magnitude of market returns and certain firm-specific characteristics. The announcement of a CRO during the period 1992-2003 was used to obtain a sample of (120) firms probably engaged in ERM and they measured abnormal stock market returns occurring on the day of the hiring announcement plus the following day. So this study only measured short-term reactions to the CRO appointment and did not consider that the synonym ERM did not appear before 1995. Beasley et al. (2007) also discusses the view that ERM may in fact be value destroying, when shareholders, according to the modern portfolio theory, are able to costless eliminate idiosyncratic risks through portfolio diversification. Prevalent studies examined the impact of ERM on different value approaches, including firm value determined with Tobin’s Q (Hoyt & Liebenberg, 2011), equity market reactions (Beasley et al., 2007) and long-term firm performance (Pagach & Warr, 2010).

The authors of this thesis claim that recent quantitative empirical studies on the topic, while contributing in examining specific factors, ultimately fail to enlighten the whole picture because of the yet to be fully understood field of ERM and a missing conceptualization of the nexus between ERM and SHV. Many studies, for example, fully relied on the appointment of a CRO as a signal of a firms’ ERM adoption and disregarded confounding ERM activities, such as idiosyncratic risks for their research. More specifically, mixed outcomes concerning a possible correlation of ERM and SHV demonstrate that the underlying model needs to be expanded. Such further scrutinization would also provide further insights not only if, but also how ERM influences SHV. The different levels or stages of ERM programs and their associated longitudinal magnitude of value creation need to be included in such a model. Therefore, it is the opinion of the authors that the researchers’ community needs to take a step backwards and conceptualize further to come up with a

more holistic and dynamic approach. As a result, this article will present an overview of the current state of literature on the ERM / VC nexus and propose a research agenda to address the “blind spots”.

The following four sequential research guidelines were thus created:

- Which quality articles on the nexus of ERM and VC are found to display a highly relevant contribution to the field?
- What schools of thought can be identified, what theoretical background from the ERM side and the VC side can be identified in them?
- What concepts of the ERM literature remain unaddressed in ERM / VC literature so far?
- Proposing an updated research agenda in the field addressing the findings.

## Literature Review

Interest in enterprise risk management (ERM) has continued to grow in recent years. A considerable number of organizations have implemented ERM programs, rating agencies have begun to consider ERM in the ratings process, consulting firms have implemented ERM in their services, universities have developed ERM addressing courses and research centres (Hoyt & Liebenberg, 2011). What’s more, in this first theoretical chapter, the authors aims to provide a brief overview on the differences of TRM and ERM as well as some insight into the development of the risk management sector in recent years.

Risk management is traceable to the late 1940s and early 1950s and started as a so-called “silo-based” approach to corporate risk management until the mid-1990s. The “silo-based” approach is also known as Traditional Risk Management (TRM) and is categorized by the management of individual risks in separate units in a highly disaggregated method (Dickinson, 2001). Until the 1990s, there were only the two categories of risks managed, namely “non-financial” and “financial” risks. The “non-financial” or physical risks include natural catastrophes, accidents and hazard, whereby the financial risks market and credit risk contain (Culp, 2002). In the early stages, Traditional Risk Management used merely insurance companies to transfer their non-financial risks. In the 1970s, companies began to look more closely at how they managed various financial risks, such as movements in exchange rates, commodity prices, interest rates and stock prices. Furthermore, financial risk management began, as a formal system, at the same time as the development of financial derivative products, e.g. futures, options and swaps (Dickinson, 2001). Twenty years ago, the responsibility for risk management was split between a risk manager at low-level position, who’s main job was the purchase of insurances and a treasurer responsible for hedging of interest rates and foreign exchange exposure (Nocco & Stulz, 2006). In 2003, even 92% of the world’s 500 largest companies report using derivatives (Smithson & Simkins, 2005). In 1995, the synonym enterprise-wide risk management appeared the first time in the Joint Australia / New Zealand Standard for Risk Management (AS/NZs, 2004). The standard provides the first practical prescription for implementation of ERM using generic examples. So the development toward a more holistic approach began.

The integrated or enterprise-wide approach has advantage over the traditional risk management approach, because it’s not managing one risk at a time on a decentralized basis, which creates inefficiencies because of the lack of coordination between the various



risk management departments, but in a systematically and consistently way. Additionally, ERM enables to identify interdependencies between risks across different sources, enhancing it from the TRM known focus on market and credit risk to operational, reputational and strategic risk, optimize the tradeoff between risk and return and strengthens a company's ability to carry out its strategic plan (Meulbroek, 2002; Nocco & Stulz, 2006). In addition to that, ERM views all risks facing a company through a common lens by harmonization of the variety of instruments, tools and terminology as well as the enterprise-wide view attempt to consolidate the risk management process organizationally across systems, processes and people (Culp, 2002). In 2002, the development towards enterprise-wide risk management obtained further support from the Public Law of Sarbanes Oxley Act (SOA 2002), which led to extensive changes in corporate governance and compliance and is applicable for all US-publicly traded companies. The SOA (2002) contains the requirement to state the responsibility of management for establishing and maintaining an internal control structure and the assessment of the effectiveness of the internal control in each annual report. Furthermore, a regulatory capital framework, known as Basel II, emerged in 2003 and expands risk management requirements for financial institutions to include oversight of operational risks in addition to credit and market risks as part of their capital adequacy determinations (Basel, 2003). In response to these requirements, financial institutions are embracing ERM to manage risks across the entity (Hoyt & Liebenberg, 2011). Not until frameworks and best practices were developed, the new concept of ERM got its updraft. The Casualty Actuarial Society (CAS, 2003) published an overview of ERM and the Joint Australia / New Zealand Standard for Risk Management enhanced its report to an international RM standard ISO 31000 (2009). But probably the 2004 emerged Integrated Framework for Enterprise Risk Management of the Committee of Sponsoring Organizations of the Treadway Commission is best known (COSO, 2004). In 2010, publications of U.S. laws concerning risk management augmented the trend towards ERM further. Moreover, the Dodd Frank Act (Act, 2010) requires financial companies to have a formal risk committee and enterprise-wide risk management program and the New York Stock Exchange Corporate Governance Rules (NYSE, 2009) calls for organizations to disclose details about the board's role in risk oversight.

**Fehler! Verweisquelle konnte nicht gefunden werden.** The differences between TRM and ERM (adapted from Banham, 2004)

Traditional Risk Management	Enterprise Risk Management
Risk as individual hazards	Risk viewed in context of business strategy
Risk identification and assessment	Risk portfolio development
Focus on discrete risks	Focus on critical risks
Risk mitigation	Risk optimisation
Risk limits	Risk strategy
Risks with no owners	Defined risk responsibilities
Haphazard risk quantification	Monitoring and measurement of risks
“Risk is not my responsibility”	“Risk is everyone’s responsibility“

*Drivers towards the Enterprise Risk Management*

The trend towards the adoption of ERM programs is attributed to a combination of external and internal pressure. Miccolis and Shah (2000a) cite the direct and indirect pressure from corporate governance bodies as well as institutional investors as external driven reason for ERM adoption. However, the literature claims that additional external drivers exist. So a company's ERM adoption is also affected by a broader scope of risks arising from factors, such as globalisation, industry consolidation, regulation and technological progress (Lam, 2001; Miccolis & Shah, 2000b). Dickinson (2001) further mentions the failures of high-profile companies along with the financial crisis as motivating factors to consider ERM. Rating agencies, like, for instance, Standard & Poor's and Moody's, have begun to take account of ERM systems in their rating methodology and, thus, it can be presumed that it's a driving factor for an organization to adopt ERM (Aabo, Fraser, & Simkins, 2005). Internally driven is the desire for an ERM program primarily by an emphasis to maximize shareholder wealth (Lam, 2001; Miccolis & Shah, 2000a). A study from Deloitte (2008) with 151 respondents from Europe, North America and South America found that ERM efforts are being driven, for the most part, by the need to be able to respond effectively to regulation, either because it is required by regulations or because ERM is seen as a means to manage increasingly complex compliance requirements. Additionally, further interest drivers in ERM are 'unanticipated losses', 'market expectation' and 'public image'. The key groups driving ERM from inside an organization are boards and audit committees, followed by internal audit and then senior management (Deloitte, 2008). Figure 1 summarizes the ERM drivers found during the literature review.

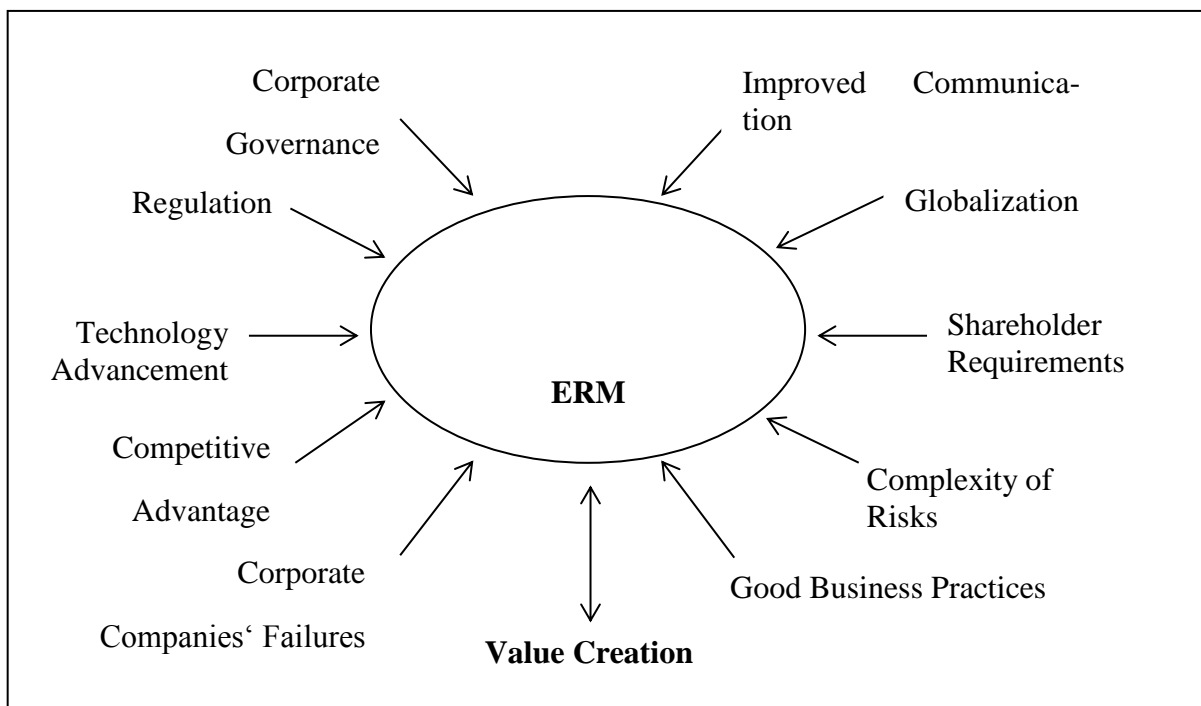


Figure 1: ERM Drivers (adapted from Banham, 2004)

### *Current State of ERM Adoption*

In 2001, a study by the Economist Intelligence Unit (EIU, 2001) found out that 41% of the companies in Europe, North America and Asia had implemented some form of ERM. Beasley et al. (2005) conducted a study on 123 organizations mainly composed of U.S. firms and also international firms in 2004. The authors noted that 50% of the entities in the sample have either partially or completely implemented ERM, 35% have not made a decision to implement ERM or have no plans to implement ERM and 31% of the entities have appointed a CRO. Furthermore, they observed that the US firms have less-developed ERM processes than the international firms in the sample. Firms in banking, education and insurance industries have a more advanced stage of ERM implementation than firms outside these industries (Beasley et al., 2005). A study of Baxter, Bedard, Hoitash, and Yezege (2011) on 165 U.S. firms in the banking and insurance industry for the period 2006 to 2008 used the S&P Rating database on ERM activities. The study states in its descriptive statistics, that 25% of the sample firms have either strong or excellent S&P RM ratings and only 4% have a weak S&P RM rating (Baxter et al., 2011). Whereas Desender and Lafuente (2010) concentrated on pharmaceutical firms by including 97 U.S. firms of this industry into the study. 39% of firms reported the presence of a CRO in 2004. Additionally, the sample firms indicated that they have adopted on average 33% of the COSO ERM framework (Desender & Lafuente, 2010).

In Canada, a study found on 118 companies from the insurance industry in 2001, that 31% of the sample had adopted ERM, 29% were investigating adopting ERM and 40% were not considering ERM. A large portion of the firms is moving towards ERM. 45 firms are developing company-wide guidelines for risk management; 49% are increasing the awareness of non-operational risks by operational risk management and increasing the awareness of operational risks by non-operational risk management as well as 64% are enhancing the coordination with different areas responsible for risk management (Kleffner, Lee, & McGannon, 2003).

A comprehensive study by Deloitte in 2008 of 151 mid-size companies, with mainly internal auditors and risk manager as respondents, from North America (56), South America (24) and Europe (68) detected a growing interest in ERM (Deloitte, 2008). What's more, the majority of respondents (64% in Europe and 62% in North America) have a higher interest in ERM than they did a year earlier, with South America showing the greatest increase in interest (79%), compared to that of the prior year. Besides, with 56% of companies having an ERM program in place for less than two years, most ERM programs are in relatively early stages of development (Deloitte, 2008). According to the study of Deloitte (2008) Europe is further ahead in ERM deployment, with 43% of companies, which have had an ERM program in place for more than four years. In terms of industry, also differences were identified in the state of ERM adoption. So are telecommunications (38%), life science and health care (34%) as well as energy (24%) more likely to have fully operational ERM programs than other industries (Deloitte, 2008).

One of the latest studies in this concern is the survey of COSO on the current state of ERM in the year 2010 with 460 respondents from U.S. based organizations (COSO, 2010). The findings of the study prove that the level of ERM sophistication still remains fairly immature for most responding to the survey. Around 15% of the respondents described their organization's level of ERM process as "very immature" and 28% as "somewhat im-

mature”. Only 3% responded that their organization’s ERM process was “very mature” (COSO, 2010). So, to get more insight, respondents were asked to pick a statement, which best described their organization’s current stage of ERM implementation. In this case, only 28% of all respondents describe their current stage of ERM implementation as “systematic, robust and repeatable” with regular reporting to the board, while almost 60% of respondents say their risk tracking is mostly informal and ad hoc or only tracked within individual silos or categories as opposed to enterprise-wide. Around 13% indicated that their organization had no structured process for identifying and reporting top risk exposures to the board (COSO, 2010).

### *Value Creation*

Proponents claim that the underlying concept of ERM is to enhance shareholder value and is related to each type of organization, whether profit, non-profit or government agency (COSO, 2004). ERM addresses important business issues, such as growth, return, consistency and value creation (CAS, 2003). Moreover, Liebenberg and Hoyt (2003) stated that unlike the traditional “silo-based” approach to corporate risk management, ERM enables firms to benefit from an integrated approach in managing risk.

The basic premise that ERM is value creating runs counter to the portfolio theory by Markowitz (1952). The portfolio theory assumes that under certain assumptions, shareholders can eliminate idiosyncratic risks in a virtually costless manner through portfolio diversification (Markowitz, 1952). So, the classical finance theory (CFT) distinguishes between systematic (market or beta) risk and idiosyncratic risk (firm-specific or unsystematic) risk, which conclude in a firm’s total risk. Investors can reduce the amount of total risk by two primary risk management tools, namely diversification and asset allocation. The systematic risk is the risk that remains after diversification, but investors can control their exposures to the systematic risk by adjusting their holdings of risky assets or by using futures, forwards or swap contracts (McShane, Nair, & Rustambekov, 2011; Woon, Azizan, & Samad, 2011).

Apparently, the ability of investors to adjust their own risk exposures seems to leave no role for firm-based risk management. Since investors can diversify firm-specific risks, they should not be compensated for bearing such risks. As a result, investors should not value costly attempts by firms to reduce firm-specific risks. Additionally, risk management at the firm level should be a negative net present value project (Meulbroek, 2002; Pagach & Warr, 2010). This view relies on the assumption that capital markets work without frictions, imperfections and asymmetric information. Modigliani and Miller (1958) established that in perfect capital markets capital structure does not affect the market value of the firm. The explanation for how risk reduction can add value must be found in the various market imperfections faced by firms, principally transaction costs, taxes and the costs of financial distress. However, in imperfect capital markets, researchers have suggested that risk management may create value by reducing and / or exploiting market imperfections (Grace, Leverty, Phillips, & Shimpi, 2010).

Another stream of the finance literature argues that firms should not engage in an effort to manage idiosyncratic risk in the context of the capital asset pricing model (CAPM). The reason in this model is that investors are compensated only for bearing systematic (non-diversifiable) risks, but not for bearing idiosyncratic (diversifiable) risks. In other words, a firm’s cost of capital (required rate of return) should depend only on the firm’s

systemic risk, not the total risk of the firm, because investors can eliminate the diversifiable risks of individual firms by holding a well-diversified portfolio. So, the systemic risk of the firm is represented by beta in the CAPM. However, several researchers countered with asset pricing models, in which idiosyncratic risk does matter, for example, because investors may hold undiversified portfolios (McShane et al., 2011).

It can be derived from the above discussion, that the theories by Markowitz (1952) and Modigliani and Miller (1958), in which firm level risk management is a negative present value projects, are disproved. Accordingly, researchers present arguments, under which risk management activities could be value increasing, when agency costs, market imperfections as well as information asymmetries interfere with the operation of perfect capital markets (Nocco & Stulz, 2006).

Based on the argument taken from the value maximization theory of corporate risk management, researchers suggest theoretical concepts of value creation through the implementation of ERM programs by firms. Stulz (1996) argues that a potential value creation role of ERM is to reduce or eliminate the probability of financial distress and, consequently, reducing the effect of “costly lower-tail outcomes“. Lower tail outcomes are primarily negative earnings and cash flow shocks following extreme, negative financial events and can have both direct costs, like, for example, losses and bankruptcy, and indirect costs, such as reputational effects with customers and suppliers. The reduction in lower-tail outcomes can be achieved by reducing the firm’s total risk, which should, in consequence, lead to smoother earnings and cash flow performance. As a result, the ERM adopting firm will experience a reduction in earnings and stock price volatility (Nocco & Stulz, 2006).

The lack of coordination by managing each risk class in separate silos creates inefficiencies. Proponents of ERM argue that by integrating all risk classes, firms are able to avoid duplication of risk management expenditure by exploiting natural hedges (Liebenberg & Hoyt, 2011). A further potential benefit from ERM might be the reduction of expected costs of regulatory scrutiny and monitoring as well as external capital costs because of the improved information about a firm’s risk profile. It enables firms to better inform outsiders about their risk profile and should serve as a signal of their commitment to risk management (Meulbroek, 2002). Additionally, the rating agencies’ focus increased on ERM as part of their financial review. So Standard & Poor’s announced that risk management will become a separate category for its analysis (S&P Standard&Poor’s, 2006).

Firms that engage in ERM have a better understanding in aggregate risk inherent in different business activities. This should in turn provide them with a more objective basis for resource allocation and, thus, improving capital efficiency and return on equity. ERM also creates value by reducing a company’s tax burden and by smoothing out cash flow volatility. ERM can also help to ensure that the firm will be able to fund profitable projects internally (Meulbroek, 2002).

Woon et al. (2011) developed a model to capture the causal relationship of ERM implementation and the enhancement of shareholder value. The authors consider this model as very useful to define the term value creation for this study.

The implementation of an ERM program will lead to tangible and intangible benefits for the firm. These benefits include outcomes, like optimizing risk / return profile of the company, reducing earning volatility, strengthening the management’s confidence in business operations and risk monitoring, creating smooth governance procedures, enriching corporate reputation, improving clarity of organization-wide decision making and chain of command, encouraging corporate entrepreneurship and boosting the enterprise’s profitabil-

ity. As a result of the ERM program implementation, all the tangible and intangible benefits will then lead to lower cost of capital and / or contribute to firm performance. This relationship represents the value creation from the ERM program and is illustrated in Figure 2 (Woon et al., 2011).

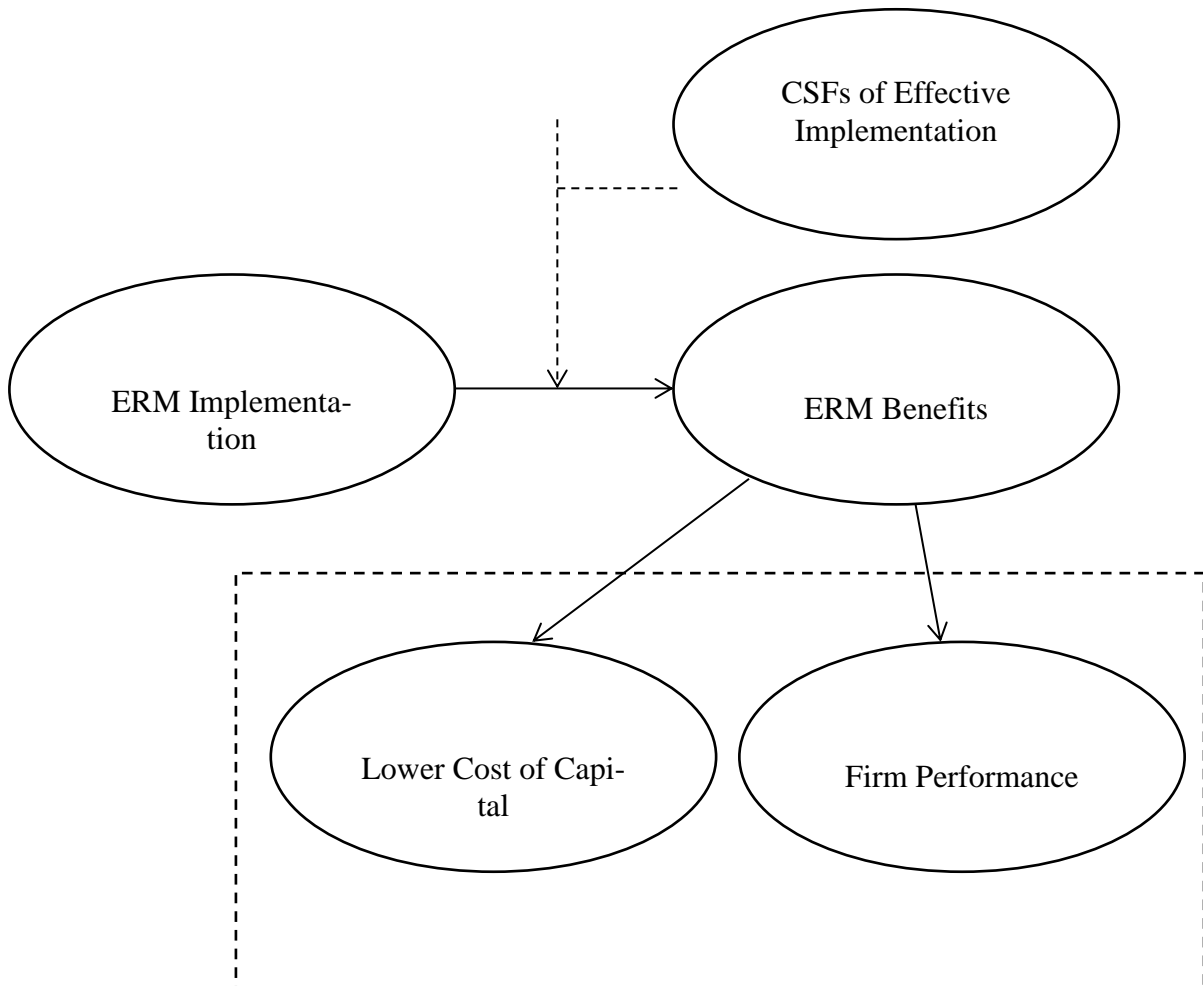
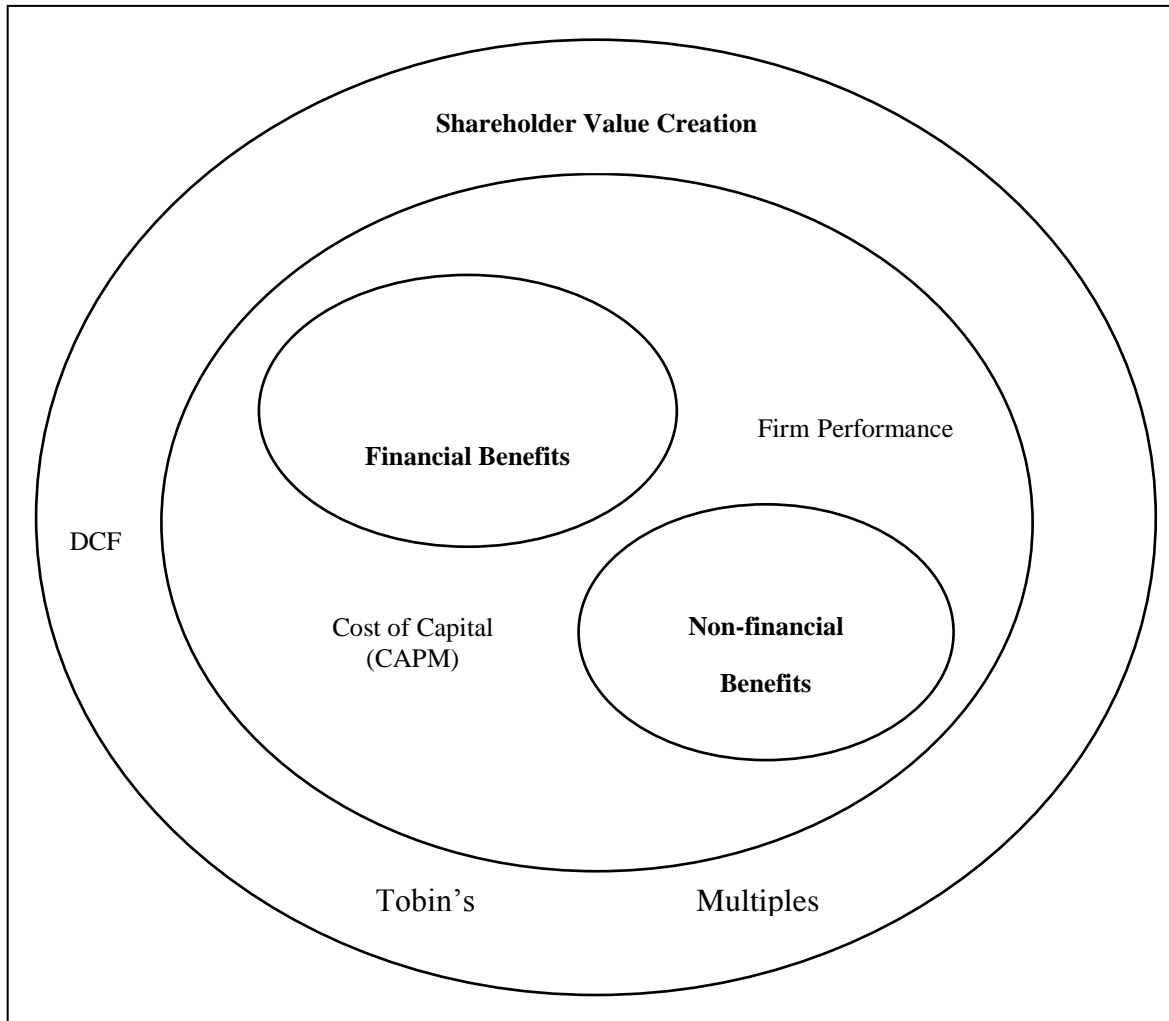


Figure 2: Path Diagram of Causal Relationship ERM and SHV (adapted from Woon et al., 2011)

While there are theoretical reasons, why ERM may increase or decrease shareholder value, according to Beasley et al. (2007) says that these reasons may depend upon the characteristics of the individual firm, suggesting that a definitive statement about the benefits or costs of ERM is not possible. Woon et al. (2011) state that the effective implementation depends on some critical success factors (CSFs) during the implementation phase of such programs. Hence, the authors also consider articles elaborating the factors associated with ERM implementation as useful for this study.

In essence, academics argue that ERM benefits firms by increasing return on equity, growth, decreasing earnings and stock-price volatility, reducing external capital costs, increasing capital efficiency and creating synergies between different risk management activities (Lam, 2001; Miccolis & Shah, 2000a). However, ERM drives value creation not only in terms of financial aspects, but also in non-financial aspects. ERM, for example, increas-



es the risk awareness, which facilitates better operational and strategic decision making (Stroh, 2005). Regarding this study, the authors decided to develop a concept to define the

Figure 3: Concept used for Value Creation

term 'value creation', involving all the discussed aspects from financial to non-financial benefits, leading to lower costs of capital and increasing firm performance resulting in an increased shareholder value. For a better overview, the concept used is illustrated in Figure 3. An improved price-to-earnings ratio or return on asset or equity influences the firm's performance, whereby the lowering of cost of capital is due to risk premium reduction as a result in the firm lowering its idiosyncratic risk and better capital efficiency (Woon et al., 2011). In literature, Tobin's Q is often used as proxy for firm value (Chung & Pruitt, 1994; Hoyt & Liebenberg, 2011). The discounted cash flow method and multiples using price-to-earnings ratio or Return on Asset (ROA) is generally accepted to measure the shareholder value of a firm (Rappaport, 1998).

*Data, Sample and Method*

For the selection of articles used in the analysis, the authors reviewed academic peer-reviewed journals that are included in the Social Science Citation Index (SSCI), an interdisciplinary database that covers citations from about 1,950 leading journals of social sciences. The authors selected articles from this database from May 2012 and included all papers published between 1998 and 2012. The advanced search term was TS (= “enterprise risk management” SAME “value creation”). The search came up with only few articles. So, to increase the scale and scope and to provide a more comprehensive collection of this field, the authors subsequently worked out additional search terms inductively and extended the search onto current literature on ERM and Value Creation from journals that were cited in the previously found papers from the SSCI. Additional search terms, such as “Integrated Risk Management” or “Holistic Risk Management” as synonyms for ERM and “Benefits” or “Firm Performance” as synonyms for Value Creation were identified and used. Furthermore, high quality conference papers, electronic articles, monographs, reports, standards and working papers from research or professional membership organizations or initiatives for ERM from searches in additional databases, like, for instance, EBSCO, LexisNexis, Sage Premier and Science Direct were included. At this stage, two major streams of research have been developed around ERM. The first stream focuses on the influence of ERM on firm performance (e. g. (Hoyt & Liebenberg, 2011; Nocco & Stulz, 2006), while a second stream studies the implementation of ERM (Beasley et al., 2005; Kleffner et al., 2003). Hence, to embrace the significant criteria for the level of ERM maturity and the firm specific characteristics enhancing an ERM’s performance, the authors decided to extend the search term to “Enterprise Risk Management” SAME “Implementation” or “Adoption”. Such an approach seems especially important in nascent research fields, as there are many journals on that topic that are too young to be included in any quality list but otherwise provide many hidden gems on the topic and there is no common definition on terms.

In total, there were N=70 papers included in this review. All articles in this selection were then evaluated, whether any substantial focus on ERM / VC or ERM / Implementation could be found. Hence, 28 articles had to be removed from further analysis, either due to a lack of an ERM / VC and ERM / Implementation attention or because of the fact that these articles used synonyms of ERM, such as Corporate Risk Management in their title, but after additional investigation, the focus on a more silo-based than a holistic view became apparent. From the remaining 42 articles, three articles did not meet the scientific requirements and had to be eliminated. From these 39 articles, the authors determined 21 articles covering the factors associated with ERM adoption and 25 articles (some articles cover both areas) with a focus on the nexus of ERM and VC, which are the basis for the qualitative analysis.

So the final sample resulted in 25 relevant articles (n=25) and these papers were then subsequently codified to detect research framework, data set, the definition of ERM, possible proxies, the definition of VC, specific linkage between ERM and VC, research outcome and limitations. The data analysis included the individual paper analysis and the cross-paper comparison within categories (see table 1) and was carried out, based on the technique of the thematic analysis (Boyatzis, 1998; Denzin & Lincoln, 2005), which was applied for this study. Due to the lacking profound theory to date, the thematic analysis was inductively conducted to identify the missing links in the literature. Through constantly going back and forth between the papers, emerging codes were identified and applied in



a reflective and recursive manner. A clustering analysis was conducted to identify existing theories and later compared to conceptualizations of ERM in literature. While the authors is aware that neither the search, nor the evaluation and coding process can guarantee that all possibly relevant articles were found and / or identified, the actual number of papers included and the variety of frameworks that were found make it safe to claim some validity and allow for a cautious generalization of the findings.  
 Figure 4 summarizes and illustrates the method used and processes followed in the study.

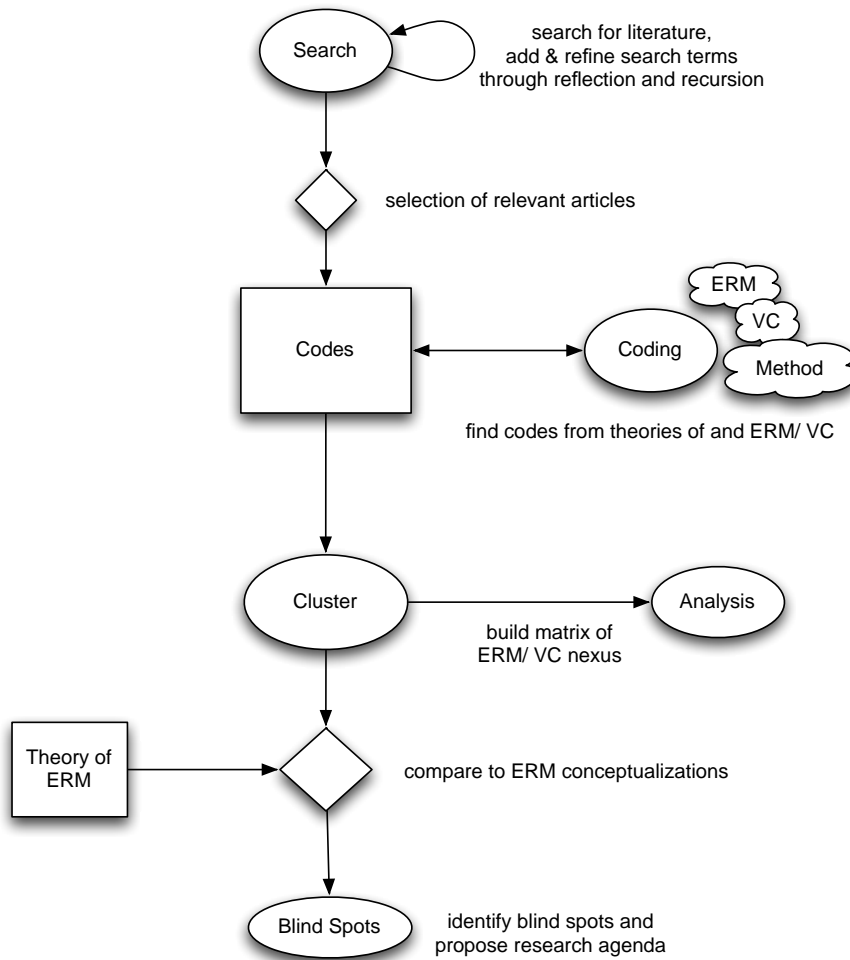


Figure 4: Method flow Source (Lehner, 2012)

## Analysis of Articles

### *Categories for Thematic Analysis*

In Table 1, the definition of the code categories and their description, which determines the requirements for an allocation to a particular category, are illustrated.

Table 1: Categories for Thematic Analysis

Variable	Description
Definition for ERM	Which concepts and frameworks were used in the study to define Enterprise Risk Management?
ERM Variable	What search strings were applied to identify the usage of an Enterprise Risk Management system in a company?
Research Framework	What were the paradigmatic assumptions of ontology, epistemology, methodology, and ethics, in the study?
Dataset for Empirical Analysis	Where did the source of data come from and what was the end value used for the study?
Definition for Value	How was the impact of Enterprise Risk Management on Value Creation defined and measured?
Linkage to Theories of ERM / Value Creation	Can a specific linkage of established theories, views or schools of thought in ERM to VC be found?
Outcome	What are the conclusions of the study?
Limitations	Which limitations are presented by the authors?

Table 8: Categories 'Area' and 'Sub-Area'

Areas	Sub Areas
Traditional Risk Management (TRM)	Traditional Risk Management (TRM)
	Connex TRM and VC
ERM practices	ERM review & techniques
	Guidelines for ERM implementation
Determinants of ERM adoption	Drivers ERM adoption
	Factors associated with extent of ERM implementation
	State of implementation
Valuation Effect of ERM	Impact of ERM on VC
	Connex maturity level of ERM on VC

In order to detect the ‘Amount of Secondary Citations’ for each article, Harzing (2007) software to analyse academic citations was used. In total, 70 articles were included in the review. Due to constraints, only 25 of them were considered in particular as ‘**Relevant for Study**’. The authors established an index to determine the relevance of each article for this

particular study. Based upon a journal publishing quality criteria, as well as an intrinsic consideration on ERM literature, the authors came out with a new index. The index was developed during the constantly re-reading of the articles to get information about the importance of each of the categories. The weight of each category was determined in accordance to the research purpose and guidelines. Articles published in journals are rated higher than electronic articles, reports, working papers or conference papers. The higher a journal article is rated in the ABS list (2005), the higher is its relevance for this study. The evaluation of an article is also positively associated with the amount of secondary citations (Harzing, 2007). The purpose of this study is to review the current state of literature on the connex of ERM and VC; therefore an article's rating increases when ERM and VC proxies are defined. Quantitative or mixed studies with in-depth statistical analysis are valued higher than qualitative studies including case study and open-ended questionnaires without detailed text analysis, and these are in turn valued higher than literature reviews with only illustrative examples. The amount of case studies, observations or interviews is also positively associated with the rating received by the article. In Table 2 the Relevance index is illustrated in detail.

Table 2: Relevance Index

Category	Weight &Evaluation
Reference Type	15%
Journal Article	100%
Conference Paper	50%
Electronic Article	50%
Report/ Monographs	50%
Working Paper/ Discussion Paper	50%
Journal Quality	15%
Not in ABS list or not a journal article	0%
Quality > = 3	100%
Quality = 2	75%
Quality = 1	50%

Amount Secondary Citations	15%
0	0%
1 – 5	20%
6 – 15	40%
16 – 25	60%
26 – 50	80%
> 50	100%
Proxies ERM	15%
Not defined	0%
ERM proxy defined	100%
Proxy VC	15%
Not defined	0%
VC proxy defined	100%
Research Framework	15%
Literature review/ illustrative examples & description of content	25%
case study & description of content	75%
open-ended questionnaire & description of content	75%
survey research & description	50%
survey research (close-ended questionnaire OR secondary data) & statistical analysis	100%
Mixed research (survey + case studies) & statistical	100%
Data Set	10%
Few & various Articles	10%
One case study in deep	80%
Survey research with 1 – 25 respondents	20%
Survey research with 26 – 60 respondents	40%

Survey research with 61 – 100 respondents	60%
Survey research with 101 – 150 respondents	80%
Survey research with > 150 respondents	100%
Amount respondents not stated	0%
Total achievable	100%

## Reflection

Within the context of this study, articles with the purpose to define the determinants of ERM adoption were reviewed. The authors was able to detect 20 articles (some of them also focus on ERM and VC and are included in the subsequent coding) examining factors associated with an ERM implementation. In this chapter the findings of these studies are presented in a qualitative description. The studies were primarily conducted as quantitative studies in form of surveys using secondary data, questionnaire and statistical analysis (Kleffner et al., 2003; Liebenberg & Hoyt, 2003; Pagach & Warr, 2011). A focus on North American companies and especially the U.S. insurance industry became apparent in the majority of the studies (Beasley et al., 2005; Desender, 2007). A smaller part of the studies concentrated its research on European firms (Altuntas, Berry-Stölzle, & Hoyt, 2011).

In order to determine a company using an ERM program, different proxies were used. The by far most used proxy was the hiring announcement of a Chief Risk Officer (CRO) or in general the search of keywords like ‘Enterprise Risk Management’, ‘Strategic Risk Management’, ‘Holistic Risk Management’, ‘Corporate Risk Management’, ‘Risk Committee’ or Enterprise Risk Officer’ (Liebenberg & Hoyt, 2003; Pagach & Warr, 2011). Some authors also used advanced proxies for their search. The Risk Management Quality Scale by Standard & Poor enabled the researchers to classify a company’s Risk Management into different stages, from a more silo-based approach to a fully integrated approach (Baxter et al., 2011). Some authors used a closed-ended questionnaire with a definition of COSO’s ERM Framework and asked the participants to determine on a scale the level of the company’s ERM program (Waweru & Kisaka, 2011).

Basically two topics emerged out of the review: the characteristics of a typical ERM user and the factors associated with the extent of ERM implementation.

### *Firm Characteristics*

Various studies claim that an ERM user is larger (Beasley et al., 2007; Hoyt & Liebenberg, 2011; Klumpes, Wang, Tang, & Abhyankar, 2011; Liebenberg & Hoyt, 2003; Pagach & Warr, 2011), has a lower cash ratio (Pagach & Warr, 2007, 2011) and is more levered (Hoyt & Liebenberg, 2011; Klumpes et al., 2011; Pagach & Warr, 2011). Hoyt and Liebenberg (2011) found that companies with an integrated ERM program have less financial slack. ERM using companies also show a significant higher level of institutional ownership (Hoyt & Liebenberg, 2011; Pagach & Warr, 2007, 2011), but are less likely to be publicly owned (Altuntas et al., 2011).

Regarding volatility, different streams were ascertainable, Hoyt and Liebenberg (2011); (Klumpes et al., 2011; Pagach & Warr, 2011) found that ERM users are less vola-

tile, have less stock return and also less cash flow volatility, whereby Pagach and Warr (2007) claim that ERM firms have higher earnings volatility and less stock price volatility.

Beasley et al. (2007) presume that firms which are more likely to benefit from an ERM program are also more likely to adopt one. As a consequence, larger firms are not only more likely to adopt ERM but also more likely to benefit from the program (Klumpes et al., 2011; Lin, Wen, & Yu, 2011; Pagach & Warr, 2007, 2011).

Additionally, there are several other firm characteristics leading to an extended likelihood of a company to adopt an ERM program, for example firms with greater financial leverage (Liebenberg & Hoyt, 2003; Pagach & Warr, 2007), with a higher institutional ownership and higher market-to-book ratio are more likely to adopt ERM (Pagach & Warr, 2011). Whereas the typical ERM user is supposed to have a lower earnings volatility, firms have a higher cash flow and stock return volatility before implementing ERM (Pagach & Warr, 2007, 2011). Firms with changes in past performance (Altuntas et al., 2011) and firms with a better credit rating are more likely to adopt ERM (Kleffner et al., 2003). Kleffner et al. (2003) are also the only ones who found differences in the likelihood of adopting an ERM program dependent on the industry, so as energy firms are more likely to adopt an integrated RM program.

So far the authors discussed the positive relations of firm characteristics and ERM program, but other studies show which factors have no significant impact on the adoption of ERM programs. So found Beasley et al. (2007) that the capital structure has no impact, Pagach and Warr (2007) found that the extent of financial slack has also no influence and Liebenberg and Hoyt (2003) claim that also ownership characteristics show no significant relationship. Whereby some authors assume that firms with more growth opportunities would value an ERM program higher, Beasley et al. (2007); Liebenberg and Hoyt (2003) weren't able to find evidence of this assumption.

#### *Factors associated with Extent of ERM Implementation*

The hypotheses that a higher level of ERM implementation is positively associated with the presence of a CRO or risk champion and the entity's size is verified by various authors (Baxter et al., 2011; Beasley et al., 2005; Paape & Speklé, 2012; Saeidi, Sofian, Rasid, & Saeid, 2012; Waweru & Kisaka, 2011).

Beasley et al. (2005); Desender and Lafuente (2009) were able to ascertain a positive association between board independence and ERM level, while Desender (2007); Waweru and Kisaka (2011) disagreed and found a negative association. It emerged that a company can achieve a higher maturity of its ERM program with the support of a CEO and a CFO and with a separation of a CEO and chairman (Beasley et al., 2005; Desender, 2007). Whereby Desender and Lafuente (2009) claim that the separation of a CEO and a chairman has no influence on the maturity level. Studies show that the use of a Big Four auditor is positively associated with the ERM level (Beasley et al., 2005; Desender & Lafuente, 2009), whereby Paape and Speklé (2012) say that the institution's auditor has no impact on the maturity level. (Paape & Speklé, 2012) also found that the presence of an audit committee is positive related, but Desender and Lafuente (2009) on the other side believe that the size of the audit committee has no impact on the maturity level. Only few studies examined the influence of different industries, but findings show that companies in the financial industry have a higher level of ERM (Paape & Speklé, 2012), and also companies in the banking, insurance and education sector have a better developed ERM program in place than companies in other industries (Beasley et al., 2005).

*Valuation Effect of ERM*

On the following pages the authors presents the table comprising the outcome of the first step in the systematic literature review. By the use of the previously developed template, consisting of six mentioned code categories and the code manual for research framework, substantial content from literature addressing the valuation effect of ERM emerged. Based on the first extraction of main content, the authors were further able to address the sub coding within the code categories.

Title							
Authors	Year	Reference Type	Data Source	Sub Area	Journal Quality	2nd Citation	Relevance
Synonyms for ERM (when provided)							
Purpose	ERM Definition		Variables for ERM	Research Framework	Data Set (End Value & Data Source)		
Value Definition (Proxies for VC)	Linkage to Theories of ERM/Value Creation		Outcome	Limitation			

**Information Conveyed in Hiring Announcements of Senior Executives Overseeing Enterprise-Wide Risk Management Processes (Beasley et al., 2007)**

Beasley, Mark S. Pagach, Don Warr, Richard	2007	Journal Article	Journal of Accounting, Auditing and Finance	Impact of ERM on VC	3	33	95.00%
Examination of equity market reactions to announcements of senior executive officers appointments and the impact of firm-specific characteristics on the magnitude of equity market response	A process of analysing the portfolio of risks facing the enterprise to ensure that the combined effect of such risks is within an acceptable tolerance; a holistic, top-down approach to manage risks across the enterprise (Kleffner et al., 2003) and designed to ensure that the entity's risk profile is within the stakeholders' risk tolerances (Beasley et al., 2005), while protecting and enhancing shareholder value (COSO, 2004)		Appointment of a CRO or equivalent as signal adoption of ERM; search string contained "announced", "named", or "appointed" in conjunction with position descriptions of "chief risk officer" or "risk management"	Research design = quantitative; Paradigm = Post positivism; Methodology = survey research; Method of data collection = secondary data (database); Method of data analysis = statistical (univariate and multivariate regression model)	120 public listed companies with CRO announcements from 1992-2003 in U.S. (CRO announcements from business library LEXIS-NEXIS); sample concentrated in three industries: financial services (39.2%; n=47), non-financial (n=73, insurance 12.5% and energy services 20.0%)		



<p>Stock market reaction surrounding the appointment of a CRO measured by cumulative abnormal return (event period as the day of the hiring announcement plus the following day; the abnormal return is computed using a three factor market model estimated over the -255 to -46 day window prior to the announcement; three factors: market return proxied by the CRSP equally weighted index, book-to-market and size)</p>	<p>No specific linkage between ERM theories and VC found</p>	<p><b>Univariate</b> average two-day market response is not significant, a general statement about the benefit or cost of ERM is not possible; <b>Multivariate analysis: in general:</b> firms with large cash reserves are less likely to benefit from ERM, the extent of growth opportunities, holdings of intangible assets, recent earnings volatility and capital structure have no impact on value creation, larger firms are more likely to benefit from ERM; <b>financial-firms:</b> firms with less cash and more leverage are more likely to see benefits from ERM, reduction in beta is associated with a positive price reaction; non-financial firms: market returns are positively associated with the firm's prior earnings volatility and size, negatively associated with the extent of cash on hand and leverage, no statistical association between returns and the firm's growth, extent of intangible assets, or change in beta; results suggest: costs and benefits of ERM are firm-specific</p>	<p>Use of CRO appointments as signal for ERM adoption might be biased, e.g. CRO appointment is a replacement of an existing CRO or a title change (manager has already been engaged in ERM); unable to directly observe the extent of ERM; capture of only short-term reactions to CRO announcements; no consideration of ERM's value to other stakeholders; issue of managerial characteristics on ERM adoption is not addressed</p>
---	--	--	---

**Enterprise risk management and firm performance: A contingency perspective (Gordon, Loeb, & Tseng, 2009)**

<p>Gordon, Lawrence A. Loeb, Martin P. Tseng, Chih-Yang</p>	<p>2009</p>	<p>Journal Article</p>	<p>Journal of Accounting and Public Policy</p>	<p>Firm specific impact of ERM on VC</p>	<p>3</p>	<p>21</p>	<p>92.00%</p>
<p>Examination of the relation between ERM and firm performance argument that ERM is related to firm performance and that the ERM-firm performance relation is contingent upon the appropriate match between a firm's ERM system and key firm-specific factors</p>	<p><b>ERM overview -Casualty Actuarial Society:</b> <i>"The discipline by which an organization in an industry assesses, controls, exploits, finances, and monitors risks from all sources for the purpose of increasing the organization's short-and long-term value to its stakeholders"</i> (CAS, 2003); <b>ERM - Integrated Framework:</b> <i>"A process, effected by an entity's board of directors, management and other personnel, applied in strategy setting and across the enterprise, designed to identify potential events that may affect the entity, and manage risk to be within its risk appetite, to provide reasonable assurance regarding the achievement of entity objectives"</i> (COSO, 2004)</p>		<p><b>Two variables: ERM Keywords:</b> "Enterprise risk management", "Strategic Risk Management", "Corporate Risk Management", "Risk Management Committee", "Risk Committee", "Chief Risk Officer" AND <b>COSO ERM effectiveness index:</b> index to measure the effectiveness of a firm's ERM based on its ability to achieve its strategy, operations, reporting, and compliance objectives; indicators measures achievement of objectives by: Strategy1 = more sales by firm relative to the industry's average sales; Strategy2 = a firm's reduction in its beta, relative to the other firms in the same industry; Operation1 = operating efficiency by turnover of assets; Operation2 = input-output ratio; Reporting1 = poor reporting reliability (measured by combination of Material Weakness, Qualified Auditor Opinion, and Restatement); Reporting2 = absolute value of abnormal accruals; Compliance1 = proportion of auditor's fees to</p>	<p>Research design = quantitative; Paradigm = Post positivism; Methodology = survey research; Method of data collection = secondary data (database); Method of data analysis = statistical (univariate tests, regression model, robustness check)</p>	<p>112 US firms identified (mainly utility, financial trading, business service, insurance industry) as using ERM derived from US Security and Exchange Commission's EDGAR database based on search in disclosed ERM activities in 10K and/or 10Q reports for 2005; Data for firm performance and firm-specific factors obtained from the Compustat database</p>		

		net sales revenue; Compliance2 =settlement net gains (losses) over total assets		
Firm performance measured by the one-year excess stock market return (risk-adjusted) to shareholders for 2005	Proper match between effectiveness of ERM, measured by the developed ERM index, the ERM index (effectiveness) is based on its ability to achieve COSO's four objectives relative to strategy, operations, reporting, and compliance	Confirmation of positive relation between ERM and firm performance; relation is contingent upon the appropriate match between a firm's ERM system and the five factors: environmental uncertainty, industry competition, firm size, firm complexity, and monitoring by the board of directors; findings are robust to such concerns as the self-selection problem, the effectiveness of a newly constructed ERM Index, different measures for monitoring by the firm's board of directors, and different measures for firm performance	Study only covers data from 2005; only one-year excess stock market returns to measure firm performance are used; a theoretical model describing which contingency variables should be considered in studies like this one does not exist	

**The Value of Enterprise Risk Management (Hoyt & Liebenberg, 2011)**

Hoyt, Robert E. Liebenberg, Andre P.	2011	Journal Article	Journal of Risk and Insurance	Impact of ERM on VC	2	32	91.25%
---	------	-----------------	-------------------------------	---------------------	---	----	--------

*Integrated Risk Management, Holistic Risk Management, Strategic Risk Management, enterprise-wide Risk Management*

Measurement of the extent to which specific firms have implemented ERM programs and the value implications of these programs	Management of a wide array of risks in an integrated, enterprise-wide fashion	<b>Keyword search:</b> "Enterprise Risk Management", "Chief Risk Officer", "Risk Committee", "Strategic Risk management", "Consolidated Risk Management", "Holistic Risk Management", "Integrated Risk Management"	Research design = quantitative; Paradigm = Post positivism; Methodology = survey research; Method of data collection = secondary data; Method of data analysis = statistical (univariate results, maximum-likelihood treatment effects model)	117 publicly traded U.S. insurers drawn from CRSP/Compustat database for the period 1998-2005 (SIC Code 6311 and 6399); 687 firm-year observations for the 8- year period
--	---	--	---	---

Tobin's Q as the market value of equity plus the book value of liabilities divided by the book value of assets	No specific linkage between ERM theories and VC found	<b>Univariate result:</b> value of Tobin's Q is higher for firms with ERM (approx. 4%); ERM user is larger, less leveraged, less opaque, has less financial slack, lower return volatility, higher levels of institutional ownership and relies less on reinsurance than the average nonuser; <b>Results maximum-likelihood treatment effects model:</b> variables Size, Leverage, Opacity, Institutions, Reinsurance, Value Change, Diversification International and Life are significantly related to ERM engagement; Insurers engaged in ERM are valued higher (approximately 20%) than other insurers	Relatively small sample size and inability to measure the intensity of ERM usage
--	---	--	--

### Does Enterprise Risk Management Add Value? (McShane et al., 2011)

McShan, Michael K. Nair, Anil Rustambekov, Elzotbek	2011	Journal Article	Journal of Accounting, Auditing and Finance	Connex maturity level of ERM and VC	3	5	84.00%
Investigation of the relationship between the degree of implementation of ERM implementation and firm performance, using Standard and Poor's newly available risk management rating	Coordinated management of all risks faced by a firm, whether it is risk related to corporate governance, auditing, supply chains, distribution systems, IT, or human resources.		<b>Standard &amp; Poor's RM Quality Scale:</b> five categories, three TRM levels ('weak' = lacks reliable loss control systems, 'adequate' = still be managing risks in silos, 'adequate with a positive trend' = still lacks a well-developed process for making coordinated risk/reward decisions) and two ERM levels ('strong' = beyond silo RM to deal with risks in a coordinated approach, well-developed risk-control processes and a focus on optimizing risk-adjusted returns; 'excellent' = even further in implementation) as a proxy for degree of RM implementation (adapted from Standard&Poor's, 2006)	Research design = quantitative; Paradigm = Post positivism; Methodology = survey research; Method of data collection = secondary data; method of data analysis = statistical (descriptive statistics, multivariate tests)	82 publicly traded U.S. insurers for which S&P released 2008 an ERM rating; data for control variables and Tobin's Q obtained from Thomson Banker One databases from 2008		
Tobin's Q as the market value of equity plus the book value of liabilities divided by the book value of assets	No specific linkage between ERM theories and VC found		<b>Descriptive results:</b> positive relationship between ERM rating (even a peak for 'adequate with a positive trend' and 'strong' ERM rating) and firm value; <b>Multivariate results:</b> results indicate a positive relationship between "ERM rating" and firm value as the value increases over the first three categories ('weak', 'adequate' and 'adequate with a positive trend')—the first three categories are indicative of increasing levels of TRM—but no additional increase in firm value as the rating moves beyond TRM into what is considered as	S&P provides these separate ERM assessment ratings only for insurance companies, a generalization of the results outside the industry is not possible			

		ERM ('strong' and 'excellent' ERM rating)	
--	--	---	--

**Incorporating Strategic Risk into Enterprise Risk Management: A Survey of Current Corporate Practice (Gates, 2006)**

Gates, Stephen	2006	Journal Article	Journal of Applied Corporate Finance	Connex maturity level of ERM and VC	2	36	78.25%
Investigating the forces behind the push for a more organized and integrated management of significant risks, the challenges to implement ERM and the effect of ERM on the company's ability to implement its strategy	ERM is a board-supervised process that aims to identify, evaluate, and manage all major corporate risks in an integrated framework	<b>ERM stages:</b> Pre-contemplation (never considered ERM); Nay-sayers (considered ERM and rejected it or between contemplation and rejection); Positively-disposed (becoming aware of need for ERM or between contemplation and preparing for action); Preparers; Developers / Implementers (actively in process); Monitors of implemented ERM systems	Research design = mixed; Paradigm = Pragmatism; Methodology = sequential (survey + case studies); Method of data collection = Questionnaire (open-ended & close-ended); Method of data analysis = description of content & statistical	271 financial and risk executives of member companies of the Conference Board in 2004 (64% North America, 28% Continental Europe, 11% U.K.; industry: 28% manufacturing, 16% financial services, 14% professional services, 10% wholesale and retail trade), 5 in-deep case studies			
Not defined ahead	Companies with ERM integrated into strategic planning, annual budget process, stakeholder communications, management scorecards and remuneration experience better-informed decisions, greater mgmt. consensus, increased mgmt. accountability, smoother governance practices, ability to meet strategic goals, better communication to board	<b>Drivers of ERM implementation:</b> Corporate governance requirements; greater understanding of strategic and operating risks; regulatory pressures, including rating agencies; board request; competitive advantage; <b>Implementation process:</b> 1. risk inventory and assessment activities, 2. introduce ERM framework and methodology in major operating unit first as a pilot; 3. install and operationalize ERM processes throughout the company, from strategic planning process to business processes, 4. apply ERM framework when entering new businesses and making other major investment decisions, 5. reinforce accountability by integrating RM with individual performance plans in a number of business units; <b>Companies with advanced ERM experience greater benefits:</b> Better-informed decisions, greater management consensus, increased corporate governance practices, ability to meet strategic goals, better communication to board, reduced earnings volatility	No limitation stated				

**The role of strategic enterprise risk management and organizational flexibility in easing new regulatory compliance (Vicky Arnold, Benford, Canada, & Sutton, 2011)**

Arnold, Vicky Benford, Tanya S. Canada, Joseph Sutton, Steve G.	2011	Journal Article	International Journal of Accounting Information Systems	Impact of ERM on VC	1	0	75.50%
--	------	-----------------	---	---------------------	---	---	--------

*Strategic Risk Management*

Examining organizations' pre-SOX ERM processes, ERM supporting technologies, and organizational flexibility in order to better understand the antecedents to the difficulty encountered in meeting SOX 404 requirements	Strategic ERM is defined as a framework for risk management that entails the following: (1) identifying events and circumstances relevant to an organization's achievement of its goals and objectives, (2) assessing these events and circumstances in terms of likelihood and magnitude of impact, (3) determining a strategy for responding to the identified threat or opportunity, and (4) monitoring the subsequent evolution and impact of the events	<b>ERM strategic benefits measure:</b> Organization performs a thorough enterprise-wide risk assessment at least once a year = ERM1; Strength of internal control system enhances organization's ability to identify events that may affect the achievement of objectives = ERM2; Organization regularly evaluates the effectiveness of internal controls to mitigate identified risks = ERM3; Management has effective processes to respond to identified risks = ERM4; RM procedures provide the necessary information top management needs to monitor changes that could impact our organization's well-being = ERM5; (Measures are designed to reflect the overall strategic ERM development; strength of ERM processes relates to how well an organization's ERM processes achieve the goals of ERM) (adapted from Vicky Arnold, Benford, Hampton, & Sutton, 2009)	Research design = quantitative; Paradigm = Post positivism; Methodology = survey research; Method of data collection = Questionnaire (close-ended, Likert scale); Method of data analysis = statistical (descriptive statistics, partial least squares, formative construct, t-statistics)	113 Chief Audit Executives (CAEs) members of the Institute of Internal Auditors Research Foundation (IIARF) in the U.S.; 94% employed at publicly traded companies; industries: financial services / real estate (17%), technology (11%), insurance (10%); data for variables strategic ERM (5-point Scale) drawn from Questionnaire
Qualitative benefits (item measures, questions to CAE): increasing strength of control environment, increasing IT compatibility, enhancing organizational flexibility, decreasing SOX 404 implementation difficulty	No specific linkage between ERM theories and VC found	Direct relationship between the strength of ERM processes and the organization's control environment; positive association between the strength of ERM and IT compatibility; organizations with strong strategic ERM processes prior to SOX 404 mandates faced fewer obstacles in implementing the processes necessary to meet internal control requirements; organizations with weak ERM processes incurred the greatest difficulty in implementing effective compliance processes	Views of CAE on SOX 404 compliance experience may not be reflective of other chief executives in the organization; limited set of organizational structures and processes; only organizations studied that have at least one in-house internal auditor (responses on chief audit executives narrowed)	

**Enterprise Risk Management as a Strategic Governance Mechanism in B2B-Enabled Transnational Supply Chains (Vicky Arnold, Benford, Hampton, & Sutton, 2012)**

<p>Arnold, Vicky Benford, Tanya S. Hampton, Clark Sutton, Steve G.</p>	<p>2012</p>	<p>Journal Article</p>	<p>Journal of Information Systems</p>	<p>Connex maturity level of ERM and VC</p>	<p>0</p>	<p>0</p>	<p>70.00%</p>
<p>Examination of the influence of strategic enterprise risk management (ERM) processes on improving supply chain capability while mitigating risks</p>	<p>ERM is a strategic mgmt. approach to integrating and coordinating RM efforts across an organization through comprehensive processes for identifying and addressing risks. An important aspect of strategic ERM is the focus on identifying both threats (risks with negative effects) and opportunities (risks with positive effects). ERM - Integrated Framework: "A process that aligns organizational risk appetite and strategy, enhances risk response decisions, reduces operational surprises and associated costs, identifies and manages integrated responses to cross-enterprise risks, proactively identifies and realizes opportunities, and improves capital allocation" (COSO, 2004).</p>		<p><b>ERM strategic benefits measure:</b> measures are reflective of activities typically associated with strategically and holistically balancing risk; Company performs a thorough enterprise-wide risk assessment at least once a year = ERM1; Company is able to identify events that may affect the achievement of our objectives = ERM2; RM procedures provide the necessary information top management needs to monitor changes that could impact our company's well-being = ERM3; One focus of ERM is the strength of internal control system for risk identification = ERM4 (adapted from Arnold et al, 2009)</p>	<p>Research design = quantitative; Paradigm = Post positivism; Methodology = survey research; Method of data collection = Questionnaire; Method of data analysis = statistical (descriptive statistics, covariance-based structural equation modelling, Chi-square test)</p>	<p>207 participants employed at North American organizations in 2011 and engaged in transnational supply chain relationships; subsample of 179 responses from 28 countries from CLOBE study used to examine the cross-cultural implications</p>		
<p>Qualitative benefits (measured by five-point Likert-type scale in Questionnaire): decrease in B2B e-commerce risk; decrease in global business risk; increase in absorptive capacity (ability to recognize the value of new external information, absorb it, and apply it for commercial ends)</p>	<p>No specific linkage between ERM theories and VC found</p>		<p>Strategic ERM leads to stronger governance over transnational supply chain partners; stronger ERM promotes higher levels of partner absorptive capacity, lower B2B risk, and lower associated global business risk; stronger ERM is associated with partners being from countries with cultural traits conducive to strong supply chain performance</p>	<p>Study may be limited in its ability to project on the role of ERM in the partner selection and integration processes</p>			

**The Relationship between Enterprise Risk Management (ERM) and Firm Value: Evidence from Malaysian Public Listed Companies (Tahir & Razali, 2011)**

Tahir, Izah Mohd Razali, Ahmad Rizal	2011	Journal Article	International Journal of Economics and Management Sciences	Impact of ERM on VC	0	0	70.00%
<i>Enterprise-Wide Risk Management (EWRM), Holistic Risk Management (HRM), Corporate Risk Management (CRM), Business Risk Management (BRM), Integrated Risk Management (IRM) and Strategic Risk Management (SRM)</i>							
Estimating the relation between ERM and firm value in the Malaysian public listed companies	ERM - Integrated framework: "A process, effected by an entity's board of directors, management and other personnel, applied in strategy setting and across the enterprise, designed to identify potential events that may affect the entity, and manage risk to be within its risk appetite, to provide reasonable assurance regarding the achievement of the entity's objectives" (COSO, 2004)		<b>Keyword search:</b> Enterprise Risk Management, dummy variable 1 = practice ERM and 0 otherwise	Research design = quantitative; Paradigm = Post positivism; Methodology = survey research; Method of data collection = secondary data (OSIRIS database); Method of data analysis = statistical (descriptive statistics, OLS regression analysis)	528 public listed companies from Malaysia in 2007 (Industrial Product 26%, Trading/Services 24%, Properties 15%, Consumer Products 15%) data obtained from OSIRIS database		
Tobin's Q as the market value of equity plus the book value of liabilities divided by the book value of assets	No specific linkage between ERM theories and VC found		<b>Descriptive statistics:</b> 29.7% are ERM-user; ERM has no impact on firm value; <b>Regression results:</b> ERM is positive but not significant with firm value;	No limitation stated			

**The Effects of Enterprise Risk Management on Firm Performance (Pagach & Warr, 2010)**

Pagach, Donald Warr, Richard	2010	Electronic Article	papers.ssrn.com	Impact of ERM on VC	0	13	66.50%
Study of the effect of ERM implementation on firms' long-term performance by focusing on how risk, financial, asset	A holistic view of RM and attempts to reduce the probability of large negative earnings and cash flows by coordinating and controlling offsetting risks across the enterprise. ERM-Integrated Framework: "A process, affected by		<b>Hiring announcements of enterprise-level or chief risk officers (CRO)</b> as a signal for ERM adoption; proxies used were "announced", "named", or "appointed", in conjunction with position descriptions such as "chief risk officer" or "director of risk management";	Research design = quantitative; Paradigm = Post positivism; Methodology = survey research; Method of data collection = secondary	106 publicly traded companies with announcements of senior risk officer appointments from 1992-2004; financial firms 56, utilities		

<p>and market characteristics change around the time of ERM adoption</p>	<p><i>an entity's board of directors, management and other personnel, applied in strategy setting and across the enterprise, designed to identify potential events that may affect the entity, and manage risk to be within its risk appetite, to provide reasonable assurance regarding the achievement of entity objectives. ERM help(ing) an entity get to where it wants to go and avoid pitfalls and surprises along the way" (COSO, 2004)</i></p>	<p>initial sample search included "title" terms like Chief, Director, Vice President, President, Head, Managing Director, Manager, General Manager</p>	<p>data; Method of data analysis = statistical (multivariate: measurement of changes in key variables in the years after relative to the years before a CRO appointment)</p>	<p>15; data collected from Compustat/CRSP (SIC Code mainly 4900s/6000s); and a matched control sample</p>
<p>Earnings volatility (standard deviation of the error term from a regression of the firm's quarterly earnings on the prior quarter's earnings) and stock price volatility (standard deviation of the firm's daily returns over the year prior to the hiring of the CRO); leverage (total liabilities to assets); accounting return (return on equity= net income/book equity); financial slack (proportion of the firm's assets that are cash or cash equivalents); opacity (ratio of intangibles to total assets); growth (market-to-book (MB) ratio and research and development expense)</p>	<p>No specific linkage between ERM theories and VC found</p>	<p>Significant decline in the standard deviation of stock returns for the CRO firms; no significant change in the earnings volatility, no leverage increase, no size increase due to ERM adoption; results fail to find support for the proposition that ERM is value creating</p>	<p>Data may be too noisy or tests too weak to pick up the changes; ERM could take a longer period of time to implement and pick up benefits from; ERM might not have any significant effect on firm performance, or no effect that can be measured from a financial statement users perspective</p>	

**The Value of Investing in Enterprise Risk Management (Grace et al., 2010)**

<p>Grace, Martin F. Leverty, Tyler J. Phillips, Richard D. Shimpi, Prakash</p>	<p>2010</p>	<p>Electronic Article</p>	<p>papers.ssrn.com</p>	<p>Impact of ERM on VC</p>	<p>0</p>	<p>1</p>	<p>65.50%</p>
--	-------------	---------------------------	------------------------	----------------------------	----------	----------	---------------



<p>Examination of the impact of ERM on firm value by investigating its effect on firm cost and revenue efficiency while controlling for firm specific factors; focus of analysis directly on the cash flow implications of adopting ERM</p>	<p>ERM is a holistic approach to risk management in which many risks are examined jointly. It is an enterprise level assessment, quantification, financing, and managing of risk. With ERM a firm assesses the interaction of a risk with the firm's portfolio of other important risks.</p>	<p><b>Tillinghast Towers Perrin survey:</b> Detailed information on a number of ERM initiatives from a survey conducted by Tillinghast Towers Perrin on their worldwide insurance clients; variables to evaluate ERM program: economic capital model (ECM); market value based risk metric; CRO or significant risk management entity; entity responsible for risk management reports to the board, the CFO, the CEO, or a committee; risk management influences executive compensation; risk reflection in decision making process</p>	<p>Research design = quantitative; Paradigm = Post-positivism ; Methodology = survey research; Method of data collection = secondary data; Method of data analysis = statistical (multivariate regression model, efficiency as the vector of firm characteristic variables and vector of variables of ERM activities)</p>	<p>National Association of Insurance Commissioner's (NAIC's) annual regulatory statement database; 532 observations (U.S. 306; non U.S. 226); data from the Bureau of Labor Statistics, the Federal Reserve Board, and A.M. Best; life-insurers &amp; property insurers for the year 2004 and 2006; Tillinghast Towers Perrin ERM survey for 2004 and 2006 for ERM practice identification</p>
<p>Cost and revenue efficiency (ROA) using frontier efficiency measures (standard linear programming technique, data envelopment analysis (DEA), to construct the "best practice" frontier for each firm and measure the firm's performance relative to this frontier; frontier efficiency analysis in R (FEAR) to estimate and bootstrap efficiency) for firm performance measurement; value-added approach to identify the important outputs of life and property-liability insurers</p>	<p>Life insurers with the use of an economic capital models, the use of a dedicated risk committee and primary reporting relationship to officials in the C-Suite of the insurer (either the CEO or the CFO) and the reflection of risks in their business decisions increases efficiency and return on assets; insurers with a dedicated entity responsible for firm-wide risk management experience a higher level of cost efficiency and returns on assets</p>	<p>Significant increases in both cost and revenue efficiency; life insurers benefit from the use of economic capital models and produce significant increases in returns on assets; insurer with entity responsible for firm-wide risk management (such as a CRO) also experiences a higher level of cost efficiency and returns on assets; use of risk committee and a primary reporting relationship to the officials in the C-Suite of the insurer (either the CEO or the CFO) is significantly related to increases in efficiency and return on assets; insurer's confidence that risk is reflected in business decisions is also significantly related to increases in efficiency and returns on assets</p>	<p>No limitation stated</p>	

**Enterprise Risk Management on the Internal Audit Function (Beasley, Clune, & Hermanson, 2006)**

Beasley, Mark S.	2006	Report	North Carolina State University, Enterprise Risk Management Initi-	Impact of ERM on VC	0	3	63.50%
------------------	------	--------	--	---------------------	---	---	--------

Clune, Richard Herman- son, Dana R.			ative				
Examining the overall impact of ERM adoption on the internal audit function's activities (i.e., in which situations does ERM alter internal audit's focus and workload to the greatest extent?)	ERM - Integrated Framework: "A process, effected by an entity's board of directors, management and other personnel, applied in strategy setting and across the enterprise, designed to identify potential events that may affect the entity, and manage risks to be within its risk appetite, to provide reasonable assurance regarding the achievement of entity objectives" (COSO, 2004)		<b>COSO ERM scale:</b> Definition and elements of COSO's ERM framework for the survey instrument; ERM Complete = if a complete ERM framework is in place; ERM Partial = if a partial ERM framework is in place (i.e., some, but not all risk areas addressed); ERM Plan = if the entity is currently planning to implement an ERM framework; ERM No Dec. = if the entity is currently investigating the concept of ERM, but has made no decision yet (no plans to implement ERM is in the intercept)	Research design = quantitative; Paradigm= Post-positivism; Methodology = survey research; Method of data collection = Questionnaire (close-ended questions); Method of data analysis = statistical (descriptive statistics, OLS regression model, sensitivity analysis)	122 organizations of the IIA s Global Audit Information Network (GAIN) in 2004, respondents were chief audit executives (79 in the U.S., 13 in Canada, eight each in Great Britain and Australia, and 14 in other countries; 10% banks, 12% educational institutions)		
Qualitative impact on Internal Audit: via Questionnaire to evaluate impact on scale from 1 = not at all to 5 = greatly	No specific linkage between ERM theories and VC found		<b>Descriptive statistics:</b> 14 organizations have a complete ERM framework in place, 55 reported a partial ERM framework; 18 planning to implement ERM, 17 are investigating ERM but have not made a decision yet, 18 have no plans to implement; <b>Regression results:</b> ERM has greatest impact on internal audit's activities when (a) the organization's ERM process is more completely in place, (b) the CFO and audit committee have called for greater internal audit activity related to ERM, (c) the chief audit executive's (CAE) tenure is longer, (d) the organization is in the banking industry or is an educational institution, and (e) the internal audit function has provided more ERM leadership; no evidence of an association between organization's size and ERM impact on IA		Rely on accuracy of individuals responses to online survey; response rate to survey is lower than typical for surveys of IA; there may be important organizational characteristics of ERM involvement that are not reflected in the study		

**Enterprise Risk Management Program Quality: Determinants, Value Relevance, and the Financial Crisis (Baxter et al., 2011)**

Baxter, Ryan Bedard, Jean C. Hoitash, Rani Yezege, Ari	2011	Electronic Article	papers.ssrn.com	Connex maturity level of ERM and VC	0	0	62.50%
---	------	--------------------	-----------------	-------------------------------------	---	---	--------

<p>Investigation of factors associated with high quality Enterprise Risk Management (ERM) programs, and whether ERM quality enhances performance and signals credibility to the financial markets</p>	<p>ERM Integrated framework: <i>"A process, effected by an entity's board of directors, management and other personnel, applied in strategy setting and across the enterprise, designed to identify potential events that may affect the entity, and manage risk to be within its risk appetite, to provide reasonable assurance regarding the achievement of the entity's objectives"</i> (COSO, 2004)</p>	<p><b>Standard &amp; Poor's RM Quality Scale:</b> Advanced: six categories, 1 = weak (no consistent control of major risks; limited ability to fully identify, measure, or manage major risk exposures), 2 = weak-adequate, 3 = adequate, 4 = strong-adequate (adequate = fully functioning risk control systems for major risks; RM is silo-based; lack of clear vision of overall risk profile and overall risk tolerance; risk limits for various risks are set independently, and systems for each risk element functions separately; lack of robust process for identifying and preparing for emerging risks; no process to optimize risk-adjusted return); 5 = strong (vision of overall risk profile, an overall risk tolerance, a process for developing risk limits and goal of optimizing risk-adjusted returns; robust processes to identify and prepare for emerging risks), 6 = excellent (share all the criteria for strong programs but more advanced in development, implementation, and execution effectiveness; process developed more fully) (Standard&amp;Poor's, 2006)</p>	<p>Research design = quantitative; Paradigm = Post positivism; Methodology = survey research; Method of data collection = secondary data (database); Method of data analysis = statistical (descriptive statistics, OLS regression, logistic regression, sensitivity analysis)</p>	<p>165 firm-year observations in the banking and insurance industries from the U.S. with coverage in the S&amp;P Ratings Direct database in 2006-2008; data for independent and performance variables drawn from Compustat, SEC filings, CRSP, S&amp;P credit rating, Audit Analytics, IRRC and Lexis Nexis</p>
<p>Financial performance measured by ROA (ratio of income before extraordinary items divided by total assets); value creation measured by Tobin's Q (market value of equity plus the book value of liabilities divided by the book value of assets); stock market reaction (average abnormal return around S&amp;P rating announcement)</p>	<p>no specific linkage between ERM theories and VC found</p>	<p>25% strong or excellent ratings (firm's ERM quality sample: 6 weak, 11 weak-adequate, 84 adequate, 22 strong-adequate, 35 strong, 7 excellent); <b>ERM adoption:</b> more complex (larger, more diversified) entities have higher quality programs; companies with higher volatility and/or risk of financial distress may demand better programs; higher-risk companies have lower quality ERM; higher quality of ERM among companies with better corporate governance; i.e., audit committees charged with direct oversight of risk, less audit-related risk (i.e., stable auditor relationships and effective internal controls), risk officers/committees, and boards with longer tenure); Impact ERM: ERM quality is positively associated with firm performance; positive and significant association between ERM and Tobin's Q; when ERM programs are initially rated by S&amp;P, average market reaction is higher for strong and excellent ERM rated firms than for firms with lower ratings; results imply market anticipation of better future performance by high-quality ERM companies; intensity of investors' average reactions to earnings surprises increases for companies with higher quality ERM; Financial Crisis: no association of ERM quality with abnormal returns in the sub-period preceding the crisis; strong association of ERM quality and returns in the initial recovery period</p>	<p>Implicitly assume that components of S&amp;P ERM ratings validly represent aspects of ERM quality, and that program effectiveness increases in ERM rating score; If credit ratings were biased upward during sample period, may also have applied to ERM quality ratings; limitation of analysis to financial services companies; impact of ERM on the equity markets is less clear</p>	

**The impact of hedge accounting rules on enterprise risk management adoption practices by multinationals (Klumpes et al., 2011)**

<p>Klumpes, Paul J. M. Wang, Pengguo  Tang, Liyan  Abhyankar, Abhay</p>	<p>2011</p>	<p>Electronic Article</p>	<p>papers.ssrn.com</p>	<p>Impact of ERM on VC</p>	<p>0</p>	<p>0</p>	<p>62.50%</p>
<p>Testing the benefits of ERM implementation by controlling for variables like firm specific risk, hedge accounting policies and GAAP quality</p>	<p>Not defined</p>		<p><b>Keyword search:</b> "Chief Risk Officer", "Enterprise Risk Management", "Enterprise Risk Officer", "Strategic Risk Management", "Integrated Risk Management", "Holistic Risk Management" and "Consolidated Risk Management"</p>	<p>Research design = quantitative; Paradigm = Post positivism; Methodology = survey research; Method of data collection = secondary data (database); Method of data analysis = statistical (descriptive statistics; multivariate logistics, OLS model)</p>	<p>60 European and 121 US non-financial publicly listed firms in the S&amp;P 500 and Euro top 300 during 2005-2009; search for ERM keywords in annual reports; 59 firms adopted ERM between 2005 and 2009; financial data from COMPUSTAT, stock price data from CRSP, derivative reporting data from annual report</p>		
<p>Stock return volatility as log of the annualized standard deviation of monthly stock returns (measure for a firm's total risk); risk to reward ratio as operating profits per unit of risk (ROA/return volatility)</p>	<p>No specific linkage between ERM theories and VC found</p>		<p><b>Descriptive statistics:</b> ERM firms are less volatile, significantly larger, more diversified and levered; <b>Multivariate results:</b> larger firms are more likely to adopt ERM; firms with less onerous net pension obligations are more likely to adopt ERM; ERM adoption is positively related to market risk but negatively related to idiosyncratic; significantly negative relation between GAAP quality and firm volatility; reduction in stock return volatility disappear over time and risk to reward benefits reduce over time</p>	<p>Results are conditioned on voluntary disclosure of notional values</p>			

**Enterprise Risk Management: Re-Conceptualizing the role of Risk and Trust on Information Sharing in Transnational Alliances (Vicky Arnold et al., 2009)**

Arnold, Vicky Benford, Tanya S. Hampton, Clark Sutton, Steve G.	2009	Electronic Article	papers.ssrn.com	Connex maturity level of ERM and VC	0	0	62.50%
Examining the influence of ERM on risk and trust associated with transnational alliances and the resulting impact on inter-organizational information sharing	A process that requires senior management direction, extends across the whole organization, and signifies a new organizational consciousness of 'risk appetite' and assurance.		<b>ERM strategic benefits measure:</b> Company performs a thorough enterprise-wide risk assessment at least once a year = ERM1; Company is able to identify events that may affect the achievement of objectives = ERM2; Company regularly evaluates the effectiveness of internal controls for mitigating identified risks, management has effective processes to respond to identified risks = ERM3; RM procedures provide the necessary information top management needs to monitor changes that could impact company's well-being = ERM4; Focus of ERM is the strength of internal control system for risk identification = ERM5; for each ERM stage five point Likert scale where 1 represented the strongest positive response, 5 represented the strongest negative response, and 6 represented "no basis for answering"	Research design = quantitative; Paradigm = Post positivism; Methodology = survey research; Method of data collection = Questionnaire (close-ended, Likert scale); Method of data analysis = statistical (descriptive statistics, structural equation modelling (SEM), sensitivity testing)	200 North American managers monitoring relationships with transnational supply chain partners (managers are familiar or very familiar with relationships) and supply chain partners located in an array of different countries and geographical locations; manufacturing 16%, wholesale/retail 15%; 2 sub samples: 117 respondents high ERM firms; 83 low ERM firms		
Qualitative benefits (item measures): B2B ecommerce risk: five aspect strategic nature, understanding of benefits, reengineering of business processes, management of data processes, and obligation fulfilment; trust: general trust in a supply chain partner in addition to trust issues distinct to B2B ecommerce based alliances; information sharing: breadth, quality, privileged nature and coordination of the information exchanged	No specific linkage between ERM theories and VC found		Positive association between increasing levels of organizational ERM and increasing trust in a supply chain partner; increases in strength of an organization's ERM are negatively associated with alliance partner's business risk (increased ERM leads to decreased risk); a positive relationship between ERM and information sharing; sensitivity testing: sample into two groups; for high-level ERM firms, all relationships center around business risk with risk levels driving trust and information sharing; for remaining sub-sample, all relationships center around trust with trust driving perceived risk and the level of information sharing	Study was focused on North American managers and there might be differences to other regions; survey data captures perception data as opposed to observable or archival data			

**Enterprise Risk Management in Financial Crisis (Seik, Yu, & Li, 2011)**

Seik, Heng Yik Yu, Jifeng Li, Jared	2011	Journal Article	The IUP Journal of Risk & Insurance	Connex maturity level of ERM and VC	0	0	62.00%
Examining whether ERM helps property and casualty insurers withstand financial crisis	ERM overview - Casualty Actuarial Society: <i>"The discipline by which an organization in any industry assesses, controls, exploits, finances and monitors risks from all sources for the purpose of increasing the organization's short- and long-term value to its stakeholders"</i> (CAS, 2003). ERM is an integrated approach in dealing with risk exposure in a business. Since ERM is an overview of the company's risk portfolio, it focuses not just on pure risks but also on financial risk, operational risk, reputation risk, and any other type of company risks. ERM considers risks as interrelated and the process should be incorporated in business strategies and decision-making processes.		<b>Two variables: ERM Keywords:</b> "CRO", "Chief Actuary Officer", "Vice President of Enterprise Risk Management", "Risk Management Committee" AND <b>Standard &amp; Poor's RM Quality Scale</b> four categories, ERM 'excellent' = advanced capabilities to identify, measure, manage all risk exposures within tolerances; advanced implementation, development and execution of ERM parameters; consistently optimizes risk adjusted returns; ERM 'strong' = clear vision of risk tolerance and overall risk profile; risk control exceeds adequate for major risks; robust processes to identify and prepare for emerging risks; incorporates RM and decision making to optimize risk adjusted returns; ERM 'adequate' = fully functioning control systems in place for major risks; lack of robust process for identifying and preparing for emerging risks; performing good 'silo'-based RM; not fully developed process to optimize risk adjusted returns; ERM 'weak' = incomplete control process for major risks; inconsistent or limited capabilities to identify, measure or manage major risk exposures (Standard&Poor's, 2006)	Research design = quantitative; Paradigm = Post positivism; Methodology = survey research; Method of data collection = secondary data (database); Method of data analysis = statistical	12 publicly traded property and casualty insurers in the US from New York Stock Exchange (NYSE) or NASDAQ during 2006 to 2008; 5 firms in 'ERM group' (three companies with excellent or good ERM and two firms with weak ERM programs according to S & P's rating (2008)) and 7 companies in 'non-ERM group'; search of CRO appointment in companies' annual reports, companies' websites, news or article in Lexis Nexis; stock return data from finance.yahoo.com from 2006 to 2009		
Stock return volatility (standard deviation); loss ratios (ratio of incurred losses to earned premiums and is used to measure the percentage of loss payments made by the company from each dollar of earned premiums in a year), combined ratios after dividends (gains from overall underwriting activity by including the total underwriting expenses	No specific linkage between ERM theories and VC found		Companies with 'excellent' or 'strong' ERM programs have a relatively low stock volatility, lower than non-ERM peers; insurers with better ERM have lower loss ratios than those of weak ERM insurers; insurers with strong ERM have higher combined ratios than those of the industry average; in terms of overall operating ratios quality ERM insurers outperform the weak ERM insurers and the industry average; results indicate that ERM programs, if not properly implemented will jeopardize the financial stability of the firm	No limitation stated			

ratio into loss ratio) and overall operating ratios ( pre-tax operating profitability which includes its return on investment and underwriting revenues and expenses)			
---	--	--	--

**The Impact of Enterprise Risk Management on the Marginal Cost of Reducing Risk: Evidence from the Insurance Industry (Eckles, Hoyt, & Miller, 2011)**

Eckles, David L. Hoyt, Robert E. Miller, Steve M.	2011	Electronic Article	villanova.edu	Impact of ERM on VC	0	3	61.50%
Testing the impact of ERM adoption on firms' risk taking behaviour by testing the hypothesis that practicing ERM reduces firms' cost of reducing firm risk; lowers the marginal cost (MC) of reducing risk, which creates incentives for profit-maximizing firms to reduce total risk while increasing firm value	ERM is a process that identifies, assesses and manages individual risks (e.g. currency risk, interest rate risk, reputational risk, legal risk, etc.) within a coordinated and strategic framework.		<b>Keyword search:</b> "Chief Risk Officer", "Enterprise Risk Management", "Enterprise Risk Officer", "Strategic Risk Management", "Integrated Risk Management", "Holistic Risk Management", "Consolidated Risk Management"	Research design = quantitative; Paradigm = Post positivism; Methodology = survey research; Method of data collection = secondary data (database); Method of data analysis = statistical (descriptive statistics, bivariate, regression analysis)	69 publicly-traded insurance companies in the US drawn from CRSP/COMPUSTAT database from 1990 to 2008 (i.e. firms with Standard Industry Classification Code between 6311 and 6399) and identified as ERM user by a search in Factiva, LexisNexis, Thomson and Edgar; financial data from COMPUSTAT, stock price data from CRSP and institutional ownership from Compact Disclosure		
Risk reduction & Profit increase; reduction in firm's total risk measured by the log of the annualized standard deviation of daily stock returns (stock return volatility as proxy for firm risk, because it is a well-established measure for a firm's total risk); profit increase is measured by ratio of Re-	ERM-adopting firms combine their individual risks in risk-portfolio leading to better recognize natural hedges, prioritize hedging activities towards the risks that contribute most to the		Firms adopting ERM experience a reduction in stock return volatility; due to costs and complexity of ERM implementation, it is also found that the reduction in return volatility for ERM-adopting firms become stronger over time; operating profits per unit of risk (ROA/return volatility) increase post ERM adoption	No limitation stated			

<p>turn on Asset (ROA) to firm risk post-ERM adoption (ratio of ROA over annualized standard deviation of stock returns) (alternative definitions of profits used, including return on book value of common equity and return on market value of common equity)</p>	<p>total risk of the firm, and optimize the evaluation and selection of available hedging instruments; these advantages allow ERM-adopting firms to produce greater risk reduction per dollar spent;</p>		
---	--	--	--

**Enterprise Risk Management: Strategic Antecedents, Risk Integration and Performance (Lin et al., 2011)**

<p>Lin, Yijia Wen, Ming-Ming Yu, Jifeng</p>	<p>2011</p>	<p>Electronic Article</p>	<p>papers.ssrn.com</p>	<p>Connex maturity level of ERM and VC</p>	<p>0</p>	<p>0</p>	<p>58.50%</p>
<p>Investigation whether the heterogeneity in Individual Risk Management practices (IRM: hedging, insurance etc) across firms accounts for their different propensities toward adopting ERM (Considering that ERM integrates IRMs) Analysing the patterns of IRM adjustments subsequent to ERM adoption; Examination of influence of ERM on firm performance in the context of IRMs</p>	<p>Through a holistic approach, ERM identifies and measures diverse risk factors and coordinates risk management activities across all operating units of an organization; ERM - integrated framework: "A process ... applied in strategy setting and across the enterprise" (COSO, 2004)</p>	<p><b>Two variables: ERM Keywords:</b> "Enterprise Risk Management", "Chief Risk Officer", "Risk Committee", "Strategic Risk Management", "Consolidated Risk Management", "Holistic Risk Management", and "Integrated Risk Management" (as dummy variable) AND <b>Standard and Poor's RM Quality Scale</b> ERM1 = Weak; ERM2 = Adequate; ERM3 = Strong; ERM4 = Excellent (Standard&amp;Poor's, 2006)</p>	<p>Research design = quantitative; Paradigm = Post positivism; Methodology = survey research; Method of data collection = secondary data (database); Method of data analysis = statistical (descriptive statistics; probit regression model; Simultaneous Equations Model; Treatment-Effect Model; Sensitivity tests)</p>	<p>507 observations for 85 publicly traded property and casualty (PC; SIC code 6331) insurers in the U.S. market during 2002 - 2007; Accounting and derivatives related data obtained from National Association of Insurance Commissioners (NAIC) annual statements; market-based measures constructed by using data from Compustat; Credit information from A. M. Best's Key Rating Guide; search in SEC filings, LexisNexis, company websites and Google for ERM evidence</p>			



Benefits: reinsurance costs (Ratio of reinsurance ceded to sum of direct business written and reinsurance assumed), asset portfolio volatility (Annualized volatility of assets estimated from seven asset return series from 1991Q1 to 2007Q4), cost of financial risk measured by derivative usage (Notional amount of all derivative positions for hedging purpose held at year end, normalized by total assets);Tobin's Q (market value of equity plus the book value of liabilities divided by the book value of assets) & return on asset (ROA) (Net income divided by total assets) & Underwriting ROA (underwriting income divided by total assets)	No specific linkage between ERM theories and VC found	<b>Descriptive statistics:</b> 18,5% use ERM; derivative usage by ERM insurers higher than non-ERM insurers; ERM insurers more diversified in terms of lines of business and underwriting regions; ERM insurers have higher Tobin's Q, ROA and Underwriting ROA than non-ERM insurers; ERM insurers are larger and have better credit rating than non-ERM insurers; <b>Probit model:</b> insurers using more reinsurance and with larger degree of geographic diversification are more likely to adopt ERM; product diversification, use of derivatives or asset allocation shows no significant effects on ERM initiation; insurers with high reinsurance sustainability index are less likely to pursue ERM; larger firms and with better credit rating are more likely to engage in ERM; financial stress from the exposures to catastrophe risks is more important than leverage; <b>Equation model:</b> ERM reduces cost of reinsurance from less reinsurance purchase; ERM reduces cost of financial risks via more derivative usage; ERM leads to lower asset volatility; <b>Treatment effect model:</b> ERM lowers Tobin's Q, ROA, Underwriting ROA; <b>Sensitivity test with S&amp;P Rating:</b> weak ERM insurers have lower ROA and Underwriting ROA than non-ERM firms in 2007; a poorly implemented ERM program is detrimental to the firm	No limitation stated
---	---	---	----------------------

**The Relationship between Enterprise Risk Management and External Audit Fees: Are they Complements or Substitutes? (Desender & Lafuente, 2010)**

Desender, Kurt Lafuente, Esteban	2010	Electronic Article	papers.ssrn.com	Connex maturity level of ERM and VC	0	0	58.50%
Exploring how the adoption of enterprise risk management (ERM) practices and the presence of a CRO influence external audit fees in large pharmaceutical firms	ERM - Integrated framework: " <i>A process, effected by an entity's board of directors, management and other personnel, applied in strategy setting and across the enterprise, designed to identify potential events that may affect the entity, and manage risk to be within its risk appetite, to provide reasonable assurance regarding the achievement of the entity's objectives</i> " (COSO, 2004).		<b>Two variables: ERM Keywords:</b> "CRO" (as dummy variable) AND <b>COSO ERM Index:</b> ERM framework (2004) as an aggregate measure of ERM, (list of 108 items related to ERM, scoring zero (absence) or one (presence) composited under the eight dimensions of COSO's ERM framework (2004): 1) internal environment, 2) objective setting, 3) event identification, 4) risk assessment, 5) risk response, 6) control activities, 7) information and communication, and 8) monitoring); variable used = weighted average of eight dimensions	Research design = quantitative; Paradigm = Post positivism; Methodology = survey research; Method of data collection = secondary data (annual reports, 10-K's, proxy statement, company website); Method of data analysis = statistical (descriptive statistics, OLS regression model)	97 U.S. based pharmaceutical firms (SIC code: 2834) randomly chosen and listed on Amex, NYSE or NASDAQ; data was collected for 2004 from the company's annual reports; information about ERM practices was obtained from public sources (10-K's, proxy statements, annual reports, firms website)		

<p>Natural log of audit fees as dependent variable = total fee paid to all auditors for both audit and non-audit services</p>	<p>No specific linkage between ERM theories and VC found</p>	<p><b>Descriptive statistics:</b> 39% of firms report the presence of a Chief Risk Manager in 2004; firms of sample have adopted on average 33% of the ERM practices considered in index; <b>Regression results:</b> larger firms pay higher external audit fees; the mere presence of a CRO does not exert a significant impact on external audit fees; taking into account the ERM index: firms that heavily rely on ERM report significantly lower levels of external auditing fees (implies a reduction in hours required by external auditors); board independence and ownership concentration are not significantly related to audit fees; external audit fees are significantly lower in firms where CEO also serves as Chairman; the size of the audit committee is positively related to external audit fees</p>	<p>Results are limited due to fact that publicly available data may not reflect true state of ERM implementation (coped by using alternative proxy for ERM); study focuses on a single industry, may not be generalized for other industries; maybe other organizational characteristics of ERM deployments not considered</p>
---	--	---	--

**The Effect of Enterprise Risk Management Implementation on the Value of Companies Listed in the Nairobi Stock Exchange (Waweru & Kisaka, 2011)**

<p>Waweru, Nelson Kisaka, Eric Simiyu</p>	<p>2011</p>	<p>Electronic Article</p>	<p>papers.ssrn.com</p>	<p>Connex maturity level of ERM and VC</p>	<p>0</p>	<p>0</p>	<p>54.50%</p>
---	-------------	---------------------------	------------------------	--	----------	----------	---------------

*"Integrated Risk Management (IRM)", "Enterprise wide risk management (EWRM)"*

<p>Assessment of the level of implementation of ERM in companies listed in the Nairobi Stock Exchange. Testing the significance of factors affecting this level of ERM implementation and to investigate whether the level of ERM implementation has a positive effect to the value of companies.</p>	<p>ERM - Integrated framework: "A process, effected by an entity's board of directors, management and other personnel, applied in strategy setting and across the enterprise, designed to identify potential events that may affect the entity, and manage risk to be within its risk appetite, to provide reasonable assurance regarding the achievement of the entity's objectives" (COSO, 2004)</p>	<p><b>COSO ERM scale:</b> Definition COSO's ERM framework for survey instrument; ERM LEVEL 6 = ERM framework is well formulated across business and fully implemented; ERM LEVEL 5 = ERM framework is well formulated across business, with implementation in progress and a clear timetable for completing implementation; ERM LEVEL 4 = ERM framework is well formulated across business, with a clear timetable for implementation but implementation has not started; ERM LEVEL 3 = ERM framework is a partially developed concept and there is no clear timetable for implementation; ERM LEVEL 2 = No ERM framework is in place but there is a plan to introduce one in the short-term; ERM LEVEL 1 = No ERM framework and no plans to introduce one</p>	<p>Research design = quantitative; Paradigm = Post positivism; Methodology = survey research; Method of data collection = questionnaire (for ERM level) &amp; secondary data (financial statements for factors influencing ERM level); Method of data analysis = statistical (descriptive statistics; multivariate regression analysis; ordinary least squares regression model; Variance Inflation Factors)</p>	<p>22 Chief Internal Auditors as the respondents of companies listed on Nairobi Stock Exchange (Industry: Commercial &amp; Service (6), Industrial &amp; Allied (4), Finance &amp; Investment (12)) ; market value data used for Tobin's Q; data collected from financial reports of companies and NSE website (Dec 2009 financial statements for companies whose year end is in Dec and year 2010 financial statements for companies whose year ends</p>
---	--	--	--	---

				fall between Jan and Jun)
Tobin's Q as the market value of equity plus the book value of liabilities divided by the book value of assets	Companies that implement ERM according to COSO's Integrated Framework in the NSE are valued at 16% higher than those that have not implemented ERM	Significant relationship between the value of the firm and the Level of ERM implementation, the company's size and the profitability of the firm; companies engaged in ERM are valued at 16% higher than other companies; presence of CRO/Risk champion positively associated with the extent of ERM deployment; organisation's size, institution's auditors, industry of operation, board independence, regulatory pressure and growth have no significant influence on ERM level;		Difficulties to measure the level of ERM implementation with limited subjectivity of questionnaire responses; only 49% of the targeted population responded to questionnaire and most of the respondents were from the financial services segment thus there is a probability of industry bias in the research findings; email questionnaires had a limitation in terms of response rate; small sample size also limited the extent of statistical analysis

**The Relationship between enterprise risk management and creating value in Iranian insurance companies (Mazloomi & Izadpanahi, 2010)**

Mazloomi, Nader Izadpanahi, Sareh	2010	Conference Paper	World Risk and Insurance Economic Congress, Singapore	Impact of ERM on VC	0	0	54.50%
--------------------------------------	------	------------------	---	---------------------	---	---	--------

*"Enterprise Risk Management", "Integrated Risk Management", "Corporate Risk Management"*

Relationship between ERM techniques in the field of "financial & operational risks" and "creating value" in insurance companies is studied	ERM overview - Casualty Actuarial Society: <i>"An operational discipline that manages risks from all sources (hazard, financial, operational and strategic risk) in order to increase short and long-term value of organization" (CAS, 2003).</i> ERM Framework: <i>"A process which is applied in strategy setting and designed to identify potential events to provide reasonable assurance regarding the achievement of the objectives" (COSO, 2004).</i> Integrated - ERM must span all	<b>ERM components:</b> Existence of Risk Management philosophy, Risk identification & analysis (Risks identification, qualitative & quantitative assessments, risks classification, risks prioritization), Extent of Risk Financing and Controlling techniques (Financing: Investment and Reserve management, Capital allocation; Controlling: Portfolio management, Asset-liability management, risk transfer & reinsurance, rules & limitations), Availability of ERM implementation requirements (Existence of CRO, risk reporting to senior man-	Research design = quantitative; Paradigm = Post positivism; Methodology = survey research; Method of data collection = Questionnaire & secondary data (financial statement); Method of data analysis = statistical (Friedman test,	21 companies from insurance industry (state-owned & privately owned); data source are financial statements from 2008
--	---	--	--	--

	lines of business, Comprehensive - ERM must include all types of risks, Strategic - ERM must be aligned with overall business strategy.	agement, RM committees, systems & data management)	regression analysis)	
Economic Value Added (EVA) = net operating profit minus an appropriate charge for the opportunity cost of all capital invested in an enterprise (Net Operating Profit after Tax (NOPAT) and net asset; Weighted Average Cost of Capital as average return expected from capital structure of the firm)	No specific linkage between ERM theories and VC found	Findings did not support a systemic use of ERM as a strategy by the insurance companies; and it was not practiced as a whole concept; the result of regression analysis carried out between ERM (independent variable) and EVA (dependent variable) showed that in the field of financial and operational risk no significant relationship was found	No limitation stated	

**The Rise and Evolution of the Chief Risk Officer: Enterprise Risk Management at Hydro One (Aabo et al., 2005)**

Aabo, Tom Fraser, John R. S. Simkins, Betty J.	2005	Journal Article	Journal of Applied Corporate Finance	Connex maturity level of ERM and VC	2	24	54.50%
---	------	-----------------	--------------------------------------	-------------------------------------	---	----	--------

*"integrated", "strategic", "enterprise-wide"*

Description and analysis of a best practice example for a successful implementation of ERM and the benefits provided by Hydro One, Inc	Foreign exchange risk, operational risk, credit risk, and commodity risks function all as parts of an integrated, strategic, and enterprise-wide system. Risk Management is coordinated with senior-level oversight, and employees at all levels of the organization are encouraged to view risk management as an integral and on-going part of their jobs.	Not defined	Research design = qualitative; Paradigm = Constructivism; Methodology = case study; Method of data collection = not stated (assume: interview & secondary data - company documents); Method of data analysis = description of content	Hydro One Inc., the largest electricity delivery company in Ontario, Canada; all the shares are owned by the Ontario government by 2003; data gathered from interviews & company documents
Not defined	No specific linkage between ERM theories and VC found	<b>Implementation:</b> preparation of ERM Policy (governing principles/definitions) and Framework (ERM procedures); start of a pilot study (determination of top risks in workshop); preparation of risk tolerance guide-	No limitation stated	

		lines (range of possible impacts on a five-point scale from Minor to Worst Case of specific risks on business objectives); identification & assessment of risks (probability of worst credible outcome & production of a 'risk map'); definition of risk tolerance by risk owner; monitoring and review; risk profile for managers twice a year (basis for resource allocation); capital allocation (based on greatest mitigation of risk per \$ spent); <b>Benefits/outcomes:</b> ERM enables regulatory, strategic, operational, and financial risks to be managed and aligned with strategic business objectives; positive reaction of the credit rating agencies, resulting in a reduction in the company's cost of debt; improvement of capital expenditure process; avoidance of surprises; reassurance of stakeholders that business is well managed; improvement of corporate governance; implementation of a formalized system of RM; identification of risks the company can pursue better than it peers; better understanding of employees at all levels of firm's risks	
--	--	---	--

**Enterprise Risk Management: The Case of United Grain Growers (Harrington, Niehaus, & Risko, 2002)**

Harrington, Scott E. Niehaus, Greg Risko, Kenneth J.	2002	Journal Article	Journal of Applied Corporate Finance	Connex maturity level of ERM and VC	2	15	51.50%
Discussion of advantages and disadvantages of ERM, description of ERM process at UGG and outcome of the ERM process; lessons to be learned from UGG's experience with ERM	Identification and (when possible) measurement of all of its risk exposures—including operational and competitive risks—and management within a single unified framework.		Not defined	Research design = qualitative; Paradigm = Constructivism; Methodology = case study; Method of data collection = not stated (assume: interview & secondary data - company documents); Method of data analysis = description of content	United Grain Growers (UGG); provides commercial services to farmers, and markets agricultural products worldwide; public company listed on Toronto Stock Exchange; data gathered from interviews & company documents; data mainly used from 1994-1999		
Not defined		No specific linkage between ERM theories and VC found	<b>ERM process:</b> formation of risk management committee (CEO, CFO, risk manager, treasurer, compliance manager, corporate audit manager), identification and ranking of firms major risks, gathering data and estimating probabilit-	No limitation stated			

		ity of losses, quantification of impact on performance (return on equity, EVA, EBIT); analysing relationship weather and UGG's profit; a contract based on grain shipments and integration of the grain volume "coverage" with other traditional property and liability coverage (aggregation of property losses, liability losses and grain volume losses); <b>Benefits to UGG:</b> coverage of a risk which was previously not hedged, more likely to have the internal funds available, increase of debt-to-equity ratio and additional tax shields without increasing the firm's cost of risk, better understanding and communication of risks	
--	--	--	--

**The influence of Enterprise Risk Management on insurers' stock market performance – an event analysis (Acharyya, 2009)**

Acharyya, Madhusudan	2009	Working Paper	Society of Actuaries	Impact of ERM on VC	0	0	47.00%
Testing whether ERM influences insurers' stock market performance and the impact of critical events	ERM overview - Casualty Actuarial Society: <i>"The management of insurers' all significant risks in a holistic framework. It operationally includes the integration of financial (including market, credit and liquidity), insurance, operational, and hazard risks – termed hereinafter as enterprise risk"</i> (CAS, 2003).	<b>Standard &amp; Poor's RM Quality Scale:</b> five categories, Excellent, Strong, Adequate with positive trend, Adequate and Weak (Standard&Poor's, 2006)	Research design = quantitative; Paradigm = Post positivism; Methodology = survey research; Method of data collection = secondary data; Method of data analysis = no statistical analysis; comparison and logical conclusions	16 members and 5 associate members of CRO forum (professional RM group, est. in 2004 to work on key relevant risk issues) including primary insurers and reinsurers with life and non-life businesses from several geographical locations; daily closing share prices downloaded from Thompson Analytics database or company's homepage for 2000 - 2008 (divided into catastrophic / market event timeframes: 2001 & 2002; 2004; 2005; 2007-2008 (i.e. subprime mortgage crisis)); ERM rating criteria from Rating Direct (S&P publication)			

Stock market performance = Standard deviation of stock prices	No specific linkage between ERM theories and VC found	Sub-prime crisis event affects insurers' stock price differently compared to other events: insurers' stock market performances maintain similar pattern in 2001-2002 credit crisis, 2004 US hurricanes; it was different in subprime and financial crisis 2007-08 (some insurers demonstrate superior performance and others were found severely vulnerable); it was concluded that insurers' stock market performance depend much on characteristics of industry events rather than performance of ERM OR insurers' stock market performance is an event driven phenomena without maintaining any direct link with ERM	Limitation of both quantitative and qualitative data; small sample size; inability to use statistical techniques; uneven understanding and framework of insurers' ERM program; lack of theoretical approach of perceiving ERM (financial or management approach)
---	---	---	--

**Enterprise Risk Management: Theory and Practice (Nocco & Stulz, 2006)**

Nocco, Brian W. Stulz, René M.	2006	Journal Article	Journal of Applied Corporate Finance	Impact of ERM on VC	2	105	46.00%
-----------------------------------	------	-----------------	--------------------------------------	---------------------	---	-----	--------

*"Enterprise Risk Management", "Corporate Risk Management"*

Examination how enterprise risk management creates value for shareholders and the practical issues that arise in the implementation of enterprise risk management	All risks viewed together within a coordinated and strategic framework	Not defined	Research design = qualitative; Methodology = literature review; Method of data collection = secondary data (literature) & development of illustrative examples; method of data analysis = description of content	Various articles & set of illustrative examples (fictive and real e.g. Nationwide Insurance);
Not defined	No specific linkage between ERM theories and VC found	ERM creates value at a "macro" or company-wide level and a "micro" or business-unit level; macro level: creates value by quantifying and managing the risk-return trade-off of the entire firm, helps the firm maintain access to the capital markets for implementing its strategy, reducing non-core risks; micro level: risk-return trade-off evaluated for all corporate decisions (decentralization), every risk is owned, risk-based capital allocation and performance evaluation; optimal level of risk: trade-off between managing risk and holding more equity to absorb costs of financial distress; ERM reduces probability of financial distress, managing risk should be less costly than holding more equity; ERM implementation: identify all risks (top-down and bottom-up), measure the risk exposure, aggregate all individual risks to a firm-wide risk profile; target accounting-based ratios as determinants of ratings; take account	No limitation stated	

		of risk correlations; equity capital set should base on a VaR estimate; evaluation of ERM	
--	--	---	--

**A Senior Manager’s Guide to Integrated Risk Management (Meulbroek, 2002)**

Meulbroek, Lisa K.	2002	Journal Article	Journal of Applied Corporate Finance	Impact of ERM on VC	2	48	43.00%
--------------------	------	-----------------	--------------------------------------	---------------------	---	----	--------

*“Integrated Risk Management”*

Statement of managerial overview of integrated risk management, using a series of examples to illustrate the range of applicable management decisions and the benefits for the firm from its implementation	ERM involves the identification and assessment of the collective risks that affect firm value and the implementation of a firm-wide strategy to manage those risks. Integrated risk management is by its nature “strategic” rather than “tactical”.	Not defined	Research design = qualitative; Methodology = literature review; Method of data collection = secondary data (literature) & development of illustrative examples; method of data analysis = description of content	Various articles & set of illustrative examples (fictive and real)
Not defined	No specific linkage between ERM theories and VC found	<b>Benefits (and costs) of risk management: vary by firm;</b> Facilitation of RM by firm’s stockholder’s (corporate-level risk management is likely to be less expensive than risk management by investors); reduction of financial distress costs (by reducing the firm’s total risk); reduction of risk faced by key undiversified investors (managers with stock-and option-based compensation); reduction of tax expense (IRM smooth’s earnings to minimize taxes); reduction of monitoring costs by improving performance evaluation (for outside investor monitoring and evaluation difficult and costly, so IRM makes corporate disclosures more informative); provision of internal funds for investment (by smoothing cash flow volatility); risks within the firm partly or completely offset each other (netting significantly reduces transaction costs); reduction of unnecessary insurance (multi-risk policies)		No limitation stated

Table 3: Substantial Content from Articles regarding ERM/VC Connex, source: Verena Kraus (2012)



*Relevance of Studies*

Univariate analysis with frequency distribution in the categories ‘reference type’, ‘amount secondary citation’ and ‘relevance’ will facilitate a better overview of quality and utility of coded articles to accomplish the research purpose. In the table underneath, the types of references and their respective absolute frequency (fi) and relative frequency (pi) are shown. Journal (52%) and electronic articles (36%) are clearly the most common used type in the study. The absolute and relative frequency of the journal quality according to the ABS list is additionally incorporated in the table. The journal articles used in the study are listed with a quality range from zero to three, whereby 77% of the articles are drawn from journals with a quality rating of at least one, as it can be seen from the cumulative relative frequency (ci) in the table.

Table 4: Distribution Table Reference Type

Reference Type	fi	pi	ci
Conference Paper	1	0,04	
Electronic Article	9	0.36	
Report	1	0.04	
Working Paper	1	0.04	
Journal Article	13	0.52	
Journal Quality			
0	3	0.23	1.00
1	1	0.08	0.77
2	6	0.46	0.69
3	3	0.23	0.23
Grand Total	25	1.00	

Due to numerous values for the variable ‘amount secondary citations’, the authors grouped the values into ranges and determined the frequencies for each group. The groups or classes are, in general, commensurate with a class range of 10 units, while only the last class is open to capture the outlier. For 64% of the articles, only between 0 and 10 secondary citations were detectable. The nascent study field of the ERM/VC topic might explain the experienced low amount of secondary citations.

Table 5: Distribution Table Amount Secondary Citations

Class Interval	Class Mark	fi	pi	ci
0 bis <10	5	16	0.64	0.64
10 bis <20	15	2	0.08	0.72
20 bis <30	25	2	0.08	0.80
30 bis <40	35	3	0.12	0.92
40 bis <50	45	1	0.04	0.96
>=50		1	0.04	1.00
Grand Total		25	1.00	

The total range is 105, the mean of the sample is 13.56 secondary citations and the median is 1. Based on the outlier the mean and the median vary in particular.

Table 6: Descriptive Statistics Amount Secondary Citations

N	25.00
Mean	13.56
Median	1.00
Standard Deviation	23.80
Variance	566.51
Range	105.00

Also for the frequency distribution of the variable ‘relevance’, groups were formed, values were assigned and group frequencies were ascertained. Every group has a range of 10%, whereby the total range of the values is 52%. The cumulative relative frequency was calculated in both ways (1) & (2), and highlights that all articles have at least achieved a relevance of 40% and more than half of all articles have at least a relevance of 60%. To be exact, the minimum of relevance obtained is 43% and the maximum obtained by an article is 95%.

On average, all coded articles are rated with 65.22 % of relevance; the median (62.50 %) doesn’t vary too much in this case and indicates a uniform distribution without significant outliers.

Table 7: Descriptive Statistics Relevance

N	25
Mean	65.22%
Median	62.50%
Standard Deviation	14.18%
Variance	2.01%
Range	52.00%

### *Emerging Codes and Thematic Clustering*

The codes basically emerged inductively through continuously re-reading the texts, and going back and forth between them, except for the category research framework, because these codes were already deductively given.

### *ERM Definition*

The authors coded 25 articles to, among other things, find out how ERM is defined, in which context it is used and what kind of frameworks are considered by the researcher. In 1 of these articles, a definition for ERM was not even provided, while 13 adopted an ERM framework as a definition and 11 established their own ERM definition from different literature modules.

The majority of the studies, which incorporated an ERM framework, made use of COSO's ERM framework (Vicky Arnold et al., 2012; Beasley et al., 2007). Besides COSO's framework, only one other framework was found in the studies, namely the ERM framework from CAS (Acharyya, 2009). In 9 studies, the ERM Framework from COSO as a solitary definition for ERM was used; 13 combined COSO's and CAS's framework for their ERM definition and 1 study applied the CAS as a solitary framework.

Other authors defined ERM independent from a particular framework as an integrated (Aabo et al., 2005; Hoyt & Liebenberg, 2011), coordinated (McShane et al., 2011; Nocco & Stulz, 2006) and holistic process (Vicky Arnold et al., 2009; Grace et al., 2010) to manage a company's overall risk exposure. Yet others see ERM as the identification, assessment and management of a risk portfolio on a firm-wide enterprise level, involving the support of the senior management (Aabo et al., 2005; Eckles et al., 2011; Hoyt & Liebenberg, 2011)

### *ERM Variables*

In order to identify an ERM using firm, four main streams of proxies and search strings were found in literature. Keyword search, S&P RM Rating, ERM Index and ERM maturity scale are the variables under which the different proxies and search strings can be aggregated. The studies using keywords conducted the search by screening secondary data like the business library Lexis Nexis or annual statements of companies. For financial service firms covered in the Standard & Poor's Ratings Direct database is the risk management rating from S&P (2006) which now also integrates ERM as a component, deemed to be a

valuable variable for ERM detection. Some authors demand a more comprehensive variable and developed as a consequence an ERM index comprising different ERM components. By screening secondary data for these components, a researcher identified ERM using firms. With these proxies, researchers were by then only able to determine if a company is a non-user or user, but a more sophisticated approach is to take possible stages of an ERM implementation into account. Hence some researchers proceeded with a survey using a questionnaire to interview a firm’s risk manager or executives responsible for the level of an existing ERM program.

The following table is structured exactly by the ERM variable used in the studies. Four studies were conducted with the aid of two variables each, either keywords in combination with an ERM index or keyword search with S&P’s RM Quality Scale.

Table 8: Frequency Table ERM Variables per Study

ERM Variables per Study	fi	pi
Secondary Data	15	0.60
Keyword Search	6	0.24
S&P RM Quality Scale	3	0.12
ERM Index	2	0.08
Double Variable	4	0.16
Keyword search & ERM Index	2	0.08
Keyword search & S&P RM Quality Scale	2	0.08
Questionnaire	6	0.24
ERM Maturity Scale	6	0.24
Not defined	4	0.16
Grand Total	25	1.00

To illustrate the total frequency for each ERM variable, the double variables were distributed to the particular ERM variable, which results in a total amount of 29 variables used for ERM identification. It is visible that the keyword search is the most common used ERM variable in the coded articles.

Table 9: Frequency Table ERM Variables in Total

ERM Variables in Total	fi	pi
Keyword Search	10	0.34
S&P RM Quality Scale	5	0.17
ERM Index	4	0.14

ERM Maturity Scale	6	0.21
Not defined	4	0.14
Grand Total	29	1.00

### Keyword Search

The keyword search was adapted in ten articles, which means in 40 % of all articles a keyword search was applied. In six cases, the keyword search was the single variable and in four cases it was used in combination either with an ERM index (2) or a S&P RM Quality Scale (2). The authors found two studies, which were only the announcement of a Chief Risk Officer or equivalent, were chosen as a proxy for ERM. The appointment of a Chief Risk Officer was simply used as a single signal for the adoption of ERM. Search strings contained “announced”, “named”, or “appointed”, in conjunction with the position descriptions of “Chief Risk Officer” or “Director of Risk Management (Beasley et al., 2007; Pagach & Warr, 2010). One study employed CRO as a single search string but therefore in conjunction with an ERM Index (Desender & Lafuente, 2010).

Table 10: Frequency Table ERM Search Strings

Search Strings	fi	pi
Chief Risk Officer	9	0.21
Chief Actuary Officer	1	0.02
Enterprise Risk Officer	2	0.05
Risk Committee	3	0.07
Risk Management Committee	2	0.05
Vice President of Enterprise Risk Management	1	0.02
Enterprise Risk Management	6	0.14
Consolidated Risk Management	4	0.10
Corporate Risk Management	1	0.02
Holistic Risk Management	4	0.10
Integrated Risk Management	4	0.10
Strategic Risk Management	5	0.12
Grand Total	42	1.00

*ERM Index*

Researchers, who are aware of the limitation of mentioned variables, extended the spectrum of ERM proxies by the development of ERM indexes. Such an index was formed by the authors through incorporating ERM specific components and by further screening secondary data to identify references approving the components. Within the scope of the literature review, the authors detected four studies using an ERM index, two integrating the COSO ERM framework (Desender & Lafuente, 2010; Gordon et al., 2009) in combination with a keywords search and two with a specific index developed (Grace et al., 2010; Mazloomi & Izadpanahi, 2010).

The COSO ERM index is an aggregate measure of ERM with a list of 108 items related to ERM, scoring zero (absence) or one (presence) composited under the eight dimensions of COSO's ERM framework (2004) (Desender & Lafuente, 2010). The COSO ERM effectiveness index is a different approach and was developed to measure the effectiveness of a firm's ERM based on its ability to achieve its strategy, operations, reporting, and compliance objectives. All the information needed to determine the index is drawn from secondary data like annual statements, websites and newspaper articles (Gordon et al., 2009).

Other indexes are a survey conducted by Tillinghast Towers Perrin from 2004 with detailed information on a number of ERM initiatives like market value based risk metric or risk reflection in decision making processes (Grace et al., 2010) and a list of various ERM components not regarding any ERM framework (Mazloomi & Izadpanahi, 2010).

*ERM maturity scale*

With the ERM maturity scales, the researchers approached the companies or RM responsible roles directly by interviewing them about the company's ERM level. Also here the COSO ERM framework became useful for two articles. In the COSO ERM scales (2), the interviewees received questionnaires with the COSO ERM framework as definition for ERM and the request to state the level of the ERM program in place, from 'complete' over 'partial' to 'no decision made', even to 'no plan to implement ERM' (Beasley et al., 2006; Waweru & Kisaka, 2011). Another article established its own scale also using different stages of ERM adoption, but without providing a particular ERM definition (Gates, 2006). The ERM strategic benefits measure developed by Vicky Arnold et al. (2009) applied for three studies slightly extends the previous mentioned ERM scales by allocating to each level a description and asking the interviewee to evaluate each level on a five point Likert-scale from total agreement to disagreement. In the review of the ERM variables, it became clear that a large number of studies empirically examine the value of ERM using the appointment of a Chief Risk Officer (CROs) or equivalent in order to identify ERM. The appointment of a CRO as an identification strategy is potentially problematic. The CRO may not be using ERM, the CRO could be replacing another CRO, so the appointment could merely indicate a title change, rather than reflect the firm's use of ERM and/or the firm can appoint a CRO, but not report it (Beasley et al., 2007). Obvious is also the extended integration of pre developed templates as theoretical lens in order to identify ERM user and their stages. This is the case with the COSO ERM framework and its components used as ERM index and ERM maturity scale as well as S&Ps RM rating scale. As a consequence aspects regarding capabilities, culture or human resource in ERM user determination are left out. Basically the ERM variables in the studies determined whether a firm has

adopted an ERM or how far the ERM implementation is processed, but only a single study addressed the evaluation of an ERM program's effectiveness and their ability to fulfil its goals. So far the literature fails to address and explore the actual contributing processes and factors, and falls short on finding a more holistic approach.

## Codes & Themes VC Definition

Table 11 includes all provided definitions for value creation listed here as codes and associated measures. Based on multiple measures implied in particular articles, in total the impact on 64 value measures was evaluated in literature. Outstanding is the frequent usage of the value measures Tobin's Q ( $fi = 6$ ) and stock return volatility ( $fi = 4$ ). In some cases ( $fi = 11$ ) the authors didn't define the value measure prior to data collection, instead they kept the answer range open for the respondents to capture all varieties of VC. Another approach was more qualitative, by asking respondents to evaluate the impact of ERM on a defined qualitative value measure, e.g. a five-point Likert-scale.

Table 11: Frequency Table Codes VC Definition and Measures

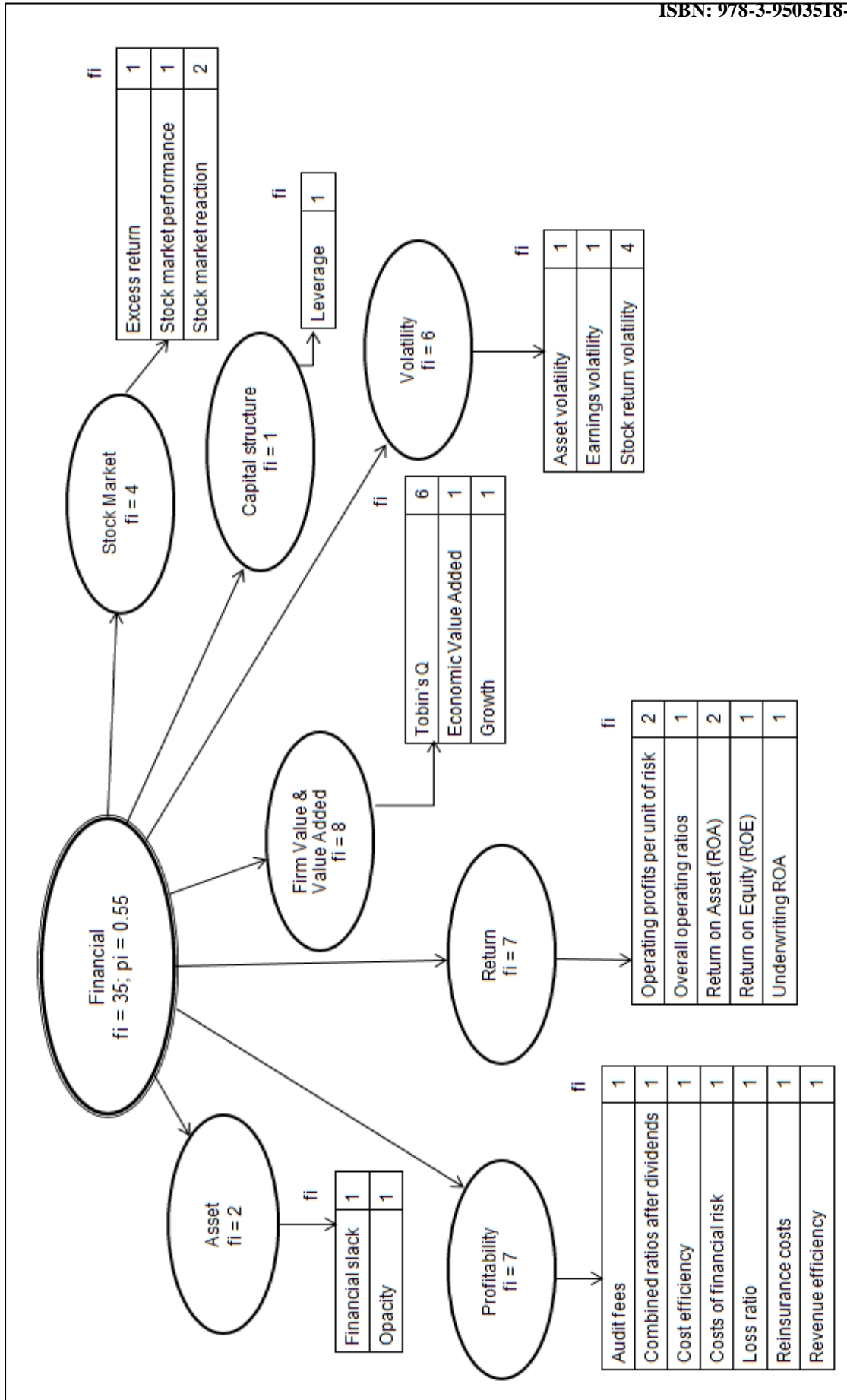
Codes VC Definition	Measures	fi
Absorptive Capacity	Evaluated by respondents on a five-point Likert-type scale	1
Asset volatility	Annualized volatility of assets estimated from seven asset return series	1
Audit fees	Total fee paid to all auditors for both audit and non-audit services	1
B2B E-commerce risk	Evaluated by respondents on a five-point Likert-type scale	1
	Item measures evaluated by respondents	1
Combined ratios after dividends	Gains from overall underwriting activity by including the total underwriting expenses ratio into loss ratio	1
Cost efficiency	Ratio of the costs of a fully efficient firm to the given firm's actual costs	1
Costs of financial risk	Measured by derivative usage (Notional amount of all derivative positions for hedging purpose held at year end, normalized by total assets)	1
Earnings volatility	Standard deviation of the error term from a regression of the firm's quarterly earnings on the prior quarter's earnings	1

Economic Value Added (EVA)	Net Operating Profit after Tax (NOPAT) minus a charge for the opportunity cost of all capital invested in an enterprise (Weighted Average Cost of Capital (WACC) x Capital)	1
Excess return	One-year excess stock market return	1
Financial slack	Proportion of the firm's assets that are cash or cash equivalents	1
Global Business risk	Evaluated by respondents on a five-point Likert-type scale	1
Growth	Market-to-book (MB) ratio and Research and Development expense	1
Impact on Internal Audit	Evaluation of impact on a scale from 1 = not at all to 5 = greatly, by respondents	1
Information Sharing	Item measures evaluated by respondents	1
IT compatibility	Item measures evaluated by respondents	1
Leverage	Total liabilities to assets	1
Loss ratio	Ratio of loss payments made by the company from each dollar of earned premiums in a year	1
Not defined upfront	Illustrative & not measured	7
	Stated by respondents	11
Opacity	Ratio of intangibles to total assets	1
Operating profits per unit of risk	Ratio of Return on Asset (ROA/stock return volatility)	2
Organizational flexibility	Item measures evaluated by respondents	1
Overall operating ratios	Pre-tax operating profitability which includes its return on investment and underwriting revenues and expenses	1
Reinsurance costs	Ratio of reinsurance ceded to sum of direct business written and reinsurance assumed	1
Return on Asset (ROA)	Net income divided by total assets	1
	Ratio of income before extraordinary items divided by total assets	1
Return on Equity (ROE)	Net Income divided by Book Equity	1



Revenue efficiency	Ratio of observed revenue to the maximum revenue of a fully efficient firm with the same input quantities and output prices	1
SOX 404 implementation difficulty	Item measures evaluated by respondents	1
Stock market performance	Standard deviation of stock prices	1
Stock market reaction	Average abnormal return around hiring announcements	1
	Cumulative abnormal return around hiring announcements	1
Stock return volatility	Annualized standard deviation of daily stock returns	1
	Annualized standard deviation of monthly stock returns	1
	Standard deviation of the firm's daily returns over the year	1
	Standard deviation of weekly stock returns	1
Strength of control environment	Item measures evaluated by respondents	1
Tobin's Q	Market value of equity plus the book value of liabilities divided by the book value of assets	6
Trust	Item measures evaluated by respondents	1
Underwriting ROA	Underwriting income divided by total assets	1
<b>Grand Total</b>		<b>64</b>

In the next step, codes were grouped by making sure that codes are homogeneous within a group and heterogeneous among other groups. Afterwards, themes emerged and are now illustrated with assigned codes and their absolute frequency shown in Figure 6. The themes were further compromised in superior themes, separating financial and non-financial benefits. As financial benefits can be assigned VC measures regarding stock market, volatility, profitability, return, assets, capital structure and firm value or value added. Non-financial themes gathered organizational structure, process, risk and communication measures. The majority of benefits measured are financial benefits (fi = 35). Especially the measurement of an ERM's impact on firm value (fi = 8), return (fi = 7) and profitability (fi = 7) was found in literature. Also the evaluation of ERM's influence on volatility (fi = 6) and stock market (fi = 4) played an important role in the articles. An ERM's impact on organizational structure (fi = 4), risks (fi = 3) and communication (fi = 3) put forth a more qualitative approach in measuring VC. After careful review of these measures, the authors observed missing approaches. An ERM impact on a company's cash flow or on its capital costs appeared to be neglected in literature.



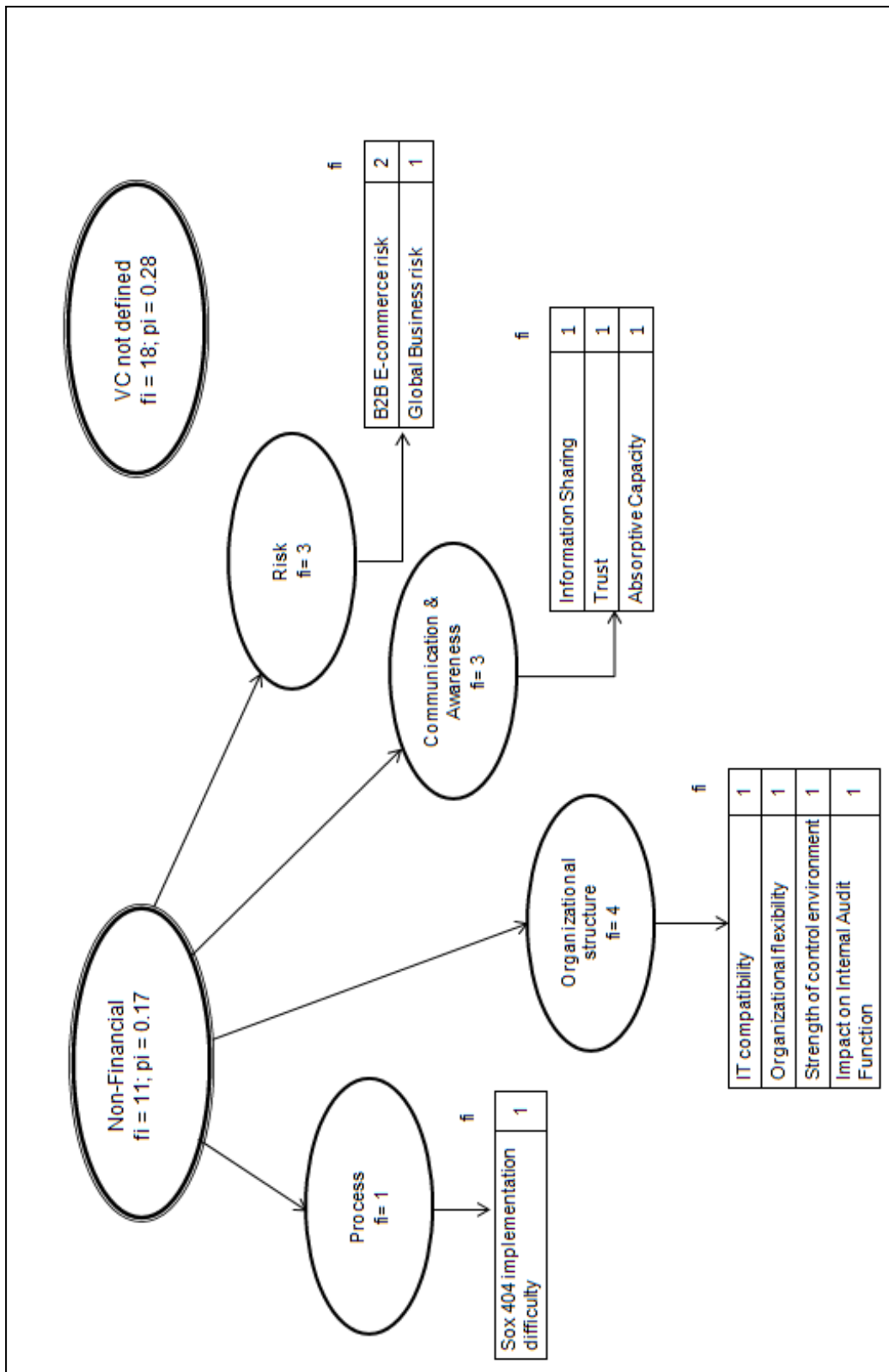
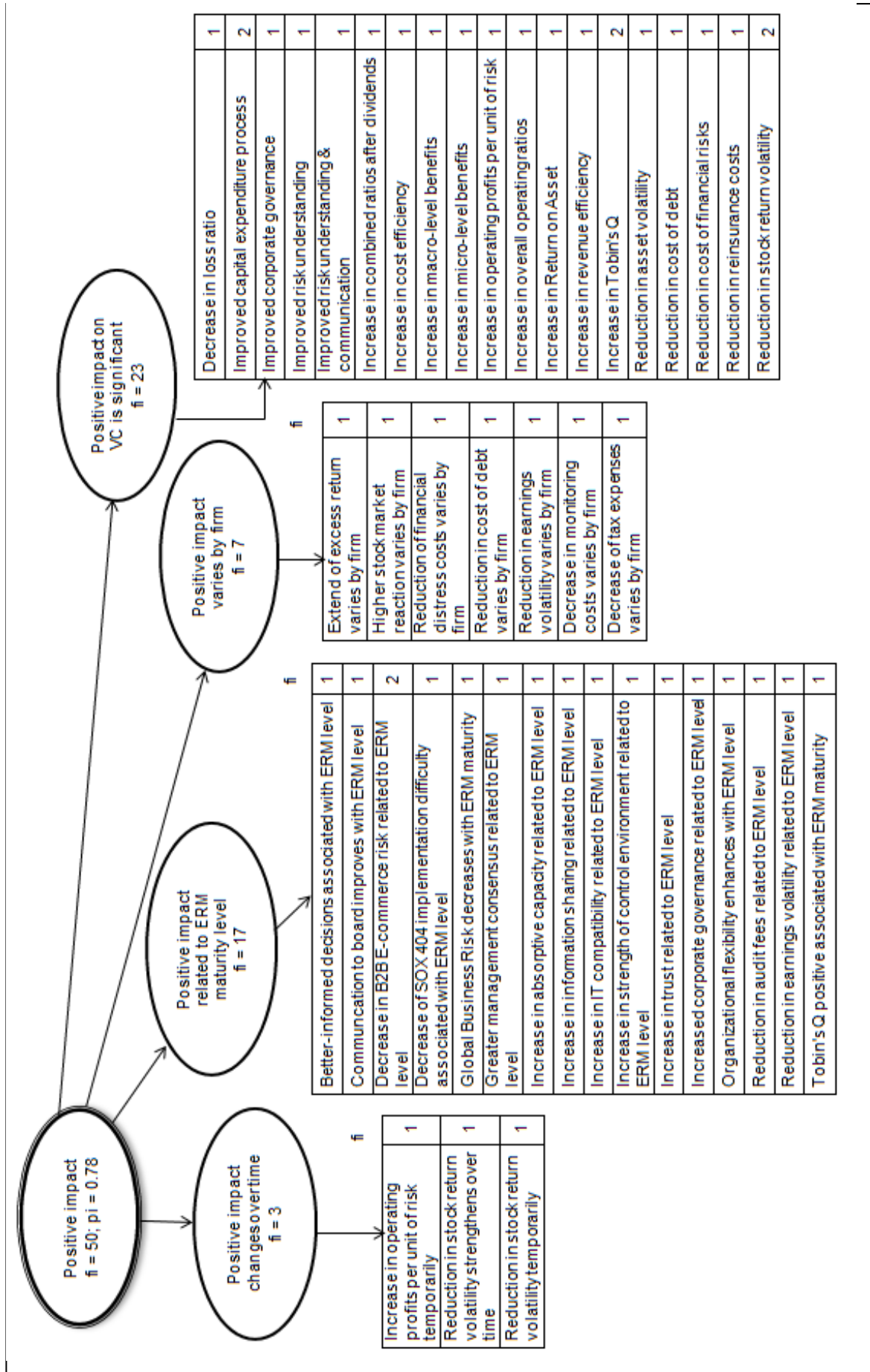


Figure 5: Themes for Definition VC

### *Impact of ERM*

Also for the impact of ERM, the codes were grouped into expressive themes, illustrated on the next two pages in Figure 6. In general, three basic forms of impact are identified in the literature as positive, negative or without significant impact. In total, the impact of ERM on 64 VC measures was examined. In 78 % of the investigations, a positive impact could be detected. This positive impact was either determined in general (fi = 23) or varied by different determinants. Studies integrated and measured the impact of different ERM stages on VC, in consequence, positive impact varies by ERM maturity level in 17 cases. Every company has different firm characteristics leading to a different extent of ERM's positive impact on VC measures (fi = 7). The authors also found that in three cases, the influence of ERM changed over time, by becoming stronger or disappearing over time. In 17 % of the cases, researchers failed in finding an impact of ERM on VC and in 5 % they even experienced a negative impact of ERM. As mentioned in the prior sector, some VC measures weren't defined upfront in order to receive open-minded statements about ERM benefits directly from respondents. The impact of these benefits are now included in the figure underneath. In this context, as new benefits appear the reduction of cost of debt and better capital expenditure process. Respondents also named improved corporate governance, better-informed decisions and increased risk understanding as benefit experienced from ERM.



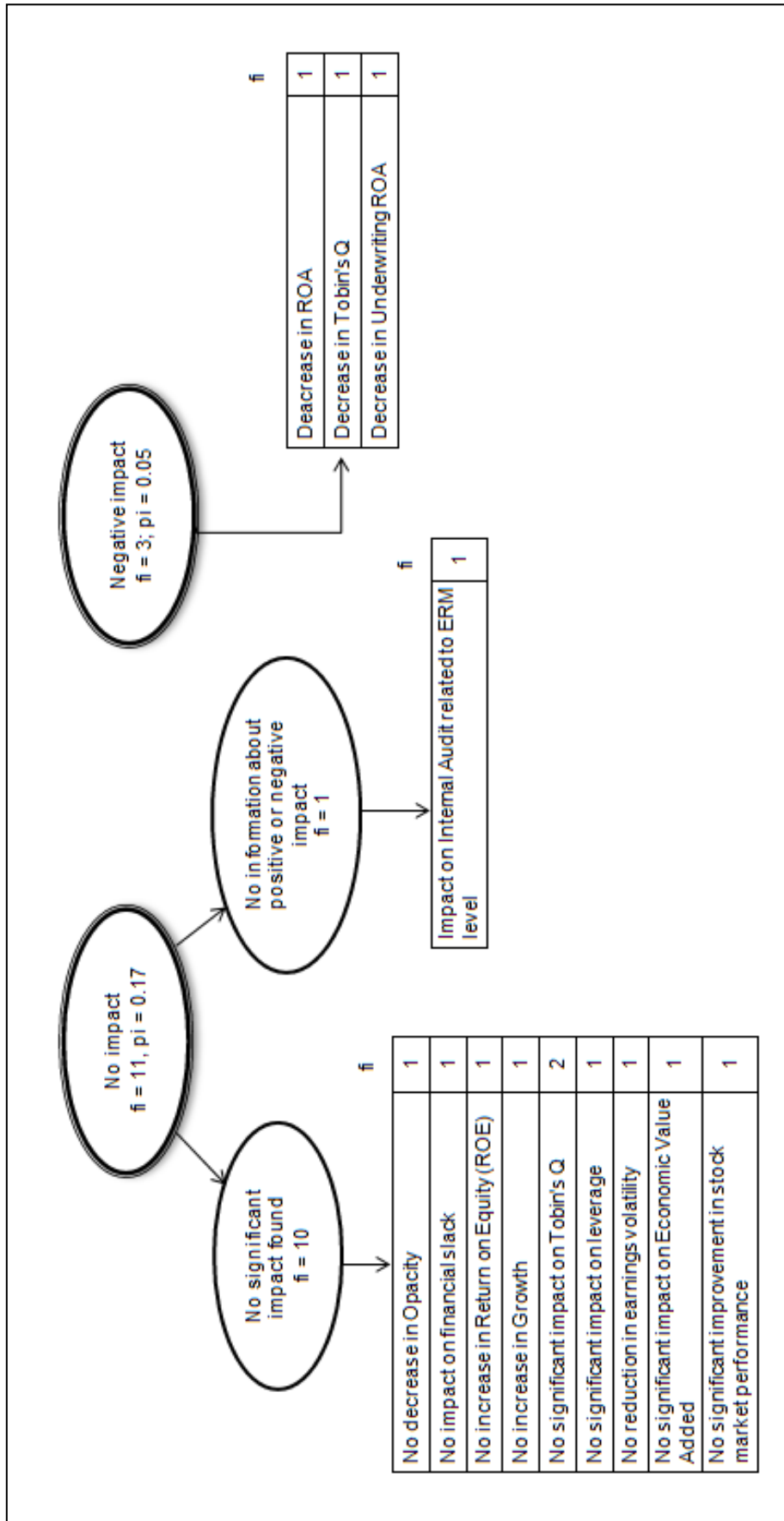


Figure 6: Themes for Impact ERM

*Relationship ERM Impact & Definition VC*

With the comparison of the themes emerged from VC definitions and ERM impact, the authors provides a better overview of different kinds of ERM influence on a company's value and performance aspects. Studies examining the impact on firm value & value added or return measures failed to find consistent results. Findings show positive impact as well as not significant and even negative results. For firm value & value added measure were in fact more negative respectively not significant outcomes identified than positive. Whereby for profitability (financial benefit), risk and communication (non-financial benefit) a throughout positive impact was detectable. For stock market, volatility and organizational structure measures positive as well as not significant impact were examined. In contrary, the authors couldn't find a significant influence of ERM on asset or capital structure.

Table 12: Relationship Themes ERM Impact &amp; Definition VC

Impact ERM & Definition VC	fi
Negative	3
Return	2
Firm Value & Value Added	1
Not significant	11
Asset	2
Organizational structure	1
Return	1
Stock market	1
Volatility	1
Firm Value & Value Added	4
Capital structure	1
Positive	50
Communication & awareness	3
Organizational structure	3
Process	1
Return	4
Risk	3
Stock market	3



Impact ERM & Definition VC	fi
Volatility	5
Firm Value & Value Added	3
Profitability	7
Not defined upfront	18
Grand Total	64

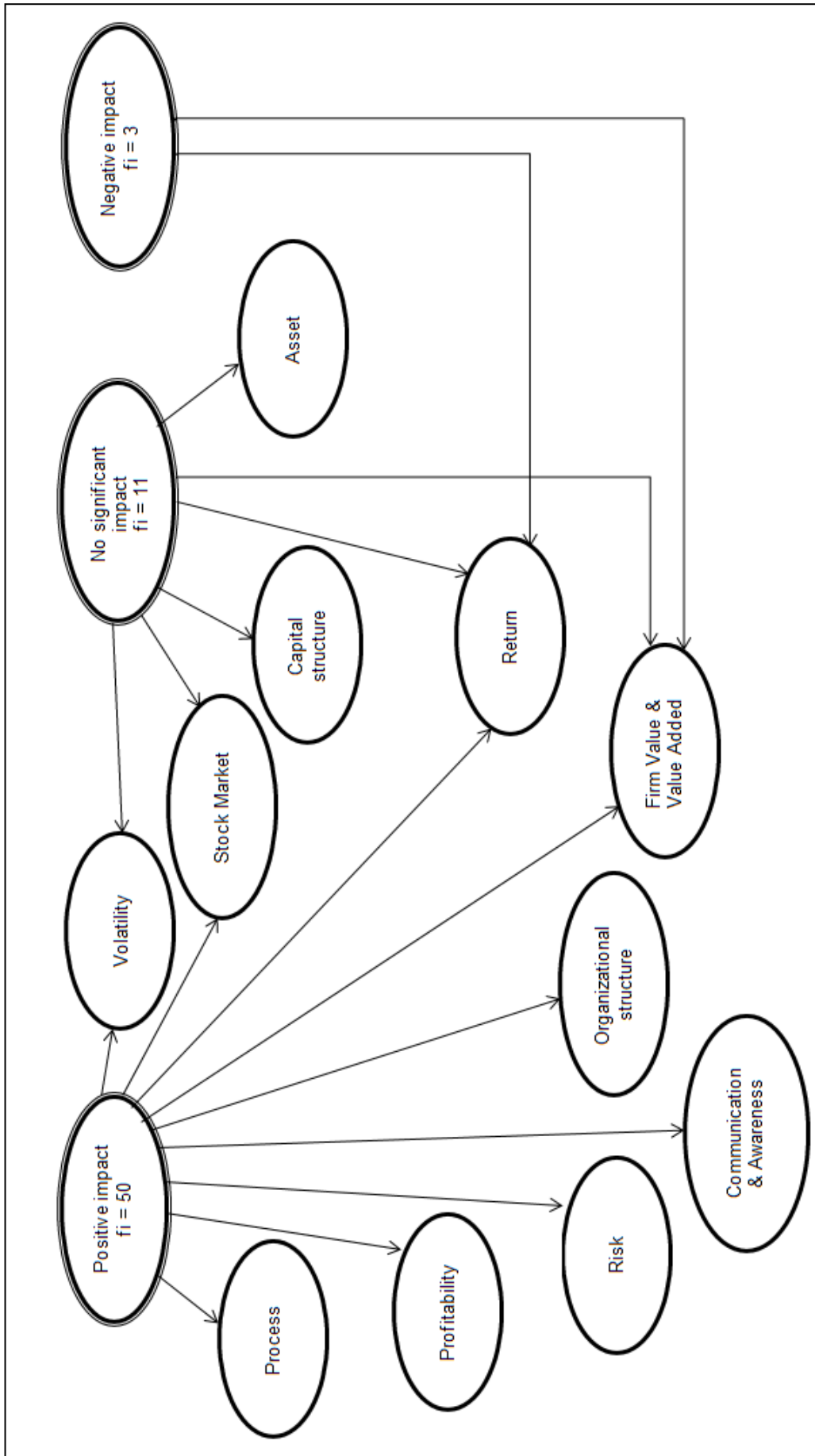


Figure 7: Relationship ERM Impact & Definition VC

*Research Framework*

Table 13 shows the deductively developed codes for the category research framework as well as the absolute and relative frequency for research design, research methodology and method of data collection with the executed data analysis. Distinctive is the high amount of quantitative studies found in literature; in 80% ( $f_i = 20$ ) of the articles, the study was conducted with a survey, mostly with data collected from secondary sources and then statistically analysed. Even though the authors were operating in a nascent research field, only four executed a qualitative research design and one used with the mixed method a more progressive approach.

Table 13: Frequency Table Research Framework

Codes Research Framework	$f_i$	$p_i$
Mixed	1	0.04
Survey & Case studies	1	
Questionnaire (open-ended & close-ended), Description of Content & Statistical	1	
Qualitative	4	0.16
Case study	2	
Description of Content	2	
Literature review	2	
Description of Content	2	
Quantitative	20	0.80
Survey	20	
Secondary Data, Statistical	13	
Secondary Data & Questionnaire (close-ended), Statistical	3	
Secondary Data, Comparison & Logical Conclusion	1	
Questionnaire (close-ended), Statistical	3	
Grand Total	25	1.00

### *Industry*

A majority of the authors addressed in their research process multiple industries. Here are only the industries listed which explicitly mentioned and composed at least 10% of the study's sample size, the rest are consolidated under the code "Others". As it is shown in Table 14, the banking and insurance industry (22%) is the most frequently observed sector in the ERM/VC literature. Financial Service Investment (12%), Trading & Services (10%) and Manufacturing (10%) were also quite common. Reason for the focus on the financial industry might be by regulations with enhanced disclosure requirements and therefore better access to data (Beasley et al., 2007; Pagach & Warr, 2010).

Table 14: Frequency Table Industry

Codes Industry	fi	pi
Banking & Insurance	11	0.22
Financial Services Investment	6	0.12
Trading & Services	5	0.10
Manufacturing	5	0.10
Energy	2	0.04
Utility	2	0.04
Education	1	0.02
Technology	1	0.02
Pharmaceutical	1	0.02
Property/Real Estate	1	0.02
Industrial Allied	1	0.02
Others	11	0.22
Not defined	2	0.04
Grand total	48	1.00

### *Sample Sizes*

The reviewed articles contained two case studies and two literature reviews, thus these four articles are not included in the classes built for the frequency Table 15. The rest of the studies applied a survey research with sample size ranging from 12 to 532 companies or observations. The class size is 50, whereby the last class is open to capture the two outliers (528, 532). The majority of the studies used a sample size between 1 and 150 companies.

Conspicuous was for studies within the class under 50, that their authors mentioned a low sample size as limitation.

Table 15: Frequency Table Sample Size

Class Interval Sample Size	fi	pi
1 to <50	4	0.16
50 to <100	4	0.16
100 to <150	6	0.24
150 to <200	2	0.08
200 to <250	2	0.08
250 to <300	1	0.04
>=300	2	0.08
various articles	2	0.08
one case study	2	0.08
Grand Total	25	1.00

### *Geography*

Table 16 gives an overview for which regions the studies were conducted. Studies examining the ERM/VC nexus focus mainly on North America and especially USA. Europe stays barely considered, although a study by Deloitte (2008) with 151 companies found that Europe's companies are further ahead with their ERM implementation and have higher developed ERM programs than companies in other continents. South America or Australia weren't addressed in any of the articles, whereby the study by Deloitte (2008) indicates a high interest in ERM of companies in South America and in Australia the now widely used AS/NZs (2004) framework emerged.

Table 16: Frequency Table Geography

Codes Geography	fi	pi
North America	3	0.12
North America & Europe	3	0.12
USA	11	0.44

Canada	2	0.08
Iran	1	0.04
Malaysia	1	0.04
Nairobi	1	0.04
not defined	3	0.12
Grand total	25	1.00

### *Study Period*

In 25 reviewed studies, not only one-year periods were observed, but rather two-year or even ten-year periods were taken into account. For the calculation of the frequency distribution, the total frequency of every year observed is calculated and grouped in clear classes, displayed in Table 17. The classes range from 1990 to 2011 with a class interval of two years. The periods from 2002 to 2003 ( $f_i = 13$ ) and 2004 to 2005 ( $f_i = 13$ ) were studied in particular. What is interesting is that around this time, major ERM frameworks emerged (CAS, 2003; COSO, 2004). Even though researchers addressed the periods from 2007 to 2009, the changes in the ERM impact during and after the financial were barely taken into account.

Table 17: Frequency Table Study Period

Class Interval Study Period	$f_i$	$p_i$
1990 - 1991	2	0.02
1992 - 1993	6	0.07
1994 - 1995	8	0.09
1996 - 1997	8	0.09
1998 - 1999	10	0.11
2000 - 2001	11	0.12
2002 - 2003	13	0.14
2004 - 2005	13	0.14
2006 - 2007	12	0.13
2008 - 2009	7	0.08
2010 - 2011	2	0.02
Grand total	92	1.00

### Three Propositions derived from the findings

Based on the findings, the authors developed the following propositions for a further research agenda. The vast majority of studies used a CRO appointment or, in general, keywords search as an ERM variable. Basically the authors aimed at determining whether an ERM program exists or not. Only a few researchers enhanced the ERM dummy variables to include an ERM's maturity level. One study came up with an advanced approach to proxy ERM programs by evaluating an ERM's effectiveness. None of these studies observed specific components of ERM influencing VC, but rather applied an ERM index and a S&P RM quality scale merely to determine if an ERM program is in place.

Even though the authors looked out for direct linkage between ERM theories and VC, only two articles explicitly mentioned a direct connection. Authors claimed the proper match within ERM effectiveness, measured by the ability to achieve COSO's four objectives relative to strategy, operations, reporting and compliance, as the basic factor for VC (Gordon et al., 2009). Yet other researchers argued that combining individual risks in risk portfolios lead to better recognized natural hedging and in turn produces a greater risk reduction per dollar spent (Eckles et al., 2011). Whereas findings in literature indicate a positive impact of ERM on VC, it is not carved out whether or how observed benefits can be assigned to TRM or can be defined as added benefit of ERM.

Hence, a research agenda, considering which components of ERM actually create value and what benefits are results of TRM or ERM in particular, is expected to advance the research field. The authors introduce the first proposition:

**Proposition 1:** Identification of specific components and processes of ERM theory contributing to firm value and evaluation of an added benefit of ERM compared to TRM.

The findings suggest that the choice of determinants influences the outcome, but the authors struggle to find the determinants. Such is true also for example with larger firms, with a lower cash ratio or with greater financial leverage, that they more likely to benefit from ERM. Ownership characteristics or type of industry also influences the extent of benefits a company can experience from ERM. A few studies found the positive impact varying from firm to firm. So far, the researchers focused on the financial service industry and especially insurance firms. In order to make a general statement on the VC effect of ERM, it is necessary to study ERM programs throughout different industries. Moreover, partially relatively small sample size may reduce the extent to which results may be generalized. The second proposition developed is:

**Proposition 2:** First step to a further research agenda is the solicitation of a same base.

The authors found around 30% of the studies examining an ERM's impact for only one year and a majority of studies remaining under five-year observations. These short and mid-term tests may be too weak to be able to pick up changes. ERM could take a longer period of time to implement and reap benefits from its processes and instruments. A large amount of studies used profitability or return measures for VC evaluation. Another prominent proxy applied was Tobin's Q for firm value. Only one article examined an ERM's impact by the usage of a value added measure, in that case Economic Value Added (EVA),

a measure based on profits. Cash flow developments remained utterly disregarded, either in terms of cash flow volatility or in common firm value (Discounted Cash Flow method) or value added (Cash Value Added) measures. Impact on capital costs or in detail Weighted Average Cost of Capital (WACC) wasn't directly examined but appeared in studies with an open answer range for VC: The authors believe a more cash flow based approach, a focus on capital costs and observation of ERM effects over longer periods will be of particular advantage for the research field. Therefore, the authors introduce the third proposition:

**Proposition 3:** Scrutinization of profitability based VC measures and consideration of capital costs and cash flow based measures as well as the monitoring of ERM benefits over longer periods.

## Conclusion and Discussion

Researchers found evidence of a positive correlation between the implementation of an ERM program and Value Creation, but failed to enlighten the whole concept of the ERM / VC connexion. The study provides a systematic analysis of the current literature regarding the impact of ERM on VC and introduces three propositions for a further research agenda. The authors identified 25 articles examining the ERM / VC nexus and found results on the impact of ERM in three forms, positive, negative or not significant. The authors acknowledge a broad range of quantitative and qualitative benefits, anticipated to generate value short- or long-term as VC. The systematic literature review let financial and non-financial measures for VC emerge. The majority of VC measures detected can be summarized under financial benefits, including cost reduction, profit or return increase, volatility decrease leading to firm performance improvement or directly proxied by firm value measures. Studies using non-financial benefits for VC measure, including process, organizational structure, communication and risk factors, basically resulted in the finding of a throughout positive ERM impact. The power of the qualitative measures in these cases might be questionable, because of the involvement of the personal opinion of respondents. The common firm value or value added measures using cash flow or cost of capital as input factors stayed highly disregarded. The findings suggest a consideration of capital cost and cash flow in VC measurement. Findings demonstrate that the majority of studies experienced a positive ERM impact. However, the authors also found the positive impact varying by ERM maturity level, by firm or over time. Results indicate that studies partially experienced for a single VC measure different outcomes, from positive over not significant to negative. The impact varying from firm to firm might be due to different determinants. Although a collective concentration in literature on North American companies in banking and insurance industry was detectable, differences in firm sample on entity size, ownership characteristics, organizational and environmental factors was present. Furthermore, studies capturing specific events were utterly left out. Based on varying determinants, it is hardly possible to make a comprehensive statement on the general impact of ERM on VC. The literature needs to conceptualize and call on a same base of determinants.

Results show ambiguities in the actual added benefit of ERM. Studies applying the S&P RM rating found a value increase for firms with a weak or adequate RM, so basically



TRM. Yet other studies found a value creation for strong and excellent RM firms, defined as ERM firms, assigning the value impact entirely to ERM and ignoring the possible proportion of TRM. Researchers didn't exclude, whether typical traditional risk management activities, such as hedging and corporate insurance, are the driving forces behind VC. However, the authors propose the explicit extinction between TRM and ERM benefits as a valuable approach towards a more advanced research field.

A prominent proxy identified during the systematic review was the CRO, but was simultaneously criticized for its limitations. The results display that the ERM variables were primarily used as dummy variables even for particular developed ERM indexes. Studies with an ERM maturity level as variable merely asked about plans to implement ERM or partially respectively fully implied ERM programs, leaving out information about components of ERM being implemented from stage to stage. An ERM variable using effectiveness evaluation admittedly focused on the strength of a program, but without insight on the valuable aspects of ERM. As a result the literature stayed without identification of value creating capabilities, processes, cultures and human resources of ERM programs. One study gave impetus in this direction by identifying the CRO and risk committee as value enhancing factors, when associated with ERM implementation. ERM roles and responsibilities emerge as a crucial factor in ERM deliberations. So, as a result, the authors propose the focus on substantial components in the ERM / VC nexus.

This study might be limited to the relatively small sample of high qualified articles, which also brings further evidence of the pre-pragmatic stage of the research field.

The findings summarize a too early stage of comprehensive quantitative studies, without the determination of efficient and reliable ERM variables as well as the lack of knowledge about essential value enhancing factors of ERM. After a systematic review of literature it is not possible to make a general statement of the value creating effects of the ERM programs. So the researchers need to step backwards and take the developed propositions into account.

## References

- Aabo, T., Fraser, J. R. S., & Simkins, B. J. (2005). The Rise and Evolution of the Chief Risk Officer: Enterprise Risk Management at Hydro One. *Journal of Applied Corporate Finance*, 17(3), 18-31.
- Acharyya, M. (2009). The influence of Enterprise Risk Management on insurers' stock market performance – an event analysis: Society of Actuaries.
- Dodd–Frank Wall Street Reform and Consumer Protection Act (2010).
- Altuntas, M., Berry-Stölzle, T. R., & Hoyt, R. E. (2011). Implementation of Enterprise Risk Management: Evidence from the German Property-Liability Insurance Industry. *The Geneva Papers on Risk and Insurance*, 36, 414 – 439.
- Arnold, V., Benford, T., Canada, J., & Sutton, S. G. (2011). The role of strategic enterprise risk management and organizational flexibility in easing new regulatory compliance. *International Journal of Accounting Information Systems*, 12(3), 171-188. doi: 10.1016/j.accinf.2011.02.002
- Arnold, V., Benford, T. S., Hampton, C., & Sutton, S. G. (2009). Enterprise Risk Management: Re-Conceptualizing the role of Risk and Trust on Information Sharing in Transnational Alliances. Retrieved from papers.ssrn.com website:
- Arnold, V., Benford, T. S., Hampton, C., & Sutton, S. G. (2012). Enterprise Risk Management as a Strategic Governance Mechanism in B2B-Enabled Transnational Supply Chains. *Journal of Information Systems*, 26(1), 51-76. doi: 10.2308/isys-10253
- AS/NZs. (2004). The Australian and New Zealand Standard on Risk Management 4360:2004.
- AS/NZs. (2009). Joint Australian New Zealand Standard on Risk Management ISO 31000:2009 - Principles and guidelines.

- Banham, R. (2004). Enterprising Views of Risk Management. *Journal of Accountancy*, 197(6), 65-71.
- Basel II: International Convergence of Capital Measurement and Capital Standards (2003).
- Baxter, R., Bedard, J. C., Hoitash, R., & Yezegel, A. (2011). Enterprise Risk Management Program Quality: Determinants, Value Relevance, and the Financial Crisis. Retrieved from papers.ssrn.com website:
- Beasley, M. S., Clune, R., & Hermanson, D. R. (2005). Enterprise risk management: An empirical analysis of factors associated with the extent of implementation. *Journal of Accounting and Public Policy*, 24(6), 521-531. doi: 10.1016/j.jaccpubpol.2005.10.001
- Beasley, M. S., Clune, R., & Hermanson, D. R. (2006). Enterprise Risk Management on the Internal Audit Function: North Carolina State University, Enterprise Risk Management Initiative.
- Beasley, M. S., Pagach, D., & Warr, R. (2007). Information Conveyed in Hiring Announcements of Senior Executives Overseeing Enterprise-Wide Risk Management Processes. *Journal of Accounting, Auditing and Finance*.
- Boyatzis, E. (1998). *Transforming qualitative information: thematic analysis and code development*. London: Sage Publications Ltd.
- CAS. (2003). Overview on Enterprise Risk Management: Casualty Actuarial Society - Enterprise Risk Management Committee.
- Chung, K. H., & Pruitt, S. W. (1994). A Simple Approximation of Tobin's Q. *Financial Management*, 23(3), 70-74.
- COSO. (2004). Enterprise Risk Management - Integrated Framework: Committee of Sponsoring Organizations of the Treadway Commission.
- COSO. (2010). COSO's 2010 Report on ERM, Current State of Enterprise Risk Oversight and Market Perception of COSO's ERM Framework: Committee of Sponsoring Organizations of the Treadway Commission.
- Culp, C. L. (2002). The Revolution in Corporate Risk Management: A Decade in Innovations in Process and Products. *Journal of Applied Corporate Finance*, 14(4), 9-26.
- Deloitte. (2008). Perspectives on ERM and the Risk Intelligent Enterprise - Enterprise Risk Management Benchmark Survey: Deloitte Development LLC.
- Denzin, N., & Lincoln, Y. (2005). *The Sage handbook of qualitative research, Third Edition*. London: Sage Publications Ltd.
- Desender, K. (2007). On the determinants of Enterprise Risk Management Implementation. Retrieved from papers.ssrn.com website:
- Desender, K., & Lafuente, E. (2009). The influence of board composition, audit fees and ownership concentration on enterprise risk management. Retrieved from papers.ssrn.com website:
- Desender, K., & Lafuente, E. (2010). The Relationship between Enterprise Risk Management and External Audit Fees: Are they Complements or Substitutes? Retrieved from papers.ssrn.com website:
- Dickinson, G. (2001). Enterprise Risk Management: Its Origins and Conceptual Foundation. *The Geneva*, 26(3), 360-366.
- Eckles, D. L., Hoyt, R. E., & Miller, S. M. (2011). The Impact of Enterprise Risk Management on the Marginal Cost of Reducing Risk: Evidence from the Insurance Industry. Retrieved from villanova.edu website:
- Edmondson, A., & Mcmanus, S. (2007). Methodological fit in management field research. *Academy of Management Review*, 32(4), 1155-1179.
- EIU. (2001). Enterprise Risk Management: Implementing New Solutions. New York: Economist Intelligence Unit Limited and MMC Enterprise Risk, Inc.
- GARP. (2004). *GARP Risk Review May/June '04: GARP Risk Review*.
- Gates, S. (2006). Incorporating Strategic Risk into Enterprise Risk Management: A Survey of Current Corporate Practice. *Journal of Applied Corporate Finance*, 18(4), 81-90.
- Gluck, F. W., Kaufman, S. P., & Walleck, A. S. (1980). Strategic management for competitive advantage. *Harvard Business Review*, 58(4), 154-161.
- Gordon, L. A., Loeb, M. P., & Tseng, C.-Y. (2009). Enterprise risk management and firm performance: A contingency perspective. *Journal of Accounting and Public Policy*, 28(4), 301-327. doi: 10.1016/j.jaccpubpol.2009.06.006
- Grace, M. F., Leverty, T. J., Phillips, R. D., & Shimpi, P. (2010). The Value of Investing in Enterprise Risk Management. Retrieved from papers.ssrn.com website:
- Harrington, S. E., Niehaus, G., & Risko, K. J. (2002). Enterprise Risk Management: The Case of United Grain Growers. *Journal of Applied Corporate Finance*, 14(4), 71-81.
- Harzing, A. W. (2007). Publish or Perish. Retrieved June 10th

- Hoyt, R. E., & Liebenberg, A. P. (2011). The Value of Enterprise Risk Management. *Journal of Risk and Insurance*, 78(4), 795-822. doi: 10.1111/j.1539-6975.2011.01413.x
- Kleffner, A. E., Lee, R. B., & McGannon, B. (2003). The Effect of Corporate Governance on the Use of Enterprise Risk Management: Evidence From Canada. *Risk Management and Insurance Review*, 6(1), 53-73.
- Klumpes, P. J. M., Wang, P., Tang, L., & Abhyankar, A. (2011). The impact of hedge accounting rules on enterprise risk management adoption practices by multinationals. Retrieved from papers.ssrn.com website:
- Kuhn, T. S. (1963). The function of dogma in scientific research. *Scientific change*, 347-369.
- Lam, J. (2001). The CRO Is Here To Stay! *Risk Management*.
- Lehner, O. M. (2012). Method flow Source Chart (pp. Process of thematic analysis and conceptualization).
- Liebenberg, A. P., & Hoyt, R. E. (2003). The Determinants of Enterprise Risk Management: Evidence From the Appointment of Chief Risk Officers. *Risk Management and Insurance Review*, 6(1), 37-52.
- Lin, Y., Wen, M.-M., & Yu, J. (2011). Enterprise Risk Management: Strategic Antecedents, Risk Integration and Performance. Retrieved from papers.ssrn.com website:
- Markowitz, H. (1952). Portfolio Selection. *The Journal of Finance*, 7(1), 77-91.
- Mazloomi, N., & Izadpanahi, S. (2010). *The Relationship between enterprise risk management and creating value in Iranian insurance companies*. Paper presented at the World Risk and Insurance Economic Congress, Singapor.
- McShane, M. K., Nair, A., & Rustambekov, E. (2011). Does Enterprise Risk Management Increase Firm Value? *Journal of Accounting, Auditing & Finance*, 26(4), 641-658. doi: 10.1177/0148558x11409160
- Meulbroek, L. K. (2002). A Senior Manager's Guide to Integrated Risk Management. *Journal of Applied Corporate Finance*, 14(4), 56-70.
- Miccolis, J., & Shah, S. (2000a). Enterprise Risk Management - An Analytical Approach: TILLINGHAST-TOWERS PERRIN MONOGRAPH.
- Miccolis, J., & Shah, S. (2000b). Risk Value Insights. Creating Value Through Enterprise Risk Management - A Practical Approach for the Insurance Industry: TILLINGHAST-TOWERS PERRIN MONOGRAPH.
- Modigliani, F., & Miller, M. H. (1958). The Cost of Capital, Corporation Finance and the Theory of Investment. *The American Economic Review*.
- Nocco, B. W., & Stulz, R. M. (2006). Enterprise Risk Management: Theory and Practice. *Journal of Applied Corporate Finance*, 18(4), 8-20.
- Corporate Governance Standards (2009).
- Paape, L., & Speklé, R. F. (2012). The Adoption and Design of Enterprise Risk Management Practices: An Empirical Study. *European Accounting Review*.
- Pagach, D., & Warr, R. (2007). An Empirical Investigation of the Characteristics of Firms Adopting Enterprise Risk Management: North Carolina State University, Enterprise Risk Management Initiative.
- Pagach, D., & Warr, R. (2010). The Effects of Enterprise Risk Management on Firm Performance. Retrieved from papers.ssrn.com website:
- Pagach, D., & Warr, R. (2011). The Characteristics of Firms That Hire Chief Risk Officers. *Journal of Risk and Insurance*, 78(1), 185-211. doi: 10.1111/j.1539-6975.2010.01378.x
- Rappaport, A. (1998). *Creating Shareholder Value: A Guide For Managers And Investors*. New York: The Free Press.
- Saeidi, P., Sofian, S., Rasid, S. Z. A., & Saeid, S. P. (2012). The Role of Chief Risk Officer in Adoption and Implementation of Enterprise Risk Management-A Literature Review. *International Research Journal of Finance and Economics*(88), 118-123.
- Seik, H. Y., Yu, J., & Li, J. (2011). Enterprise Risk Management in Financial Crisis. *The IUP Journal of Risk & Insurance*, 8(3), 7-21.
- Smithson, C., & Simkins, B. J. (2005). Does Risk Management Add Value? *Journal of Applied Corporate Finance*, 17(3), 8-17.
- Sarbanes Oxley Act, Public Law 107-204 (2002).
- Standard&Poor's. (2006). Enterprise Risk Management For Financial Institutions: Rating Criteria And Best Practices: Standard & Poor's.
- Stroh, P. (2005). Enterprise Risk Management at Unitedhealth Group. *Strategic Finance*.
- Stulz, R. M. (1996). Rethinking Risk Management. *Journal of Applied Corporate Finance*, 9(3).

- Tahir, I. M., & Razali, A. R. (2011). The Relationship between Enterprise Risk Management (ERM) and Firm Value: Evidence from Malaysian Public Listed Companies. *International Journal of Economics and Management Sciences*, 1(2), 32-41.
- Waweru, N., & Kisaka, E. S. (2011). The Effect of Enterprise Risk Management Implementation on the Value of Companies Listed in the Nairobi Stock Exchange. Retrieved from papers.ssrn.com website:
- Woon, L. F., Azizan, N. A., & Samad, F. A. (2011). A Strategic Framework for Value Enhancing Enterprise Risk Management. *Journal of Global Business and Economics*, 2(1), 23-47.

## MANAGING RISK IN FINANCIAL MARKET IN SHIPPING INDUSTRY

Dimas Mukhlas Widiatoro<sup>1</sup> and Vegard Elvenes<sup>2</sup>

<sup>1,2</sup> University I Agder, Department of Economics and Business Administration, Norway

***Abstract.** This paper examines how to manage risk in financial market in shipping industry by using option strategies instead of investing directly into shipping stocks. Freight rates play an important role in shipping industry, since they determine the income to the shipping companies, and thereby the company's share price. Based upon the residual earning model of equity valuation of Farstad Shipping, it appears that a 3 months straddle strategy and a cylinder strategy seems to be a better strategy than a 1 year straddle strategy, due to the volatility in the shipping industry.*

***Key words:** risk in shipping, freight rates, equity valuation, option strategies*

### Introduction

One year after crisis 2008, shipping industry still barely wakes up to refresh their self in gaining the profit. In business week 2009, Jung, Schulz, and Wagner wrote in their sub headline 'a brutal downturn in global trade has left shippers with idle capacity, billions in losses, and even facing potential bankruptcy'. This news for sure will not make any player in this industry to be happy. But why is shipping industry still promising as the investment area? Research from Drobetz (2010) found interesting phenomenon where actually the risk is not as big as other industry. He stated that that shipping market has lower beta compared with overall stock market (Drobetz, Schilling, & Tegtmeier, 2010) . This statement has opposite view from what is written from Stopford (2009) where in his book Stopford told that volatility of the shipping industry is very high where actually means that the beta should be bigger than overall stock in the financial market.

Stopford (2009) claimed that managing the shipping industry itself is volatile. The volatility in the shipping industry is driven by the freight rates, which is determined by the demand and supply in the shipping market (Stopford, 2009). Furthermore, the freight rates are the income for the shipping companies, i.e. they generate the revenue to shipping companies (Stopford, 2009), and thereby influence the stock price of the shipping companies. So if the freight a rate goes up then the stock price to the shipping companies also goes up and vice versa if the freight rates goes down.

Based on aforementioned, the freight rates in the shipping industry are extremely important for the price of the stock to a shipping company, since the freight rates determine the income to the shipping company. Moreover, investment in shipping stocks can be very difficult, since these stocks might vary a lot. This because the shipping industry is extremely volatile, where supply and demand of the freight rates determines the income to a shipping company, and thereby its stock price, which again affect the price of the option related to the shipping companies.

The shipping industry is embedded with risk(Ghiorghe & Ana-Maria, 2012, p. 25). Ghiorghe and Ana Maria (2010) also suggest that it is the fluctuation in the freight rates that

create the risk in the shipping industry. In order to understand the fluctuations of the freight rates one have to understand the economic mechanism. The freight rates are determined by the supply and demand

The freight rates are the earnings to a shipping company. This earning affects the value of the shipping company. Generally, if the freight rates are high, then the earning to the shipping company will also be high. Thus, the stock to the shipping company will be high. If the opposite happens, i.e. freight rates are low, and then the value of the shipping company will be low.

However the factor that determines the price of shipping stock in financial market is not always on freight rates. This phenomenon become more attractive since the shipping industry has allegation about inefficiency in this market. Inefficiency here means that there is possibility for some player to get own benefit based on imperfectness of the shipping market information. This idea brings this paper into the valuation of stock analysis.

By getting the deep analysis of one shipping financial stock analysis, this paper also suggest one of many ways in managing risk. Our recommendation here is the financial investor use option strategies to hedge against the risk in the shipping industry in financial markets.

In section 4 we will discuss a lot about the option strategy. Typically, an option valuation model is used to identify overvalued and undervalued observed (call) option premiums, which are sold or bought against a delta hedged position in the underlying asset (McKenzie, Thomsen, & Phelan, 2007, p. 511). A fundamental problem associated with efficiency test that it assumes some model of market equilibrium. In the other woes a the option valuation model is correctly specified and option market is efficient (McKenzie et al., 2007, p. 512). An alternative way to empirically test for options market efficiency is to use an event study type approach (McKenzie et al., 2007, p. 512). That's why when this paper does not have expert ability in predicting the 100% true model and the option market equilibrium also not 100% efficient, we tend to use case study. The existence of a trading strategy generating systematic profits, implemented around known (scheduled) events, would indicate a degree of market inefficiency by failing to take into account all relevant price sensitive information.

Straddle is a trading strategy that involves the simultaneous purchase of an equal number of put and call options with the same strike price (McKenzie et al., 2007). Some research already used this strategy to test market efficiency (McKenzie et al., 1997; Chen and Leung, 1994). The result assuming half tick transaction cost, suggest pricing inefficiencies because evidence is found of systematic profits from long straddle positions. However in this paper, straddle will be used as the case study material in understanding the volatility in the market and how to deal with it.

The remainder of the paper is organized as follows. Part 2 is a discussion of the freight rates in the supply market. In part 3 is a valuation model used in order to value the shares of Farstad Shipping. Part 4 is about option strategies. The last part, part 5 is the conclusion

## **Discussion of freight rates**

The freight market is determined by the interaction between demand for freight and supply of tonnage (vessels)(Stopford, 2009, p. 160). In the short term, the supply of tonnage is relatively fixed where a shipowner can adjust its supply of vessels through lay-up, speed and reactivation(Stopford, 2009, p. 163). In the long term the supply is more flexible, i.e. the shipowner can adjust its supply of ships by order or cancel orders of new vessels, and even change supply sources(Stopford, 2009, p. 163). Olivier Blanchard defines the short-run as *"year-to-year movements in output are primarily driven by movements in demand"*

(Blanchard, 2006, p. 34). And according to Stopford it typically takes 1 to 4 years to build a ship (Stopford, 2009, p. 157). Therefore will we define the short-run as within a year, and our main focus will be on the short-run. Furthermore we know that the demand consists of the World economy, seaborne commodity trade, average haul, random shocks and transport costs, while the supply side consists of the world fleet, fleet productivity, shipbuilding production, scrapping and losses, and freight revenue (Stopford, 2009, p. 136).

Stopford uses GNP (Stopford, 2009, p. 141), but Olivier Blanchard writes that there is a subtle difference between GDP and GNP (Blanchard, 2006, p. 22), and therefore we will use GDP as the indicator for the demand of and investment activity. The intuition is as following, when the income for an individual increase, then the individual will consume more. This increase in consumption leads to a higher GDP, where some of the consumption is directed towards domestic produced goods, and some demand is directed towards foreign produced goods. This means that as the world GDP gets higher, then there will be more traded goods, and therefore there will be more demand for freight (Blanchard, 2006, p. 399). DNB NOR data suggests a 3.6% change in the work economy by 2011i. However, we see that different countries have different growth rates in their GDP, which have an impact on the demand for freight. The GDP numbers that are most interesting for Farstad is the GDP for countries that are allocated near their geographic segments, such as the North Sea, Brazil and Indian Pacific. The countries which are allocated near the segment North Sea is the Netherlands, Norway, Denmark and the UK. In per cent change IMF has estimated that the GDP will be 1.511 for Denmark, 1.630 for the Netherlands, 1.677 for Norway and 1.137 for UK. In other words the activity in this area doesn't seem to be very big. From the same report the estimated GDP in per cent change seems to be 3.769 for Brazil, which is more promising for demand of the vessels Farstad is offering in their market segment. The last segment, Indian Ocean, stretches from Africa in east to Asia in west and north, and to Australia and Antarctica in south (THE WORLD FACTBOOK 1994, ELECTRONIC VERSION). Since the Indian Ocean consists of a lot of countries we choose to look at the GDP for Australia and Indonesia. This because there is a heavy traffic of oil and oil products from Indonesia, and that Western-Australia has large reserves of hydrocarbons outside their coast (THE WORLD FACTBOOK 1994, ELECTRONIC VERSION). The GDP for Australia looks to be 1.796 in per cent change for 2011, and 6.4 in per cent change for Indonesia in 2011ii. So in other words when we solely look at the GDP numbers it doesn't very good for the North Sea area, but the GDP numbers for Brazil and Indian Ocean looks more promising

Seaborne commodity trade consists of two parts, short-term and long-term (Stopford, 2009, p. 143). The long run is affected by changes in demand for a particular good (e.g. oil), changes in supply sources, changes in reallocation of processing plants and transport policy (Stopford, 2009, p. 144). Since our focus is the short-run, we will therefore focus on the factor seasonality. The reason is that seasonality affects the demand for freight in the short-run. And as Stopford writes, the seasonality is about cycles that last just a few months, and repeats itself every year (Stopford, 2009, p. 144). For instance, the demand for oil increases during fall and winter in the northern hemisphere, and decreases during spring and summer. This mechanism repeats itself every year, and has a substantial effect on the spot market, since the price of the product varies a lot (Stopford, 2009, p. 144). Average haul is defined as tonnage of cargo shipped multiplied with the average distance (Stopford, 2009, p. 146). For a company that is transporting iron-ore the average haul is more significant, than for a company that is in the offshore-supply vessel. This can be seen from the map from Statoil, where the distance from the Norwegian coast to the North Sea, where Ekofisk exists, is much smaller than the distance from Australia to Chinaiii, and due to the fact that the distance from Ekofisk to Stavanger is 250 kmiv, while the distance from Australia to China is around 7474 kmv.

And the vessels that operates in the offshore-service are AHTS and PSVs, where a PSV is defined as loading capacity of 2000 DWT, and AHTS is defined as engine power than 10 000 BHPvi. Vessels that carry oil and iron ore for instance have deadweight capacity from 30 000 to 200 000, and increases over time (Stopford, 2009, pp. xxi-xxiv). Therefore we assume that this variable does have not a very big effect in the market for offshore-service, and we choose to ignore it. Random shocks, on the other hand, have a significant effect on the demand for ships, and it consists of wars, commodity price changes, and economic shocks. Wars have generally a positive effect on the shipping industry. The intuition is as follow, when wars break out the demand for commodity increases, leading to higher freight rates, and the shippers will then get higher revenues (Stopford, 2009, pp. 147-148). When the war in Libya broke out February 15<sup>th</sup> 2011vii the oil price increased significantly when almost all of the oil production in Libya ceasedviii. And according to IEA, the world has lost 1.5 b/d millionix. Economic shocks are the most important factor, and are specific economic disturbances which are superimposed on business cycles, often with dramatic effect(Stopford, 2009, p. 148). A good example of this is the subprime crisis which struck in 2007x, and developed in to a financial crisis in 2008xi,xii. Whether it was a shock or something anticipated is debatable. According to Rune Skarstein the financial crisis, which occurred in 2008, was not unexpected, but expected, since the financial market is an unstable system (Skarstein 2008, p. 188-189). The consequence of this crisis would be at the same level as the crisis in 1987, and even as catastrophic as the Great Depression that started in October 1929 (Skarstein, 2008, p. 189). However, whether the crisis was expected or not it had a major impact, especially for the industrialized countries as the data from IMF showsxiii. The last variable on the demand side is transport cost. As Stopford writes, materials will only be transported from distant sources if the cost the shipping operation can be reduced to an acceptable level or some major benefit is obtained in quality of product (Stopford 2009, p. 149). For Farstad it is the service it provides to the oil companies which is important, i.e. how good the quality of their service is compared to the level of the cost they have. For Farstad it is the crew cost which constitutes the majority of the operating costsxiv.

The merchant fleet is the most important variable on the supply side, and is measured in deadweight ton (DWT) (Stopford 2009, s. 151). What decide the size of the fleet is scrapping and delivering of ships. The fewer ships that are scrapped the bigger the supply will be, and therefore DWT will be high. In addition, if more ships enter the market, then again the supply of ships will increase, DWT will be even higher, thus only a small proportion of vessels is scrapped each year (Stopford 2009, p. 151). As the annual report from Farstad shows, between 1998 to the beginning of 2011 the merchant fleet has increased by 397 %xv. This has been an increase in the fleet over 10 years. Therefore we regard this variable to be constant. The productivity of the fleet is measured in ton miles per deadweight, and relies on speed, port time, deadweight utilization and loaded days at sea (Stopford 2009, p. 155). In the segment for offshore-service we assume that it is deadweight utilization and port time at sea which are important. Since Farstad has a deadweight utilization of 82 % for the rest of 2011, we therefore assume that the total deadweight utilization for Farstad will be between 80-90 % for 2011xvi. Port time shows the physical performance of ships and it is related to number of loaded days at sea (Stopford 2009, p. 156). An increase in number days at sea will reduce the time off-hire or time in lay-up (Stopford 2009, p.156). And the higher the freight rates are, i.e. higher demand for freight, the fewer ships will be in lay-up/off hire (Stopford 2009, p. 161). The reason for this is that higher freight rates are so high that it covers the cost for the least efficient ship (Stopford 2009, p. 165-166). The third variable is the newbuilding market and this is a long-term cycle. The reason is that it takes time to build a ship, normally between 1-4 years, depending on how large the shipyards orders are. The shippers order ships based on the anticipation of the future. And there is a tendency that the shippers order ships when the



freight rates are high. When the freight rates are high the revenues are high, and the price on the second-hand ships are high. Therefore will the shippers turn to the newbuilding market, since the price in this market is relatively lower than the price for second-hand ships. As the annual report for 2010 shows, there were ordered totally 259 large and medium-sized supply vessels, and approximately 54 % (about 140 vessels) of them is going to be delivered in 2011<sup>xvii</sup>. Farstad also wrote that if all vessels were delivered, it would not be enough work for them, and therefore some of the planned delivered vessels have to be cancelled/delayed<sup>xviii</sup>. A shipowner may also scrap ships, and this scrapping also affect the supply of ships (Stopford 2009, p. 158), although very few ships are scrapped. The key decisions for scrapping vessels are age, technical obsolescence, the scrap price, current earnings and market expectations. Age is the most important one because as the vessels get older the repairs and maintenance increases. The effect is a combination of heavier costs and more time off hire. Technical obsolescence is related to the efficiency of the vessels, i.e. how well suited the vessels are for their missions. Another thing is that obsolescence also is related to gear and machinery, since vessels are always enhanced with new technical solutions, however, this is a long term-trend, so we chose to ignore this factor. The scrap price on the other hand is more important a lot, because vessels are sold to shipbreakers, and the shipbreakers sell the scrap to the steel industry. The scrap price varies a lot, because it depends of demand and supply in the steel industry, as well as the availability of scrap metal from other sources, such as the destruction of vehicles and other shipbreakers. But the most important factor for decision of scrapping is the shipowners anticipation of the future operating profitability of the vessels and the financial position for the firm. That is, if the shipowner believes in an increase or decrease in the freight rates in the future. The last variable is the freight revenue, which helps to adjust capacity in the short term, and to find ways to reduce costs and improve service in the long term. The intuition is as following; in the short run the shipowner decides whether to put vessels in lay-up or not. If the freight revenue is high, then the operating income is low and the shipowner has no incentive to put vessels in lay-up. If the opposite is the case, low freight rates, then the shipowner has an incentive to put vessels in lay-up, because of low income and little work for the ships. In the long run the decision for the shipowner is whether to scrap or invest. If the freight revenue is high (low) then the shipowner might order new ships (scrap old ships) as discussed above (Stopford 2009, p. 160). As of the 1st quarter of 2010 the freight revenue was NOK 730 530 000, while it was 801 015 000 in the 1st quarter 2011. This means that the freight revenue has increased with 9.6 %. In the second quarter of 2011 the freight income was NOK 880 443 000<sup>18</sup>, i.e. an increase of freight income of about 9.92 %.

Based on the discussion of how the freights are determined theoretically, and the empirical evidence we have, we believe that the freight rates will continue to increase in the future. Based on this we assume that the freight income to the firm will increase with about 10 % each quarter.

## Valuation of Farstad Stock

There are several models which can be used to value a firm. The models that can be used are the Dividend Discount Model (DDM), the Discounted Cash Flow Model (DCF), the Residual Earnings Model (REM), and the Abnormal Earnings Growth Model (AEG) (Penman, 2010). The valuation model we will use is the REM. The reason for this is the advantages of this model outweigh its disadvantages. First, it focuses on value drivers, which means it focuses on the profitability of investment and growth in investment (Penman 2010, p. 169). Second, it incorporates the value that is already recognized in the balance sheet,

meaning the book value is already incorporated, and that it forecasts the income statement rather than the cash flow statement (Penman 2010, p. 169). Furthermore, REM uses accrual accounting, and therefore recognize the value added, and treats investment as an investment rather than a loss of value (Penman 2010, p. 169). By using REM, the forecast horizon can be shorter than for DCF and more value is typically recognized in the immediate future (Penman 2010, p. 169). By using this immediate forecast we can then forecast the valuation of the firm up to the horizon, which gives a good indicator of profitability and growth for continuing value calculations (Penman 2010, p. 169). And the last advantage is that this forecast model protects from paying too much for growth (Penman 2010, p. 169).

However, there are two disadvantages by using this valuation model. The first one is that we have to understand how accrual accounting works (Penman 2010, p. 169). Second, is that the model relies on the accounting numbers, which can be suspect (Penman 2010, p. 169). Nevertheless, since there are more advantages than there are disadvantages, we will therefore use the REM model.

The residual earning can be expressed like this:

$$RE = Earn_t - (\rho_e - 1)B_{t-1}$$

Equation 1. Residual Earning Model, (Penman 2010, p. 153)

Where  $\rho_e = 1 + r$ , and  $r$  can be viewed as the return the shareholders require in percent. In our case we will view  $r$  as the depreciation rate, meaning the cost of capital. For Farstad the depreciation rate is at 10 %xix, i.e.  $r = 10 \% = 0.1$ . Penman defines  $Earn_t$  as comprehensive income in period  $t$  (Penman 2010, p. 153). In our analysis of Farstad Shipping Stocks we will use total operating income as  $Earn_t$  in period  $t$ . The reason for this is by using the definition as Penman uses the company value per share actually should be approximately NOK 7, when in fact the company's value per share per October 24<sup>th</sup> 2001 is at NOK 149xx. Another reason for us to use total operating income is due to the fact that Farstad operates mainly in three different geographic areas, namely Indian Pacific, Brazil and Northwest Europe. This makes it hard to evaluate the value of the company based solely on the activity in the North Sea. The activity in the North Sea constitutes approximately 19.73% of the total operating incomexxi, which means that the other sectors constitute approximately 80.27%. That is why we regard total operating income as  $Earn_t$ , and in 2<sup>nd</sup> quarter 2011 Earn for Farstad was at NOK 883 925 000. In the first quarter of 2011 the total operating income was at NOK 730 530 000xxii, i.e. the total operating income had increased with approximately 10.35 %. We assume the income will increase with the same percent for 2011 in the 3<sup>rd</sup> and 4<sup>th</sup> quarter. This means it will be at approximately NOK 975 411 238 in the 3<sup>rd</sup> quarter of 2011 and approximately NOK 1 076 366 301 in the 4<sup>th</sup> quarter of 2011.

$B_{t-1}$  is the book value in last period. Here we will use total equity as the book value, and  $t-1$  is the period before. In the first quarter of 2011 the total equity was at 6 700 710 000, and in the second quarter it was at 6 660 785 000. This states that the total equity had declined by approximately 0.6 %. We regard the percentage change in the total equity to be so small that it will be viewed as a constant. In other words, we will use the total equity from the first quarter as the book value for all of the quarters in 2011.

But residual earning can also be expressed in the following way:

$$RE = [ROCE_t - (\rho_e - 1)]B_{t-1}$$

Equation 2. Another Form of Retained Earning, (Penman 2010, p. 156)

We have that  $ROCE_t = (Earn_t / B_{t-1})$ . From this equation, we see that the residual income consists of two elements, namely the return on common equity (ROCE) which is expressed in dollars instead of percentages, and the book value of equity investment. These two components are called residual earnings drivers. The reason for this is as following, if  $ROCE > r$  then the value of the firm will increase over the book value. Thus, the value of the firm will increase more with growth in the book value, at a given level of ROCE, when  $ROCE > r$ . So in this case we should sell at a premium. So if the  $ROCE < r$ , then the opposite happens, and we should sell at discount (Penman 2010, p. 156). At the appendix we have calculated ROCE based on our assumption of the book value and the earnings. As we can see from the appendix the ROCE is at 14.08 %, 14.56 %, and 16.06 % in respectively 2<sup>nd</sup>, 3<sup>rd</sup>, and 4<sup>th</sup> quarter 2011. This shows that ROCE is larger than the depreciation rate, which gives an incentive to buy the stock today and sell it at the end of December. And the residual earnings for the 2<sup>nd</sup>, 3<sup>rd</sup>, and 4<sup>th</sup> quarter is respectively NOK 5.48, NOK 7.83 and NOK 10.41. In other words there will be added value for the next two quarters, since the residual earnings are positive.

But we need to find what the value of Farstad Shipping will be in the future. Since it is reasonable to assume that Farstad Shipping is a going concern, then the value of common equity can be expressed in three different cases:

$$V_0E = B_0 + \left(\frac{RE_1}{\rho_e}\right) + \left(\frac{RE_1}{\rho_e^2}\right) + \dots + \left(\frac{RE_1}{\rho_e^T}\right) = B_0 + \sum \left(\frac{RE}{\rho_e^T}\right) \dots (1)$$

$$V_0E = B_0 + \left(\frac{RE_1}{\rho_e}\right) + \left(\frac{RE_1}{\rho_e^2}\right) + \dots + \left(\frac{RE_1}{\rho_e^T}\right) + \left(\frac{\left(\frac{RE_T}{\rho_e^T - 1}\right)}{\rho_e^T}\right) = B_0 + \sum \left(\frac{RE}{\rho_e^T}\right) + \left(\frac{\left(\frac{RE_T}{\rho_e^T - 1}\right)}{\rho_e^T}\right) \dots (2)$$

$$V_0E = B_0 + \left(\frac{RE_1}{\rho_e}\right) + \left(\frac{RE_1}{\rho_e^2}\right) + \dots + \left(\frac{RE_1}{\rho_e^T}\right) + \left(\frac{\left(\frac{RE_T}{\rho_e^T - g}\right)}{\rho_e^T}\right) = B_0 + \sum \left(\frac{RE}{\rho_e^T}\right) + \left(\frac{\left(\frac{RE_T}{\rho_e^T - g}\right)}{\rho_e^T}\right) \dots (3)$$

Equation 3. Value of Common Equity in Three Different Cases

As we can see in each case the value of the equity of a firm,  $V_0^E$ , depends on the book value in current period,  $B_0$ , plus the residual earnings for each period  $RE_T$ , divided on 1 plus the cost of capital in each period,  $\rho_e^T$ .

The second case includes the continuing value (CV) with no growth, which is the expression  $(RE_T / \rho_e^T - 1) / \rho_e^T$ . This means that the RE will grow as perpetuity.

In the third case 1 plus the growth rate,  $g$ , is included in the continuing valuation. The reason for including the continuing valuation is to determine the current premium that is needed to calculate a premium in the future. In other words we are trying to calculate the horizon premium by including the continuing value, in order to determine what kind of option strategy we should choose. However, the problem is that the long-term growth rate is hard to predict, and therefore we should not pay too much attention to growth (Penman 2010, p. 163-164). Therefore, and on the basis from discussion of the freight revenue in the previous section, we assume that the growth rate will be equal to zero. This means we will value the firm by using the second valuation case as stated above. In the appendix the value per share is calculated to be approximately NOK 255.88. This means that the actual value per share should be higher than NOK 151, as is the case of 17.10.2011.

The target price is book value in period  $t$  plus the continuing value in the same period, expressed like this:

$$V_t^E = B_t + CV_t$$

Equation 4. Target Price of Company, (Penman 2010, p. 164)

In the pro-forma table in the appendix we have shown that the book value per share is NOK 171.81 in the 4<sup>th</sup> quarter of 2011, and the continuing value in the same period is NOK 85.3. This means that the target price 4<sup>th</sup> quarter of 2011 should be NOK 257.3. So since the stock price at October 24<sup>th</sup> 2011 is at NOK 149 a person should buy the stock today, and sell it at the end of December.

However, since the freight revenue varies a lot, and therefore the volatility of Farstad's earnings are quite high, so instead of investing directly in the stocks, it might be better to hedge by using different option strategies. The use of different options strategies is discussed in the section, where we first will discuss the theory, and thereafter the empiric.

## Options Strategy

### *Options, the meaning and definition*

Options come from the concept of hedging. Brigham and Houston (2004) define hedging as the method of the investor in locking the value of the asset in the future in some specific number in order to maintain the uncertainty risk. Moreover, Black and Scholes (1973) define options as a security giving the right to buy or sell an asset, it also means as a subject to certain conditions, within a specified period of time. Moreover, Black and Scholes divided the Options into two types. First is an American option, which is one that can be exercised at any time up to the date the options expires. The second one is a European option, which is one that can be exercised only on a specified future date. Madura and Fox (2011) describe the way an option works is by providing the right but not the obligation to purchase and sell an underlying asset in specified prices. Mostly options are used in Currency Market and Stock Market.

There are several things that we should know about options. First is exercise price or striking price, the price that is paid for the asset when the option is exercised. Second is expiration date or maturity date which means the last day on which the option may be exercised.

Options have been used since 1982; exchanges in Amsterdam, Montreal and Philadelphia first allowed trading in standardized foreign currency options. Mostly options are used in Exchange. In United States, options exchanges are regulated by The Securities and Exchange commissions. In the market, brokers are the main hub between customer and seller who want to buy options. Brokers will ask that the margin will be maintained during the life of the contract. For the options which have deteriorated positions, the margin will be much higher. The reason is the broker needs protections if the clients do not fulfil their obligation. Madura and Fox (2011) told in September 2000 the exchanges in Amsterdam, Brussels, and Paris merged to form Euronext N.V, A Dutch holding company. All developing structures in the market have made Options more visible to public.

### *Options technique*

There are several techniques in using option. The two main types in this hedging technique are call and put options. Madura and Fox (2011) define call option as the security that grants the right to buy specific currency/stock at a designated price within a specific period of time.

On the other hand, put options grant the right to the buyer to sell specific currency/stock at designated price within a specific period of time.  
Madura and Fox (2011) give an explanation about Options

Stock Exchange Pounds / Dollar for call options for 50000 Dollar – European Style Model

Spot : £0.67:\$1

Current Date : November

Strike price value of \$1 in pounds	Premiums £s per \$1	
	December	January
£0.60	£0.076	£0.085
£0.65	£0.040	£0.052
£0.70	£0.017	£0.029

Table 1. Options Strategy Calculation

- A January call options at a strike price of £0.65 would incur a cost £0.052x50000 = £2600 known as the contract premium
- The buyer of the January call option at a strike price of £0.65 will collect £0.01 x 50000 = £500 for every penny (£0.01) the spot rate of the dollar is above £0.65 at the designed date in January.
- If the spot rate is below £0.65 in January, the option will not be exercised and will be allowed end will be allowed to lapse, the premium will have been forfeited by the purchaser of the call option.
- European options can only be exercised at the exercise date – an American option any time up to the exercise date.

*Factors affecting currency call options premium*

$$C = f(S-X, T, \sigma)$$

Equation 5. Currency Call Option Premium (Madura et. all, 2011)

Where :

S-X = the difference between the spot exchange rate (S) and the strike or exercise price

T = the time to maturity

$\sigma$  = the volatility of the currency, as measured by the standard deviation of the movements in the currency.

The relations with shipping in each factor

- Level of existing spot price relative to strike price

The higher the performance of shipping company which represent by the increase in the ship stock price relative to strike price, the more likely to payout. Where the spot of ship stock

company is above the strike, the option contract is going to enable the holder to buy the stock at below the current price.

- Length of time before the expiration date

Madura and Fox (2011) describe that people generally expecting that the spot rate has greater chance of rising above the strike price if I has longer period of time to do so. In the example above the premium of January is higher than December.

- Potential variability of shipping stock

In the shipping industry the cyclicality between the bull and bear season are quite volatile, align with the price of the stock. In the concept of options, the greater variability of stock changes, the higher probability that the sport rate will above the strike price. It means more volatile spot have higher call option price.

### Several types of options combinations

#### Conditional Currency Options

Conditional Currency Option is the way of doing option hedge with conditional premium. The price of premium will be adjusted with the fluctuation of the real spot price. The objective of conditional currency option is to compete with futures which do not have premium. The intention behind this method is to get a higher premium than a basic option when the condition is favorable and there will be no premium when the condition happens on the opposite side. This idea makes people consider that conditional currency option is an option on an option.

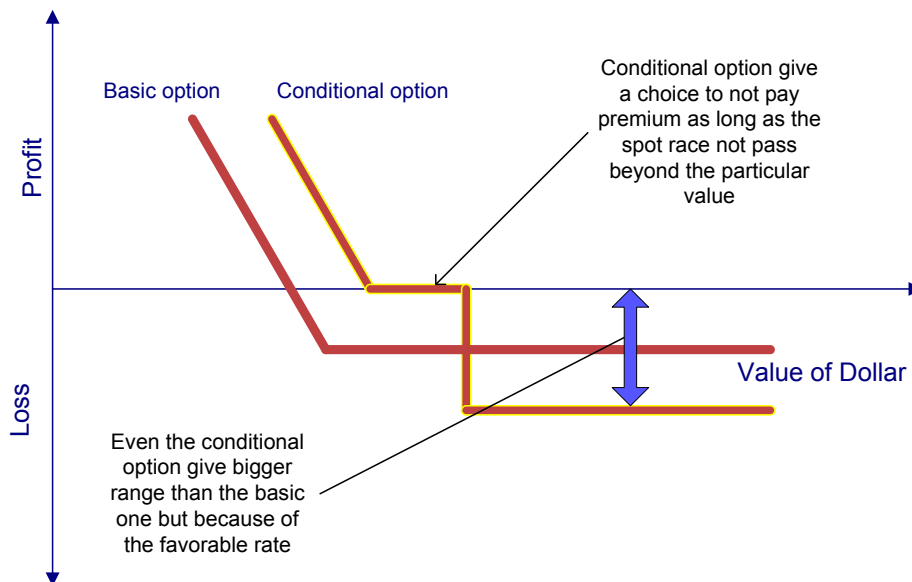


Figure 1. Conditional Currency Options

#### Cylinder Options

Based on Madura (2010), a cylinder option is a kind of option which uses currency range as the base of an agreement. The role is quite simple; the agreement is between bank and Farstad Shipping. If the price of the currency goes above the limit, the bank will compensate Farstad

Shipping, but in return if the price goes below the lower limit, the Farstad Shipping will have to buy at the lower limit price and the bank will gain by the difference between the lower limit price at which the bank sell the currency to Farstad Shipping and the even lower market price.

Even the option does not have premium and cost any money, but the bank will get the profit if the currency lower the limit. A similar argument can be made out for the income in foreign currency. Increases above the upper limit would be collected by the bank (the Farstad Shipping writes a call to the bank); but if the value of the foreign currency fell below a lower limit, the bank would compensate Farstad Shipping for the difference (Farstad Shipping hold put option funded by the bank).

The guaranteed limit to sell currency also can be one of the alternatives in using cylinder option. Suppose Farstad Shipping wanted to sell dollars that they earn in UK British pound. The dollar was offered an upper limit at 0,8 pounds, in return the bank will guarantee a lower limit to the value of the dollar of 0,70 pound. Farstad Shipping would in effect purchase a put at the lower limit to benefit from falls below 0,7 pound and sell or write a call at the higher limit where the bank would now benefit from being able to buy dollar from the Farstad Shipping at the top limit of 0,8 if the market rates even higher.

The table of the explanation is in the appendix 2

### *Straddle*

Madura and Fox (2011) describe straddle as the bet on the standard deviation or variability of the currency/spot. Straddle concept are constructed from both call option and put options. The investor should buy both to which have same expire date and strike price. The concepts come from the expectation from each option character, such as call option will become profitable if the foreign currency appreciates, and put option will become profitable if the foreign currency depreciates, a long straddle will become profitable when the underlying asset either appreciates or depreciates.

The example will portray the way of straddle working,

Put and call options are available for dollars with the following information

Call option premium on dollar = £0.03 per unit

Put option premium on dollar = £0.02 per unit

Strike price = £0.60

One option contract represents \$50000

To construct long straddle the buyer purchase both dollar call and put option, paying £0.03+£0.02=£0.05 per unit. If the value at expiration dates above £0.6, the call option is in the money, but the put option is out of the money. On the other hand if the value is under £0.6, the put option is in the money, but the call option is out of the money.

Value of dollar at option expiration	£0.5	£0.55	£0.6	£0.65	£0.7
Profit (loss) from purchasing a call	-£0.03	-£0.03	-£0.03	+£0.02	+£0.07
Profit (loss) from purchasing a put	£0.08	£0.03	-£0.02	-£0.02	-£0.02
Net	£0.05	£0.00	-£0.05	£0.00	£0.05

Table 2. Straddle Calculation

The description based on the graph of straddle

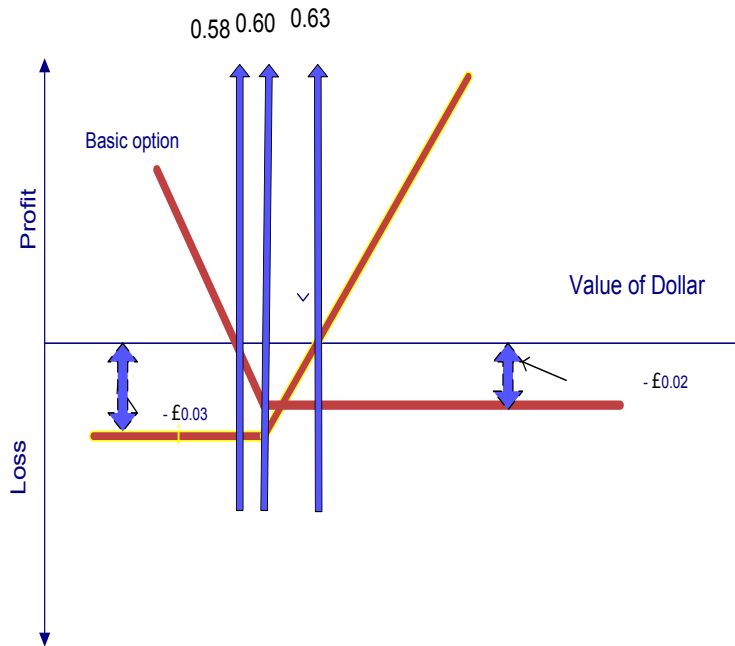


Figure 2. Description of Straddle Strategy

*Options Valuation*

Black–Scholes (1973) formulate the calculation of the price of European put and call options in two different types. First is the calculation of the stock that does not shares their dividend, and second is the stock which does dividend retaining.

First is the calculation of the option call price which does not share the dividend:

$$C(S, t) = N(d_1) S - N(d_2) K e^{-r(T-t)}$$

$$d_1 = \frac{\ln(\frac{S}{K}) + (r + \frac{\sigma^2}{2})(T - t)}{\sigma \sqrt{T - t}}$$

$$d_2 = \frac{\ln(\frac{S}{K}) + (r - \frac{\sigma^2}{2})(T - t)}{\sigma \sqrt{T - t}}$$

$$d_2 = d_1 - \sigma \sqrt{T - t}.$$

Equation 6. Option Call Price for the Company who does not share Dividend

Where

C = call option price

On the condition



$$\begin{aligned}
P(S, t) &= Ke^{-r(T-t)} - S + C(S, t) \\
&= N(-d_2) Ke^{-r(T-t)} - N(-d_1) S .
\end{aligned}$$

Equation 7. The Price Of A Corresponding Put Option Based On Put-Call Parity

For both, as above:

- $N(\cdot)$  is the cumulative distribution function of the standard normal distribution
- $T - t$  is the time to maturity
- $S$  is the spot price of the underlying asset
- $K$  is the strike price
- $r$  is the risk free rate (annual rate, expressed in terms of continuous compounding)
- $\sigma$  is the volatility of returns of the underlying asset

The calculation from The Data

$S$  = stock price = NOK 255.88

$X$  = strike price = year 1 = NOK 260.9976  
 $X$  = strike price = 3 months = NOK 255.88

$T$  = years of maturity = 1 year

$R$  = risk free rate = inflation + risk premium = 2.5% + 1.5% = 4%

$V_{3\text{months}}$  = average volatility in 3 months volatility from EPS4-1 = 23, 25, 28 =  $((25-23)/23 + (28-25)/25)/2 = 0.10347826 = 10.35\%$

$V_{1\text{year}}$  = average volatility in 1 year =  $28-23/23 = 21\%$

Strike price one year from now = price of equity x discount factor one year ahead

The price of stock for three months and one year ahead are in appendix 3.

### *Implementation of option strategies*

For year one we see from appendix 4 that use of a straddle will not be profitable, since the net profit will be negative. The reason is that the time period is quite long, and therefore the volatility will be quite high. This means that the company that sells the option requires a high price on premium. Also from appendix 4, we see that the only time where we will not have any profit is when the stock price is equal to the forecasted stock price. This is due to the fact that we sell the stock at the same price as we buy it for. In reality we make a loss when the stock price is equal to the forecasted stock price (which is at NOK 260.9976), because we have to pay the premium.

But instead of buying options we as investors can use cylinder, i.e. we agree with our counterpart to buy the stock at an agreed price, and hope that the stock will be worth more than the agreed price. The drawback is if the stock price in the future will be lower than the agreed price of the stock. For example, if we agree with our counterpart for a price of Farstad Shipping's shares equal to the target price, then we hope that the actual value will be higher than the forecasted target price. The reason for this is when the share price is lower than the expected we then will suffer a loss. However, we don't have to pay any premium by using a cylinder. This means that if the actual share price of Farstad Shipping is equal to the target

price of NOK 257, we will break even. Therefore, it may be wise to use both the cylinder strategy, and straddle strategy for 3 months. We prevented an option strategy for 1 year, since the risk is too high.

## Conclusion

As we see from our study of the freight market, there are a lot of things that affect the freight rates. This makes the shipping business very volatile. When we tried to estimate the value of Farstad Shipping, we saw that the freight revenue plays an important role. In section 4 of this paper we discussed how the use of different option strategies using a 3 months straddle implantation would be a better idea than using a 1 year straddle implementation. We also indicated that it may be wise to use a cylinder strategy. This proves that the knowledge of shipping economics in the financial market is a benefit for investors in order to avoid risk.

## Appendix

### Appendix 1:

	Year: 2011			
	1 <sup>st</sup> quarter	2 <sup>nd</sup> quarter	3 <sup>rd</sup> quarter	4 <sup>th</sup> quarter
Earnings per share (EPS)		22.66	25.01	27.60
Book value per share (BPS)	171.81	171.81	171.81	171.81
Return on common equity (ROCE)		14.08 %	14.56 %	16.06 %
Residual Earnings (RE)		5.48	7.83	10.41
Discount rate		1.1	1.21	1.331
Present value of residual earning (PV of RE)		4.98	6.47	8.53
Total present value (Total PV)	19.98			
Continuing value without growth (CV)				19.98
Present value of continuing value without growth (PV of CV)	64.09			
Value of equity per share ( $V_0^E$ )	255.88			

*Appendix 2:*

Column Number	1	2	3	4	5
Value of US dollar at settlement to pay	-£0.65	-£0.70	-£0.75	-£0.80	-£0.85
Farstad Shipping profit (loss) from purchasing a call on dollars	Not exercised	Not exercised	Not exercised	Not exercised	+£0.05
Farstad Shipping profit (loss) from selling a put on dollars	-£0.05	Not exercised	Not exercised	Not exercised	Not exercised
Net rate for the US dollars for Farstad Shipping	-£0.65	-£0.70	-£0.75	-£0.80	-£0.80

*Appendix 3:*

	for 1 year	for 3 months
<b>S</b>	<b>255,88</b>	<b>255,88</b>
<b>X</b>	<b>260,9976</b>	<b>257,1594</b>
<b>T</b>	<b>1</b>	<b>0,25</b>
<b>r</b>	<b>2,00%</b>	<b>0,50%</b>
<b>v</b>	<b>21,0%</b>	<b>10,0%</b>
<b>d1</b>	<b>0,1059</b>	<b>-0,0498</b>
<b>d2</b>	<b>-0,1041</b>	<b>-0,0998</b>
<b>call value</b>	<b>21,4209</b>	<b>4,6483</b>
<b>put value</b>	<b>21,3704</b>	<b>5,6064</b>

*Appendix 4:*

Value of Farstad stock at option expiration	235	250	260,9976	280	295
Profit (loss) from purchasing a call	-21,4209	-21,4209	-21,4209	-2,4185	12,5815
Profit (loss) from purchasing a put	4,6272	-10,3728	-21,3704	-21,3704	-21,3704
Net	-16,7938	-31,7938	-42,7914	-23,7890	-8,7890

## For 3 Months

Value of Farstad stock at option expiration	235	250	260,9976	280	295
Profit (loss) from purchasing a call	-4,6483	-4,6483	-4,6483	14,3541	29,3541
Profit (loss) from purchasing a put	20,3912	5,3912	-5,6064	-5,6064	-5,6064
Net	15,7429	0,7429	-10,2547	8,7477	23,7477

**References***Books*

- Black, Fischer.; and Scholes, Myron., (1973)*The Pricing of Options and Corporate Liabilities* Journal of Political Economy, Vol. 81, No. 3 (May - Jun., 1973), pp. 637-654
- Blanchard, O. (2006). *Macroeconomics 4th edition*. United States: Pearson Education.
- Drobetz, W., Schilling, D., & Tegtmeier, L. (2010). Common risk factors in the returns of shipping stocks. [Article]. *Maritime Policy & Management*, 37(2), 93-120. doi: 10.1080/03088830903533726
- Ghiorghe, B., & Ana-Maria, B. (2012). CONSIDERATIONS ON THE FINANCIAL RISKS IN THE SHIPPING INDUSTRY. [Article]. *Analele Universitatii Maritime Constanta*, 25-28.
- McKenzie, A., Thomsen, M., & Phelan, J. (2007). How do you straddle hogs and pigs? Ask the Greeks! [Article]. *Applied Financial Economics*, 17(7), 511-520. doi: 10.1080/09603100500428230
- Stopford, M. (2009). *Maritime Economics* (Vol. Third Edition). Newyork, USA: Routledge.
- Brigham and Young (2004), *Basic Financial Management*, Prentice Hall, United States
- Madura, Jeff., and Fox, Roland., (2007), *International Financial Management*, Thomson Learning, London (UK) ISBN 978-1-84480-360-6
- McDonald, Robert L, (2006),, *Derivatives Markets*, Second edition Pearson Education Addison Wesley, ISBN : 0-321-31149-3 345678910-HT-09 08 07 06
- Penman, Stephen H., (2010), *Financial Statement Analysis and Security Valuation 4th edition*, McGraw Hill, United States, ISBN : 978-007-126780-9
- Skarstein, Rune., (2008), *Økonomi på en annen Måte, Makt og penger fra europeisk føydalisme til globalisert kapitalisme*, Abstrakt forlag AS, ISBN : 978-82-7935-231-0
- Stopford, M. (2009). *Maritime Economics* (Vol. Third Edition). Newyork, USA: Routledge.

*Articles*

- Drobetz, W., Schilling, D., & Tegtmeier, L. (2010). Common risk factors in the returns of shipping stocks. [Article]. *Maritime Policy & Management*, 37(2), 93-120. doi: 10.1080/03088830903533726
- McKenzie, A., Thomsen, M., & Phelan, J. (2007). How do you straddle hogs and pigs? Ask the Greeks! [Article]. *Applied Financial Economics*, 17(7), 511-520. doi: 10.1080/09603100500428230

### Internet Link

- <http://www.statoil.com/AnnualReport2010/en/OurOperations/BusinessAreas/EPNorway/Pages/IntroductionToEPNorway.aspx>
- <http://www.solakonferansen.no/Skaar.pdf>
- <http://www.distancefromto.net/distance-from/China/to/Australia>
- <http://project.vbook.no/Farstad-Annual-2010-EN#b42>
- <https://www.dnbnor.no/portalfont/nedlast/no/markets/analyser-rapporter/engelske/economic-outlook/EO110824.pdf?popup=true>
- <http://www.dn.no/forsiden/borsMarked/article1153667.ece>
- <http://www.dn.no/forsiden/utenriks/article1503440.ece>
- <http://www.dn.no/forsiden/utenriks/article1503884.ece>
- [http://www.imf.org/external/pubs/ft/weo/2011/02/weodata/weorept.aspx?sy=2006&ey=2011&scsm=1&ssd=1&sort=country&ds=.&br=1&c=193%2C223%2C138%2C142%2C924%2C128%2C536%2C112%2C111&s=NGDP\\_RPCH%2CTXGO%2CTMGO&grp=0&a=&pr.x=37&pr.y=6](http://www.imf.org/external/pubs/ft/weo/2011/02/weodata/weorept.aspx?sy=2006&ey=2011&scsm=1&ssd=1&sort=country&ds=.&br=1&c=193%2C223%2C138%2C142%2C924%2C128%2C536%2C112%2C111&s=NGDP_RPCH%2CTXGO%2CTMGO&grp=0&a=&pr.x=37&pr.y=6)
- <http://project.vbook.no/Farstad-Annual-2010-EN#b74>
- <http://project.vbook.no/Farstad-Annual-2010-EN#b42>
- <http://project.vbook.no/Farstad-2Q-2011-EN#b10>
- <http://project.vbook.no/Farstad-Annual-2010-EN#b44>
- <http://project.vbook.no/Farstad-Annual-2010-EN#b44>
- <http://project.vbook.no/Farstad-1Q-2011-EN#b6>
- <http://project.vbook.no/Farstad-2Q-2011-EN#b10>
- <http://project.vbook.no/Farstad-Annual-2010-EN#b98>
- <http://project.vbook.no/Farstad-2Q-2011-EN#b13>
- <http://project.vbook.no/Farstad-1Q-2011-EN#b7>
- <http://www.oslobors.no/Oslo-Boers/Notering/Energi-shipping-og-sjoemat/Energi/Alle-noterte-selskaper-i-OSLO-Energy-Index>
- <https://www.dnbnor.no/portalfont/nedlast/no/markets/analyser-rapporter/engelske/economic-outlook/EO110824.pdf?popup=true>
- [http://seawifs.gsfc.nasa.gov/OCEAN\\_PLANET/HTML/oceanography\\_geography\\_Indian.html](http://seawifs.gsfc.nasa.gov/OCEAN_PLANET/HTML/oceanography_geography_Indian.html)

### Endnote

- 
- i <https://www.dnbnor.no/portalfont/nedlast/no/markets/analyser-rapporter/engelske/economic-outlook/EO110824.pdf?popup=true>
- ii [www.imf.org](http://www.imf.org)
- iii <http://www.statoil.com/AnnualReport2010/en/OurOperations/BusinessAreas/EPNorway/Pages/IntroductionToEPNorway.aspx>
- iv <http://www.solakonferansen.no/Skaar.pdf>
- v <http://www.distancefromto.net/distance-from/China/to/Australia>
- vi <http://project.vbook.no/Farstad-Annual-2010-EN#b42>
- vii (<http://www.nrk.no>)
- viii (<https://www.dnbnor.no>, economic outlook august 2011, p. 27)
- ix <https://www.dnbnor.no/portalfont/nedlast/no/markets/analyser-rapporter/engelske/economic-outlook/EO110824.pdf?popup=true>
- x <http://www.dn.no/forsiden/borsMarked/article1153667.ece>
- xi <http://www.dn.no/forsiden/utenriks/article1503440.ece>
- xii <http://www.dn.no/forsiden/utenriks/article1503884.ece>
- xiii <http://www.imf.org/external/pubs/ft/weo/2011/02/weodata/weorept.aspx?sy=2006&ey=2011&scsm=1>

- &ssd=1&sort=country&ds=.&br=1&c=193%2C223%2C138%2C142%2C924%2C128%2C536%2C112%2C111&s=NGDP\_RPCH%2CTXGO%2CTMGO&grp=0&a=&pr.x=37&pr.y=6
- xiv <http://project.vbook.no/Farstad-Annual-2010-EN#b74>
- xv <http://project.vbook.no/Farstad-Annual-2010-EN#b42>
- xvi <http://project.vbook.no/Farstad-2Q-2011-EN#b10>
- xvii <http://project.vbook.no/Farstad-Annual-2010-EN#b44>
- xviii <http://project.vbook.no/Farstad-Annual-2010-EN#b44>
- xix <http://project.vbook.no/Farstad-Annual-2010-EN#b98>
- xx <http://www.oslobors.no/Oslo-Boers/Notering/Energi-shipping-og-sjoemat/Energi/Alle-noterte-selskaper-i-OSLO-Energy-Index>
- xxi <http://project.vbook.no/Farstad-2Q-2011-EN#b13>
- xxii <http://project.vbook.no/Farstad-1Q-2011-EN#b7>

## FIRM'S FINANCING CONSTRAINTS AND INVESTMENT-CASH FLOW SENSITIVITY: EVIDENCE FROM COUNTRY LEGAL INSTITUTIONS

Ahmed Marhfor<sup>1</sup>, Bouchra M'Zali<sup>2</sup> and Jean-Claude Cosset<sup>3</sup>

<sup>1</sup> Department of administrative studies, University of Quebec in Abitibi-Témiscamingue

<sup>2</sup> Department of Finance, ESG/UQÀM Montréal

<sup>3</sup> HEC Montréal

***Abstract.** In this paper, we investigate whether high investment-cash flow sensitivity can be interpreted as evidence that firms are facing binding financing constraints. Using institutional features and an intuitive measure of stock price informativeness to distinguish between most constrained and least constrained firms, we document that firms that are supposed to be more financially constrained exhibit greater investment-cash flow sensitivity. Our findings support the results of Fazzari et al. (1988) who also find that investment spending of firms with high levels of financial constraints is more sensitive to the availability of cash flow.*

***Keywords:** Investment decisions, stock price informativeness, investment-cash flow sensitivity, financing constraints*

*JEL Classifications: E22; G31; G3*

### Introduction

Under the perfect and complete capital markets assumptions, Modigliani and Miller (1958) argue that firm's investment decisions are independent from the financing sources. However, many studies appeal to problems in capital markets, especially asymmetric information, to suggest that financial structure is relevant to investment decisions. For example, Myers and Majluf (1984), Greenwald et al. (1984), and Myers (1984) provide strong support of the fact that external funds are not a perfect substitute for internal capital. As a result, the cost of external finance may differ substantially from internal capital. According to this view, investment expenditures may depend on financial factors such as the availability of internal capital (Fazzari et al. 1988); and firms are considered as financially constrained when the wedge between internal and external cost of capital increases.

Considerable research relies on the association between investment and internal capital to test for the presence and importance of firm's financing constraints. However, from the existing literature, it's not clear whether greater investment-cash flow sensitivity can be interpreted as evidence that firms are facing more or less financing constraints. For instance, Fazzari et al. (1988) argue that such sensitivity increases with the degree of firm's financing constraints. On the other hand, Kaplan and Zingales (1997) disagree with Fazzari et al. (1988) interpretation.

According to Kaplan and Zingales (1997), firms with stronger financial positions exhibit high investment-cash flow sensitivity in comparison to firms with weaker financial positions.

This work represents an attempt to solve the financing constraints hypothesis controversy. It's motivated by the fact that many authors (e.g. Moyen, 2004 and Cleary et al. 2007) consider that the source of such controversy lies in the disagreement in identifying appropriate factors to distinguish between financially constrained and unconstrained firms. We argue that the traditional classification scheme based on firm-level data (dividend payout, size, leverage, etc.) is not without drawbacks. First, firm-level financial variables can be regarded as endogenous and time-variant (firms identified now as facing binding financial constraints can change their financial status in the future). Second, tests based on firm-level data do not provide a direct evidence that it's asymmetric information that explains the cost differential between internal and external capital. Therefore, we propose new empirical approaches to examine the investment-cash flow sensitivity controversy. In our tests, we use more exogenous factors and account for varying degrees of information asymmetry.

We make several contributions to the literature. First, our classification scheme attempts to overcome the problem of endogeneity of the standard classification approach. In fact, we choose to sort firms into financially constrained and unconstrained according to country-level data related to legal environment. We claim that such factors are less endogenous (our classification is based on measures less correlated with firm's internal funds) and more stable over time. In addition, we use country-level variables because there is a growing literature supporting the fact that national capital markets impact firms' cost of capital, despite increasing markets integration. Stulz (2009) considers that firms can raise funds at lower cost in their country and not elsewhere if their capital market performs better than capital markets of other countries. According to Stulz (2009), a major reason why national capital markets remain an important factor for optimal resource allocation and investment decisions is that they have different securities laws. We argue that equity valuation and cost of external capital should differ across countries because securities laws impact production decisions, the cost of trading and information acquisition costs. Indeed, the findings of many papers in the literature suggest that strong securities regulation helps diminish firms' cost of capital and relax financing constraints (Hail and Leuz, 2006; and Qian and Strahan, 2007). Given the significant body of research recognizing the importance of legal institutions in shaping the financial sector, we base our first firms' classification methodology on legal origin (common law versus civil law countries). In 2006, Laporta et al. find significant differences in capital markets development based on legal origin. According to them, common law countries have more developed stock markets compared to civil law countries because common law systems focus on market discipline and private litigation. Furthermore, legal systems with common law origin offer better protection to investors (Laporta et al. 2006). In the same vein, Aggarwal et al. (2008) show that firms from common law countries are more likely to adopt governance practices that restrict the discretion of insiders. Therefore, in our tests, we consider common law firms as facing lower financing constrained and civil law firms as more constrained. Our second measure of legal environment is the anti-director rights index from Djankov et al. (2008) that proxies the level of minority investors' protection. We propose to partition our sample into two subsamples based on anti-director rights scores. Firms from countries with scores above the sample median are considered as financially unconstrained because stronger investors' protection laws are linked to better functioning capital markets. For instance, Morck et al. (2000) find that capital allocation efficiency is positively correlated to the level of investors' protection. Similarly, Laporta et al. (2002) show that strong investors' protection laws reduce the ability of firm's insiders to expropriate outsiders, and thus enhance



investors' confidence in firms managers. In this paper, we stress the importance of such bonding mechanism in relaxing firms' financing constraints. Therefore, if countries can be ranked by the strength of their legal system, firms originating from countries where minority investors are better protected should face lower binding financial constraints. It's worth mentioning that our classification methodology assumes that firms' cost of capital is set in centralized capital markets and is not dependant on firms' particular characteristics. To overcome this limitation, we propose, for robustness, to sort firms based on both firm-level and institutional characteristics. To our knowledge, our research is the first study that uses country legal institutions to distinguish between financially constrained and unconstrained firms.

Second, we focus on asymmetric information issues by using an intuitive and direct measure of stock price informativeness. We consider that greater stock price informativeness is related to more information about future earnings being reflected in current stock prices. To measure this relation, we regress current returns against both current and future earnings, in accord with a growing literature (Collins et al. 1994; Gelb and Zarowin, 2002; Lundholm and Myers, 2002; and Durnev et al. 2003). Theoretically, more informative stock prices should reflect more information about future earnings (firm fundamentals). This reasoning leads us to choose future earnings response coefficients as our proxy of the severity of a firm's information problems. We argue that firms with stock prices reflecting more information about future earnings should face less asymmetric information problems. Hence, we consider these firms as unconstrained because many theoretical and empirical studies imply a cost premium for external capital based on asymmetric information (Myers and Majluf, 1984; Barry and Brown, 1985; and Merton, 1987). Should we find negative associations between our proxy of price informativeness and investment-cash flow sensitivity, we can infer that transparent firms (with more informative stock prices and less financial constraints) exhibit lower investment-cash flow sensitivity. Despite its common sense appeal, our approach has yet to appear in the literature.

Finally, we test and validate our hypotheses using a large sample of firms originating from 44 countries (developed and emerging countries) over the period 1995-2007. Sampling stops in 2007 instead of 2010 because some of our variables require three years of data beyond any sampling year. It is worth mentioning that most studies in the literature provide either US evidence or limited international evidence. For instance, Kadapakkam et al. (1998) study is based on firms originating from six developed countries and Cleary (2006) provides evidence for seven developed countries.

Our results suggest that investment decisions of companies originating from countries that provide strong legal protection to minority investors are less sensitive to the availability of cash flow. Further, transparent companies exhibit lower investment-cash flow sensitivity in comparison to opaque companies. Finally, additional analysis shows negative associations between our proxy of stock price informativeness and investment cash-flow sensitivity. Our large sample evidence supports the results of Fazzari et al. (1988) who also find that investment spending of firms that are less financially constrained is less sensitive to internal funds.

The remainder of the paper is organized as follows. Section 2 reviews the existing literature. In section 3, we develop our empirical model and outline the construction of some of our variables. In section 4, we present the main results including robustness' tests results. Section 5 concludes.

## Previous Research Work

In the literature, the investment-cash flow sensitivity has been extensively used as a measure of firm's financial constraints. This sensitivity is measured by regressing investment on cash flow, controlling for investment opportunities. According to Fazzari et al. (1988), firm's internal cash flow may impact investment because of a financing hierarchy (Pecking Order Theory) in which internal capital have a cost advantage over external capital. Following this argument, a value maximizing firm will issue new debt or shares only after it exhausts internal capital (Fazzari et al. 1988). In fact, more financially constrained firms will increase investment when they have enough cash flow to do so. Therefore, we should expect high investment-cash flow sensitivity for constrained firms. In contrast, unconstrained firms have the possibility to increase their investment expenditures even when they do not have enough cash flow because the cost differential between internal and external capital is small. Hence, unconstrained firms should exhibit low investment-cash flow sensitivity. A related argument is that the premium on external capital is also linked to the collateral represented by the net worth of the firm. Gilchrist and Himmelberg (1995) argue that an increase in cash flow signals an increase in firm's net worth. Hence, as net worth rises, the cost of external capital should decrease, and investment spending should respond more to cash-flow innovation. On the other hand, in periods when cash-flows are low, the cost of capital is high, and firms invest less (Gilchrist and Himmelberg, 1995).

A large number of empirical studies have provided strong support for the financing hierarchy hypothesis. The standard approach of this research is to categorize firms according to a variety of firm-level financial variables (dividend payout, size, Leverage, etc.) before measuring the investment-cash flow sensitivity. The main results of these papers suggest that investment is more sensitive to cash flow for firms with high levels of financial constraints. For instance, Fazzari et al. (1988) consider firms with high dividend payout ratios as unconstrained and firms with low ratios as financially constrained. They show that investment is less sensitive to internal funds for firms with high dividend payout ratios. Other papers sort companies according to firm size and age. Smaller and young firms are considered to be more financially constrained because they face high information asymmetry problems. In 1992, Oliner and Rudebusch use proxies of information asymmetry based on firm age, exchange listing and firm's patterns of insider trading. Their results show greater investment-cash flow sensitivity for stocks traded over-the-counter, firms that tend to be young, and that exhibit patterns of insider trading behaviour. Scaller (1993) shows that investment decisions of young firms are more influenced by internal funds in comparison to mature firms. In addition, Scaller findings suggest that firms with unspecialized assets, which can serve as collateral, have lower investment-cash flow sensitivity. As for Gilchrist and Himmelberg (1995), they show that investment spending of firms with limited access to public debt markets appear to be highly sensitive to fluctuations in cash flow. On the other hand, other contributions challenge the conclusions summarized above. In 1997, Kaplan and Zingales have reached opposite conclusions suggesting that corporate investment is less sensitive to fluctuations in cash flow for financially constrained firms. In addition, Kadapakkam et al. (1998) provide international evidence supporting Kaplan and Zingales (1997) results. They find that investment-cash flow sensitivity is higher for large firms and lower for small firms. In 1999, Cleary shows that corporate investment is more sensitive to cash flow for firms with high credit worthiness. In addition, Cleary (2006) uses an international data set to further examine the investment-cash flow controversy. His results suggest that companies with stronger financial

positions are more investment-cash flow sensitive than companies with weaker financial positions.

As for us, we fashion our own way to provide a valuable setting that clarifies the role of cash flow in investment equations. In fact, we propose to sort firms according to various institutional factors rather than firm-level factors.

## Empirical Methodology

The major focus of our methodology is to compare investment-cash flow sensitivity across two different groups of firms (constrained versus unconstrained firms). Our first contribution to the literature consists of differentiating companies according to a variety of country-level variables related to legal environment. The second contribution is to examine the relation between our cash flow coefficients and an intuitive measure of stock price informativeness.

We conjecture that a country's legal system can affect firm's financing constraints for many reasons. For instance, Stulz (2009) considers that securities laws remain an important determinant for equity valuation because strong national regulations help reduce agency costs. In addition, we argue that legal institutions are also tied to firms' disclosure quality. In countries where disclosure laws are more extensive and more strictly enforced, we should expect firms to provide high levels of disclosure. The latter should reduce information asymmetries between market participants and ultimately lower firms' cost of capital (Diamond and Verrecchia, 1991; Leuz and Verrecchia, 2000; and Verrecchia, 2001). A related argument is that increased levels of disclosure broaden firm's investors' base because investors are more confident that stock transactions occur at "fair" prices (Bailey et al. 2006). As a consequence, risk is more widely shared, which should reduce firm's cost of capital (Merton, 1987). The literature also suggests that the enhanced transparency linked to stricter disclosure rules and potential legal exposure may influence negatively cost of capital through cash flow effects. In fact, the threat of shareholder litigation makes it harder and more costly for firm's insiders to expropriate outside shareholders. Such bonding (Coffee, 1999 and Stulz, 1999) should increase investors' expectation about future cash-flows and improve firm's ability to raise capital. Finally, legal institutions may also impact corruption. We argue that lower corruption engenders lower risks for investors because it makes firms' creditors and shareholders better able to monitor potential violations in financial contracts.

The estimation of investment-cash flow sensitivity across our two different groups (constrained and unconstrained firms) is based on the following equation:

(1)

$$(I / K)_{i,t} = \beta_0 + \beta_1(CF / K)_{i,t} + \beta_2(M / B)_{i,t} + \beta_3(Size)_{i,t} + \varepsilon_{i,t}$$

Where  $I_{i,t}$  represents investment in plant and equipment for firm  $i$  during period  $t$ ;  $K$  denotes the beginning-of-period value of total assets;  $CF$  is the sum of income before extraordinary items and depreciation net of cash dividends (for robustness, we also measure  $CF$  as : net income + depreciation and/or amortization + changes in deferred taxes);  $M/B$  denotes the market to book ratio, and  $Size$  denotes the natural logarithm of firm size. The market to book ratio is a proxy for investment opportunities and growth, while size variable controls for potential market imperfections related to firm size. Our main interest in equation (1) centers on  $\beta_1$ . This coefficient represents the investment-cash flow sensitivity (cash flow coefficient). If our results suggest that

corporate investment is less sensitive to internal funds for companies originating from countries with strong securities laws; we will conclude that unconstrained firms' exhibit lower investment-cash flow sensitivity. Such results will be consistent with Fazzari et al. (1988) findings.

To further examine the impact of firm's financing constraints on the investment-cash flow sensitivity, we also propose to sort our sample according to an intuitive measure of stock price informativeness before comparing the investment-cash flow sensitivity across our two different groups. We consider firms with more informative stock prices as unconstrained because high stock price informativeness can lower the information risk borne by investors, and in turn, reduce firm's cost of capital. Further, informative stock prices should help providers of external capital to better assess firm's investment opportunities. Following this argument, firms with informative stock prices should exhibit low costs of capital because such costs are function of the estimation risk (Barry and Brown, 1985). The proxy of stock price informativeness we propose is based on Collins et al. (1994). It measures how much current stock prices contain information about future earnings (informative prices should reflect more information about future earnings). Therefore, in this research, we regress current returns against both current and future earnings to estimate price informativeness:

$$R_t = \beta_0 + \beta_1 uce_t + \sum_{j=1}^{\infty} \beta_{2j} \Delta E_t(fe_{t+j}) + \varepsilon_t \quad (2)$$

Where

$R_t$  current stock return (period  $t$ )

$uce_t$  unexpected current earnings (period  $t$ )

$\Delta E_t(fe_{t+j})$  change in expectations about future earnings

$\varepsilon_t$  error term

The explanatory variables in regression (2) being unobservable, similar proxies are used in the literature. For instance, Lundholm and Myers (2002), and Durnev et al. (2003) use earnings at periods ( $t$ ) and ( $t-1$ ) to proxy for the unexpected current earnings in period  $t$ . Lundholm and Myers (2002) consider that including past year earnings ( $e_{t-1}$ ) in equation (2) allows the regression to dictate the best representation of the prior expectation for current earnings. According to Lundholm and Myers (2002): "if earnings are treated by the market as a random walk process, then the coefficient on  $e_{t-1}$  and  $e_t$  are of similar magnitude but opposite signs. In contrast, if the coefficient on  $e_{t-1}$  is approximately zero then earnings are treated as a white noise process".

Furthermore, to proxy for the changes in the expected future earnings, we follow the standard practice in the literature and use the realized future earnings ( $e_{t+j}$ ) and future returns ( $R_{t+j}$ ) as proxies. Note that Beaver et al. (1980) and Warfield and Wild (1992) proxy for  $\Delta E_t(fe_{t+j})$  by using only realized future earnings. However, Collins et al. (1994) recommend including future stock returns as an additional control variable because the omission of this variable introduces an error in variables (realized future earnings have expected and unexpected

components). In order to control for the unexpected component, an instrument (future returns) is needed that correlates with the measurement error but not with the dependent variable. The underlying intuition being that an unexpected shock to future earnings ( $t+j$ ) should have an impact on future returns ( $R_{t+j}$ ).

Hence, the regression we estimate to proxy for stock price informativeness goes as follows:

$$R_t = b_0 + b_1 e_{t-1} + b_2 e_t + \sum_{j=1}^3 (b_{3j} e_{t+j} + b_{4j} R_{t+j}) + \varepsilon_t \quad (3)$$

We use only three years of future earnings ( $e_{t+1}$ ,  $e_{t+2}$  and  $e_{t+3}$ ) and corresponding returns ( $R_{t+1}$ ,  $R_{t+2}$  and  $R_{t+3}$ ) because prior research has shown that amounts further out in time add little explanatory power (Collins et al. 1994). The aggregated coefficients on the future earnings (Sum of  $b_{3j}$ ) measure the association between current return and realized future earnings. The more current return,  $R_t$ , contains information about future earnings, the higher the coefficients are expected to be. It is worth mentioning that when we measure the Pearson correlations between current earnings, future earnings and future returns, multicollinearity is not an issue in equation (3). We also use the variance inflation factor and find no evidence of multicollinearity.

$R_t$  are the buy-and-hold returns for the 12 months period starting at the fiscal-year-end<sup>1</sup>. Earnings  $e_t$  equates with income before interest, taxes, depreciation and amortization (EBITDA), recorded at the end of fiscal year ( $t$ ) divided by the initial market value of equity recorded at ( $t-1$ ). Durnev et al. (2003) argue that depreciation and amortization are quite sensitive to differences in discretionary accounting rules. Therefore, knowing that such differences in accounting practices are country-or industry-specific, the advantage of relying on EBITDA is increasing with trans-industry and transnational sampling. Furthermore, the country or the industry fixed effects in our regressions models are likely to pick up any potential differences in accounting rules (see, Hail and Leuz, 2006, 2009 for a discussion).

In our tests, we consider the sum of the coefficients on future earnings as the variable that measures stock price informativeness:

$$PI = \sum_{j=1}^3 b_{3j} \quad (4)$$

This variable cumulates the sensitivities of current prices to future earnings. Thus, transparent firms should have higher measures of PI because informative stock prices contain more information about future earnings. We obtain the estimates of PI for either a firm or a group of firms on an industry level. For the firm-by-firm approach, we pool many years of data for each firm (from 1995 to 2007) to estimate its PI based on equation (4). Then, we calculate the PI sample median. We consider firms with PI estimates above the sample median as unconstrained because such firms face low asymmetric information problems.

On the other hand, pooling years of data to calculate PI for each firm may be problematic for two main reasons. First, we use few observations for our estimation purpose (maximum 13 observations for each firm). The result could be unreliable measures for PI. Second, as stressed

---

<sup>1</sup> The fiscal-year-end adjusted share price, plus the adjusted dividends, all divided by the adjusted price at the end of the previous fiscal year ( $t-1$ ). The adjustment factor reflects stocks splits that occurred during the fiscal year.

by Durnev et al. (2003), changes in macroeconomic environment, industry conditions, accounting rules and financial regulations can cause intertemporal changes in our future earnings coefficients. To avoid these limitations, we follow Durnev et al. (2003) and use a cross-section of similar firms (industry level approach). This approach requires pooling firms in two-digit SIC industries before running regression (3). Hence, to investigate whether greater stock price informativeness is linked to higher or lower investment-cash flow sensitivity, based on our industry-level method, we run the following regression:

$$CFC_{i,t} = \alpha_0 + \alpha_1 PI_{i,t} + \alpha_2 (controls)_{i,t} + \varepsilon_{i,t} \quad (5)$$

Note that in equation (5), *i* indexes two-digit SIC industries and *t* indexes years (in equation 1, *i* indexes firms and *t* indexes years). The two-digit SIC industry approach consists of pooling firms in a two-digit code industry before calculating the corresponding variables. Therefore, in equation (5), we regress our industry cash flow coefficients on industry price informativeness estimates and industry average estimates of our control variables (leverage and lagged values of cash). Adding leverage in equation (5) allows us to consider the riskiness of debt. We argue that it's important to control for potential differences in CFC between high and low leverage firms because higher degrees of leverage are associated with risky debt (binding financing constraints). Leverage is the ratio of long term debt to total assets. In addition, lagged values of cash may have explanatory power for firm's financing constraints because some firms tend to accumulate and use liquidity as a buffer against these constraints (Cleary and Booth, 2008). Cash is cash and marketable securities. Finally, to control further for differences among industries in equation (5), we use a one-digit industry-fixed effects model (we do not use two-digit industry dummies to conserve degrees of freedom). If  $\alpha_1$  is negative and significant, we can infer that firms with more informative stock prices (unconstrained firms) exhibit lower investment-cash flow coefficients.

## Empirical Results

We compile our country-level data and firms characteristics from a variety of sources. A description of country-level data is given in Appendix A. Common law or civil law describes the legal origin system and anti-director rights scores are obtained from Djankov et al. (2008). In this paper, we use international data from 44 countries over the 1995-2007 period. Information on firm-level data is drawn from Datastream and Worldscope. To be consistent with prior research, commercial banks, insurance companies, diversified financial services and brokerage houses were deleted from the sample. In addition, to avoid drawing spurious inferences from extreme values, regression results are robust to outliers (observations are winsorised at 1%).

*Primary results*

Table 1 presents the primary empirical results of equation (1) for constrained and unconstrained firms. The equations were estimated with fixed country, industry and year effects (for robustness, we also estimate our regressions using fixed firm and year effects)<sup>2</sup>. Further, in all specifications, standard errors are adjusted for heteroskedasticity and clustering at the firm level.

Independent variables	Legal origin approach		Investors' protection approach		Price informativeness approach	
	Common law firms	Civil law firms	Firms with high scores	Firms with low scores	Firms with high PI	Firms with low PI
Intercept	-0.045 <b>(0.001)</b> ***	-1.183 (0.221)	-0.753 (0.225)	0.017 (0.983)	-1.633 <b>(0.001)</b> ***	0.392 (0.552)
Cash flow	0.452 <b>(0.001)</b> ***	0.713 <b>(0.001)</b> ***	0.591 <b>(0.001)</b> ***	0.810 <b>(0.001)</b> ***	0.654 <b>(0.001)</b> ***	0.747 <b>(0.001)</b> ***
Market-to-Book	-0.000 (0.567)	-0.000 (0.839)	-0.000 (0.965)	-0.000 (0.936)	-0.003 (0.611)	0.000 (0.957)
Size	0.004 <b>(0.001)</b> ***	0.140 <b>(0.001)</b> ***	0.054 <b>(0.004)</b> ***	0.054 <b>(0.004)</b> ***	0.171 <b>(0.001)</b> ***	0.092 (0.690)
Country dummies	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes

<sup>2</sup> Introducing fixed firm effects estimation should mitigate concerns about correlated omitted variables and selection bias based on unobservable time-invariant firm characteristics. Further, fixed time effects are included to capture aggregate business-cycle influences. Firm fixed effects estimates are obtained by demeaning the observations with respect to the firm average for each variable. Year dummies are included in our analysis. Our conclusions are not affected when we estimate our regressions based on fixed firm and year effects instead of fixed country, industry and year effects.

Independent variables	Legal origin approach		Investors' protection approach		Price informativeness approach	
	Common law firms	Civil law firms	Firms with high scores	Firms with low scores	Firms with high PI	Firms with low PI
R <sup>2</sup>	0.063	0.076	0.069	0.082	0.070	0.079
N	40 370	66 460	50 268	56 562	62 447	44 383

Table 1: The impact of firm's financing constraints on investment-cash flow sensitivity: Primary results

Where  $i$  indexes firms and  $t$  indexes years. In our first approach, we classify firms according to legal origin before estimating investment cash-flow sensitivity. In the second approach, we sort firms based on scores of the anti-director rights index. Finally, in the third approach, we classify firms according to an intuitive measure of stock price informativeness before estimating investment cash-flow sensitivity. Financial firms were deleted from our sample. Country, industry and year dummies are included but not reported. P-values for two-tailed tests are in parentheses. One, two or three asterisks denote significance at the 10, 5 and 1% levels, respectively.

Our findings suggest that the coefficients for cash flow are all positive and significant, which is consistent with the existence of a financial hierarchy. More important, the cash flow coefficient is greater for civil law firms (0.713) in comparison to common law firms (0.452). We also perform tests for the difference between our two regressions coefficients and find that this difference (0.713-0.452) is significant at 1% level. Table 1 also reports results for the groups formed according to investors' protection scores. As suggested earlier, we assume that firms with high scores (above the median) face lower binding financing constraints. We find that such companies' exhibit low investment-cash flow sensitivity (0.591) compared to companies with scores below the median (0.810). We also computed the statistical difference between the two coefficients and find that it's significant at 1% level. So far, our evidence suggests that financially constrained firms are more investment-cash flow sensitive than unconstrained firms. Our third measure of financial constraints is based on stock price informativeness. In Table 1, we consider firms with PI coefficients above the median sample as unconstrained (transparent firms), and firms with PI coefficients below the median as constrained (opaque firms). PI is estimated using a firm-by-firm approach. The latter is conducted by pooling many years of data for each firm to estimate its PI. Then, the median we use to distinguish between our two firms' classes is calculated as the median across all firms. Again, our findings (PI approach in Table 1) show large estimated cash flow coefficients for constrained firms (opaque firms with low PI). Further, the difference in estimated coefficients (0.747 – 0.654) across the two classes remains statistically significant at very high confidence levels.

We now turn to investigate the relation between our proxy of stock price informativeness and the cash flow coefficients according to equation (5). In this regression, PI is estimated using two digit code cross-industry approach.



Independent variables		
	Coefficient	p-value
Intercept	0.505	0.001***
Price informativeness	-0.204	0.056*
Leverage	0.104	0.343
Lagged cash	0.070	0.056*
Industry dummies	Yes	
Year dummies	Yes	
R <sup>2</sup>	0.063	
N	266	

Table 2: Stock price informativeness and cash flow coefficients

Where  $i$  indexes two-digit SIC industries and  $t$  indexes years. The two-digit SIC industry approach consists of pooling all firms in a two-digit code industry and calculate the corresponding variables. Industry and year dummy variables are included but not reported. One, two or three asterisks denote significance at the 10, 5 and 1% levels, respectively.

Table 2 shows that the PI coefficient is negative (-0.204) and significant (at 10% level), suggesting that greater stock price informativeness is linked to lower cash flow coefficients. This additional result provides further support for the fact that unconstrained firms are less cash flow sensitive, which is consistent with Fazzari et al. (1988) findings.

#### *Robustness checks*

In this section, we conduct extensive robustness tests to validate our primary findings. First, we run pooled regressions (unconstrained and constrained firms together) and use a dummy variable to distinguish between the two groups. Second, we drop firms with US exchange cross-listings from our sample because relaxation of firm's financial constraints can be an important outcome

of the US cross-listing decision (Errunza and Miller, 2000; Lins et al. 2005; and Hail and Leuz, 2009). This additional test will allow us to isolate the effect of companies that cross-list on US exchanges in order to improve their corporate governance practices and overcome their weak domestic markets laws. Finally, we propose to classify firms according to both firm-level and institutional features, before estimating investment-cash flow sensitivity.

**Joint analysis:** Instead of classifying firms into two groups, we conduct a joint analysis by using the entire data set in one regression and adding a dummy variable to distinguish between unconstrained and constrained firms. The following model is used:

$$(I / K)_{i,t} = \beta_0 + \beta_1(CF / K)_{i,t} + \beta_2(M / B)_{i,t} + \beta_3(Size)_{i,t} + \theta_0 D_{i,t} + \theta_1 D_{i,t} \times (CF / K)_{i,t} + \varepsilon_{i,t} \quad (6)$$

Where  $D_{i,t}$  is a dummy variable that takes the value 1 if the firm is unconstrained and 0 otherwise. In fact, we will estimate three different models based on equation (6). In the first model,  $D_{i,t}$  is equal to 1 for common law firms and 0 otherwise. In the second model,  $D_{i,t}$  takes the value of 1 for firms with high investors' protection scores and 0 otherwise. Finally, in the third model,  $D_{i,t}$  takes the value of 1 for firms with greater stock price informativeness and 0 otherwise. The interaction term  $D_{i,t} \times (CF/K)_{i,t}$  proxies for the interaction effect between being an unconstrained firm and the cash flow coefficient. Given that  $\beta_1$  represents the cash flow coefficient for constrained firms, the cash flow coefficient for unconstrained firms becomes  $\beta_1 + \theta_1$ . If  $\theta_1$  is negative and significant, investment decisions of unconstrained firms can be considered as less liquidity sensitive. On the other hand, if  $\theta_1$  is positive and significant, we can infer that unconstrained firms are more investment-cash flow sensitive. The findings (not tabulated) show that unconstrained firms exhibit lower investment cash flow sensitivity ( $\theta_1$  is negative and significant in all models).

In additional checks, we also calculate our estimates of CFC (cross-industry method) without using Market-to-Book and size as controls variables in equation (1). Instead, we propose to add these variables in equation (5). We confirm again our primary results suggesting the presence of a negative and significant (10% level) association between our proxy of price informativeness and cash flow coefficients.

**Additional Robustness checks:** In other tests, firms with US exchange cross-listings are dropped from our sample before estimating equation (1). In fact, if cross-listing in the US alleviates firm's financing constraints as stressed in many papers in the literature (Errunza and Miller, 2000; Lins et al. 2005; and Hail and Leuz, 2009), it's possible that any differences in the estimated cash flow coefficients may be driven by US cross-listed firms. On the other hand, it's worth mentioning that we find US cross-listed companies across all firms' classes (constrained and unconstrained companies). This additional test yields similar results (not tabulated) to those found in our primary analysis. Finally, we propose to sort firms based on both firm-level and institutional characteristics before estimating the cash flow sensitivity. In this case, firms are categorized, first, according to the level of investors' protection and, second, based on their dividend payout ratios (dividends/EBIT). For instance, we will choose among a group of firms with high investors' protection scores only those with high dividend payout ratios. This subsample will be considered as facing lower financing constraints. On the other hand, firms with lower investors' protection scores and low dividend payout ratios are considered as financially constrained. Model (1) and (2) in Table 3 report results of estimations based on our combined classification scheme. Consistent with Fazzari et al. (1988), we find that investment-cash flow coefficient is greatest for constrained firms (1.181) while unconstrained firms' exhibit a lower cash flow coefficient (0.344).

Independent variables	Institutional and firm-level classification	
	Model (1) Unconstrained firms	Model (2) Constrained firms
Intercept	-1.729 <b>(0.025)**</b>	0.046 (0.980)
Cash flow	0.344 <b>(0.001)***</b>	1.181 <b>(0.001)***</b>
Market-to-Book	-0.081 (0.153)	-0.000 (0.916)
Size	1.146 <b>(0.001)***</b>	0.005 (0.724)
Country dummies	Yes	Yes
Industry dummies	Yes	Yes
Year dummies	Yes	Yes
R <sup>2</sup>	0.165	0.096
N	2835	4376

Table 3: The impact of firm's financing constraints on investment-cash flow sensitivity: Combination of country-level and firm-level data for firms' classification

Where  $i$  indexes firms and  $t$  indexes years. In table 3, we classify firms according to both firm-level and institutional characteristics. Firms with high investors' protection scores and dividend payout ratios are considered as financially unconstrained. On the other hand, firms with lower investors' protection scores and low dividend payout ratios are

considered as financially constrained. Financial firms were deleted from our sample. Country, industry and year dummies are included but not reported. P-values for two-tailed tests are in parentheses. One, two or three asterisks denote significance at the 10, 5 and 1% levels, respectively.

## Conclusion

In this paper, the investment-cash flow sensitivity controversy is examined using a sample of 44 countries. Investment decisions of constrained firms are shown to be highly sensitive to the availability of internal funds. This large sample evidence is based on a different sorting approach that classifies firms according to a variety of country-level variables instead of firm-level variables. We argue that relying on institutional features for firms' classification will mitigate some concerns about the potential endogeneity of firm-level classification methodology. In addition, we also propose an intuitive measure of stock price informativeness and examine its relation with the investment-cash flow coefficients. Our findings support the results of Fazzari et al. (1988) who argue that higher investment-cash flow sensitivity can be interpreted as evidence that firms are more financially constrained.

## References

- Aggarwal, R., Erel, I., Stulz, R., & Williamson, R. (2008). Differences in governance practices between US and foreign firms: measurement, causes, and consequences. *Review of Financial Studies* 22, 3131-3169
- Bailey, W., Karolyi, A., & Salva, C. (2006). The economic consequences of increased disclosure: evidence from international cross-listings. *Journal of Financial Economics* 81, 175-213.
- Barry, C., & Brown, S. (1985). Differential information and security market equilibrium. *Journal of Financial and Quantitative Analysis* 20, 407-422
- Beaver, W., Lambert, R., & Morse, D. (1980). The information content of security prices. *Journal of Accounting and Economics* 2, 3-28.
- Cleary, S. (1999). The relationship between firm investment and financial status. *Journal of Finance* 54, 673-692.
- Cleary, S. (2006). International corporate investment and the relationships between financial constraint measures. *Journal of Banking and Finance* 30, 1559-1580.
- Cleary, S., & Booth, L. (2008). Cash flow volatility, financial slack and investment decisions. *China Finance Review* 2, 63-68
- Cleary, S., Povel, P., & Raith, M. (2007). The U-shaped investment curve: theory and evidence. *Journal of Financial and Quantitative Analysis* 42, 1-39
- Coffee, J. C. (1999). The future as history: the prospects for global convergence in corporate governance and its implication. *Northwestern University Law Review* 93, 641-707.
- Collins, D. W., & Khotari, S.P. (1989). An analysis of intertemporal and cross-sectional determinants of earnings response coefficients. *Journal of Accounting and Economics* 11, 143-181.
- Diamond, D., & Verrecchia, R. (1991). Disclosure, liquidity, and the cost of capital. *Journal of Finance* 56, 1325-1360.
- Djankov, S., La Porta, R., Lopez-de-Silanes, F., & Shleifer, A. (2008). The law and economics of self-dealing. *Journal of Financial Economics* 88, 430-165.
- Durnev, A., Morck, R., Yeung, B., & Zarowin, P. (2003). Does greater firm-specific return variation mean more or less informed stock pricing? *Journal of Accounting Research* 41, 797-836.
- Errunza, V., & Miller, D. (2000). Market segmentation and the cost of capital in international equity markets. *Journal of Financial and Quantitative Analysis* 35, 577-600.
- Fazzari, S., Hubbard R.G., & Petersen B. (1988). Financing constraints and corporate investment, *Brookings papers on Economic Activity* 19, 141-195
- Freeman, R. (1987). The association between accounting earnings and security returns for large and small firms. *Journal of Accounting and Economics* 9, 195-228.

- Gelb, D., & Zarowin, P. (2002). Corporate disclosure policy and the informativeness of stock prices. *Review of Accounting Studies* 7, 33-52.
- Gilchrist, S., & Himmelberg, C. (1995). Evidence for the role of cash flow in investment, *Journal of Monetary Economics* 36, 541-572.
- Greenwald, B., Stiglitz, J., & Weiss, A. (1984). Information imperfections and macroeconomic fluctuations. *American Economic Review* 74, 194-199.
- Hail, L., & Leuz, C. (2006). International differences in the cost of equity capital: do legal institutions and securities regulation matter? *Journal of Accounting Research* 44, 485-531.
- Hail, L., & Leuz, C. (2009). Cost of capital effects and changes in growth expectations around U.S cross-listings. *Journal of Financial Economics* 93, 428-454.
- Kadapakkam, P.R., Kumar, P.C., & Riddick, L.A. (1998). The impact of cash flow and firm size on investment: the international evidence, *Journal of Banking and Finance* 22, 293-320.
- Kaplan, S.N., & Zingales, L. (1997). Do financing constraints explain why investment is correlated with cash flow? *Quarterly Journal of Economics* 112, 169-215.
- La Porta, R., Lopez-de-Silanes, F., & Shleifer, A. (2006). What works in securities laws? *Journal of Finance* 61, 1-32
- La Porta, R., Lopez-de-Silanes, F., Shleifer, A., & Vishny, R. (2002). Investor protection and corporate valuation. *Journal of Finance* 57, 1147-1170.
- Leuz, C., & Verrecchia, R. (2000). The economic consequences of increased disclosure. *Journal of Accounting Research* 38, 91-124.
- Lins, K.V., Strickland, D., & Zenner, M. (2005). Do non-U.S. firms issue equity on U.S stock exchanges to relax capital constraints? *Journal of Financial and Quantitative Analysis* 40, 109-133.
- Lundholm, R., & Myers, L.A. (2002). Bringing the future forward: The effect of disclosure on the returns-earnings relation. *Journal of Accounting Research* 40, 809-839.
- Merton, R. (1987). A simple model of capital market equilibrium with incomplete information. *Journal of Finance* 42, 483-510
- Modigliani, F., & Miller, M.H.(1958). The cost of capital, corporation finance, and the theory of investment, *American Economic Review* 48, 261-297.
- Morck, R., Yeung, B., & Yu, W. (2000). The information content of stock markets: why do emerging markets have synchronous stock price movements? *Journal of Financial Economics* 58, 215-260.
- Moyen, N. (2004). Investment-cash flow sensitivities: constrained versus unconstrained firms. *Journal of Finance* 59, 2061-2092
- Myers, S.C. (1984). The capital structure puzzle, *Journal of Finance* 39, 575-592.
- Myers, S.C., & Majluf, N.S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics* 13, 187-221.
- Oliner, S.D., & Rudebusch, G.D. (1992). Sources of the financing hierarchy for business investment. *Review of Economics and Statistics* 74, 643-654.
- Qian, J., & Strahan, P. (2007). How laws and institutions shape financial contracts: the case of bank loans. *Journal of Finance* 62, 2803-2834.
- Scaller, H. (1993). Asymmetric information, liquidity, and Canadian investment. *Canadian Journal of Economics* 26, 552-574.
- Stultz, R.M. (1999). Globalization, corporate finance and the cost of capital. *Journal of Applied Corporate Finance* 12, 8-25.
- Stultz, R.M. (2009). Securities laws, disclosure, and national capital markets in the age of financial globalization. *Journal of Accounting Research* 47, 349-390
- Verrecchia, R. (2001). Essays on disclosure. *Journal of Accounting and Economics* 32, 98-180
- Warfield, T.D., & Wild, J.J. (1992). Accounting recognition and the relevance of earnings as an explanatory variable for returns. *Accounting Review* 67, 821-842.

## Appendix A

### *Country-level variables description*

This table summarizes variables for legal origin and shareholder protection. The common law variable represents a dummy set equal to 1 for countries falling into the common law legal system and 0 for civil law countries. The Anti-director rights variable is taken for Djankov et al. (2008). It represents an index that measures the level of protection for minority investors.

	<i>Common law dummy</i>	<i>Anti-director rights</i>
<b>Panel A : Developed markets</b>		
Australia	1	0.79
Austria	0	0.21
Belgium	0	0.54
Canada	1	0.65
Denmark	0	0.47
Finland	0	0.46
France	0	0.38
Germany	0	0.28
Hong Kong	1	0.96
Ireland	1	0.79
Italy	0	0.39
Japan	0	0.48
Netherlands	0	0.21
New Zealand	1	0.95
Norway	0	0.44
Portugal	0	0.3
Singapore	1	1
Spain	0	0.37
Sweden	0	0.34
Switzerland	0	0.27
UK	1	0.93

<b>Panel B : Emerging markets</b>		
Argentina	0	0.44
Brazil	0	0.29
Chile	0	0.63
China	0	0.78
Colombia	0	0.58
Czech Republic	0	0.34
Greece	0	0.23
Hungary	0	0.2
India	1	0.55
Indonesia	0	0.68
Israel	1	0.71
Korea (South)	0	0.46
Malaysia	1	0.95
Mexico	0	0.18
Pakistan	1	0.41
Peru	0	0.41
Philippines	0	0.24
Poland	0	0.3
Russia	0	0.48
South Africa	1	0.81
Taiwan	0	0.56
Thailand	1	0.85
Turkey	0	0.43

# FAIR VALUE ACCOUNTING IN TIMES OF FINANCIAL CRISIS

Natascha Jarolim<sup>1</sup> and Carina Öppinger<sup>2</sup>

<sup>1,2</sup> Department of Accounting and Auditing, Johannes Kepler University, Austria

**Abstract.** *Fair value accounting is an essential feature of International Financial Reporting Standards. Even though this accounting method did not spark the financial crisis, it did enhance its impact. As a consequence of the financial crisis the IASB amended IAS 39 to override the fair value recognition. The amendments to IAS 39 & IFRS 7 permitted reclassifications of the categories Held for Trading and Available for Sale, some of which had explicitly been forbidden prior to the amendment. Critics argue that these modifications to IAS 39 made it possible to camouflage losses of hundreds of billions of euros. The main goal of this paper is to evaluate the amendment to IAS 39 & IFRS 7 by conducting a survey of the banking sector. Furthermore fair value accounting in general is critically discussed.*

**Keywords:** *amendment, banking sector, fair value, financial assets, financial crisis, IAS 39, IFRS 7, IFRS 9, OCI, reclassification.*

## Introduction

In the aftermath of the financial crisis in 2008 increased criticism was made of fair value measurement of financial instruments in accordance with IAS 39. Due to the inactivity of the markets it was almost impossible to perform a reliable market valuation. In addition to the valuation issue, the increased depreciation posed an even greater problem. These circumstances made it necessary for the IASB and the EU to take urgent measures. Thus, in October 2008 an amendment to IAS 39 and IFRS 7 was drafted by means of an accelerated process, which did not follow due process regulations. The amendment allowed additional reclassification options. In this paper, these will be presented, in order to subsequently investigate their effects on the financial statements of selected European Banks.

## Definition and determination of the fair value

The term “fair value” is not based on any precise definition that can be found within the framework of the IASB. Solely in two places is the term mentioned within the framework (F.51 and F.100). The exact definition of the term fair value is only given at the level of the individual standards. Since the beginning of the 1980’s the following definition has been used in the individual standards: “Fair Value is the amount for which an asset could be exchanged, or a liability settled, between knowledgeable, willing parties in an arm’s length transaction” (IAS 2.6). Subsequently the definition of the fair value will be discussed and the underlying methodology for determining it will be briefly demonstrated.

The fair value is described as the amount which could be transferred in a fictitious transaction between knowledgeable, willing parties under normal market conditions (arm’s length transaction). Therefore, the fair value constitutes a hypothetical market price under



idealized conditions (Hitz, 2005a, p. 1014). This definition indicates that the fair value is a market-based measure of value (Hitz, 2005b, p. 83). At first glance, the definition of fair value in IFRS appears to be clear. However, the determination methodology is extremely difficult to apply in practice. Reasons for this are that not all assets are dealt on an active market and that observable market prices do not always exist. Furthermore, the policy of determination, as already described, can also be found within the individual standards, where they differ in respect to their detail and application areas (Hitz, 2005, p. 1016).<sup>1</sup>

The method of determining the fair value for financial instruments arises from the fair value hierarchy according to IAS 39. At this juncture basically two levels which arise as a result of the existence of an active market can be distinguished and broken down into five sublevels (IAS 39.48 in conjunction with IAS 39.AG69-AG82). This measurement hierarchy can be amended to a third level, which results from the derogation rule for unquoted equity instruments (Eckes and Frick, 2008, p. 459; IAS 39.46c; IAS 39.AG80; IAS 39.AG81). The derogation rules according to IAS 39.46c as well as IAS 39.AG80 and IAS.39.AG81 will not be discussed in more detail within the scope of this paper.

A measurement hierarchy according to the 3-step-hierarchy in US-GAAP (SFAS 157) has also been applied in practice. In March 2009 this hierarchy was taken over from the IASB as part of the amendments to IFRS 7 regarding disclosure of financial instruments (Deloitte, 2009; IFRS 7.27A).

Figure 1 illustrates the fair value measurement hierarchy of IAS 39 and IFRS 7 and provides an overview of the respective hierarchy levels and their relations to one another.

Firstly, the reporting entity must consider which measurement level applies. In the presence of an active market level 1 or 2 come into consideration, in accordance with IAS 39.AG71. In its absence level 3 to 5 should be selected. According to IAS 39.AG71 a financial instrument is regarded as having been quoted in an active market if the quoted prices are readily and regularly available from an exchange, dealer, broker, industry group, pricing service or regulatory agency, and those prices represent actual and regularly-occurring market transactions on an arm's length basis (Eckes and Frick, 2008, p. 460; IAS 39.AG71).

#### *Level 1 (mark to market):*

The best evidence of fair value is the existence of published price quotations in an active market. If they exist, they will be used to measure the financial asset or liability (=level 1 (IAS 39)) (IAS 39.AG71). If current prices are unavailable, the fair value can be deduced from the most recent transactions. If the company, however, can demonstrate that the last transaction price is not the fair value, an appropriate price at the time shortly before the balance sheet date can be determined (= level 2 (IAS 39)) (Henkel and Eller, 2009a, p. 289; IAS 39.AG72 and IAS 39.AG73).

#### *Level 2 (mark to model with market parameters):*

The fair value is established by means of a valuation technique if the market for the financial instrument is not active. Valuation techniques include using recent arm's length market transactions between knowledgeable, willing parties – if available (=level 3 (IAS 39)), reference to the current fair value of another financial instrument that is substantially the same (=level 4 (IAS 39)) or the application of discounted cash flow analysis (DCF) or option pricing models (=level 5a (IAS 39)) (IAS 39.AG74). The fair value is estimated on the basis

---

<sup>1</sup> In May 2011 IFRS 13 was issued, which sets the definition of the fair value on a consistent basis and, additionally, leads to convergence with US-GAAP. This development can be assessed as extremely positive, although it did not provide solutions in the majority of the problem areas (Kümpel, Oldewurtel and Wolz, 2012, pp. 103-105).

of the results of a valuation technique which makes the maximum use of the market inputs and relies as little as possible on entity-specific inputs (Henkel and Eller, 2009a, p. 289).

*Level 3 (mark to model without market parameters):*

Equivalent to level 5a (IAS 39), non-observable market parameters are here incorporated into the valuation method. This is explicitly defined in IAS 39 for instruments which do not have quoted prices on an active market and the derivatives linked to them (= level 5b (IAS 39)) (IAS 39.AG80 and IAS 39.AG81). In respect to the level-3-systematics, this also applies for debt instruments (Henkel and Eller, 2009a, p. 289).

Whereas the investigative effort increases from level to level downwards, the reliability of the fair value steadily decreases (Baetge and Zülch, 2011, p. 547). Furthermore, the potential deobjectification of the stated amount increases with each level and the risk that the margin of powers distorts the measurement therefore increases (Hitz, 2005b, p. 95).

In a study from the year 2011 the 55 largest European banks were analyzed in respect to their fair value calculation methodology. The result show that for financial instruments measured at fair value on the asset side on average 33.66% were determined on the basis of observable market prices (level 1), 62.21% on the basis of past or similar transactions (level 2) and 4.13% on internal assessment (level 3) (Zülch and Salewski, 2011, p. 37). On the liabilities side, in contrast, the picture was different. Value determinations were on average based only 11.04% on active market prices (level 1), 85.84% within level 2 and 3.12% with the help of internal assessment (level 3) (Zülch and Salewski, 2011, p. 39). Accordingly, the influence of internal assessment procedures on the balance sheet structure of European banks seems to be negligible. The result must however be interpreted in perspective, and it must be considered, that some banks have an equity ratio of only 2-3%. The study's authors believe that even a level of one percentage point of total assets determined by internal assessment and therefore partly not due a traceable assessment process, is too high when the capital base is so low (Zülch and Salewski, 2011, p. 37). This view is also maintained by the authors of this paper. To clarify this statement, the result will be explained briefly with reference to Deutsche Bank. Deutsche Bank showed total assets amounting to EUR 2,164 billion in the year 2011. Let us assume that only a percentage of this amount is determined using valuation methods. This would be an amount of EUR 21.64 billion whose valuation would find its way into the balance sheet under the influence of subjective assessments and large discretionary decisions. Compared with an equity of only EUR 53.39 billion (with an equity ratio of 2.47 %), this value is considerable.

Common uncertainties arise not only from the fact that for valuations neither an active market nor comparable transactions are available. This was also the case during the financial crisis. In such situations recourse is taken to assessment procedures which also include estimations and assumptions of external data, such as interest rates, which are mainly based on current market conditions. In uncertain market conditions, there is a rise in interest rates and risk spread that are used for discounting in carrying out assessment procedures. As a result, the calculated fair value is lower and leads to devaluation (Schmitz, 2008, p. 236). In good times, on the other hand there is an increase in the calculated fair values because of lower risk spread. The influence of the interest rate selection will be illustrated subsequently by a brief example (see Table 1).

The presentation compares three different discount rates (a comparable interest rate, a lower and a higher rate) and their effects on total company value. The calculation shows that a change of only 1% in the discount rate has a major impact on the total company value. It should also be noted, that a downward change in the interest rate has a greater effect (+15.37%) on the result than an upwards one (-11.76%).

In addition to this problem, the estimation of future cash flows involves a massive scope for discretion. This includes the failure rate, the failure time and the recovery rate. These parameters can *inter alia* be used to model cash flows from the underlying receivables. Usually this is done by using the following modeling techniques: re-rating-method, vector analysis or probabilistic-method (for further information see Prince, 2006, pp. 14-21). As a result of the choice of parameters and methods, the amount of the determined balance sheet value can be influenced to a great extent (Baetge, Bremdt and Brüggemann, 2008, p. 1008).

These problem areas of fair value measurement were exacerbated by the collapse of markets during the financial crisis. Due to the enormous depreciation of financial instruments, the company results and some of the equity vanished into air. Accordingly, fair value accounting was partially blamed for the financial crisis. The blame has yet to be seen critically, because the accounting merely reflects current problems and does not cause them (Schütte, 2009, p. 56).

In summary, it can be stated that fair value accounting should theoretically be able to provide crucial information for users of financial statements, but its ability to do so is severely limited by the insufficient reliability of the determined values. This is the result of the trade-off between relevance and reliability – investors perceive information at fair value as relevant, although it sometimes does not result from reliable market prices (level 2 and 3). This reduced reliability has negative effect on the decision usefulness of the information (Zülch, Fischer and Willms, 2006, p. 21).

## **Fair value accounting in IFRS**

The fair value is a customary assessment procedure within IFRS. However, it is neither consistently defined nor applied within the regulatory framework. For example, not all financial instruments are equally assessed at fair value, since an assessment on amortized cost is sometimes given. In addition, the fair value is not limited to financial items, but can also be found in a number of other positions.

Therefore the recognition of fair value changes in IFRS leads to significant differences in treatment. Evaluation results are partially recognized in the net income (NI) or in OCI. This can be achieved through explicit statutory provision or, on the other hand, by granted voting rights. Furthermore, not all items, which were previously recognized in OCI, are equally subjected to recycling. This results in a loss of the comparability of financial statements, as voting rights are applied differently in each company. And additionally unrealized value changes sometimes find their way into the net income (NI) (which financial performances are recognized for equity purposes is, for example, measured by the allocation of financial instruments in the category “Available for Sale” or by the decision whether or not to use hedge accounting) (Küting and Weber, 2009, p. 258).

These conceptual shortcomings within the IFRS accounting system give rise to discussions and sometimes to fierce criticism from experts and the accounting community. The demand for consistent conceptual recognition criteria is constantly getting louder (with further references Cearn, 1999; Kerkhoff, 2005; Kerkhoff and Diehm, 2005; Antonakopoulos, 2007; Ballwieser, 2009).

In addition to the conceptual weaknesses of fair value measurement in IFRS, there is a representation problem in terms of the valuation results. Below, the issues will be outlined briefly and evaluated critically in view of their increased recognition within the OCI.

### *More recognition in the OCI*

In the context of the financial statement presentation project (for further information see Pellens, Basche and Crasselt, 2004; IASB, 2004; Kerkhoff and Diehm, 2005; IASB, 2006a; EFRAG, 2006; IASB, 2012c) the performance reporting components were defined in 2007. These components are part of a complete financial statement (FASB and IASB, 2007, pp. 1-3). A significant step was the reform of the presentation and disclosure requirements of OCI. With the use of IAS 1 (rev. 2007) all components of financial performance should now be presented in the comprehensive income, which in turn will lead to an increase in the transparency of financial information (IASB, 2006b, pp. 4-5; IAS 1.81).

Until the implementation of IAS 1 (rev. 2007) on January 1<sup>st</sup> 2009, OCI was only shown in the statement of changes in equity. This led to a representation problem, since the question was whether the “hidden” representation in the statement of changes in equity had an effect on how readily accounting manipulation can be discovered. Studies have shown that the discovery of manipulation of the NI (net income) is more likely if the components of financial performance are shown within the statement of comprehensive income, and not in the statement of changes in equity (Hirst and Hopkins, 1998, pp. 67-68). In another study conducted in 2006, a positive correlation between the decrease in the frequency of “cherry picking”<sup>2</sup> and the compulsory disclosure of the OCI in the income statement was demonstrated (Hunton, Libby and Mazza, 2006, p. 151). Based on these findings, it can be regarded as very positive that the disclosure OCI in the statement of changes in equity has not been permitted since the year 2009 (IAS 1.139). The negative effect of various mapping and voting rights is compensated by the overall performance figure, and thus discretion in terms of balance sheet policy is disempowered (Holzer and Ernst, 1999, p. 369). This is also regarded as very positive in terms of fair value measurement issues, since book profits or losses, which for example result from the valuation of securities Available for Sale, must be prominently presented.

Through the revision of IAS 39, which is intended to be replaced by IFRS 9 in the near future, an increased entry of components of financial performance into OCI is probable (Zülch and Salewski, 2010, p. 427). Also the current revision of IAS 19 leads to the expectation of an increase in the components of financial performance which have to be recorded in OCI (Zimmermann and Huuk, 2010, pp. 483-487).

### *Trend towards more fair value in international accounting*

Initially fair value was introduced only for the valuation of some assets and liabilities, mostly financial instruments. However, fair value has turned into an essential evaluation measurement within IFRS. Its slow implementation has led to the laying down of a variety of case-related regulations on the basis of individual standards. The fair value application field includes inter alia, up to date, IAS 16, IAS 36, IAS 38, IAS 40, IAS 41, IFRS 2, IFRS 3 and IFRS 9. The reason for this widespread application can be found in the primary objective of the IASB, namely to serve the information needs of investors. Up to now, it has not been possible to achieve the long-term ideal concept of IASB, which can be seen in a full fair value approach. At the moment, fair value cannot act as the only evaluation measurement; rather a mixed model (amortized cost and fair value) is currently being used in IFRS (Kümpel, Oldewurtel and Wolz, 2012, p. 103).

IFRS 9, which will (gradually) replace IAS 39 in the near future, partly leads to an increase in the fair value valuation. As late as the year 2009, Sir David Tweedy emphasized,

---

<sup>2</sup> Through targeted sales, and some immediate redemption of Available for Sale securities, in OCI cached results are realized in income, which in turn leads to an increase in NI.

that the revision of IAS 39 was not intended to be an expansion of fair value measurement (IASB, 2009b; for further information see Breitzkreuz and Zimmermann, 2011; Kuhn, 2010).

### **Fair value during the crisis**

To improve the profitability of banks, mortgage loans were securitised using so-called special purpose vehicles (SPV) and sold on capital market. As the subprime crisis in the USA took its course, banks in the USA and Europe suffered losses of billions of dollars because of these securitizations. As a consequence, the crisis demanded its first great sacrifice: the bankruptcy of the investment bank Lehman Brothers. Afterwards, states were forced to invest billions in order to put together one rescue package after another in order to rescue banks. In connection with this crisis the fair value measurement has also been critically discussed and an attempt was made to define its role. Below the function and operation of fair value accounting in times of crisis will be briefly outlined.

In periods of rising market prices and, consequently, increasing valuation fair value measurement leads to book gains. These have not yet been paid by the market and it is doubtful whether they will ever be collected. Especially in the banking sector the recognition of such book gains plays a meaningful role if they result in an increase in regulatory equity (Bieg et al., 2008, p. 2551).

The macroeconomic mood may be strongly influenced by the volatility of reporting and earnings related to fair value measurement. The positive mood in boom times leads to high price estimates and high assessments. Therefore the book loss in periods of downturn is significantly higher, and thus leads to more pessimistic earning expectations (Küting and Lauer, 2009, p. 556). This mode of action is shown in figure 2, which compares the evaluation at fair value to the evaluation based on historical costs.

The pro-cyclical effect of fair value accounting is demonstrated by Schweitzer on the basis of bank balance sheets because of the particularly strong influence it exerts there. When banks hold securities and stocks whose prices fall, these stock have to be depreciated. Banks sell these securities in order to counter these losses, which again leads to losses. If all banks act according to this pattern, it leads to a self-accelerating spiral of depreciation (Schweitzer, 2009, p. 145).

The considerable devaluation resulting from financial instruments measured at fair value made it necessary to weaken the regulations of IAS 39 by introducing an amendment. This resulted in the admission of further reclassifications, and thus a suspension of fair value measurement was allowed. The accounting treatment of financial assets according to the regulation of IAS 39 and the October 2008 amendments to IAS 39 and IFRS 7 are presented below.

#### *Reporting of financial instruments with special consideration of amendments to IAS 39 & IFRS 7*

Adequate regulations concerning financial instruments can be found in IAS 32, 39 and IFRS 7. Financial instruments can be divided into financial assets and financial liabilities. This paper focuses on (original) financial assets, as only these are affected by the amendments to IAS 39 and IFRS 7.

#### *Categorization*

Financial instruments have to be assigned to one of the categories for financial assets at the time of their acquisition, (at “Fair Value through Profit or Loss”, which is further divided into

“Held for Trading” and “Designated as at Fair Value”, “Held to Maturity”, “Loans and Receivables” and “Available for Sale”) (Eckes and Weigel, 2009, p. 374). Categorization is thereby separately carried out for each financial instrument.

#### Held for Trading – Trading Portfolio

A financial instrument that has been acquired for short-term trade or as part of a unique portfolio of financial instruments which is aimed at driving short-term profits, has to be classified as Held for Trading (Petersen, Bansbach and Dornbach, 2008, p. 191).<sup>3</sup> According to the appendix of IAS 39, trade is defined as the realization of profits from short-term buying and selling activities (IAS 39.AG14). The period considered as short term has to be defined in relation to the situation in a given industry, according to Grünberger (2008, p. 138). A benchmark should be separately determined within each company.

#### Fair Value Option – Designated financial instruments

When the fair value option is used, it has to be applied irrevocably. This is an accounting choice within the scope of IAS 39, which can be separately exploited for each business transaction. Moreover, the financial statement has to provide a reliable view when the fair value option is applied (IAS 39.AG4C). In order to make use of the fair value option, one of the following three criteria has to be fulfilled (Kuhn and Scharpf, 2006, p. 107):

- The classification has to decrease the possibility of an accounting mismatch. This can occur when associated financial assets and liabilities are classified in different categories of financial instruments and are therefore differently revaluated. A designation could then lead to more secure information.
- Another possibility for making use of the fair value option exists, when a portfolio of financial assets and liabilities is valued and monitored at fair value as part of an investment and risk-avoidance strategy. This has to be documented and reported to people holding key positions in the company (Grünberger, 2008, p. 140).
- According to IAS 39.11A it is also possible to designate contracts which include embedded derivatives. These exceptions are made for derivatives that only slightly modify the contractual cash flows, or if it can be readily seen that the separation of the derivative and the host contract is not possible (PWC, 2012b, p. 6002).

#### Held to Maturity

This category is for non-derivative financial instruments which do not meet the definition of Loans and Receivables and are not Designated at Fair Value through Profit or Loss or as Available for Sale. An entity has to intend to hold the asset until maturity and, moreover, must have the ability to do so. The periodic cash flows have to be made to an equal amount or be fixed in advance (IAS 39.9). The amount and the period have to be noted on a contractual basis; a variable interest rate of the assets does not prevent classification in this category (IAS 39.AG17).

Moreover, the financial instrument has to be traded on an active market and a fixed maturity date has to be given (Grünberger, 2008, p. 149). An asset is regarded as being traded on an active market when it is regularly traded in a way that is recognizable for the general public; that means, that it takes place among independent outsiders (IAS 39.AG71).

---

<sup>3</sup> These derivatives, which are not considered in detail in this paper, have to be classified as Held for Trading mandatorily (IAS 39.9).

## Loans and Receivables

The requirements for a classification as Loans and Receivables are in some way similar to the requirements of the Held to Maturity category, since only non-derivative financial asset with fixed or determinable payments are included in this category. However, the asset must not be quoted in an active market when designated to this category (Rohatschek and Maukner, 2012, p. 128). A fixed maturity is not required, but the probability of a full refund must be given. As examples the standard mentions accounts payables, bank deposits and unlisted bonds (IAS 39.AG26).

## Available for Sale

The fourth and final category for the classification of financial instruments is usually referred to as a collection item in the literature (Petersen, Bansbach and Dornbach, 2008, p. 192). This follows from its definition, which says that financial assets that are not designated as assets at Fair Value through Profit or Loss or as Available for Sale or as Loans and Receivables have to be classified as held for sale (IAS 39.9(a)-(c)).

These categorizations are critical for the initial and subsequent measurement and the recognition of changes in value.

### *Initial and subsequent measurement*

Initial measurement should basically take place at fair value (IAS 39.43 und IAS 39.AG64). Financial assets categorized as Held to Maturity or Loans and Receivables should be measured after their initial recognition at their amortized cost, using the effective interest method for recording value changes. The effective interest rate represents a constant interest rate that discounts estimated future cash flows from the initial carrying amount of the asset during the life of the financial instrument (IAS 39.9). Fees that will eventually be paid, other fees, transaction costs, premiums and discounts will be included in the calculation and amortized over the life of the financial instrument (IAS 39.AG6). The calculation is based on reasonable estimations of cash flows. Should these estimations change during the term, the carrying amount must be adjusted (IAS 39.AG8).

The two remaining categories of financial instruments, “Available for Sale” and “at Fair Value through Profit and Loss”, should be measured at their fair value. Value changes are thereby recognized in equity in the former, and affect net income in the latter. A presentation of the fair value valuation was undertaken in the previous section.

A graphic overview of initial and subsequent measurement of financial assets of the different categories can be found in Appendix, Table 2.

### *Reclassification according to IAS 39 in the old version*

The previous version of IAS 39 only mandated a reclassification of the category “Held to Maturity” into the category “Available for Sale” if there were changes in the intention or ability to hold (IAS 39.51), or if the so called “tainting provisions” was triggered as a result of sales (IAS 39.52). Is more than a minor amount of the category “Held to Maturity” reclassified into the Available for Sale category, a forced reclassification of all Held to Maturity financial instruments into the Available for Sale category has to take place (Beyer, 2008, pp. 62-63). This reclassification is accompanied by a change in valuation towards fair value. Furthermore, it is not allowed to classify financial instruments as “Held to Maturity” in the two subsequent periods (retention period) (so called tainting rule) (Barz, Eckes and Weigel, 2008, pp. 290-291 as well as Henkel and Eller, 2009b, p. 351).

If an intention and ability to hold arises over the course of time or the two-year retention period has expired, financial instruments of the “Available for Sale” category may be reclassified as “Held to Maturity” (IAS 39.53 and 39.54).

*New Reclassification possibilities according to IAS 39 (amended 2008)*

Against the background of the financial crisis the IASB issued amendments to IAS 39 & IFRS 7 “Reclassification of Financial Assets” on an accelerated basis (without due process) on October 13<sup>th</sup> 2008. The changes were adopted two days later, on October 15<sup>th</sup> 2008, in European law and two days after that, on October 17<sup>th</sup> 2008, they entered into force.

The newly adopted additional opportunities of reclassification only apply to non-derivative financial assets of the initial categories “Held for Trading” and “Available for Sale”. Here the restriction on financial assets described above is declared. For derivative financial instruments (IAS 39.50 (a)) and financial instruments for which the fair value option was accessed at initial recognition (IAS 39.50 (b)), there still is a prohibition of reclassification.

Reclassification out of Held for Trading in Available for Sale or Held to Maturity

A reclassification from the “Held for Trading” category to the categories “Available for Sale” or “Held to Maturity” is permitted, when the intention to sell or repurchase which existed at the time of acquisition no longer exists or there are “rare circumstances” (IAS 39.50 (c) in conjunction with IAS 39.50B). The phrase “rare circumstances” is further defined in IAS 39.BC104D as “...*rare circumstances arise from a single event that is unusual and highly unlikely to recur in the near term*”. A clear example of such a rare circumstance which was given by the IASB is the financial crisis (IASB, 2008). When a reclassification into the “Held to Maturity” category is planned, the reporting entity must have the intention and ability to hold the financial asset until maturity. Reclassification can only take place after all requirements have been met (Eckes and Weigel, 2009, p. 374).

For reclassification the fair value at the time of reclassification, which corresponds to the new or amortized cost, has to be used (IAS 39.50C). The difference between the new and amortized cost and the redemption amount is distributed with a determinable remaining period of time, using the effective interest method for financial assets. Gains or losses previously recognized as profit or loss cannot be reversed, according to IAS 39.50C.

A renewed classification into the category “Held for Trading” is excluded (IAS 39.50).

Reclassification from “Held for Trading” or “Available for Sale” into “Loans and Receivables”

For a reclassification of securities from “Held for Trading” to the category “Loans and Receivables”, the requirements of IAS 39.50 (c) in conjunction with IAS 39.50D have to be observed.

Therefore, the following requirements have to be met to obtain the permission for such a reclassification:

- an intention to trade no longer exists
- the requirements for classification as Loans and Receivables have been met at the time of the reclassification
- the entity has the intention and ability to hold the financial asset “for foreseeable future” or until maturity

For a reclassification of Available for Sale in Loans and Receivables, the first condition does not pertain (IAS 39.50E).



In accordance with IAS 39.9, Loans and Receivables that are not quoted in an active market are described as non-derivative financial assets with fixed or determinable payments unless they are not Held for Trading, included in the fair value option or categorized as Available for Sale. If the claim holder's initial investment cannot recover substantially, caused by other reasons than a credit deterioration, it has to be categorized as "Available for Sale". It is expected that there is no quotation in an active market at the time when (in the market environment in which) a reclassification is made.

Again, the reclassification in accordance with IAS 39.50F has to be carried out at fair value on the day of reclassification; the fair value represents new or amortized costs. With reclassification of the source category "Held for Trading", recorded valuation gains or losses cannot be reversed. For reclassification from the category "Available for Sale" to the category "Loans and Receivables", income previously recognized in other comprehensive income components according to IAS 39.55 has to be amortized over the remaining term using the effective interest method to turn it into interest income according to IAS 39.54. This resolution is not considered in calculating the effective interest rate for the distribution of the difference between fair value and repayment value on the day of reallocation.

In summary, it can be noted at this point, that the possibilities to reclassify made available by IAS 39 allow the transfer from a fair value assessment to amortized cost (HfT → HtM, HfT → L&R, AfS → L&R), or at least from a performance effective fair value valuation to one that is neutral for profit purposes (HfT → AfS). For an overview of the reclassification possibilities that are now permitted see also Table 3. Reclassification criteria are shown in Table 4.

#### Period of validity of the reclassification and effects

The reclassification was in fulfillment of the requirements allowed until October 31<sup>st</sup> 2008, or backdated until July 1<sup>st</sup> 2008 or at any time before November 1<sup>st</sup> 2008; from November 1<sup>st</sup> 2008 on the new reclassification regulations can only be applied prospectively (IAS 39.103G).

A retrospective application at the market conditions prevailing in the fall of 2008 resulted *ceteris paribus* in a reduction in expenses in the profit and loss account or a low burden on the (negative) revaluation reserve in both the III. Quarter of 2008 and the fiscal year 2008. This arrangement allowed a retrospective reclassification, to a period in which developments were already known.

#### *Disclosure requirements under IFRS 7*

The standard-setter has tied the granting of relief for the reclassification of financial assets to additional disclosure requirements, so the following points will have to be disclosed in future:

- the reclassified amount for each category, whereby both the access amount of the "receiving" category and the amount leaving the "donor" category will have to be given (IFRS 7.12 and IFRS 7.12A(a)). The amount is the fair value, the value at which the additional indication of nominal amounts would increase the informational value;
- the reasons for reclassification (IFRS 7.12);
- for each reporting period until derecognition, the carrying amounts and fair values of financial assets that were reclassified in the current and in prior periods (IFRS 7.12A(b));
- with reclassifications in accordance with IFRS 7.50B, the rare circumstance and facts that explain why the situation was rare have to be presented (IFRS 7.12A(c));

- for the reporting period of reclassification and the previous reporting period, the gains or losses realized in the income statement, or whether there was neutrally for profit purposes in equity (IFRS 7.12A(d));
- for the reporting period of the reclassification and for each reporting period until derecognition of the financial assets was accomplished, the gains or losses, that would have been recognized in the income statement or whether neutrality would have existed in respect to profit purposes in equity, and no diversion of income and real income would have been realized in the profit- and loss statement („as-if-bill”; IFRS 7.12A(e)) and
- the effective interest rate and expected return of cash flows for the financial asset, estimated at the time of reclassification (IFRS 7.12A(f)).

Recalculation of effective interest rate on the date of reclassification and extensive additional disclosures make it necessary to document each reclassification promptly and to mark the assets accordingly in the accounting.

Due to the extensive additional disclosures, especially the “as-if-bills”, there is no information loss for the financial statements analysis according to IFRS. However, the reclassification does result in an additional computational cost for both the accountant and the analyst. Estimation uncertainties arise in the context of economic conditions, especially in determining the fair value at the time of reclassification and in determining the expected cash backflows. However, after the reclassification has been accomplished there are fewer estimation uncertainties.

#### *Critical acknowledgement of the amendments*

The public viewed the new regulations critically. The hasty approval of the amendment and its adoption into EU law without correct due-process led to a negative connotation being associated with it. This caused confusion among the public, which is understandable when considering that especially financial service providers supported the extension of valuation at fair value in good times (Dobler and Kuhner, 2009, pp. 24-33). Nevertheless, the relaxing of reclassification options, particularly from trading portfolio into the investment portfolio, does not represent an infringement of IFRS. Allocation in accordance with the amendment may only take place if an intention to sell is abandoned in favor of an intention to hold. An allocation to one of the four categories is regulated in IAS 39.9 according to the subjective purpose of the balancing unit. The different kinds of intentions to hold result in different valuation rules (for further information see Dobler and Kuhner, 2009, p 33).

#### Empirical Method

The accounting treatment of assets and liabilities at fair value is of particular relevance for banks, since a significantly greater portion of the bank’s assets and liabilities falls into this category than that of other companies (Zülch and Salewski, 2011, p. 35). Therefore it seems that an industry-related restriction on the banking industry would be advantageous, when we consider the results of the following study on the significance of the amendments to IAS 39 and IFRS 7. For this reason the STOXX® Europe TMI Banks Index, which includes the 80 largest banks in the European region, was chosen as the basis for this study. This index seems to be appropriate, as it provides a good overview of the application and importance of the amendments in the European region.

Out of the 80 titles included in the STOXX® Europe TMI Banks Index, banks for which the annual report of 2008 was not publically available at the time of analysis (April/May 2012) were excluded. This was necessary, as the analysis is based on information included in

the financial statements of 2008 (including differing balance sheet dates; quarterly reports were not included in the analysis). There were nine companies, whose financial statements were no longer available for download on their websites. In addition, financial statements that were not prepared under IFRS were eliminated. This led to the exclusion of three more companies, two of which had prepared their financial statements in accordance with SWISS GAAP and one of which had done so in agreement with US-GAAP. Finally, companies were eliminated whose data either contained no information on the amendment to IAS 39 & IFRS 7 or which provided information that was so inadequate that no statement could be made. This led to the exclusion of another 16 companies. In total, there were 52 financial statements that proved capable of analysis.

### Sample Selection

STOXX® Europe TMI Banks	80
- no annual report 2008	9
available financial reports	71
- not applying IFRS	3
available IFRS financial reports	68
- no or insufficient data	16
<b>Sample</b>	<b>52</b>

An exclusion of foreign currencies did not take place. Consequently, reporting date values were converted at their reporting date exchange rate, and flow variables at the average exchange rate of the period. The historical exchange rate data were taken from the OANDA website, using the respective midpoint between bid and ask price.

Of the remaining 52 companies 75%, that is 39, made use of the amendment possibility. In their financial statements of 2008 the remaining 25% (13 companies) clearly recorded, that they did not make use of the reclassification possibility.

Use of reclassification possibilities given by amendment	Number (absolute)	%
Yes	39	75.00
No	13	25.00
Total	52	100.00

The following detailed evaluation of the use of amendments is based on those 39 banks which actually used them. Banks with total assets of around EUR 20 trillion (average total assets: around EUR 508 billion) or with a total capital sum of around EUR 708 billion (average equity: around EUR 18 billion) were examined.

### Analysis of reclassification time

First the reclassification date is analyzed. The regulations of the amendment imply that reclassifications done up to October 31<sup>st</sup> 2008 can be backdated to October 1<sup>st</sup> 2008 or to any

time prior to November 1<sup>st</sup> 2008. After November 1<sup>st</sup> 2008 the reclassification regulations can only be applied prospectively.

Of the 39 banks that were surveyed, seven reclassified their financial instruments on two or more dates and 25 banks chose only a single reclassification date. The seven remaining banks have not provided sufficient information to enable an assessment of reclassification times.

Two or more reclassification times	Number (absolute)	%
Yes	7	17.95
No	25	64.10
n.a.	7	17.95
Total	39	100.00

The majority of banks (23 or 58.97%) decided in favour of a retrospective reclassification on July 1<sup>st</sup> 2008. Ten banks (25.64%) opted for a reclassification date different from July 1<sup>st</sup> 2008. For six banks the given information was not sufficient to enable an assessment of whether a reclassification had been made on July 1<sup>st</sup> 2008 or not.

Retrospective reclassification on 01.07.2008	Number (absolute)	%
Yes	23	58.97
No	10	25.64
n.a.	6	15.39
Total	39	100.00

Nine (23.08%) banks decided in favour of a retrospective reclassification between July 2<sup>nd</sup> 2008 and October 31<sup>st</sup> 2008. Eight of these carried out a retrospective reclassification on October 1<sup>st</sup> 2008 and one did so on October 31<sup>st</sup> 2008.

Retrospective reclassification between July 2 <sup>nd</sup> 2008 and October 31 <sup>st</sup> 2008	Number (absolute)	%
Yes	9	23.08
- on October 1 <sup>st</sup> 2008	8	20.51
- on October 31 <sup>st</sup> 2008	1	2.57
No	24	61.54
n.a.	6	15.38
Total	39	100.00

A prospective reclassification was carried out by nine banks (23.08%), but 24 banks refrained from doing one. Six banks made insufficient statements, so it could not be assessed whether a prospective reclassification had been made or not.

Prospective reclassification (after October 31 <sup>st</sup> 2008)	Number (absolute)	%
Yes	9	23.08
- November 1 <sup>st</sup> 2008	1	2.56
- December 16 <sup>th</sup> 2008	1	2.56
- December 31 <sup>st</sup> 2008	1	2.56
- March 31 <sup>st</sup> 2009	1	2.56
- no information about the date of prospective reclassification	5	12.84
No	24	61.54
n.a.	6	15.38
Total	39	100.00

In summary, at this point it can be noted that only eleven banks (thus 28.21%) provided complete information regarding their time of reclassification. However, one or more item of information was missing from 28 banks, so an analysis of the reclassification time was not or only incompletely possible.

Sufficient information regarding reclassification time	Number (absolute)	%
Yes	11	28.21
No	28	71.79
Total	39	100.00

### *Reclassification*

In the next step, the reclassifications were examined in detail. Initially, the number of reclassifications that were made by banks was investigated. Reclassifications of the same type (eg. HtM in AfS) were only recorded as reclassifications if they were made at different times. A majority of the banks that were surveyed (51.28% or 20) made only one reclassification. The remaining 19 banks made several reclassifications, and two of them even used all four possible forms of reclassification. Reclassifications which had previously been permitted (AfS in HtM or vice versa) were not taken into account. The analysis therefore only covers those reclassifications that were newly introduced by the amendment.

Number of reclassifications made per bank	Number (absolute)	%
1	20	51.28
2	7	17.95
3	10	25.64
4	2	5.13
Total	39	100.00

From the above analysis it can be seen that 72 reclassifications were made. Of these 72 reclassifications a quarter was from HfT into AfS. Most reclassifications were from HfT to L&R (33.33%). HfT was reclassified into HtM 13 times (18.06%) and AfS into L&R 17 times (23.61%). As for two reclassifications from HfT into L&R no book value data are available; the given total book value only includes those 70 reclassifications for which the book value was available. In respect to their total number, reclassifications from AfS to L&R (book value of EUR 167,120,685,900) were most significant, followed by L&R into HfT (EUR 134,217,540,150). The other two reclassification categories involved much smaller amounts.

Type of reclassification	Number	%	Number incl. BV	Book valueΣ
HfT in AfS	18	25.00	18	52,047,488,900
HfT in L&R	24	33.33	22	134,217,540,150
HfT in HtM	13	18.06	13	15,219,502,425
AfS in L&R	17	23.61	17	167,120,685,900
Total	72	100.00	70	368,605,217,375

Per reclassification an average book value of EUR 5 billion was reclassified. The most insignificant reclassification in respect to its amount came to EUR 87,250 (at Sparebank 1 Nord-Norge). The highest reclassification in this respect amounts to EUR 90 million at Dexia. These high amount related differences are also shown in the calculation of the standard deviation.

Type of reclassification	Mean	Min	Median	Max	Std.dev.
HfT in AfS	2,891,527,161	3,600,000	603,533,500	19,313,139,000	5,563,569,544
HfT in L&R	6,100,797,280	87,250	2,444,000,000	23,633,000,000	7,704,757,950
HfT in HtM	1,170,730,956	388,625	371,686,000	11,008,800,000	2,966,168,526
AfS in L&R	9,830,628,582	61,900,000	2,713,524,000	90,784,000,000	22,388,078,599
Total	5,265,788,820	87,250 (Sparebank 1 Nord-Norge)	822,604,000	90,784,000,000 (Dexia)	12,386,928,077

Sparebank 1 Nord-Norge (NO) did the least reclassification (EUR 475,875). The most reclassification was done by Dexia (BE) with a book value of around EUR 100 billion.

Minimum and maximum values (bank)	Total book value of reclassification
<b>MIN</b> (Sparebank 1 Nord-Norge)	475,875
<b>MAX</b> (Dexia)	100,079,000,000

Apart from the representation of the reclassified amounts, the relative importance of reclassification, that is the percentage of the total assets and the percentage of equity involved, should also be analysed at this point. The equity was generally taken from the balance sheet, provided that the total equity (including minority interest) could be seen on it. When no clear equity value was shown in the balance sheet, the value was taken from the statement of changes in equity.

In relation to total assets, the reclassification, which had an average percentage level of 2.92%, did not show a very great influence. In relation to bank equity, which is usually relatively low, it was shown that the average book value of the reclassification exceeded the average book value of equity by 2.02%. The lowest relative effects of 0.01% on total assets or 0.11% on equity were found at Sparebank 1 Nord-Norge.

When considering the maximum values, however, it is shown that the reclassification at Natixis (FR) was 20.80% of the total assets and therefore amounted to about a fifth of them. Reclassification had an extreme impact in relation to equity at Dexia, namely 1,781.40%.

Relative importance of reclassifications	Mean	Min	Median	Max	Std.dev.
reclassification/ total assets	2.92%	0.01%	1.54%	20.80%	4.55%
reclassification / equity	102.02%	0.11%	34.24%	1,781.40%	304.83%

#### Impact of reclassification on results

In this section, the losses which were prevented by reclassification are analysed in detail. In principle, banks had to report the losses they would have suffered if reclassification had not been undertaken. However, ten banks (25.64%) did not fulfil this requirement, so they were eliminated from the following analysis. Furthermore, two companies were eliminated from the analysis of NI-effects, because they showed an effect of 0 on the results. This was done in order to avoid an adulteration of the calculation; only data which show a value > 0 are included in the following analysis. The same applies to 15 banks, for which an influence on NI but not on OCI was given. These are excluded from the more detailed analysis of OCI.

Impact of reclassification on results	n.a	n.a. %	No impact	No impact %
Total CI	10	25.64%	-	-
NI	10	25.64%	2	5.13%
OCI	10	25.64%	15	38.46%

On average, losses of EUR 863,531,416 were prevented due to reclassification. The reclassification of Barclays had the slightest effect on the total CI. Barclays saved losses of approximately EUR 2 million due to reclassification. Reclassification had the greatest effect

at Deutsche Bank, which was able to avoid losses of approximately EUR 5 billion by reclassification.

Net income was impacted positively by EUR 595 million on average as a result of reclassification. The lowest effect is again shown by Barclays and the highest by the Deutsche Bank.

OCI has been improved by an average of EUR 555 million as a result of reclassification. Leader in this case is Dexia, which would have had to record a loss of EUR 2 billion in OCI without reclassification. The lowest OCI effect resulting from reclassification was shown at BCO Comercial Portugues.

Impact of reclassification on results	Mean	Min	Median	Max	Std.dev.
Total CI-effect	-863,531,416	-1,595,850 (Barclays)	-336,471,000	-5,209,000,000 (Deutsche Bank)	1,369,464,756
NI-effect	-594,898,698	-1,595,850 (Barclays)	-73,218,600	-3,409,000,000 (Deutsche Bank)	1,021,377,997
OCI-effect	-555,170,329	-81,371,000 (BCO Comercial Portugues)	-261,567,500	-2,123,000,000 (Dexia)	649,661,900

In a further step, the net income effect (in relation to the annual net income) that was prevented by reclassification was analyzed. On average, there would have been a 22.65% on annual net income as a result of losses that would have occurred if there had been no reclassification. A minimal effect on the result was revealed at Barclays (0.02%). The largest effect on the profit and loss statement was revealed at BCO Popolare di Sondrino, where the influence on the annual net income amounted to 91.73%. It should also be mentioned, that Deutsche Bank was also able to influence its annual net income massively - by 85.50%.

	Mean	Min	Median	Max	Std.dev.
P&L- effect in % of net income	22.65%	0.02% (Barclays)	14.04%	91.73% (BCO Popolare di Sondrino)	25.43%

#### Reallocation of results from Profit/Loss into OCI due to reclassification from HfT into AfS

Furthermore, the reallocation from HfT into AfS was analysed in greater detail. This reclassification made it possible to report losses in a manner that is neutral as far as profit is concerned, namely in OCI. Originally they would have been reported in the income statement. This enabled the transfer of losses out of the profit and loss account into OCI, and thus into the statement of changes in equity. So these losses were presented in a less prominent place. Concerning this issue, also see chapter “More recognition in the OCI” in this article. Basically 18 companies carried out a reclassification from HfT into AfS. Since eight of these companies did not adequately present the impact of the AfS reserve on the results after the time of reclassification, these 44.44% were excluded from the analysis. Therefore, ten banks were included in the following analysis.

Due to the reclassification, it was possible to transfer around one billion (an average of around EUR 128 million) in losses from the profit or loss statement into the OCI.



Loss detection trough reclassification of HfT into AfS	Total	Mean	Min	Median	Max	Std.dev.
Detection neutrally for profit purposes by AfS reclassification	-1,284,219,100	-128,421,910	-1,340,000 (Bank Attica)	-34,467,200	-807,629,200 (Royal Bank of Scotland GRP)	249,562,030
AfS reserve effect in % of equity		-1.19%	-0.05% (Intesa Sanpaolo)	-0.55%	-5.43% (Atebank)	1.64%

### Disclosure requirements according to IFRS 7

Finally, the extent to which banks fulfilled the extensive disclosure requirements of IFRS 7 was shown. Considering the complexity of individual disclosure requirements, it is not surprising that only 20.51% (8) fulfilled all of them. The overwhelming majority of 79.49% of the banks (thus 31) were negligent in respect to at least one requirement. An extensive evaluation of the information which was not provided has not been performed.

	Yes	Yes %	No	No %
Disclosure requirements fulfilled	8	20.51%	31	79.49%

Summarizing the empirical results showed that the majority of the surveyed banks made use of the amendment possibility. Thereby, losses of EUR 863,531,416 per bank were prevented. Although these amendments prevented losses of billions of euros and therefore an imminent economic collapse, the public viewed the new possibilities critically. This general criticism was due to the fact that the banks, who are now opponents of the amendments, formerly supported the fair value system. Nevertheless the IASB broke with his fair value concept and permitted an exit option of fair value accounting.

### Future perspectives

Within international financial reporting the implementation of a single fair value definition for all standards is being undertaken (IAS, IFRS). After an exposure draft in 2009 (IASB, 2009a), which showed differences in comparison to US-GAAP, a supplementary exposure draft was published in 2010 (IASB, 2010a). The new draft and the FASB's ED now have uniform rules concerning fair value (FASB, 2011; IASB, 2010a; IASB, 2010b). In the spring of 2011 the final standard (IFRS 13 – Fair Value Measurement) including all of the adaptations that had been made was finally released (for further information see Grosse, 2011; Flick, Gehrler and Meyer, 2011, Hitz and Zachow, 2011). This approach can be interpreted as positive in terms of definition problems. With it, the standard setters created a uniform basis for fair value accounting, a method which is sometimes subject to controversy. However, it was not possible to solve either the problem of inconsistent recognition or the representation problem of fair value changes.

In addition to the uniform fair value definition, changes have been made to the accounting rules for financial instruments. The new IFRS 9 is intended to fulfil the desire for reduced complexity and create a single set of regulations for the accounting of financial instruments. The standard contains only two categories, on the one hand recognition at

amortized cost and on the other hand at fair value (PWC, 2012; for further information see Breitkreuz and Zimmermann, 2011; Kuhn, 2010; for project details see IASB, 2012b).

Finally, it can be stated that the current crisis was not caused by an incorrect accounting or inadequate corporate disclosure. Instead, the large structuring and securitization of assets, the risks of which cannot be communicated to the capital markets audience with the previously existing instruments, was a trigger (Dobler and Kuhner, 2009, p. 33).

## Appendix

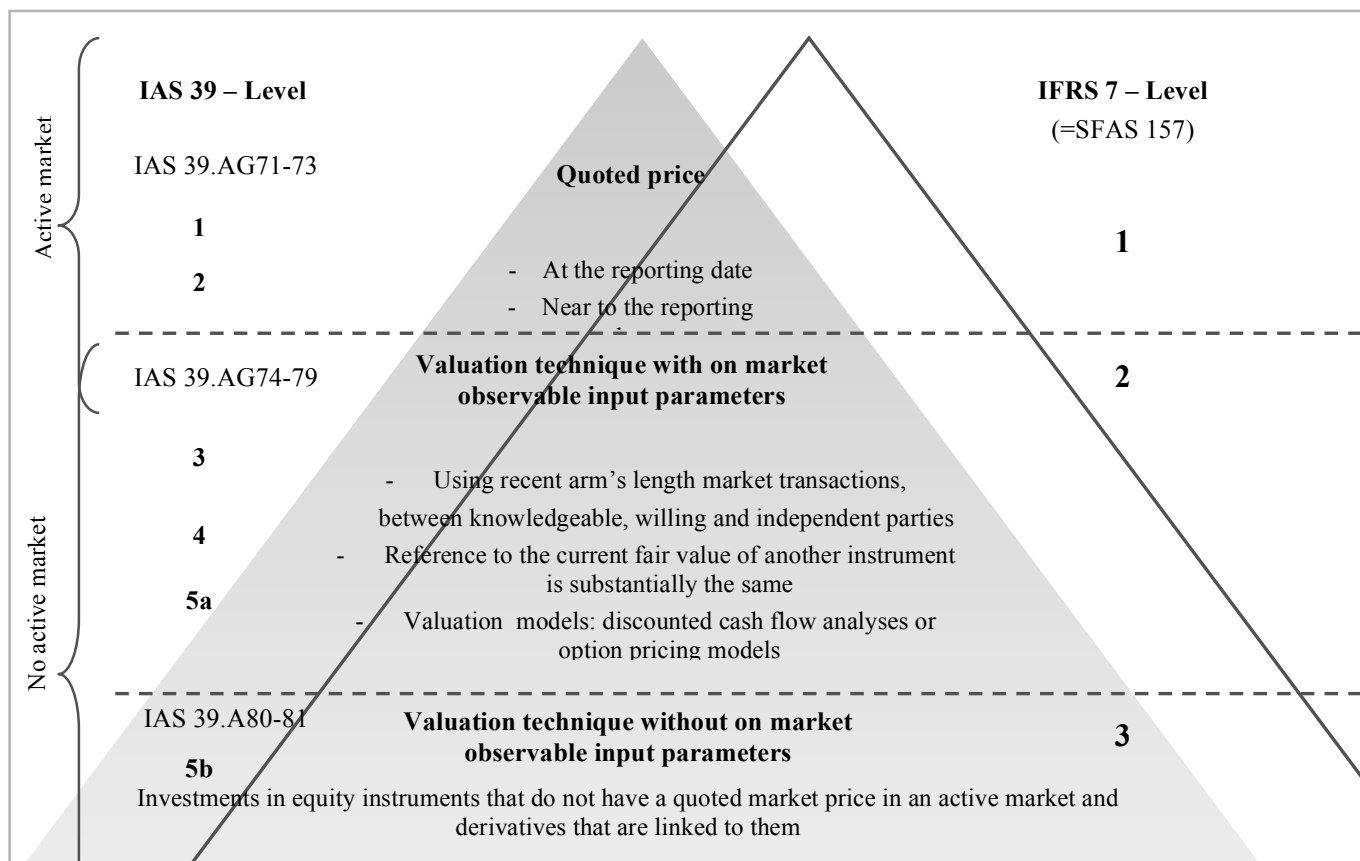


Figure 1: Fair value hierarchy IAS 39 versus SFAS 157

	X1	X2	X3	X4	X5	perpetuity
Free Cash Flow	2,000,000.00	2,500,000.00	2,200,000.00	2,150,000.00	2,100,000.00	2,200,000.00
WACC	7.50%	7.49%	7.51%	7.51%	7.48%	7.51%
Present value	1,860,465.12	2,163,734.07	1,770,419.14	1,609,322.24	1,464,134.61	20,395,691.51
<b>Total enterprise value</b>	<b>29,263,766.67</b>					

WACC 1% higher	8.50%	8.49%	8.51%	8.51%	8.48%	8.51%
Present value	1,843,317.97	2,124,029.73	1,721,921.67	1,550,812.90	1,397,883.29	17,184,792.93

<b>Total enterprise value</b>	<b>25,822,758.48</b>
Difference	-3,441,008.20
Difference in %	-11.76%

WACC 1% lower	6.50%	6.49%	6.51%	6.51%	6.48%	6.51%
Present value	1,877,934.27	2,204,562.19	1,820,755.07	1,670,617.10	1,534,189.77	24,654,134.95
<b>Total enterprise value</b>	<b>33,762,193.34</b>					
Difference	4,498,426.67					
Difference in %	15.37%					

Table 1: Selection of discount rate (DCF-Method)

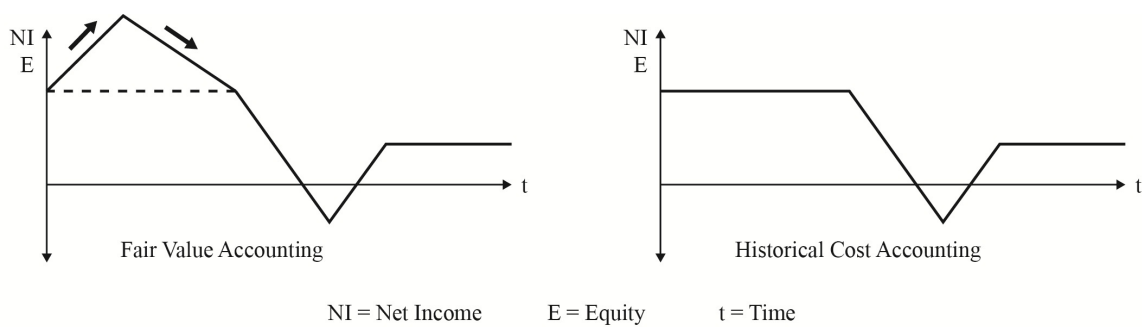
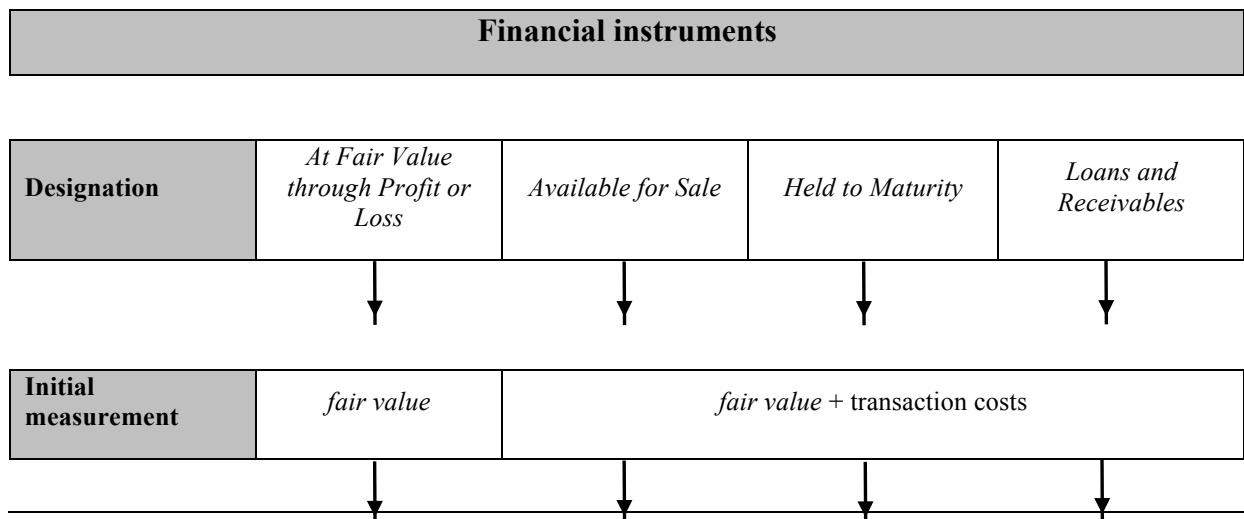


Figure 2: Fair value accounting versus historical cost accounting



<b>Subsequent measurement</b>	<i>fair value</i>		amortised cost	
	↓	↓	↓	↓
<b>Changes in value</b>	recorded in profit/loss	recorded in AfS reserve (equity)	effective interest method	

Table 2: Initial and subsequent measurement of financial instruments according to IAS 39

	Into...				
Out of...	<i>Held for Trading</i>	<i>Designated at Fair Value</i>	<i>Loans and Receivables</i>	<i>Held to Maturity</i>	<i>Available for Sale</i>
<i>Held for Trading</i>		No	Yes* (IAS 39.50 (c) iVm IAS 39.50D)	Yes* (IAS 30.50(c) iVm IAS 30.50B+C)	Yes* (IAS 39.50(c) iVm IAS 39.50B+C)
<i>Designated at Fair Value</i>	No		No	No	No
<i>Loans and Receivables</i>	No	No		No	No
<i>Held to Maturity</i>	No	No	No		Yes
<i>Available for Sale</i>	No	No	Yes* (IAS 39.50E)	Yes	

\* Amendments to IAS 39 & IFRS 7 (2008)

Table 3: Reclassification options according to the Amendment to IAS 39 & IFRS 7

Reclassification		Criteria			
Out of	Into	Rare circumstances	No longer trading intention	Hold until maturity	definition of L&R
HfT	AfS	Yes	Yes	No	No
HfT	HtM	Yes	Yes	No	No
HfT	L&R	No	Yes	Yes	Yes
AfS	L&R	No	No	Yes	Yes

Table 4: Reclassification criteria

## References

Antonakopoulos, N. (2007). Gewinnkonzeption und Erfolgsdarstellung nach IFRS. Wiesbaden: Gabler Edition Wissenschaft.

- Baetge, J. & Zülch, H. (2001). Fair Value-Accounting. *Betriebswirtschaftliche Forschung und Praxis*, 53(6), 543-562.
- Baetge, J., Bremdt, T. & Brüggemann, P. (2008). Die Mark-to-Model-Bewertung des IAS 39 in der Subprime-Krise. *Die Wirtschaftsprüfung*, 61(21), 1001-1010.
- Ballwieser, W. (2009). IFRS-Rechnungslegung: Konzept, Regeln und Wirkungen, 2nd Edition. München: Vahlen.
- Barz, K., Eckes, B. & Weigel, W. (2008): IFRS für Banken, 4th Edition, Frankfurt am Main.
- Bieg, H., Bofinger, P., Küting, K., Kußmaul, H., Waschbusch, G. & Weber, C.-P. (2008). Die Saarbrücker Initiative gegen den Fair Value. *Der Betrieb*, 61(47), 2549-2552.
- Breitkreuz, R. & Zimmermann, M. (2011). IAS 39 versus IFRS 9 – Ein empirischer Überblick zur Bedeutung der Held to Maturity-Kategorie in der europäischen Finanzindustrie. *Zeitschrift für internationale und kapitalmarktorientierte Rechnungslegung*, 11(6), 297-303.
- Cearns, K. (1999). Reporting Financial Performance: A proposed Approach, G4+1 Special Report, London: IASC.
- Deloitte (2009). *IAS Plus Update, March 2009*. Retrieved April 2012 from <http://www.iasplus.com/en/publications/ifrs-in-focus/2009/ias-plus-newsletter-2014-ifrs-7-amended-to-improve-disclosures-about-financial-instruments/file>
- Dobler, M. & Kuhner, C. (2009). Die internationale Rechnungslegung im Belastungstest der subprime-Krise. *Die Wirtschaftsprüfung*, 62(1), 24-33.
- Eckes, B. & Frick, S. (2008). Fair value gleich fair value? Gegenüberstellung der Vorschriften unter US-GAAP und IFRS. *Zeitschrift für internationale und kapitalmarktorientierte Rechnungslegung*, 8(7-8), 456-466.
- Eckes, B. & Weigel, W. (2009). Zusätzliche Möglichkeiten der Umkategorisierung von finanziellen Vermögenswerten Bilanzierungsfragen und Umfang der Anwendung – Umsetzung bei Kreditinstituten. *Zeitschrift für internationale Rechnungslegung*, 4(9), 373-380.
- EFRAG (2006). *PAAnE Discussion Paper: The Performance Reporting Debate – What (if anything) is wrong with the good old income statement?*. Retrieved April 2012 from <http://www.efrag.org/files/ProjectDocuments/Performance%20Reporting/061127%20PAAnE%20Performance%20Reporting%20Project%20final%20paper.pdf>
- FASB (2011). Fair Value Measurement (Topic 820), Amendments to Achieve Common Fair Value Measurement and Disclosure Requirements in U.S. GAAP and IFRSs. Retrieved April 2012 from <http://www.fasb.org/cs/BlobServer?blobcol=urldata&blobtable=MungoBlobs&blobkey=id&blobwhere=1175822486936&blobheader=application/pdf>
- FASB & IASB (2007). *Financial Statement Presentation Project: A Joint Project of the FASB and IASB – Phase A: Summary as of September 30, 2007*. Retrieved April 2012 from <http://www.fasb.org/cs/BlobServer?blobcol=urldata&blobtable=MungoBlobs&blobkey=id&blobwhere=1175818790495&blobheader=application%2Fpdf>
- Flick, P., Gehrler, J. & Meyer, S. (2011). Neue Vorschriften für die Fair Value-Ermittlung von Finanzinstrumenten durch IFRS 13. *Zeitschrift für internationale Rechnungslegung*, 6(9), 387-393.
- Gross, J.-V. (2011). IFRS 13 „Fair Value Measurement“ – Was sich (nicht) ändert. *Zeitschrift für internationale und kapitalmarktorientierte Rechnungslegung*, 11(6), 286-296.
- Grünberger, D. (2008): IFRS 2009, 7th Edition, Wien: lexisnexis.
- Henkel, K. & Eller, R. (2009a). Glossar zur Rechnungslegung von Finanzinstrumenten nach IFRS (und HGB) – Teil 1 Buchstaben A bis E. *Zeitschrift für internationale und kapitalmarktorientierte Rechnungslegung*, 9(5), 279-294.
- Henkel, K. & Eller, R. (2009b). Glossar zur Rechnungslegung von Finanzinstrumenten nach IFRS (und HGB) – Teil 2 Buchstaben G bis Z. *Zeitschrift für internationale und kapitalmarktorientierte Rechnungslegung*, 9(6), 340-352.
- Hitz, J.-M. (2005a). Fair value in der IFRS-Rechnungslegung – Konzeption, Inhalt und Zweckmäßigkeit. *Die Wirtschaftsprüfung*, 58(18), 1013-1027.
- Hitz, J.-M. (2005b). Rechnungslegung zum fair value: Konzeption und Entscheidungsnützlichkeit. Frankfurt: Peter Lang.
- Hitz, J.-M. & Zachow, J. (2011). Vereinheitlichung des Wertmaßstabs „beizulegender Zeitwert“ durch IFRS 13 „Fair Value Measurement“. *Die Wirtschaftsprüfung*, 64(20), 964-972.
- Hirst, D. E. & Hopkins, P. E. (1998). Comprehensive Income Disclosures and Analysts' Valuation Judgements. *Journal of Accounting Research*, 36(Supp. 3), 47-75.
- Holzer, P. & Ernst, C. (1999). (Other) Comprehensive Income und Non Ownership Movements in Equity – Erfassung und Ausweis des Jahresergebnisses und des Eigenkapitals nach US-GAAP und IAS. *Die Wirtschaftsprüfung*, 52(9), 353-370.
- Hunton, J. E., Libby, R. & Mazza, C. L. (2006). Financial Reporting Transparency and Earnings Measurement. *Accounting Review*, 81(1), 135-157.

- IASB (2004). *IASB Update April 2004*, Retrieved April 2012 from <http://www.ifrs.org/NR/rdonlyres/EC24EFE9-5920-4E11-805B-ECAB6E1F773D/0/apr04.pdf>
- IASB (2006a). *IASB Update March 2006*, Retrieved April 2012, from <http://www.ifrs.org/NR/rdonlyres/E6A28BC4-3E39-4598-BA75-9FDF29FCF33B/0/mar06.pdf>
- IASB (2006b). *IASB Update December 2006*. Retrieved April 2012 from <http://www.ifrs.org/NR/rdonlyres/843BCA59-0578-4DC6-A052-7D8D07D01B57/0/Upd0612.pdf>
- IASB (2008). Press Release: IASB publishes educational guidance on the application of fair value measurement when markets become inactive, Retrieved April 2012 from <http://www.ifrs.org/news/press+releases/iasb+publishes+educational+guidance+on+the+application+of+fair+value+measurement+when+markets+become.htm>
- IASB (2009a). *ED/2009/5 Fair Value Measurement*. Retrieved April 2012 from [http://www.iasb.org/NR/rdonlyres/C4096A25-F830-401D-8E2E-9286B194798E/0/EDFairValueMeasurement\\_website.pdf](http://www.iasb.org/NR/rdonlyres/C4096A25-F830-401D-8E2E-9286B194798E/0/EDFairValueMeasurement_website.pdf)
- IASB (2009b). *Chairman of the IASB provides update to ECOFIN on reform of IAS 39*. Retrieved April 2012 from <http://www.ifrs.org/News/Press+Releases/Chairman+of+the+IASB+provides+update+to+ECOFIN+on+reform+of+IAS+39.htm>
- IASB (2010a). *ED/2010/7 Measurement Uncertainty Analysis Disclosure for fair value measurements, Limited re-exposure of proposed disclosure*. Retrieved April 2012 from <http://www.ifrs.org/NR/rdonlyres/07855A41-D0A9-4197-ADF9-15A1088E466A/0/EDMeasurementUncertaintyAnalysis0610.pdf>
- IASB (2010b). *Comprehensive Project Summary, Developing common fair value measurement and disclosure requirements in IFRSs and US-GAAP*. Retrieved April 2012 from <http://www.ifrs.org/NR/rdonlyres/5179C9D9-F7D8-4742-939C-2B6677F75FF7/0/FVMprojectssummaryJuly2010.pdf>
- IASB (2012a). International Financial Reporting Standards, London.
- IASB (2012b). *IFRS 9: Financial Instruments (replacement of IAS 39)*. Retrieved April 2012 from <http://www.ifrs.org/Current+Projects/IASB+Projects/Financial+Instruments+A+Replacement+of+IAS+39+Financial+Instruments+Recognitio/Financial+Instruments+Replacement+of+IAS+39.htm>
- IASB (2012c). *Financial Statement Presentation*. Retrieved April 2012 from <http://www.ifrs.org/Current+Projects/IASB+Projects/Financial+Statement+Presentation/Financial+Statement+Presentation.htm>
- Kerkhoff, G. (2005). JIG – Performance Reporting, Retrieved Mai 2012 from [http://www.fasb.org/project/Guido\\_Kerkhoff.pdf](http://www.fasb.org/project/Guido_Kerkhoff.pdf)
- Kerkhoff, G. & Diehm, S. (2005). Performance Reporting: Konzepte und Tendenzen im kommenden FASB-/IASB-Standard. *Zeitschrift für internationale und kapitalmarktorientierte Rechnungslegung*, 5(9), 342-350.
- Kuhn, S. (2010). Neuregelung der Bilanzierung von Finanzinstrumenten: Welche Änderungen ergeben sich aus IFRS 9?. *Zeitschrift für internationale Rechnungslegung*, 6(3), 103-111.
- Kuhn, S. & Scharpf, P. (2006). Rechnungslegung von Financial Instruments nach IFRS, 3rd Edition, Stuttgart: Schäffer-Poeschel.
- Kümpel, K., Oldewurtel C. & Wolz, M. (2012). Der fair value in den IFRS. *Praxis der internationalen Rechnungslegung*, 8(4), 103-109.
- Küting, K. & Lauer, P. (2009). Der Fair Value in der Krise, *Betriebswirtschaftliche Forschung und Praxis*, 61(6), S. 547-567.
- Küting, K. & Weber, C.-P. (2009). Die Bilanzanalyse, 9th Edition, Stuttgart: Schäfer-Poeschel.
- Pellens, B., Basche, K. & Crasselt, N. (2004). Eignung des IASB-Vorschlags zur Ergebnisspaltung für die Steuerung von Geschäftsbereichen. In M. Bank & B. Schiller (Eds.), *Finanzintermediation, Festschrift für Wolfgang Gerke zum 60. Geburtstag* (pp. 599-613). Stuttgart: Schaeffer-Pöschl.
- Petersen, K., Bansbach, F. & Dornbach, E. (2008). IFRS Praxishandbuch, 3rd Edition, München: Vahlen.
- Prince, J. (2006). A General Review of CDO Valuation Methods. *The Journal of Structured Finance*, 12(Summer), 14-20.
- PWC (2012a). *In drei Phasen zu tiefgreifenden Veränderungen: IFRS 9 ersetzt IAS 39*. Retrieved April 2012 from <http://www.pwc.de/de/accounting-of-the-future/ifrs-9-ersetzt-ias-39.jhtml>
- PWC (2012b). IFRS Manual of Accounting, Financial instruments 2012, West Sussex: Bloomsbury Professional.
- Rohatschek, R. & Maukner, H. (2012). Rechnungslegung nach IFRS – Überblick mit erläuternden Beispielen, 4th Edition, Wien: Manzsche Verlags- und Universitätsbuchhandlung.
- Schmitz, F. (2008). Ist die Finanzmarktkrise eine Bilanzkrise? Ist die Forderung nach Aufweichung der bestehenden Ausweispflichten berechtigt?. *CFOaktuell*, 2(12), 233-237.

- Schütte, S. (2009). Konsequenzen aus der Finanzmarktkrise. *Die Bank, Jg(5)*, 56-63.
- Schweitzer, M. (2009). Wirtschaftsruhe und Rechnungsrisiken, In H. Haesler & F. Hörmann (Eds.), *Rechnungslegung und Unternehmensführung in turbulenten Zeiten, Festschrift für Gerhard Seicht* (pp. 127-149). Wien: LexisNexis.
- Zimmermann, J. & Huuk, A. (2010). Pragmatik statt Dogma: die neuen Vorschläge des IASB zur Bilanzierung von Post Employment Benefits. *Zeitschrift für internationale und kapitalmarktorientierte Rechnungslegung, 10(10)*, 483-487.
- Zülch, H., Fischer, D. & Willms, J. (2006). Die Neugestaltung der Ertragsrealisierung nach IFRS im Lichte der „Asset-Liability-Theorie“. *Zeitschrift für internationale und kapitalmarktorientierte Rechnungslegung, 6(10)*, 2-23.
- Zülch, H. & Salewski, M. (2011). Die Bedeutung des fair value für europäische Banken: Empirische Erkenntnisse der Geschäftsjahre 2008 und 2009. *Zeitschrift für internationale und kapitalmarktorientierte Rechnungslegung, 11(1)*, 35-40.
- Zülch, H. & Salewski, M. (2010). Das Joint Financial Statement Presentation Project von IASB und FASB. *Zeitschrift für internationale und kapitalmarktorientierte Rechnungslegung, 10(9)*, 425-428.

***Section 3:***  
***Accounting and***  
***Risk Perspectives***



## QUALITY AND DETERMINANTS OF RISK REPORTING - EVIDENCE FROM GERMANY AND AUSTRIA

Susanne Leitner-Hanetseder<sup>1</sup>

<sup>1</sup>Department of Accounting and Auditing, Kepler University of Linz, Austria

***Abstract.** While risk reporting disclosures have been required in Germany since 1999, equal requirements have become mandatory in Austria and all member states of the European Union only since 2005. The analysis conducted includes the risk reporting disclosures of all non-financial companies listed in the German prime stock market (DAX-30) and Austrian prime stock market (ATX). The purpose of this study is to investigate information quality of risk reporting disclosures within the annual reports of Austrian and German listed companies by using a scoring model. As most industries (except finance industry) have been affected by the financial crisis in the second half of 2008, also the risk reporting could be affected by the financial crisis. To identify the impact of the financial crisis on risk reporting the study analysis the risk reporting disclosures of the financial years 2007 and 2008. Based on these data, also a multiple regression model was used to identify specific determinants on information quality of risk reporting disclosures. The findings indicate that information quality of risk reporting increases over time and index and quantity of risk information disclosures are a determinant for the information quality of risk reporting.*

***KEYWORDS:** risk reporting, scoring model, regression model, quantity of risk reporting disclosures, quality of risk reporting disclosures*

### Framework of Risk Reporting in Germany and Austria

The German and Austrian Commercial Code requires a management report (the so called *Lagebericht*) by individual entities classified as companies with limited liability in § 289 dHGB (German Commercial Code) and § 243 UGB (Austrian Commercial Code) as well as by groups in § 315 dHGB and § 267 UGB. In Germany/Austria risk reporting is a mandatory part of the management report since 1999/2005 and shall include a description of the principal risks and uncertainties of a company. However, neither the German/Austrian Commercial Code nor the corresponding legislation material specifies the risk reporting requirements. This was left to the private standard-setters of Germany and Austria. Since the transformation of the Fair Value Directive (2001/65/EC) German and Austrian entities are also required to disclose financial risk management objectives and policies and the entity's exposure to price risk, credit risk, liquidity risk and cash flow risk. With the introduction of the new German legislation (BilMoG) and modernisation of the Austrian GAAP (URÄG 2008), companies have to

describe the main features of the group's internal control and risk management in relation to the process for preparing (consolidated) accounts since 2009.

## Empirical Study

### *Population and Data*

The study conducted explores risk reporting disclosures for the years 2007 and 2008 by analysing a sample of 43 German and Austrian group accounts. The target population of this survey are listed companies in the German and Austrian prime stock market (DAX-30 and ATX). Financial institutions are excluded from the population. The reasons for the exclusion are twofold: First, risk reporting of financial institutions is not comparable to other industries. Second, the finance industry had been affected by the current crisis several months before other industries and including these companies would have reduced the comparability and subsequently the validity of the findings. Finally, the current target population includes 26 companies which are listed in the German prime stock market DAX-30 and 17 companies which are listed in the Austrian prime stock market ATX.

By comparing companies which are listed in the prime German stock market (DAX-30) and prime Austrian stock market the study analyses whether there is an influence on the quality of risk reporting according to the country index and size of a company. As table 1 shows the total assets and sales of DAX-30 companies are on average higher than ATX companies. Also the BRAVAIS-PEARSON CORRELATION COEFFICIENT shows a significant correlation between total assets ( $r_{pb} = 0,485$ ) or sales ( $r_{pb} = 0,533$ ) and the index a company is listed in.

Table 1: Total assets and sales of German and Austrian publicly traded companies

<b>Companies listed in ATX</b>		
	<b>total assets</b>	<b>sales</b>
<b>n</b>	17	17
<b>Mean</b>	4.797.200.000,00	4.247.400.000,00
<b>Std. Deviation</b>	5.870.590.000,00	6.599.720.000,00
<b>Min.</b>	3.086.301,00	3.609.812,00
<b>Max.</b>	21.400.000.000,00	25.500.000.000,00
<b>25%-Quantil</b>	552.450.000,00	468.380.000,00
<b>Median</b>	1.735.300.000,00	1.731.200.000,00
<b>75 %-Quantil</b>	8.645.600.000,00	4.457.500.000,00
<b>Companies listed in DAX-30</b>		
	<b>total assets</b>	<b>Sales</b>
<b>n</b>	26	26
<b>Mean</b>	62.845.000.000,00	36.921.000.000,00

<b>Std. Deviation</b>	67.014.200.000,00	32.877.600.000,00
<b>Min.</b>	3.470.000.000,00	2.460.000.000,00
<b>Max.</b>	263.000.000.000,00	114.000.000.000,00
<b>Companies listed in DAX-30</b>		
<b>25%-Quantil</b>	14.665.000.000,00	10.752.000.000,00
<b>Median</b>	28.824.000.000,00	19.908.000.000,00
<b>75 %-Quantil</b>	106.600.000.000,00	61.826.000.000,00

### *Parameters of the Scoring Model*

In order to evaluate the quality of risk reporting disclosures of German and Austrian listed companies in the DAX-30 and ATX a scoring model was used. This scoring model equates to the greatest possible extent to the scoring model of Ewelt et al. (2009) and meets the criteria of the recommendations of the private standard setting bodies in Austria and Germany. In the following scoring model, the quality of risk reporting is determined by 5 parameters (form, disclosure of risk management, disclosure of overall risks, disclosure of individual risks and disclosure of financial risks) which are analyzed by several research questions (see table 2).

Table 2: Scoring model

<b>Parameter</b>	<b>Research questions:</b>
<b>I. Form</b>	<ol style="list-style-type: none"> <li>1. Is the risk report disclosed in a self-contained section of the management report and is the risk report marked by a headline?</li> <li>2. Is the risk report excluded from the reporting of prospects?</li> <li>3. Are rewards presented outside the risk report?</li> <li>4. Has the risk report a clear structure?</li> <li>5. Are risks separated into adequate categories and types?</li> <li>6. Are financial risks presented in the risk report?</li> </ol>
<b>II. Risk management</b>	<ol style="list-style-type: none"> <li>1. Does the risk report include the forecasting horizon?</li> <li>2. Does the risk report include a definition of „risk” and „risk management“?</li> <li>3. Does the risk report include the objectives and the strategy to achieve the objectives?</li> </ol>

<b>III. overall risk</b>		4. Are disclosures about the risk communication understandable?
		5. Are there any disclosures about the company's implementation of risk management?
		6. Is the process of risk management demonstrated?
		7. Are the methods to identify risks presented?
		8. Are there any disclosures concerning the tasks of risk management and the internal review process?
		9. Does the risk report explain materiality in context to risks?
		1. Are risks which may lead to an insolvency presented or does the risk report include a negative statement if a risk of insolvency is not existing?
		2. Are risk concentrations demonstrated?
		3. Are there any interdependences between risks?
		4. Does the risk report include a general statement about the risk situation of the group?
	5. Are the priorities concerning risks presented?	
<b>IV. Individual risks</b>		1. How are individual risks described and possible consequences explained?
		2. Are quantitative information concerning an individual risk demonstrated?
		3. How are measurement and methods to quantify individual risks presented?
		4. How are techniques presented to handle an individual risk?
<b>IV. Financial risks</b>		1. How does the company report about the risks of financial instruments?
		2. How does the company report about price risks?
		3. How does the company report about credit risks?
		4. How does the company report about liquidity risks and cash flow risks?
		5. Does the risk report include techniques to handle risks?

## Factors to determine information quality

After evaluating the information quality of risk reporting in the disclosures of companies in the prime stock markets in Germany and Austria by a scoring model, the analysis is extended to the determinants of the information quality on risk reporting.

According to prior literature three determinants (quantity of risk reporting disclosures, firm size and index) are analyzed regarding the impact of information quality.

A vast literature is related to the quantity of corporate disclosures. Therefore, the quantity of risk reporting can be defined by the number of words (for example see Deegan and Rankin, 1996, Neu et al., 1998); the number of sentences (Buhr, 1998), the number of pages (Cowen et al., 1987) and the percentage of pages (Adams et al., 1995). In the study conducted, the quantity of risk reporting is defined by the number of pages. According to the descriptive data in table 3 an increase in risk reporting can be determined within the years 2007 and 2008. This increase in the quantity of the disclosure of risk reporting may be caused by the financial crisis or by a general increase of the quantity in disclosures of risk reporting (see Lenz and Diehm, 2010). However, an increase in the quantity of risk reporting disclosures is not essentially related with an increase of the information quality. If the quality does not increase by an increase of quantity an information overload may exist. An information overload results in the fact that users of disclosures are not able to screen decision usefulness information (see Ewelt et al., 2009). According to Ewelt et al., 2009, an increase of the quantity of risk reporting disclosures results in declining information quality.

Several accounting studies have already provided evidence there is a positive relationship between company size and information quality (see Ewelt et al., 2009; Abraham and Cox, 2009). In the following study quality is determined by sales and total assets of the group.

Fischer and Vielmeyer (2004) proved that the quality of risk reporting varies with the index a company is listed. Based on the empirical findings that the quantity of risk reporting disclosures, firm size and index may be an important determinant of the quality of risk reporting leads to the following assumptions:

*Hypothesis: The quality of risk reporting is influenced by the quantity of risk reporting, firm size and/or the index a company is listed.*

## Research Method

In order to test this relationship the following regression model is tested:

$$\text{Information Quality}_i = \beta_0 + \beta_1 \text{Quantity} + \beta_2 \text{Sales} + \beta_3 \text{Total Assets} + \beta_4 \text{Index} + \varepsilon$$

In the regression model, the information quality of risk reporting is the dependent variable. The independent variables shall capture the influence of size of the firm, index and quantity of risk reporting. The size of the firm is measured by the variable total assets and sales. The variable index is a dummy variable index and is coded 0, when the enterprise is listed in the ATX. It is coded 1, when the enterprise is listed in the DAX-30. The relevance of quantity is represented by the number of pages used for risk reporting. Altogether, five independent variables are included in the regression model to explain the attitudes of enterprises towards risk reporting.

## Results

### *General Aspects*

In this section the main results of the empirical study are presented. As shown in table 3 the quantity of risk reporting varies between 3 and 27 pages. Companies listed in the ATX report on average 6,63 in the year 2007 in comparison to companies listed in the DAX-30 which report on average 11,56 pages in the year 2007. From the year 2007 to 2008 an increase of the quantity of risk reporting disclosures can be demonstrated for ATX and DAX-30 listed companies. The results also show that the quantity of risk reporting disclosures vary according to the index a company is listed. According to the descriptive data, the quantity of risk reporting disclosures of companies which are listed in the DAX-30 tend to be higher than for companies which are listed in the ATX.

Table 3: Quantity of risk reporting disclosures

	Companies listed in ATX		Companies listed in DAX-30	
	Number of pages in the year 2007	Number of pages in the year 2008	Number of pages in the year 2007	Number of pages in the year 2008
<b>Mean</b>	6,63	8,03	11,56	12,67
<b>Std. Deviation</b>	2,02	2,16	4,55	3,61
<b>Min.</b>	3,00	5,00	3,50	5,00
<b>Max.</b>	10,00	11,50	27,00	19,00
<b>25%-Quantil</b>	5,00	6,13	9,50	9,88
<b>Median</b>	7,00	8,50	11,50	13,75
<b>75%-Quantil</b>	8,00	9,50	13,00	16,00

As most industries (except the finance industry) have been affected by the financial crisis in the second half of the year 2008, an increase in the quantity of risk reporting could be caused by the financial crisis in the year 2008. Lenz and Diehm, 2010 even attribute the risk report disclosures a prognostic value.

### *Form*

In the years 2007 and 2008 in all companies the disclosed risk report information are separated from other disclosures and marked by a separate headline. In the year 2007/2008 six/five companies listed in the DAX-30 report about the chances in the risk management disclosures. According to the German Standard of risk reporting disclosures chances have to be presented outside the risk report. The number of risk categories varies between 4 and 20 categories (without financial risks). The study found that internal risks dominate external risks. In the year 2007/2008 166/183 internal types

of risk are mentioned in the risk reporting disclosures. Internals risks included mostly risks related to production, products, staff and/or information systems. In comparison only 109/124 external risks are reported in the risk reporting disclosures in the year 2007/2008. External risks include risks concerning price, regulation, industry and economic situation. Most companies use the possibility to report about their financial risks in their group accounting notes instead of the management report. All in all, the risk reporting disclosures of companies listed in the ATX as well as companies listed in the DAX-30 meet the requirements of the form of risk reporting disclosures.

Table 4: Results of analyzing the parameter „form“

<b>I. Form</b>	<b>Companies listed in the ATX</b>				<b>Companies listed in the DAX-30</b>			
<b>I.1. Separate and headline</b>	<b>absolute</b>		<b>relative</b>		<b>absolute</b>		<b>relative</b>	
	<b>2007</b>	<b>2008</b>	<b>2007</b>	<b>2008</b>	<b>2007</b>	<b>2008</b>	<b>2007</b>	<b>2008</b>
<b>Yes</b>	17	17	100,00%	100,00%	26	26	100,00%	100,00%
<b>No</b>	0	0	0,00%	0,00%	0	0	0,00%	0,00%
<b>total</b>	<b>17</b>	<b>17</b>	<b>100,00%</b>	<b>100,00%</b>	<b>26</b>	<b>26</b>	<b>100,00%</b>	<b>100,00%</b>
<b>I.2 Excluded from prospects</b>	<b>absolute</b>		<b>relative</b>		<b>absolute</b>		<b>relative</b>	
	<b>2007</b>	<b>2008</b>	<b>2007</b>	<b>2008</b>	<b>2007</b>	<b>2008</b>	<b>2007</b>	<b>2008</b>
<b>Yes</b>	17	17	100,00%	100,00%	26	26	100,00%	100,00%
<b>No</b>	0	0	0,00%	0,00%	0	0	0,00%	0,00%
<b>total</b>	<b>17</b>	<b>17</b>	<b>100,00%</b>	<b>100,00%</b>	<b>26</b>	<b>26</b>	<b>100,00%</b>	<b>100,00%</b>
<b>I.3 Are rewards presented outside the risk report?</b>	<b>absolute</b>		<b>relative</b>		<b>absolute</b>		<b>relative</b>	
	<b>2007</b>	<b>2008</b>	<b>2007</b>	<b>2008</b>	<b>2007</b>	<b>2008</b>	<b>2007</b>	<b>2008</b>
<b>Yes</b>	17	17	100,00%	100,00%	20	21	76,92%	80,77%
<b>No</b>	0	0	0,00%	0,00%	6	5	23,08%	19,23%
<b>Total</b>	<b>17</b>	<b>17</b>	<b>100,00%</b>	<b>100,00%</b>	<b>26</b>	<b>26</b>	<b>100,00%</b>	<b>100,00%</b>
<b>I.4 Clear Structure</b>	<b>absolute</b>		<b>relative</b>		<b>absolute</b>		<b>relative</b>	
	<b>2007</b>	<b>2008</b>	<b>2007</b>	<b>2008</b>	<b>2007</b>	<b>2008</b>	<b>2007</b>	<b>2008</b>
<b>Yes</b>	12	13	70,59%	76,47%	25	26	96,15%	100,00%
<b>No</b>	5	4	29,41%	23,53%	1	0	3,85%	0,00%
<b>total</b>	<b>17</b>	<b>17</b>	<b>100,00%</b>	<b>100,00%</b>	<b>26</b>	<b>26</b>	<b>100,00%</b>	<b>100,00%</b>
<b>I.5 Separation into categories and types</b>	<b>absolute</b>		<b>relative</b>		<b>absolute</b>		<b>relative</b>	
	<b>2007</b>	<b>2008</b>	<b>2007</b>	<b>2008</b>	<b>2007</b>	<b>2008</b>	<b>2007</b>	<b>2008</b>
<b>Yes</b>	14	15	82,35%	88,24%	25	25	96,15%	96,15%
<b>No</b>	3	2	17,65%	11,76%	1	1	3,85%	3,85%

<b>total</b>	<b>17</b>	<b>17</b>	<b>100,00%</b>	<b>100,00%</b>	<b>26</b>	<b>26</b>	<b>100,00%</b>	<b>100,00%</b>
<b>I.6 Presentation of financial risks in the management report</b>	<b>absolute</b>		<b>relative</b>		<b>absolute</b>		<b>relative</b>	
	<b>2007</b>	<b>2008</b>	<b>2007</b>	<b>2008</b>	<b>2007</b>	<b>2008</b>	<b>2007</b>	<b>2008</b>
<b>Yes</b>	1	0	94,12%	100,00%	3	3	88,46%	88,46%
<b>No</b>	16	17	5,88%	0,00%	23	23	11,54%	11,54%
<b>total</b>	<b>17</b>	<b>17</b>	<b>100,00%</b>	<b>100,00%</b>	<b>26</b>	<b>26</b>	<b>100,00%</b>	<b>100,00%</b>

## Risk Management

Only one company gives some information about the forecasting horizon in the financial year 2008. The term “risk” is neither defined in the law nor in the literature, that is why the definition of the term “risk” has to be explained to the users in the risk management report. In the financial year 2007 or 2008 only eight (18,60 %) or ten (23,25 %) of the considered companies explain their understanding of “risk”. The companies of the ATX fulfill the requirement to explain “risk” in comparison with the companies of the DAX-30 almost equally. The majority defines risk as a negative deviate from the expected value or another comparative value. More than 36 (83,72 %) or 37 (86,05 %) of the considered companies present the objectives and strategy of risk management. In general, companies which are listed in the DAX-30 fulfill the requirement better than ATX companies do. Concerning risk communication attention is paid to information process within the group accounts. In the financial years 2007 or 2008 in 29 (67,44 %) or 30 (69,77 %) risk management reports provide an appropriate information of risk communication. Companies which are listed in the DAX-30 offer more information about their risks than companies which are listed in the ATX. At least, 36 (83,72 %) or 38 (88,37 %) of the considered companies make a statement about the implementation of risk management. The presentation of the process of risk management is necessary to see how the companies handle risks. Although an information about the process of risk management is only mandatory for companies which are listed in the DAX-30, 30 (69,77 %) or 31 (72,09 %) of the considered companies present the process of risk management reporting in the financial year 2007 or 2008. Reporting on methods in order to identify risks is important for users as to get an idea how companies recognize potential risks and take necessary measures against it. The willingness to provide information about such risks is small. It is obvious, that the number of methods to identify risks is limited. For example risk inventory, market analyses or interviews with employees are methods mentioned in the risk reports. In the financial year 2007 seven companies (16,28%) explained the internal review process. The number of companies explaining the tasks of risk management and the internal review process declined in the financial year 2008 to twelve. Furthermore, the German and Austrian regulations require information about risks that could affect decisions of the users of risk reports. This scope is extensive. Therefore, companies should define their understanding of materiality in the context to risks. In 2007 19 companies provided adequate information in comparison to only 18 companies in the year 2008.



Table 5: Results of analyzing the parameter risk management reporting

II. Risk management	Companies listed in the ATX				Companies listed in the DAX-30			
	absolute		relative		absolute		relative	
II.1. Forecasting horizon	2007	2008	2007	2008	2007	2008	2007	2008
Yes	0	0	0,00%	0,00%	0	1	0,00%	3,85%
No	17	17	100,00%	100,00%	26	25	100,00%	96,15%
<b>total</b>	<b>17</b>	<b>17</b>	<b>100,00%</b>	<b>100,00%</b>	<b>26</b>	<b>26</b>	<b>100,00%</b>	<b>100,00%</b>
II.2. Definition of "risk"	absolute		relative		absolute		relative	
	2007	2008	2007	2008	2007	2008	2007	2008
Yes	3	4	17,65%	23,53%	5	6	19,23%	23,08%
No	14	13	82,35%	76,47%	21	20	80,77%	76,92%
<b>total</b>	<b>17</b>	<b>17</b>	<b>100,00%</b>	<b>100,00%</b>	<b>26</b>	<b>26</b>	<b>100,00%</b>	<b>100,00%</b>
II.3 Objectives and strategy of risk management	absolute		relative		absolute		relative	
	2007	2008	2007	2008	2007	2008	2007	2008
Yes	12	12	70,59%	70,59%	24	25	92,31%	96,15%
No	5	5	29,41%	29,41%	2	1	7,69%	3,85%
<b>total</b>	<b>17</b>	<b>17</b>	<b>100,00%</b>	<b>100,00%</b>	<b>26</b>	<b>26</b>	<b>100,00%</b>	<b>100,00%</b>
II.4. Communication about risk management	absolute		relative		absolute		relative	
	2007	2008	2007	2008	2007	2008	2007	2008
Yes	6	7	35,29%	41,18%	23	23	88,46%	88,46%
No	11	10	64,71%	58,82%	3	3	11,54%	11,54%
<b>total</b>	<b>17</b>	<b>17</b>	<b>100,00%</b>	<b>100,00%</b>	<b>26</b>	<b>26</b>	<b>100,00%</b>	<b>100,00%</b>
II.5. Implementation of risk management	absolute		relative		absolute		relative	
	2007	2008	2007	2008	2007	2008	2007	2008
Yes	13	14	76,47%	82,35%	23	24	88,46%	92,31%
No	4	3	23,53%	17,65%	3	2	11,54%	7,69%
<b>total</b>	<b>17</b>	<b>17</b>	<b>100,00%</b>	<b>100,00%</b>	<b>26</b>	<b>26</b>	<b>100,00%</b>	<b>100,00%</b>
II.6. Process of risk management	absolute		relative		absolute		relative	
	2007	2008	2007	2008	2007	2008	2007	2008
Yes	8	9	47,06%	52,94%	22	22	84,62%	84,62%
No	9	8	52,94%	47,06%	4	4	15,38%	15,38%
<b>total</b>	<b>17</b>	<b>17</b>	<b>100,00%</b>	<b>100,00%</b>	<b>26</b>	<b>26</b>	<b>100,00%</b>	<b>100,00%</b>
II.7. Methods to identify risks	absolute		relative		absolute		relative	
	2007	2008	2007	2008	2007	2008	2007	2008

QUALITY AND DETERMINANTS OF RISK REPORTING –  
EVIDENCE FROM GERMANY AND AUSTRIA

<b>Yes</b>	3	5	17,65%	29,41%	11	13	42,31%	50,00%
<b>No</b>	14	12	82,35%	70,59%	15	13	57,69%	50,00%
<b>total</b>	<b>17</b>	<b>17</b>	<b>100,00%</b>	<b>100,00%</b>	<b>26</b>	<b>26</b>	<b>100,00%</b>	<b>100,00%</b>
<b>II.8. Internal review process</b>	<b>absolute</b>		<b>relative</b>		<b>absolute</b>		<b>relative</b>	
	<b>2007</b>	<b>2008</b>	<b>2007</b>	<b>2008</b>	<b>2007</b>	<b>2008</b>	<b>2007</b>	<b>2008</b>
<b>Yes</b>	3	6	17,65%	35,29%	4	6	15,38%	23,08%
<b>No</b>	14	11	82,35%	64,71%	22	20	84,62%	76,92%
<b>total</b>	<b>17</b>	<b>17</b>	<b>100,00%</b>	<b>100,00%</b>	<b>26</b>	<b>26</b>	<b>100,00%</b>	<b>100,00%</b>
<b>II.9. Materiality of risks</b>	<b>absolute</b>		<b>relative</b>		<b>absolute</b>		<b>relative</b>	
	<b>2007</b>	<b>2008</b>	<b>2007</b>	<b>2008</b>	<b>2007</b>	<b>2008</b>	<b>2007</b>	<b>2008</b>
<b>Yes</b>	5	6	29,41%	35,29%	14	12	53,85%	46,15%
<b>No</b>	12	11	70,59%	64,71%	12	14	46,15%	53,85%
<b>total</b>	<b>17</b>	<b>17</b>	<b>100,00%</b>	<b>100,00%</b>	<b>26</b>	<b>26</b>	<b>100,00%</b>	<b>100,00%</b>

## Overall Risks

According to the Austrian and German regulations companies have to present risks which may lead to an insolvency. Furthermore, companies have to make a negative statement, if there is no risk of insolvency. Even with the beginning of the financial crisis not a single company reported risks which may lead to an insolvency or any risk concentrations in the group. 28 companies explicitly reported a negative statement implying that there is no risk of insolvency. In the years 2007 and 2008 the number of companies making a general statement about the risk situation of the group increased from 25 to 28 companies. However, most of the companies which made a general statement about the risk situation of the group are companies listed in the DAX. An increasing number of 13 companies which are listed in the DAX-30 also reported in the year 2008 the priority of risks in their risk reporting disclosures, whereas only one company which is listed in the ATX reports about the priority of risks.

Table 6: Results of analyzing the parameter “overall risks”

III. Overall risks	Companies listed in the ATX				Companies listed in the DAX-30			
	absolute		relative		absolute		relative	
III.1. Report of risk which may lead to insolvency or a negative statement of it	2007	2008	2007	2008	2007	2008	2007	2008
Yes	0	0	0,00%	0,00%	0	0	0,00%	0,00%
Negative statement	8	8	47,06%	47,06%	20	20	76,92%	76,92%
No	9	9	52,94%	52,94%	6	6	23,08%	23,08%
<b>Total</b>	<b>17</b>	<b>17</b>	<b>100,00%</b>	<b>100,00%</b>	<b>26</b>	<b>26</b>	<b>100,00%</b>	<b>100,00%</b>
III.2. Risk concentrations	absolute		relative		absolute		relative	
	2007	2008	2007	2008	2007	2008	2007	2008
Yes	0	0	0,00%	0,00%	0	0	0,00%	0,00%
no	17	17	100,00%	100,00%	26	26	100,00%	100,00%
<b>Total</b>	<b>17</b>	<b>17</b>	<b>100,00%</b>	<b>100,00%</b>	<b>26</b>	<b>26</b>	<b>100,00%</b>	<b>100,00%</b>
III.3. Interdependences between risks	absolute		relative		absolute		relative	
	2007	2008	2007	2008	2007	2008	2007	2008
Yes	0	0	0,00%	0,00%	0	0	0,00%	0,00%
In relation to risks which could lead to insolvency	1	1	5,88%	5,88%	5	6	19,23%	23,08%
No	16	16	94,12%	94,12%	21	20	80,77%	76,92%
<b>Total</b>	<b>17</b>	<b>17</b>	<b>100,00%</b>	<b>100,00%</b>	<b>26</b>	<b>26</b>	<b>100,00%</b>	<b>100,00%</b>
III.4. General statement about risks	absolute		relative		absolute		relative	
	2007	2008	2007	2008	2007	2008	2007	2008
Yes	4	5	23,53%	29,41%	21	23	80,77%	88,46%
No	13	12	76,47%	70,59%	5	3	19,23%	11,54%
<b>Total</b>	<b>17</b>	<b>17</b>	<b>100,00%</b>	<b>100,00%</b>	<b>26</b>	<b>26</b>	<b>100,00%</b>	<b>100,00%</b>
III.5. Priority of risks	absolute		relative		absolute		relative	
	2007	2008	2007	2008	2007	2008	2007	2008
Yes	1	1	5,88%	5,88%	7	13	26,92%	50,00%
No	16	16	94,12%	94,12%	19	13	73,08%	50,00%
<b>Total</b>	<b>17</b>	<b>17</b>	<b>100,00%</b>	<b>100,00%</b>	<b>26</b>	<b>26</b>	<b>100,00%</b>	<b>100,00%</b>

## Individual Risks

With regard to the presentation of risks and their qualitative consequences in the financial year 2007 two reports of risk managements were assessed with “inadequate”, eight with “adequate” and 29 with “highly detailed”. In 2008 the reporting of risk management showed a slight tendency to rise. Only two reports were assessed with “inadequate reported”. Four reports of risk management were “adequate” and at least 35 were “highly detailed”. In 2007 and 2008 two companies of the ATX did not report any individual risks or explained their possible consequences. According to the German requirements, risks do not need to be quantified unless several criteria are met. In the financial years 2007 and 2008 quantitative estimates are only made by three DAX-30 companies. These three companies disclosed the methods and estimates used to quantify individual risks. Furthermore, companies have to present the handling techniques for existing specific risks. As shown in table 7 companies which are listed in the DAX-30 report about their handling techniques and mostly highly detailed and fulfill the criteria better than companies which are listed in the ATX do.

Table 7: Results of analyzing the parameter “individual risks”

IV. Individual Risks	Companies listed in ATX				Companies listed in DAX-30			
	absolute		relative		absolute		relative	
	2007	2008	2007	2008	2007	2008	2007	2008
IV.1. Presentation of risks and explanation of possible consequences?								
No statement	2	2	11,76%	11,76%	0	0	0,00%	0,00%
Inadequate	2	1	11,76%	5,88%	2	1	7,69%	3,85%
Adequate	4	3	23,53%	17,65%	4	1	15,38%	3,85%
Highly detailed	9	11	52,94%	64,71%	20	24	76,92%	92,31%
<b>Total</b>	<b>17</b>	<b>17</b>	<b>100,00%</b>	<b>100,00%</b>	<b>26</b>	<b>26</b>	<b>100,00%</b>	<b>100,00%</b>
IV.2. Estimated quantitative consequence of an individual risk								
Yes	0	0	0,00%	0,00%	3	3	11,54%	11,54%
No	17	17	100,00%	100,00%	23	23	88,46%	88,46%
<b>Total</b>	<b>17</b>	<b>17</b>	<b>100,00%</b>	<b>100,00%</b>	<b>26</b>	<b>26</b>	<b>100,00%</b>	<b>100,00%</b>
IV.3. Are methods to quantify individual risks presented?								
No statement	0	0	0,00%	0,00%	0	0	0,00%	0,00%
Inadequate	0	0	0,00%	0,00%	0	0	0,00%	0,00%
Adequate	0	0	0,00%	0,00%	1	0	33,33%	0,00%
Highly detailed	0	0	0,00%	0,00%	2	3	66,67%	100,00%
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0,00%</b>	<b>0,00%</b>	<b>3</b>	<b>3</b>	<b>100,00%</b>	<b>100,00%</b>

IV.4. Information to handle an individual risk	absolute		relative		absolute		relative	
	2007	2008	2007	2008	2007	2008	2007	2008
No statement	2	1	11,76%	5,88%	0	0	0,00%	0,00%
Inadequate	4	4	23,53%	23,53%	2	1	7,69%	3,85%
Adequate	5	5	29,41%	29,41%	6	4	23,08%	15,38%
Highly detailed	6	7	35,29%	41,18%	18	21	69,23%	80,77%
<b>Total</b>	<b>17</b>	<b>17</b>	<b>100,00%</b>	<b>100,00%</b>	<b>26</b>	<b>26</b>	<b>100,00%</b>	<b>100,00%</b>

## Financial Risks

The German and Austrian GAAP also requires special disclosures for financial instruments. The analysis shows that quality of risk management objectives and policies for financial instruments differ. As presented in table 8, companies which are listed in the DAX-30 present their financial risk disclosure more detailed than companies listed in the ATX. Although, at least all companies which are listed in the ATX report about their risk management objectives and policies for financial instruments. Whereas in 2007/2008 four/two companies which are listed in the DAX-30 do not report about their risk management objectives and policies. The results also indicate that companies report their price and liquidity/cash flow risks mostly detailed. Only a small number of companies reports inadequately about their price and liquidity/cash flows. Room for improvements exists for credit risks. However, all companies report their handling techniques concerning financial risks.

Table 8: Results of analyzing the parameter “financial instruments”

V. Financial risks	Companies listed in ATX				Companies listed in DAX-30			
V.1. Risk management objectives and policies	absolute		relative		absolute		relative	
	2007	2008	2007	2008	2007	2008	2007	2008
No statement	0	0	0,00%	0,00%	4	2	15,38%	7,69%
Inadequate	8	6	47,06%	35,29%	5	4	19,23%	15,38%
Adequate	5	7	29,41%	41,18%	8	8	30,77%	30,77%
Highly detailed	4	4	23,53%	23,53%	9	12	34,62%	46,15%
<b>Total</b>	<b>17</b>	<b>17</b>	<b>100,00%</b>	<b>100,00%</b>	<b>26</b>	<b>26</b>	<b>100,00%</b>	<b>100,00%</b>
V.2. Price risk	absolute		relative		absolute		relative	
	2007	2008	2007	2008	2007	2008	2007	2008
No statement	0	0	0,00%	0,00%	0	0	0,00%	0,00%
Inadequate	2	2	11,76%	11,76%	2	0	7,69%	0,00%
Adequate	4	3	23,53%	17,65%	4	4	15,38%	15,38%
Highly detailed	11	12	64,71%	70,59%	20	22	76,92%	84,62%

QUALITY AND DETERMINANTS OF RISK REPORTING –  
EVIDENCE FROM GERMANY AND AUSTRIA

<b>Total</b>	<b>17</b>	<b>17</b>	<b>100,00%</b>	<b>100,00%</b>	<b>26</b>	<b>26</b>	<b>100,00%</b>	<b>100,00%</b>
	<b>absolute</b>		<b>relative</b>		<b>absolute</b>		<b>relative</b>	
<b>V.3. Credit risk</b>	<b>2007</b>	<b>2008</b>	<b>2007</b>	<b>2008</b>	<b>2007</b>	<b>2008</b>	<b>2007</b>	<b>2008</b>
<b>No statement</b>	0	0	0,00%	0,00%	1	1	3,85%	3,85%
<b>Inadequate</b>	5	5	29,41%	29,41%	7	5	26,92%	19,23%
<b>Adequate</b>	7	6	41,18%	35,29%	7	9	26,92%	34,62%
<b>Highly detailed</b>	5	6	29,41%	35,29%	11	11	42,31%	42,31%
<b>Total</b>	<b>17</b>	<b>17</b>	<b>100,00%</b>	<b>100,00%</b>	<b>26</b>	<b>26</b>	<b>100,00%</b>	<b>100,00%</b>
<b>V.4.Liquidity and cash flow risk</b>	<b>absolute</b>		<b>relative</b>		<b>absolute</b>		<b>relative</b>	
	<b>2007</b>	<b>2008</b>	<b>2007</b>	<b>2008</b>	<b>2007</b>	<b>2008</b>	<b>2007</b>	<b>2008</b>
<b>No statement</b>	1	0	5,88%	0,00%	2	1	7,69%	3,85%
<b>Inadequate</b>	4	3	23,53%	17,65%	4	3	15,38%	11,54%
<b>Adequate</b>	1	3	5,88%	17,65%	3	2	11,54%	7,69%
<b>Highly detailed</b>	11	11	64,71%	64,71%	17	20	65,38%	76,92%
<b>Total</b>	<b>17</b>	<b>17</b>	<b>100,00%</b>	<b>100,00%</b>	<b>26</b>	<b>26</b>	<b>100,00%</b>	<b>100,00%</b>
<b>V.5. Techniques to handle risks</b>	<b>absolute</b>		<b>relative</b>		<b>absolute</b>		<b>relative</b>	
	<b>2007</b>	<b>2008</b>	<b>2007</b>	<b>2008</b>	<b>2007</b>	<b>2008</b>	<b>2007</b>	<b>2008</b>
<b>Yes</b>	17	17	100,00%	100,00%	26	26	100,00%	100,00%
<b>No</b>	0	0	0,00%	0,00%	0	0	0,00%	0,00%
<b>Total</b>	<b>17</b>	<b>17</b>	<b>100,00%</b>	<b>100,00%</b>	<b>26</b>	<b>26</b>	<b>100,00%</b>	<b>100,00%</b>

### General statement about the quality of risk reporting

In this section the main results of the empirical study are presented. As table 9 shows no company receives all points of the scoring model. In 2007 companies listed in the DAX-30 received 27 points on average for their risk reporting. Companies listed in the ATX got on average only 21 points. Table 9 provides evidence that companies which are listed in the DAX-30 report their risk reporting information with higher quality than companies which are listed in the ATX. These results are similar to those of Ewelt, C. et al., 2009. Ewelt et al., 2009 found that DAX-30 companies show the highest quality of risk reporting in comparison to other German indexes. As the number of individual risks increased in 2008, the financial crisis might had an effect on risk reporting. But as companies are affected by financial crisis in the second half of 2008, an increasing number of risks in 2008 indicates that companies show risks which are on the horizon.

Table 9: Results of evaluation

	Companies listed in ATX		Companies listed in the DAX-30	
	Evaluation in points in 2007	Evaluation in points in 2008	Evaluation in points in 2007	Evaluation in points in 2008
<b>Mean</b>	21	23	27	28
<b>Median</b>	22	23	27	30
<b>Stand. Deviation</b>	5	4	4	4
<b>Min.</b>	13	15	17	17
<b>Max.</b>	28	31	36	36
<b>25%-Quantil</b>	18	19	25	26
<b>75%-Quantil</b>	25	27	30	31

Maximum points of the scoring model = 42

## Results of regression model

The results of the regression model are summarised in the table below. The author finds statistical evidence that the information quality of risk reporting is influenced by the quantity of risk reporting. The results of the regression model show that quality increases significantly with the number of pages of risk reporting which are disclosed. The study also shows that index influences the quality of risk reporting. According to the results, companies which are listed in the DAX-30 have statistically a higher quality of risk reporting. The study found no evidence that the firm size influences the information quantity of risk reporting disclosures statistically significant.

Table 10: Results of multiple linear regression model

	<b>Regression coefficient (Beta)</b>	<b>T</b>	<b>Sig.</b>	<b>VIF</b>
Number of pages	0,58	5,75	0,00	1,70
Sales	-0,04	-0,29	0,77	2,89
Total assets	-0,03	-0,26	0,80	2,74
Index	0,26	2,61	0,01	1,62

N= 86, R<sup>2</sup>= 0,511, adjusted R<sup>2</sup>= 0,486

## Conclusions

This paper attempted to establish a scoring model for the analysis of the information quality of risk reporting. As indicated above, according to German and Austrian GAAP the scoring model included five parameters (form, risk management, overall, individual and financial risks). The analyses show that no company fulfils all criteria of the scoring model and information quality of risk reporting is not uniform across companies. Furthermore, there is a steady increase of the information quality of risk reporting from 2007 to 2008. The results of the multiple regression model indicate that the quantity of risk reporting and the index a company is listed in, are statistically significant in determining the information quality of risk reporting disclosures.

The study faces the following limitations. First, only two periods of reporting are analyzed. Second, the sample includes only German and Austrian companies in the prime stock market. Second, the results of a scoring model are always influenced by a validity problem. Third, the evaluation of a scoring model requires the identification of a vast number of dimensions to information quality that potentially exist. However, these aspects offer fruitful avenues for further research.

## References

- Abraham, S. and Cox, P. 2007, Analysing the determinants for narrative risk information in UK FTSE 100 annual reports, *The British Accounting Review*, pp. 227-248.
- Adams, C. A., Coutts, A. and Harte G., 1995, Corporate equal opportunities (non-)disclosure, *The British Accounting Review*, pp. 87-108.
- Buhr, N., 1998, Environmental performance, legislation and annual report disclosure: the case of acid rain and Falconbridge, *Accounting, Auditing and Accountability Journal*, pp. 163-190.
- Cowen, S. S.; Ferreri, L. B. and Parker, L. D. (1987), The Impact of corporate characteristics on social responsibility disclosure: a typology and frequency-based analysis, *Accounting, Organizations and Society*, pp. 111-122.
- Deegan, C. and Rankin, M. 1996, Do Australian companies report environmental news objectively? An analysis of environmental disclosures by firms prosecuted successfully by the Environmental Protection Authority, *Accounting, Auditing & Accountability Journal*, pp. 50-67.
- Ewelt, C.; Knauer, T. and Sieweke, M. 2009, Mehr = besser? Zur Entwicklung des Berichtsumfangs in der Unternehmenspublizität am Beispiel der risikoorientierten Berichterstattung deutscher Aktiengesellschaften, *Zeitschrift für kapitalmarktorientierte und internationale Rechnungslegung*, pp. 706-715.
- Fischer, T. M. and Vielmeyer, U. 2004: Analyse von Risk Disclosure Scores: Risikoorientierte Unternehmenspublizität der DAX 100-Unternehmen, *Zeitschrift für kapitalmarktorientierte und internationale Rechnungslegung*, pp. 459-474.
- Lenz, H. and Diehm, J. 2010, Einfluss der Finanz- und Wirtschaftskrise auf die Risikoberichterstattung im SDAX, *Zeitschrift für kapitalmarktorientierte und internationale Rechnungslegung*, pp. 385-394.
- Neu, D., Warsame, H. and Pedwell, K. 1998, Managing public impressions: environmental disclosures in annual reports, *Accounting, Organizations and Society*, pp. 265-282.



# THE EFFECTS OF GLOBAL FINANCIAL CRISIS ON THE BEHAVIOUR OF EUROPEAN BANKS: A RISK AND PROFITABILITY ANALYSIS APPROACH

Mehmet Hasan EKEN<sup>1</sup>, Huseyin SELIMLER<sup>2</sup>, Suleyman KALE<sup>3</sup>, Veysel Ulusoy<sup>4</sup>

<sup>1</sup> Kadir Has University

<sup>2</sup> T.C. Ziraat Bank

<sup>3</sup> T.C. Ziraat Bank

<sup>4</sup> Yeditepe University

***Abstract.** The effects of global financial crisis have been severe on banks. Many banks went bankrupt and many are in distress due to their sensitivities, stored in their balance sheets, to financial risks enlarged by the crisis. Some of banks, on the other hand, have felt the effects slightly. Recalling that total risk is sum of two parts of risk namely; volatility and sensitivity and that volatility is not under the discretion of banks, i.e. externally determined, it is assumed that the degree of banks getting affected by the global financial crisis is largely dependent on their sensitivities to risks. Banks' sensitivities to risks are assumed to be under the control of banks. Thus, in line with their risk appetite, banks can always change the structure of their balance sheet to alter their sensitivities to financial and non financial risks. In this paper it is targeted to analyze and compare the balance sheet structure banks from 27 European countries in order to find their sensitivities to different financial risks such as credit risk and liquidity risk. It will further be analyzed how banks' balance sheet structures have been altered after the crisis. To observe the behavioural variations (if there is any) of banks getting affected by financial crisis, the analysis is widened to include different characteristics of banks such as; the country where they are operating, region where they are belong to, scale of their operations, their ownership, their type and etc..*

***JEL:** G15, G21, G32*

***KEYWORDS:** Global crisis, banking, balance sheet structure.*

## Introduction

Banks are intermediary institutions that borrow funds from surplus spending units (SSUs) for lending to deficit spending units (DSUs)(Sinkey (1989)). Depositing their money in banks, SSU's target to secure a certain rate of return on their savings while immunizing their investments against all types of risks. On the other hand, the main purposes of DSUs those borrow from banking industry are to fix the cost of their borrowings and protect themselves from the effects of risks. This helps both SSUs and DSUs to eliminate uncertainty related to their operations.

These purposes of DSUs and SSUs increase pressure on banks to undertake the unwanted risks that they are exposed to. Thus by providing their customers with intermediation activities, banks implicitly purchase those unwanted risks from the customers that wishes to be free of them. This leaves banks with the management of risks bourn of their activities yet allow them to charge their customers with a risk premium. Thus, one of key issues in banking is the management of risks in order to secure a certain rate of return on capital and/or maximizing the value of their shareholders' equities.

This is easily done in prosperous times. However, in the times of financial disasters it becomes a major threat to the profitability and/or market value of banks. This works in different ways for risk prone and risk averse banks. Recalling that risk is composed of two parts namely; volatility and sensitivity, (Eken, (2005)), risk prone (averse) banks' usually prefer a high (low) level of sensitivity to volatility which is a nondiscretionary factor. Thus in the times of financial turmoil it is expected that risk prone banks' profitability will get affected badly much more than risk averse banks. On the other hand, when volatility is at relatively low levels, risk prone banks' profitability will remain higher than risk averse banks' figures, provided all the other things remain constant.

Volatility goes up sharply during financial turmoil periods and therefore the risk taking preferences of investors and banks is widely believed to shrink to their minimum levels. It is believed that even risk prone investors move towards the direction of becoming risk averse in order to limit their exposure to default risk and other financial and non-financial risks. De Haas and Van Horen (2009) provided evidence that during financial crisis banks tend to increase their activities with regard to monitoring and screening of borrowers in order to better control their exposures to default risk. Ivashina and Scharfstein (2010) indicated that banks lending fell significantly during the financial crisis. The largest fall was of those banks that had limited access to financing with deposits.

On the other hand regulators target to control and/or minimise banks' lending activities by imposing tighter regulations. Barajas et al. (2010) examined the effects of tighter liquidity and capital constraints on the ability of banks' lending activities. Their results indicated that rather than liquidity, capital constraints were found more effective in controlling banks' lending facilities.

Another issue is that whether banks that are internationally oriented behave different than banks that are locally oriented. De Haas and Van Horen (2011) indicated that during the global financial crisis banks were better able to keep lending to countries in which they were well integrated into a network of domestic co-lenders during the financial crisis in Europe.

In this paper we will analyse changes in the balance sheet structure of European banks in order to pinpoint changes in their risk preferences and behaviours during the period in analysis.

The analysis will be performed based on different perspectives such as size, ownership, region and quotation in a stock exchange in order to better understand the behaviour of banks and their characteristics in dealing with their exposures.

In the following sections firstly an overview of European banking industry is introduced followed with the description of data employed in analysis. After that the behaviour of banks will be thoroughly analyzed with specific references to their risk preferences and profitability ratios. The geographical location, size, ownership and quotation at stock exchange will be the characteristics of banks to be considered while performing the analysis.

## **An Overview of the European Banking System**

During the last decade, the European banking sector has been witness to substantial changes as a result of technological improvements, including innovative and sophisticated instruments which have led to highly leveraged market conditions, plentiful global liquidity appearing as a boom in commodity prices, deregulation and integration, globalization of financial markets with increasing activities of foreign banks, and growth of cross-border activities and a geographically widespread business volume. The creation of single financial market and the introduction of the Euro have led to converged interest rates and market structures of member countries. In competitive financial market conditions, banks have searched for ways to improve efficiency and profitability by trying to penetrate into new markets and by increasing the product range they serve, which has resulted in consolidations, mergers and acquisitions, as in other parts of the world (Asimakopoulou and Athanasoglou, 2009). According to the ECB, the number of credit institutions in EU27 decreased to 8.356 in 2009 from EU25s' 9.363 in 2001 and Euro-EU12s' 7.213 in 2001 decreased to Euro-EU16s' 6458 in the same period. The recent credit crisis followed by a debt crisis in Europe forced, also, a substantial number of compulsory merger and acquisition operations in last few years. The total value of mergers and acquisitions in the banking sector reached to its peak at €152 billion in 2008 following €140 which includes ABN Amro's €71 billion in 2007 and €99 in 2006.

In parallel to the decreasing number of banks, as a result of mergers and acquisitions, market concentration has increased (Fiordelisi, 2009). The seven biggest banking sectors, in the UK, France, Germany, Italy, Spain, Netherlands and Switzerland, constitute more than 75% of total banking sectors among EBF members. The Netherlands and Germany differ exceptionally from the others, with the Netherlands at an 85% high and Germany at a 25% low, which indicates a fragmented banking sector and concentration ratios.

The Herfindahl Index (in which greater value indicates less competition, more market power, more concentration) for credit institutions increased from 0.0506 in 2001 for EU25 to 0.0632 in 2009 for EU27; similarly, the share of total assets of the five largest credit institutions increased from 37.8% to 44.3%. But the importance of the banking sector has continued to increase in the EU; the number of branches rose from 206,265 to 229,532 and total assets increased from €24.7 trillion to €42.2 trillion during this period, in spite of losses caused by the crisis.

Despite all of the EU-specific and global incentives towards convergence and integration, the structure of the banking system and financial regulatory and supervisory framework still displays different characteristics among European countries, as each has gone through unique historical backgrounds and financial experiences. For example, the financial supervisory system of France, Italy and Spain are marked by a functional approach in which each type of business has its own functional regulator; in contrast, the UK, Germany and Switzerland have taken an integrated approach, indicating that a single universal regulator performs all regulation and supervision tasks. The jurisdictions in the Netherlands use a twin-peaks approach in which regulatory functions are separated between two regulators: one that performs the safety and soundness supervision function and the other that focuses on conduct-of-business regulation (Group of Thirty, 2008).

## Data and Methodology

BankScope data of 1.123 commercial, saving and cooperative banks which have asset value of more than \$1 billion as of 2010 year end, from 27 European Union members and Turkey are used. Total assets of analysed banks are \$52.917 billion which represent about 86.57% all banking sectors in these countries by assets and 34.04% by bank number.

Table 1: Banking Data Obtained From Bankscope

Countries	Number of Banks Being Analysed	Total Assets 2010 (\$1000)	Number of Banks Analysed/Total Number of Banks %	Total Assets of Banks Analysed/Total Banks' Assets %
Austria	48	875.330.457	22,02	72,99%
Belgium	16	1.569.072.476	47,06	95,06%
Bulgaria	7	24.253.123	33,33	52,13%
Cyprus	5	91.412.884	50,00	95,42%
Czech Republic	13	189.509.507	72,22	93,62%
Denmark	13	1.120.916.360	13,27	94,92%
Estonia	1	5.779.620	16,67	17,28%
Finland	5	582.405.151	50,00	95,82%
France	109	14.868.324.377	57,37	89,32%
Germany	535	6.643.289.122	34,97	79,53%
Greece	13	600.710.470	72,22	97,48%
Hungary	8	122.719.010	47,06	93,21%
Ireland	7	710.093.825	58,33	90,78%
Italy	110	3.803.404.061	20,64	80,51%
Latvia	5	17.011.589	23,81	50,20%
Lithuania	2	16.083.069	18,18	52,85%
Luxembourg	30	549.807.665	48,39	69,76%
Malta	1	7.568.895	12,50	57,98%
Netherlands	15	2.627.397.206	57,69	81,83%
Poland	20	274.120.990	55,56	84,79%
Portugal	11	505.376.421	44,00	92,14%
Romania	9	66.053.393	37,50	71,20%

Countries	Number of Banks Being Analysed	Total Assets 2010 (\$1000)	Number of Banks Analysed/Total Number of Banks %	Total Assets of Banks Analysed/Total Banks' Assets %
Slovakia	6	51.748.532	50,00	77,30%
Slovenia	10	56.107.298	55,56	81,42%
Spain	46	3.854.412.347	36,51	70,05%
Sweden	13	948.044.038	17,81	96,57%
Turkey	20	636.729.142	76,92	99,35%
United Kingdom	45	12.099.608.321	38,79	96,34%
<b>Total</b>	<b>1123</b>	<b>52.917.289.348</b>	<b>34,04</b>	<b>86,57%</b>

Descriptive statistics of data are provided in Table 2. The wide ranges between min and max figures profitability and leverage that cause large standard deviations are due to two factors: wide number of banks, size of banks and financial crisis. The most similarity is seen in loans/assets and consumer credits/total credits for which lowest standard deviations were calculated.

Table 2: Descriptive Statistics of Data

Ratios Analysed	Mean	Std. Dev.	Min	Max	CV
Net Interest Margin (NIM)	0,024	0,014	0,007	0,062	0,597
Return On Assets (ROA)	0,007	0,013	-0,056	0,032	1,775
Return On Equity (ROE)	0,092	0,197	-1,361	0,311	2,150
Leverage	17,572	7,067	7,042	35,741	0,402
Regulatory Capital/Risk Weighted Assets	0,119	0,272	0,061	0,224	2,286
Regulatory Tier 1 Capital/Risk-Weighted Assets	0,088	0,030	0,000	17,690	0,341
Total Loans/Assets	0,586	0,139	0,222	0,873	0,238
Consumer Credits/Total Credits	0,131	0,122	0,000	0,490	0,934
NPL/Gross Loans	0,040	0,037	0,002	0,234	0,929
Liquid Assets/Total Assets	0,208	0,083	0,087	0,517	0,398

The methodology employed in this paper is based on trend analysis and panel data analysis of banks' data for a pre-determined time period. For the purpose of analysis different tables containing trends in banks' balance sheet structures are prepared as using raw data from Bankscope to identify different behaviour of European Banks towards risk taking activities and profitability in line with the perspectives mentioned earlier.

## Analysis of Profitability

As can be seen from the below Table 3, the average Net Interest Margin (NIM) of European Banks is slightly up from 12% in 2006 to 14% in 2010. Considering that NIM is the difference between weighted average return on earning assets and weighted average cost of liabilities, it is important to note that banks managed to increase it during the financial crisis. However we see this as an illusion due to the accounting rules and standards that help banks to isolate their NIM figures from the effects of provisions for impaired assets<sup>1</sup>.

The effect of provision for bad assets is witnessed in the figures of Return on Assets (ROA) and Return on Equities (ROE) shown in Table 4 and Table 5 respectively. As can be seen from these two tables, the ROA and ROE ratios are sharply down in the years of financial crisis mainly due to the sharp increases in provisions for non-performing assets.

The slightly up NIM figures during the financial crisis imply that banks tend to continue their businesses in line with their past experiences and preferences. They continue to focus on protecting the difference between their lending and borrowing rates for the sake of profitability and running their businesses as usual. This management behaviour seems to be un-sensitive to financial crisis. It is likely that on average European banks' approach to their customers did not change that they preferred to make a classification between their customers based on their measured riskiness and kept the pre crisis relationship with those customers considered less risky than others.

---

<sup>1</sup>In this paper we avoid using “non-performing loans” instead we prefer to use a phrase; “non-performing assets” that is wide enough to include any type of lending in the forms of loans, bonds, etc.

Table 3: Net Interest Margin

<b>Number of Banks</b>	<b>Categories</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>Average</b>
1103	EU 27	0,012	0,012	0,013	0,013	0,014	0,013
1021	EU 16	0,012	0,011	0,012	0,013	0,014	0,012
82	EU ENLARGED 11	0,034	0,035	0,036	0,034	0,036	0,035
968	EU AREA 17	0,012	0,012	0,013	0,014	0,015	0,013
135	NON-EURO AREA 10	0,012	0,012	0,011	0,010	0,012	0,011
37	State	0,015	0,015	0,014	0,013	0,013	0,014
1086	Non-State	0,012	0,012	0,013	0,014	0,014	0,013
109	Listed	0,013	0,013	0,015	0,016	0,016	0,014
1014	Unlisted	0,012	0,011	0,012	0,012	0,013	0,012
1002	Main Country	0,014	0,014	0,015	0,015	0,016	0,015
121	Main+ Foreign Country	0,011	0,010	0,011	0,012	0,013	0,012
27	XXL	0,010	0,009	0,011	0,012	0,013	0,011
18	XL	0,008	0,009	0,009	0,010	0,010	0,009
23	L	0,017	0,017	0,019	0,017	0,016	0,017
100	M	0,021	0,022	0,022	0,022	0,021	0,022
154	S	0,022	0,022	0,022	0,021	0,021	0,021
801	XS	0,024	0,023	0,023	0,023	0,024	0,023
31	Scandinavian	0,011	0,010	0,011	0,012	0,010	0,011
81	Former Eastern Europe	0,034	0,035	0,036	0,034	0,036	0,035
195	Mediterranean	0,022	0,024	0,025	0,025	0,024	0,024
720	Western European Countries	0,010	0,009	0,010	0,011	0,012	0,010
20	Turkey	0,059	0,062	0,051	0,060	0,048	0,056
<b>1123</b>	<b>Average</b>	<b>0,012</b>	<b>0,012</b>	<b>0,013</b>	<b>0,014</b>	<b>0,014</b>	<b>0,013</b>

The results of panel data analysis are in line with the findings of trend analysis and are provided in appendix 2

Having noted that NIM figures of European Banks are slightly up during the global financial crisis, NIM figures of European banks can be analyzed further from different perspectives. Banks of EU Enlarged 11 countries seem perform best in terms NIM management with NIM figures 2.7 times higher than other banks. From the ownership point of view NIM figures are very close to each other. However, at the beginning of crisis state banks had slightly higher NIM figures which eroded to the level of private banks. That is probably due to the fact that state banks tend to cooperate with their states in combating the crisis as shrinking down their profitability figures.

On the other hand listed banks' NIM figures are slightly higher than those of unlisted banks. Listed banks managed to increase their NIM figures during the crisis faster than unlisted banks. That could be related to the so called market discipline imposed on listed banks. Most importantly scale does matter in achieving NIM figures with XS banks having highest and XL banks together with XXL banks having lowest NIM ratios. This could well be a result of small banks getting specialized in specific areas of lending or concentrating on specific customers as providing them with better and faster services that help them to bust their profitability.

Geographically Former Eastern European Banks have the highest NIM figures followed by banks of Mediterranean Countries. The lowest figures are of Western European countries and Scandinavian Countries. The Euro Zone banks seem to perform slightly better than banks outside of the Euro Zone. Although Turkey's NIM figures went down from 5.9% in 2006 to 4.8% in 2010, it still keeps an average NIM figure 4.3 times higher than the average of all banks in analysis.

The main source of NIM is the difference between lending and borrowing rates that is shaped by the competition in the market, demand for loans and deposits and the other market characteristics. The successful management can only protect this figure from bad effects of risks. It seems that this margin is very narrow in Western European Countries and much wider in Former Eastern European Countries and in Turkey, as suggesting that higher NIM figures in these countries are not necessarily a management's success but rather a market characteristic.



Table 4: Return on Assets

<b>Number of Banks</b>	<b>Categories</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>Average</b>
1103	EU 27	0,006	0,006	0,001	0,001	0,002	0,003
1021	EU 16	0,006	0,006	0,001	0,001	0,002	0,003
82	EU ENLARGED 11	0,017	0,018	0,015	0,007	0,009	0,013
968	EU AREA 17	0,006	0,006	0,001	0,001	0,002	0,004
135	NON-EURO AREA 10	0,006	0,006	0,001	0,001	0,001	0,003
37	State	0,009	0,008	-0,006	-0,003	-0,009	0,000
1086	Non-State	0,006	0,006	0,002	0,002	0,003	0,004
109	Listed	0,007	0,007	0,003	0,003	0,003	0,005
1014	Unlisted	0,006	0,006	0,000	0,001	0,002	0,003
1002	Main Country	0,007	0,006	0,002	0,001	0,002	0,004
121	Main+ Foreign Country	0,006	0,006	0,001	0,002	0,003	0,004
27	XXL	0,006	0,005	0,001	0,002	0,003	0,003
18	XL	0,006	0,006	-0,002	0,000	0,004	0,003
23	L	0,009	0,008	0,004	0,001	-0,001	0,004
100	M	0,010	0,010	0,006	0,000	-0,001	0,005
154	S	0,009	0,009	0,006	0,005	0,005	0,007
801	XS	0,005	0,005	0,003	0,002	0,005	0,004
31	Scandinavian	0,007	0,007	0,003	0,001	0,003	0,004
81	Former Eastern Europe	0,017	0,018	0,015	0,007	0,009	0,013
195	Mediterranean	0,010	0,012	0,007	0,006	0,006	0,008
720	Western European Countries	0,005	0,005	0,000	0,001	0,002	0,003
20	Turkey	0,026	0,032	0,020	0,025	0,024	0,025
<b>1123</b>	<b>Average</b>	<b>0,006</b>	<b>0,006</b>	<b>0,001</b>	<b>0,001</b>	<b>0,002</b>	<b>0,004</b>

As can be seen from Table 4, all European Banks' ROA ratios went down sharply due to the sky-rocketed non-performing assets. State banks seem to be affected worst. Unlisted banks seem to be affected worse than listed banks; this may well be due to the market control on listed banks.

As it was the case in NIM Scale effect is witnessed here as well. Banks of small sizes seem to get affected by the financial crisis less than banks of medium or larger sizes. This may well be as a result of being smaller could have allowed small banks to have a better control over their balance sheets through knowing their customers and/or borrowers better. Flexibility in shifting their assets and liabilities could be another explanation that needs further research.

Geographically EU Enlarged 11 banks seem to perform much better than banks of all other classes. Banks of Western European countries are worst followed by banks of Scandinavian and Mediterranean countries. Banks operating in Turkey have ROA figures 6.25 times greater than the average ROA of all banks in analysis. This is thought to be a success achieved for a set of reforms implemented in Turkey after the crisis in 2001.

Table 5: Return on Equity

Number of Banks	Categories	2006	2007	2008	2009	2010	Average
1103	EU 27	0,150	0,141	0,033	0,031	0,046	0,080
1021	EU 16	0,149	0,139	0,028	0,030	0,045	0,078
82	EU ENLARGED 11	0,192	0,211	0,178	0,076	0,090	0,149
968	EU AREA 17	0,144	0,131	0,035	0,033	0,053	0,079
135	NON-EURO AREA 10	0,171	0,175	0,026	0,025	0,029	0,085
37	State	0,197	0,168	-0,135	-0,064	-0,162	0,001
1086	Non-State	0,146	0,141	0,057	0,047	0,075	0,093
109	Listed	0,169	0,160	0,077	0,061	0,072	0,108
1014	Unlisted	0,140	0,133	0,009	0,018	0,037	0,067
1002	Main Country	0,141	0,133	0,039	0,015	0,040	0,074
121	Main+ Foreign Country	0,163	0,155	0,033	0,058	0,063	0,094
27	XXL	0,161	0,146	0,032	0,049	0,064	0,091
18	XL	0,167	0,176	-0,062	0,007	0,089	0,075
23	L	0,181	0,152	0,089	0,029	-0,018	0,087
100	M	0,146	0,155	0,087	0,004	-0,015	0,075
154	S	0,114	0,112	0,081	0,064	0,065	0,087
801	XS	0,072	0,074	0,044	0,023	0,070	0,057
31	Scandinavian	0,153	0,155	0,074	0,022	0,072	0,095
81	Former Eastern Europe	0,191	0,211	0,178	0,075	0,090	0,149

Number of Banks	Categories	2006	2007	2008	2009	2010	Average
195	Mediterranean	0,153	0,167	0,110	0,090	0,080	0,120
720	Western European Countries	0,143	0,129	-0,009	0,030	0,062	0,071
20	Turkey	0,227	0,281	0,187	0,226	0,202	0,225
<b>1123</b>	<b>Average</b>	<b>0,151</b>	<b>0,144</b>	<b>0,036</b>	<b>0,036</b>	<b>0,051</b>	<b>0,084</b>

ROE figures given in Table 5 indicate sharp decreases for all types of banks except for banks of small sizes whose figures are down moderately. In ROE analysis scale does matter again in achieving and/or protecting high profitability figures. Ratios suggest the larger banks are the sharper their figures fallen during the financial crisis. This has some suggestions for regulators that similar to the famous saying “too big to fail” it is also relevant to say that “too big to be managed or controlled”. Similar to ROA ratios, listed banks performed better than unlisted banks during the financial crisis. Again this suggests that being quoted on a stock exchange market generates a market control on banks in terms of profitability management.

Scale seems very crucial here again. Unlike their great performances in NIM and ROA analysis, small banks performed worse than larger banks due to their preferences regarding leverage multiplier. Larger banks geared up their low profitability ratios with the help of much larger leverage multipliers. However this makes larger banks very much vulnerable to bankruptcy risk. From the ownership point of view state banks seem to perform worse than private banks, again due to relatively much higher ratio of provisions for non-performing assets. However, it is important to note that state banks are very strict to set aside provision for loan losses whereas private banks tend to exhaust all possible ways of collecting loans before provisioning their bad assets. On geographical basis, Former Eastern European Banks performed much better than Euro Zone Banks, Western European Countries Banks and Scandinavian Banks. Turkey again by far outperformed all banks with its average ROE ratio being 2.7 times higher than all banks average.

Table 6: Leverage (Total Assets/Shareholders' Equity)

Number of Banks	Categories	2006	2007	2008	2009	2010	Average
1103	EU 27	23,612	23,489	25,331	24,597	21,950	23,796
1021	EU 16	23,953	23,836	25,761	25,041	22,344	24,187
82	EU ENLARGED 11	11,407	11,739	12,019	11,467	10,406	11,408
968	EU AREA 17	22,793	22,443	23,820	23,086	21,251	22,679
135	NON-EURO AREA 10	26,334	27,117	31,066	29,755	23,963	27,647
37	State	21,712	21,075	21,917	22,830	19,003	21,308
1086	Non-State	23,601	23,461	25,360	24,374	21,864	23,732
109	Listed	23,117	22,972	24,467	23,387	21,554	23,099
1014	Unlisted	23,582	23,355	25,352	24,810	21,582	23,736
1002	Main Country	20,955	20,545	22,041	21,754	19,850	21,029
121	Main+ Foreign Country	26,122	26,166	28,269	26,816	23,407	26,156
27	XXL	27,204	27,743	31,041	29,330	25,268	28,117
18	XL	29,826	27,298	27,580	28,144	25,298	27,629
23	L	19,355	19,114	19,939	19,891	19,786	19,617
100	M	15,314	14,964	15,624	15,254	13,973	15,026
154	S	12,489	12,546	13,785	13,859	12,925	13,121
801	XS	15,109	14,676	14,716	14,368	13,591	14,492
31	Scandinavian	21,133	21,703	23,570	23,686	22,806	22,580
81	Former Eastern Europe	11,388	11,707	11,981	11,433	10,370	11,376
195	Mediterranean	14,749	14,469	14,804	14,588	13,993	14,520
720	Western European Countries	27,627	27,608	30,843	29,740	25,658	28,295
20	Turkey	8,725	8,887	9,411	8,988	8,418	8,886
<b>1123</b>	<b>Average</b>	<b>23,399</b>	<b>23,203</b>	<b>24,990</b>	<b>24,218</b>	<b>21,571</b>	<b>23,476</b>

The leverage of all classes of banks remained almost constant over the period in analysis. This means that the global financial crisis did not change the leverage of banks in Europe. However, large banks keep much higher leverage multipliers (LM) relative to small banks. This in turn gear up their ROE ratios. The average LM of European banks is about 23X, implying that they only finance 4,35% of their assets with their shareholders' funds. On average XS banks finance 8% and XXL banks finance 3.6% of their assets with their

shareholders' funds. That makes large banks much riskier than small banks. Interestingly no bank seems to have reduced its leverage during the period in analysis which contain the years of global financial crisis. State banks tend to keep slightly low LMs and there is no difference between the preferences of listed and unlisted banks with regard to their LM levels. Due to their relatively low ROA figures banks from Western European countries keep very high LMs in order to gear up their ROE ratios that in turn increase their riskiness and vulnerability. The lowest LMs are of banks operating in Turkey followed by Former Eastern European Banks.

## Analysis of Capital Adequacy

Analysis of capital adequacy (CA) is rather tricky. Unlike LM which is calculated as using balance sheet figures of assets and shareholders' funds, for the calculation of CA ratios based on the Basel Committee criteria regulatory capital is used which is much different than shareholders' funds and risk weighted assets are used that are also much different than total assets that banks own.

Table 7: Total Regulatory Capital/Risk Weighted Assets

Number of Banks	Categories	2006	2007	2008	2009	2010	Average
1103	EU 27	9,106	9,340	10,105	12,025	12,305	10,576
1021	EU 16	9,072	9,315	10,097	12,005	12,277	10,553
82	EU ENLARGED 11	11,586	10,995	10,640	13,262	14,056	12,108
968	EU AREA 17	9,830	9,492	10,386	12,016	12,289	10,803
135	NON-EURO AREA 10	7,045	8,922	9,397	12,050	12,345	9,952
37	State	6,045	10,855	12,955	14,320	13,874	11,610
1086	Non-State	9,569	9,249	9,849	11,866	12,220	10,551
109	Listed	10,599	10,335	11,162	12,773	13,209	11,616
1014	Unlisted	8,332	8,819	9,507	11,633	11,788	10,016
1002	Main Country	8,986	9,000	10,102	11,503	12,000	10,318
121	Main+ Foreign Country	9,415	9,772	10,198	12,619	12,708	10,942
27	XXL	8,969	9,314	10,026	12,191	12,797	10,659
18	XL	11,527	11,638	12,658	14,626	14,177	12,925
23	L	10,700	9,993	10,528	11,821	11,792	10,967
100	M	10,371	9,545	9,834	11,238	10,694	10,336
154	S	5,122	5,451	6,007	7,580	7,860	6,404
801	XS	4,120	5,944	8,393	10,129	10,212	7,760

Number of Banks	Categories	2006	2007	2008	2009	2010	Average
31	Scandinavian	11,477	10,706	11,274	13,780	13,473	12,142
81	Former Eastern Europe	11,592	11,001	10,637	13,296	14,092	12,124
195	Mediterranean	10,458	10,999	11,344	12,602	12,610	11,603
720	Western European Countries	8,700	8,985	9,857	11,921	12,314	10,355
20	Turkey	22,449	17,430	16,115	18,798	17,381	18,435
<b>1123</b>	<b>Average</b>	<b>9,213</b>	<b>9,460</b>	<b>10,423</b>	<b>12,624</b>	<b>12,756</b>	<b>10,895</b>

Calculated figures in Table 7 indicate that all banks' average CA ratio went up remarkably with greatest increases in state banks' and XS banks' figures. A similar behaviour is witnessed in Table 8 that contain Tier 1 capital of banks divided by their risk weighted assets. However, remembering that the LM figures of banks almost remained unchanged, it can be concluded that these increases were not achieved by the injection of new and fresh capital. The changes in the structures of balance sheets seem to have made great contributions to the increases witnessed in the CA ratios of European banks.

Despite the fact that the CA figures of small banks increased during the period in analysis, the ratios indicate that small banks are the most poorly capitalised banks in contrast to the other banks of larger sizes. Similar improvements are witnessed for the CA ratios of all the other banks nonetheless they are still less capitalised in comparison to banks operating in Turkey<sup>2</sup> which have an average CA ratio of 18.4% during the period in analysis.

---

<sup>2</sup> Turkish banks' CA went up remarkably after the reforms implemented in 2001 and thereafter.

Table 8: Regulatory Tier 1 Capital/ Risk Weighted Assets

<b>Number of Banks</b>	<b>Categories</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>Average</b>
1103	EU 27	6,547	7,024	7,612	9,326	9,770	8,056
1021	EU 16	6,533	7,011	7,596	9,314	9,753	8,041
82	EU ENLARGED 11	7,585	7,854	8,670	10,027	10,794	8,986
968	EU AREA 17	7,265	7,426	8,081	9,440	9,822	8,407
135	NON-EURO AREA 10	7,299	6,767	6,993	8,558	7,866	7,497
37	State	3,879	7,636	9,180	10,550	10,653	8,379
1086	Non-State	6,904	7,012	7,507	9,281	9,754	8,092
109	Listed	7,541	7,589	8,403	10,100	10,639	8,854
1014	Unlisted	5,999	6,744	7,201	8,923	9,282	7,630
1002	Main Country	6,535	6,656	7,690	8,958	9,573	7,882
121	Main+ Foreign Country	6,655	7,440	7,656	9,791	10,077	8,324
27	XXL	6,371	6,934	7,660	9,703	10,361	8,206
18	XL	8,522	9,330	9,248	11,283	11,423	9,961
23	L	7,911	7,625	8,266	9,267	9,338	8,481
100	M	7,154	7,076	8,077	9,248	9,005	8,112
154	S	3,799	4,269	4,851	5,611	5,915	4,889
801	XS	2,743	3,320	4,101	4,315	4,653	3,826
31	Scandinavian	9,732	8,983	9,263	11,874	12,156	10,402
81	Former Eastern Europe	8,206	7,921	9,293	10,879	11,624	9,584
195	Mediterranean	7,164	8,019	8,784	9,949	10,299	8,843
720	Western European Countries	5,665	6,468	7,227	8,804	9,306	7,494
20	Turkey	13,008	12,781	14,818	16,584	15,084	14,455
<b>1123</b>	<b>Average</b>	<b>6,598</b>	<b>7,110</b>	<b>7,911</b>	<b>9,799</b>	<b>10,058</b>	<b>8,295</b>

However these CA ratios are deceptive since they do not measure the accounting based capital/asset ratio of banks. Thus a bank that has accounting capital/asset ratio of say 1% could have even larger than say 10% CA ratio based on Basel Committee Criteria. This is exactly the case here as well. The accounting based CA ratios of small banks are much greater

than those of larger banks, however the CA ratios of small banks seem much smaller than that of larger banks calculated based on Basel Committee criteria<sup>3</sup>.

## Analysis of Credit Risk

Figures in Table 9 state that the global financial crisis did not affect the preferences of banks in terms of allocating their sources between credits and other assets. However the size of banks does affect their preferences with this respect. As banks get smaller the share of advances on their balance sheets get greater. This allows banks of smaller sizes to have diversified portfolios of assets in comparison with large banks that heavily invest in bonds of different states and large corporations. However since the risk weight of bonds is smaller than risk weight of private loans, investing in bonds allow large banks to operate with much higher leverage multipliers.

Table 9: Total Loans/Total Assets

Number of Banks	Categories	2006	2007	2008	2009	2010	Average
1103	EU 27	0,446	0,446	0,446	0,460	0,470	0,454
1021	EU 16	0,445	0,444	0,443	0,457	0,467	0,451
82	EU ENLARGED 11	0,543	0,589	0,636	0,660	0,669	0,619
968	EU AREA 17	0,436	0,440	0,450	0,475	0,478	0,456
135	NON-EURO AREA 10	0,475	0,465	0,434	0,422	0,449	0,449
37	State	0,566	0,553	0,513	0,489	0,490	0,522
1086	Non-State	0,433	0,435	0,440	0,458	0,469	0,447
109	Listed	0,407	0,417	0,426	0,453	0,454	0,431
1014	Unlisted	0,472	0,466	0,460	0,466	0,482	0,469
1002	Main Country	0,476	0,486	0,498	0,517	0,528	0,501
121	Main+ Foreign Country	0,420	0,413	0,402	0,413	0,418	0,413
27	XXL	0,387	0,385	0,379	0,393	0,410	0,391
18	XL	0,457	0,450	0,451	0,485	0,477	0,464
23	L	0,588	0,617	0,647	0,653	0,635	0,628
100	M	0,600	0,608	0,622	0,627	0,624	0,616

<sup>3</sup> The new Basel III Criteria is expected to include an accounting based leverage to overcome this shortcoming of risk based capital adequacy criteria.



Number of Banks	Categories	2006	2007	2008	2009	2010	Average
154	S	0,581	0,591	0,597	0,605	0,618	0,598
801	XS	0,586	0,592	0,599	0,599	0,604	0,596
31	Scandinavian	0,594	0,605	0,602	0,603	0,583	0,598
81	Former Eastern Europe	0,542	0,589	0,636	0,661	0,670	0,620
195	Mediterranean	0,609	0,632	0,650	0,657	0,648	0,639
720	Western European Countries	0,398	0,390	0,382	0,397	0,412	0,396
20	Turkey	0,476	0,536	0,535	0,520	0,530	0,519
<b>1123</b>	<b>Average</b>	<b>0,447</b>	<b>0,447</b>	<b>0,447</b>	<b>0,461</b>	<b>0,471</b>	<b>0,454</b>

On the other hand state banks tend to lend credits significantly more than private banks. However, during the crisis, unlike private banks which increased their loan ratio, state banks reduced the share of credits on their balance sheets. This might also be a result of removing all bad loans from their balance sheets after proper provisioning.

Sharpest increases were witnessed in the figures of Former Eastern European Banks followed by increases in the figures of Turkish Banks. The least average ratio is 39.6% and it is belong to banks of Western European countries which mainly invest in the state bonds of countries worldwide.

As can be seen from the below Table 11, there is a sharp decline in the average figure of consumer credits/total credits for European Banks during the period 2006-2010. L, XL and XXL banks' figures are the worst effected figures. Figures belonging to banks of smaller sizes remained constant during the period in analysis. L banks had a figure of 22.5% in 2006 that went down to 3.2% in 2010 underline a great asset shift from consumer credits to other types of assets, probably government bonds. Unlike the fallen figures of non-state banks, the increase noted in the figures of State banks in 2010 is considered as a support for the recovery of economies from the possible recessions. Despite the 4.1% average figure of Western European countries, the average figure of Former Eastern European Banks is 20.9%.

Table 11: Consumer Credits/Total Credits

Number of Banks	Categories	2006	2007	2008	2009	2010	Average
1103	EU 27	0,110	0,082	0,056	0,066	0,071	0,077
1021	EU 16	0,109	0,079	0,053	0,062	0,067	0,074
82	EU ENLARGED 11	0,161	0,209	0,209	0,221	0,237	0,207
968	EU AREA 17	0,107	0,085	0,050	0,059	0,068	0,074
135	NON-EURO AREA 10	0,119	0,072	0,074	0,086	0,077	0,086
37	State	0,136	0,086	0,030	0,028	0,105	0,077
1086	Non-State	0,107	0,082	0,061	0,071	0,069	0,078
109	Listed	0,167	0,129	0,094	0,114	0,115	0,124
1014	Unlisted	0,079	0,056	0,035	0,036	0,045	0,050
1002	Main Country	0,068	0,058	0,036	0,051	0,053	0,053
121	Main+ Foreign Country	0,154	0,108	0,082	0,084	0,096	0,105
27	XXL	0,097	0,076	0,054	0,070	0,070	0,073
18	XL	0,145	0,135	0,057	0,055	0,103	0,099
23	L	0,225	0,069	0,037	0,036	0,032	0,080
100	M	0,094	0,084	0,079	0,087	0,082	0,085
154	S	0,103	0,099	0,120	0,125	0,127	0,115
801	XS	0,015	0,019	0,020	0,022	0,021	0,019
31	Scandinavian	0,156	0,109	0,109	0,123	0,097	0,119
81	Former Eastern Europe	0,162	0,210	0,211	0,223	0,239	0,209
195	Mediterranean	0,194	0,173	0,108	0,142	0,142	0,152
720	Western European Countries	0,065	0,045	0,028	0,029	0,041	0,041
20	Turkey	0,181	0,199	0,191	0,183	0,183	0,188
<b>1123</b>	<b>Average</b>	<b>0,111</b>	<b>0,083</b>	<b>0,058</b>	<b>0,067</b>	<b>0,072</b>	<b>0,078</b>

This could be due to several reasons. Firstly the residents in Western European Countries could have higher saving ratios that reduce their demand for consumer loans. Secondly, residents in these countries could be over indebted that banks prefer to withdraw their funds from that area. Thirdly, banks in these countries could have sold their consumer loans to investors, as removing them from their balance sheets, in order to generate funds to finance their lending to countries in trouble.

The effects of global financial crisis have been severe on European banks in terms of provisioning for bad loans that are given in below Table 12. Large banks were hit worse than small banks and state banks were punished worse than private banks. It looks like a paradox that the small banks with highest ratio of loans to assets are the banks with the lowest ratio of non-performing loans to total loans. It is expected that banks with highest exposure to credit risk must get hurt worse than banks with lower exposure. However this is not valid for European Banks at least during the period in analysis.

Table 12: Non-Performing Loans/Total Loans

<b>Number of Banks</b>	<b>Categories</b>	<b>2006</b>	<b>2007</b>	<b>2008</b>	<b>2009</b>	<b>2010</b>	<b>Average</b>
1103	EU 27	0,018	0,019	0,026	0,044	0,048	0,031
1021	EU 16	0,017	0,019	0,026	0,043	0,047	0,030
82	EU ENLARGED 11	0,039	0,032	0,037	0,074	0,089	0,054
968	EU AREA 17	0,020	0,021	0,027	0,041	0,046	0,031
135	NON-EURO AREA 10	0,012	0,015	0,024	0,050	0,053	0,031
37	State	0,016	0,014	0,026	0,063	0,086	0,041
1086	Non-State	0,018	0,020	0,026	0,042	0,044	0,030
109	Listed	0,021	0,026	0,032	0,051	0,055	0,037
1014	Unlisted	0,016	0,016	0,023	0,039	0,043	0,027
1002	Main Country	0,017	0,019	0,025	0,042	0,045	0,029
121	Main+ Foreign Country	0,019	0,021	0,027	0,045	0,052	0,033
27	XXL	0,017	0,022	0,029	0,047	0,049	0,033
18	XL	0,021	0,017	0,024	0,037	0,040	0,028
23	L	0,016	0,015	0,023	0,038	0,050	0,028
100	M	0,023	0,021	0,028	0,054	0,066	0,038
154	S	0,016	0,016	0,022	0,035	0,038	0,025
801	XS	0,007	0,008	0,012	0,021	0,023	0,014
31	Scandinavian	0,005	0,005	0,011	0,025	0,026	0,014
81	Former Eastern Europe	0,039	0,032	0,037	0,074	0,089	0,054
195	Mediterranean	0,025	0,030	0,039	0,058	0,064	0,043
720	Western European Countries	0,017	0,018	0,023	0,038	0,040	0,027
20	Turkey	0,035	0,032	0,034	0,051	0,035	0,037
<b>1123</b>	<b>Average</b>	<b>0,018</b>	<b>0,020</b>	<b>0,026</b>	<b>0,044</b>	<b>0,048</b>	<b>0,031</b>

S and XS banks' success could be due to two reasons. The first is that they might be managing their credit portfolio much better than larger banks. The second is that because they keep little government bonds and because the crisis hit government securities worse than private loans, S and XS banks were just lucky. Listed Banks' average figure is larger than that of Unlisted Banks' ratio. Again, due to the market discipline listed banks might be reacting faster than unlisted banks in provisioning their bad assets. Geographically Former Eastern European banks, banks of Mediterranean Countries and Turkish Banks were the banks having highest NPL to Total Loans.

## Analysis of Liquidity Risk

Before the global financial crisis European banks' average liquid assets/total assets ratio was 30% that went down to 24% after the crisis. As can be seen from Table 12, this downturn trend was witnessed for all types of banks. S and XS banks kept lower ratios than larger banks during the period in analysis. Usually small banks rely on stored liquidity and thus they invest in liquid assets more than larger banks which rely on purchased liquidity. However, contrary to the general thoughts, S and XS banks' liquidity ratio was lower than large banks' ratios before, during and after the crisis. During the same period state banks' liquidity ratios were lower than those of private banks, in line with the general thought.

Table 12: Liquid Assets/Total Assets

Number of Banks	Categories	2006	2007	2008	2009	2010	Average
1103	EU 27	0,301	0,290	0,247	0,237	0,238	0,263
1021	EU 16	0,302	0,291	0,248	0,239	0,239	0,264
82	EU ENLARGED 11	0,247	0,209	0,169	0,155	0,142	0,184
968	EU AREA 17	0,298	0,290	0,230	0,226	0,226	0,254
135	NON-EURO AREA 10	0,308	0,289	0,290	0,267	0,266	0,284
37	State	0,221	0,218	0,129	0,166	0,186	0,184
1086	Non-State	0,309	0,296	0,259	0,243	0,241	0,270
109	Listed	0,325	0,308	0,248	0,249	0,248	0,276
1014	Unlisted	0,283	0,276	0,245	0,227	0,228	0,252
1002	Main Country	0,275	0,250	0,197	0,222	0,207	0,230
121	Main+ Foreign Country	0,322	0,322	0,287	0,249	0,263	0,289
27	XXL	0,344	0,317	0,271	0,257	0,260	0,289
18	XL	0,279	0,308	0,221	0,245	0,254	0,261
23	L	0,199	0,189	0,160	0,165	0,156	0,174

Number of Banks	Categories	2006	2007	2008	2009	2010	Average
100	M	0,202	0,202	0,195	0,185	0,162	0,189
154	S	0,231	0,233	0,237	0,216	0,200	0,223
801	XS	0,192	0,198	0,193	0,167	0,163	0,183
31	Scandinavian	0,249	0,241	0,189	0,215	0,203	0,219
81	Former Eastern Europe	0,247	0,208	0,168	0,154	0,141	0,184
195	Mediterranean	0,202	0,183	0,153	0,150	0,136	0,165
720	Western European Countries	0,328	0,318	0,272	0,261	0,265	0,289
20	Turkey	0,157	0,144	0,141	0,127	0,099	0,134
<b>1123</b>	<b>Average</b>	<b>0,300</b>	<b>0,288</b>	<b>0,246</b>	<b>0,236</b>	<b>0,236</b>	<b>0,261</b>

Remembering the negative relationship between liquidity and profitability, the low liquidity ratios of S and XS banks make sense that they have had much higher profitability ratios than larger banks. On the other hand, all banks might have thought that the reduction witnessed in their profitability ratios could be compensated, at least partly, by reducing the level of liquid assets and investing in the assets of longer maturities with higher expected returns.

The least ratio is the one belong to the Turkish banks with an average of 13.4% and the highest average ratio of 28.9% is belong banks of Western European Countries.

## Conclusion

The global financial crisis ignited at the end of 2007 has had severe effects on European banks. In this manuscript the effects of crisis on European banks are analysed by spotting changes in the balance sheet structures of banks with specific references to profitability, capital adequacy, loan structure and liquidity ratios during the period 2006-2010. One of the main targets of this research has been to analyze the behaviour of different banks in combating the financial crisis. For this purpose banks were divided into several groups based on ownership, scale and type of banks; geographical location and listing on a stock exchange; in order to differentiate the reaction of each group of banks to financial crisis.

It is observed that NIM of all banks remained unchanged during the period analysed. Nonetheless the NIM figures of different bank groups considerably varied. 2.7 times higher NIM figures of Banks of EU Enlarged 11 countries indicate a strong geographical effect on NIM. The scale effect is considerably apparent that NIM figures of XS banks were twice higher than that of XL and XXL banks.

However, in contrast to the constant NIM figures ROA and ROE ratios went down sharply mainly due to the sky-rocketed non-performing assets. The severe effects on state banks and unlisted banks are considered as signs for the ownership and market discipline. Scale effect is observed again as banks of small sizes got affected by the financial crisis less than banks of medium or larger sizes. The effects of crisis on banks differ geographically as well.

Similar to NIM the LM of all bank groups remained almost constant over the period in analysis. Nonetheless this figure differs based on the characteristics of banks analyzed in this

manuscript. Higher LM of large banks in comparison to small banks suggest a scale effect and higher LM of EU 16 in comparison to EU Enlarged 11 suggest a geographical effect too.

The average CA ratio of all banks went up remarkably with greatest increases in state banks' and XS banks' figures. In contrast to the constant LM figures of banks, increases in CA ratios are related to changes in the structures of balance sheets and definition of CA based on Basel Criteria. In analyzing the credit structure of European banks, scale effect is obvious that the smaller banks are the greater the share of loans on their balance sheets. Significantly higher loan/asset ratio of state banks in comparison to that of private banks indicates an ownership effect. Significant geographical variations were also observed in developments regarding loan/asset ratios. The behaviour of listed and unlisted banks differs under this heading too.

Diversity is observed in the reaction of different groups of banks with regard to liquidity management during the period in analysis. Scale, ownership and geographical effects are relevant under this heading.

## References

- Asimakopoulos, I. and Athanoglou, P. P. (2009), Revisiting the Merger and Acquisition Performance of European Banks, Bank of Greece Working Paper 100.
- Barajas, A., Chami, R., Cosimano, T. and Hakura, D., 2010, U.S. Bank Behaviour in the Wake of the 2007–2009 Financial Crisis, IMF Working Paper, WP/10/131..
- De Haas, R. and Van Horen, N., (2009), The Strategic Behaviour of Banks During a Financial Crisis: Evidence From the Syndicated Loan Market, MPRA Paper No: 14164.
- De Haas, R. and Van Horen, N., (2011), Running for the Exit: International Banks' and Crisis Transmission, EBRD Working Paper, No: 124.
- European Central Bank (ECB), (2010), EU Banking Structures. Retrieved from [www.ecb.eu/pub/pdf/other/eubankingstructures201009en.pdf](http://www.ecb.eu/pub/pdf/other/eubankingstructures201009en.pdf)
- Eken, M. H. (2005). On Analysis and Control of Financial Risks and A View of Turkish and European Banks. *Journal of European Studies, Marmara University*, 13(1-2), 129-140.
- Fiordelisi, F. (2009), Mergers and Acquisitions in European Banking, New York: Palgrave Macmillan.
- Group of Thirty (2008), The structure of Financial Supervision Approaches and Challenges in a Global Marketplace, Group of Thirty, Washington, D.C.
- Howells, P. and Bain, K. (2005), The economics of money, banking and finance - a European text (3rd Edition). London: Prentice Hall/Financial Times.
- Ivashina, V. and Scharfstein, D., (2010), Bank Lending During The Financial Crisis of 2008, *Journal of Financial Economics*, V.97, P.319-338..
- Richards, P. (2003). The EU Financial Services Action Plan: A Guide. Bank of England Quarterly Bulletin, (Autumn 2003), Available at SSRN: <http://ssrn.com/abstract=706966>
- Rodriguez, S. (1994). Are Banks Within the European Community Adequately Supervised?. *B.C. Int'l & Comp. L. Rev.* 17(1), Retrieved from <http://lawdigitalcommons.bc.edu/iclr/vol17/iss1/13..>
- Sinkey, J.F. Jr. (1989). *Commercial Bank Financial Management in the Financial Services Industry*, Third Edition, U.S.A.: MacMillan Publishing Company.
- Stigum, M.L. & Branch, R.O. (1983), *Managing Bank Assets and Liabilities; Strategies for Risk Control and Profit*, First Edition, U.S.A.: Dow Jones-Irwin.
- Sturm, J.E., and Williams, B. (2004), Foreign Bank entry, Deregulation and Bank Efficiency: Lessons from the Australian Experience. *Journal of banking and Finance*, 28(7), 1775-1799..
- Saunders, A. and Cornett, M.C., (2011), *Financial Institutions Management: A Risk Management Approach*, Seventh Edition, McGraw Hill-Irwin, USA.
- Toevs, A.L. (1983). Gap Management: Managing Interest Rate Risk in Banks and Thrifts. *Economic Review* no 2, Federal Reserve Bank of San Francisco, P.20-35..

Appendix 1: Definition of Ratios Used in Analysis

1	NIM	Net Interest Income / Average Earning Assets
2	ROA	Net Income/Average Assets
3	ROE	Net Income/Average Equity
4	Leverage	Average Assets / Average Equity
5	Regulatory Capital to Risk-Weighted Assets	Taken Directly From Bankscope
6	Regulatory Tier 1 Capital to Risk-Weighted Assets	Taken Directly From Bankscope
7	Total Loans/Assets	Average Loans / Average Assets
8	Consumer Credit / Total Credit	Consumer Credit/Total Credit
9	NPL to Gross Loans	Non-Performing Loans/Gross Loans
10	Liquid Assets / Total Assets	Liquid Assets/Total Assets

Appendix 2: Classification of Banks

Category	Number of banks	Criteria (\$ Billion)
XXL	27	>500
XL	18	250 – 500
L	23	100 – 250
M	100	25 – 100
S	154	10 – 25
XS	801	1 – 10
Commercial Banks	408	Banks mainly active in commercial activities and deposits
Saving Banks	388	Banks mainly active in long term borrowing and lending
Cooperative Banks	327	Banks mainly active in home loan businesses
Private Banks	1086	Banks owned by private entities
State Banks	37	Banks owned and operated by their states
Listed Banks	109	Banks whose shares are traded on stock exchanges
Unlisted Banks	1014	Banks that are not listed on stock exchanges
EU 27	1103	All European Union Banks

The Effects of Global Financial Crisis on the Behaviour of European Banks: A Risk and Profitability Analysis Approach

EU 16	1021	EU members in 2002
EU ENLARGED 11	82	Countries Joined EU after 2002
EU AREA 17	968	Euro zone Area Countries
NON-EURO AREA 10	135	Countries Not in the Euro zone
State	37	Banks owned by the state
Non-State	1086	Private banks
Main Country	1002	Banks Operating Only in their Host Country
Main+ Foreign Country	121	Banks Operating in their Host Country and Abroad
Scandinavian	31	
Former Eastern Europe	81	
Mediterranean	195	
Western European Countries	720	

Appendix 3: Panel Data Analysis Results

COUNTRIES	NIM	ROA	ROE	LEVERAGE X	REGULATORY CAPITAL / RISK-WEIGHTED ASSETS %	REGULATORY TIER 1 CAPITAL TO RISK-WEIGHT ASSETS %	Total Loans / Total Assets %	CONSUMER CREDIT / TOTAL CREDIT %	NPL / TOTAL GROSS LOANS	LIQUID ASSETS / TOTAL ASSETS %
Austria	-3,65	1,06	-0,30	-6,25	-1,73	-0,59	-0,03	-1,74	-0,14	-7,41
Belgium	-7,86	9,58	-1,07	-5,72	2,88	-1,22	-1,14	-5,35	-0,02	-6,33
Bulgaria	0,31	-2,84	2,80	18,12	0,84	0,01	9,10	5,14	1,09	10,73
Cyprus	-6,47	3,93	-0,04	-1,96	-0,42	2,62	2,53	0,39	0,32	9,46
Czech Republic	-7,89	17,74	0,56	10,18	1,57	-0,53	-2,37	-2,26	0,97	19,50
Denmark	20,08	-8,14	-1,38	-10,55	0,70	-2,33	-3,79	2,77	-0,66	-12,08
Estonia	1,97	-	-0,64	-7,19	2,46	-2,21	6,42	6,57	-0,73	-18,64
Finland	7,05	14,77	-1,21	-3,72	4,60	-2,72	-8,62	-1,58	0,52	-13,61
France	24,15	23,53	-1,24	-8,51	0,41	-0,84	-11,61	1,32	0,51	-10,70
Germany	-4,72	22,09	-0,98	-11,33	0,21	-1,36	-7,15	-9,09	0,42	3,07
Greece	-7,72	-8,61	0,67	0,72	0,28	2,76	5,13	-1,95	-0,43	5,55
Hungary	-8,13	-9,14	1,90	14,29	-1,13	2,84	4,84	-2,20	0,03	-1,08
Ireland	-2,29	45,94	-0,99	0,03	-0,46	1,58	-5,27	-2,76	-2,13	-4,68



COUNTRIES	NIM	ROA	ROE	LEVERAGE X	REGULATORY CAPITAL / RISK-WEIGHTED ASSETS %	REGULATORY TIER 1 CAPITAL TO RISK-WEIGHT ASSETS %	Total Loans / Total Assets %	CONSUMER CREDIT / TOTAL CREDIT %	NPL / TOTAL GROSS LOANS	LIQUID ASSETS / TOTAL ASSETS %
Italy	5,02	-6,79	-0,29	-13,32	-1,46	1,71	-0,96	-0,32	-0,34	6,58
Latvia	5,10	38,36	-0,02	-6,60	-1,24	5,17	2,95	5,61	-2,23	-9,77
Lithuania	-0,56	28,91	-0,30	5,49	-1,54	2,37	0,52	4,99	-1,46	-16,66
Luxembourg	4,50	39,64	-1,16	-7,45	0,55	-2,77	-7,29	9,96	1,18	-17,87
Malta	0,64	9,45	0,23	-13,16	-8,91	-0,70	-0,77	6,38	0,47	24,94
Netherlands	-6,19	1,79	-1,35	-7,84	2,42	-2,18	0,40	-4,52	-0,32	2,71
Poland	-8,61	4,36	0,93	3,07	0,32	1,36	-0,12	-1,98	0,82	13,25
Portugal	-3,37	-9,26	-0,71	0,18	-1,80	-2,22	0,67	-1,88	-0,52	0,13
Romania	6,41	4,27	3,37	28,30	0,56	2,22	25,74	9,66	0,86	0,16
Slovakia	11,97	11,76	0,97	0,44	0,52	0,69	2,11	-4,49	0,63	18,70
Slovenia	-6,44	16,18	0,00	-6,10	-3,57	1,60	4,42	-2,32	-0,78	2,02
Spain	-2,01	-1,40	-0,38	17,33	-0,68	-1,74	0,82	-1,76	-0,07	-1,68
Sweden	11,39	-0,35	-1,41	11,47	-0,18	-2,98	-4,25	2,04	-0,34	-8,99
Turkey	17,33	20,59	3,26	6,05	6,02	-0,17	-7,61	-10,86	2,09	14,21
United Kingdom	18,61	17,61	-1,22	-5,98	-1,22	-0,38	-4,66	0,24	0,26	-1,49
<b>Estimated Average</b>	<b>69,85</b>	<b>55,17</b>	<b>1,77</b>	<b>9,99</b>	<b>5,51</b>	<b>2,93</b>	<b>111,60</b>	<b>50,83</b>	<b>-1,65</b>	<b>63,00</b>
<b>EU 27</b>	<b>-0,31</b>	<b>-0,08</b>	<b>-0,09</b>	<b>222,04</b>	<b>0,10</b>	<b>0,20</b>	<b>-4,67</b>	<b>-0,99</b>	<b>0,12</b>	<b>2,32</b>
<b>EU 16</b>	<b>-0,34</b>	<b>-0,09</b>	<b>-0,31</b>	<b>261,19</b>	<b>0,08</b>	<b>0,18</b>	<b>-4,92</b>	<b>-1,28</b>	<b>0,12</b>	<b>2,44</b>
<b>EU ENLARGED 11</b>	<b>1,93</b>	<b>0,88</b>	<b>6,80</b>	<b>-1016,76</b>	<b>1,63</b>	<b>1,13</b>	<b>11,90</b>	<b>12,04</b>	<b>-0,03</b>	<b>-5,50</b>
<b>EU AREA 17</b>	<b>-0,26</b>	<b>-0,07</b>	<b>-0,22</b>	<b>110,36</b>	<b>0,33</b>	<b>0,55</b>	<b>-4,46</b>	<b>-1,29</b>	<b>-1,40</b>	<b>1,49</b>
<b>NON-EURO AREA 10</b>	<b>-0,44</b>	<b>-0,10</b>	<b>0,41</b>	<b>607,17</b>	<b>-0,52</b>	<b>-0,36</b>	<b>-5,14</b>	<b>-0,12</b>	<b>5,19</b>	<b>4,47</b>
<b>State</b>	<b>-0,16</b>	<b>-0,43</b>	<b>-8,04</b>	<b>-26,77</b>	<b>1,13</b>	<b>0,52</b>	<b>2,17</b>	<b>-0,97</b>	<b>6,94</b>	<b>-5,55</b>
<b>Non-State</b>	<b>-0,29</b>	<b>-0,02</b>	<b>1,19</b>	<b>215,68</b>	<b>0,07</b>	<b>0,23</b>	<b>-5,34</b>	<b>-0,87</b>	<b>-0,89</b>	<b>3,03</b>
<b>Listed</b>	<b>-0,14</b>	<b>0,05</b>	<b>2,65</b>	<b>152,42</b>	<b>1,14</b>	<b>0,99</b>	<b>-6,90</b>	<b>3,69</b>	<b>-0,54</b>	<b>3,64</b>
<b>Unlisted</b>	<b>-0,37</b>	<b>-0,13</b>	<b>-1,41</b>	<b>216,09</b>	<b>-0,46</b>	<b>-0,23</b>	<b>-3,11</b>	<b>-3,67</b>	<b>0,15</b>	<b>1,25</b>
<b>Main Country</b>	<b>-0,10</b>	<b>-0,06</b>	<b>-0,76</b>	<b>-54,61</b>	<b>-0,16</b>	<b>0,02</b>	<b>0,06</b>	<b>-3,38</b>	<b>-0,20</b>	<b>-0,93</b>
<b>Main+Foreing Country</b>	<b>-0,43</b>	<b>-0,05</b>	<b>1,31</b>	<b>458,08</b>	<b>0,47</b>	<b>0,46</b>	<b>-8,71</b>	<b>1,80</b>	<b>-0,03</b>	<b>4,93</b>

The Effects of Global Financial Crisis on the Behaviour of European Banks: A Risk and Profitability Analysis Approach

COUNTRIES	NIM	ROA	ROE	LEVERAGE X	REGULATORY CAPITAL / RISK-WEIGHTED ASSETS %	REGULATORY TIER 1 CAPITAL TO RISK-WEIGHT ASSETS %	Total Loans / Total Assets %	CONSUMER CREDIT / TOTAL CREDIT %	NPL / TOTAL GROSS LOANS	LIQUID ASSETS / TOTAL ASSETS %
XXL	-0,49	-0,09	0,95	654,19	0,18	0,35	-10,95	-1,36	0,69	5,01
XL	-0,65	-0,15	-0,60	605,41	2,45	2,10	-3,66	1,22	4,45	2,19
L	0,13	0,03	0,55	-195,83	0,49	0,62	12,78	-0,70	0,95	-6,53
M	0,59	0,07	-0,60	-654,93	-0,14	0,25	11,58	-0,18	0,62	-5,00
S	0,56	0,25	0,60	-845,44	-4,07	-2,97	9,80	2,79	-7,67	-1,61
XS	0,76	-0,02	-2,44	-708,31	-2,72	-4,03	9,58	-6,75	-8,45	-5,67
Estimated Average	1,58	0,42	8,12	2157,52	10,48	7,86	50,04	8,69	10,70	23,93

## IS THE PRICE KERNEL MONOTONE?

Giovanni Barone-Adesi<sup>1</sup>, Hakim Dall'Ò<sup>2</sup>, Volodymyr Vovchak<sup>3</sup>

<sup>1</sup> Swiss Finance Institute at University of Lugano

<sup>2</sup> University of Lugano

<sup>3</sup> Swiss Finance Institute at University of Lugano

***Abstract.** The pricing kernel based on SPX option prices and GARCH model is derived and tested for monotonicity. Derivation of the risk neutral distribution is conducted based on the result in Breeden and Litzenberger (1978) and the historical density is estimated by means of our asymmetric GARCH model. Applying two statistical tests we are not able to reject null hypothesis of monotonically decreasing pricing kernel, showing that using a large dataset and introducing non-Gaussian innovations solves the pricing kernel puzzle posed in Jackwerth (2000), both in a single day and over an average of different days with the same options' maturity. We also evaluate the price kernel before and during the recent crisis and we look at the change in the shape in order to evaluate the difference.*

***Keywords:** Pricing kernel, State price density per unit probability, Risk neutral, Historical distribution*

### Introduction

According to economic theory, the shape of the state price density (SPD) per unit probability (also known as the asset pricing kernel, (Rosenberg & Engle, 2002) or stochastic discount factor (SDF), (Campbell, Lo, & MacKinlay, 1997)) is a decreasing function in wealth.

(Jackwerth J. C., 2000) finds a kernel price before the crash of 1987 in agreement with economic theory, but a discordant result for the post-crash period. After his work, a number of papers have been written on this topic trying to explain the reason for this puzzle. (Rosenberg & Engle, 2002), (Detlefsen, Härdle, & Moro, 2007) and (Jackwerth J. C., 2004) are among the most interesting papers on this subject. Unfortunately, none of them found an answer to this puzzle. In all of these papers the authors found problems in the methodology employed by previous papers and tried to improve them, but the result was the same: the puzzle remained.

An answer to this puzzle has been given in (Chabi-Yo, Garcia, & Renault, 2005), where they argue that the main problem is the regime shifts in fundamentals: when a volatility change, the kernel price is no longer monotonically decreasing. In each regime they prove that the kernel price is consistent with economic theory, but when there is a shift in regime the kernel price changes in its shape and it is no longer consistent with economic theory.

In a recent paper, (Barone-Adesi, Engle, & Mancini, 2008) compute again the kernel price and find kernel prices consistent with economic theory. In particular they find kernel price consistency for fixed maturities. They do not pool different maturities as (Aït-Sahalia & Lo, 1998) and therefore they avoid the problem that arises when maturities are different, but they do not consider the change in fundamentals as a relevant aspect of their computation. Their

result can be explained by the fact that the sample they use is very short (3 years) and that throughout this period (2002 - 2004) the volatility does not change much.

In this paper we compute the kernel price both in a single day and as an average of kernel prices over a period of time, holding maturity constant. We want to understand the implication of the changing regime using two measures of moneyness: in the first case we consider the kernel price as a function of two parameters, the underlying and the interest rate (we do not take into consideration the changing regime) and then we add third parameter – the volatility of the underlying. As argued in (Brown & Gibbons, 1985), under some general assumptions one may substitute (in estimation) consumption with the market index while working with asset pricing models<sup>1</sup>. That's why in order to evaluate the kernel price we need to take a broad index which attempts to cover the entire economy. As it is common in this kind of literature to use S&P500 index, we also use data on S&P500 index prices and options on the S&P500 index over a period of 12 years (from the 2nd of January 1996 to the 31st December 2007).

Evaluating the kernel price in a period of time, without taking into consideration the change in volatility, should lead to a kernel not consistent with economic theory. Surprising, when we compute the kernel price considering only two parameters (the underlying and the interest rate), the average kernel price is consistent with economic theory, with the exceptions of a few dates.

To check our result we also do kernel smoothing which is similar to averaging, but it has the advantage of producing smooth price kernel without the spikes one might get from simple averaging. Another robustness check for our results is the testing of monotonicity of the obtained kernel price. We take our estimated average price kernel, consider its monotone version and then compare the monotone version with the estimated version by means of Kolmogorov-Smirnov test.

In order to estimate the risk neutral distribution, we use the well-known result in (Breedon & Litzenberger, 1978). The difference with previous works is in the options we use. Instead of creating option prices through nonparametric or parametric models (all the previous research use artificial price of options and this could introduce a bias in the methodology), we use only the options available on the market. We then construct the historical density using the GJR GARCH model with Filtered Historical Simulation already presented in (Barone-Adesi, Engle, & Mancini, 2008).

As discussed in (Rosenberg & Engle, 2002), among the several GARCH models, the GJR GARCH with FHS has the flexibility to capture the leverage effect and the ability to fit daily S&P500 index returns. Then, the set of innovations estimated from historical returns and scaled by their volatility gives an empirical density function that incorporates excess skewness, kurtosis, and other extreme return behavior that is not captured in a normal density function. These features avoid several problems in the estimation of the kernel price. For example, using a simple GARCH model where the innovations are standard normal (0; 1) leads to a misspecification of the return distribution of the underlying index.

Once we have the two probabilities, under the pricing and the objective measures, we take the ratio between the two densities, discounted by the risk-free rate, in a particular day, to compute the kernel price for a fixed maturity. We repeat the same procedure for all the days in the time series which have options with the same maturity and then we take the average of the kernel price through the sample. At the same time we apply kernel smoothing on the estimated values of the price kernel to confirm our result.

---

<sup>1</sup>The aggregated consumption is inconvenient in two ways: (1) it is hard to measure, and (2) no options on aggregate consumption are traded.

We also evaluate how the shape of the price kernel changes before and during a crisis (the 2008 crisis). We notice that the three periods before the crisis (2005, 2006 and 2007) exhibit fairly monotonically decreasing paths, while during the crisis, the kernel price remains monotonically decreasing, but has higher values. This is consistent with the idea that during a crisis investors increase the risk aversion.

In order to evaluate the impact of the shifting regime, we repeat the computation of the different kernel prices considering the volatility as a parameter of the kernel function. As expected, results improve, but they are still quite similar, supporting our first intuition that the changing regime is relevant, but our methodological choices have a strong impact on the final result.

The remainder of this paper is organized as follows. In section 2, we present a review of the literature and we define the “pricing kernel puzzle”. In section 3, we define our method to estimate the kernel price. We explain our application of the result of (Breedon & Litzenberger, 1978) and we derive the risk neutral distribution. We then estimate the historical density using a GJR GARCH method with FHS and we take the kernel price from a particular day as well as the kernel price over the time series of our sample. In the last part of the section we conduct two statistical tests. Namely, we use two Kolmogorov type tests of the monotonicity of the estimated pricing kernels. In section 4, we provide further evidence of our results. First we plot kernel price with different maturities to prove the robustness of our methodology, then we take the average of these different kernel prices and we show that the average of SPD per unit probabilities with close maturities have a monotonically decreasing path. In section 5, we present the change in the kernel price shape before and during the recent crisis. In section 6, we extend our model, using a kernel price with three parameters (underlying, volatility and risk-free), and in section 7 we offer conclusions.

## Review of the Literature

In this section we derive the price kernel as in macroeconomic theory and also as in probability theory. We then present some methods, parametric and non-parametric, to derive the kernel price.

### *Price kernel and investor preference*

The ratio between the risk neutral density and the historical density is known as the price kernel or state price density per unit probability. In order to explain the relationship between the risk-neutral distribution and the historical distribution we need to introduce some basic concepts from macroeconomic theory. In particular, we use a representative agent with a utility function  $U(\cdot)$ . According to economic theory (the classical von Neumann and Morgenstern economic theory), we have three types of investors: risk averse, risk neutral and risk lover. The utility function  $U(\cdot)$  of these investors is a twice differentiable function of consumption  $c$ :  $U(c)$ . The common property for the three investors is the non-satiation property: the utility increase with consumption, e.g. more consumption is preferred to less consumption, and the investor is never satisfied - he never has so much wealth that getting more would not be at least a little bit desirable. This condition means that the first derivative of the utility function is always positive. On the other hand, the second derivative changes according to the attitude the investor has toward risk.

If the investor is risk averse, his utility function is an increasing concave utility function. The risk neutral investor has a second derivative equal to zero, while the risk seeker - a convex utility function.

Defining  $u(\cdot)$  as the single period utility function and  $\beta$  as the subjective discount factor, we can write the intertemporal two-period utility function as

$$U(c_t; c_{t+1}) = u(c_t) + \beta u(c_{t+1})$$

We introduce  $\xi$  as the amount of an asset the agent chooses to buy at time  $t$ ,  $e$  as the original endowment of the agent,  $P_t$  as the price of the asset at time  $t$  and  $x_{t+1}$  as the future payoff of the asset. The optimization problem is:

$$\max_{\xi} \{u(c_t) + \beta E_t[u(c_{t+1})]\}$$

subject to

$$c_t = e_t - P_t \xi$$

$$c_{t+1} = e_{t+1} + x_{t+1} \xi$$

The first constraint is the budget constraint at time 1, while the second constraint is the Walrasian property, e.g. the agent will consume his entire endowment and asset's payoff at the last period. Substituting the constraints into the objective and setting the derivative with respect to  $\xi$  equal to zero we get:

$$P_t = E_t \left[ \beta \frac{u'(c_{t+1})}{u'(c_t)} x_{t+1} \right].$$

We define

$$\beta E_t \left[ \frac{u'(c_{t+1})}{u'(c_t)} \right] = m_{t,t+1} = MRS, \quad (1)$$

as the *marginal rate of substitution* at time  $t$ . The MRS is also known as the Stochastic Discount Factor (SDF) or the price kernel. Therefore the price of any asset can be expressed as

$$P_t = E_t [m_{t,t+1} x_{t+1}].$$

In a continuous case, the price of any asset can be written as

$$P_t^p = \int_{\mathbb{R}} m_{t,T}(S_T) x_T(S_T) p_{t,T}(S_T) dS_T \quad (2)$$

where  $p_{t,T}(S_T)$  is the physical probability of state  $S_T$  (for the rest of the paper we refer to this probability as the historical probability) and  $x_T(S_T)$  is the payoff of an asset.

To define the price of an asset at time  $t$ , under the risk neutral measure, we can write equation (2) as:

$$P_t^q = e^{-rt} \int_{\mathbb{R}} x_T(S_T) q_{t,T}(S_T) dS_T \quad (3)$$

where  $q_{t,T}(S_T)$  is the state price density (for the rest of the paper we refer to this probability as the risk neutral probability). At this point, combining equation (2) and (3) we can derive the SDF as:

$$m_{t,T}(S_T) = e^{-rt} \frac{q_t(S_T)}{p_t(S_T)} \quad (4)$$

In this case we consider a two period model where the price kernel is a function only of the underlying,  $S_T$ , and the risk free rate,  $r$ . In the following part we will see how to have a kernel price with more parameters.

In their papers (Arrow, 1964) and (Pratt, 1964) find a connection between the kernel price and the measure of risk aversion of a representative agent. Arrow-Pratt measure of absolute risk-aversion (ARA) is defined as:

$$A_t(S_T) = \frac{u''(S_T)}{u'(S_t)}$$

The absolute risk aversion is an indicator of willingness to expose some amount of wealth to risk as a function of wealth. An agent's utility function demonstrating decreasing (constant or increasing) absolute risk aversion implies that her willingness to take risk increases (does not change or decreases) as the agent becomes wealthier.

Classic economic theory assumes risk averse economy agents, i.e. the utility function of the economy is concave (mathematically  $u''(S_T) \leq 0$ ). The following argument should unveil an impact of this basic property of pricing kernel behavior.

From (1), the pricing kernel can be written as function of the marginal utility as:

$$m_{t,T}(S_T) = \beta \frac{u'(S_T)}{u'(S_t)},$$

and its first derivative is:

$$m'_{t,T}(S_T) = \beta \frac{u''(S_T)}{u'(S_T)} = -\beta A_t(S_T),$$

which (remember  $u''(S_T) \leq 0$  and  $u'(S_T) > 0 \forall t$ ) implies  $m'_{t,T}(S_T) \leq 0$ , or in words, the pricing kernel is decreasing as a function of the wealth. We are aiming to check if the pricing kernel is decreasing and, as a consequence, if agents in the economy are risk averse.

### *Nonparametric and parametric estimation*

There are several methods to derive the kernel price. There are both parametric models and nonparametric models. In this section we give a review of the most well-known methods used in literature. We focus particularly on the nonparametric models because they do not assume any particular form for the risk neutral and historical density and also for the kernel price.

One of the first papers to recover the price kernel in a nonparametric way is (Aït-Sahalia & Lo, 1998). In their work they derive the option price function by nonparametric kernel regression and then, applying the result in (Breedon & Litzenberger, 1978), they compute the risk neutral distribution. Their findings are not consistent with economic theory. Because they

look at the time continuity of  $m_{t,T}$  across time, one may understand their results as estimates of the average kernel price over the sample period, rather than as conditional estimates.

Other problems in their article are discussed in (Rosenberg & Engle, 2002). In particular they suggest that the non-specification of the investors beliefs about future return probabilities could be a problem in the evaluation of the kernel price. Also they use of a very short period of time, 4 years, to estimate the state probabilities. Moreover, they depart from the literature on stochastic volatility, which suggests that future state probabilities depend more on recent events than past events. In fact, past events remain useful for prediction of future state probabilities. In order to take this into account we use a dataset of 12 years of option prices.

A work close in spirit to (Aït-Sahalia & Lo, 1998) is (Jackwerth J. C., 2000). His article is one of the most interesting pertaining to this literature. Beyond the estimation technique used, his paper is noteworthy because it also opened up the well-known "pricing-kernel puzzle". In his nonparametric estimation of the kernel price, Jackwerth finds that the shape of this function is in accordance with economic theory before the crash of 1987, but not after the crash. He concludes that the reason is the mispricing of options after the crash.

Both articles could incur some problems that cause the kernel price and the relative risk aversion function (RRA) to be not consistent with economic theory. In (Aït-Sahalia & Lo, 1998), we see that, if the bandwidth changes, the RRA changes as well and this means that the bandwidth chosen influences the shape of the RRA; on the other hand, in (Jackwerth J. C., 2000), the use of option prices after the crisis period could influence the shape of the kernel price if volatility is misspecified.

Another nonparametric estimation model for the kernel price is given by (Barone-Adesi, Engle, & Mancini, 2008), where they use a procedure similar to the one used by (Rosenberg & Engle, 2002), but with a nonparametric estimation of the ratio  $q_{t,t+\tau}/p_{t,t+\tau}$ . While in the papers by (Aït-Sahalia & Lo, 2000) and (Jackwerth J. C., 2000) results are in contrast with the economic theory, (Barone-Adesi, Engle, & Mancini, 2008) find a kernel price which exhibits a fairly monotonically decreasing shape.

Parametric methods to estimate the kernel price are often used in literature. (Jackwerth J. C., 2004) provides a general review on this topic, but for the purpose of our work we do not go into much detail on parametric estimation. As pointed out by (Birke & Pilz, 2009) there are no generally accepted parametric forms for asset price dynamics, for volatility surfaces or for call and put functions and therefore the use of parametric method may introduce systematic errors.

Our goal is to test whether a different nonparametric method, starting from option pricing observed in the market, respects the conditions of no-arbitrage present in (Birke & Pilz, 2009). In particular, we test if the first derivative of the call price function is decreasing in the strike and the second derivative is positive. These conditions should guarantee a kernel price monotonically decreasing in wealth.

It is important to stress that our kernel price is a function of three variables: the underlying price, the risk-free rate and volatility. In the first part, we use only two factors: the underlying and the risk-free rate. In last sections we introduce also volatility.

### *Empirical kernel price*

In this section we compute the kernel price as the ratio of the risk-neutral and the historical density, discounted by the risk-free interest rate. First we describe how we compute the risk-neutral density. Then, we explain our computation of the historical density. In each part we describe the dataset we use and our filter for cleaning it.



*Theoretical backgrounds of risk-neutral density*

(Breedon & Litzenberger, 1978) shows how to derive the risk-neutral density from a set of call options with fixed maturity. The formula for risk-neutral density is (see Appendix A for derivation):

$$f(K) = e^{rT} \frac{\partial^2 C(S_t, K, T)}{\partial K^2} \Big|_{S_T=K} \quad (5)$$

We can approximate this result for the discrete case as:

$$f(K) \approx e^{rT} \frac{C_{i+1}(S_t, K, T) - 2C_i(S_t, K, T) + C_{i-1}(S_t, K, T)}{(K_{i+1} - K_i)(K_i - K_{i-1})} \Big|_{S_T=K} \quad (6)$$

and for puts

$$f(K) \approx e^{rT} \frac{P_{i+1}(S_t, K, T) - 2P_i(S_t, K, T) + P_{i-1}(S_t, K, T)}{(K_{i+1} - K_i)(K_i - K_{i-1})} \Big|_{S_T=K} \quad (7)$$

Note that in equations (6) and (7) we wrote numerical derivatives for values of  $K_{i-1}$  and  $K_{i+1}$  which are not symmetric around  $K_i$ . (Breedon & Litzenberger, 1978) used symmetric strikes while deriving (5). But having non symmetric strikes does not hurt our estimation in any sense; to the contrary it gives us more observations and as a result may improve our estimation.

Now we discuss some other methods of deriving the risk neutral density and compare it to the one we use.

A recent paper by (Figlewski, 2008) is very close in spirit to our work. In his paper he derives the risk neutral distribution using the same result in (Breedon & Litzenberger, 1978). We differ from him in some aspects. First, we use the bid and ask prices that are given on the market to construct butterfly spreads. e.g. for the long position the ask price is used and for the short position the bid price. Our choice removes negative values in the risk-neutral distribution and we therefore find that the no-arbitrage condition described in (Birke & Pilz, 2009) holds. Second, we do not need to convert the bid, ask, or mid-prices into implied volatility to smooth the transition from call to put because we take the average of butterfly prices from several days with equal maturities and this improves the precision of our result. Other similar works are discussed in (Bahra, 1997), (Pirknert, Weigend, & Zimmermann, 1999) and (Jackwerth J. C., 2004).

In (Bahra, 1997), the author proposes several techniques to estimate the risk neutral density. For every method he explains the pros and the cons. He then assumes that the options prices can be derived either using a parametric method, by solving a least squares problem, or nonparametric only, using kernel regression. In our work, using a time series of options over a sample of 12 years and taking averages we avoid the parametric or nonparametric pricing step and therefore we rely only on pricing available on the market.

In (Pirknert, Weigend, & Zimmermann, 1999), they use a combination approach to derive the risk neutral distribution. They combine the implied binomial tree and the mixture distributions to get the approach called "Mixture Binomial Tree". Our work differs from their work due to our use of European options. In their work, they use American options and therefore they could have the problem of the early exercise. In our sample, we consider only European options to be sure to have the risk neutral density for that expiration time only.

(Jackwerth J. C., 2004) may be considered as a general review of different methods and problems. He concentrates in particular on nonparametric estimation, but he gives a general

overview also on parametric works, sorting parametric works into classes and explaining the positive and negative aspects of each one.

### *Historical density*

To obtain historical probability density we need to account for features of the empirical returns of S&P500 index. There are lots of evidence suggesting that return innovations are (i) not normal, (ii) volatility is stochastic and, (iii) that positive and negative shocks to return have diverse effect on returns' volatility (see for example (Ghysels , Harvey , & Renault , 1996). That's why we are going to use a GARCH model together with the filtered historical simulation (FHS) approach used by (Barone-Adesi, Bourgoin, & Giannopoulos, 1998). FHS approach allows to model volatility of returns without specifying any assumption on return innovations.

Among variety of GARCH models we are going to use (Glosten, Jagannathan, & Runkle, 1993) (GJR GARCH) model. The choice of the GJR model relies on two properties: 1) its ability to capture an asymmetry of positive and negative returns effect on return volatility and, 2) its fitting ability (Rosenberg & Engle, 2002) document that GJR GARCH model fits S&P500 returns data better than other GARCH models).

Under the historical measure, the asymmetric GJR GARCH model is

$$\log \frac{S_t}{S_{t-1}} = \mu + \epsilon_t,$$

$$\sigma_t^2 = \omega + \beta\sigma_{t-1}^2 + \alpha\epsilon_{t-1}^2 + \gamma I_{t-1}\epsilon_{t-1}^2,$$

where  $S_t$ — the underlying price,  $\epsilon_t = \sigma_t z_t$ , and  $z_t \sim f(0,1)$ , and  $I_{t-1} = 1$  when  $\epsilon_{t-1} < 0$ , and  $I_{t-1} = 0$  otherwise. The scaled return innovation,  $z_t$ , is drawn from the empirical density function  $f(\cdot)$ , which is obtained by dividing each estimated return innovation,  $\hat{\epsilon}_t$ , by its estimated conditional volatility  $\hat{\sigma}_t$ . This set of estimated scaled innovations gives an empirical density function that incorporates excess skewness, kurtosis, and other extreme return behavior that is not captured in a normal density function.

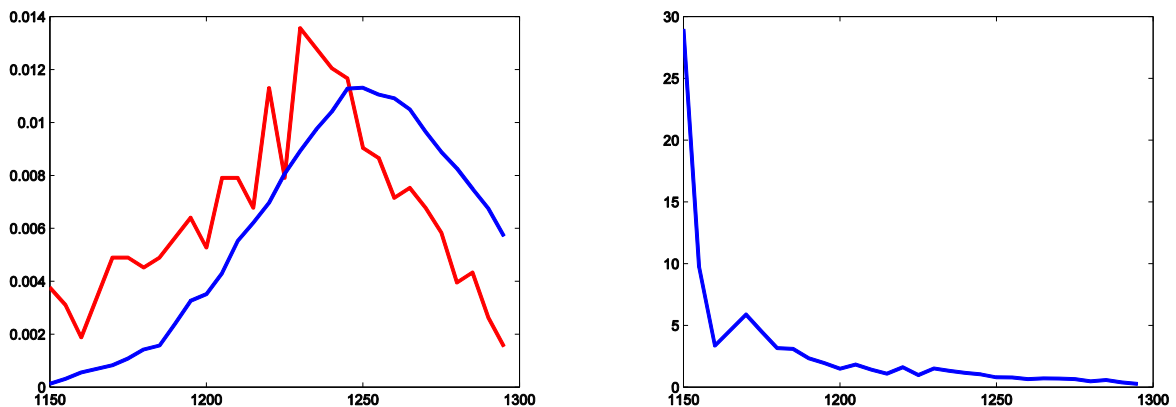


Figure 1. Left: Risk-neutral distribution (red line) and the historical distribution (blue line). We take one day at random from our sample (11 August 2005) with maturity equal to 37 days. Right: Price kernel for this particular day (11 August 2005).

The methodology we use to estimate the historical density is as follows. We have a set of risk neutral densities,  $f(K_i)$ , for each day over 12 years. They are calculated from S&P500 index options with constant maturities. Our  $f(K_i)$  are prices of hypothetical butterfly strategies constructed from two (call or put) options with strike  $K_i$  and two long options of the same type with strikes  $K_{i-1}$  and  $K_{i+1}$ . Our triplets  $K_{i-1}$ ,  $K_i$  and  $K_{i+1}$  are not necessary symmetric. For each day, we estimate the parameters of the GJR GARCH using a time series of 3500 returns from the S&P500. Once we have the estimated parameters for each day, we simulate 35000 paths of S&P500 index using as a distribution of  $z_t$  the empirical distribution of the normalized innovation (FHS). We estimate the probability that at maturity we exercise the butterfly, e.g. we count the fractions of paths that at maturity are in the range  $[K_{i-1}, K_{i+1}]$ <sup>2</sup>:

$$p(K_i) = \frac{\frac{\text{\#of paths in the interval } [K_{i-1}, K_{i+1}]}{\text{total number of paths}}}{K_{i+1} - K_{i-1}}. \quad (8)$$

Once we have computed the probability for each day, we can apply the same methodology we use for the risk-neutral distribution. We round the butterfly moneyness to the second digit after the decimal point and we take the average over the sample period.

We use the mid-strike for the butterfly and we round the moneyness to two decimal places. We take the average throughout the time series and we plot the resulting distribution as a function of moneyness. The historical density is drawn for one day at figure 1, and averaged at figure 2.

In the next subsection we explain the estimation method we use for the risk neutral distribution.

### *Risk-neutral estimation*

We use European options on the S&P 500 index (symbol: SPX) to implement our model. We consider the closing prices of the out-of-the-money (OTM) put and call SPX options from 2<sup>nd</sup> January 1996 to 29<sup>th</sup> December 2007. It is known that OTM options are more actively traded than in-the-money options and by using only OTM options one can avoid the potential issues associated with liquidity problems.

Option data and all the other necessary data are downloaded from OptionMetrics. We compute the risk-neutral density at two different maturities: 37, 46, 57 and 72 days<sup>3</sup>. The choice of maturities is random and the same procedure can be applied for all other maturities. We download all the options from our dataset with the same maturities (we provide analysis and graphs for four maturities: 37, 46, 57 and 72 days; for other maturities results are similar) and we discard the options with an implied volatility larger than 75%, an average price lower than 0.05 or a volume equal to 0. In table 1 we summarized the number of options available for each maturity.

---

<sup>2</sup> In our sample we use intervals with different lengths: most of them are intervals with a length of 10 index points, but we also have some intervals with 25 or 50 points, and these intervals are in some cases overlapping.

<sup>3</sup> We work with this four maturities through the paper, although we provide sometimes graphs and p-values for more maturities.

Table 1. The options number for all maturities

<b>Panel A. Main sample (1996-2007)</b>								
Maturity	36	37	38	39	43	44	45	46
Calls	2753	2789	2667	2537	2424	2321	2318	2171
Puts	3406	3421	3308	3217	3112	3057	3026	2870
Maturity	54	57	58	59	71	72	73	74
Calls	1879	1873	1853	1934	1460	1466	1414	1281
Puts	2469	2488	2497	2569	1976	1985	1966	1837
<b>Panel B. Around crisis samples</b>								
Maturity	37	46	57	72				
	Aug 12, 2004 to Sep 15, 2005							
Calls	340	250	207	147				
Puts	385	297	217	179				
	Nov 10, 2005 to Oct 10, 2006							
Calls	364	280	256	172				
Puts	424	329	303	199				
	Jun 14, 2006 to Jun 14, 2007							
Calls	486	355	325	187				
Puts	608	441	386	250				

Oct 11, 2007 to Aug 14, 2008

Calls	607	505	403	271
Puts	727	609	478	301

We construct then butterfly spreads using the bid-ask prices of the options. The butterfly spread is formed by two short call options with strike  $K_i$  and long two call with strikes  $K_{i+1}$  and  $K_{i-1}$ , the same for puts. We divide the dataset and we construct a butterfly spread for every day. We try to use the smallest distance possible in the strikes to construct the butterfly spread. Following the quotation for the SPX we use a difference of 5 basis points. However, for the deep-out-of-the-money options we need to take into consideration a larger distance because there are fewer options traded. In that case, we arrive to have spreads of 10 to 50 points. We download option prices, order by strike, from smallest to largest. We take

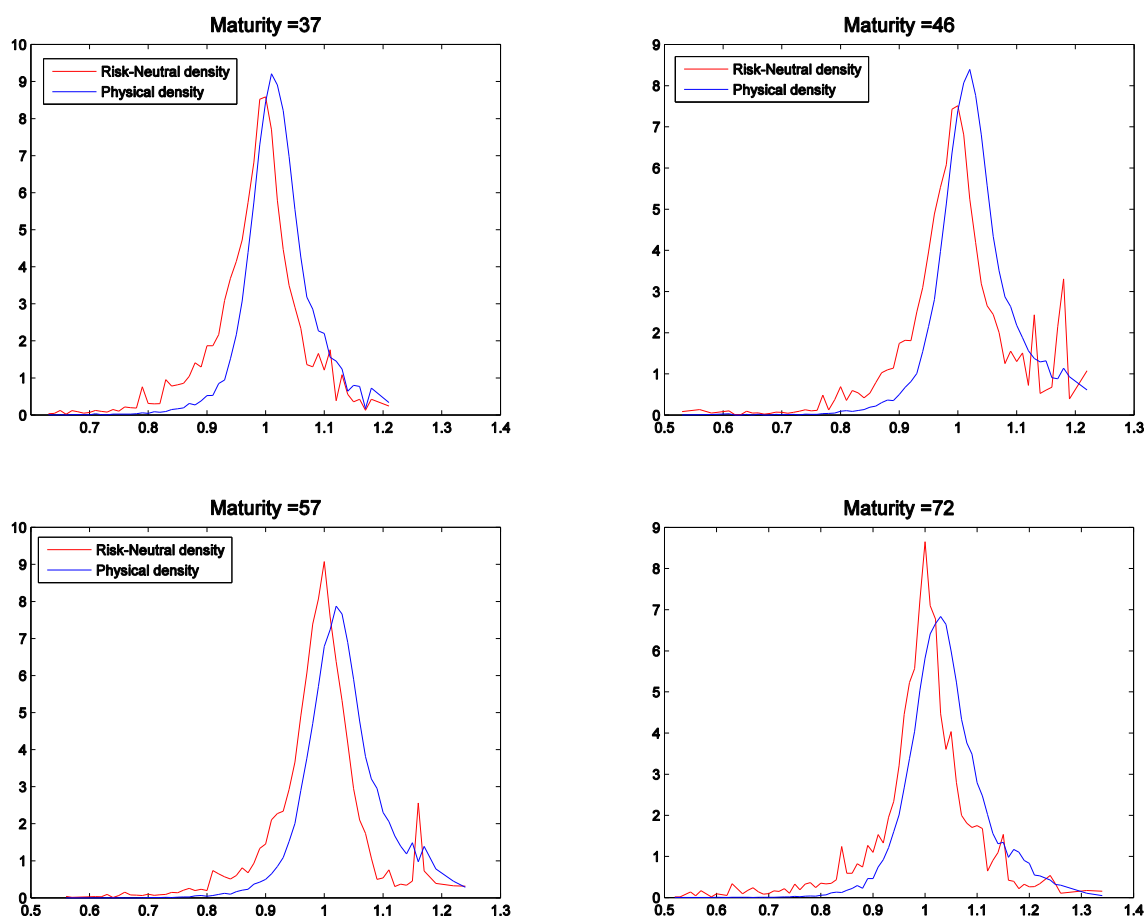


Figure 2. Risk neutral and historical distribution as the 12 year average of risk neutral and historical distributions for a fixed number of days to maturity.

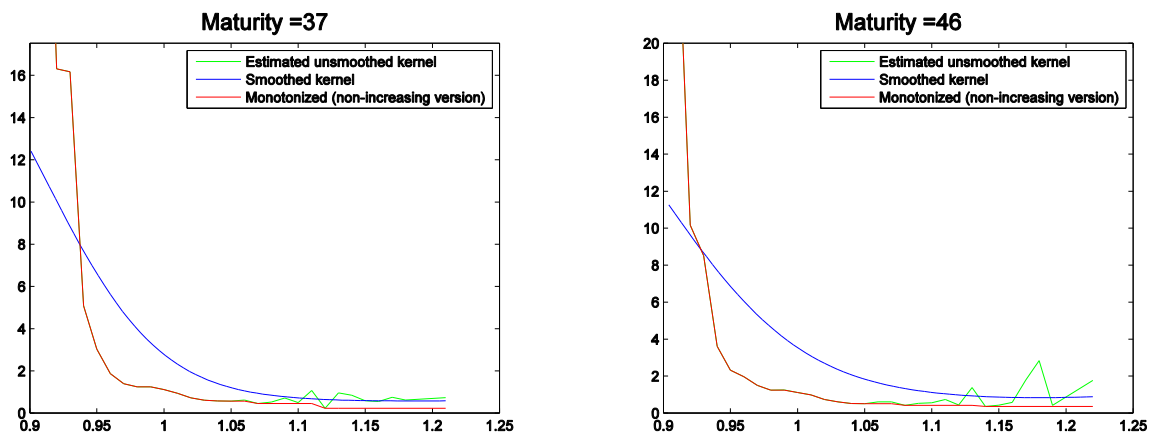
the second difference of option prices using formulas (6) and (7), for calls and puts separately, and then combine them. We do it for each day available in our dataset.

In figure 1 we take a day at random from our sample and we show the risk-neutral distribution, the historical distribution and their ratio as the price kernel. As an example, we take 11 August 2005, and we look at options with a maturity equal to 37 days. We see that for this choice, the kernel price shows a monotonically decreasing path in  $S_T$ , with some jumps because we do not smooth the curve.

At this point, we take into consideration the moneyness of each butterfly. As reference moneyness of the butterfly spread, we use the moneyness of the middle strike. We round all the butterfly moneyness to the second decimal digit and we take the average of all the butterfly prices with equal moneyness<sup>4</sup>. We can now plot the risk-neutral distribution as an average of the butterfly prices for a fixed maturity over a twelve year period. Figure 2 draws the risk-neutral and historical (physical) distributions of the underlying index. As expected, the risk neutral distribution is shifted to the left with respect to the historical distribution.

### *Kernel price*

We apply the definition given in equation (4) in order to get the kernel price. From previous calculations we obtain the average risk-neutral distribution for the fixed maturity and also the average historical density. In order to get the average kernel price we take the kernel price of each day and then we compute the average from all the days in our time series. Averaging across time allows us to increase the otherwise small number of data points.



<sup>4</sup> In order to find an equal moneyness it is necessary to round the moneyness values to the second decimal digit. Otherwise we cannot average and we are left with a lower number of points.

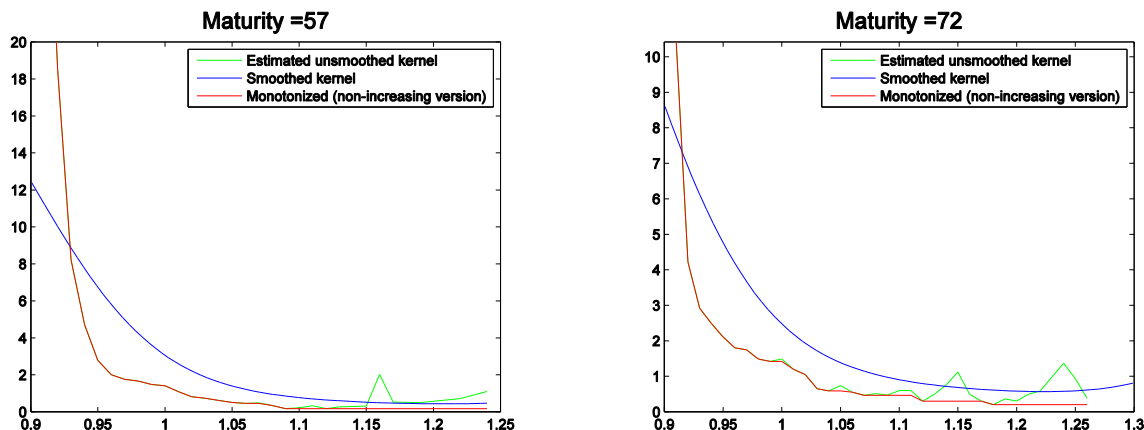


Figure 3: SPD per unit probability as the average of the SPD per unit probability throughout the time series of 12 years and with equal maturity. It is important to keep in mind that this SPD per unit probability is not derived from the two distributions given in Figure 2.

It is important to recall that our kernel price is the average of the kernel prices estimated each day. In other words, we estimate the risk neutral and the historical densities for each day, calculate the price kernel and then average these daily kernels, rather than calculate average densities over the entire sample.

Generally, for all different maturities we get a monotonically decreasing path for the kernel price and all of these are in accordance with economic theory.

We also obtain a kernel-smoothed version of the price kernel by applying to our unaveraged pricing kernel the kernel smoothing. Our smoothed pricing kernels are also monotonic decreasing (see figure 3).

### *Monotonicity testing*

In this section we introduce some monotonicity testing. We do two kinds of monotonicity tests. Both of them, as many nonparametric tests, involve the notion of Kolmogorov distance. The first one is very simple, may be not completely justified by theory but it is very intuitive. The second one is more thorough and is more sound statistically proves and results.

**Simple test.** Our first test (call it *simple*), considers a monotonized version of the price kernel obtained earlier. We test that the estimated and monotonized versions are equal.

Table 2: The pricing kernel monotonicity testing

Maturity, days	Intuitive test		Durot test	
	$H_0^a$	<i>P</i> -value	$H_0^b$	<i>P</i> -value
36	Not rej.	0.3213*	Not rej.	0.2398
37	Not rej.	0.0221**	Not rej.	0.2138
38	Not rej.	0.0259**	Not rej.	0.4809
39	Not rej.	0.3402*	Not rej.	0.3338
43	Not rej.	0.1088*	Not rej.	0.3535
44	Not rej.	0.6976*	Not rej.	0.1824
45	Not rej.	0.1088*	Not rej.	0.4186
46	Not rej.	0.0259**	Not rej.	0.1046
54	Not rej.	0.1844*	Not rej.	0.2855
57	Not rej.	0.0259**	Not rej.	0.2079
58	Not rej.	0.1088*	Not rej.	0.4088
59	Not rej.	0.0343**	Not rej.	0.1097
71	Not rej.	0.1315*	Not rej.	0.1021
72	Not rej.	0.0244**	Not rej.	0.1034
73	Rej.	0.0082	Rej.	0.0493
74	Rej.	0.00013	Not rej.	.05114

<sup>a</sup> In the intuitive test we use 1% confidence interval. Starred numbers denote that in this case  $H_0$  is not rejected for the 5% confidence level, double starred – for the 1%.

<sup>b</sup> While using the Durot testing procedure we use 5% confidence level.



We create our monotone version,  $\widehat{m}(x)$ , as follows. From estimation of the pricing kernel,  $x_i \rightarrow m(x_i)$ , we inspect each point  $m(x_i)$  for monotonicity. If it is between its adjacent points, the monotone version is defined to be equal to estimated one, otherwise – the monotone version is defined to be constant and equal to previous value. More precisely, the monotone version is given as:

$$\widehat{m}(x_1) = m(x_1),$$

$$\widehat{m}(x_{i+1}) = \begin{cases} m(x_{i+1}), & \text{if } m(x_{i+1}) \leq m(x_i) \\ \widehat{m}(x_i), & \text{if } m(x_{i+1}) \geq m(x_i) \end{cases}$$

where  $m(x)$  – the estimated price kernel.

After getting the monotone version we compare it with the estimated price kernel,  $m(x)$ , by means of Kolmogorov-Smirnov test<sup>5</sup>.

Results of testing are given in the table 2, test result in “Not rej.” if  $H_0: \widehat{m} \equiv m$  is not rejected and in “Rej.” – if it was rejected at the 1% significance level. Also one can observe p-values of  $H_0$  and that comes from the table is that we are not able to reject null hypothesis of monotonicity of the price kernel at the confidence level 1% (for some maturities it is 10%). Only for maturities of 73 and 74 days we reject monotonicity, possibly because of discretization errors. In any case this test is rather weak. Thus we are going to introduce a more powerful test.

**Sophisticated test.** To test monotonicity of the pricing kernel more thoroughly we use a Kolmogorov-type test for monotonicity of a regression function described in (Durot, 2003). Hypothesis testing is performed within the following regression model

$$y_i = f(x_i) + \varepsilon_i,$$

where, in our case  $x_i$  is the moneyness of the option,  $y_i$  is the price kernel, and  $\varepsilon_i$  – random errors with mean 0. Our second test is based on the fact that  $f$  is non-increasing (decreasing) if and only if  $\widehat{F} \equiv F$ , here  $F(t) = \int_0^t f(s)ds, t \in [0,1]$ , and  $\widehat{F}$  is the least concave majorant (lcm) of  $F$ . One should reject  $H_0$  about monotonic decrease of pricing kernel in case the difference between  $F$  and  $\widehat{F}$  corresponding to our price kernel is too large.

**Test construction.** From previous subsections we can obtain the pricing kernel, so we have function  $f$  given as

$$\text{moneyness } (x_i) \xrightarrow{f} \text{pricing kernel}$$

As mentioned above  $f$  is non-increasing on  $[0,1]$  if and only if  $F$  is concave on  $[0,1]$ . Denote  $i_t$  integer part of  $nt$  and define

$$F_n(t) = \frac{1}{n} \sum_{j \leq i_t} y_j + (t - x_{i_t})y_{i_t}, \quad t \in [0,1]$$

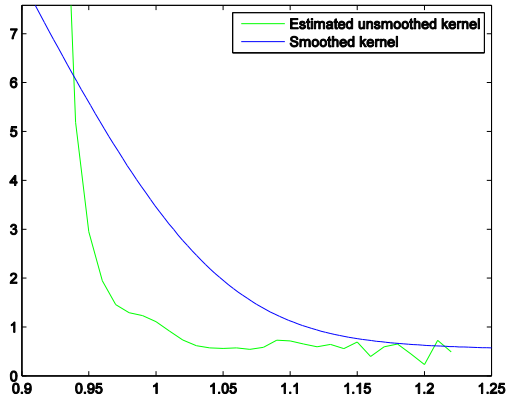
$F_n$  is approximation of  $F$ , thus we consider Kolmogorov-type test statistic

$$S_n = \frac{\sqrt{n}}{\widehat{\sigma}_n} \sup_{t \in [0,1]} |\widehat{F}_n(t) - F_n(t)|, \quad (9)$$

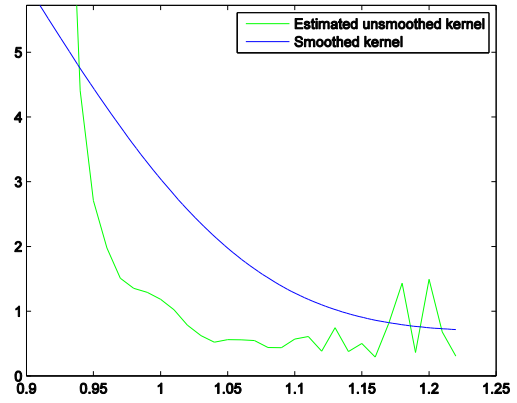
---

<sup>5</sup> One can do it using MatLab standard function `kstest2`.

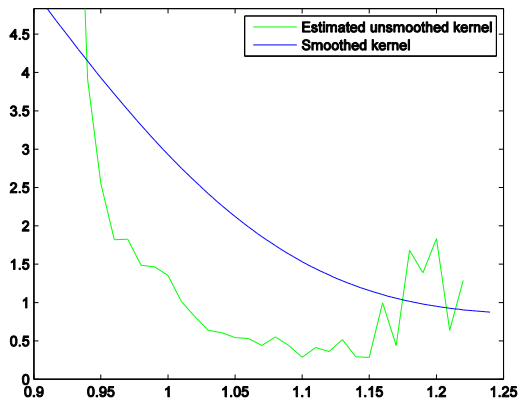
where  $\widehat{F}_n$  is lcm of  $F_n$  and  $\widehat{\sigma}_n$  consistent estimator of  $\sigma_n$ .<sup>6</sup> (Durot, 2003) proves that under  $H_0$   $S_n$  converges in distribution to  $Z = \|\widehat{W} - W\|$ , where  $W$  is standard Brownian motion,  $\widehat{W}$  its lcm and  $\|\cdot\|$ –supremum distance.



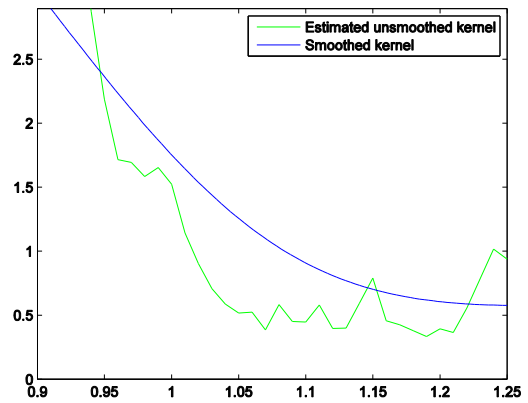
The first sample: 36 - 39 days



The second sample: 43 - 46 days



The third sample: 54, 57 - 59 days



The fourth sample: 71 - 74 days

Figure 4: SPD per unit probability over time. It is averaged over close maturities.

<sup>6</sup> We use the one provided in Durot paper:  $\widehat{\sigma}_n^2 = \frac{1}{2(n-1)} \sum_{i=1}^{n-1} (y_i - y_{i+1})^2$ .

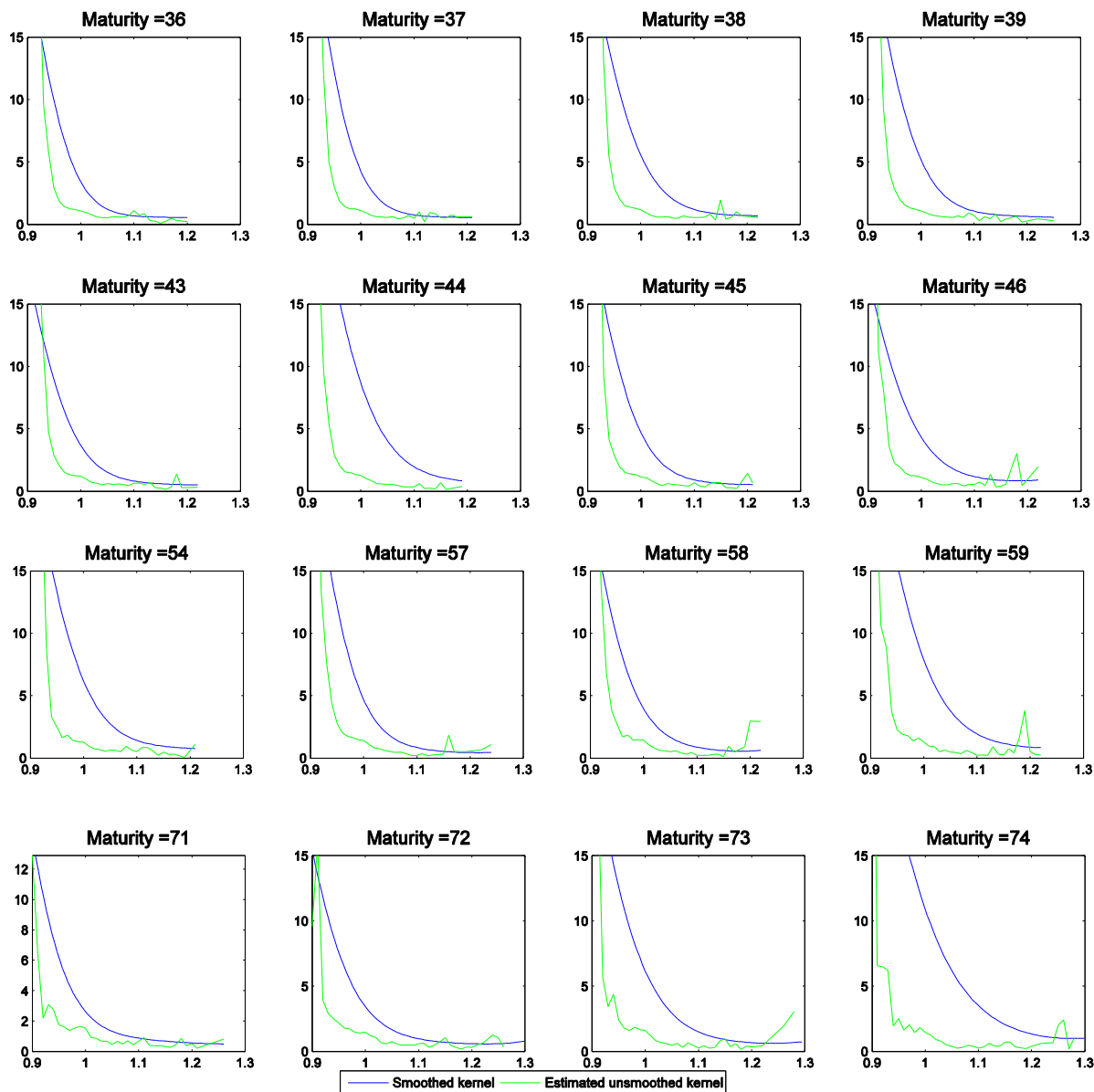
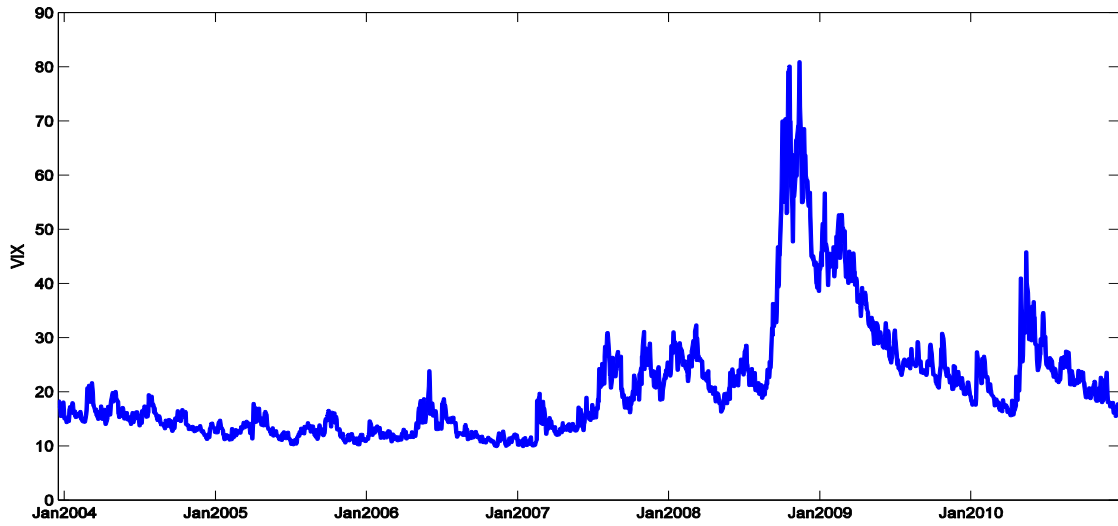


Figure 5: SPD per unit probability for different maturities. Maturities are written above each figure.

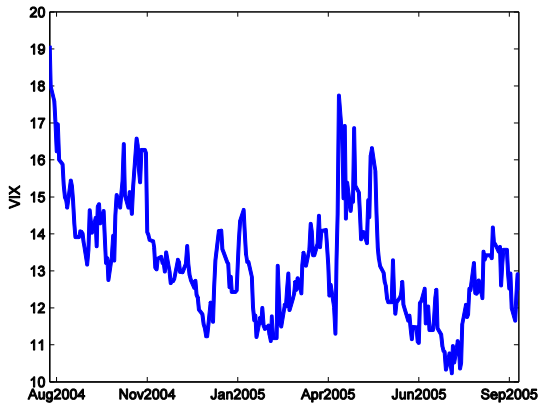
In Table 2 results of described testing procedure are presented on the right. We can see that all p-values support our hypothesis, namely we cannot reject  $H_0$  for 5% confidence level (except for the price kernel obtained from 73 days maturity options where p-value is 0.0493. Even for the 10% confidence level most of the samples would not contradict monotonicity of pricing kernels.

#### *Averaging price kernel over time*

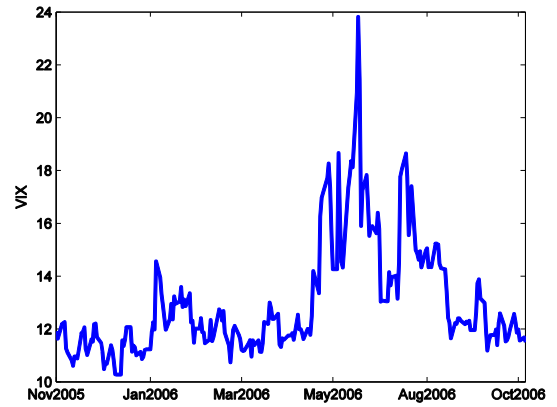
In this section we check the robustness of our methodology and we try to find smoothness criteria for smoothing our price kernels. First of all, we show different price kernels with maturities close to those we showed before. According to economic theory, price kernels with close maturities should have similar shape. Different price kernels with close maturity should be similar to each other. In order to check this, we create four samples: the



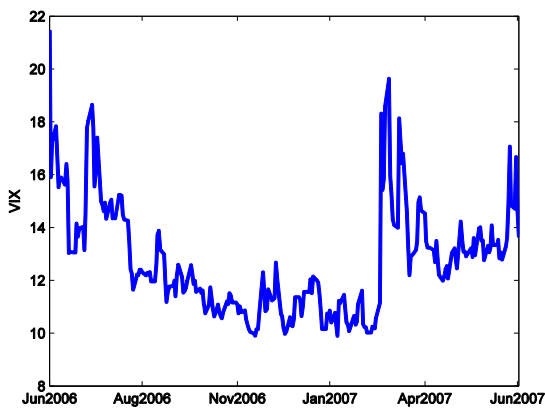
The VIX index between 2nd of January 2004 and 29st of December 2010



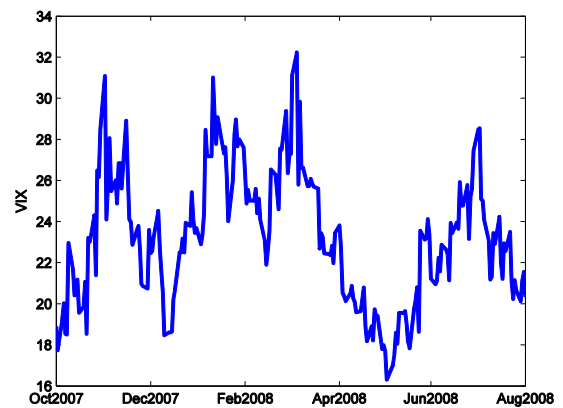
The sample: Aug 12, 2004 to Sep 15, 2005



The sample: Nov 10, 2005 to Oct 10, 2006



The sample: Jun 14, 2006 to Jun 14, 2007



The sample: Oct 11, 2007 to Aug 14, 2008

Figure 6: The four samples we use to compute the different SPD per unit probabilities over different years.

first one has maturities ranging 36 - 39 days, the second – 43 - 46 days, the third – 54, 57-59 days<sup>7</sup>, and the last one consists of 71 - 74 days maturities.

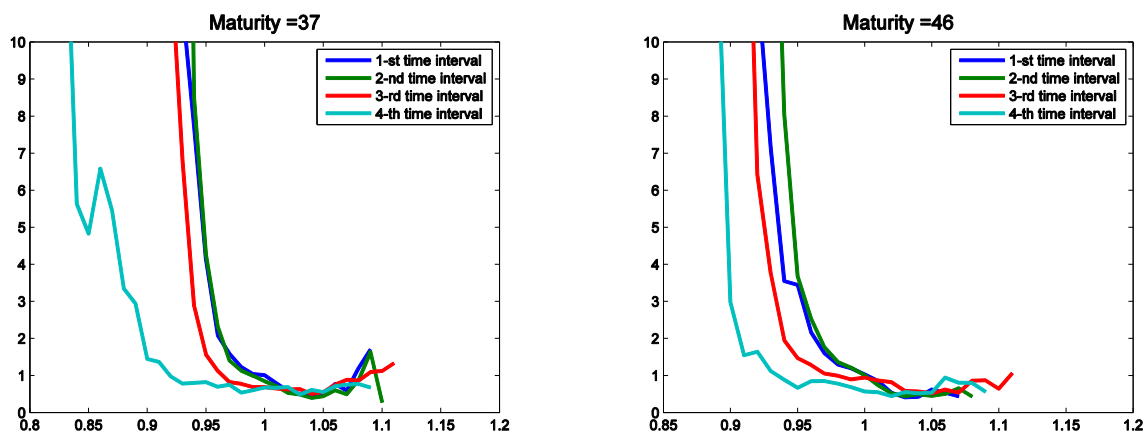
We use the approach explained in previous section. By this method we derive the price kernels for the maturities in all four samples and in Figure 5 we plot the results of our estimations. The unsmoothed kernel prices show a clearly monotonically decreasing path, except in some points that may be due to the discretization of the data. Our smoothed pricing kernels are all smoothly decreasing. In order to verify that the price kernels are monotonous over time, we plot the kernel price as the average of different maturities (see figure 4). In particular, referring to our four samples (the first one is for maturities 36 – 39 days, the second – 43 - 46 days, the third – 54, 57 - 59, and the last – 71 - 74 days), we take the average over the 4 different maturities. We expect to find a kernel price that is monotonically decreasing in wealth, because of the fact that we average over close maturities in our sample.

As we see in figure 5, the kernel prices close in maturity, have similar path, supporting the robustness of our methodology. Test statistics for monotonicity of these price kernels are presented in table 2.

In figure 4, we plot the average for each sample. We find decreasing kernel prices for smoothed estimation, and mainly decreasing kernel prices for unsmoothed estimation, although 50th and 70th samples have some jumps. In this way we were able to have some sort of smoothing criteria without using a method which biases our findings.

#### *Price Kernel around a crisis*

In this section we evaluate the change of kernel price during the crisis. In particular, we look



at kernel prices before and during the recent financial crisis. We divide our sample in 4 periods. Every period is from 9 to 12 months and we take periods which show a similar range in volatility according to the VIX index (see Figure 6).

<sup>7</sup> There are no options for 55 and 56 days to maturity in OptionMetrix.

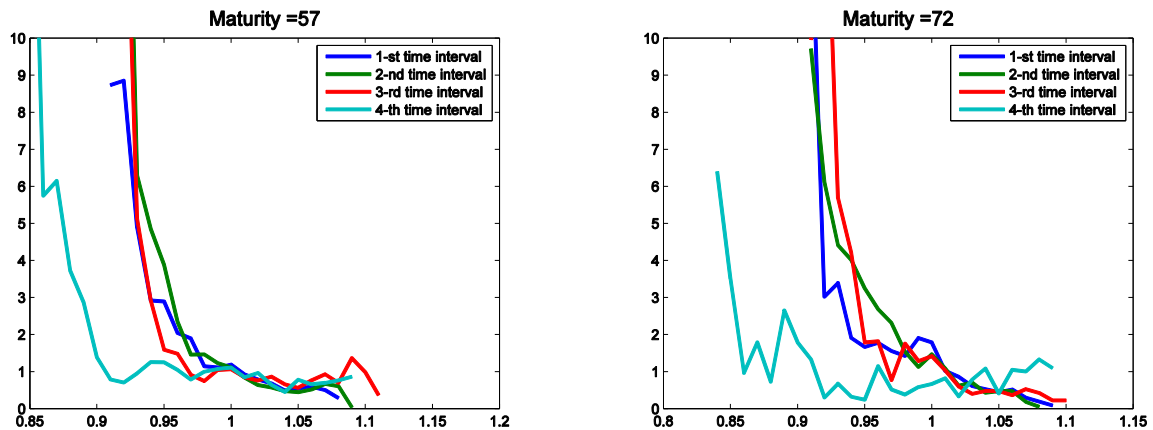


Figure 7: The kernel prices for four samples we create looking at different levels of volatility index.

### *Estimates of pricing kernels in different periods*

We identify four different periods between August 2004 and August 2008. The first period goes from August 2004 to the 15<sup>th</sup> of September 2005. In this period volatility is between 10 and 20 points. The second period is between 10 November 2005 to 10 October 2006. In this second period the volatility is again in a fixed range between 10 to 20 points. The third period, which is before the crisis period, is between 14 June 2006 and 14 June 2007. Even here the volatility is in a range of 10 to 20 points. The last period, the period of the beginning of the crisis is between 11 October 2007 and 14 August 2008. In this period the volatility is much higher and it is in a range between 10 and 30 points.

For each period, we compute the price kernel by the methodology presented above. We fix a maturity (in this case we look at maturities of 37, 46, 57 and 72 days) and we plot the kernel price of each period.

As expected, for the three periods before the crisis we get price kernels monotonically decreasing and very similar in shape one each other. For the kernel price of the crisis period, we have a different shape. It is higher for moneyness smaller than 1 and constant for moneyness larger than 1. For the value smaller than 1, this is exactly what we expected to obtain. The probability of negative outcome is higher therefore we give more weight of negative outcomes. On the other hand, we do not expect to have a constant kernel price for moneyness values larger than 1.

In the next section, we focus only on the kernel price of the crisis period.

### *Kernel Price in Crisis Time*

In the previous subsection we show kernel prices for different periods (see Fig 7). We see in figure 7 that the kernel prices in period where the volatility is stable (it remains in a determinate range of 10 to 20 points) the SPD per unit probabilities exhibit a monotonically decreasing shape.

When we enter in a period of the crisis, volatility changes dramatically. In this case, we observe a kernel price that is no more monotonically decreasing, but decreasing on the left, with constant value after the moneyness equal to 1.

However, it is interesting to notice that the method we use to derive kernel prices is sufficiently robust to guarantee that even in a crisis we get kernel prices in agreement (in part of the graph) with economic theory.

*Kernel price as a function of volatility*

In this section we would like to extend our model and consider the kernel price as a function of more variables. In fact, as explained in (Chabi-Yo, Garcia, & Renault , 2005), one possible explanation for the non-monotonicity of the price kernel is volatility. In a previous section we compute the price kernel as a function of one variable: the underlying,  $m_{t,T}(S_T)$ . We know from (Pliska, 1986), (Karatzas, Lehoczky, & Shreve, 1987), and (Cox & Huang, 1989) that the kernel price is characterized by at least two factors: the risk-free rate and the market price of risk. In our analysis we would like to consider the kernel price as a function of three different factors: the risk-free rate, the underlying price and the volatility. We have already introduced the underlying price and the risk free-rate. Now we want to introduce also the volatility, so  $m_{t,T}(S_T, r_f, \sigma)$ .

We saw that the risk-free rate is a parameter that does not enter in our analysis for as a decisive factor. Both probabilities are forward looking. In fact, the historical probability is seen as the probability to exercise a butterfly spread at maturity, while the risk-neutral is seen as the probability of a particular state.

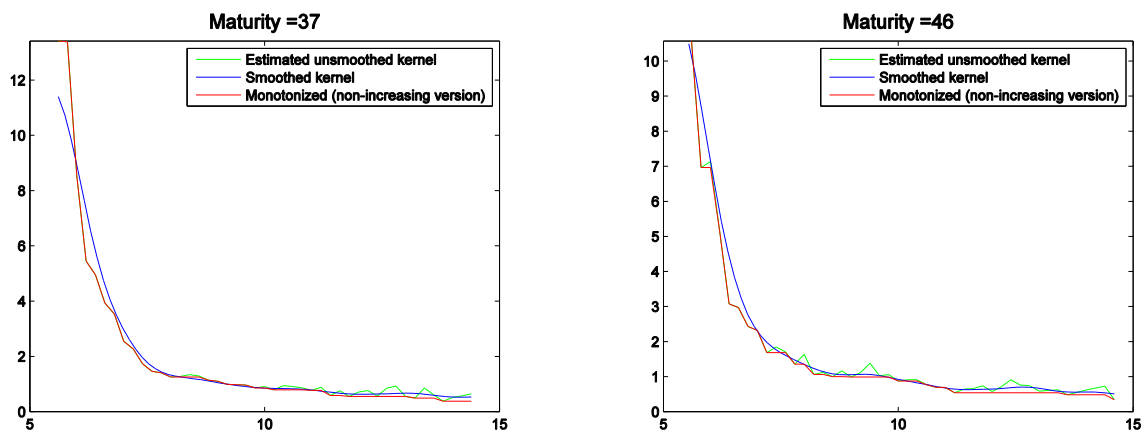
The moneyness is nothing else than the  $K/S_t$ . In order to introduce the volatility we take as a reference the idea by (Carr & Wu, 2003). They use a moneyness defined as:

$$\text{moneyness} = \frac{\log(K/F)}{\sigma\sqrt{T}},$$

where F is the futures contract price, T is the maturity time and  $\sigma$  is the average volatility of the index.

For our propose, we can change this formula to look:

$$\text{moneyness} = \frac{K}{S_t \cdot \sigma},$$



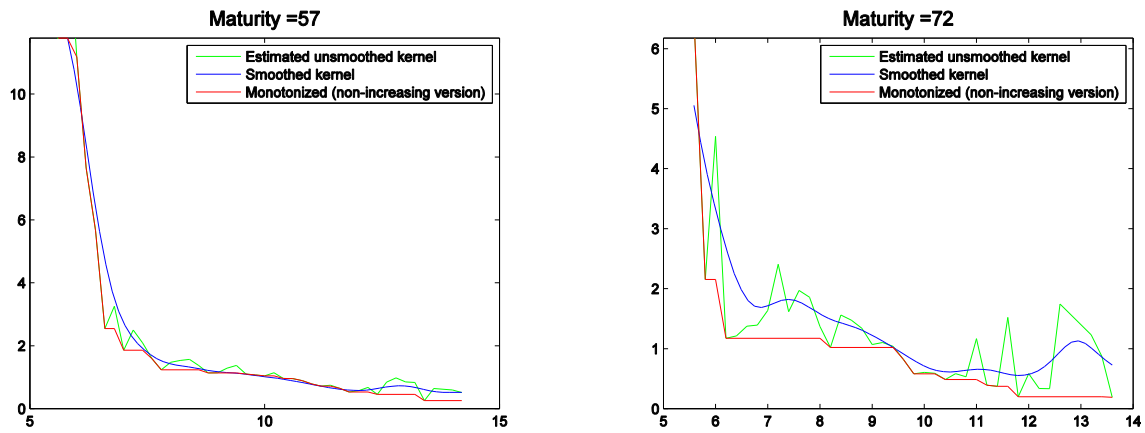


Figure 8: The Kernel prices when we use moneyyness factor that take into consideration underlying price and volatility.

In fact the futures price is already considered for the above explanation of the forward looking probabilities, while the time to maturity is constant over the sample we consider. In our case the volatility is not anymore the average volatility, but the implied volatility of each option.

The procedure to derive the kernel price is again the same we have seen in the previous sections<sup>8</sup> and therefore our result for maturities equal to 37, 46, 57 and 72 are as at the figure 8.

At figure 8 we plotted pricing kernels with volatility accounted in the moneyyness parameter.

<sup>8</sup> There is only a small difference when we round the new moneyyness in order to average different periods. We do not take the second digit after the point, but we arrive only at the first one.



Table 3: The pricing kernel monotonicity testing in case of volatility being additional parameter for moneyiness. Table provides p-values for monotonicity tests.

Maturity	Intuitive	Durot	Maturity	Intuitive	Durot
36	0.7651	1.0000	54	0.1489	1.0000
37	0.2951	1.0000	57	0.4075	0.5313
38	0.2823	0.9401	58	0.5480	0.9037
39	0.0569	1.0000	59	0.2436	0.0058
43	0.1078	0.9715	71	0.0042	0.0000
44	0.0372	0.5398	72	0.0042	0.0000
45	0.2823	0.9363	73	0.6403	0.1268
46	0.0569	0.8069	74	0.0000	0.0446

In this case the results are consistent with the economic theory. In table 3 we give p-values for all maturities we have seen above. One can see that these p-values confirm our graph, namely for smooth pricing kernels p-values are high in both test. Only for maturities equal to 71, 72 p-values suggest that pricing kernels are not monotone which one can also notice at the graph.

## Conclusion

We propose a method to evaluate the kernel price in a specific day for a fixed maturity as well as the average of different kernel prices in a time series of 12 years for a fixed maturity. Using option prices on the S&P 500, we derive the risk-neutral distribution through the well-known result in (Breedon & Litzenberger, 1978).

We compute the risk neutral distribution in each day where we have options with a fixed maturity. Then, we compute the historical density, for the same maturity, in each day, using a GARCH method, based on the filter historical simulation technique. We then compute the ratio between the two probabilities in order to derive the kernel price for that given day. We show that in a fixed day (chosen at random in our sample) the risk-neutral distribution implied in the option prices satisfies the no-arbitrage condition.

We provide a smoothed version of the pricing kernel, to test its monotonicity. Our tests support the pricing kernel monotonicity. Therefore, we show that the ratio between the two probabilities, is monotonically decreasing in agreement with economic theory (see figure 1). We then show how the average of the different kernel prices across 12 years display the same monotonically decreasing path (see figure 3 and p-values in table 2).

We also prove that average price kernels over time, if we take close maturities, exhibit a monotonically decreasing path in agreement with economic theory.

Furthermore, we try to explain the reason why with different methods it could be possible to incur into the “pricing kernel puzzle” and have a different shapes for the kernel price. We can conclude that in most cases the model used to estimate the kernel price or the sample taken into consideration could introduce some errors in the estimation of the kernel price.

In the last part, we show the changing in shape of different price kernels before and during the recent crisis. We see that before the crisis the price kernels are monotonically decreasing while during the crisis it becomes decreasing in a part and then constant for moneyness value higher than 1. We understand this result in a very simple way: the risk neutral probability changes faster with respect to the historical one and therefore the ratio between the two remain constant.

## References

- Aït-Sahalia, Y., & Lo, A. W. (1998). Nonparametric estimation of state-price densities implicit in financial assets prices. *Journal of Finance*, 53(2), 499-548.
- Aït-Sahalia, Y., & Lo, A. W. (2000). Nonparametric risk management and implied risk aversion. *Journal of Econometrics*, 94, 9-51.
- Arrow, K. J. (1964). The role of securities in the optimal allocation of risk-bearing. *The Review of Economic Studies*, 91-96.
- Bahra, B. (1997). Implied risk-neutral probability density functions from options prices: Theory and application. *Working Paper*.
- Barone-Adesi, G., Bourgoin, F., & Giannopoulos, K. (1998). Don't look back. *Risk*, 11, 100-103.
- Barone-Adesi, G., Engle, R. F., & Mancini, L. (2008). A garch option pricing model with Filtered Historical Simulation. *Review of Financial Studies*, 21(3), 1223-1258.
- Birke, M., & Pilz, K. F. (2009). Nonparametric Option Pricing with No-Arbitrage Constraints. *Journal of Financial Econometrics*, 7(2), 53-76.
- Breeden, D. T., & Litzenberger, R. H. (1978). Prices of State-Contingent Claims Implicit in Option Prices. *The Journal of Business*, 51(4), 621-651.
- Brown, D. P., & Gibbons, M. R. (1985). A Simple Econometric Approach for Utility-Based Asset Pricing Models. *The Journal of Finance*, 40(2), 359-381.
- Campbell, J. Y., Lo, A. W., & MacKinlay, C. A. (1997). *The Econometrics of Financial Markets*. Princeton University Press.
- Carr, P., & Wu, L. (2003). The Finite Moment Log Stable Process and Option Pricing. *Journal of Finance*, 58(2), 753-777.
- Chabi-Yo, F., Garcia, R., & Renault, E. M. (2005). State Dependence in Fundamentals and Preferences Explains Risk-Aversion Puzzle. *Working Paper*, 33.
- Cox, J. C., & Huang, C.-f. (1989). Optimal consumption and portfolio policies when asset prices follow a diffusion process. *Journal of Economic Theory*, 49(1), 33-83.
- Detlefsen, K., Härdle, W., & Moro, R. (2007). Empirical Pricing Kernels and Investor Preferences. *Working Paper*, 33.
- Durot, C. (2003). A kolmogorov-type test for monotonicity of regression. *Statistics & Probability Letters*, 63, 425-433.
- Figlewski, S. (2008). The risk neutral probability distribution for the US stock market. *Volatility and Time Series Econometrics: Essays in Honor of Robert F. Engle*.
- Ghysels, E., Harvey, A. C., & Renault, E. M. (1996). Stochastic volatility. In G. S. Maddala, & C. R. Rao, *Handbook of Statistics 14: Statistical Methods in Finance* (pp. 119-192). Butterworth Heinemann.
- Glosten, L. E., Jagannathan, R., & Runkle, D. E. (1993). On the Relation between the Expected Value and the Volatility of the Nominal Excess Return on Stocks. *The Journal of Finance*, 48(5), 1779-1801.
- Jackwerth, J. C. (2000). Recovering risk aversion from option prices and realized returns. *Review of Financial Studies*, 13(2), 433-451.
- Jackwerth, J. C. (2004). *Option-implied risk-neutral distributions and risk aversion*. Charlottesville: Research Foundation of AIMR.
- Karatzas, I., Lehoczky, J. P., & Shreve, S. E. (1987). Optimal Portfolio and Consumption Decisions for a “Small Investor” on a Finite Horizon. *Journal of Control and Optimization*, 25(6), 1557-1586.

- Pirknert, C. D., Weigend, A. S., & Zimmermann, H. (1999). Extracting risk-neutral density from option prices using mixture binomial trees. *Proc. IEEE/IAFE 1999 Conf. Comput Intell. Financial Eng.*, 135-158.
- Pliska, S. R. (1986). A Stochastic Calculus Model of Continuous Trading: Optimal Portfolios. *Mathematics of Operations Research*, 11, 371-382.
- Pratt, J. W. (1964). Risk Aversion in the Small and in the Large. *Econometrica*, 32(1/2), 122-136.
- Rosenberg, J. V., & Engle, R. E. (2002). Empirical pricing kernels. *Journal of Financial Economics*, 64(3), 341–372.

### Appendix A. Derivation of risk-neutral density

We start from a portfolio with two short call options with strike  $K$  and long two call with strikes  $K - \epsilon$  and  $K + \epsilon$  and consider  $1/2\epsilon$  shares of this portfolio. The result is a butterfly spread which pays nothing outside the interval  $[K - \epsilon, K + \epsilon]$ . Letting  $\epsilon$  tend to zero, the payoff function of the butterfly tends to a Dirac delta function with mass at  $K$ <sup>9</sup>, i.e. this is nothing else than an Arrow-Debreu security paying \$1 if  $S_T = K$  and nothing otherwise (see (Arrow, 1964)). In this case, define  $K$  as the strike price,  $S_t$  the value of the underlying today,  $r$  as the interest rate, and  $T$  as the maturity time, the butterfly price is given by

$$P_{butterfly} = \frac{1}{2\epsilon} [2C(S_t, K, T, r) - C(S_t, K - \epsilon, T, r) - C(S_t, K + \epsilon, T, r)]$$

taking limit of this expression as  $\epsilon \rightarrow 0$  we get

$$\lim_{\epsilon \rightarrow 0} P_{butterfly}(S_T) = \frac{\partial^2 C(S_T, K, T)}{\partial K^2}. \quad (1)$$

Now substitute the butterfly payoff,  $x_{butterfly}(S_T) = \mathbb{I}_{[K-\epsilon, K+\epsilon]}(S_T)$ , into equation (3) we get that the price of the butterfly is:

$$P_{butterfly} = e^{-rT} \int_{K-\epsilon}^{K+\epsilon} q_t(S_T) dS_T.$$

If we take limit as  $\epsilon \rightarrow 0$  and calculate this integral using properties of Dirac delta function, we get that

$$\lim_{\epsilon \rightarrow 0} P_{butterfly} = e^{-rT} q_t(S_T)|_{S_T=K}. \quad (2)$$

Rearranging equations (10) and (11) we can have that

$$\lim_{\epsilon \rightarrow 0} P_{butterfly} = e^{-rT} q_t(S_T) = \frac{\partial^2 C(S_T, K, T)}{\partial K^2} |_{S_T=K}. \quad (3)$$

This result suggests that the second derivative of a call price (we will see that it is also true for a put price) with respect to the strike price gives the risk neutral distribution<sup>10</sup>

$$q_t(S_T) = e^{rT} \frac{\partial^2 C(S_t, K, T)}{\partial K^2} |_{S_T=K}.$$

---

<sup>9</sup> More formally, payoff of the butterfly is  $x_{butterfly}(S_T) = \mathbb{I}_{[K-\epsilon, K+\epsilon]}(S_T)$ , or when  $\epsilon \rightarrow 0$  it is  $\lim_{\epsilon \rightarrow 0} x_{butterfly}(S_T) = \delta_K(S_T)$ .

<sup>10</sup> This can also be obtained by differentiating  $C(S_t, K, T) = \int_K^\infty e^{-rT}(S_T - K)f(S_T)dS_T$  w.r.t.  $S_T$  as in (Birke & Pilz, 2009)

In the next part of this section we see how to apply this result in the discrete case.

In the following, we consider three call options with strikes  $K_i, K_{i-1}, K_{i+1}$ , where  $K_{i+1} > K_i > K_{i-1}$ . We have seen that the price of a call option can be written as:

$$C(S_t, K, T) = \int_K^\infty e^{-rT} (S_T - K) f(S_T) dS_T$$

We define  $F(x)$  as the cumulative distribution function,  $f(x)$  as the probability density,  $C(S_t, K, T)$  as the price of a European call option,  $P(S_t, K, T)$  as the price of a European put option, and  $K$  as the strike price of the reference option. According to the result in (Breedon & Litzenberger, 1978) taking the first derivative with respect to the strike price, we get:

$$\begin{aligned} \frac{\partial C(S_t, K, T)}{\partial K} &= \frac{\partial}{\partial K} \left[ \int_K^\infty e^{-rT} (S_T - K) f(S_T) dS_T \right] \\ &= e^{-rT} \left[ -(K - K) f(K) + \int_K^\infty -f(S_T) dS_T \right] = e^{-rT} \int_K^\infty -f(S_T) dS_T \\ &= -e^{-rT} (1 - F(K)) \end{aligned}$$

Solving for  $F(x)$  one gets:

$$F(K) = e^{rT} \frac{\partial C(S_t, K, T)}{\partial K} + 1$$

Now, taking the second derivative, we have equation (5).

# MEASURING THE IMPACT OF INTANGIBLE ASSET INVESTMENT TOWARD COMPANY FINANCIAL HEALTH AND COMPANY AGENCY PROBLEM

Dimas Mukhlas<sup>1</sup>

<sup>1</sup>University Agder, Christiansand Norway

Empirical Research from Indonesian Companies during World Economic Financial Crisis 2006-2011

***Abstract.** The thesis examines the impact of intangible investment toward company's market value. The scenario is working under 2 conditions. First is detecting the role of intangible asset in moderating company financial health toward company market value. The financial health here is working from 3 perspectives. These indicators of company's health are company performance, solvency ratio, and debt proportion. The second scenario is detecting the role of intangible asset in moderating policy in corporate governance toward market value. Intangible asset analysis was chosen here because of its special characteristic. The first is the character which gives benefits to company. Secondly is the character that put the company in risky point. Intangible asset as the asset of production has equipped the employee with better skills and knowledge on productions. On the other hand, an intangible asset that does not have physical evidence triggered the liquidity problem of the company. Indonesia was chosen as the place of observation because of their growth in intangible asset investment. Based on OECD, after 2002, either Foreign Direct Investment or Intellectual Asset in Indonesia has increased. The thesis attempts to analyze how the impact of this assets toward company performance during the crisis. The research involves 158 Indonesian stock listed companies where the data has been collected from 2006 until crisis 2011. Looking at market value of company, intangible value of company, the dividend policy, and corporate financial structures, empirical evidence reveals a significant positive relationship between the amount of intangible asset and the market value of company.*

## Introduction

During last decades the development and alteration of business environment grow tremendously fast. The rapid technology improvement, deregulation and globalization have forced companies to go through the process of reinventing (Garanina & Pavlova, 2011). The investment that helps the companies to improve their competitive abilities will be presented in two ways. The first way is a tangible asset which has physical evidence, whereas the later one is an intangible asset without physical evidence. The appropriate intangible asset helps the company to achieve the success 'roots of company value creation' (Garanina & Pavlova,

2011). Moreover, researcher believe that intangibles asset are ‘major drivers of company growth and value in most economy sector’(Lev, 2001).

Before the financial crisis of 2008, Neil Gross in Business Week August 2001 stated that ‘*Valuing intangibles is a tough job, but it has to be done*’. He also claimed that there are huge transformations in defining important asset. ‘*The shifting from brick and mortar to patent and knowledge are the new realities that grow in latest Modern business competition*’. According to that statement, the good knowledge and understanding about intangible asset can be one of endurance component to face the crisis. Furthermore, Gross (2008) stated that many accountants do not put in the account about this knowledge. It is caused by the nature of intangible value which is not stated in balance sheet.

Petkov (2011) stressed that intangible asset brought many advantages to the company; however, it also triggers the agency cost, which leads to the bankruptcy of the company. The bankruptcy is the result of the large sunk cost (which are beneficial, only when they will be returned in the future), (Martins & Alves, 2010). Align with explanation above; many economists put allegation that the wrong way of manager in valuing and treating intangible asset also led to world economic crisis in 2008 (Petkov, 2011). It is also worth mentioning bubble phenomenon, namely the condition where the price of asset increases, but later on falling down and end up with the lower intrinsic price (White, 2011). Economists believe that bubble phenomenon can happen because of some asset that does not have ability to be identifiable (Petkov, 2011). The effect was that the price of the asset does not reflect the real number of intrinsic value. The increasing gap between market and book value of companies spurred reflections on the importance of intangible asset and the way they are measured (Garanina & Pavlova, 2011).

Indonesia is one of the countries which are able to maintain their economic growth during the crisis. Based on the data in Indonesian Statistical Department, in 2008, Indonesia recorded 6,01% on year average economic growth where almost all countries in rest of the world recorded minus National Economic growth. During the first, the second, the third, and the fourth quarter Indonesia record their growth as 6.21%; 6.25%, 6.30%, and 5.27%. Hence Indonesia did not struggle the bubble burst, many researcher attempt to find the knowledge behind it.

This phenomenon is not common in the global economic transaction framework nowadays where the financial transaction can happen beyond the country border, thus the bubble phenomenon should affect Indonesia easily. Both characteristic of intangible asset, either in creating company competitive advantage or triggering the potential risk of the bubble makes this particular asset become interesting research object therefore in this research we will see how big the intangible asset role in assisting the Indonesian’s company’s endurance before and during crisis in 2008 was.

Based on the paper from Organization for economic Cooperation and Development (OECD) titled Foreign Direct Investment and Intellectual Capital Formation in South East Asiaii, after 2002 foreign direct investment in Indonesia has increased, especially in intellectual capital. The intangible asset has the same characteristic as bubble has; it is very hard to measure the intrinsic value. The crisis that took a place in 2008 was a cause of the United States bubble phenomenon. The question is, why Indonesia was not affected by the whole world crisis in 2008, even if the intangible asset shared some similarity with the bubble characteristic.

## Problem Definition

Study objective of the research is to get the information of relation between intangible assets with the market expectation which represent by Market Value of Company.

- The first objective study of the research is finding the effect of intangible asset toward market value of company.
- The second is finding the role of intangible asset in moderating company financial health variable toward market value.
- The third objective is finding the role of intangible in moderating company corporate governance or agency problem toward market value of company. The characteristic of intangible asset which has huge risk especially in company liquidity make the shareholder put high level attention on this issue. The allegation here is the shareholder will reduce the proportion of debt and issue more stock. The high number of intangible value as a nature will make the manager hedge the risk as much as they can. The allegation here is there will be negative correlation between intangible asset and debt.

## Literature Review and Hypothesis Formulation

### *Company Health Indicators*

There are several measurements to evaluate company's financial health. One of the most popular method is the bankruptcy test from Altman Z. These methods are known as Z-score. Research from Velavan (2011) successfully implemented Z-score to measure bankruptcy risk for real estate companies in India. The method used 5 indicators in predicting the level of company bankruptcy risk such as retained earnings, EBIT, Stockholder Equity, and Revenue. If Z score is low it means the company has big risk in their company health.

This research will not use Z-factor as the method in measuring Financial Health. The reason is this research also elaborates the analysis from corporate governance view. However the idea of Z-score analysis is used in defining Company Performance and Bankruptcy analysis in this thesis. The paper suggests two methods in measuring company health, such as:

- Company Performance
  - Return on Equity are one of the most popular method in calculating company performance (Brigham, 1992). These methods are the comparison between Earning after Tax and Stockholder Equity. ROE will calculate the level of return that the stockholder will get from their contribution in equity.
- Solvency Ratio
  - Solvency Ratio is the comparison between company profit and the liabilities. It measures the ability of the company in paying their short and long term liabilities (Brigham, 1992).

### *Corporate Governance and its relation with Intangible Asset*

Corporate Governance is derivative from an analogy between the government of cities, nations or states and the governance of corporations (Becht, Bolton, & Röell, 2002, p. 5).

From the paper of (Becht et al., 2002, p. 7) the issue of corporate governance become such a prominent topic is because of

- The worldwide wave of privatization of the past two decades;
- Pension fund reform and the growth of private savings;
- The takeover wave of the 1980s;
- Deregulation and the integration of capital markets
- The 1998 East Asia crisis, which has put the spotlight on corporate governance in emerging markets.

The debate on the corporate governance had started since 1932 when Berle in (Becht et al., 2002) argue that

*Responsibility to multiple parties would exacerbate the separation of ownership and control and make management even less accountable to shareholders.*

The East Asia crisis has highlighted the flimsy protections investor in emerging markets. The crisis has also led to a reassessment of the Asian model of industrial organizations and finance around highly centralized and hierarchical industrial groups controlled by management and large investors(Becht et al., 2002, p. 10).

Two main subjects of Corporate Governance theory which broadly used for this topic are Agency Cost Problem and Risk Management. The explanation of this theory will be described below.

#### *Agency Cost Theory*

Brigham (1992) described agency theory as the relationship between principal and its agent. The problems arise when they have to deal with two big problems. The first is the difference of goal between principal and agent. The second is the different tolerances between agent and principal toward risks valuation. Fama (1980) stated that agency problem tends to occur when the manager does not have 100% of company stocks.

Alves and Martin (2010) stressed that the bulk of corporate governance research aim was to understand the consequences of the separation of ownership from control on firm's performance. Adam Smith quotation related with agency cost is

*Negligence and profusion is arising when people run companies, which are rather of other people's money than of their own.*

There are two perspectives in seeing the agency conflict which is caused by investment in intangible asset. The first is the relation between manager and principal. Manager as the executor of intangible investment plan will increase their role by holding strategic position in the project. The benefit for managers is they can improve their bargaining power, namely 'manager specific investment'(Martins & Alves, 2010). Since innovation projects are risky, unpredictable, long term, and labor intensive, it turns out that contracting manager under this set of circumstances is particularly demanding and as a consequence the agency cost associated with innovation are likely to be high (Holmstrom, 1989).

According to the aforementioned, intangible asset can be considered as the long term commitment between manager and principal. The uncertainties about when the company can take the benefit from this investment become such an important issue within their relation. There is allegation that company will not able to fulfill their liabilities from the profit that they had. In financial world this problem was called solvency problem.



Goyal (2002) said

*Because the assets of high growth firms are largely intangible, debt holders have more difficulty observing how stockholders see assets in high growth firms”*

Moreover, Martin and Alves (2010) stressed that consequently as the scope for discretionary behavior is higher in more intangible asset intensive sectors than in traditional industries, the asset substitution (risk shifting) and under investment problem increase, exacerbating adverse selection problems. From this perspective debt holder are the party who has highest risk within information asymmetry and high bankruptcy costs, the consequence is debt holders will limit their credit to intangible asset intensive firms(Martins & Alves, 2010).

Petkov (2011) stressed that there were possibilities of intangible asset that company does not intend to use in order to deny other parties to access them. According from aforementioned, intangible asset does not always booster the company operation performance. If the definition criteria for control, identify ability and future benefits are not met, the expenditure is recognized as an expense or as part of purchased goodwill if it involves a business combination (IAS-38, 2007).

Martin and Alves (2010) stressed in their previous research about the relation of agency cost and dividend Policy. Agency Cost between Manager and Shareholder will increase when manager does not share the dividend (Martins & Alves, 2010). Based on this idea the paper proposed dividend as the one of indicator the agency cost problem.

### *Risk Management*

Risk Management is the process of identification, analysis and either acceptance or mitigation of uncertainty in investment decision making<sup>iii</sup>. In investment Risk, risk management is separated into two types which are systematic risk and unsystematic risk. Systematic risk is the risk that any company cannot avoid it and unsystematic risk is the risk that any company can manage to avoid it. Systematic risk is related with the condition that closes with macroeconomic such as the inflation, interest rate, the political instability, the trade balance of the country and some macroeconomics variables. Related with systematic risk the company can manage it by set the hedge to protect their asset.

In unsystematic risk, some variables can be managed by company such as agency conflict, the operational cost risk, and any other microeconomic risk. At this level company has mostly enough power to manage the risk such as reduce the agency cost, create the better remuneration system, create the healthy dividend policy, arrange the financing structure between equity and debt.

Related with this paper, the risk management become prominent because the characteristic of modern company asset which is not physically seen. The nature of intangible asset which highly risk needs special treatment in terms of risk management(Alves & Martins, 2010). Moreover, research from Petkov suggests some steps to deal with intangible asset risk. One of the steps is reducing proportion of debt as the source in financing intangible asset. By reducing the debt proportion, the risk of intangible investment will be borne by stockholder with their equity. This is better because there are no obligations of manager to pay the return of equity periodically. This character is different with debt which required debt interest to be paid annually.

## Hypothesis Formulation

### *The Role of Intangible Asset Toward Market Value of Equity*

Intangible asset are believed as the important factor in determine the company success (Garanina & Pavlova, 2011; Lev, 2001; Stewart, 1995; Titova, 2011). Moreover Research from Petkov (2011) stated that intangible asset has important role toward company success or failure during the crisis. On this research, the author attempts to see the relation of intangible asset and the market value of the company during the crisis period in 2006 until 2011. The Market Value index here is represented by Tobin's Q value index. Tobin's Q are proved in some previous researches as the valid indicator in showing investment effectiveness in business market (Tillinger, 1991; Wolfe & Sauaia, 2005). Based on aforementioned, the author propose first paper hypothesis

*H1a: Intangible asset intensive has positive relation to market value of company.*

### *The Role of Intangible Asset toward Company Financial Health's*

Garanina and Pavlova (2010) found that intangible value has positive relation with Company Performance. Even though Petkov (2011) belief that intangible asset need several years before the company can take its benefit, but the appreciation of company makes the principal belief that company performance should improves. Based on this idea, the paper proposes second Hypothesis.

*H2a: Intangible asset can help to explain the relation between Company Performance and Company Market Value.*

The natures of intangible asset risk make principal more concern in its investment. The principal tend to change the company financing structure. Debt holder also will mind to put debt on high risk investment. This investment is affecting the corporate governance in organization. There is allegation that company will not able to fulfill their liabilities when they do investment in intangible asset.

The explanation above led to the hypothesis that there is difference in equity and debt portion between company that have high intangible asset investment and the one who do not put high investment in it.

*H3a: Intangible asset can help to explain the relation between Company Financial Health and its effect to market value of company.*

### *The Role of Intangible Asset toward Agency Problem*

The crisis in Indonesia which happened in 1998 is good example of liquidity problem. The condition was caused by the high amount of debt which needs to be paid off. It becomes worse when dollar scarcities as the debt currency are disappearing from market. These conditions bring the awareness about debt risk.

According with it Alves and Martin (2010) argue that the existence of intangible asset will increase the stakeholder monitoring toward debt volume. Principal will tend to finance all intangible asset based on equity instead of debt because of debt. The premium of debt which

is high is too risky for financing innovation. This phenomenon led this paper into the idea that the existence of intangible asset will have negative correlation with debt or leverage.

The nature of intangible asset which risky has made the company becomes more careful in managing their asset. Based on research from (Alves & Martins, 2010), intangible assets increase both agency cost of shareholders (hidden information and hidden action) and agency cost of debt holders (asset substitution and underinvestment issues become more important). As a consequence of both high non interest tax shields and high financial distress costs, the level of debt is expected to be low in intangible assets intensive firms(Alves & Martins, 2010). In contrast, as intangibles assets are associated with high levels of information asymmetry, pecking order theory, and signaling arguments suggest high levels of debt.

Profit retention is the lowest cost funding source of intangible assets firms(Petkov, 2011). Moreover, the company who put intangible investment mostly uses this asset for long term investment. If it comes to Company Life Cycle graph the company is in the position of growth. Therefore intensive firms in intangible asset intend to pay low dividends. On the other hand based on signaling theory, the company who has big asymmetric information will tend to give higher dividend. Since the intangible asset was preferred to be financed by equity the company will tend to make the equity become more attractive by the policy of more generous in dividend sharing.

*H4a: Intangible Asset is able to describe more about relation between debt proportions toward Market Value of Company.*

*H5a: Based on signaling theory, Intangible asset can help to explain the relation between the dividend policy and market value.*

## Methodology and Hypothetical Test

The analysis of intangible asset role needs the existence of variables. Multiple regression analysis need two or more variable and type for measurement of both dependent and explanatory will be interval (Zikmund, Babin, Carr, & Griffin, 2010). The dependent will be explained by the independent. Here are the list of variables and theory behind it.

The formula will work when the value of each variable has the same or comparable type (Hair, 2006). Since the purpose of the research is getting the relative value from each company so typical data from this research was using ratio. Another advantage is the ratio volume can reduce the level of deviation which results from the huge variance and company size.

Table 1. List of Variables

Variable	Definition	Type
<i>Company Investment Effectiveness</i>		
Tobins Q Ratio	The ratio between market value of equities plus liabilities compared with book value of asset	DEPENDENT
<i>Fundamental Value</i>		
Intangible Value (Log Form)	Intangible Value based	INDEPENDENCE & MODERATOR

Variable	Definition	Type
Solvency Ratio	The ratio of the company ability in fulfill their short term liabilities	INDEPENDENCE
<i>Firm Corporate Governance &amp; Characteristic</i>		
Firm Performance	Return On Equity	INDEPENDENCE
Debt Ratio	The proportion of Debt in the company	INDEPENDENCE
Dividend Pay Out (Log Form)	Dummy Variable related with policy of Company in Giving Dividend or not	INDEPENDENCE
Firm Size (Log Form)	The Size of the Firm, will be transformed into log forms	CONTR

### *Dependent Variable*

Tobins Q ratio is proposed as the dependent variable. This variable was used in some previous research such as research from Tillinger (1991) and Wolfe (2005). Tobin's Q were consistently showed its ability in measuring the company investment effectiveness (Tillinger, 1991). Moreover Tobins Q also able to show the result of short games business performance (Wolfe & Sauaia, 2005).

Moreover, research related with Intangible Asset from Garanina (2010) claimed that Intangible value was one of important factor in determining the Market Value of the company. This theory becomes the background of the decision in using this variable.

### *Independent Variable*

#### Solvency Ratio

Solvency ratio is the measurement of company's ability to pay their long term obligation. The calculation is based on company's after tax income, excluding non-cash depreciation expenses, as compared to the firms total debt obligations (Brigham, 1992).

The calculation is

$$\text{Solvency Ratio} = \frac{\text{After Tax Net Profit} + \text{Depreciation}}{\text{Long Term Liabilities} + \text{Short term liabilities}}$$

Moreover Brigham (1992) stated that acceptable solvency ratio will be different from one and other industry. However the number which considered normal if the solvency ratio is greater than 20%. The lower solvency ratio means the greater risk to be default in obligations payment.

The relation between Solvency Ratio and intangible asset here was described on the introduction before. Martin and Alves (2010) stated that greater intangible investment, then greater possibility of company bankruptcy. That author conveyed that unphysical asset will risky when this sector cannot pay back the investment from its return. Moreover, liquidity problem always following this asset since the companies cannot sell their intangibles.

## Firm Performance

Firm Performance here was putted based on the research from Martin and Alves (2010) with use ROE as the indicator of company performance. The performance of the company will raise the market value of the company (Brigham, 1992). However in some particular condition the performance of the company will not help to raise the market value when the economic condition is in the crisis. In 2008, there was one company namely BUMI RESOURCE which performed well in mining industry but its asset value was dramatically sliding in 3 months. This condition proves that during the crisis, each company variable has unpredictable characteristic. The influence of intangible asset toward firm performance will be analyzed in this research.

## Dividend Payout

Dividend Payout are used oftenly as the indicator of Agency Theory in the company (Petkov, 2011; Titova, 2011). Dividend also used as the indicator of signaling theory phenomenon in the company. Signaling theory stated that the company will share dividend when the company need more stock for their operation. Signaling theory is also close with company internal governance issue (Brigham, 1992). In Agency Conflict issue, signaling theory can be interpreted as the manager willingness to raise the market value of company for their own favor. One indicator of agency conflict allegation is when the company does not perform well and still share the dividend. Most common step after this is the company will issue more stock.

On the other hand, opposite from signaling theory, company will not share so many dividends. The reason is because the company still in the growth phase which means the company needs more capital to invest in intangible value (Alves & Martins, 2010). Two theory of it will be analyzed in each hypothesis. At this research, we will also use one variable which not in metric type. We will use one dummy variable which means only 0 or 1 as the variable to help the reliability of model. The control variable here is related with dividend policy. If the companies share their dividend then the value will be 1 otherwise it will be 0.

The variance on dividend amount to share is commonly big among companies. On this research the author convert the dividend value from each company into logarithms form.

## Debt Ratio

Lev (2001) explained that intangible has high liquidity risk. Liquidity risk here means about the ease of company asset to be sold. This risk affects the shareholder to be more careful in financing the intangible investment. Martin and Alves (2010) in their paper told that there are tendency to finance the intangible investment from the equity. The reason is to reduce the risk from the debt holder in terms of intangible investment is failed in producing return. Therefore debt ratio is putted as the independence variable as one of the variables which are expected has negative correlation with intangible asset.

## Intangible Asset

Research from Garanina (2011) and Alves (2010) put intangible as their independent variable. However they did not put intangible Asset as moderator Variable. The contribution of this

research toward business study in intangible asset is by putting its variable as the moderator on the model.

There are two reasons why this research put intangible asset as moderator variable. First the big range in company size make the calculation of intangible industry has large standard deviation. The varieties in One Industry in Indonesia are quite big. Second reason is this research want to see deeper influence of intangible asset toward other variable and also the model. The third reason is because the assumption of CIV model in calculating the intangible value has so many criticizes in accuracy, so this research will emphasize on the existence of intangible value toward the other variable. The intangible here still will be counted and represented in descriptive statistic. However in the regression model, intangible value will be converted into dummy variable where stated if the company has positive intangible value then it will be in value 1 but if the company does not have or have 0 intangible values then it will be written in 0 values.

Moderator variable here was expected to give moderator effect. Moderator effect based on Hair (2006) is the variable where has function in moderating the explanatory variable to explain more the dependence. When Intangible value here become Moderator variable is expected to be able explain more the model of the dependence and increase the adj. R square model.

The intangible variable has quite big variance. The volume mostly aligned with the size of the company. Therefore in reducing the variance problem, the research converts the variable with logarithms form.

#### Control Variable (Firm Size)

Indonesia has big variety in the company size range. Even in one industry sector the gap can be so large. Here control variable namely Firm Size will be attached to help the model in explaining the dependence variable. The wide variety in Indonesian company size will be disadvantage for this research; therefore the author will convert the form of the firm size into the logarithm value.

#### First Model

$$\text{Tobin'sQ} = \alpha + \beta_1 \times \text{ROE} + \beta_2 \times \text{DebtRatio} + \beta_3 \times \text{Solvency Ratio} + \beta_4 \times \text{Ln}(\text{Dividend}) + \beta_5 \times \text{Ln}(\text{Intangible Value}) + \beta_6 \times \text{Ln}(\text{Size of Firm}) + \varepsilon$$

#### Second Model

$$\text{Tobin'sQ} = \alpha + \beta_1 \times \text{ROE} + \beta_2 \times \text{DebtRatio} + \beta_3 \times \text{Solvency Ratio} + \beta_4 \times \text{Ln}(\text{Dividend}) + \beta_5 \times \text{Ln}(\text{Intangible Value}) + \beta_6 \times \text{Ln}(\text{Size of Firm}) + \varepsilon$$

#### Deal with collinearity model from Moderation

Gujarati (2003) stated that Moderation variable is increasing the collinearity problem in the model. Collinearity occurs when the interaction between explanatory variables within the model is higher than the relation of explanatory variable and the dependent variable. Therefore Gujarati suggest the result of moderation to be centralized. The formula of data centralization is

$$\text{Centralize Moderating Variable} = \text{Moderating variable} - \text{Median of the Group.}$$

The example is there are 3 data on the observation such as 9, 18, and 27. Here if the data has same value with median then it will be valued 0. The value which is less than median will have negative value, in this term 18 become 0, 9 become -9 (9-18) and 27 become 9 (27-18). This method was proofed effectively in reducing collinearity problem.

## Data Analysis

### *Descriptive Statistic*

Descriptive Statistic here has a purpose to describe the general information of the sample. The descriptive statistic will show the mean, median, standard deviation, and variance. The descriptive statistic here will show the development of the phenomenon in the observation data from year to year especially in the development of intangible asset data.

Table Preliminary results from data collection

Intangible Asset and Goodwill Report	Count	Percentage
2011	98	32.70%
2010	95	32.36%
2009	90	31.50%
2008	85	29.62%
2007	77	26.83%
2006	65	22.65%
Average	62.5714286	29.28%

The limited availability of data made the researcher to take fixed number of company which consistently publishes their financial report. Therefore the research took 30 companies in 6 years period of time.

The proportion of each company with complete financial data is displayed below. From each industry, the research took randomly and put it in the group of observation.

Number	Classification	Amount	Percentage
1	Agriculture	24	8.54%
2	Mining	23	8.19%
3	Basic Industry	36	12.81%

Number	Classification	Amount	Percentage
4	Misc. Ind.	69	24.56%
5	Consumer and Manufacture	58	20.64%
6	Property and Real Estate	22	7.83%
7	Infrastructure, Utilities and Transportation	26	9.25%
8	Trade, Services and Investment	23	8.19%

With the calculation from Eviews version 6 Software, Research got correlation for 6 years series, such as

Table 2. Descriptive Statistic of Indonesian Companies

	TQ	ROE	SR	DR	DIV	SIZE	INT
Mean	1.351589	31.35800	32.95596	0.439647	2.940568	22.26120	16.61968
Median	1.065547	26.52000	29.98000	0.454077	3.348517	22.85114	18.56597
Maximum	9.750000	120.9100	97.27975	1.000000	7.600902	25.35787	22.64790
Minimum	0.365175	-48.93000	-68.44765	0.001581	0.000000	15.48000	0.000000
Std. Dev.	1.106968	26.18674	25.85453	0.276443	2.582357	1.896271	6.644303
Skewness	4.458772	0.876407	0.259462	0.016430	-0.032272	-0.791630	-1.892377
Kurtosis	29.25546	4.649618	3.703081	1.847508	1.350421	3.391313	5.148897
Jarque-Bera	5766.540	43.45198	5.727042	9.969890	20.43959	19.94880	142.0658
Probability	0.000000	0.000000	0.057067	0.006840	0.000036	0.000047	0.000000
Sum	243.2861	5644.440	5932.073	79.13643	529.3023	4007.015	2991.543
Sum Sq. Dev.	219.3428	122748.5	119653.7	13.67935	1193.673	643.6559	7902.271
Observations	180	180	180	180	180	180	180

The analysis of each variable shows that Tobin's Q has the biggest skewness among all. The conversion of big variance variable into logarithm for has make the data variance of data smaller. The next step in this analysis is discovering about the correlation from each variable. The descriptive statistic shows the whole characteristic of the data. The descriptive divide the data into each category based on the industry. Since we already got the situation from each industry the next is we gather the data into one big sample in Indonesia.



The tables below show the bivariate correlation between each variable. The data will be divided into each year to see the relation from each variable before and at crisis.

	TQ	ROE	SR	DR	DIV	SIZE	INT
TQ	1.000000						
ROE	-0.021186	1.000000					
SR	0.067973	0.266714	1.000000				
DR	0.225156	0.049850	0.003822	1.000000			
DIV	-0.117271	0.233799	0.015234	-0.431009	1.000000		
SIZE	-0.294725	-0.116052	-0.225169	-0.270626	0.340011	1.000000	
INT	0.104321	0.103060	0.188969	0.236977	-0.077063	-0.099792	1.000000

The significant correlation here will be started from the intangible asset

- Intangible Asset has positive and significance correlation with Tobins Q Index.
- Intangible Value has significance correlation with Company Performance.
- Intangible Asset has positive significance with Solvency Ratio
- Intangible Asset has positive significance with Debt Ratio
- Intangible Asset has negative and not significance with dividend and size of company.

### Regression Analysis

### Panel Data Analysis

Regression analysis here has a purpose to find out the relationship between dependent variable and explanatory variable. The author intends to find the relation of the each variable from the regression analysis. The analysis will analyze t-test of each independent analysis, the F-test from the model, and the adjusted R squared. The data are the 30 selected companies which has complete financial report. The time span for the research is 6 years from 2006 until 2011. In terms of finding the causality the calculation will use Panel Data analysis.

Each variable has been adjusted to have valid model in regression analysis. The Dividend Payout, Intangible Value, and the size of Firm already converted in Ln. The software that the author used here is Eviews 6<sup>th</sup> version.

The regression model for Panel Data analysis here are :

$$\text{Market Value Added} = \alpha + \beta_1 \times \text{Solvency Ratio} + \beta_2 \times \text{DebtRatio} + \beta_3 \times \text{ROE} + \beta_4 \times \text{Ln}(\text{DividendPayOut}) + \beta_5 \times \text{Ln}(\text{Intangible Value}) + \beta_6 \times \text{Ln}(\text{Size of Firm}) + \varepsilon +$$

The calculation of data panel here show the result in the original table of Eviews output tables analysis such as :

Dependent Variable: TQ

Method: Panel Least Squares

Date: 05/24/12 Time: 15:07

Sample: 1 180

Periods included: 6

Cross-sections included: 30

Total panel (balanced) observations: 180

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.382349	1.339165	4.019183	0.0001
ROE	-0.005741	0.003561	-1.612180	0.1092
Variable	Coefficient	Std. Error	t-Statistic	Prob.
SR	-0.000949	0.004066	-0.233515	0.8157
DR	0.119559	0.507153	0.235746	0.8140
DIV	0.053259	0.039272	1.356172	0.1772
SIZE	-0.160738	0.057029	-2.818548	0.0055
INT	-0.027101	0.015102	-1.794530	0.0749

Effects Specification

Cross-section fixed (dummy variables)

Period fixed (dummy variables)

R-squared	0.515945	Mean dependent var	1.351589
Adjusted R-squared	0.376648	S.D. dependent var	1.106968
S.E. of regression	0.873981	Akaike info criterion	2.765555
Sum squared resid	106.1740	Schwarz criterion	3.492840
Log likelihood	-207.9000	Hannan-Quinn criter.	3.060438
F-statistic	3.703934	Durbin-Watson stat	0.790543
Prob(F-statistic)	0.000000		

The panel data regression result

The table above shows the result of data pools from 2006 until 2011. The adj. R square number are 0,37 which means the model can describe 37% from the whole phenomenon. The F statistics are 3.7 with the standard error below 0.01. The F-statistic shows that the model significantly influences the dependence Variable. The variance analysis shows that the mean of dependence variable are higher than the standard deviation.

The analysis of independent data, the author found that t-statistic of Intangible value has Significance -1,7 and with significance under 0,1 toward market value index. It means the depreciation of each intangible asset has opposite relation with the appreciation the market value. This result has opposite value with research from Garanina and Pavlova (2011), where they found intangible has positive correlation with the market value index.

The Control variable, Company Size has significant t-statistic 2.81 with standard error Alva less than 0,1. This analysis proved the theory of Tobin's Q theory that the appreciation of company size whiles the market value of company stagnant will result the negative relation within it.

Other variable exclude intangible asset and size does not show their relation with the market value. Even ROE and Solvency ratio has negative relation but the error value is not significance. Therefore the paper will attempt to show the hide value by putting intangible value as the moderator within the model.

Panel Data with moderation value

The next uses moderation value. This model will evaluate the impact of intangible value toward each financial indicator. The Moderation method here is by multiplying each independent variable with intangible value. To reduce the Multicollinearity the paper uses the centering method for each result of moderation variable.

Tobin's Q Market Value

$$\begin{aligned}
 &= \alpha + \beta_1 \times \text{Solvency Ratio} + \beta_2 \times \text{DebtRatio} + \beta_3 \times \text{ROE} \\
 &+ \beta_4 \times \text{Ln}(\text{DividendPayOut}) + \beta_5 \times \text{Ln}(\text{Intangible Value}) \\
 &+ \beta_6 \times \text{Ln}(\text{Size of Firm}) + \beta_1 \times \text{Ln}(\text{Intangible}) \times \text{Solvency Ratio} \\
 &+ \beta_2 \times \text{Ln}(\text{Intangible}) \times \text{DebtRatio} + \beta_3 \times \text{Ln}(\text{Intangible}) \times \text{ROE} \\
 &+ \beta_4 \times \text{Ln}(\text{Intangible}) \times \text{Ln}(\text{DividendPayOut}) + \beta_5 \times \text{Ln}(\text{Intangible Value}) \\
 &+ \beta_6 \times \text{Ln}(\text{Intangible}) \times \text{Ln}(\text{Size of Firm}) \varepsilon
 \end{aligned}$$

And to manage with collinearity after moderation, the moderator variable was centered with formula

$$\begin{aligned}
 &\beta_n \times \text{Ln}(\text{Intangible}) \times \text{Ln}(\text{IndependentVariable}) \\
 &- \text{Median}(\text{Ln}(\text{Intangible}) \times \text{Ln}(\text{IndependentVariable}))
 \end{aligned}$$

The time span is from 2006 until 2011. The author calculating the model by Eviews 6th version.

The data show this result

Dependent Variable: TQ

Method: Panel Least Squares

Date: 05/24/12 Time: 15:08

Sample: 1 180

Periods included: 6

Cross-sections included: 30

Total panel (balanced) observations: 180

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.012628	2.090090	2.876732	0.0047
ROE	-0.006858	0.009206	-0.744941	0.4576
SR	0.001080	0.004122	0.261867	0.7938
Variable	Coefficient	Std. Error	t-Statistic	Prob.
INT	-0.070904	0.039448	-1.797397	0.0745
MODCTRROE	0.000115	0.000526	0.218765	0.8272
MODCTRSR	2.70E-06	7.55E-06	0.357975	0.7209
MODCTRDR	-0.226291	0.087086	-2.598465	0.0104
MODCTRDIV	-0.009001	0.006617	-1.360199	0.1761
MODCTRSIZE	0.005918	0.002216	2.670758	0.0085

Effects Specification

Cross-section fixed (dummy variables)

Period fixed (dummy variables)

R-squared	0.552746	Mean dependent var	1.351589
Adjusted R-squared	0.402549	S.D. dependent var	1.106968
S.E. of regression	0.855631	Akaike info criterion	2.742039
Sum squared resid	98.10196	Schwarz criterion	3.558017
Log likelihood	-200.7835	Hannan-Quinn criter.	3.072883
F-statistic	3.680134	Durbin-Watson stat	0.845812
Prob(F-statistic)	0.000000		

The Moderation variable shows that the model becomes much better with the appreciation of Adjusted R Square. Model 2 show the adjusted R square is increasing from 37% into 40% where there is 3% appreciation after the model using moderation variable. The F statistic depreciates 0.01.

After moderation each t-statistic shows the different effect. The t-statistic of Debt Ratio become significant in -2.5 and the alva of error become lower than 0,1. The Intangible and Size t-statistic still constant. Another change is t-statistic of ROE become positive. T-statistic of Solvency ratio also becomes positive. The result shared the same finding with Alves and Martin (2010) where debt ratio will depreciate the market value of company. Dividend ratio has negative effect and increase significantly.

## **The Finding and Discussion**

The author will present the findings and persistently discuss the relation of findings with related theory, previous conducted surveys by other researchers, and empirical result. All the calculation will be used to answer the research hypothesis. The analysis will show new aspect in financial discipline that may highly contribute to next intangible researches.

### *The Contribution of Intangible Asset toward Market Value.*

*H1a: Market Value of Company has positive relation with intangible asset.*

The aforementioned hypothesis is significantly supported by the data calculation. From 2006 until 2011, intangible asset has positive and significant relation with Market Value Index. The research shared the same result where Intangible asset has the significant relation toward market value (Aho, Stöhle, & Stöhle, 2011; Garanina & Pavlova, 2011; Stewart, 1995; Titova, 2011). The paper concludes that the investment in intangible assets has a significance influence on Market Value of company. In addition, the data show that stock holder put into account about intangible investment in their portfolio and also realize the importance of intangible investment in stock valuation.

### *The Role of Intangible toward Company Financial Health*

*H2a: Intangible asset can explain the relation between Company Performance and Company Market Value.*

The hypothesis is not strongly supported by the data. The model which has already moderated by intangible asset cannot explain the relation between Company Performance and Market Value of Company. It means that during the period of 2006 until 2011 there are no relation between company performance and intangible asset investment within company. These finding is align with research from (Garanina & Pavlova, 2011; Maree, 2001; Megna & Klock, 1993; Phillips & Phillips, 2009; Stewart, 1995; Titova, 2011). However, the research from (Martins & Alves, 2010; Petkov, 2011) stressed that the company needs time for process and innovation until they can get benefit from intangible asset investment.

*H3a: Intangible asset can help to explain the relation between company financial health and its effect toward Market Value of Company*

This hypothesis is not strongly supported by data calculation. The methodology to test this aforementioned hypothesis is by putting intangible value as the moderator variable in the

model. The value of Solvency Ratio which has been multiplied by Intangible value could not show any significance appreciation toward t-statistic. It means that the level of intangible value will not affect the ability of company in fulfilling their liability.

The research from Petkov (2011) which stated that investment in intangible asset will depreciate the company ability in paying their liabilities was not supported by the calculation. In addition to that, solvency ratio is the parameter of company ability in paying their short and long term obligation. The high volume of solvency ratio means that the company is able to pay their liabilities However; data panel calculation does not show any relation between solvency ratio and market value of company.

### *The Role of Intangible Toward Agency Conflict*

*H4a: Intangible Asset is able to describe more about relation between debt proportion toward Market Value of Company.*

The aforementioned hypothesis is strongly supported by the data calculation. Based on calculation, there are negative relations between intangible asset and debt. The manager tends to finance intangible asset with stock instead of debt. The debts with high interest-rate make investment in intangible too risky. Data panel show there are negative relations between intangible and debt. Within Market value, debt also has strong negative relation with the improvement of market value of company. The reason is the high level of debt will increase the risk of the company because of their interest premium.

*H5a: Based on signaling theory, intangible asset can explain more the relationship between the dividend policy and company market value.*

The last hypothesis is strongly supported by data calculation. After get moderated by intangible value the dividend does show t-statistic improvement. In the regression, there is shown that there is positive relationship between dividend and market valued of the company. It means that for the company with intangible value intensive tends to increase their stock. Its aligned with research result from Alves, high investment company will prefer to finance their activity from their equity (Alves & Martins, 2010). It means they give positive signaling news to the shareholder in order to increase their stock.

## **Conclusion**

The research in finding out how Indonesia can survive during crisis 2008 is always interesting discussion among economist. The data and analysis that the author has collected from 2006 until 2011 show some way in seeing this phenomenon from different point of view, namely intangible asset.

The conclusion is described below.

1. The research find that Intangible as Moderator value can improve the ability of the model in explaining the phenomenon. The value of adj. r square has increased after moderation variable is used. Intangible asset also has significant relation between company market value. It means stockholder estimates that intangible value investment is an important issue in company operation decision.
2. The Hypothesis related to the Role of Intangible Asset in Company Financial Health is not strongly supported by data calculation. Which means the market price of the

company is not influenced by intangible asset investment if the company has good performance.

3. The second hypothesis which is related to the role of Intangible in Financial Health is not strongly supported by data calculation. Even though the solvency ratio variable was moderated by intangible asset, but there were no significant change within the model. This finding lead the researcher to belief that solvency ratio as the bankruptcy indicator does not show any relation with market value of equity. The paper has discovered that investment in Intangible asset will not affect the perception of market toward company who has bankruptcy risk.
4. The first hypothesis related to the role of intangible asset in affecting market price of company who has internal conflict was strongly supported by data. It is started by the calculation of first model which does not use moderator variable. It results that the model did not show the relation between debt and market value added. However, when moderation value moderates comes up, the relationship become significant between debt ratio and market value of the company. It means the increase of intangible asset has influence the investor valuation toward company who has internal conflict.
5. The Second hypothesis related to the role of intangible asset within corporate governance policy was strongly supported by data. The relation between dividend and market value of company is increased when the moderator variable is putted in. The appearance of moderator variable is followed by the improvement of t-statistic. It proves that signaling theory is occurred when intangible asset is moderating the model.

## Reference

- Aho, S., Stöhle, S., & Stöhle, P. (2011). A critical assessment of Stewart's CIV method. [Article]. *Measuring Business Excellence*, 15(4), 27-35. doi: 10.1108/13683041111184080
- Alves, S., & Martins, J. (2010). The Impact of Intangible Assets on Financial and Governance Policies: UK Evidence. [Article]. *International Research Journal of Finance & Economics*(36), 147-169.
- Becht, M., Bolton, P., & Röell, A. A. (2002). Corporate Governance and Control. *SSRN eLibrary*. doi: 10.2139/ssrn.343461
- Brigham, E. F. (1992). *Fundamentals of financial management*. Fort Worth: Dryden Press.
- Garanina, T., & Pavlova, Y. (2011). Intangible Assets and Value Creation of a Company: Russian and UK Evidence. [Article]. *Proceedings of the European Conference on Intellectual Capital*, 165-175.
- Hair, J. F. (2006). *Multivariate data analysis*. Upper Saddle River, N.J.: Prentice Hall.
- Holmstrom. (1989). Agency costs and innovation, . *Journal of Economic Behavior and Organization*, 12(4), 305-327.
- IAS-38. (2007). International Accounting Standards No.38. *IASB, London*, 3(IASB).
- Lev, B. (2001). *Intangibles: management, measurement, and reporting*. Washington, D.C.: Brookings Institution Press.
- Maree, K. W. (2001). Valuation of intellectual capital in South African companies: a comparative study of three valuation methods. *Master of Commerce Dissertation, Department of Accounting*.
- Martins, J., & Alves, S. (2010). THE IMPACT OF INTANGIBLE ASSETS ON FINANCIAL AND GOVERNANCE POLICIES: A LITERATURE REVIEW. [Article]. *Portuguese Journal of Management Studies*, 15(1), 87-107.
- Megna, P., & Klock, M. (1993). The impact of intangible capital on Tobin's q in the semiconductor industry. [Article]. *American Economic Review*, 83(2), 265.
- Petkov, R. R. (2011). The Current Financial Crisis and Its Potential Impact on Internally Generated Intangible Assets. [Article]. *International Journal of Business & Management*, 6(3), 37-44.

- Phillips, J., & Phillips, P. (2009). Measuring return on investment in HR. [Article]. *Strategic HR Review*, 8(6), 12-19. doi: 10.1106/14754390910990946
- Stewart, T. A. (1995). TRYING TO GRASP THE INTANGIBLE. [Article]. *Fortune*, 132(7), 157-161.
- Tillinger, J. W. (1991). An Analysis of the Effectiveness of the Research and Experimentation Tax Credit in a q Model of Valuation. [Article]. *Journal of the American Taxation Association*, 13(2), 1.
- Titova, N. (2011). Summary on Intellectual Capital Value Added (VAIC) and Calculated Intangible Value (CIV) all Over the World: Lessons to be Learnt. [Article]. *Proceedings of the European Conference on Intellectual Capital*, 543-554.
- White, L. J. (2011). PREVENTING BUBBLES: WHAT ROLE FOR FINANCIAL REGULATION? [Article]. *CATO Journal*, 31(3), 603-619.
- Wolfe, J., & Sauaia, A. C. A. (2005). The Tobin q as a business game performance indicator. [Article]. *Simulation & Gaming*, 36(2), 238-249. doi: 10.1177/1046878105275237
- Zikmund, W. G., Babin, B. J., Carr, J. C., & Griffin, M. (2010). *Business Research Methods*. Canada: South-Western, Cengage Learning.

## Endnote

---

- i Gross, Neil, Commentary: Valuing 'intangibles' is tough job, but it has to be done. [http://www.businessweek.com/magazine/content/01\\_32/b3744008.htm](http://www.businessweek.com/magazine/content/01_32/b3744008.htm)
- ii <http://www.oecd.org/dataoecd/8/40/1949901.pdf>
- iii <http://www.investopedia.com/terms/r/riskmanagement.asp#axzz1r3DBnrm0>
- iv <http://us.finance.detik.com/read/2008/09/15/095817/1006187/6/saham-bumi-bisa-jatuh-lagi>



# A DYNAMIC INFLATION HEDGING TRADING STRATEGY USING A CPPI

Nicolas Fulli-Lemaire<sup>1</sup>

<sup>1</sup> Crédit Agricole S.A. ; Paris II Panthéon-Assas University

***Abstract.** This article tries to solve the portfolio inflation hedging problem by introducing a new class of dynamic trading strategies derived from classic portfolio insurance techniques adapted to the real world. These strategies aim at yielding higher returns on a risk-adjusted basis than regular inflation hedging portfolio allocation while achieving a lower cost than comparable option-based guaranteed real value strategies.*

***Keywords:** ALM, Inflation Hedging, Portfolio Insurance, CPPI.*

## Introduction

The demand for inflation hedges from pension funds has spurred the academic literature on optimal portfolio allocation and investment strategies for durations up to several decades. These types of long haul strategies are designed to match future liabilities that must be provisioned but that do not require specifically that the mark to market value of their investments matches that of their liabilities in the short run. In this paper, we set ourselves in the different context of commercial banks that need to hedge their inflation liabilities arising from retail products such as guaranteed power purchasing saving accounts, term deposits, or even asset management structured products. All of these guarantees are immediately effective and their duration rarely exceeds a decade. Moreover, a constant access to liquidity is required for these open funds which can face partial or total redemption any time during their lifetime.

This new framework requires the construction of an investment strategy that must have a positive mark to market real value at its inception and throughout its life. Also, because of the constraints resting on the inflation linked market we expose in our first part, we seek to develop a strategy that would be purely nominal, that is entirely free of inflation indexed products which are costly and therefore reduce the potential real return. After summarizing the possible alternative inflation hedges in a second part, we explore the feasibility of adapting portfolio insurance techniques to the inflation hedging context in order to honor our guarantees while exploiting the inflation hedging potential of alternative asset classes. We seek to avoid the use of derivative instruments which costs can be prohibitive considering the scale of the liabilities. Combining all the above-mentioned points, we introduce our Dynamic Inflation Hedging Trading Strategy (DIHTS) and backtest its performance on a long US historical dataset which we use both for historic simulation and bootstrapped simulation.

## Inflation Hedging and Portfolio Insurance

*Motivations for seeking alternative hedges, a review of the existing literature*

Corporations which are structurally exposed to inflation would most naturally like to hedge their liabilities by the purchase of inflation linked financial assets, or by entering in derivative

contracts which would outsource the risk. But these two natural solutions rely on an insufficiently deep and insufficiently liquid market for the first one and is excessively costly for the second one as a result of an unbalanced market:

On the demand side of the inflation financial market, the need for inflation protected investments is spurred by four main drivers which are pension funds because of their inflation liabilities arising from explicit power purchasing guaranteed pensions, retail asset managers providing inflation protected funds, insurance companies hedging their residual inflation liabilities and, mostly in continental Europe, commercial banks exposed to state guaranteed inflation indexed saving accounts. The bulks of those liabilities have long to very long durations and amount to the equivalent of hundreds of billions of Euros. On the supply side of the market for inflation-linked bonds, there is a very limited pool of issuers which is comprised mostly of sovereign or quasi-sovereign entities. There are very few corporate issuers of inflation linked bonds as there are very few corporations that have a structural long net exposure to inflation to the exception of maybe utilities engaging in Public-Private-Partnerships or real-estate leasers which tariffs are periodically adjusted on an inflation basis by law or contract. And even in those cases, it is not obvious that those companies have an interest in financing their operations on an inflation-linked basis which in nominal term is a floating rate. In fact, very few choose to. This limited pool of issuers is subject to changing budget policies, issuance strategies and current deficits which result in a fluctuating primary supply. Moreover, most of the buyers in the primary market acquire those assets on a hold to maturity basis or for immediate repo, rendering the secondary market relatively more illiquid than the one of their nominal counterparts, as is evidenced in the working paper (D'Amico, Kim et Wei 2009).

The derivative market for inflation is characterized by relatively high transaction costs as a result of shallow depth at reasonable price. Since on the one hand the sellers of those instruments will either have to hedge their trading books on the shallow and illiquid primary inflation market or assume the full inflation directional risk as a result of cross-hedging on nominal assets but on the other hand face a huge demand, the required premiums are very high. There has been since the mid 2000 a liquid market for exchange traded inflation swaps which has enabled to price inflation breakevens rates. There is to this day no liquid exchange traded market for inflation options as most of the deals are done in an Over-The-Counter basis. If the domestic supply of inflation linked instruments is not sufficient to meet the demand, as it is often the case, there is little international diversification can do as inflation is mostly a domestic variable which correlation to other foreign equivalents can be fickle, even in the case of monetary unions or currency pegs where foreign exchange is not an issue like in the Euro-Area. The recent Euro-area sovereign crisis has made this point all the more acute.

This gap between supply and demand in the inflation financial market has spurred the interest in alternative inflation hedging techniques that could solve the depth, cost and liquidity issues that have plagued the inflation financial market. Academic literature dating back from as far as the seventies has explored the use of a portfolio of real investments as an inflation hedge. Various asset classes such as equities (Z. Bodie 1976), commodities (Z. Bodie 1983), real estate (Rubens, Bond et Webb 2009), REITS (Park, Mullineaux et Chew 1990), and more recently dividend indices (Barclays Capital Research 2008) have been examined as potential real hedges to inflation. Even exotic assets such as forest assets (Washburn et Binkley 1993) and farmland (Newell et Lincoln 2009) just to mention two of them have also been explored but offer very limited interest with respect to the added complexity their investment requires.

The first emission of a long term CPI linked bond by a private US financial institution in the late eighties has lead to a string of papers starting with (Z. Bodie 1990) which aimed at finding the optimal strategic asset mix these new assets enabled. Similarly, the first issuance

by the United States treasury of inflation protected securities in 1997, following the first issuance by the British treasury of inflation linked gilts in 1981 have generated a renewal of interest in their role as inflation risk mitigation and diversification assets. The latest of which is the (Brière et Signori 2010) paper. These studies are of limited help for the purpose of this work as they still rely for a significant fraction of their investment strategies on inflation linked assets, which we are precisely trying to avoid doing. They nonetheless offer a first alternative to fully inflation protected investments, and therefore offer a potentially higher degree of returns, at the cost of a more hazardous hedging method.

Another stream of academic literature has focused on the optimal allocation for inflation hedging portfolios using only nominal assets and using various approaches to determine the optimal allocation like the recent (Amenc, Martellini et Ziemann 2009) paper which devised a global unconstrained nominal inflation hedging portfolio that would use a Vector Error Correcting Model to determine the optimal ex-ante allocation of the various potential inflation hedging asset classes mentioned before. This kind of strategy would solve the availability problem of the inflation linked assets, but would fail to bring any kind of guaranteed value to the portfolio, be it in real or nominal terms, and because of that, fails to meet our Asset Liability Management (ALM) constraints. In fact, the hedging potential of all the above-mentioned asset classes has proved to be horizon sensitive and dependent on the macroeconomic context. (Attié et Roache 2009) have studied the time sensitivity of the inflation hedging potential of various asset classes and have shown in particular that some asset classes like commodities react better to unexpected inflation shocks than others, like most obviously nominal bond. More generally, the inflation betas has also proved to be unstable over time and can exhibit strong local decorrelations, rendering the inflation hedging exercise risky considering for example that the volatility of most of these asset classes is far superior to that of the Consumer Price Index we are precisely trying to hedge.

Using an error correction framework to optimize the portfolio allocation might have solved part of the problem by incorporating into the model those dynamics in asset price levels and returns that might otherwise have been overlooked as outliers by more general VAR models, but these classes of models are tricky to calibrate and would most probably result in statistically insignificant estimations, and accordingly, wrong allocations. Moreover, they would also most probably fail to detect in a timely manner small macroeconomic regime changes that could have a lasting impact on the structure of the inflation betas. This might in turn jeopardize the overall inflation hedging potential of the portfolio if for example one of the invested assets suffered a significant fall in value as none of them has a guaranteed value at maturity like a bond, credit risk apart. Overall, this type of strategies would still fall short of a totally guaranteed value for the portfolio as would be the case with a real zero coupon bond.

#### *Adapting Portfolio Insurance techniques to the real world*

The limitations in term of guaranteed terminal value for the classic Markowitz approach to optimal portfolio selection based on the benefit of diversification have motivated the quest for portfolio insurance strategies in the seventies (Leland, Who Should Buy Portfolio Insurance? 1980). In purely nominal terms, the optimal tradeoff between the enhanced returns on risky assets and the low returns on assumed risk-free nominal bonds is known as the “two fund theorem”. The optimization can also be further constrained by incorporating guaranteed nominal-value-at-maturity characteristics. Doing so yields the so called Dynamic Portfolio Insurance Strategies (Perold et Sharpe 1988) which includes: Buy and Hold, Constant Mix, Constant Proportion and Option Based Portfolio Insurance. But can such guaranteed-values-at-maturity strategies be transposed to the real world?

The simplest solution would be to mimic a two fund strategy in the real world: it would be implemented using a real risk free zero coupon bond and either a diversified portfolio of real assets or a call on the real performance of a basket of assets. The call option could also be either bought or replicated using an adaptation of the ideas exposed in (Leland et Rubinstein, Replicating Options with Positions in Stocks and Cash 1981). Such strategies would unfortunately be highly intensive in inflation indexed products use and would therefore not solve our availability problem, without even taking into account the low real returns these strategies would probably yield.

Using a call option on nominal assets, as opposed to real assets, would only partly solve the problem as the risk-free part is either made of zero coupon bonds which are available in limited supply or synthetic bonds made of nominal zero coupon bonds combined with a zero coupon inflation index swap which have greater supply but very low real returns. It could also be envisaged to combine a risk free zero coupon nominal bond and an out of the money call option on inflation. It would almost exactly be a replication of an inflation index bond as we will explain in the next subsection.

A last possibility would involve the transposition of the CPPI technique of (Black et Jones 1987) in the real world by using the above mentioned techniques to dynamically manage a cushion of inflation indexed bond and a portfolio of real return yielding assets. As was mentioned before, this strategy would still rely on indexed assets. The inflation hedging portfolio insurance problem would therefore be solved without investing in inflation linked assets or derivatives if it were possible to generate a portfolio that could mimic the cash-flows of an inflation-linked-bond as we will try to prove in the next subsection.

To sum up, any real portfolio insurance strategy would involve a capital guaranteeing part and a real performance seeking investment made of a diversified portfolio or a derivative and without explicit capital guarantees at maturity. Depending on the strategy used, the guaranteed capital part would either have a real guarantee embedded, or simply a nominal guarantee which would have to be complemented by a real guarantee attained to the detriment of the performance seeking part.

Trying to do without the IL instruments, we want to replicate the cash flows of an ILB with a Fisher Hypothesis: this replication can be achieved using the OBPI portfolio insurance technique as mentioned in the previous subsection and the theoretical justification is provided below:

Replicating the cash flows of ILB is equivalent to fully hedging a portfolio on a real basis. To do so, we need to invest a fraction  $\alpha$  of the notional of the portfolio  $N$  in a zero coupon nominal bond of rate  $\tau_{0,T}^N$  defined such that:

$$\alpha = \frac{1}{1 + \tau_{0,T}^N}$$

We therefore have a residual amount out of which we buy the call option:

$$1 - \alpha = 1 - \frac{1}{1 + \tau_{0,T}^N}$$

The strike of the option should be defined as  $\alpha$  multiplied by the sum of the inflation anticipation embedded in the nominal rate  $\mathbb{E}_0(\pi_{0,t})$  and the inflation premium  $p_0(\pi_{0,t})$  as defined by the Fisher framework (Fisher 1907):

$$1 + \tau_{0,T}^N = (1 + \tau_{0,T}^R) \left(1 + \mathbb{E}_0(\pi_{0,T})\right) \left(1 + p_0(\pi_{0,T})\right)$$

Therefore, if we assume  $\mathbb{E}_0(\pi_{0,T})$  to be the spot rate for inflation under the rational expectation hypothesis, we have an OTM strike if:

$$K > S_0 \Rightarrow \alpha > \frac{1}{(1 + p_0(\pi_{0,T}))}, \quad \text{with } \begin{cases} K = \alpha (1 + \mathbb{E}_0(\pi_{0,T})) (1 + p_0(\pi_{0,T})) \\ S_0 = (1 + \mathbb{E}_0(\pi_{0,T})) \end{cases}$$

Let  $c_{0,T;K}$  be the premium of the call on inflation of strike  $K$  and maturity  $T$  at 0 and let  $\pi_{0,T}^r$  be the realized inflation between 0 and  $T$ . Under those assumptions, we obtain the real return  $R^R$  as:

$$R^R = \alpha \tau_{0,T}^R + \left( \alpha (1 + \mathbb{E}_0(\pi_{0,T})) (1 + p_0(\pi_{0,T})) - \pi_{0,T}^r - 1 \right)^+ - c_{0,T;K}$$

Nota bene: This return is not necessarily positive.

In fact, since call options on inflation are not liquid exchange-traded instruments but OTC products, there is a high probability that the call premium would be sufficiently high to render the real return of the strategy very low at best if not negative at worst. This is not inconsistent with empirical observations that have been made on real bonds: some TIPS issuances in 2010 have had negative real rates.

The replication of the ILB cash flows by a combination of a nominal bond and a call option on inflation still fails to fully satisfy our objective of getting rid of the dependency on the inflation financial market because of the call option. To relax this constraint, it might be possible to manage the option in a gamma trading strategy without having to outrightly buy the derivative. The obvious challenge to overcome is that the natural underlying of the call option is an inflation indexed security, which brings us back to our previous hurdle. To overcome this latest challenge, it could be possible to envisage a cross-hedging trading strategy to gamma hedge the call on purely nominal underlings as will be exposed in the next subsection. (Brennan et Xia 2002) proposed a purely nominal static strategy that would both replicate a zero coupon real bond and invest the residual fraction of the portfolio in equity while taking into account the horizon and the risk aversion of the investor in a finite horizon utility maximization framework. We would like to extend the scope of this work to dynamic allocation.

## Theoretical construction of the DIHTS

### *The DIHTS as an alternative strategy*

To achieve this inflation hedging portfolio insurance, we would like to capitalize on the popular CPPI strategy to build a dynamic trading algorithm that would be virtually free of inflation linked products and derivatives, but still offer a nominal and a real value-at-maturity guarantee: we propose a strategy which we will call the Dynamic Inflation Hedging Trading Strategy (DIHTS).

The risk-free part of the DIHTS portfolio would be invested in nominal zero coupon bonds which maturity matches that of our target maturity. The ideal asset for our strategy would be a floating rate long duration bond but since too few corporate or sovereign issuers favor this type of product, we cannot base a credible strategy relying on them. We could swap the fixed rate of the bond for a floating rate with a Constant Maturity Swap (CMS) as this type of fixed income derivative does not suffer for the limited supply and its cost implications like inflation indexed ones as it boasts a much boarder base of possible underlings in the interest rate market. Also, contrary to the inflation financial market, there are players in the market which are naturally exposed to floating rate and who wish to hedge away this risk by entering in the opposite side of a CMS transaction, therefore enhancing liquidity and driving

the cost down for such products. But, we have to accept bearing huge costs if the portfolio is readjusted as long rates move up or have to forfeit the capital guarantee at maturity by synthesizing the CMS by rolling positions on long duration bonds. Either which of these options are hardly sustainable.

Be it a fixed or a floating rate bond, a nominal security does offer only a limited inflation hedging potential: even if the Fisher framework exposed previously can let us hope that an increase in expected future inflation will drive rates up, the economic theory tells us that the Mundell-Tobin effect will reduce the Fisher effect and therefore reduce the inflation hedging potential of nominal floating rate asset, which, though not capped as in fixed rate assets, will still fail to hedge entirely the inflation risk. The residual part of this risk has to be hedged away by incorporating the real guarantee in the diversified part of the portfolio which is made up of potential inflation hedging asset classes which we will limit to three: equities, commodities and REITS. Subsequent work could exploit a finer distinction between commodities by dividing them in for example four sub-classes: soft, industrial metals, precious metals and energy. The tactical allocation of the portfolio will be made according to a systematic algorithm which doesn't allow for asset manager input as a first step. Eventually a more complex asset allocation algorithm could be added. We assume, as in the portfolio insurance literature, that there is no credit risk in either one of the fixed income assets we hold. The value at maturity of these assets is therefore their full notional value. We do not assume any outright hypothesis on the guaranteed value-at-maturity for the diversification asset, but as in any CPPI strategy, a maximum tolerable loss has to be set at a desired level which we will denote  $\mu$ . The parameter could be set specifically for each asset class, but we will assume only a single one for simplicity. If we add a martingale hypothesis for the price process  $V_t$  of the other asset classes:

$$P_{t+\theta} = \mathbb{E}_t(P_t)$$

This “limited liability” assumption becomes equivalent to a value-at-maturity hypothesis for the diversified portfolio which we can write for  $GV_T$  being the guaranteed value at maturity:

$$\mathbb{E}_t(GV_T) = \mu \cdot V_t$$

By further assuming that expected inflation can be obtained by the use of BEIs derived from ZCIIS, we can compute the initial fixed income fraction of the DIHTS which we will denote  $\alpha_0$ .

Let  $\pi_{t,t+\tau}^r$  be the realized inflation between  $t$  and  $t+\tau$ , and let  $\pi_{t,t+\tau\theta}^e$  be the expected inflation between  $t$  and  $t+\tau$  at time  $\theta$ . We have:

$$\pi_{t,t+\tau}^r = \pi_{t,t+\tau\theta}^e + \varepsilon_{t,t+\tau}$$

Let's further assume that:

$$\forall \theta < t, \quad \mathbb{E}_\theta(\varepsilon_{t,t+\tau}) = 0$$

We then assume that:

$$\pi_{t,t+\tau\theta}^e = BEI_{t,t+\tau\theta}$$

This assumption simplifies the problem of the computation of the inflation expectation in a rational anticipation framework: since in the Fisher framework we have:

$$\left(1 + BEI_{t,t+\tau\theta}\right) = \left(1 + \pi_{t,t+\tau\theta}^e\right) \left(1 + p_\theta \left(\pi_{t,t+\tau\theta}^e\right)\right)$$

The above assumption is equivalent to considering that the risk premiums are nil, which is a prudent hypothesis since they are non negative: we therefore never underestimate the inflation

risk. This hypothesis will have a further justification when we'll discuss the definition of the DIHTS' floor.

The use of DIHTS in an ALM strategy as it is presented here is better fitting for long term investors who wish to diversify away from zero-coupons inflation derivatives yielding back in bullet both the inflated principal and the real performance at maturity. It would be better fitting for retail oriented asset managers or pension funds. Investors wishing to diversify away from year-on-year type of inflation derivatives would rather use a strategy which cash flow profile still matches that of their liabilities which could for example require that the instrument pays the accrued inflation on the notional, and eventually a real coupon, on a yearly basis such that the instrument is at a yearly real par. Such strategies would benefit from an enhanced version of DIHTS using couponed bonds and eventually CMS-like fixed income derivatives in overlay to replicate our targeted benchmark instrument while still exploiting the same general principal as for the simpler strategy presented here. Henceforth, we will focus only on bullet repaying strategies since the marking-to-market allows us to theoretically adjust the notional of the fund at a current value, therefore without risking incurring a loss in case of partial or total redemption from the fund.

As previously defined,  $\alpha$  denotes the fraction of the fund invested in risk free nominal assets. Let  $(\alpha_0, 1 - \alpha_0)$  be the initial global allocation of the DIHTS and  $NPV$  denotes the net present value of the two fractions. All rates from now on are given in annual rate. At inception:

$$(1 - \alpha_0) \cdot \mu + \alpha_0 = \left( \frac{1 + \pi_{0,T}^e}{1 + \tau_{0,T}} \right)^T$$

Therefore have

$$\alpha_0 = \left( \left( \frac{1 + \pi_{0,T}^e}{1 + \tau_{0,T}} \right)^T - \mu \right) \frac{1}{1 - \mu}$$

Let  $A_t$  represent the ZC zero coupon bonds fraction of equivalent tenor (T-k), invested at time t and maturing at time T (for a ZCNB, only the nominal at maturity counts):

Let  $NAV_t^{ZCNB}$  represent the NAV of the zero coupon part, we have:

$$NAV_t^{ZCNB} = \frac{A_t}{(1 + \tau_{t,T})^{T-t}}$$

Before any reallocation we have:

$$\alpha_t = \frac{NAV_t^{ZCNB}}{NAV_t^{PTF} + NAV_t^{ZCNB}}$$

Where  $NAV_t$  represents the total NAV of the fund as we will define now. From now on, the star will denote the post optimization value of the parameter.

Let  $\omega_t$  be the weights of the ex-ante optimal allocation of the diversified portfolio, let  $\Omega_t$  be the vector of the value of the assets of the portfolio and let  $P_t$  be the price vector of the selected asset classes. We have at inception:

$$\omega_0^* = \frac{\Omega_0^*}{1 - \alpha_0}$$

$$1 - \alpha_0 = \omega_0^{*'} \cdot P_0$$

We then define  $NAV_t^{PTF}$  as:

$$NAV_t^{PTF} = \Omega_{t-1}^{*'} \cdot \frac{P_t}{P_{t-1}}$$

And  $NAV_t^{Lb}$  as:

$$NAV_t^{Lb} = \frac{(1 + \pi_{0,t}^r)^t (1 + \pi_{t,T}^e)^{T-t}}{(1 + \tau_{t,T})^{T-t}}$$

For any  $t > 0$ , we define the net asset value of the strategy  $NAV_t$ :

$$NAV_t = NAV_t^{PTF} + NAV_t^{ZCNB} - NAV_t^{Lb}$$

Let  $NAV_t^G$  be the implicitly guaranteed net asset value of the strategy taking into account the loss tolerance parameter  $\mu$ :

$$NAV_t^G = \mu \cdot NAV_t^{PTF} + NAV_t^{ZCNB} - NAV_t^{Lb}$$

The strategy remains viable as long as  $NAV_t > 0$ . If the floor is breached, the fund is closed before the maturity or a zero coupon inflation hedging security would have to be bought at a loss.

A global reallocation is necessary if  $NAV_t^G < 0$  and in which case, we have to add a new trench of ZCNB such that:

$$\alpha_t^* = \underset{\alpha_t}{\operatorname{argmin}}\{NAV_t^G(\alpha_t) > 0\}$$

In case we have:

$$NAV_t^G(0) > 0 \quad \text{we set} \quad \alpha_t = 0$$

Since the expected returns on the diversified part of the portfolio are potentially higher than those on the fixed income part, we set  $\alpha$  at the lowest possible value that verifies  $NAV_t^G > 0$ . In order not to reallocate constantly the global parameter at the slightest market movement, we set a tolerance parameter  $\eta$  under which no global reallocation is done:

$$\alpha_t^* = \alpha_t \quad \text{if} \quad |NAV_t^G| < \eta \quad \text{or if} \quad \alpha_t = 0 \quad \text{and} \quad NAV_t^G > 0$$

Obviously, any global reallocation would trigger a reallocation of the diversified portfolio weights. It is a sufficient but not necessary condition as it may be more optimal to do so more frequently as we will expose in the next subsection.

The breaching of the DIHTS' floor is obtained when it is not possible to reallocate the global parameter such that the guaranteed net asset value becomes positive:

$$\forall \alpha > 0, \quad NAV_t^G(\alpha) < 0$$

If such an event were to occur, the diversified portfolio would already have been entirely liquidated and the remaining net asset value could as before be used to buy a string of ZCIIS to insure the real guarantee at maturity of the portfolio. The gap risk and the liquidation cost would probably result in a negative real return. Gap risk apart, the downside risk would be curtailed by the fact that we had taken ZCIIS BEIs when computing the NAV and not directly the expected inflation which would have been lower.

#### *Optimal allocation of the diversified portfolio*

The diversification portfolio is allocated in order to hedge both the residual expected inflation and the unexpected inflation, while also yielding the real excess return that is targeted. Once



the global allocation parameter  $\alpha$  is set, we can compute the residual expected inflation and eventually set a targeted real excess return. According to our hypothesis, we have no input regarding the value of the unexpected inflation which ex-ante conditional expectation is nil.

Out of all the possible portfolio optimization criteria, we will limit ourselves to envisaging allocating the diversified portfolio according to three criteria: a Constant Weight scheme (CW), a minimum-variance (MV) and an Information Ratio (IR). We introduce the following definitions: Let  $\bar{R}$  be the targeted real return scalar,  $R_k$  be the realized return vector over the period  $k$  for the different asset classes and  $\Sigma_t$  be the variance-covariance matrix of the return vector at time  $t$ . Let  $\omega_{X_t}$  be a portfolio allocation at time  $t$  and  $\omega_{X_t}^*$  be the optimal one according to the  $X$  criteria used. Let  $\pi_k^r$  be the realized inflation over the  $k$  period,  $\pi_{k_t}^e$  be the expected inflation over the  $k$  period at time  $t$  and  $R_t^{ZCNB}$  be the nominal return on the fixed-income investment.

The MV optimization criterion is defined by the following loss function  $L$  at time  $t$ :

$$L_{MV}(t, \omega_{MV_t}, \bar{R}, \pi_k^e, \mathbb{E}_t(R), \Sigma_t) = \omega_{MV_t}' \cdot \Sigma_t \cdot \omega_{MV_t}$$

We therefore obtain the optimal portfolio according to the MV criterion by minimizing  $L$ :

$$\omega_{MV_t}^* = \underset{\omega_{MV_t}}{\operatorname{argmin}} \{L_{MV}(t, \omega_{MV_t}, \bar{R}, \pi_k^e, \mathbb{E}_t(R), \Sigma_t)\}$$

The IR optimization criterion is defined such that:

$$\begin{aligned} IR(t, \omega_{IR_t}, \bar{R}, \pi_k^e, \mathbb{E}_t(R), \Sigma_t, R_t^{ZCNB}) \\ = \frac{\omega_{IR_t}' \cdot \mathbb{E}_t(R_T) - \bar{R} - (\pi_{t,T}^r - \pi_{T_t}^e) - \frac{1}{1 - \alpha_t} (\pi_{T_t}^e + \pi_{0,t}^r - \alpha_t \cdot R_t^{ZCNB})}{\omega_{IR_t}' \cdot \Sigma_t \cdot \omega_{IR_t}} \end{aligned}$$

We therefore obtain the optimal portfolio according to the IR criterion by maximizing the  $IR$ :

$$\omega_{IR_t}^* = \underset{\omega_{IR_t}}{\operatorname{argmax}} \{IR(t, \omega_{IR_t}, \bar{R}, \pi_k^e, \mathbb{E}_t(R), \Sigma_t, R_t^{ZCNB})\}$$

The first criterion required at least the estimation of the variance-covariance matrix of the investable assets and the second one requires in addition the estimation of those average returns. The ex-post inflation forecasting error and therefore the shortfall probability are trickier to compute since they require for example a model to compute simulated trajectories and perform Monte-Carlo estimation. The CW method being blind, it is obviously the less demanding in term of input.

In the next section on empirical estimation, we will rely on historical estimations of the key optimization inputs out of simplicity considerations. Forecasting errors will be assumed to be nil (rational expectation hypothesis). A slightly more comprehensive approach to allocating our portfolio would involve the modeling of the joint distribution of inflation and investable assets from a macro or an econometric perspective in order to make forecasts (or simulations). Unfortunately, as we will expose thereafter, no such simulation tool is available today.

## Empirical estimations of the performance of the strategy

### *Methodology and data sources*

To empirically test the efficiency of the global allocation principle independently from the optimization method used to allocate the diversified portfolio, we adopted the same allocation technique for both the diversified fraction of the investment and for the standard benchmark portfolio. Portfolios were simulated over the longest available timeframe on US data spanning three decades from 1990 to the end of 2010.

Using the results from these portfolio simulations, we computed the Failure Rate (FR), the Information Ratio (IR) and the Turnover Ratio (ToR) for the different strategies. The FR is defined as the percentage of times a portfolio breaks the real par floor, the IR is the Sharpe ratio applied to a pure inflation benchmark and the ToR is the percentage of the initial value of the fund that is reallocated during the life of the strategy. To have a measure of the potential Profit and Loss (P&L) of the benchmark portfolio returns in case of failure of the DIHTS, we measure the P&L Given Failure (PLGF). *Nota bene*, this indicator is obviously measurable only if the DIHTS does fail.

For the three previously selected allocation methods, we then tested the impact on the overall strategy performance on the choice of a shorter investment horizon based on our central scenario of  $\mu = 50\%$  and  $\eta = 1\%$ . We then computed the sensitivity analysis of the DIHTS to the choice of  $\mu$  and  $\eta$  in our 10 year investment horizon base scenario (results presented in the working paper version). We also plotted the comparative real return profile of the DIHTS compared to the benchmark portfolio allocated with the same technique for various investment horizons in our baseline scenario. Eventually, we constructed an efficient frontier based on our real return compared to a risk measure (the volatility of the NAV).

The various portfolios values were computed on end-of-period values at a monthly frequency obtained from the Bloomberg data services: for the diversified and benchmark portfolios the S&P-GSCI-TR total return commodity index, the S&P500-TR total return broad US equity index, the FTSE-NAREIT-TR traded US real estate total return index and the Barclays Capital Long U.S. Treasury Index (the last being only for the benchmark portfolio). For our zero-coupon and mark-to-market computation, we used the US sovereign ZC-coupon curve computed also by Bloomberg. CPI inflation was measured using the standard official measure. The longest overlapping availability period for all of these data stretches from 1988 to 2011.

Forward inflation expectations used to compute the floors were obtained using market values derived from the Zero Coupon Inflation Indexed Swaps curve (ZCIIS) which is available from June 2004 to the 2011. Prior estimations of expected inflation were obtained using the Federal Reserve Bank of Philadelphia Survey of Professional Forecasters (SPF) for future US inflation at 1 and 10 year horizon available for the entire 1988 to 2010 period.

To compute our historical estimation of the covariance matrix and the expected returns for Inflation, S&P500-TR, S&P-GSCI-TR, FTSE-NAREIT-TR, we used a longer dataset going back to 1985 so that we could compute them on a moving time-frame of five years. This value was chosen as a rule of thumb reflecting empirical estimation of the smallest period usable to compute our parameters with the least noise possible while not being too long to be able to reflect relatively rapidly persistent changes in the correlation structure we hope to exploit, or avert depending on our current position.

*Historical Backtesting results*

The first striking results of this study is that as we can see from the analysis of any of the horizon sensitivity analysis presented in tables 1 is that the efficiency of the DIHTS compared to the benchmark portfolio is stronger for medium investment horizon of 5 to 7 years, whereas for longer ones, the effect tends to diminish as the benchmark portfolio failure rate drops. Shorter horizons were not modeled as in some cases interest rate from inception to maturity being lower than the expected inflation, the strategy could not have been initiated. The less striking result is that a classical portfolio of our alternative asset classes does offer a relatively good inflation hedge over long horizons, whilst failing at shorter ones. Comparatively, in our baseline scenario, the DIHTS never fails over the same range of maturities and ensures through its life a positive real mark to market. Again, as could have been expected after the following analysis, the IR for the DIHTS is persistently higher over the entire range of investment horizons, but as the maturity lengthens, the difference diminishes.

Table 1: Horizon sensitivity of the DIHTS vs. the Benchmark Portfolio for the historical simulation.

<b>CW</b>						
<b>Horizon (Years)</b>	<b>Fail Rate</b>		<b>IR</b>		<b>ToR</b>	
	<b>DIHTS</b>	<b>PTF</b>	<b>DIHTS</b>	<b>PTF</b>	<b>DIHTS</b>	<b>PTF</b>
<b>5</b>	0,00%	12,44%	60,27% (28,6%)	33,80% (21,93%)	5,46% (1,8%)	3,65% (0,63%)
<b>6</b>	0,00%	1,66%	44,03% (18,0%)	28,96% (11,57%)	6,89% (1,8%)	4,79% (0,87%)
<b>7</b>	0,00%	1,18%	34,23% (12,4%)	24,52% (7,61%)	8,65% (1,8%)	6,09% (1,02%)
<b>8</b>	0,00%	1,91%	26,89% (8,2%)	20,27% (6,50%)	10,45% (1,8%)	7,47% (0,97%)
<b>9</b>	0,00%	0,00%	21,56% (5,8%)	17,13% (5,05%)	12,24% (1,8%)	9,00% (0,96%)
<b>10</b>	0,00%	0,00%	17,92% (4,2%)	14,80% (3,63%)	14,22% (2,2%)	10,83% (1,32%)

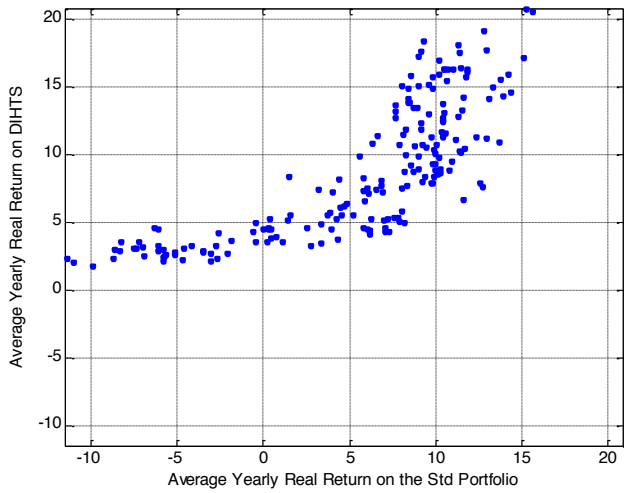
<b>MV</b>						
<b>Horizon (Years)</b>	<b>Fail Rate</b>		<b>IR</b>		<b>ToR</b>	
	<b>DIHTS</b>	<b>PTF</b>	<b>DIHTS</b>	<b>PTF</b>	<b>DIHTS</b>	<b>PTF</b>
<b>5</b>	0,00%	13,47%	53,80% (27,1%)	29,69% (26,33%)	6,09% (2,2%)	6,59% (1,29%)
<b>6</b>	0,00%	8,84%	42,26% (21,5%)	26,17% (15,03%)	7,66% (2,5%)	8,53% (1,64%)
<b>7</b>	0,00%	0,00%	34,10% (14,0%)	22,11% (8,11%)	9,62% (2,7%)	10,74% (2,09%)
<b>8</b>	0,00%	1,27%	27,85% (10,5%)	18,47% (6,20%)	11,70% (2,6%)	13,11% (2,35%)
<b>9</b>	0,00%	0,00%	22,37% (8,6%)	15,82% (5,05%)	13,70% (2,5%)	15,75% (2,78%)
<b>10</b>	0,00%	0,00%	18,56% (6,5%)	13,72% (3,86%)	15,90% (2,9%)	18,99% (3,86%)

Horizon (Years)	IR					
	Fail Rate		IR		ToR	
	DIHTS	PTF	DIHTS	PTF	DIHTS	PTF
5	0,00%	20,73%	59,48% (30,2%)	24,35% (32,65%)	7,17% (3,2%)	7,36% (1,39%)
6	0,00%	21,55%	48,70% (26,2%)	22,55% (20,50%)	8,91% (3,5%)	9,30% (1,75%)
7	0,00%	9,47%	38,41% (18,3%)	20,82% (11,31%)	10,29% (3,9%)	11,45% (2,03%)
8	0,00%	8,28%	32,06% (13,6%)	18,42% (10,61%)	11,18% (3,9%)	13,57% (2,03%)
9	0,00%	9,66%	29,30% (13,6%)	15,91% (9,53%)	12,08% (3,7%)	15,87% (2,10%)
10	0,00%	7,52%	25,56% (12,4%)	13,89% (7,95%)	13,33% (3,5%)	18,55% (2,36%)

The main drawback of this study is that reallocations are done at no trading costs. The performance indicated here is in effect purely theoretical. This is why the ToR ratios are computed in order to have an idea of the potential trading cost implications. On this aspect, the DIHTS does underperform its benchmark portfolio by a relatively small measure, even if this conclusion has to be nuanced by the large and relatively higher volatility of the ToR for the DIHTS compared to its benchmark. The choice of our baseline scenario is comforted by the parameter sensitivity analysis which clearly indicates that a conservative estimate for  $\mu = 50\%$  reduces failure rates at the 10 year horizon tested. The tolerance parameter  $\eta = 1\%$  impact seems to be of lesser importance but it is clear the ToR versus FR arbitrage could be of significance had trading costs been accounted for as can be seen in tables 4 to 6. The CW allocation is rather surprisingly less ToR intensive compared to the other allocation methods but achieves lower IR performance. This could be attributed to the volatility of the estimation of future expected returns and volatility which require important shifts in allocation.

The graphical representation of the comparative real performance of the strategy at medium maturities as can be seen in figure 2 appears to show the classical CPPI “call-like” optional risk profile in which the strategies holds in tough times whilst potentially achieving higher returns in favorable ones. As fewer negative results are experienced for longer investment horizons, the risk profile is less clear to establish but is consistent with the previous analysis in the IR case. The analysis of our empirical determination of the real efficient frontier of our strategy reinforces the previous conclusions as to the relative efficacy of the DIHTS in medium term and its less clear performance gains for longer horizons as can be seen in figure 3: at the five years horizon, the DIHTS frontier is systematically shifted towards the upper left corner compared to its benchmark whilst at the ten year horizon, it is shifted to the left in the IR case.

US Market (1990-2010) : DIHTS vs. Std Portfolio, allocated by IR with a 5 years horizon



US Market (1990-2010) : DIHTS vs. Std Portfolio, allocated by IR with a 10 years horizon

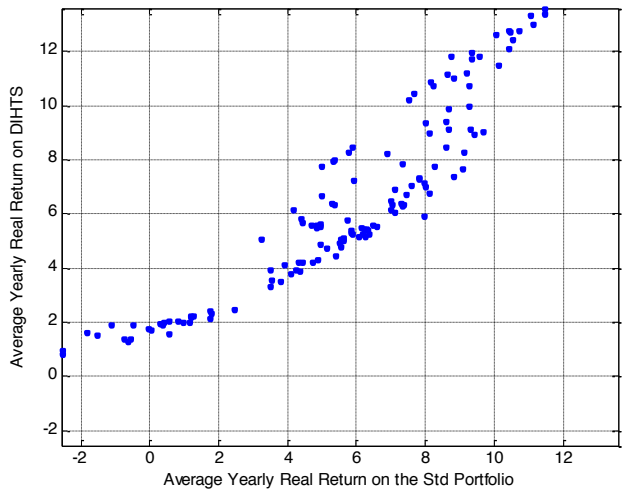
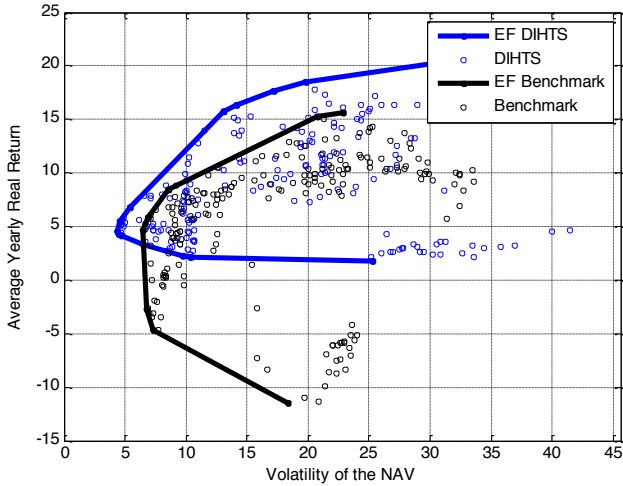


Figure 1: Graphic performance comparison for historical simulation allocated by IR

US Market (1990-2010) : DIHTS vs. Benchmark Efficient Frontier Allocated by IR with a 5 years horizon



US Market (1990-2010) : DIHTS vs. Benchmark Efficient Frontier Allocated by IR with a 10 years horizon

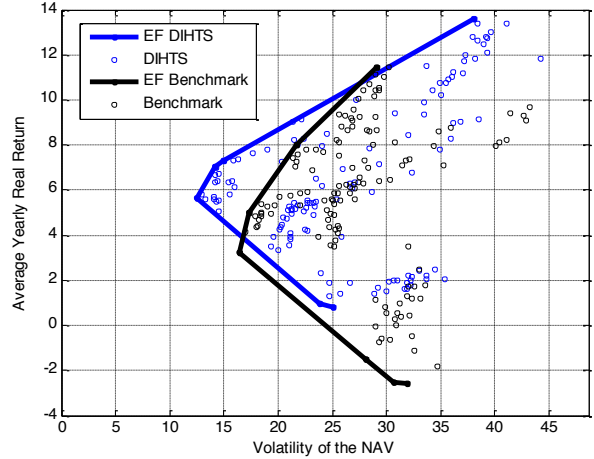


Figure 2: Efficient frontier estimation for historical simulation allocated by IR

Consistently with our prior findings, we actually observe in the baseline scenario a better performance for the IR than with the MV and even better performance compared to the CW in term of achieved IR. It is therefore interesting to note that the DIHTS, with its conditional allocation does offer better than expected results in the most favorable circumstances, which is very uncommon in the plain vanilla derivative instruments it is supposedly mimicking. To sum up, the DIHTS achieves inflation hedging and delivers real returns in all the backtest simulations for any targeted maturity whilst consistently achieving higher returns than its benchmark, thus justifying the validity of our approach.

# A Dynamic Inflation Hedging Trading Strategy Using a CPPI

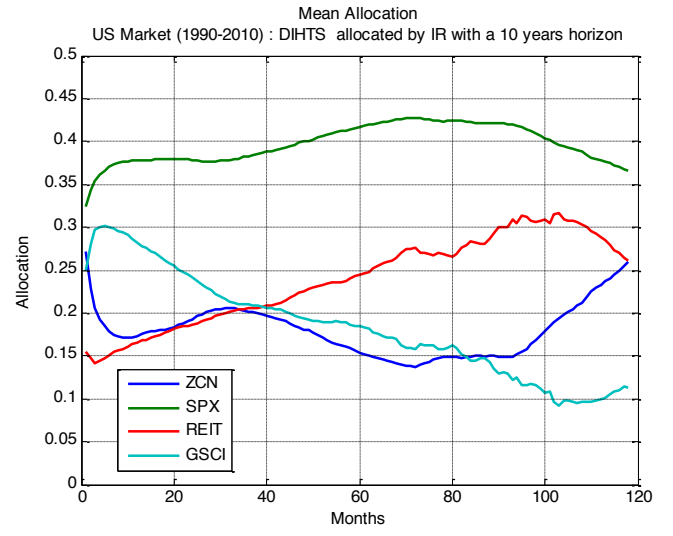
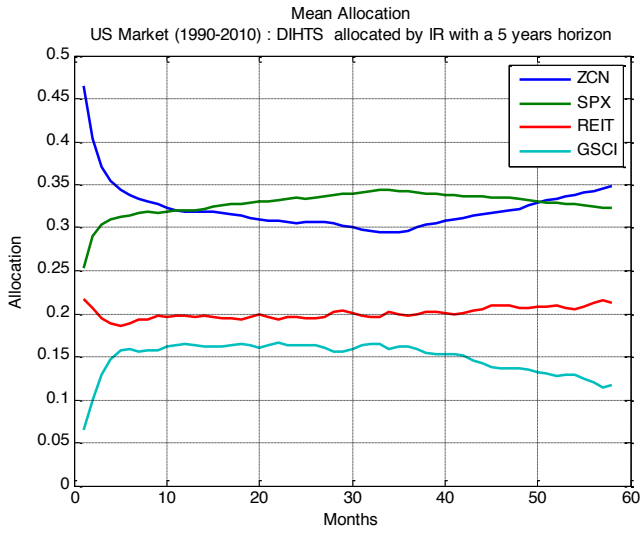


Figure 3: Allocation for historical simulation allocated by IR

Table 2: Allocation horizon sensitivity analysis for the DIHTS for the historical simulation.

**CW**

Horizon (Years)	ZCN	SPX	REIT	GSCI
5	23,5% <i>(22,2%)</i>	24,9% <i>(14,3%)</i>	24,9% <i>(10,2%)</i>	24,9% <i>(7,9%)</i>
6	19,0% <i>(19,7%)</i>	26,6% <i>(12,2%)</i>	26,6% <i>(8,3%)</i>	26,6% <i>(6,2%)</i>
7	13,9% <i>(16,4%)</i>	28,3% <i>(9,2%)</i>	28,3% <i>(5,5%)</i>	28,3% <i>(3,4%)</i>
8	9,9% <i>(12,9%)</i>	29,7% <i>(6,2%)</i>	29,7% <i>(2,6%)</i>	29,7% <i>(0,7%)</i>
9	7,6% <i>(9,8%)</i>	30,5% <i>(3,6%)</i>	30,5% <i>(0,3%)</i>	30,5% <i>(1,5%)</i>
10	5,7% <i>(6,9%)</i>	31,2% <i>(1,4%)</i>	31,2% <i>(1,6%)</i>	31,2% <i>(3,3%)</i>

**MV**

Horizon (Years)	ZCN	SPX	REIT	GSCI
5	28,1% <i>(22,2%)</i>	29,9% <i>(17,3%)</i>	5,3% <i>(14,9%)</i>	35,0% <i>(13,9%)</i>
6	24,1% <i>(19,7%)</i>	31,7% <i>(15,9%)</i>	5,7% <i>(13,9%)</i>	37,2% <i>(13,3%)</i>
7	19,3% <i>(16,4%)</i>	33,7% <i>(14,2%)</i>	6,1% <i>(13,1%)</i>	39,7% <i>(12,9%)</i>
8	14,9% <i>(12,9%)</i>	35,5% <i>(13,1%)</i>	6,6% <i>(12,8%)</i>	41,9% <i>(13,1%)</i>
9	12,3% <i>(9,8%)</i>	36,5% <i>(12,7%)</i>	6,9% <i>(13,0%)</i>	43,3% <i>(13,6%)</i>
10	9,8% <i>(6,9%)</i>	37,6% <i>(12,8%)</i>	7,2% <i>(13,6%)</i>	44,6% <i>(14,3%)</i>

**IR**

Horizon (Years)	ZCN	SPX	REIT	GSCI
5	31,6% <i>(22,2%)</i>	32,2% <i>(16,5%)</i>	19,8% <i>(12,9%)</i>	14,7% <i>(10,9%)</i>
6	29,0% <i>(19,7%)</i>	33,6% <i>(14,4%)</i>	20,3% <i>(10,9%)</i>	15,7% <i>(9,2%)</i>
7	25,9% <i>(16,4%)</i>	35,2% <i>(11,5%)</i>	20,6% <i>(8,3%)</i>	17,2% <i>(7,3%)</i>
8	22,7% <i>(12,9%)</i>	36,8% <i>(8,7%)</i>	21,2% <i>(6,9%)</i>	18,3% <i>(6,8%)</i>
9	20,3% <i>(9,8%)</i>	38,0% <i>(6,9%)</i>	22,4% <i>(7,1%)</i>	18,3% <i>(7,8%)</i>
10	17,8% <i>(6,9%)</i>	39,3% <i>(7,1%)</i>	23,8% <i>(8,3%)</i>	18,3% <i>(9,4%)</i>

## Block Bootstrapping based evaluation of the DIHTS

### *Principle*

The main shortfall of the previous empirical estimation of the performance of the DIHTS is that it relies on the historical time series which represent only one scenario in a backtesting approach. Moreover, the historical time span studied here corresponds to a very specific context of a downward trending inflation and its associated risk premium. We therefore have a context in which long horizon inflation hedging techniques were beaten by classic allocations since inflation tended to be systematically under its expected value ex-ante. In such a context, investing in long duration nominal assets accordingly yields strong real returns. Considering for example the vast amount of liquidity injected by central banks in the financial market by the various unconventional monetary policies of the last couple of years, the still untamed government spending generating large deficits and a looming sovereign crisis, it is very hard to imagine that inflation will keep following the same path it followed over the past twenty years. A backward looking approach is therefore clearly insufficient. Yet, it is probable that fundamental economic relations will still more or less link the various asset classes and we can hope that our approach can hold in such a context. Exploiting simulated stressed scenarios could therefore be informative if they are credible. But since we do not have a credible simulation tool, we choose to bootstrap the existing dataset using a block method to retain as much as we can of the existing correlation structure of our dependent vector time series.

As a make-up solution we simulate a universe of scenari by using a multidimensional time series block-bootstrapping method. Log-returns are computed on our longest comprehensive dataset and using the automatic block-length selection algorithm of (Politis et White 2004) with its associated Matlab code written by Dr. Andrew Patton from the LSE, we generate a new set of trajectories by integrating the resulting series of return blocks. This technique would partially preserve the correlation structure of our time series which are by nature strongly dependent. The obvious shortfall of this approach is that some intrinsic adjustment mechanisms could take place at a horizon way too great to be captured by the bootstrapped which has to be of limited length to ensure a sufficient range of scenari. To stress test the resilience of the strategy, we simulated 200 times a 20 year bootstrapped vector time series. Out of this 4000 year of simulated scenari, we ran for each of the 200 paths from 120 to 180 different 5 to 10 year portfolio simulations. As in the previous section on historical backtesting, we presented the results of this exercise on graphic format and tables summarizing the comparative performances, and the average allocation of the portfolio.

Out of the universes of scenari we generated, some will be extraordinarily adverse. It is worth mentioning that since those scenari are obtained from real past returns, they do constitute credible “black swans” events worse evaluating, especially since recent turmoil have taught us that such improbable events do actually occur rather frequently. There are obvious intrinsic shortfalls to this methodology: we puts into question the rational expectation hypothesis as when the simulated path crosses over from one block of returns to the other, there is no reason to believe expectations will hold. It is an especially acute problem for the fixed income market where we should see forward rates converging towards spot rates. Even though from a purely numerical point of view, correlation structures should be mostly preserved. Though imperfect, this method is the only credible alternative to historical backtesting. It generates extreme scenarios with intrinsic structural breakpoints in term of correlations and rational expectation, but might be informative for stress testing.



Results

If we first look at both the five year and ten year DIHTS versus Benchmark plot, it is difficult to see any significantly different pattern at first glance. It is not as clear as in the previous case that we have a clear optional-like payoff profile with an asymmetrical distribution. In fact, the distribution shows remarkable similarity, except maybe for highly negative returns. We do observe large numbers of FR for the DIHTS but reassuringly, the PLGF is also negative, indicating that the benchmark would probably haven't fared better in such adverse environments. We also observe a significant number of DIHTS simulations which end-up below the real floor at maturity whilst they never broke the real floor during their lifetime up to the before-last valuation of their mark-to-market. Since this represents the gap risk resulting from the mark-to-market at a low frequency (monthly here), we have included those cases in the computation of the failed rate. Moving to higher frequency estimation would probably eliminate much if not all of these below zero points as in the conventional CPPI.

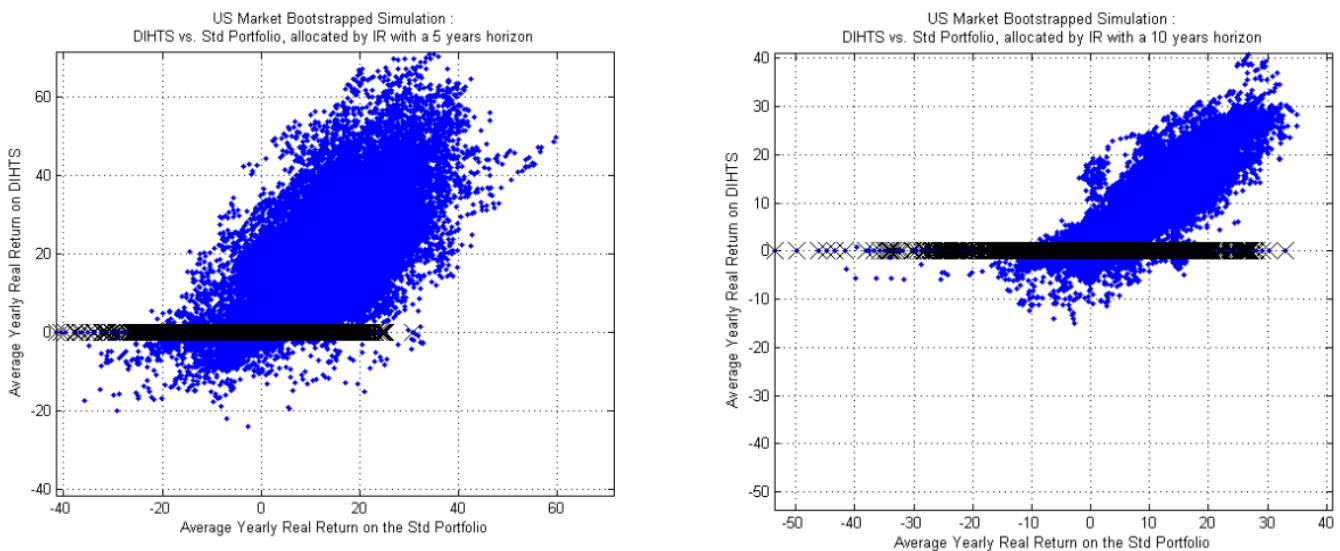


Figure 4: Graphic performance comparison for the bootstrapped simulation allocated by IR.

Looking then at the efficient frontier empirical estimation, we have once again as in the previous case better results for the five year with frontiers pushed to the northwest for all the allocation methods. For the ten year cases, there seems to be no significant difference between the efficient frontiers of the benchmark portfolio and the DIHTS but for the very adverse cases as before. Nota bene: the efficient frontiers of the DIHTS passes through the (0,0) point because in case of a breach of the real par, the strategies are terminated and an arbitrary (0,0) return variance couple is entered.

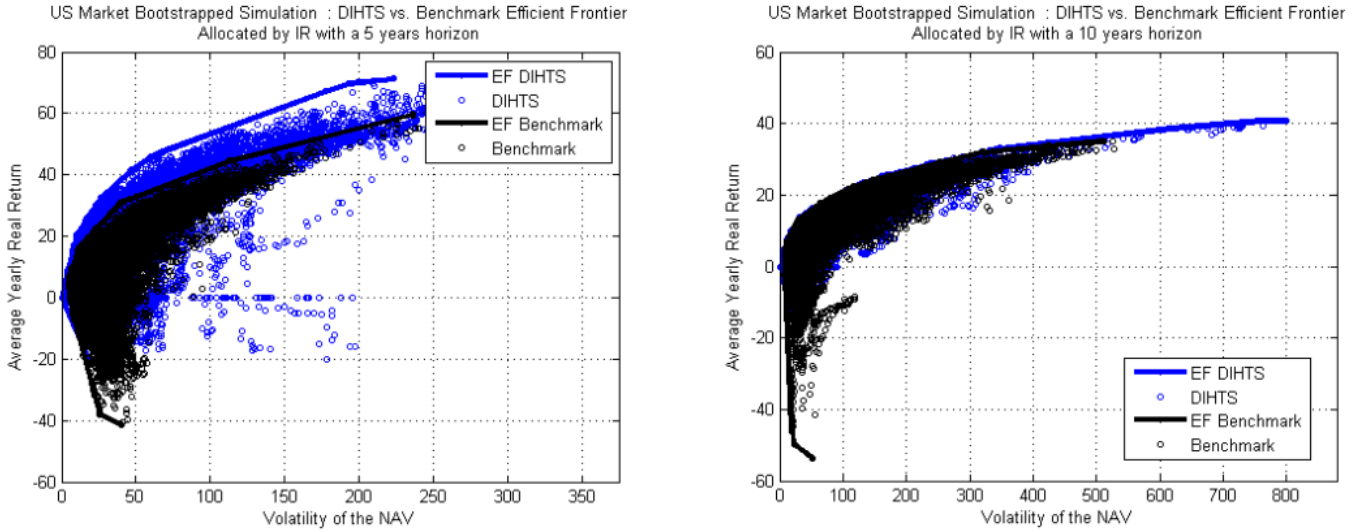


Figure 5: Efficient frontier estimation for bootstrapped simulation allocated by IR.

The average allocation of the portfolio shows a progressive substitution of the nominal bond to the benefit of the other asset classes which exhibit upward trending means for all classes in the five year computation. In the case of the ten year horizon, the REIT allocation exhibits a downward trend in the MV allocation and so does the GSCI in the IR allocation. There is no clear explanation for these phenomena.

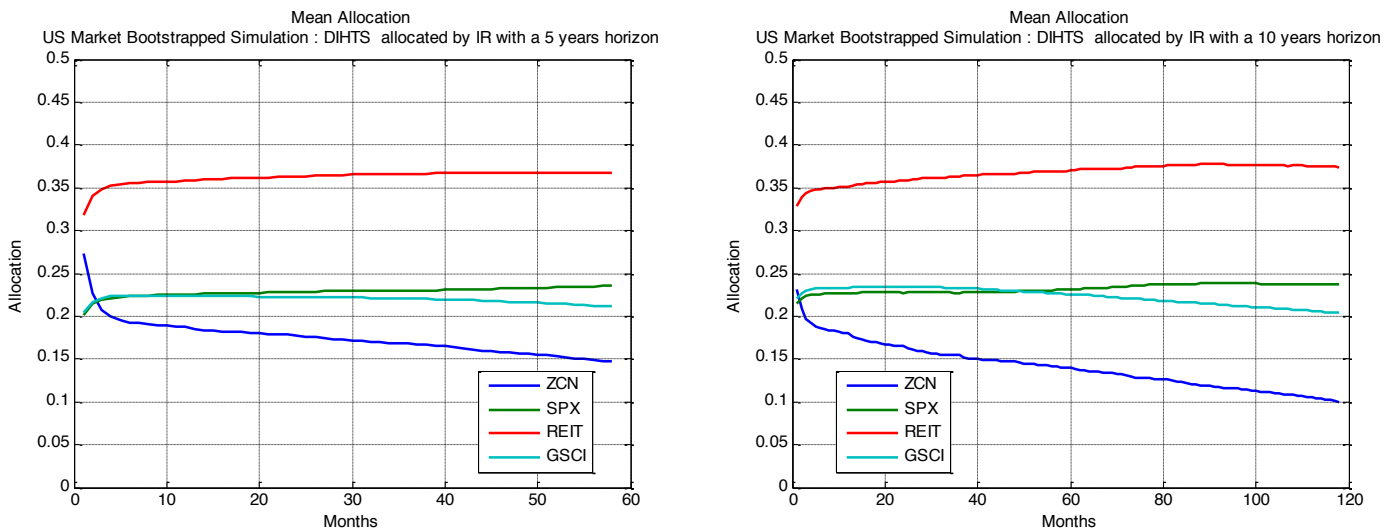


Figure 6: Allocation for historical simulation allocated by IR.

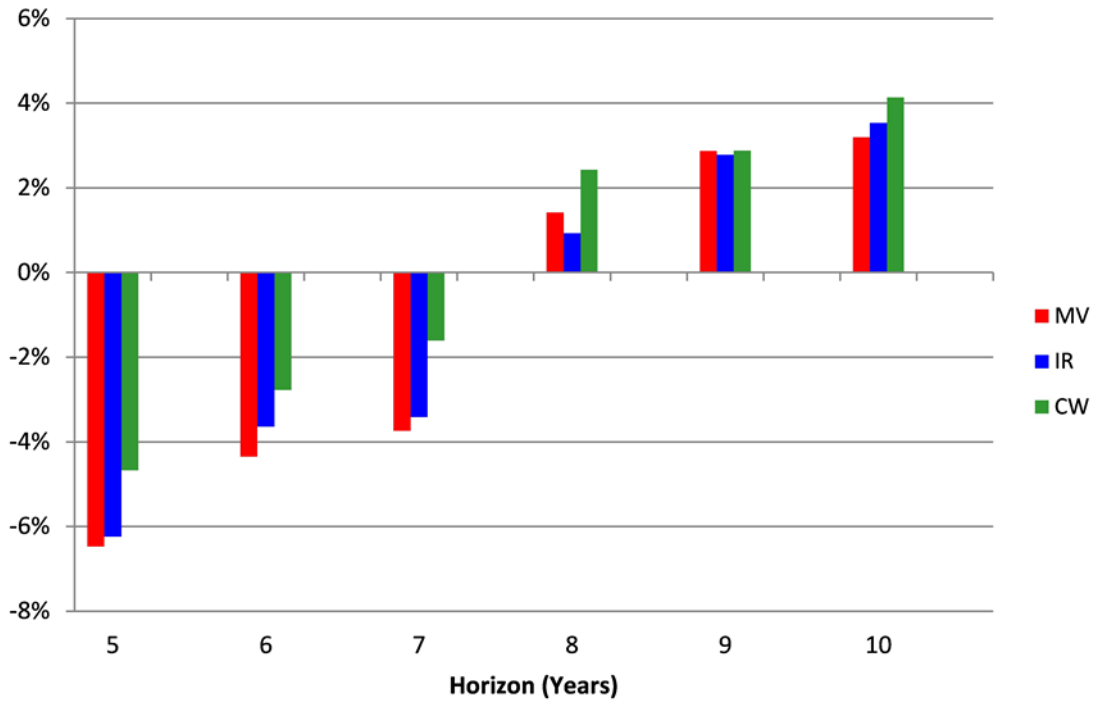


Figure 7: DIHTS vs. Benchmark, rate of failure enhancement according to investment horizon.

Table 3: Allocation horizon sensitivity analysis for the DIHTS for the bootstrapped simulation.

Horizon \ Allocation	CW			
	ZCN	SPX	REIT	GSCI
5	16,8% (10,9%)	26,9% (1,8%)	26,9% (1,4%)	26,9% (2,7%)
6	16,2% (10,3%)	27,1% (2,4%)	27,1% (0,6%)	27,1% (1,9%)
7	15,0% (8,6%)	27,7% (1,7%)	27,7% (1,1%)	27,7% (2,4%)
8	14,5% (7,3%)	27,7% (1,8%)	27,7% (0,7%)	27,7% (1,9%)
9	14,3% (5,9%)	27,5% (1,2%)	27,5% (1,0%)	27,5% (2,1%)
10	14,5% (5,1%)	27,4% (1,0%)	27,4% (0,7%)	27,4% (1,6%)

**MV**

<b>Horizon \ Allocation</b>	<b>ZCN</b>	<b>SPX</b>	<b>REIT</b>	<b>GSCI</b>
5	17,9% (10,8%)	35,6% (6,9%)	16,9% (7,3%)	26,9% (7,8%)
6	17,6% (10,1%)	36,1% (7,3%)	16,5% (7,4%)	27,0% (7,8%)
7	16,6% (8,7%)	36,9% (7,3%)	16,7% (7,5%)	27,5% (7,9%)
8	16,1% (7,4%)	35,2% (6,6%)	16,8% (6,8%)	29,4% (7,2%)
9	16,3% (5,6%)	35,8% (6,7%)	16,3% (7,1%)	28,4% (7,4%)
10	16,9% (5,1%)	35,8% (7,2%)	15,8% (7,4%)	27,8% (7,7%)

**IR**

<b>Horizon \ Allocation</b>	<b>ZCN</b>	<b>SPX</b>	<b>REIT</b>	<b>GSCI</b>
5	17,3% (10,7%)	22,5% (5,7%)	35,5% (6,1%)	21,6% (6,6%)
6	17,1% (10,2%)	22,9% (5,9%)	35,7% (5,9%)	21,4% (6,4%)
7	15,9% (8,7%)	21,9% (6,3%)	37,0% (6,5%)	22,7% (6,9%)
8	15,8% (7,5%)	25,3% (5,7%)	35,9% (5,8%)	20,1% (6,1%)
9	14,9% (5,8%)	24,8% (5,5%)	35,9% (5,7%)	20,4% (6,1%)
10	14,5% (5,0%)	23,2% (5,5%)	36,3% (5,7%)	21,3% (5,9%)

In term of comparative performance to the benchmark, we have computed the excess rate of failure of the DIHTS over its benchmark for the three allocation methods for horizons ranging from 5 to 10 years. The results are presented in the figure 2. We observe that in term of FR, the DIHTS achieves a significant reduction for maturities ranging from 5 to 7 years and then underperforms its benchmark significantly for maturities of 8 years and over.

The PLGFs do seem to follow the same pattern as they exhibit fairly negative figures for short maturities and tend to diminish as the maturity lengthens. They end up close to zero for the CW and MV case and remain negative for the IR which is the overall best performer. The IR ratios yield little discriminative value as the differences between the ones of the DIHTS and those of its benchmark are negligible. The ToRs are also fairly close, but it is rather encouraging as it removes partly the trading cost caveat.

Table 4: Allocation horizon sensitivity analysis for the DIHTS for the bootstrapped simulation.

Horizon \ Allocation	CW			
	ZCN	SPX	REIT	GSCI
5	16,8% <i>(10,9%)</i>	26,9% <i>(1,8%)</i>	26,9% <i>(1,4%)</i>	26,9% <i>(2,7%)</i>
6	16,2% <i>(10,3%)</i>	27,1% <i>(2,4%)</i>	27,1% <i>(0,6%)</i>	27,1% <i>(1,9%)</i>
7	15,0% <i>(8,6%)</i>	27,7% <i>(1,7%)</i>	27,7% <i>(1,1%)</i>	27,7% <i>(2,4%)</i>
8	14,5% <i>(7,3%)</i>	27,7% <i>(1,8%)</i>	27,7% <i>(0,7%)</i>	27,7% <i>(1,9%)</i>
9	14,3% <i>(5,9%)</i>	27,5% <i>(1,2%)</i>	27,5% <i>(1,0%)</i>	27,5% <i>(2,1%)</i>
10	14,5% <i>(5,1%)</i>	27,4% <i>(1,0%)</i>	27,4% <i>(0,7%)</i>	27,4% <i>(1,6%)</i>

Horizon \ Allocation	MV			
	ZCN	SPX	REIT	GSCI
5	17,9% <i>(10,8%)</i>	35,6% <i>(6,9%)</i>	16,9% <i>(7,3%)</i>	26,9% <i>(7,8%)</i>
6	17,6% <i>(10,1%)</i>	36,1% <i>(7,3%)</i>	16,5% <i>(7,4%)</i>	27,0% <i>(7,8%)</i>
7	16,6% <i>(8,7%)</i>	36,9% <i>(7,3%)</i>	16,7% <i>(7,5%)</i>	27,5% <i>(7,9%)</i>
8	16,1% <i>(7,4%)</i>	35,2% <i>(6,6%)</i>	16,8% <i>(6,8%)</i>	29,4% <i>(7,2%)</i>
9	16,3% <i>(5,6%)</i>	35,8% <i>(6,7%)</i>	16,3% <i>(7,1%)</i>	28,4% <i>(7,4%)</i>
10	16,9% <i>(5,1%)</i>	35,8% <i>(7,2%)</i>	15,8% <i>(7,4%)</i>	27,8% <i>(7,7%)</i>

Horizon \ Allocation	IR			
	ZCN	SPX	REIT	GSCI
5	17,3% (10,7%)	22,5% (5,7%)	35,5% (6,1%)	21,6% (6,6%)
6	17,1% (10,2%)	22,9% (5,9%)	35,7% (5,9%)	21,4% (6,4%)
7	15,9% (8,7%)	21,9% (6,3%)	37,0% (6,5%)	22,7% (6,9%)
8	15,8% (7,5%)	25,3% (5,7%)	35,9% (5,8%)	20,1% (6,1%)
9	14,9% (5,8%)	24,8% (5,5%)	35,9% (5,7%)	20,4% (6,1%)
10	14,5% (5,0%)	23,2% (5,5%)	36,3% (5,7%)	21,3% (5,9%)

## Conclusion

Inflation hedging has been a broad cyclical concern in Asset Liability Management for almost every type of financial institution and states alike. Be it for hedging on the short or the long part of the curve depending on their type of liabilities, virtually every player has had to grapple with an unbalanced market and all the costs and liquidity problems associated with it. Three decades of development of the primary inflation linked market have failed to quench the demand for inflation linked securities as its growth has been largely outpaced by the one of the potential demand for such instruments, adding extra pressure on hedgers. Recent spikes in headline inflation in OECD countries have spurred once again the quest for alternative hedging techniques as many sovereign issuers, constituting the bulk of the emitters, might rethink their emission policies. Some have already done so in the face of growing servicing cost and mounting public debt, the enduring testimony of the 2008-2009 financial crises.

This paper presents a novel way of hedging inflation without having to use inflation linked securities or other kind of derivatives through the transposition of a classic portfolio insurance strategy called CPPI. The Dynamic Inflation Hedging Strategy offers the promise of an implicitly guaranteed real par value for the portfolio whilst also delivering real returns at a much lower cost than comparative inflation-linked strategies would offer. The first empirical backtesting results of the potential of the DIHTS obtained for a set of US data have showed encouraging results. With conservative parameter choice, the strategy delivers on its promises and never breaks the floor at any investment horizon and for any of the thousands of overlapping periods tested. The strategy is able to save the par value in rough markets conditions and delivers strong real performance in more auspicious ones.

In the light of the results obtained by running a simulation exercise using a bootstrapping method with all the caveats before mentioned, we can reasonably uphold the rather optimistic results obtained in the historical simulation back-testing as we are able to prove a significant outperformance of the DIHTS over its benchmark in term of rate of failure for horizons of five to seven years, whilst it unfortunately suffers greater losses for longer targeted maturities. Contrary to our first estimation, the bootstrapping simulation exercises shows that the DIHTS can fail in cases of extremely adverse scenari, the like of which we have never seen before though.

Further work on this subject might involve taking on the most severe caveat of this study: the absence of trading cost. The exceptionally strong performance of the strategy clearly

demonstrates the need to take them into account in a realistic way. It is an especially difficult problem since the length of the period studied would force the use of time varying trading cost as markets have evolved dramatically in recent times, especially since the early nineties in terms of liquidity and trading costs. Another aspect that could be envisaged would be to run the experiment on better simulation universes if they were to materialize since the back-testing bootstrapping techniques suffer from important caveats. It is especially important as the period studied in the historical simulation involves mostly decreasing inflation and risk premiums which tend to bias upward our results. Eventually, it could also be possible to enhance the allocation by incorporating more advanced models into the framework or using predictive allocation variables to market-time the alternative asset classes. The breakdown of the general asset classes we are investing on into more subtle sub-indexes might also yield enhanced performance in term of tracking error of the CPI.

To conclude, this paper does successfully prove that transposing systematic trading rules to achieve a real portfolio insurance through the use of the DIHTS is both feasible and generates higher real returns than a classic portfolio approach benchmark would. The framework developed here is also sufficiently flexible to allow for asset managers input in term of tactical allocation for the diversified part of the portfolio. Obviously, the strategy would still suffer from the main shortfall of the CPPI, as it only insures a hedge up to a certain level of negative performance. The gain in term of real return come at a cost: there is "no free lunch" for "black swans".

## References

- Amenc, Noël, Lionel Martellini, and Volker Ziemann. "Inflation-Hedging Properties of Real Assets and Implications for Asset-Liability Management." *Journal of Portfolio Management*, 2009: Summer 2009, Vol. 35, No. 4: pp. 94-110.
- Ang, A., G Bekaert, and M Wei. "The term structure of real rates and expected inflation." *Journal of Finance*, 2008: 63, p797-849.
- Attié, Alexander P, and Shaun K Roache. "Inflation Hedging for Long-Term Investors." *IMF Working Paper*, April 2009.
- Barclays Capital Research. "Dividend Swap Indices, Access to equity income streams made easy." *Analysts Index Products Research*. April 2008.
- Black, Fischer, and Robert Jones. "Simplifying portfolio insurance." *Journal of Portfolio Management* 14, no. 1 (Fall 1987): p48-51.
- Bodie, Zvi. "Common Stocks as a Hedge Against Inflation." *The Journal of Finance*, May 1976: VOL. XXXI, NO. 2.
- Bodie, Zvi. "Inflation, index-linked bonds, and asset allocation." *Journal of Portfolio Management* Vol. 16, no. Issue 2 (Winter 1990): p48-53.
- Bodie, Zvie. "Commodity futures as a hedge against inflation." *The Journal of Portfolio Management*, Spring 1983: Vol. 9, No. 3: pp. 12-17.
- Brennan, Michael J., and Yihong Xia. "Dynamic Asset Allocation under Inflation." *The Journal of Finance*, 2002: 1201-1238.
- Brière, Marie & Signori, Ombretta. "Inflation-hedging portfolios in Different Regimes." *Working Papers, Université Libre de Bruxelles*, 2009: CEB 09-047.RS, ULB.
- Brière, Marie, and Ombretta Signori. "Inflation-hedging portfolios in Different Regimes." *Working Paper*. 2010.
- D'Amico, S, D Kim, and M Wei. "Tips from TIPS: The informational content of Treasury Inflation-Protected Security prices." *Federal Reserve Board, Working Paper*, 2009.
- Fisher, Irvine. *The Rate of Interest*. New York: Macmillan, 1907.
- Leland, Hayne E. "Who Should Buy Portfolio Insurance?" *The Journal of Finance* 35, no. 2 (Mai 1980).
- Leland, Hayne E., and Mark Rubinstein. "Replicating Options with Positions in Stocks and Cash." *Financial Analysts Journal*, 1981: 63-72.
- Newell, Graeme, and Chris Eves Lincoln. "The Role of U.S. Farmland in Real Estate Portfolios." *Journal of Real Estate Portfolio Management*, 2009: 317-328.
- Park, Jeong Yun, Donald J. Mullineaux, and It-Keong Chew. "Are REITs Inflation Hedges?" *The Journal of Real Estate Finance and Economics*, 1990: 91-103.

- Perold, Andre F., and William F. Sharpe. "Dynamic Strategies for Asset Allocation." *Financial Analyst Journal*, 1988: 16-27.
- Politis, Dimitris N., and Halbert White. "Automatic Block-Length Selection for the Dependent Bootstrap." *Econometric Reviews* Vol. 23, no. Issue 1 (Feb 2004): p53-70.
- Rubens, Jack H, Michael T Bond, and James R Webb. "The Inflation-Hedging Effectiveness of Real Estate." *Journal of Real Estate Research*, 2009: 45-55.
- Van den Goorbergh, Rob., Onno. W. Steenbeek, R. Molenaar, and Peter Vlaar. "Risk Models after the Credit Crisis." *SSRN Working Paper Series*, December 2009.
- Washburn, Courtland L., and Clark S. Binkley. "Do Forest Assets Hedge Inflation?" *Land Economics*, 1993: 215-224 .
- Zvie, Bodie. "Commodity futures as a hedge against inflation." *The Journal of Portfolio Management*, Spring 1983: Vol. 9, No. 3: pp. 12-17.



# OPTION MARKET OVERREACTION TO STOCK PRICE CHANGES

Eric Gettleman<sup>1</sup>, Brandon Julio, Ph.D.<sup>2</sup>, Elizabeth A. Risik, Ph.D.<sup>3</sup>

<sup>1</sup> Chesapeake Partners

<sup>2</sup> London Business School

<sup>3</sup> Webster University

**Abstract.** *In this paper we examine the relationship between implied volatility of individual stocks in the S&P 100 and the ex-post realized volatility of these stocks following weekly movements of at least 10 percent in the underlying stock prices. When conditioning on these extreme stock price events, we find that the implied volatility is significantly higher than the realized volatility. Furthermore, we are able to construct profitable trading strategies based on this finding. These strategies are successful both in event and calendar time.*

**Keywords:** *Investments, Options, Behavioral Investments, Behavioral Finance, Asset Pricing*

## Introduction

*“Jefferies shares slumped as much as 20% earlier as traders are jittery about the investment bank’s exposure to euro-zone sovereign debt.... Traders are piling into opening put positions.... Jefferies’ 30-day implied volatility...has jumped 57% to 142, by far the highest in at least two years.” – Wall Street Journal, November 11, 2011 (<http://www.wsj.com>)*

*“Rumors that eBay, Inc. could face new competition from Google, Inc. sent investors scurrying to the options market.... Not the kind to wait for confirmation...investors had already focused in on eBay’s short-term puts as they weighed what the news could do to the Internet auctioneer’s stock. More than twice as many puts traded Tuesday than on an average day in the preceding three weeks.” – Wall Street Journal, October 26, 2005 (<http://www.wsj.com>)*

*“Even before trading costs are imposed, systematically writing stock options does not appear to generate abnormal gains.” – Bollen and Whaley 2004*

There is evidence in the literature that investors misreact in the option market. Stein (1989) first documented this misreaction, and more recently, Poteshman (2001) showed that option investors overreact in the long term and underreact in the short term. Anecdotal evidence suggests that investors turn to the option market to act rapidly on pressing information. If that is indeed the case, it seems that there should be a systematic way to generate profits in the option market based on investor behavior. Bollen and Whaley (2004) found that there is no way of systematically obtaining such profits by writing stock options on individual stocks (even before trading costs). Our results stand in contrast to theirs in that we are able to find significant trading profits in writing options. The reason for the difference in results is how we partition the individual stocks. Unconditionally writing puts and calls on stocks, we find results similar to theirs (although on a larger scale – we examine all the individual stocks in the S&P 100 while they look at the 20 stocks with the most actively traded options). When conditioning on recent stock price performance, however, we find that after large stock price drops, the strategy of writing put options systematically provides profits for the investor. Following sharp stock price declines

(of at least 10 percent), there is a statistically significant difference between the implied volatility of options (in particular, out-of-the-money puts) on that stock and the ex-post realized volatility of the stock. Examining short-term out-of-the-money puts, we find that following a five-day stock price drop of at least 10 percent, implied volatility is on average 25 percent higher than the realized volatility on the underlying stock over the remaining life of the option. This large difference leads us to construct two profitable trading strategies, earning returns of between 15 percent and 18 percent over a 30-day period.

Our paper provides two significant contributions to the literature. First, we extend the similar work of Amin, Coval and Seyhun (2004) on index options to individual stocks, providing evidence of overpricing of individual options following movements in the underlying. This overpricing is evidence of investor overreaction to recent information, whereas most prior literature has found option market overreaction only in the long term. Secondly, we create simple trading strategies, which in contrast to much of the existing literature, show that there is a systematic way to profit from writing individual stock options and hedging. One possible exception to this is the work of Goyal and Saretto (2009), who find significant profits from a long-short portfolio of individual options, conditioning on the difference between historical and implied volatilities. There are some significant differences between their work and ours. We condition on an event in the stock market, not the option market, and examine the impact this has on option prices. We restrict our sample to options on the largest 100 firms, rather than all firms meeting liquidity criteria. This likely biases against our finding significant results, as the largest firms with the most liquid securities should be the least likely to show evidence of mispricing. Our strategy also has a better reward-to-risk ratio, with a Sharpe ratio of 1.00 to Goyal and Saretto's 0.73. Our work extends theirs in one interesting way: they suggest that option mispricing may be an overreaction to extreme stock returns—exactly what this paper shows.

While there is no definite explanation of why we find mispricing and are able to profit from it, anecdotal evidence suggests that following sharp price declines unsophisticated investors may panic. In panicking, these investors buy out-of-the-money puts on the stocks they own as insurance, causing the implied volatility of those options to rise, usually to levels higher than the volatility eventually realized by the underlying stock. We implicitly assume limits to arbitrage, which cause demand to have an impact on option prices, as modeled by Garleanu, Pedersen and Poteshman (2009). This allows sophisticated investors to sell out-of-the-money puts on those stocks and delta-hedge, realizing significant profits. This set of events leads us to three testable hypotheses. First, following a sharp price decline, implied volatility should be higher than ex-post realized volatility. Secondly, the steeper the drop, the higher the difference between implied and realized volatility should be. Third, the implied volatility of these options should be higher than that of a control sample. We find strong evidence for all of these hypotheses.

The remainder of the paper is organized as follows: Section 2 provides a summary of the existing literature and how our research contributes. Section 3 describes our data and methodology. Section 4 provides our main results relating to volatility. Section 5 details our trading strategies. We provide a summary and conclude in section 6.

## Related Literature

Misreaction in the option market was first documented by Stein in 1989. He finds that there is overreaction in long-term options relative to short-term options. When short-term S&P 100 index options' implied volatility moves, long-term options' implied volatility moves the same amount. Since implied volatility follows a mean-reverting process, it should be the case that the long-term options' implied volatility moves less than that of short-term options. The cause of this mispricing is investor overreaction to new information. Poteshman (2001) documents both longer-term overreaction and shorter-term underreaction in the option market. Our paper adds to this string of research by providing evidence of overreaction to a specific type of information, and linking this overreaction to the stock market. It is also notable that we see this overreaction in the short term, which has not been documented before.

We take as given the relatively new idea that demand is instrumental in option pricing. This literature begins with Bollen and Whaley (2004), who show how investor demand affects the steepness of the implied volatility function of S&P 500 index options and 20 individual stock options. First, the authors document the differences between implied volatility smiles of index options versus individual options. Index smiles monotonically decrease, whereas individual smiles are more symmetric. They also document that demand for puts is dominant in the market for index options, while demand for calls is dominant in the market for individual stock options. Thus, since the demand mechanisms and volatility functions are different for index versus individual options, we may expect different findings for those two categories. For both types of option, the authors find evidence against the null hypothesis modeled by Black-Scholes where demand has no effect on option prices due to a horizontal supply curve. Their evidence suggests that limits to arbitrage lead to demand affecting the shape of the IVF, and therefore the prices of options. The authors also construct a simulated trading strategy in which options are sold and delta-hedged using underlying securities. Before transactions costs, the strategies using index options are profitable, but those using individual stock options are not.

Further evidence that demand determines the price of options is presented in the work of Garleanu, Pedersen and Poteshman (2009). The authors develop a microstructure model showing how the demand of an option affects the prices and skews of that option and other options. In particular, the effect on price from an increase in demand is proportional to the unhedgeable part of that option. The effect on another option's price is proportional to the covariance of the unhedgeable parts of the two options. The authors have a unique dataset containing direct data on demand, and they define net demand as the sum of long open interest minus the sum of short open interest for each investor category. Regressions of daily excess implied volatility, measured as the difference between Black-Scholes implied volatility and historical 60 day volatility (or realized ex-post volatility, or GARCH(1,1)) on net demand produce a positive and statistically significant coefficient. Regressions of excess implied volatility skew on skewness in net demand also produce significantly positive coefficients. Excess implied volatility skew is defined as the average implied volatility from low moneyness options minus that from options with moneyness close to one, with moneyness equal to strike price divided by stock price. The authors are, however, silent on the causes of demand. This is where our paper fits in. Garleanu, Pedersen, and Poteshman provide the theoretical basis for our paper, and we extend their research by identifying a possible demand driver and showing its effect on individual option prices.

Our paper is closely related to Amin, Coval, and Seyhun (2004). Focusing solely on S&P 100 index options, their paper examines the relationship between momentum in stock prices and option prices, with demand being the mechanism that links stock price to option price movements. Two main

tests are conducted. The first is an examination of American option put-call parity violations. The authors find that 60-day stock price changes of 5 percent (-5 percent) or more (less) significantly increase the probability that parity will be violated due to high-priced calls (puts). The second test compares the Black-Scholes implied volatility spread between calls and puts following 60-day stock market increases or decreases. They find that following stock market increases, calls become overpriced relative to puts, and following stock market decreases, puts become overpriced relative to calls. Regressions of volatility spread on past stock returns produce positive coefficients. The authors also find that the steepness of the volatility smile is greater following stock market decreases than increases, for both calls and puts. The spirit of our paper is quite similar. However, our paper differs from, and adds to, this research in two important ways. First, we look at the individual equity options that make up the S&P 100, rather than options on the index itself. Second, we look at much shorter and more extreme stock price changes. Thus, we are not focusing on momentum, but rather overreaction to extreme information in the short term.

Several papers provide evidence on the expensiveness of put options on the S&P indices. Coval and Shumway (2001) show that the expected returns of puts are negative, while the expected returns of calls are positive. Bondarenko (2003) generalizes the martingale restriction of the CAPM and the model of Rubinstein (1976) to include an entire class of models. This more general restriction holds even with sample biases and incorrect beliefs of investors. However, put option prices are still too high to be rationally explained. We provide evidence that given a recent sharp decline in stock price, put options on individual equities also become overpriced.

In summary, our contributions to the existing literature are twofold. We extend the work of Coval and Shumway (2001), Amin, Coval, and Seyhun (2004) and Bondarenko (2003) on index options to the market for options on individual stocks. We provide evidence on the overpricing of individual equity options, as well as short-term investor overreaction in the options market to stock price changes. We extend the work of Bollen and Whaley (2004) and Goyal and Saretto (2009) in terms of trading strategies. Following the methodology of Bollen and Whaley, we find that after conditioning on past stock returns, a strategy of selling individual stock options and delta hedging is profitable before trading costs, whereas they did not find any significant profits without said conditioning. Thus, we show that investors consistently overreact in the options market for individual stocks, and this overreaction can be taken advantage of via an appropriate trading strategy.

## Data And Methodology

Our empirical tests involve options on S&P 100 stocks from 1996 to 2004. Using these stocks will reduce problems from small stock biases and liquidity issues. Option data are obtained from Ivy DB OptionMetrics. This database includes implied volatilities, which are computed using a binomial tree that incorporates the early exercise feature (individual equity options are American options). We also use this dataset for bid and offer option prices, exercise prices, maturity dates, volume, and option deltas. Each option we use must have a positive volume, positive implied volatility, and a best bid price greater than \$0.24. We obtain stock prices from the CRSP database, and require that prices be available every day while a position is open for the purpose of computing holding returns and realized volatilities. We define moneyness as strike price divided by stock price; deepest out-of-the-money puts (in-the-money calls) have moneyness less than 0.85, at-the-money options have moneyness between 0.95 and 1.05, and deepest in-the-money puts (out-of-the-money calls) have moneyness greater than 1.15. For robustness, we also conduct our analysis using option delta as moneyness. We sort options according to

moneyness category and days to maturity. Our analysis is performed using the averages of implied volatility and expensiveness for each moneyness/maturity combination.

We perform our analysis in event time, an event being a stock price change of greater than 10 percent or greater than 20 percent in either direction during a five-day window. To avoid counting the same event twice, we require that no event has occurred in the prior five days. Our measure of expensiveness is the Black-Scholes implied volatility minus the ex-post realized volatility of the underlying stock over the remaining life of the option. We compare this measure across moneyness categories, holding maturity constant. Our hypothesis is that, due to demand pressure sparked by a steep stock price decline, out-of-the-money puts will become overpriced. We also expect that a steeper stock price drop will result in more pronounced put overpricing. Since the volatility implied by the Black-Scholes formula is not an ideal measure, we do not focus on absolute magnitudes, but rather employ three benchmarks. The first is to look at the difference in expensiveness following a stock price increase and decrease of the same percentage (i.e., 10 percent or 20 percent), and the second is to look at two different levels of drops and increases (i.e., a 10 percent drop (increase) versus a 20 percent drop (increase)). The third is a control sample which excludes any options which have a stock price event in the previous five days.

## **Main Volatility Results**

The first results in this paper relate to the difference between implied volatility of an option and the realized volatility of its underlying following underlying stock price movements. This is our measure of expensiveness. Since implied volatility is a forward-looking measure, the most appropriate comparison is with the ex-post realized volatility for the remaining life of the option, rather than historical volatility measures. We find that implied volatility is driven up very high following extreme stock price movements—in fact, it is too high, since the actual realized volatility turns out to be much lower in truth.

Table 1: Unconditional Implied Volatilities

Moneyiness (X/S)	<0.85	0.85-0.95	0.95-1.05	1.05-1.15	>1.15
<b>Panel A: Calls</b>					
<31 Days To Maturity	0.713	0.398	0.314	0.398	0.611
31-61 Days To Maturity	0.512	0.354	0.304	0.341	0.481
61-91 Days To Maturity	0.458	0.337	0.296	0.315	0.427
>91 Days To Maturity	0.400	0.327	0.299	0.297	0.358
<b>Panel B: Puts</b>					
<31 Days To Maturity	0.744	0.450	0.323	0.370	0.620
31-61 Days To Maturity	0.561	0.380	0.310	0.331	0.477
61-91 Days To Maturity	0.493	0.351	0.304	0.318	0.423
>91 Days To Maturity	0.406	0.325	0.305	0.311	0.366

*Implied volatilities are reported, without conditioning on prior stock returns. Call and put options are sorted by moneyiness and days to maturity. Moneyiness is defined as strike price divided by stock price.*

Table 2: Implied Volatilities Following Extreme 5-Day Returns (+/-10%)

Moneyiness (X/S)	<0.85	0.85-0.95	0.95-1.05	1.05-1.15	>1.15
<b>Panel A: Calls After At Least 10% Return</b>					
<31 Days To Maturity	0.826	0.542	0.481	0.527	0.679
31-61 Days To Maturity	0.644	0.486	0.458	0.472	0.594
61-91 Days To Maturity	0.589	0.465	0.450	0.452	0.537
>91 Days To Maturity	0.529	0.456	0.441	0.440	0.492
<b>Panel B: Calls After At Most -10% Return</b>					
<31 Days To Maturity	0.998	0.649	0.578	0.599	0.750
31-61 Days To Maturity	0.737	0.572	0.532	0.520	0.623
61-91 Days To Maturity	0.664	0.522	0.496	0.486	0.547
<b>Panel B: Calls After At Most -10% Return</b>					

>91 Days To Maturity	0.591	0.501	0.484	0.469	0.503
----------------------	-------	-------	-------	-------	-------

---

**Panel C: Puts After At Least 10% Return**

---

<b>&lt;31 Days To Maturity</b>	0.793	0.570	0.500	0.536	0.758
--------------------------------	-------	-------	-------	-------	-------

---

**Panel C: Puts After At Least 10% Return**

---

31-61 Days To Maturity	0.664	0.505	0.468	0.483	0.605
61-91 Days To Maturity	0.603	0.479	0.457	0.463	0.577
>91 Days To Maturity	0.545	0.458	0.446	0.457	0.523

---

**Panel D: Puts After At Most -10% Return**

---

<b>&lt;31 Days To Maturity</b>	0.907	0.647	0.551	0.550	0.817
31-61 Days To Maturity	0.751	0.575	0.522	0.516	0.648
61-91 Days To Maturity	0.677	0.520	0.489	0.482	0.579
>91 Days To Maturity	0.591	0.487	0.477	0.463	0.524

---

*Implied volatilities are reported conditioned on a prior 5-day stock return of at least 10 percent in magnitude. Call and put options are sorted by moneyness and days to maturity. Moneyness is defined as strike price divided by stock price.*

Unconditional implied volatilities are presented in Table 1. This table provides a base case against which to compare our conditional results. These implied volatilities are in line with those reported by previous studies, and show the typical volatility smile, which is steeper for shorter maturity options. Table 2 reports implied volatilities conditional on stock price events of at least 10 percent in magnitude. After such an event, all of the implied volatilities are higher than the unconditional implied volatilities. Negative price movements appear to have a larger impact on implied volatilities than do positive price movements, although there is a caveat that the price events may not be of the same magnitudes on either side. Table 3 reports similar findings, this time conditioning on even more extreme stock price movements of at least 20 percent in magnitude. As expected, the implied volatilities shoot up even higher.

Table 3: Implied Volatility Minus Realized Volatility Following Extreme 5-Day Returns (+/-10%)

Moneyiness (X/S)	<0.85	0.85-0.95	0.95-1.05	1.05-1.15	>1.15
<b>Panel A: Calls After At Least 10% Return</b>					
<31 Days To Maturity	0.261	-0.017	-0.068	-0.056	0.029
31-61 Days To Maturity	0.107	-0.040	-0.056	-0.062	-0.010
61-91 Days To Maturity	0.029	-0.074	-0.091	-0.096	-0.034
>91 Days To Maturity	-0.008	-0.090	-0.086	-0.092	-0.050
<b>Panel B: Calls After At Most -10% Return</b>					
<31 Days To Maturity	0.296	0.028	-0.058	-0.057	0.026
31-61 Days To Maturity	0.139	0.004	-0.072	-0.080	-0.023
61-91 Days To Maturity	0.085	-0.014	-0.085	-0.101	-0.058
>91 Days To Maturity	0.029	-0.073	-0.100	-0.101	-0.079
<b>Panel C: Puts After At Least 10% Return</b>					
<31 Days To Maturity	0.176	0.004	-0.053	-0.025	0.141
31-61 Days To Maturity	0.102	-0.026	-0.036	-0.056	0.022
61-91 Days To Maturity	0.031	-0.049	-0.071	-0.073	0.005
>91 Days To Maturity	0.026	-0.058	-0.059	-0.071	-0.013
<b>Panel D: Puts After At Most -10% Return</b>					
<31 Days To Maturity	0.253	0.038	-0.046	-0.053	0.164
31-61 Days To Maturity	0.144	0.003	-0.063	-0.056	0.047
61-91 Days To Maturity	0.114	-0.031	-0.069	-0.112	-0.009
>91 Days To Maturity	0.051	-0.069	-0.087	-0.080	-0.052

This table shows our measure of expensiveness of options, conditioned on a prior 5-day stock return of at least 10 percent in magnitude. A positive number indicates an overpriced option. Moneyiness is defined as strike price divided by stock price. Implied volatility is from OptionMetrics, and is calculated using a binomial model. Realized volatility is the stock's volatility

over the remaining life of the option following an extreme stock price movement. It is calculated as  $rv = \sum_{i=1}^N \sqrt{252 * R_i^2}$ , where  $R_i$  is the daily stock return, and  $i$  indexes the stocks in the sample which have met the prior 5-day return requirements.



High implied volatilities on their own do not imply overpricing. Table 4 compares these implied volatilities to the volatilities actually realized over the remaining life of the options. Since implied volatility is supposed to be a predictor of the ex-post volatility, it is interesting to see how far off it actually is following these stock price events. Following a stock price decrease of at least 10 percent, short-term out-of-the-money puts have an implied volatility which is 25.3 percent higher than the actual realized volatility. Following at least a 20 percent drop, this difference increases to 27.5 percent.

Table 4: Unconditional Implied Volatility Minus Realized Volatility

Moneyiness (X/S)	<0.85	0.85-0.95	0.95-1.05	1.05-1.15	>1.15
<b>Panel A: Calls</b>					
<31 Days To Maturity	0.251	-0.088	-0.180	-0.125	-0.007
31-61 Days To Maturity	0.048	-0.138	-0.208	-0.200	-0.067
61-91 Days To Maturity	-0.002	-0.131	-0.190	-0.173	-0.072
>91 Days To Maturity	-0.074	-0.183	-0.219	-0.220	-0.138
Average	0.056	-0.135	-0.199	-0.179	-0.071
<b>Panel B: Puts</b>					
<31 Days To Maturity	0.161	-0.013	-0.169	-0.106	0.108
31-61 Days To Maturity	0.078	-0.106	-0.198	-0.157	-0.016
61-91 Days To Maturity	0.023	-0.110	-0.169	-0.142	-0.019
>91 Days To Maturity	-0.046	-0.156	-0.188	-0.170	-0.073
Average	0.054	-0.096	-0.181	-0.144	0.000

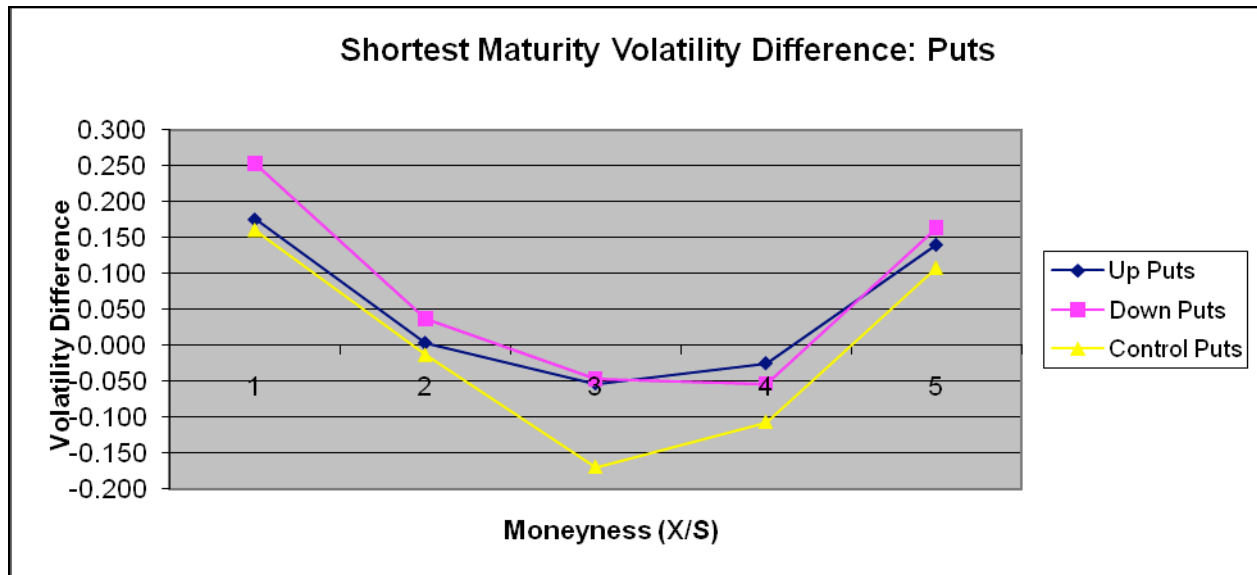
*This table shows our measure of expensiveness of options, unconditionally. A positive number indicates an overpriced option. Moneyiness is defined as strike price divided by stock price. Implied volatility is from OptionMetrics, and is calculated using a binomial model. Realized volatility is the stock's volatility over the remaining life of the option following an extreme stock price movement. It is calculated as  $rv = \sum_{i=1}^N \sqrt{252 * R_i^2}$ , where  $R_i$  is the daily stock return, and  $i$  indexes the stocks in the sample.*

As a benchmark, these numbers can be compared to the average unconditional volatility differences for short term puts of 16.1 percent, reported in Table 4. The volatility difference for short-term, out-of-the-money puts following the 10 percent stock price drop is about twice as high as it is unconditionally, and

this difference is significant at the 5 percent level (t-statistic 2.27). It should be noted that while this volatility difference is most pronounced for short-term out-of-the-money put options, it remains positive across all moneyness categories and all maturities, as well as for calls (following the 10 percent minimum drop). It is also striking that following 10 percent and 20 percent minimum increases in stock price, there is a significant difference between implied and realized volatility as well. The relationship between volatility differences following 10 percent decreases, 10 percent increases and without conditioning upon stock price changes can be seen in Figure 1.

Figure 1: Shortest Maturity Volatility Difference

### When Absolute Return Is Greater Than 10%: Puts



While there are many possible explanations for the observed relationship, we believe that the likely reason for the “negative shock” graph in Figure 1 being highest is that following stock decreases, people tend to panic, and their increased demand drives the put prices (and by put-call parity, the call prices) up too high. This theory is supported by data on trading volume, which are shown in Figure 2. This figure shows the number of short-term, out-of-the-money put options traded on a daily basis surrounding a five-day stock price decrease of 10 percent. In the figure, Day 0 corresponds to the trading day after the five-day stock price drop has been recorded. The figure is consistent with the fact that our choice of five days for a stock price event is somewhat arbitrary, but is a reasonable timeframe. We can see that the volume increases sharply at Day -2, and stays high for several more days before tapering off. As for a positive shock, following a sharp price increase, investors may become too exuberant, pushing the price of calls too high in an attempt to lever up their investments. This investor overreaction helps explain why following stock price movements, there is an increased difference between realized and implied volatilities. It also helps explain why this difference increases the sharper is the stock price movement—investors simply tend to panic (or conversely, get excited) more as movement increases.

Given the large magnitude of these differences, and hence the expensiveness of options, the natural question which arises is how sophisticated investors can systematically take advantage of this overreaction in the option market. This leads us to the next section, which focuses on trading strategies.

## Trading Strategies

A good question to ask when hearing about security mispricing is, “Can I profit from this?” In this section, we construct trading strategies which take advantage of the overpriced, short-maturity, out-of-the-money puts. We follow the general methodology of Bollen and Whaley (2004) in order to be able to compare our results to theirs. We find that when conditioning the strategy on prior stock price performance, we find statistically significant profits (before trading costs) from selling the overpriced puts and delta-hedging daily until the option’s expiration date, and from variations on this strategy.

From the results reported in the previous section, we see that the most extreme overpricing of puts occurs in the shortest maturity, deepest out-of-the-money options. The anecdotal evidence from the Wall Street Journal also points us in the direction of the shortest maturity options. These will also have the fewest liquidity problems. For these reasons, this is where we focus our strategy—we use options with 30 days or less left to maturity and moneyness (strike divided by stock price) of 0.85 or less. The average position is held for 15 days, so we also present returns rescaled on a monthly basis for purposes of comparison. We adjust for the dividends paid during the time the position is held, and use the one-month Treasury bill rate as the risk-free rate. We condition on stock market movements in the following way: we open a position only after observing a five-day drop of 10 percent or more in a stock’s price. As before, to avoid double counting, we do not allow more than one stock price event to occur in any five-day period.

In our first strategy, we sell the overpriced puts at the bid-ask midpoint and delta-hedge the position on a daily basis once an event is observed. The returns to this strategy are computed according to the following formula:

$$(1) \quad RET = \frac{|\Delta_0|(S_0 e^{rT} - S_T - \sum_{t=0}^T D_t e^{r(T-t)}) + (p_0 e^{rT} - p_T) + \sum_{t=0}^T |\Delta_t|(S_t - S_{t+1} - D_t) e^{r(T-t)}}{|\Delta_0|S_0 + p_0}$$

where  $\Delta_t$  is the option delta on date  $t$ ,  $S_t$  is the closing price of the stock on date  $t$ ,  $D_t$  is the dividend paid on the stock at date  $t$ ,  $p_0$  is the price of the option on the date the position is opened,  $p_T$  is the greater of zero or the strike price of the option minus the stock price on the expiration date of the option, and  $r$  is the risk-free rate. Since we are selling both the puts and the stock, there is no initial outlay; instead, there is an inflow. So, the returns to the trading strategy can be interpreted as the amount of the initial inflow that we get to keep after the positions are closed out.

Table 5: Trading Strategy Results

(A)	(B)	(C)
Strategy 1:	Strategy 2:	Strategy 3:
Sell put at bid-ask midpoint, daily delta-hedge	Sell put at bid, daily delta-hedge	Sell put at bid, initial delta hedge only
<b>Panel A: Conditional on Stock Price Drop</b>		

\$ per transaction	\$0.81 (11.23)	\$0.77 (10.54)	\$0.27 (4.99)
% per transaction	11.88% (10.84)	11.02% (9.90)	3.45% (4.53)
30-day %	17.12% (10.99)	15.91% (10.10)	4.81% (4.24)

**Panel B: Control Sample**

\$ per transaction	\$0.42 (2.74)	\$0.37 (2.39)	\$0.31 (3.14)
% per transaction	6.57% (3.78)	5.74% (3.29)	4.05% (3.51)
30-day %	8.96% (4.39)	7.97% (3.89)	5.69% (4.14)

*This table shows the profits generated by three trading strategies. Panel A presents results conditional on stock price movements. For all three strategies, positions are only opened after a stock price decrease of at least 10 percent. Panel B presents results from the control sample. Strategy 1 sells puts at the bid-ask midpoints and delta hedges, adjusting the hedge on a daily basis. Strategy 2 is the same as Strategy 1, except puts are sold at the bid price. Strategy 3 sells puts at the bid price and delta hedges when the position is opened, and does not adjust the delta hedge. The first row shows the average profit per position, the second row shows the returns to the strategy, which are interpreted as the percentage of the initial inflow the investor ultimately keeps, and the third row adjusts the returns so they are on a monthly basis. T-statistics have not been corrected for cross-correlation, and so will actually be lower*

The first term in the numerator is the gain or loss from selling delta shares of the underlying at the time the position is opened, and holding those shares until the position is closed out at the expiration date of the option. The second term in the numerator is the gain or loss from selling the put and closing out the position at the expiration of the option. The third term of the numerator accounts for the daily gains or losses resulting from adjusting the delta hedge on a daily basis. The denominator simply gives us a way to scale and compare profits. As reported in Panel A of Table 5, the per transaction profit is \$0.81 (t-statistic 11.23), and the 30-day return to this strategy is 17.12 percent (t-statistic 10.99). The second strategy mirrors the first, but with the puts being sold at the bid price, rather than at the bid-ask midpoint. This takes into account the trading costs from selling the option. This strategy produces a per transaction profit of \$0.77 (t-statistic 10.54); the 30-day return is 15.91% (t-statistic 10.10). As a back-of-the-envelope calculation of trading costs on the stock, we assume that these hedging transactions are done in large amounts, and commissions on S&P 100 stocks are about \$0.05 per share. Since the average position is held for 15 days, and the average total number of shares sold is less than two, incorporating trading costs reduces our profits from \$0.77 to about \$0.67. Our third strategy is a way

around the costs of daily delta-hedging. In this strategy, we delta-hedge on the day the position is opened, and simply hold that stock position until the option expires. Thus, we significantly cut our transaction costs of delta-hedging. The returns to this strategy are calculated as follows:

$$(2) \quad RET = \frac{|\Delta_0|(S_0 e^{rT} - S_T - \sum_{t=0}^T D_t e^{r(T-t)}) + (p_0 e^{rT} - p_T)}{|\Delta_0|S_0 + p_0}$$

Here, all terms are defined as before. The only change in return computation is the omission of the term calculating mark-to-market gains and losses. The per-transaction profit to this strategy (before trading costs) is \$0.27 (t-statistic 4.99), and the 30-day return is 4.81 percent (t-statistic 4.24).

To verify that these returns are abnormal, we constructed a control sample and ran the same analysis. The control sample was constructed to exclude the options that are included in our main results. Thus, none of the positions held in the control sample strategy have experienced a stock price event in the previous five days. The positions that are opened were randomly chosen and have a similar sample size to the previous results. Results are reported in Panel B of Table 5. For strategies 1 and 2, the returns are about half that of the conditional strategy, and are not as strongly significant. Strategy 3 does not outperform the control sample. As another robustness check, we ran these strategies without opening any positions in the five days before option expiration with nearly identical results. We have also tested the strategies using delta to define moneyness, with similar results.

Table 6: Aggregate Results Per Company Per Open Date

	(A)	(B)	(C)
	Strategy 1:	Strategy 2:	Strategy 3:
	Sell put at bid-ask midpoint, daily delta-hedge	Sell put at bid, daily delta- hedge	Sell put at bid, initial delta hedge only
\$ per transaction	\$1.49 (7.38)	\$1.41 (7.07)	\$0.60 (3.28)
% per transaction	19.17% (9.22)	17.97% (8.63)	6.87% (4.07)
30-day %	32.49% (9.28)	30.51% (8.68)	12.80% (4.56)

*This table shows the profits generated by three trading strategies when our positions are aggregated by company. When a stock meets the prior return requirement, all that stock's puts (which meet selection criteria) are combined into a single short position. For all three strategies, positions are only opened after a stock price decrease of at least 10 percent. Strategy 1 sells puts at the bid-ask midpoints and delta hedges, adjusting the hedge on a daily basis. Strategy 2 is the same as Strategy 1, except puts are sold at the bid price. Strategy 3 sells puts at the bid price and delta hedges when the position is opened, and does not adjust the delta hedge. The first row shows the average profit per position, the second row shows the returns to the strategy, which are interpreted as the percentage of the initial inflow the investor ultimately keeps, and the third row adjusts the returns so they are on a monthly basis*

Next we address the problem of having non-independent observations, which comes from the fact that we have more than one option per stock for a given event day when we open a position. To adjust for this, we add together all the positions for a given company on a given position-open day. This means we now have one aggregate position per company, rather than several separate positions. As shown in Table 6, our returns to each strategy are higher. The t-statistics decrease but are still very high.

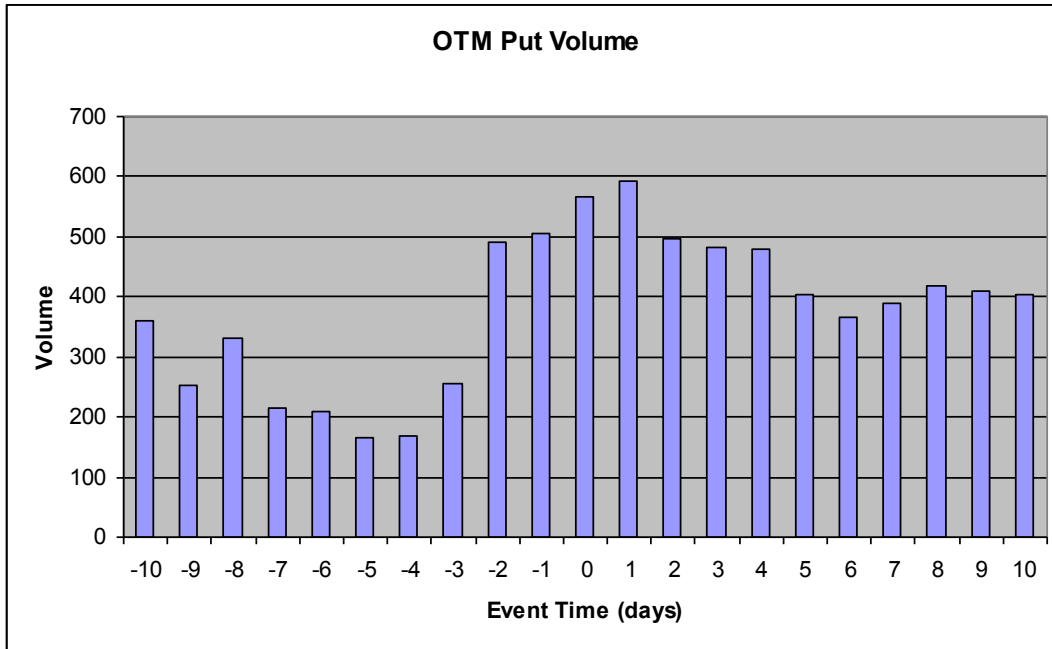
Table 7: Calendar-Time Strategy Results

	(A)	(B)	(C)
	Strategy 1: Sell put at bid-ask midpoint, daily delta-hedge	Strategy 2: Sell put at bid, daily delta- hedge	Strategy 3: Sell put at bid, initial delta hedge only
Monthly Return	10.50%	9.50%	4.03%
	(7.60)	(6.80)	(2.70)
Sharpe Ratio	1.00	0.88	0.35

*This table shows the monthly return to each of the three strategies when implemented in calendar time. For all three strategies, positions are only opened after a stock price decrease of at least 10 percent. Strategy 1 sells puts at the bid-ask midpoints and delta hedges, adjusting the hedge on a daily basis. Strategy 2 is the same as Strategy 1, except puts are sold at the bid price. Strategy 3 sells puts at the bid price and delta hedges when the position is opened, and does not adjust the delta hedge. The Sharpe ratio for each strategy is also presented, and t-statistics are shown in parentheses.*

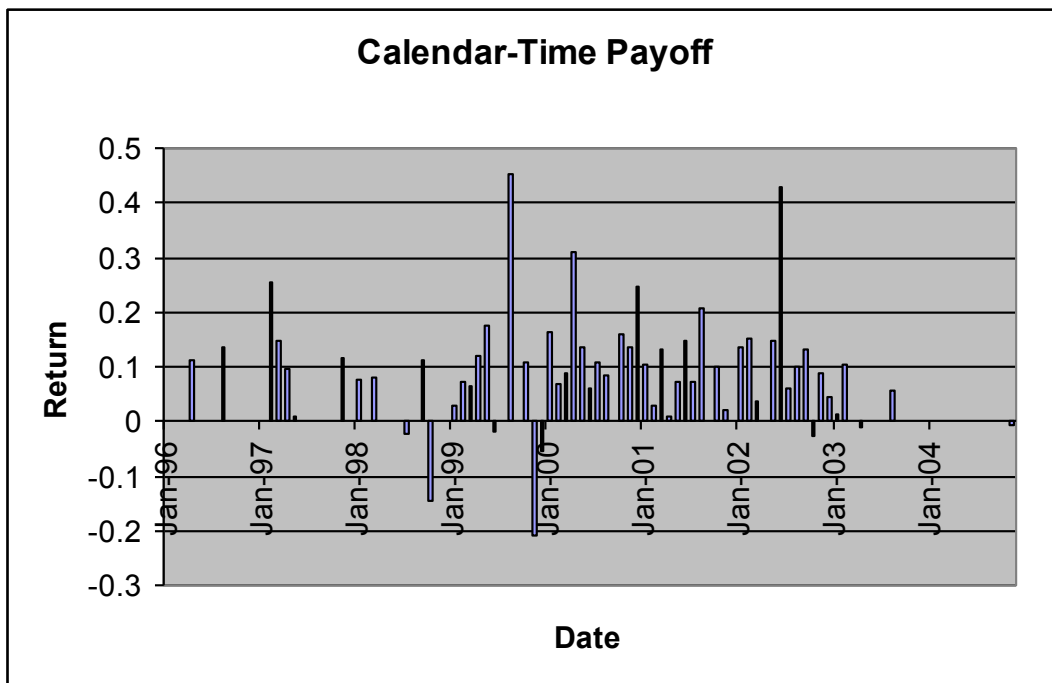
We also conduct our trading strategy in calendar time and find significantly positive returns. Doing this demonstrates that the strategy is implementable for a real-world investor. Results are reported in Table 7. When selling puts at the bid-ask midpoint, the strategy earns 10.5 percent per month (t-statistic 7.6), with a Sharpe ratio of 1.00. More realistically, when puts are sold at the bid price, the strategy earns 9.5 per month (t-statistic 6.8), with a Sharpe ratio of 0.89. Furthermore, Figure 3 shows that this strategy earns positive returns in nearly every month in which positions are held from 1996 to 2004.

Figure 2: Put Option Volume Around Extreme Stock Price Drops



*This figure shows number of short-term, out-of-the-money put contracts traded on a daily basis surrounding a 5-day stock price drop of at least 10 percent. Day 0 corresponds to the trading day after the 5-day price drop was recorded.*

Figure 3: Calendar-Time Trading Strategy Returns



Three-factor model regression results are shown in Table 8. When the dependent variable of the monthly return (selling at the bid) minus the risk-free rate is regressed on the three standard Fama-



French factors, it produces an alpha of 9.39 (t-statistic 7.24). In addition to positive average returns, we also find that our first two strategies earn a profit over 84 percent of the time, while the single delta-hedge strategy earns a profit over 63 percent of the time.

Table 8: Fama-French Three Factor Model Results

	Estimate	t-statistic
Alpha	9.39	7.24
MRP	-0.72	-2.32
SMB	0.10	0.35
HML	0.42	1.14

*This table reports the results of regressions of monthly calendar returns on the market risk premium, size factor and book-to-market factor. The dependent variable is the return from Strategy 2, where put options are sold at the bid price after a stock price decrease of at least 10 percent has been observed, and delta hedging is performed daily.*

## Summary And Conclusion

In this paper, we start by examining the difference between implied volatility and realized volatility of individual stocks in the S&P 100 following sharp price movements, as a method of determining the expensiveness of options. We find that following a stock price decrease of at least 10 percent, implied volatility of puts exceeds the ex-post realized volatility of the underlying stock by 25.3 percent. For a stock price drop of at least 20 percent, the volatility difference is 27.5 percent.

One possible explanation for this difference is that put options become overpriced following extreme recent stock price drops due to the demand generated by panicking investors. Following stock price increases, call options become similarly overpriced. The rationale here is that investors become overly excited following sharp price run-ups and buy calls to take advantage of further expected run-ups in stock prices.

Given the large difference between implied and realized volatilities, there should be a way to systematically profit from writing stock options. We examine three trading strategies. We follow the methodology of Bollen and Whaley (2004), with the exception that we confine our option sales to times following a significant stock drop (later work will include trading strategies following stock price increases). In their paper, Bollen and Whaley found that there was no way of systematically profiting from a trading strategy involving writing options. Our work shows that one can profit significantly from selling options, provided they do so following significant stock price movements.

Overall, our paper follows most closely in the spirit of Amin, Coval and Seyhun (2004) and Bollen and Whaley (2004). While the former examines index option prices following stock price movements, our paper complements it by doing similar work with individual stock options. The latter paper examines trading strategies (in addition to explaining how demand drives implied volatility) for both individual equities and the S&P 100 index. We find results which extend theirs by conditioning the

trading strategies on stock price movements. We are able to find a systematic way of profiting from selling individual stock options.

## References

- Amin, K., Coval, J., & Seyhun, H. (2004). Index Option Prices and Stock Market Momentum. *Journal of Business*, 77(4), 835-873.
- Barberis, N., Shleifer, A., & Vishny, R. (1998). A Model of Investor Sentiment. *Journal of Financial Economics*, 49(3), 307-343.
- Bates, D. (1991). The Crash of '87: Was It Expected? The Evidence From Options Markets. *The Journal of Finance*, 46(3), 1009-1044.
- Bates, D. (2000). Post '87 Crash Fears in the S&P 500 Futures Options Market. *Journal of Econometrics*, 94(1-2), 181-238.
- Black, F., & Scholes, M. (1973). The Pricing of Options and Corporate Liabilities. *Journal of Political Economy*, 81(3), 637-659.
- Bollen, N., & Whaley, R. (2004). Does Net Buying Pressure Affect the Shape of Implied Volatility Functions? *The Journal of Finance*, 59(2), 711-753.
- Bondarenko, O. (2003). *Why Are Put Options So Expensive?* Paper presented at the AFA 2004 San Diego Meetings, San Diego, CA.
- Coval, J., & Shumway, T. (2001). Expected Option Returns. *The Journal of Finance*, 56(3), 983-1009.
- De Long, J., Shleifer, A., Summers, L., & Waldmann, R. (1990). Noise Trader Risk in Financial Markets. *Journal of Political Economy*, 98(4), 703-738.
- Fama, E., & French, K. (1993). Common Risk Factors in the Returns on Stock and Bonds. *Journal of Financial Economics*, 33(1), 3-56.
- Figlewski, S. (1989). Option Arbitrage in Imperfect Markets. *The Journal of Finance*, 44(5), 1289-1311.
- Garleanu, N., Pedersen, L., & Poteshman, A. (2009). Demand-Based Option Pricing. *Review of Financial Studies*, 22(10), 4259-4299.
- Goyal, A., & Saretto, A. (2009). Cross-section of Option Returns and Volatility. *Journal of Financial Economics*, 94(2), 310-326.
- Hong, H., & Stein, J. (1999). A Unified Theory of Underreaction, Momentum Trading and Overreaction in Asset Markets. *The Journal of Finance*, 54(6), 2143-2184.
- Lakonishok, J., Lee, I., Pearson, N., & Poteshman, A. (2007). Option Market Activity. *Review of Financial Studies*, 20(3), 813-857.
- Lo, A., & Wang, J. (1995). Implementing Option Pricing Models When Asset Returns Are Predictable. *The Journal of Finance*, 50(1), 87-129.
- Poteshman, A. (2001). Underreaction, Overreaction, and Increasing Misreaction to Information in the Options Market. *The Journal of Finance*, 56(3), 851-876.
- Shleifer, A., & Vishny, R. (1997). The Limits of Arbitrage. *The Journal of Finance*, 52(1), 35-55.
- Stein, J. (1989). Overreactions in the Options Market. *The Journal of Finance*, 44(4), 1011-1023.

***Section 4:***  
***Miscellaneous Perspectives***

In the Name of God

## Legal Aspects of Project Finance in International Trade

Ali Rezaee<sup>1</sup>

<sup>1</sup>Shahid Beheshti University, Evin Tehran, Iran

**Abstract:** *Major investments in various projects are the essential needs of any country and project financing is treated as the most common methods of investment. Clarifying the concept of project finance, risk, contractual frameworks and agreements and disputes resolution constitute the matter of this paper. For this purpose, analysis this matter from different perspectives and in order to harmonize and improve of defects, suggestions and actual guidelines have been introduced.*

**Keywords:** *project finance, international trade, dispute settlement, foreign investment, comparative law.*

### 1. Introduction

While major investment in infrastructure projects is an urgent need for any country, governments are unable to provide the necessary capital to finance projects. In most cases, states that need to construction and infrastructure projects and at the same time, they don't have adequate capital and expertise for its implementation, trying to attract foreign investment in order to use from foreigners' technical knowledge and capital and by contrast, be the owner of the project, through exercising the right of preservation of foreign private sector. One of the ways in problem solving investment is project finance, which has been considered by countries especially developing countries. Because, the subject has apparent and hidden aspects that cannot be answered to all of them in this article, therefore, we have tried to review legal aspects of project finance on possible and to be analyzed from different perspectives.

## 2. General Overview

Since the subject matter of this paper is project finance, inevitably we must introduce some issues which are necessary to login to discuss. Thus, explain of the definition of project finance, background, characteristics, advantages and disadvantages of project finance, project participants and types of sources funding are issues which have been studied in this section.

### 2-1. Definition of Project Finance

There are several definitions of project finance. In fact, the concept of project finance is so dynamic, evolving, and extensive that introducing a comprehensive and concise definition is difficult. However, some writers presented relatively rational definitions which refer to some of them as follows.

1. “The term project finance is used to refer to a wide range of financing structures. However, these structures have one feature in common – the financing is not primarily dependent on the credit support of the sponsors or the value of the physical assets involved”. (Cliford, Chance 1991)
2. “Financing of the construction or development of a project where the lenders rely primarily on the expected cash flow generated by the operation of the project for repayment of their loans as well as for the value of the project’s assts” (Harold F. Moore and Evelyn D. Giaccio 1986)
3. “The term project finance is generally used to refer to a nonrecourse or limited recourse financing structure in which debt, equity and credit enhancement are combined for the construction and operation, or the refinancing of a particular facility in a capital- intensive industry, in which lenders base credit appraisals on the projected revenues from the operation of the facility, rather than the general assets or the credit of the sponsor of the facility, and rely on the assets of the facility, including any revenue-producing contracts and other cash flow generated by the facility, as collateral for the debt. In a project financing, the debt terms are not based on the sponsor’s credit support or on the value of the physical assets of the project. Rather, project performance, both technical and economic, is the nucleus of project finance” (Hoffman 2008)

## 2-2. Background of Project Finance

Project finance has experienced a strong surge in popularity in the last three decades, the largest increase having been that which took place in the 1990s. Although project finance only reappeared as a structure in the international project scene with the financing of North Sea oil projects in the late 1960s, its origins go far back in history. The merchants trading by sea in ancient Greece and Rome who were well acquainted with the dangers which storms and parties represented to their vessels, already knew the *fenus Nauticum* (Sea loan). In the other hand, Project finance is not a new invention. The ancient Greeks and Romans used instruments which resemble today's project finance, namely sea loans. (Anette Kavaleff 2002-2003). This *fenus nauticum* worked on the basis that a loan was advanced to the merchant for the purpose of purchasing goods on the outward voyage, which loan would only be repayable if the ship arrived safely at the home port with the cargo on board. (Cuthbert, Neil 2000) A more recent example of project finance is the construction of the Prussian railroad network in the mid- nineteenth century which was based on a law promulgated especially for this purpose. A further example of project financing is the construction of a tunnel in the Gotthard region of the Swiss alps at the beginning of the twenties century, and the present extension of this railroad network, known as the NETA (Neue Eisenbahnlpentransversale), due to be completed around 2016. A trend towards the privatization of traditionally government- controlled sectors such as water, electricity, air traffic control; waste treatment etc. has had s strong influence on the development of project finance as an approach to infrastructure financing. Developments in recent years confirm the assumption that project finance, despite its recent boom, still has an enormous potential both in terms of growth and development in the aim to satisfy the demand for financing solutions in the international markets. (Reinhard Leopold Klarmann 2003)

## 2-3. Characteristics, Advantages and Disadvantages

Although each Financing is especially designed to meet the requirements of a particular project, however, the following characteristics can enumerate to most project finance: origination and development of project through a separate and usually single purpose, financial and legal entity;

separation of the debt of the project company from the sponsors' direct obligations; maximizing the debt to equity leverage of the project by sponsors; projects assets and revenues are generally pledged as security for the lenders; and firm contractual commitments of various third parties represents significant components of the credit support for the project; Nonrecourse debt financing; off-balance-sheet debt treatment; leveraged debt; risk sharing, collateral limited to project assets are advantages and by contrast, complexity of risk allocation; increased lender risk; higher interest rates and fees; increased insurance coverage; lender supervision and lender reporting requirements are disadvantages of project finance. (Hoffman 2008)

#### 2-4. Project Participants

The structure of a project finance arrangement is often rendered rather complex due to the involvement of a multitude of parties, each with a particular role, working together towards the realization of the project. The aim of this section is to briefly introduce the main participants to project finance.

**Sponsor:** the sponsor is the party that organizes all of the other parties. He typically controls, and makes an equity investment in the company or other entity that owns the project.

**Project Company:** The project company is the entity that will own, develop, construct, operate and maintain the project. It is also referred to as the SPV, usually incorporated for the sole purpose of completing the project.

**Commercial Lender:** Commercial lenders, including banks, insurance companies, credit corporations and other lenders such as multilateral agencies, provide debt financing for projects.

**Host Government:** The host government is the government of the country in which the project is located.

**Suppliers:** Suppliers are companies supplying essential goods such as raw materials, fuel or other inputs and/or services in connection with a particular project.

**Output Purchaser:** Output Purchaser's commitment provides the credit support for the financing in most non- recourse and limited recourse projects.

**Construction Contractor:** Construction Contractor enters into a contract with the project company for the design, engineering and construction of the project.

**Operator:** The project operator is a specialized entity with practical experience successfully operating, maintaining and managing similar commercial enterprises.

**Consultants:** These parties are experts in various fields and in the first instance, are engaged by the sponsors to undertake due diligence for the benefit of the project lenders.

**The Other Participants:** Agent banks, technical experts and the parties of insurance contracts are the other participants in project finance.

## 2-5. Sources of Funding

Generally, the finance is usually divided into two portions, debt capital and equity, in the ratio of seventy to thirty percent or eighty to twenty percent, or any range in between. The difference between debt and equity ratios is usually significant in favor of debt since it is the cheaper form of finance. (Nagla Nassa 1999-2000). From the inception of the development process, sponsors will be minded continually to assess the availability and constitution of the likely sources of project capital. Since, the sources of funding are various; we just to mention some of them.

**Equity:** Sponsors wish to maximize their profits. In terms of equity capital, lenders typically require a sponsor or a third party equity participant to contribute a meaningful portion of the capital invested in the project.

**Equity Bridge Loans:** Sponsors may opt to meet their equity funding obligations by way of debt financing. This is known as an equity bridge financing. Loans are typically provided by commercial bank lenders.

**Subordinated Shareholder Debt:** Subordinated Shareholder Debt may serve as an alternative or a supplement to equity funding of the sponsors' contributions. Sponsor may prefer to make their contributions primarily in debt, rather than equity, for tax and corporate finance reasons. (John Dewar 2011)



**Mezzanine Debt:** Mezzanine debt provided by third-party, non equity investors at a higher rate of interests are not a common feature of project finance transaction. It can be used as a layer of finance between the equity deeply subordinated debt of the sponsors and senior debt in the capital structure of a project company.

**Bank Debt:** Most projects have been financed in the commercial bank market and in part, this is because commercial banks have substantial experience and appetite for cross-border financings.

**Islamic Project Finance:** More than one-fifth of the world's population practices the Islamic faith. In conjunction with the rapid growth in the wealth of many predominantly Muslim Middle Eastern and Asian countries, the project finance markets has been affected by an increasing amount of funds from Islamic state-owned investment fund, Islamic financial institutions, and individual Muslims who desire to conduct their commercial and financial activities in accordance with Islamic law. (Michael J. T. McMillen 2000-2001)

**Capital Markets:** Additional debt financing for a project may be obtained in the capital market.

**Bonds:** Bond issues are one of other methods for financing a project.

**Public Sector lenders in Project Financings:** The public sector funding sources compromise four categories: (1) export credit agencies and export and investment insurance agencies; (2) multilateral agencies; (3) bilateral and development finance agencies; and (4) domestic agencies. (John Dewar 2011)

### **3. Risk, Assessment of Risk, Allocation of Risk, Feasibility Study and Insurance**

Projects face a variety of risks, and not all of these risks can be easily identified. On the other hands, risk cannot always be mitigated or contracted away, but it can be assessed, allocated, and managed so that it is commercially reasonable. Therefore, in this section, issues of risk, assessment of risk, allocation of risk, feasibility study and insurance will be examined.

### **3-1. Definition of Risk**

Risk has been defined as “uncertainty in regard to cost, loss or damage”. Uncertainty is the important aspect of the definition. Project finance abhors it. An important part of the successful closing of a project financing is the risk structuring process. It is during this process that risk are identified, analyzed, quantified, mitigated and allocated so that no individual risk threatens the development, construction, or operation of the project in such way that the project is unable to generate sufficient revenues to repay the project debt, pay operating expenses, and provide an attractive equity return to investors. (Hoffman 2008) Also, a project risk could be defined as a possible event of mischance (such as delays, damages, breach of contract, defaulting parties, fines, errors in planning, changes in legislation or other occurrences) which takes place after the commencement of the project and has a negative effect on the planned proceeding of the project, usually leading to financial losses. (Reinhard Leopold Klarmann 2003)

### **3-2. Assessment of Risk**

We can isolate two basic influences on how risk is measured and perceived. One is the quantitative measure of risk: the assessment of the probability of its occurrence and the likely impact it will have. The other is the qualitative measure, or the perception of the risk, based on an individual’s past experiences, personal bias and intuition. Each is a valid part of risk assessment and it is preferred to describe separately, although in practice it may not be possible to truly separate these two aspects of risk assessment. Even if no risk exists, the assessment is necessary, because, the assessment of a risk is more relevant than the risk itself. Quantitative risk assessment is comprised of two components. First, it is the likelihood of the occurrence of an adverse event measured in terms of its probability: for example, the risk that an earthquake will occur in a given area over a specified period. Secondly, risk is the probable consequence of the occurrence of the event measured in terms of its potential magnitude: for example, the effect of an earthquake would have on a given property. In qualitative risk assessment, unlike quantitative risk assessment, considered the effect of occurrence of event on the qualitative issues and problems which are multiple. Our experiences are based on cognition of single events. Those

events are not necessarily related one to another, yet we extrapolate from a singular experience and create an abstraction which we connect with or relate to future experiences. We take an isolated concept from a single event or experienced and universalize that concept for application in other circumstances or situation. In most cases, the associated event or circumstances is somehow related to the original single event or experience in order to justify this abstraction. However, the method of association of the new event with the original event is subject entirely to the perception of the individual. Once the concept is universalized and a related event is identified, that concept must be applied to the related event. The difficulty in this process revolves around the application of an abstraction to an entirely separate and independent event. This application will require an adjustment of the abstraction to compensate for contextual and factual differences between the original event and the related event. This adjustment will rely heavily on assessment of the related event, understanding of the original event and the ability to identify the differences between the two. (Jeffrey Delmon 2005)

### **3-3. Allocation of Risk**

A successful project must benefit from workable, commercially viable and cost-effective risk sharing. Given the differing interests and objectives of the parties involved, effective risk allocation will be an essential part of the drafting of the project documents and an integral part of the project's success. This relies on the fact that, without a suitable allocation of risk, the benefits of project can be notably reduced. (Leonardo Freitas de Moraes e Castro 2010). Risk management based on efficiency is, of course, an ideal, a goal. In practice, risk tends to be allocated on the basis of commercial and negotiating strength. The stronger party will allocate risk that it does not want to bear to the weaker party. This scenario does not necessarily provide the most effective and efficient risk management. Improperly allocated risk will have an impact on the entire project and may affect the stronger party as well as the weaker. Efficient allocation of risk will generally result in a more successful and profitable project and will benefit each of the parties involved. (Jeffrey Delmon 2005) Misallocation of risk is a leading cause of construction disputes and thus the importance of an informed risk allocation in project documentation cannot be understated. (James Bremen 2001).

### 3-4. Types of Risks and Mitigations

Risks are classified to different ways. Some divide the risks to two categories: common risks and special risks and some of them divided to three categories: commercial risks, macroeconomic risks and political risks. Some also divide the risks as for main stages of project i.e. construction stage and operation stage. Human rights risk is another risk that some people referred to it. (Eric Marcks 2001). But, Scholars and practitioners engaged in project finance routinely identify two primary categories of risks with respect to infrastructure development: (1) commercial, or economic, risks, including (a) construction risks, which generally take the form of delays and cost overruns, (b) fuel supply risks, including price increases and supply shortfalls, (c) market risks, such as weak demand for output, lower prices for the project output, and changes in the exchange rate and inflation, and (d) operating risks, which include risks relating to the day-to-day operations of a project, such as environmental damage or regulatory interference; and (2) political risks such as government expropriation, currency inconvertibility, and war. (Shalanda H. Baker 2010-2011). However, below has been referred to some of the most different kind of risk and its mitigations.

**Construction/Completion Risk:** The construction and completion risk is one of the key risks in an infrastructure project involving a construction element. Problems may occur in the form of shortfalls in expected material reserves, cost overruns, delays in completion, availability of workforce, unexpected engineering and structural deficiencies and force majeure, just to name a few. This form of risk can be mitigated by e.g. opting for an agreement with a general contractor rather than a series of direct contracts with the individual entrepreneurs, fixed-price lump-sum contracts, and fixed penalties for delays in completion, reasonable force majeure provisions and adequate supervision of the progress of the project throughout the construction period. (Reinhard Leopold Klarmann 2003)

**Operating Risk:** Operating risks are those risks that arise after the project is provisionally or definitely accepted. Issues which can contribute to limiting the extent of risk are, for example, the selection of the operator of the project facility and management of operation costs and agreements whereby the sponsors agree to provide management, personnel and technical assistance. (Ibid)

**Supply Risk:** A supply risk exists when the feedstock supply necessary for the project's production is interrupted due to insufficient supply resources, poor design, or poor operation of the supply system. Such interruption will thereby affect the project's ability to satisfy its obligations under the sales and purchase agreements. Ways to mitigate this risk include: negotiation of long-term supply agreements that provide sufficient inputs to supply the project plant at full capacity; development and operation of dedicated supply sources by experienced suppliers and obtain confirmation from an independent supply consultant as to the adequacy, availability, and reliability of supplies. (Katharine 2004-2005)

**Market risk:** Once the project has been completed and is operating as originally planned, risks regarding the use of the project's output remain. Every product needs a market and issues of accessibility demand, as well as several other factors influence the marketability of a product. Ways to mitigate this risk include: confirmation, in the form of an independent consultant's report, that the market demand for the project's product is sufficient to sustain the anticipated revenues to be received from sale of the product; negotiation of long-term, fixed price, purchase agreement that provide sufficient demand to maintain plant supply at full capacity and operation of the project as an efficient, low-cost producer thus allowing the project to endure periods of low prices. (Ibid)

**Political Risk:** Political risk is the risk of a government, usually the host government, interfering with the project or its immediate environment, e.g. through the imposition of new taxes, exchange control restrictions or, in the worst case, the expropriation of assets. Factors involved in mitigating this risk include: the credit rating of the host country; location of the host country and the obligation of the host government to provide security at all times adequate to protect the project's property and personnel.

**Environmental Risk:** In project finance, one can distinguish two principal types of environmental risk. The first type is when the environmental effects of a project might cause delay in the project's development or necessitate costly redevelopment. The second type of environmental risk is that pertaining to legal liabilities arising from the construction or operation of the project, sometimes even merely from the ownership of land. Observation of environmental standards and impose of heavy fines can be mitigated this kind of risk.

**Legal Risk:** Legal risk meant that the law in the host jurisdiction will not be interpreted and applied in a way consistent with the legal advice obtained from lawyers at the outset of the project. Use of experienced lawyers and advisors can to some extent mitigate this risk.

**Currency Risk:** This category of risk relates to fluctuations in the exchange rate of currencies in which project is trading and/or borrows that may negatively affect the cash flow of the project. To mitigate this risk, revenues, costs and debt facilities are denominated in U.S. dollars; thereby providing a natural hedge against adverse exchange rate fluctuations.

**Interest Rate Risk:** Interest rate risk is the risk that interest rate variations may increase the financial obligations of the project. Ways of mitigating this risk include: implement a hedging policy to manage interest rate exposure; implement a hedging policy for exposure arising from contractual obligations that prohibits any speculative dealing and ensure the project's cash flow is robust and not very sensitive to interest rate variations. (Ibid)

### 3-5. Feasibility Study

One of the first steps in project finance is for the sponsor, or a technical consultant hired by the sponsor, to prepare a feasibility study showing the financial viability of the project. In fact, Fundamental to assessing the bankability of a project is the feasibility study (Alexander F H Loke 1998). In some instances, a prospective lender will hire its own independent consultants to prepare an independent study before the lender will commit to lending funds for the project. The feasibility study will analyze the technical, financial, and other aspect of the project, including the time frame for completion of the various phases of the project development. The study will clearly set forth all of the financial and other assumptions upon which the conclusion of the study are based. Among the following are the more important items contained in a feasibility study: description of project; description of sponsor; sponsors' agreements; project site, government arrangements; source of funds; feedstock agreements; off-take agreements; construction contract; management of project; capital costs; working capital; equity sourcing; debt sourcing; financial

projections; market study, and financial and commercial assumptions used to develop the financial model. (Katharine 2004-2005)

### **3-6. Insurance**

The approach taken by financiers to insurance in project financed transactions is onerous, requiring a comparably more robust insurance program than would be adopted in a project that is financed on balance sheet alone. This is a reflection of the fact that until the project company has established a reliable revenue stream, it will have a low level of capitalization and be highly leveraged. This means that any reduction in its cash flow or call on its capital as a result of material loss or damage to the project's assets, or an interruption or delay in achieving its revenue generating capability, will have a detrimental impact on its ability to maintain adequate debt service cover ratios. While insurance does not remove risk, it does offer some financial security to the project company by providing financial assistance that it suffers the effects of such risk becoming manifest. The primary function of insurance is to act as a risk transfer mechanism. In return for a known cost (the premium) the uncertainty associated with both the frequency and severity of loss is transferred to the insurer. Of course, the objective of the lenders is to ensure that the project company puts in place a bankable insurance program. Central to doing this are risk management and control strategies, which generally fall into two categories: physical and financial control of risk. Physical control of risk may be achieved through the elimination or minimization of the uncertainty associated with loss both before and after such loss has occurred. Financial control may be achieved through retention; by transferring such risk to other parties, usually by way of contract; or for residual risks, by way of insurance. Also, a bankable insurance program should be designed to provide the types of cover that lenders expect and that the project company requires. The first and most important cover is for the costs of reinstating loss or damage to the project's assets. Future cover will be required to protect against any delay or interruption to the project's assets. The fundamental starting point of a bankable insurance is that, in almost all circumstances, it should be under the exclusive control of the project company rather than any individual sponsors, contractor, operator, or an authority. Attention to integrity and restrictions of insurance program should be considered. (John Dewar 2011)

## 4. Project Finance Structures and Contractual Frameworks

There are different structures and agreements in project finance. Although, in many cases, these two problems are mixing together, Nevertheless, this section attempts to distinguish the various structures and contracts and reviewing and studying them.

### 4-1. Project Finance Structures

Although a single sponsors may decide to carry out a project alone, as a matter of practice most large projects are jointly owned or jointly controlled. The reasons for selecting a joint structure include: spreading the project risk among a number of participants; maximizing the benefits of a combination of skills, technology, and resources; and allowing participants to act in a project that would otherwise be beyond the capabilities of any of the individual sponsors.

The ownership structure of a project is influenced by the particular financial, legal, accounting, and taxation objectives and concerns of the sponsors. Flexibility of management structure, the ease with which profits can be distributed, minimizing tax burdens, achieving off-balance sheet treatment, the scope of minority protection, and considerations regarding dissolution are among the issues that guide decisions about the proper project structure.

The main types of structure that are used in project finance should be examined, albeit briefly. It is worth remembering that there are basically two ways for a commercial venture to raise non-equity money from "outside" sources. These are: (a) conventional "full recourse" borrowing; and (b) receipt of "principal" sum as the price for the use or disposal (sale, lease or otherwise) of an asset. (Roger S. McCormick 1983) Given the above description, basic and fundamental format and structure of project are as follows.

**Corporation:** This is the simplest form of project ownership. A special purpose project company may be formed under the laws of jurisdiction in which the project is located, or it may be formed in some other jurisdiction and be qualified to do business in the jurisdiction of the project.



**General Partnership:** The sponsor may form a general partnership. In most jurisdictions a partnership is recognized as a separate legal entity and can own, operate and enter into financing arrangements for project in its own name. Due to the high likelihood that the general partners will be severally liable for all of the debts and liabilities of the partnership, a sponsor frequently will form a wholly owned, single-purpose subsidiary to act as its general partner in a partnership.

**Limited Partnership:** A limited partnership has similar characteristics to a general partnership. The difference is that limited partners have limited control over the business of the partnership and are liable only for the debts and liabilities of the partnership to the extent of their capital contribution in the partnership. A limited partnership may be useful for project financing when the sponsor do not have substantial capital, and the project requires large amounts of outside equity.

**Limited Liabilities Companies:** Limited liability companies are a cross between a corporation and a limited partnership. (Katharine 2004-2005)

**Concession:** In the most basic form of public sector project, the government, municipality, or other public body awards the project company a concession granting it a license for exclusive ownership of a specified facility or asset for fixed number of years. At the end of the concession, the asset is handed back to the public sector in a specified condition.

**Build, Operates Transfer (BOT) and the other types of this Structure:** Under this structure, the host government provides a concession to the project company, which agrees to build and operate the project for a specified number of years. At the end of the operations period, the project company either transfers the project to the host government for an extended period of operation. Build, Own, Operate (BOO); Build, Transfer, Operate (BTO) and Build, Lease, Transfer (BLT) are the other types and of course similar BOT structure.

**Joint Venture:** Joint venture is a combination of entities to achieve a common purpose. It is a flexible form of business enterprise that allows the number companies great flexibility in how the venture will be managed and controlled.

**Transfer of Operating Rights:** The divesting entity in this structure transfers the right to use existing assets and, in return, enters into an agreement with the acquiring entity for the purchase

of the capacity or output of those assets. Often, the acquire must investment significant capital to repair or expand the assets and, in some cases, must deal with complex issues concerning relations with existing facility employees. (John Dewar 2011)

**Forward Sale Structures:** In this structure, a project company will finance the construction of its facilities with, in addition to equity invested by the sponsors, proceeds from selling all or a portion of its anticipated production during a specified period to an unaffiliated purchaser, often a special purpose company organized offshore and owned by a charitable trust.

**Privatization:** Government often seeks to raise capital by selling all or part of their assets to the private sector. A government may in some instances ‘corporatize’ the entity that holds the asset and then sell down all or a portion of the equity in that entity. Alternatively, it may ‘divisionalize’ an entity by selling one or more discrete businesses while maintaining public ownership of others. (Ibid)

#### 4-2. Contractual Frameworks of Project Finance

The overall structure of the project finance transaction is set out in the contractual agreements between all of the parties. These contracts define each party’s role in the transaction and clearly identify their liabilities and expected functions within the transaction. The agreements are designed to fit within the overall legal framework of the host country for the project. The agreements deal with the methods of construction, financing and operation of the facility, and agreed procedures to be implemented in the event of default, failure to complete the construction, and failure to perform during the operational period. They also cover what should happen in the event of unforeseen circumstances such as war or earthquake.

**Construction Agreement:** The construction contract serves to give the project company a fully completed and equipped facility. In addition, it provides for delivery by the contractor of a facility that satisfies specified performance criteria, for a fixed or predictable price, and completed on a specified date. To do so, the contract typically requires the contractor to provide

all engineering and construction work, procurement of equipment and supplies, and start-up and testing. (Hoffman 2008)

**Loan and Security Agreement:** Typically, the borrower in a project financing is the project company formed by the sponsors to own the project. The loan agreement sets forth the basic terms of the loan and contains general provision relating to maturity, interest rate and fees.

**Site Lease Agreement:** The project company typically enters into a long-term for the life of the project relating to the real property on which the project is to be located. Rental payments may be set in advance at a fixed rate, or may be tied to project performance.

**Operation and maintenance Agreement:** The project company will enter into a long-term agreement for the day to day operation and maintenance of the project facilities. The operator company has the technical and financial expertise to operate the project in accordance with the cost and production specifications for the project. The operator typically paid a fixed compensation and may be entitled to bonus payments for extraordinary project performance. Additionally, the operator may be required to pay liquidated damages for project performance below specified levels.

**Product Off-take Agreement:** Product off-take agreements are the agreements that provide the revenue flow to a project. They are the agreements by which the project company sells its product or service.

**Feedstock Supply Agreement:** The project company will enter into one or more feedstock supply agreements for the supply of raw materials.

### 4-3. Stages of Project Finance

Project origination, financing the project, constructing the project and operating the project are stages that can be outlined for the project. Below is a passing reference to each of these stages.

**Stage one: Project Origination:** The main protagonist in the origination of a project is almost always either a host government or a private sponsor, and both will, normally, have key roles. Governments are key players in encouraging the development of projects to meet the core needs

of their communities within the infrastructure sector particularly in less developed countries, while private sponsors are more likely to demonstrate their initiative where there is an opportunity to utilize or exploit resources. There are, of course, overlaps and exceptions.

**Stage Two: Financing the Project:** Through the origination of a project, financing costs are typically for the account of the project originator, whether such originator is a private sponsors or host government. At this stage, using funding sources that were previously mentioned, the project will be funded.

**Stage Three: Constructing the Project:** The construction phase of project will, in many instances, commence before the financing for the project is fully agreed. This may be necessary to enable the project to be constructed to a schedule imposed as a condition of a bidding process run by the host government. Although construction arrangements are, typically negotiated between the sponsors of a project and the relevant contractor or contractors, and then presented to the project company's lenders, lenders will review the terms of any material contracts that the project company entered into before the financing has been agreed and amendments, usually of a minor nature, may be necessary to ensure bankability.

**Stage Four: Operating the Project:** As in relation to the commencement of construction, there is likely to be a timing overlap between the completion of construction and the commencement of the operational phase of any project. Early generation revenues may be available if a project can be operated before its scheduled commercial operations commencement date. There may, therefore, be an incentive for a project company to develop operational capability while the construction contractors and/or subcontractors, as applicable, are finishing the building or, more likely, the testing of the project facilities. (John Dewar 2011)

## 5. Governing Law, Forum and Dispute Resolution

One of the important aspects of project finance which has been kept in the dark is dispute resolution and issues related to it i.e. governing law and competent forum. The amount of political risk associated with project finance causes project participants to seek efficient and

unbiased forms of dispute resolution. Delays in the resolution of project disputes can negatively affect project economics, through lower project revenues and higher project expenses. Multiple project documents, multiple parties, and potentially inconsistent treatment of the same or similar contract provisions can lead to unacceptable results. In transactional project financing, dispute resolution planning is particularly important because of conflicting laws, multiple forums with an interest in hearing a dispute, and varying tolerance for arbitration and enforcement of arbitration awards. Within project finance, these diverse parties have different tolerances for the acceptability of arbitration for dispute resolution. Although project sponsors and contractors in project finance consider arbitration preferable to litigation for dispute resolution, project lenders and insurers often prefer litigation.

### **5-1. The Different Types of Dispute Resolution Mechanism**

There are mainly two types of forums open to parties to an international contract: domestic courts and international arbitral tribunals. In this regard, project finance transactions are no exception to the rule. When they are negotiating their contracts, the first danger that international financiers should avoid is the failure to draft a dispute resolution clause and, therefore, the failure to select a forum. In reality, international project financing participants and their counsels are sophisticated enough to understand the necessity of drafting the most favorable dispute resolution clause. The practical difficulty to which they are confronted relates, rather, to the choice between domestic courts and international arbitration. (Christophe Dugue 2000-2001)

#### **5-1-1. Recourse to Domestic Courts**

The parties to the different agreements in international project financing can be located in different countries. The jurisdictional corollary is that the parties tend to choose domestic courts for the resolution of their future disputes, in particular the courts of their seat or place of business, perceived as the most favorable forum. The jurisdiction of domestic courts is reinforced in project financing by the fact that some of the underlying agreements are governed by local laws. (Ibid)

### **5-1-2. Recourse to International Arbitration**

In avoiding the proliferation and dissipation of their potential future disputes, project financing participants have slowly evolved towards international arbitration as a truly neutral alternative to domestic courts. The past reluctance of many international operators due to the arbitral tribunals' lack of authority to order provisional measures has been swept away by the adoption by the major arbitration institutions of rules allowing for such measures. Additionally, arbitration clauses are enforced in domestic courts more easily and more successfully than forum selection clauses. The application of doctrines such as forum non convenience in certain countries may be an obstacle to the effective application of a forum selection clause and most importantly, the adoption of international convention and treaties concerning the enforcement of arbitral awards, as well as pro-arbitration legislations, have largely favored the arbitral mechanism. In the context of international project financing, one of the main advantages of international arbitration lies in its flexibility as regards to the resolution of multi-party disputes. It is therefore important for project participants to efficiency draft their arbitration clauses. (Ibid)

### **5-2. Transactional Unity of International Project Finance and Multi – Party Disputes**

The common denominator between all international projects, in spite of their inevitable individuality, is that the participants negotiate multiple and separate contracts that will form a global structure with links, both form a business and a legal perspective. This transactional unity is an essential factor in understanding the specificity of dispute resolution mechanisms in international project financing. However, in recent years, project financing participants increasingly have grown aware that even the simplest project financing structure includes a network of various interrelated agreements between the sponsors, lenders, insurance companies, and host governments. The multi-contractual, multi-party aspect of the transactions creates multi-party disputes. These multi-party disputes could arise between multiple parties to a single agreement containing a single choice of Forum clause or, more problematically, between different parties to different multi-party agreements containing different choice of forum clauses.

As a result of its ability to deal better with these problems, international arbitration appears to offer a more effective dispute resolution mechanism than a domestic court in cases of these multi-party disputes, which pervade project finance transactions. (Dinesh D. Banani 2003)

### **5-3. Governing Law**

The first and most important document to help resolve disputes is contract of parties whether during the contract implementation or pleading stage in legal authorities as court or tribunal. The contract indicates the intention of parties; shows that the parties have agreed on what and what they expect. The contract resolves the most of disputes without the need to refer to law or legal rules. However, there are many issues raised in the dispute whether not anticipated in the contract or necessarily must refer to an Act or a set of legal rules. Therefore, the judge or arbitrator must determine this Act or rules and apply to the dispute. (Hamid Reza Nikbakht, 1999)

Contracts are often quite clear in describing the terms of a transaction, but the manner in which contracts will be interpreted or enforced may differ significantly from those terms. The relevant considerations involve an analysis of: (i) the choice of law to govern the contracts; (ii) the enforceability of contracts under that law; and (iii) the choice of forum for disputes arising from the transaction, including whether judgments or awards from that forum will be enforced in each relevant jurisdiction.

#### **5-3-1. Choice of Law**

The knowledge that the transaction is governed by the law of a familiar jurisdiction can be a source of significant comfort to investors and lenders. In relation to a range of commercial contracts, the choice of law can have particular significance. The conflict of laws is another

important issue which considerable in the choice of law; a problem that its solution isn't ease in some cases. (John Dewar 2011)

### **5-3-2. Enforceability**

Not all contracts are enforceable with their terms. There may be mandatory provisions of law that override the terms of the contracts. Many countries have civil or similar codes whose provisions will apply to a contract notwithstanding its terms. Uncertainty and brevity are the issues which can emerge with ambiguity and lack of law. Also, like Sharia'a principles relating to prevention of enforcement of interest payments, domestic law prohibits fundamental aspects of the contract. In some cases, mandatory provisions of law will be applied by the courts even if not applicable under the express law stated to govern the contract. Thus, parties need to assess not only the terms of the relevant agreements, but also their consistency with applicable law. (Ibid)

### **5-3-3. Competent Forum**

The selection of a forum for any disputes heard in connection with the project has important implications such as:

- (1) Will the forum be neutral in its decision-making?
- (2) What law will the chosen forum apply and will the outcome differ as a result?
- (3) Which evidential or procedural rules will apply in the forum?
- (4) Will judgment or awards be enforced in the home jurisdiction of the borrower or the other project parties?

One important factor, when considering the choice of forum, is whether the dispute should be litigated or arbitrated. (Ibid) Due to advantages and disadvantages of each of the two methods mentioned, it is natural that selection also has excellent sensitivity. The parties usually prefer to choose a court as a forum, although, the choice of arbitral tribunal may be particularly advantageous in terms of hearing issues and procedures. About enforcement of awards, according to the conventions that have been approved in this area, the choice of arbitration mechanism will be better from court. Another issue that should be considered in selecting



competent forum is sovereign immunity. The host government and its instrumentalities may be immune from being brought before the courts of either the host state or of other sovereign countries. In addition, they may be immune from enforcement of judgments, so that even if a court or arbitral panel were to rule against them, it may not be possible to execute that judgment against their assets. This immunity is widely acknowledged as a matter of international law, but there may be exceptions to its application. (Ibid)

## **6. Conclusion**

A glance at the different types of commercial contracts, especially those that are somehow related to attracting foreign investment, indicate this fact that all of which somehow paid attention to certain aspects, surely it cannot cover all aspects especially legal aspects and provide solutions for all the legal issues. The fact is that the legal nature of contracts and rules, which will be used in project finance, not only are the mold of traditional contracts, but also, the use of these contracts alone created a lot of legal problems, perhaps, the solution is not readily available. For this reason, on the one hand, the new legal nature and forms which can respond to all of the dimensions should be achieved; and on the other hand, don't combine with legal nature and rules and to be distinguished from each other. Overview of domestic and international laws and regulations, indicates that unfortunately, legislative attention has been limited to the specific contracts which cannot meet the legal gaps in this area. Thus, preparation and approval of international convention on the project finance is necessary.

## **References**

1. Alexander F H Loke, (1998), Risk Management and Credit Support in Project Finance, *Singapore Journal of International & Comparative Law*, 41.
2. Anette Kavaleff, (2002-2003), Project Finance: Contracting and Proactive Preventive Law, *21 Preventive L. Rep.*, 18.
3. Chance , Clifford, (1991), Project Finance, *IFR Publishing*.

4. Christophe Dugue, (2000-2001), Dispute Resolution in International Project Finance Transactions, *Fordham International Law Journal*, Vol. 24, 1064-1082.
5. Dinesh D. Banani, (2003), International Arbitration and Project Finance in Developing Countries: Blurring the Public/Private Distinction, *26 Boston College International and Comparative Law Review*. 355, 361-362.
6. Eric Marcks, (2001), Avoiding Liability for Human Rights Violations in Project Finance, *22 Energy Law Journal*, 301.
7. Hamid Reza Nikbakht, (1999), Conflict of Laws in International Commercial Arbitration, First International Conference on Arbitration, *Revue de Recherche Juridique No. 27-28*, Universite Chahid Beheshti, 135-180.
8. Harold F. Moore and Evelyn D. Giaccio, (1986) International Project finance (A Practitioner's Guide to International Banking and Trade Finance), *11 North Carolina Journal of International Law and Commercial Regulation*, 597-598.
9. Hoffman, Scott L., (2008), The law and Business of International Project Finance, Third Edition, Cambridge University Press.
10. James Bremen, (2001), Risk Allocation, Project Finance and Trends in Project Delivery, *20 Australian Mining & Petroleum Law Journal*, 256.
11. Jeffrey Delmon, (2005), Project Finance, BOT Projects and Risk, Kluwer Law International.
12. John Dewar, (2011), International Project Finance, Law and Practice, Oxford University Press.
13. Katharine C. Baragona, (2004-2005), Project Finance, *Transnational Lawyer*, Vol. 18, 139-158.
14. Leonardo Freitas de Moraes e Castro, (2010), Project Finance and Public- Private Partnerships: a Legal and Economic View from Latin American Experience, *11 Business Law International*, 240.
15. Michael J. T. McMillen, (2000-2001), Islamic Shari'ah -Compliant Project Finance: Collateral Security and Financing Structure Case Studies, *24 Fordham Int'l L.J.* 1184.
16. Nagla Nassa, (1999-2000), Project Finance, Public Utilities, and Public Concerns: A Practitioner's Perspective, *23 Fordham International Law Journal*, S62.

17. Reinhard Leopold Klarmann, (2003), *Project Finance – An Introduction*, Chapter 2: Islamic Project Finance, 79-134.
18. Roger S. McCormick, (1983), Legal Issues in Project Finance, *1 Journal of Energy & Natural Resources Law*, 22.
19. Shalanda H. Baker, (2010-2011), Unmasking Project Finance: Risk Mitigation, Risk Inducement, and an Invitation to Development Disaster?, *Texas Journal of Oil, Gas, and Energy Law*, 314.

## Factors Contributing to Audit Lags of Zakat Institutions in Malaysia

Asmah Abdul Aziz<sup>1</sup>, Muslimah Mohd Jamil<sup>2</sup>, Huzaimah Ismail<sup>3</sup> and Nafisiah Abdul Rahman<sup>4</sup>

<sup>1,2</sup>Accounting Research Institute & Faculty of Accountancy, Universiti Teknologi MARA, Malaysia

<sup>3,4</sup>Centre of Islamic Thought, Universiti Teknologi MARA, Malaysia

**Abstract.** *Zakat fund is public money. Thus, it is the responsibility of zakat collection centers to effectively and efficiently manage and distribute the zakat fund. Due to that, auditing can be one of the mechanisms to evaluate the effectiveness of the zakat administration. The auditors will take some period in order to complete auditing process. This period is called audit lag. It is important because it is one of the signs for measurement of quality. It is also important in preventing the insider trading, leaks and rumors and reducing information asymmetry. It can be a potential alarm for risk measurement. There are many studies conducted as regards to the determinant of audit lags. However, there is no study conducted pertaining to zakat institutions. Thus, this research is aimed to determine the relationships between audit lags and the size of zakat institutions, types of zakat institutions, preparation lag and amount of expenditure. The findings could also help the government in evaluating the performance of the zakat institutions. It also can aid in identifying the factors that abstain the timeliness of audit reports. This study used the audited financial statements from 2000 to 2009 that were collected from the National Audit Department in Malaysia. The results showed that the size of zakat institutions, types of zakat institutions and preparation lag have significance relationships with audit lags. However, there was no significant association between the expenditure and audit lags.*

**Keywords:** *zakat, auditing, audit lags, zakat fund, determinants of audit lags, size of zakat institutions, types of zakat institutions, expenditure*

## INTRODUCTION

*Zakat* also plays important roles in developing ethical community. This is because *zakat* can empower and enhance human resource development (Choudhury & Silvia, 2006). The recipients of *zakat* can utilized the money in building their careers. Consequently, unlawful actions such as adultery and crimes can be abolished when people have means to generate income. Due to this, *zakat* institutions need to have an effective and efficient delivering system.

## Factors Contributing to Audit Lags of Zakat Institutions in Malaysia

Since *zakat* institutions are parties that have been given the power to manage *zakat*, the officers in *zakat* institutions are held accountable to uphold the responsibility wisely. Referring to the agency theory, the officer in *zakat* institutions is considered as an agent, while *zakat* payer is the principal. The officer needs to manage *zakat* in a way that does not contradict to the needs of the principal especially, the principles of Shariah. For instances, *zakat* officer allocates *zakat* funds to the other than eight group of recipients. This action is against the Islamic rulings. Thus, there is a need to have an independent auditor in evaluating *zakat* institutions. As a result, the principals can rely on the audited financial statements to evaluate the agent's action.

In Malaysia, National Audit Department (NAD), the sole government-auditing department, is responsible in auditing financial statements of the public sector organizations including 14 *zakat* institutions. NAD reviews and audits the financial statements yearly. If there is no material misstatement, audit certificate will be issued by NAD. There are three types of audit certificate, namely clean report, comment short audit qualification report and audit qualification report. The audit certificates consist of the auditor's opinion on the truthful representations of the financial statement and audit incidents, if any. This auditing process will take some time to complete. Thus, there is lag of time between financial year-end and the audit certification dates. This time lag is known as audit lag.

There are several factors that lead to the prolong audit lags. These factors are preparation lag, the size of *zakat* institution, the amount of expenses and the types of *zakat* institutions. After conducting statistical test, it is found that, type of *zakat* institutions, preparation lags and size of *zakat* institutions are significant causes to the prolonged audit lags. However, the amount of expenses is not significant to the delay of audit lag.

## PROBLEM STATEMENT

Audit lag is one of the items that could reflect audit risk. Lengthy audit lags means there could be problems in internal control or the quality of financial reporting. Several researchers conducted studies in order to see the relationship between audit lags with the determinants of audit lags. The determinants are, the size of auditee (Copley, 1991; Ahmed, 2003; Ku Ismail & Chandler, 2004; Leventis & Caramanis, 2005; Naser & Nuseibeh, 2007; Al-Ajmi, 2008; Krishnan & Yang, 2009), the types of auditee (McLelland & Giroux, 2000; Payne & Jensen, 2002; Ahmad & Abdul Aziz, 2005; Che-Ahmad & Abidin, 2008; Naser & Nuseibeh, 2007;

Turel, 2010), the types of audit reports (Dwyer and Wilson, 1989; McLelland & Giroux, 2000; Soltani, 2002, Ahmad & Abdul Aziz, 2005; Che-Ahmad & Abidin, 2008; Turel, 2010; Mande & Son, 2011) preparation lags (Dwyer & Wilson, 1989) and the amount of expenses (Ahmad & Abdul Aziz, 2005). To the best knowledge of the researcher, there is no study conducted in evaluating the determinants of audit lags in *zakat* institutions. In conjunction with that, this study plans to analyze the relationship between audit incidents and the determinants of audit lags like size, types of *zakat* institutions, the amount of expenses and preparation lags.

## **SIGNIFICANCE OF STUDY**

*Zakat* ensures social justice especially those who are in need through an efficient and well-structured administration. The efficient and well-structured administration helps in developing the national economic growth. A country will have sufficient income when the well-structured and efficient management is achieved. The officers in *zakat* institutions should also play a vital role in preaching the benefits and responsibilities of *zakat* payments (Ab Rahman & Syed Omar, 2010). Here, this study helps *zakat* organizations by identifying factors that abstain the timeliness of audit reports so that there will be no delay in producing the audit report in the future.

In addition, Johnstone and Bedard 2004 as cited in Mande & Son, 2011 pointed out that the clients' internal controls, financial reporting quality, and management integrity present useful measures for audit risks. They also argued that audit lags i.e. the time between the fiscal year end and the audit completion date, could be a potential candidate for measuring of several risk factors. The risk factors are clients' internal controls, financial reporting quality, and management integrity. A long audit delay occurs when a client has high inherent and/or control risk requiring more work by the auditor (Ireland, 2003 as cited in Mande & Son, 2011). The aim of this study is to identify the factors that prolong audit lags. It can assist the *zakat* institutions in preparing the timely audited financial statements.

## **LITERATURE REVIEW**

Audit lags are the period between the financial year-ends and the auditor signs the audit report (Al-Ajmi, 2008; Mande & Son, 2011; Khasharmeh & Aljifri, 2010). Audit lags are

## **Factors Contributing to Audit Lags of Zakat Institutions in Malaysia**

important because it is one of the indicators for measurement of quality. It is also important in preventing the insider trading, leaks and rumors. It helps in reducing information asymmetry. It also aids in reducing the opportunity of spreading the report about the company's financial performance (Al-Ajmi, 2008) in which it can be a potential alarm for risk measurement particularly in terms of internal control, financial reporting quality and management integrity (Mande & Son, 2011).

There are several studies conducted by previous researchers in finding the determinants of the audit lags in the public sectors, companies and non-profit organizations. In public sectors, Dwyer & Wilson, (1989) started a study on the effects of management signaling, the message contained in the annual report and regulatory and technological constraints on the municipal reporting timeliness. They found that the management competency helps in reducing the audit lags due to the involvement in the Certificate of Achievement for Excellence in Financial Reporting program. seeking of the Certificate of Conformance programme. They also found that the existence of the preparers of the financial reports and the independence of the auditor will affect the audit timeliness. The timing of audit and the size of the city have little association with audit lags. The accounting regulations will increase reporting lags. Thus, this study make the conclusion that the timely reporting gives a signal of competence performance (Dwyer & Wilson, 1989).

McLelland & Giroux (2000) conducted a study on the effect of the signaling, information technology, report content, client size and complexity, audit characteristics and regulatory constraint in United States towards the timely auditing lags. This study is an extension study from Dwyer and Wilson (1989) where their sample used is bigger. It is study conducted in a different year from Dwyer and Wilson. The result between two studies are consistent with a slight difference in terms of the time taken to issue audit report . The issuance of audit report takes a month longer than the previous study (McLelland & Giroux, 2000).

Payne & Jensen (2002) tried to examine the relationship between the municipal audit and audit-firm characteristic with the municipal audit delay in the United States. They found that audit delay reduces when there are management incentives, timely reporting, the presence of a high quality financial reporting system and bonded indebtedness. The audit delay increases during the transformation of the audit procurement process. Municipal size, audits performed during busy season and the receipts of a qualified audit opinion gives impact on the prolong audit delay (Payne & Jensen, 2002).

Another study done by Ahmad and Abdul Aziz (2005) evaluated on the association of audit lag with the types of local authorities. They investigated financial reports and audit certificates of 15 local authorities in Johor Bharu. They found that 88.89% of audit lags of local authorities in Johor exceeded 12 months. The shortest audit lag was in 1995 and the longest average audit lag was in 1990 (Ahmad & Abdul Aziz, 2005).

Carslaw, Mason, and Mills (2007) had also conducted a research in order to study the audit timeliness in the district school. There were several determinants; district size, type of auditor, internal control, types of report and low-risk classification that impacts the audit timeliness. Carslaw et al (2007) concluded that the district schools take longer audit lags due to larger district size, types of auditor, weak internal control and quality reports. The low-risk classification of school district do not contribute to longer audit lags (Carslaw, Mason, & Mills, Fall 2007).

In the private sector, Ahmed (2003) conducted a study to see the association of the company size, sign of earnings, financial condition, size of audit firm and company year-end toward the timeliness of the financial reporting in Bangladesh, India and Pakistan for the year 1998. By comparing with these countries, India has a lower audit lag as compared to Bangladesh and Pakistan. The researcher also found that good sign of earnings, international financial linkages and big size of audit fees reduce audit lags in India and Pakistan. Profitability and corporate size have negative association in Pakistan only (Ahmed, 2003).

Meanwhile, Naser and Nuseibeh (2007) tried to investigate on the structure of audit fees in Jordan. They wanted to see the relationship between corporate size, status of audit firm, degree of complexity, profitability, risk, corporate accounting year-end and audit lags toward audit fees. They took 202 companies in Amman Stock Exchange. They found time lag between year-end and audit report date are insignificant determinants of audit fees (Naser & Nuseibeh, 2007).

Al-Ajmi, (2008) had investigated factors contributing to prolong audit lags. The factors are company size, profitability, leverage, accounting complexity, auditor type and corporate governance. He took 231 companies under Bahraini Stock Exchange. From the sample, he bound company size, profitability and leverage are factors contributing to the timeliness of financial statement while accounting complexity and auditor change are not factors that



## **Factors Contributing to Audit Lags of Zakat Institutions in Malaysia**

prolong audit timeliness. He also found corporate governance does not affect audit lags but does effect period from which the auditor signs the report to publication date (Al-Ajmi, 2008).

In addition, Khasharmeh & Aljifri, (2010) had also conducted a research on the factors affecting audit delay at Bahraini and UAE listed companies for year 2004. The researcher wants to see whether firm size, sector type, debt ratio, profitability, price earnings ratio and dividend payout contributes to longer time taken to issue audit certificate. The results proved debt ratio has stronger relationship with audit delay in both countries, Bahrain and UAE. In Bahrain, profitability, sector type and dividend payout ratio give strong effect to audit delay whereas audit type, firm size and price earnings ratio have little association with audit delay. For UAE, type of audit firm has strong relationship with audit delay but other factors do not contribute to longer audit delay (Khasharmeh & Aljifri, 2010).

Since zakat institutions can also be considered as non-profit organization, there is a study conducted to evaluate audit timeliness. Kitching (2009) attempted to investigate on the perception of donours in charitable institutions toward the quality of audit report. The researcher came up with two hypotheses. The hypotheses are the amount of charity increases as the quality of audit report increases and the donor favors high audit quality. The results proved both hypotheses are accepted. It means donours are willing to contribute more when audit quality increases. This relate to the second hypothesis where the amount of contribution increases as the audit quality improves. The relationship exists as the amount of contribution depends on donours' perception (Kithching, 2009).

## **RESEARCH POPULATION**

There are 14 zakat institutions in Malaysia. It encompasses 13 states and 1 federal territory. Data was collected from National Audit Department headquarter, States National Audit and Zakat institutions for a 10 year period from 2000 until 2009. This study examines the information in the audited financial statements of zakat institutions. All the required financial statements were collected personally. The whole population consisted of 140-audited financial reports. Thus, the sample of this study is 140-audited financial reports.

## RESEARCH DESIGN

This study is an empirical research. It is because this study is used to gather information that will assist in exploring the problem and suggested hypotheses. The suggested hypotheses used statistical analysis in order to test whether there is an existence of the causal relationships. This study is a longitudinal study because it covers ten-year period. Many researches have been conducted in the accounting perspectives (Abdul Rahman, Aug. 2006 & Jan. 2007; Adnan & Abu Bakar, 2009; Ali, 2006; Abu Bakar, n.d). There are also empirical studies on the stakeholders' perception (Hedzir, 2009; Md Idris, 2002; Abu Bakar & Abdul Rashid, 2010). This study also attempts to analyze several factors, which prolonged the audit lags, of which are:

### Size of zakat institutions

- The auditors will spend a lot time to evaluate big companies due to the complexity of transactional audits of the business (Naser & Nuseibeh, Determinants of audit fees: empirical evidence from an emerging economy, 2007; Krishnan & Yang, 2009; Leventis & Caramanis, 2005). However, previous findings showed negative association between the reporting lag and the firm size. The first argument showed that the big organizations were capable to utilize the resources in developing sophisticated internal control systems and engaging auditors in continuous basis. The second argument proved that large firm tried to provide financial information in time basis as large investors viewed it. The last argument mentioned that the large company was able to influence the auditor to start and complete the audit according to the time given (Ahmed, The timeliness of corporate reporting:A comparative study of South Asia, 2003).
- Moreover, bigger organizations can affect the timeliness since larger companies depend on external financing and they are required to produce adequate audit procedure. In addition to that, larger companies are able to employ big audit firm and get the audit done within a shorter period (Al-Ajmi, 2008; Copley, 1991). Furthermore, large companies, which have more resources; more accounting staffs and more accounting information systems can have shorter audit lag due to faster reporting. They are also able to have shorter audit lags because they want to grasp public attention (Ku Ismail & Chandler, 2004).

## Factors Contributing to Audit Lags of Zakat Institutions in Malaysia

- In terms of public sector, it is a compulsory for the organizations be audited by the National Audit Department. Thus, the ability of choosing the auditor is not the case. Hence, the hypothesis is identified as:
  - **H<sub>1</sub>: There is an association between revenue of zakat institutions and audit lags.**

### The amount of expenditure

- Ahmad and Abdul Aziz (2005) conducted a research on whether the total expenditure affects the audit lag of the local authority. The result shows that there is no relationship between total expenditure with audit lags. It is not consistent with the study conducted by Luehfling in 1996 where, total expenditure increased as the time of issuance of audit report increased (Ahmad & Abdul Aziz, 2005). Thus, the second hypothesis is identified as:
  - **H<sub>2</sub>: There is an association between the amount of expenditure and audit lags.**

### Types of zakat institutions

- Che-Ahmad & Abidin (2008) mentioned that large corporations have more complex accounting system. A large proportion of collections required more audit work. Thus, there are positive associations with audit timeliness. Bigger collection leads to longer audit lags. Turel (2010) mentioned that the profitable companies will have shorter lead time as compared to the loss companies. There are negative correlations between the lead time and profitable companies. It is because the loss companies tend to hide information and it required substantive work.
- Ahmad & Abdul Aziz, (2005) divided the type of local authority into three categories which are city council, municipal council and district council. The study showed that the types of local authority influenced the audit lags. Naser & Nuseibeh (2007) proved that the size of organization as small and large companies affect the audit lags. The small size and less complex organizations will have shorter audit lags. Payne & Jensen (2002) also examined the relationship between the types of municipalities with the audit lags. The result indicates that the large municipalities took longer audit lags. This study is consistent with the study conducted by McLelland and Giroux in 2000. Thus, the third hypothesis is recognized as:
  - **H<sub>3</sub>: There is an association between types of zakat institutions and audit lags.**

## Preparation lags

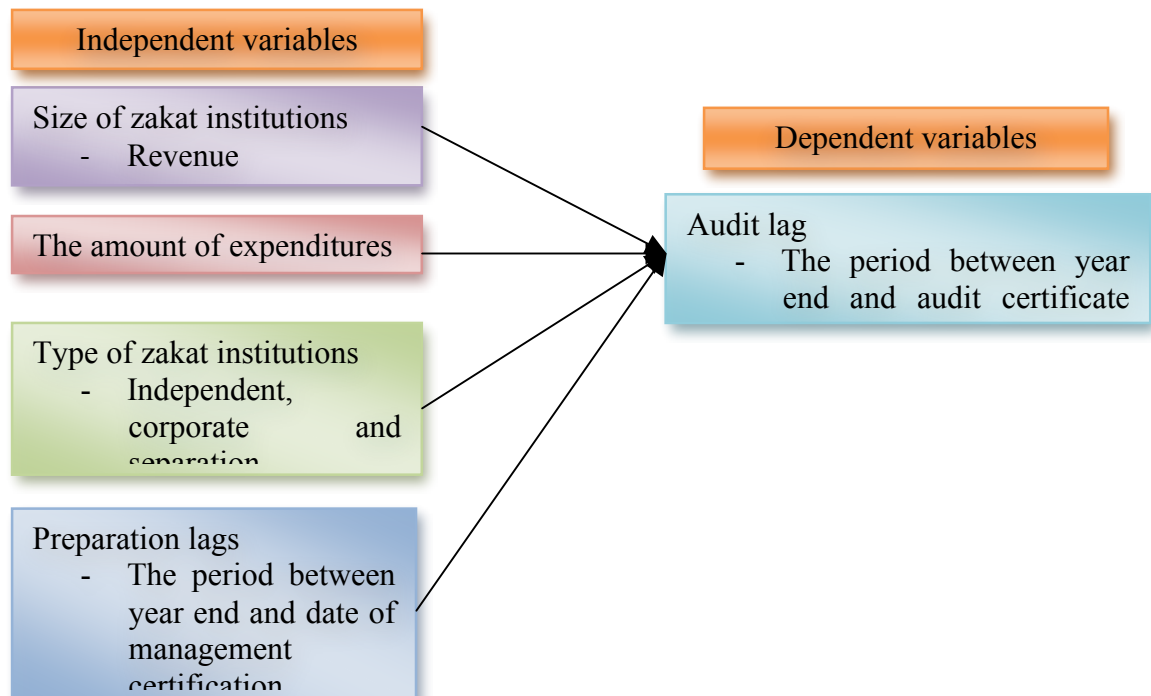
• Unfamiliarity with the financial accounting system will lead to the difficulties in preparing financial statements. Later, it will result to longer time taken in preparing the financial statements to be audited (Dwyer & Wilson, 1989). Thus, this study tends to evaluate the following hypothesis, which is:

- **H<sub>4</sub>: There is an association between preparation lags and audit lags.**

## Research framework

The study begins with the unveiling of audit incidents particularly to the zakat administration. Then, the study learns to extract the comments from the auditors regarding the audit incidents. Lastly, this study used to analyze the relationship between audit lags and the determinants of audit lags like size, types of audit reports and the amount of expenses. **Figure 1** showed the research framework of this study.

**Figure 1- The Research Framework.**



### DATA COLLECTION

- The sample was taken from 14 zakat institutions in Malaysia. It is equal to the population since Malaysia has 14 states, which separately managed their own zakat institutions. The data were collected from audit reports regarding zakat from National Audit Department covers a 10-year period from 2000 to 2009. The data was gathered after getting an approval from the Auditor General of Malaysia, Yang Berbahagia Tan Sri Amrin Buang.
- Upon approval, there was a meeting held on 4 July 2011 with the Deputy Auditor General of the States Government Division, YBhg. Dato'Mustafa Bin Hj.Saman and the Deputy Director of States Government Division that is En Ahmad Bin Seli. During the meeting, they wanted to see the significance of this study. They gave the permission to get the audited financial statements from the SIRC in Malaysia. It is because there is no specific report on zakat alone. After getting the approval, the researcher was able to get, the financial statements from the National Audit Department headquarter in Putrajaya. However, not all financial statements were available there. Due to that, the researcher had requested for the financial statements from the States National Audit Department via e-mail. The financial statements were collected by hand, email and post. The researcher also collected the financial statements from various zakat institution and website. If there is any incomplete information, the researcher contacted the zakat institutions.

### DATA ORDERING

- The data on the audited financial statements was arranged and organized by using Microsoft Office Excel 2007 software. All hard copies of the documents were clearly named, stored and filed. All these sorting, categorizing, storing and retrieving data can easily done from such procedures.

### DATA ANALYSIS

- For the data analysis, the researcher highlighted and elicited the relevant audit incidents for *zakat* institutions together with the audit recommendations. The data was categorized under several criteria, such as the amount of the revenue and expenditure, date of certification by management, auditor and financial year-end. All these information are stored in EXCEL spreadsheet. This is done to analyze the factors contributing to the audit lags.

- There are four variables used in this study for the dependent variable, audit timeliness was measured using the periods in months from financial year-end date until the signature date of the Auditor General certificate (Ahmad & Abdul Aziz, 2005). For the first hypothesis, the independent variable is measured by using the total collections at year-end. Many researchers use the natural log of year-end total assets (Ahmed, 2003; Al-Ajmi, 2008; Naser & Nuseibeh, 2007; Payne & Jensen, 2002). Conversely, McLelland and Giroux, (2000) use the log of population to indicate the size of municipal councils. In this case, the total collections at year-end will be used since zakat institutions are charitable institutions and it depends on zakat payments. For the second hypothesis, the researcher used the total expenditure of the zakat institutions, similar to the study conducted by Ahmad & Abdul Aziz, (2005).

For the third hypothesis, the categorical measurement was used by putting the variables into dummy variables. Many researchers use this kind of data (Afify, 2009; Ahmad & Abdul Aziz, 2005; Ahmed, 2003; Al-Ajmi, 2008; Dwyer & Wilson, 1989; McLelland & Giroux, 2000). For the fourth hypothesis, researcher used the period between the date of the financial year to the date of certification by the management as it had been used by Dwyer & Wilson in 1989.

Later, these information was analyzed by using Statistical Package for Social Science Software (SPSS) for the analysis. In this study, there are four types of analysis that will be conducted in order to answer the hypotheses namely descriptive analysis, coding analysis, normality test, Chi Square test and Mann Whitney test.

## **FINDINGS**

The researchers used SPSS system in order to evaluate the descriptive analysis such as mean, median, mode, standard deviation, skewness and kurtosis. It is important to be done before calculating the statistical analysis. The statistical analysis is based on the normality of the data. The result showed that the data are not normally distributed. **Table 1** showed that the summary of the mean, median, mode, standard deviation, skewness and kurtosis according to the variables of this study.

## Factors Contributing to Audit Lags of Zakat Institutions in Malaysia

**Table 1-Summary of the Descriptive Analysis**

	Audit lag	Size of zakat institutions	Amount of expenditure	Type of zakat	Preparation lag
Mean	4.16	2.48	2.16	1.66	3.24
Median	5.00	2.00	2.00	1.50	3.00
Mode	5	2	2	1	2
Std. Deviation	1.068	1.115	.918	.745	1.388
Skewness	-1.218	1.080	1.137	.636	.046
Kurtosis	.758	.481	1.483	-.938	-1.421

Due to that, the researcher conducted Spearman rank order correlation and Chi-Square test for further analysis. Spearman rank order correlation is used for nonparametric data in order to see the direction between independent and dependent variable while Chi-Square test is used to determine the relationship between two variables of a sample. **Table 2** showed synopsis of the statistical analysis which are Spearman rank order correlation and Pearson chi-square test.

**Table 2- Summary of the Result of the Spearman Correlation and Chi-Square Test**

	Size of zakat institutions	Amount of expenditure	Type of zakat	Preparation lag
Spearman correlation	-.171	-.081	-.206	.617
Sig	.043	.344	.015	.000
	Significance	Not significance	Significance	Significance
	Negative		Negative	Positive
Pearson Chi-Square	32.926	20.822	23.150	90.307
Sig	.008	.185	.003	.000
	Significance	Not significance	Significance	Significance
	Accepted	Rejected	Accepted	Accepted

H1 is supported. It is consistent with the study conducted by Copley (1991) Ahmed (2003), Al-Ajmi (2008) and Ku Ismail and Chandler (2004). The possible reason could be the bigger the size of *zakat* institutions, the higher will be the probability of having more funds whereby they can purchase more sophisticated accounting software to enable them to produce financial statements on time. They could also hire more knowledgeable and experienced accounting staff to ensure that financial statements follow accounting standards accordingly. The “big” size *zakat* institutions also could have shorter audit lags in order to reflect that they are efficient in managing public funds.

H2 is rejected. It is consistent with the previous studies. Regarding expenditure, the findings show that the amounts of expenditure are not significant. The reason could be due to double entry transactions which it not affected by the amount of transactions. Regardless, the amount of expenditure the double entry will still be the same.

H3 is supported. It is consistent with the previous studies. Among the three types of *zakat* institutions, the best in term of timeliness of financial statement is corporatized *zakat* institutions, followed by the independent *zakat* bodies and separate *zakat* institutions. The possible reason could be due to the Companies’ Act 1965 requirements whereby all the companies need to submit the financial statements six months after the financial year-end. Thus, they will have shorter audit lags. The independent *zakat* body could be subjected to the government regulations where they need to get the approval from the board committee members. Therefore, this could lengthen the audit lags. In the case of “separate *zakat* institutions”, the audit lags could be lengthy due to the delay in reconciling the accounts from two separate organizations.

H4 is supported. This is because the preparation la is a subset of the audit lag. The longer the preparation lags, the longer will be the audit lag.

Since H1, H2 and H4 showed significant relationship, the researcher use Mann- Whitney test to rank between these hypothesis. The result demonstrated that preparation lag is the most significant determinant to the audit lag followed by size of *zakat* institutions and type of *zakat* institutions. Table 3 showed the summary of Mann-Whitney test.



## Factors Contributing to Audit Lags of Zakat Institutions in Malaysia

Table 3- Summary of Mann Whitney Test

	Size of zakat institutions	Type of zakat institutions	Preparation lag
Mann-Whitney test	16.987	14.083	58.298
Sig	.002	.007	.000

### CONCLUSION

- In Malaysia, *Zakat* institutions have been developed according to the Ninth schedule of the Federal Constitution where *zakat* institutions are governed under the state governments through the establishment of the States Islamic Religious Council (Government of Malaysia, 1957). They will administer Islamic matters including the collections and distributions of *zakat*. *Zakat* money is different from any government money due to the payment of *zakat* as one of the pillars of Islam and it is an obligation to Muslim.
- Since the *zakat* is considered as public money, it is the responsibility of *zakat* collection centers to manage and distribute *zakat* money in a wise manner. Then, the principle of agency theory is applied. Due to that, auditing can be one of the mechanisms to evaluate the effectiveness of *zakat* institutions in handling *zakat*. Thus, this study aims to identify the existence of audit incidents in *zakat* institutions in Malaysia.
- In addition, many researches have been done in order to see the determinants of the audit lags, which are size, type of auditees, types of audit reports, and preparation lags. These research have been conducted in private and public organizations. Only one study conducts a research pertaining to the charitable organization. There is no literature in evaluating the determinant of the audit lag for the Islamic institutions. In conjunction with that, this study plans to see the relationship between audit incidents and the determinant of audit lags like size, types of *zakat* institutions, the amount of expenditure and preparation lags.
- As the Malaysian public organization, the auditors will do the annual auditing in order to evaluate the effectiveness and efficiency of the operations of the public offices including *zakat* institutions. The auditors will give recommendations to *zakat* institutions. Thus, this study had attempted to unveil the comments from the auditors regarding audit incidents. This study intends to fulfill three objectives. The objective is to analyze audit incidents of *zakat* institutions in Malaysia for the ten-year period with the determinants of the

audit lags, which are size of *zakat* institutions, types of *zakat* institutions, the amount of expenditure and preparation lags

By having this research, it helps *zakat* organizations to identify incidents that restrain the timeliness of audit reports. It is because *zakat* ensures social justice. It is where the structured and efficient management can contribute to the development of the national economic growth. By having that, country will have sufficient income in achieving harmonious environment. Therefore, the officers in *zakat* institutions should play a vital role in preaching the benefits and responsibilities of *zakat* payments (Ab Rahman & Syed Omar, 2010).

This study also aims to identify the factors that prolong audit lags in *zakat* institutions. It is because the clients' internal controls, financial reporting quality, and management integrity bring useful measures of audit risks. The audit lags i.e. the time between the fiscal year end and the audit completion date, can be a potential candidate for measuring risk factors relating to clients' internal controls, financial reporting quality, and management integrity. A long audit delay occurs when a client has high inherent and/or control risk requiring more work by the auditor (Ireland, 2003 as cited in Mande & Son, 2011).

This study used the audited financial reports from 2000 until 2009 of the 13 States Islamic Religious Councils and one Federal Islamic Religious Council and also referred to the data on performance audit reports taken from the Malaysian National Audit Department. In the absence of the audited financial statements from the National Audit Department, the researcher personally obtained the information from *zakat* institutions, email and post. Thus, the researcher is able to obtain the whole population of this study.

The researcher maintains the information in the Microsoft Excel as the database of this study. The researcher conducts a statistical test in order to see relationship of the audit lags with several determinants like size of *zakat* institutions, types of *zakat* institutions, types of audit reports and preparation lags. The researcher performs Chi-Square test and Spearman rank order correlation in order to see the relationship between the audit lags and determinant of the audit lags. The result shows that the size of *zakat* institutions has significant relationship with the audit lags. Type of audit report and the amount of expenditure are do not have significant relationship with the audit lags.

### RECOMMENDATIONS

Since the findings of H<sub>1</sub> showed that the bigger the size of zakat institutions the shorter the audit lag; *zakat* institutions should increase the amount of collection, so that, the institutions have enough fund to employ more qualified staff to produce timely financial statements. They should also evaluate the effectiveness of zakat awareness campaign in order to boost the *zakat* collection. In conjunction with that, the increment of *zakat* collection could be used as one of the measurement to evaluate performance of *zakat* institutions.

Meanwhile, for hypothesis three (H<sub>3</sub>) that is type of zakat institution affect audit lag, thus, in order to be more efficient, *zakat* institution should be the collection as well as distribution center of zakat like *Pusat Zakat Sarawak*. It is recommended that zakat institutions be established as a trustee. The staff should be motivated to improve timeliness of financial statements in addition to increase in zakat collection. Later, this could enhance in the level of accountability and integrity among staff in the *zakat* organizations.

Finally, for hypothesis four (H<sub>4</sub>) i.e. the preparation lag has significant positive relationship with audit lag, therefore, *zakat* institution should focus on the internal control. It is recommended that the zakat institutions have proper standards operating procedures and work manual. They also need to do frequent internal audit in order to have good internal control in the organization. They should frequently check on the accounting information systems as well as information technology (IT) aspect in order to eliminate the accounting information error and to ensure the smooth running of the IT system. The SIRC should keep a breast with the advancement in technology such as creating website for the public usage example SIRC Pulau Pinang and Melaka.

### LIMITATION OF STUDY

This study cannot reflect the real situation of *zakat* institutions because there is no explanation on the shared expenses by *zakat* institutions. Among the shared expenses are salaries, utility expenses and operational costs. Moreover, this study cannot compare between *zakat* institutions as the audited financial statements differ in the level of disclosure. There are some *zakat* institutions had lengthy reports while the other some are not.

## References

- Ab Rahman, A., & Syed Omar, S. M. (2010). Tauhid Epistemology in Increasing the Number of Zakat-of-Wealth Payers and Its Contributions Toward The Development of Malaysian Economy . *Seventh International Conference – The Tawhidi Epistemology:Zakat and Waqf Economy, Bangi 2010* (pp. 53-63). Bangi: Universiti Kebangsaan Malaysia.
- Abu Bakar, N. B. (2007). *Study Guide: Zakat Accounting Concepts and Application*. Kuala Lumpur: Wise Words Publishing.
- Abu Bakar, N. B., & Abdul Rashid, H. M. (2010). Motivations of Paying Zakat on Income: Evidence from Malaysia. *International Journal of Economics and Finance Vol. 2, No. 3* , 76 - 84.
- Afify, H. (2009). Determinants of audit report lag -Does implementing corporate governance have any impact? Empirical evidence from Egypt. *Journal of Applied Accounting Research Vol. 10 No. 1* , 56-86.
- Ahmad, N., & Abdul Aziz, A. (2005). Timeliness of Local Authorities. *National Accounting Research Journal* , 111 - 127.
- Ahmed, K. (2003). The Timeliness of Corporate Reporting: A Comparative Study of South Asia. *Advances in International Accounting, Volume 16* , 17 - 43.
- Al-Ajmi, J. (2008). Audit and reporting delays: Evidence from an emerging market. *Advances in Accounting, incorporating Advances in International Accounting 24* , 217–226.
- Al-Ajmi, J. (2008). Audit and reporting delays: Evidence from an emerging market. *Advances in Accounting, incorporating Advances in International Accounting 24* , 217–226.
- Carslaw, C., Mason, R., & Mills, J. R. (Fall 2007). Audit Timeliness of Schol District Audits. *Journal of Public Budgeting, Accounting & Financial Management, 19 (3)* , , 290-316.

## Factors Contributing to Audit Lags of Zakat Institutions in Malaysia

- Che-Ahmad, A., & Abidin, S. (2008). Audit Delay of Listed Companies: A Case of Malaysia. *International Business Research Vol. 1 No.4* , 32-39.
- Choudhury, M. A., & Silvia, B. (2006). A phenomenological conception of private sector responsibility in socioeconomic development. *International Journal of Social Economics Vol. 33 No. 1* , pp. 796-807.
- Copley, P. A. (1991). The Association Between Municipal Disclosure Practices and Audit Quality. *Journal of Accounting and Public Policy 10* , 245-266.
- Dwyer, P. D., & Wilson, E. R. (1989). An Empirical Investigation of Factors Affecting the Timeliness of Reporting by Municipalities. *Journal of Accounting and Public Policy 8* , 29 - 55.
- Dwyer, P. D., & Wilson, E. R. (1989). An Empirical Investigation of Factors Affecting the Timeliness of Reporting by Municipalities. *Journal of Accounting and Public Policy Vol 8* , 29-55.
- Government of Malaysia. (1957). *Law of Malaysia : Federal Constitution*. Kuala Lumpur: Percetakan Nasional Malaysia Berhad.
- Hedzir, I. H. (2009). *Intention to Pay Zakah on Employment Income Among Manufacturing Employees in Penang* (Master Dissertation ed.). Sintok: Universiti Utara Malaysia.
- Johnsen, A., Robertsen, K., & Aslan, D. Y. (2004). Contracting Out Municipalities Auditing: Conceptual Framework and Assessment. *SAGE Publications Vol 10(3)* , 305-326.
- Khasharmeh, H. A., & Aljifri, K. (2010). The Timeliness of Annual Reports in Bahrain and The United Arab Emirates: An Empirical Comparative Study. *The International Journal of Business and Finance Research, Volume 4, Number 1* , 51-71.
- Kithching, K. (2009). Audit value and charitable organizations. *Journal Account Public Policy 28* , 510- 524.
- Krishnan, J., & Yang, J. S. (2009). Recent trends in audit report and earnings announcement lags. *Accounting Horizons Vol.23 No.3* , 265-288.

- Ku Ismail, K. N., & Chandler, R. (2004). The timeliness of quarterly financial reports of companies in Malaysia. *Asian Review of Accounting Volume 12, Number 1* , 1 -18.
- Leventis, S., & Caramanis, C. (2005). Determinants of audit time as a proxy of audit quality. *Managerial Auditing Journal Vol. 20 No. 5* , 460-478.
- Mande, V., & Son, M. (2011). Do audit delays affect client retention? *Managerial Auditing Journal Vol. 26 No. 1* , 32-50.
- McLelland, A. J., & Giroux, G. (2000). An empirical analysis of auditor report timing by large municipalities. *Journal of Accounting and Public Policy 19* , 263 - 281.
- Md Idris, K. (2002). *Gelagat Kepatuhan Zakat Pendapatan Gaji Di Kalangan Kakitangan Awam Persekutuan Negeri Kedah* (Phd Thesis ed.). Universiti Utara Malaysia.
- Naser, K., & Nuseibeh, R. (2007). Determinants of audit fees: empirical evidence from an emerging economy. *International Journal of Commerce and Management, Vol 17, No 3* , 239 - 254.
- Nik Hassan, N. M. (2009, March 3). *Zakat mampu bentuk peradaban mulia ummah*. Retrieved January 21, 2011, from Bernama: <http://blis.bernama.com/getArticle.do?id=17872&tid=89&cid=3>
- Payne, J. L., & Jensen, K. L. (2002). An examination of municipal audit delay. *Journal of Accounting and Public Policy 21* , 1 - 29.
- Payne, J. L., & Jensen, K. L. (2002). An examination of municipal audit delay. *Journal of Accounting and Public Policy 21* , 1–29.
- Qardawi, Y. (2010). *Hukum Zakat* . Batu Caves: Pustaka Islamiyah Sdn Bhd.
- Saleem, M. Y. (2007). *A Handbook on Fiqh For Economist 2*. Gombak: International Islamic University of Malaysia.
- Soltani, B. (2002). Timeliness of corporate and audit reports: Some empirical evidence in the French context. *The International Journal of Accounting 37* , 215 - 246.

## A STUDY OF AUDIT LAGS IN NORTHERN MALAYSIA LOCAL AUTHORITIES

Asmah Abdul Aziz<sup>1</sup>, Amal Hayati Aziz<sup>2</sup>  
<sup>1,2</sup> Universiti Teknologi MARA, Malaysia

**Abstract.** *Timely financial reporting is an important aspect for the usefulness of accounting information. Financial reports need to be prepared in a timely manner to provide users with information on financial performance in their decision making and in assessing the level of services provided whether the legal obligations are met. The purpose of this study is to investigate the contributing factor that influence the timeliness of financial reporting by local authorities in North Region for a ten year period from 2000 to 2009. The contributing factor that might affect the ARL is the availability of accounting software. In this study, the measurement used to measure the timeliness of financial reports is based on the audit report lag (ARL) which is the duration of time taken by auditors to certify the annual accounts of local authorities. The result of this study show that ARL for the local authorities in Northern Malaysia ranges from 4 months to 35 months for the ten year period. The results of this study also show that the availability of accounting software contributed as important factor that affect the timeliness of financial reporting of the local authorities. Overall, from the findings reveal that financial reporting is considered a low priority task by some of the local authorities.*

*Keywords: Timeliness, Audit Report Lag, Malaysia, Local Authorities*

### INTRODUCTION

Local authorities play important roles and are responsible towards the public interests and needs. In general, local authorities are major providers of services to the states which are dealing with environmental issues such as housing, employment services, waste management, and transportation in order to improve the lives of people (Gilbert et al., 1996). These roles require local authorities to incur a substantial amount of expenditure and therefore they must have solid administration and management systems as all the actions taken would affect the entire population under their jurisdiction (Aziz & Heald, 2004; Gilbert et al., 1996).

Financial reporting seems to be the important process of preparing and providing financial information to a wide range of users in satisfying their information needs and in making

economic decisions. Particularly, the stakeholders in any organization have their right to get up-to-date information on an entity's performance as promptly as possible in order for them to make well-informed decisions. Thus, the local authorities as the front-line agencies between the Government and citizens need to provide and communicate relevant financial information to the public in a timely fashion to allow users to make an informed judgment on the prudent use of resources and to achieve the stated objectives embodied in the public policy statement (Athmay, 2008).

In the public sector, Local Government Act 1976 (Act 171) outlines the requirements for local authority's financial reporting that require local authorities have to keep adequate records for audit purposes and to provide a basis on which to report to Parliament and the general public on the stewardship of public funds. Accordingly, verification of the annual accounts by independent party adds credibility to the report and at the same time proved to Parliament and general public on the stewardship of public funds (Messier et al., 2007). Such independent reviews in auditor's reports are only effective if the information provided is accurate and timely (Schelker & Eichenberger, 2010).

The timeliness in financial reporting could enhance the usefulness of the information (Hashim & Rahman, 2011). Meaning that, the financial information in the financial reports will be highly useful, relevant and reliable to the users, if those reports are reported in a timely manner. Hence, government personnel need to set the requirement in producing accurate and reliable annual financial accounts as a priority job to encourage timely reporting. If they failed to do so, delay in providing timely financial statements may render the information less relevant for decision making (Lazar, 2009).

Recent issue found by public is that local authorities often have difficulties communicating the reasons for decisions about facility closure to the community with accountability (Zakaria, 2011). Thus, local authorities are also expected to be highly accountable to the public as nowadays people are more concerned with accounting information and the performance of the government.

Up to now, the central roles of local authorities in implementing programs to pursue sustainable development in a state can be seen in the recent Government development initiative that has spent the substantial amount of RM59 billion across the states of Kedah,



Perlis, Penang and Perak to accelerate economic growth and elevate income levels in the northern region Malaysia since 2007 (Northern Corridor Implementation Authority, 2011). The government's main thrust is to bridge the income differential gap between these two regions by 2025 and to promote the development of the NCER into a choice of destination for investment, work, and living.

Thus, the targets of the development initiative require participation and assistance from all government agencies including local authorities to accelerate management programme in each state of the Northern Region in Malaysia (The Star, 2011). In order to achieve the targets, the local authorities require to carry out their duties efficiently and effectively from time to time to help the region in achieving the objective (Gilbert et al., 1996).

The aim of this study is to examine the timeliness of financial reporting by 29 local authorities and the factors which influence the reporting time by local authorities. This study covers the four states in the area of the Northern Region of Malaysia which includes the states of Perlis, Kedah, Penang and Perak. Such examination is important since the representatives in the public criticised that audit delays had become a serious problem which hamper timely financial reports to reach the users in the public (Crain & Bean, 1998; Payne & Jensen, 2002).

It is significantly important to examine the factor that influence the timeliness of financial reporting as it can assist local authorities to focus their improvement efforts in the area of weaknesses for a better and efficient management. If the local authorities manage to overcome their weaknesses, it will enable the public to have confidence on the quality of accounts that have been distributed in the future. Thus, the findings found through the examination of the financial information existing in the audited financial accounts may encourage local authorities to emphasize on the improvement of the audit lags and in taking action to avoid repeated faults in future.

## **LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT**

Timely financial reporting seems to enhance positive public perception on local authorities' management and encourage economic decision making as the information was promptly made available in public. Prior studies have provided evidence that a delay in

annual audit function is the most influential factor that affects the timeliness of financial reports (Afify, 2009). Recently, the public keeps raising the issue on the inability of local authorities to produce complete annual financial accounts. In addition, the audit function has been viewed to influence the timeliness of financial reporting by local authorities (Sallem, 2009).

Due to the raised issues, the Auditor General of Malaysia opposed that a delay in audit work was due to the inability of the agency to provide complete evidence and documents for the annual financial accounts that report on the activities of the agency itself (Salleh & Khalid, 2011). Thus, it is essential to explore the factor that influence timeliness of financial reporting in this current study. As cited in Habib & Bhuiyan (2011], Bamber et al. (1993) suggest that the determinants of the audit report lag is important because (1) the audit report lag affects the timeliness of both audit and earnings information; and (2) a better understanding of what factors drive the audit report lag is likely to provide more insights into audit efficiency.

The following sections develop a hypothesis to meet the objectives of the study which are related to the contributing factor that might affect the timeliness of financial reporting (Audit Report Lag - ARL) which is the availability of accounting software.

### **Availability of Accounting Software**

In Malaysia there are many types of accounting software developed and employed by the small and large organizations in order to maintain a proper financial record. This will enable the organization to maintain high level of financial control and to satisfy the legal obligation to produce real-time and accurate financial reporting (Kaliannan et al., 2009). The government of South Africa, Australia and India use the technology system as a vital tool for the operations and development of their financial system, in order to assist them in better planning and budgetary control of government finance (Rauf et al., 2004).

McLelland & Giroux (2000) and Sallem (2009) also claimed that, the usage of advanced technology in accounting influenced the organization to produce timely information made available to all potential users. The availability of specific accounting software is an essential component in enhancing effectiveness and productivity in government service, greater transparency and accountability of local authorities. The information produced will be more

**accurate** and timely updated (Rauf et al., 2004). Thus, based on the argument above, the hypothesis to examine is as follow:

**H1: There is a negative relationship between the availability of accounting software and the timeliness of financial reporting by local authorities**

## RESEARCH DESIGN

In this study, exploration on audit report lag applies to 29 local authorities in North Region of Malaysia. The data and information were obtained from the two sources. First source is through the 290 sets of audit reports which obtained from 29 local authorities.

Then, the second source is by using questionnaires which were distributed to the accountant of each local authority in Northern Region of Malaysia. The researcher will investigate the timeliness of financial reporting by generating information available in the two sources of documents. In order to carry out this study, two variables were included which comprise of one dependent variable and one independent variable as describe in **Table 1**.

**Table 1.**  
**Variables Measurement**

<b>Variables</b>	<b>Measurement</b>
Dependent Variable:	
Audit Report Lag	The number of months elapsing between the end of the fiscal year of the local authority (31st December) to the completion of the audit for the current year for each individual local authority (signature date of Auditor General)
Independent Variable:	
Availability of Accounting Software	A dummy variable coded "1" for local authority with no accounting software and "0" otherwise.

## RESULT

### Descriptive Statistic

**Table 2.**  
**Descriptive Statistic For ARL (Months) at Aggregate Level**

Year		N	Min	Max	Mean	Median
2000	ARL	29	6.95	34.92	13.15	10.92
2001	ARL	29	6.46	22.95	11.23	10.62
2002	ARL	29	6.98	18.72	10.76	9.87
2003	ARL	29	5.54	16.10	9.34	9.61
2004	ARL	29	4.07	16.20	9.81	9.51
2005	ARL	29	4.10	15.05	9.25	8.89
2006	ARL	29	5.08	15.41	9.15	9.08
2007	ARL	29	4.23	15.48	9.78	9.93
2008	ARL	29	6.46	14.00	9.14	9.18
2009	ARL	29	4.79	9.64	7.21	6.89
2000-2009	ARL	290	4.07	34.92	9.88	9.13

Audit report lag (ARL) is defined as the duration of time taken by auditors to certify the annual accounts of organization. As shown in the Table 2, the mean score of audit report lag for the pooled sample is 9.88 months with maximum and minimum months of 34.92 and 4.07 respectively. This indicates that on average, the local authorities took 9.88 months to get the annual accounts certified. Using the pooled sample from period 2000 to 2009, the results indicate that the local authorities complied with Local Government Act (Act 171) requirements where they have to submit their report within 10 months except for one local authority which took 34.92 months to submit the report.

In addition, the researcher can see that the average of audit report lag trend that decreased over the years. The mean scores were decreasing from year 2000 to 2009 except for 2004 and 2007 when average audit report lag were slightly increased by 0.47 month and 0.60 month respectively. It shows that local authorities in Northern Region of Malaysia are improving

over the years on the number of months taken to complete and release the annual accounts and reports.

**Table 3.**  
**Number of Local Authorities and ARL for 2000-2009**

Year / ARL (within)	Number of local authorities			Total
	< 10 months	10-12 months	> 12 months	
2000	13	6	10	29
2001	13	8	8	29
2002	16	4	9	29
2003	24	1	4	29
2004	17	6	6	29
2005	20	4	5	29
2006	20	4	5	29
2007	16	8	5	29
2008	24	1	4	29
2009	29	0	0	29
<b>Total</b>	<b>192</b> <b>66.21%</b>	<b>42</b> <b>14.48%</b>	<b>56</b> <b>19.31%</b>	<b>290</b> <b>100%</b>

As summarized from Table 3 shows that for the ten year period, 66.21% of local authorities have completed and submitted their annual audited accounts within 10 months. There was an improvement in timely reporting from 2002 to 2009 when each year more than 50 % of local authorities complied with Act 171. It is interesting to note that in year 2009, all local authorities prepared and get the annual accounts certified within ten months which is in accordance with the date stipulated by Section 60 (2) of Act 171, that is the annual accounts shall be issued and published in Gazette on or before 31<sup>st</sup> October in each year or within ten months after the financial year end. But the results also show that 56 annual accounts were certified more than 12 months after the financial year end. This unfavorable result indicated that 19.31% of local authorities' performances on audit report lag were very weak for the ten years period.

However, overall results show that local authorities in the Northern Region of Malaysia have improved their financial reporting lag over the years. The results indicate that the local authorities are concerned on the timeliness of financial reporting to provide useful

information to public. But, if they failed to do so, delay in providing timely financial statements may render the information less relevant for decision making (Lazar, 2009).

### Correlation Analysis

**Table 4.**  
**Correlation Result**

<b>Correlations</b>			
		<b>ARL</b>	<b>ACTSOF</b>
<b>Audit Report Lag (ARL)</b>	Pearson Correlation	1	.673**
	Sig. (2-tailed)		.000
	N	24	24
<b>Availability of Accounting Software (ACTSOF)</b>	Pearson Correlation	.673**	1
	Sig. (2-tailed)	.000	
	N	24	24
** . Correlation is significant at the 0.01 level (2-tailed).			

The development in information technology including the creation of sophisticated accounting software are able to assist management in organization to maintain their accounts efficient and effectively. The study by Sallem, (2009) did not find any relationship between usage of accounting software and audit report lag. However, McLelland & Giroux (2000) claimed that, the usage of advanced technology in accounting influenced the organization to produce timely information made available to all potential users. For that reason those researchers have found that there was a negative relationship between the usage of technology in accounting and the reporting time. The previous result is similar with this study as the researcher has found that there is negative relationship between the usage of accounting software and the audit report lag.

Based on the Table 4, results of the second model of analysis have shown a strong relationship between these two variable. The correlation on availability of accounting software and ARL is 67.3% which are statistically significant at 1% level. This confirms the hypothesis three that availability or usage of accounting software negatively influences the timeliness of financial reporting by local authorities. Thus, H1 is accepted.

## CONCLUSION

The overall performances of local authorities in the Northern Region revealed that they have performed well in financial reporting preparation and publication as compared to the findings of the other States. There are improvements on ARL of local authorities as the average ARL scores were decreasing from 13.15 months to 7.21 months over a ten year period indicate that they are concerned on the timeliness of financial reporting to provide useful information to citizens.

Previous study proved that lengthy audit lag reflects inefficiency in management, weak internal control, thus to indicate that financial reporting is considered as a low priority task (Aziz & Heald, 2004). In this study, the findings revealed that even though overall ARL performance of local authorities in the Northern Region is good, the performances of local authorities at the individual state level of the Northern Region vary tremendously as some local authorities performed very well and some of them were very weak. Thus, this proved that it is not impossible to get the annual accounts being certified within the required time stipulated by the Act 171.

The results show that the usage of specific accounting software contributed as important factor that affect audit lag of the local authorities. From that result, it shown that the availability of accounting software significantly influenced the local authorities in enhancing their reporting time as compared to the other local authorities which manually managed their financial and accounts transactions. Thus this study suggest that the usage accounting software in financial reporting should be given priority and improved in order to enhance the performance of local authorities in Malaysia as well as in ensuring timely financial reporting.

Further research is highly encouraged to extend and improve this research. This is because there are two limitations that have to address in this study such as, firstly, the sample is only on the local authorities in the Northern Region of Malaysia. Not all annual accounts of local authorities in Malaysia were publicly available to the citizens as compared to the local authorities in the other developed countries. Secondly, this study does not include other factors such as government political issues, economic areas of local authorities that might affect audit report lag of local authorities. The States of Perlis, Kedah, Penang and Perak have different political ruling parties and their key economic focus activities are different.

## References

- Aziz, A. A., & Heald, D. (2004). Audit Lags in Scottish Local Authority Financial Reporting. *Malaysian Accounting Review* , 3 (1), 149-170.
- Afify, H. (2009). Determinants of Audit Report Lag: Does Implementing Corporate Governance Have Any Impact? Empirical Evidence from Egypt. *Journal of Applied Accounting Research* , 10 (1), 56-86.
- Athmay, A.-A. A. (2008). Performance auditing and public sector management in Brunei Darussalam. *International Journal of Public Sector Management* , 798-811.
- Crain, G., & Bean, D. (1998). What Users Think of the New Reporting Model For Government: The Result of the GASB's Focus Group Sessions. *Government Finance Review* , 14 (1), 9-13.
- Gilbert, R., Stevenson, D., Girardet, H., & Stren, R. (1996). *Making Cities Work: The Role of Local Authorities in the Urban Environment*. London.
- Habib, A., & Bhuiyan, M. B. (2011). Audit Firm Industry Specialization and The Audit Report Lag. *Journal of International Accounting, Auditing and Taxation* , 20, 32-44.
- Hashim, U. J., & Rahman, R. A. (2011). Audit Report Lag and the Effectiveness of Audit Committee Among Malaysian Listed Companies. *EuroJournal, Inc* (10), 50-60.
- Kaliannan, M., Raman, M., & Dorasamy, M. (2009). ICT in the Context of Public Sector Service Delivery: A Malaysian Perspective. *Wseas Transactions on Systems* , 8 (4).
- Lazar, J. (2009). *Beginners' Guide to Malaysian Financial Reporting Standards* (1st ed.). Leeds Publications.
- McLelland, A. J., & Giroux, G. (2000). An Empirical Analysis of Auditor Report Timing by Large Municipalities. *Journal of Accounting and Public Policy* , 263-281.
- Messier, Glover, Prawitt, & Boh, M. (2007). *Auditing and Assurance Service in Malaysia* (3rd Edition ed.). Mc Graw Hill Education.
- Northern Corridor Implementation Authority. (n.d.). *About NCER: NCER Socioeconomic Blueprint*. Retrieved November 20, 2011, from Northern Corridor Economic Region: [www.ncer.com.my](http://www.ncer.com.my)
- Payne, J. L., & Jensen, K. L. (2002). An Examination of Municipal Audit Delay. *Journal of Accounting and Public Policy* , 1-29.
- Rauf, F. A., Yatim, N., Saleh, S. C., Yusoff, H., Poobalan, U. R., & Othman, R. Financial Reporting in Public Sector. In F. A. Rauf, N. Yatim, S. C. Saleh, H. Yusoff, U. R.



- Poobalan, & R. Othman, *Public Sector Accounting: Malaysian Context* (p. 2004).  
Prentice Hall.
- Salleh, D., & Khalid, S. N. (2011). Accountability Practice at Local Government of Malaysia.  
*2nd Intertional Conference on Business and Economic Research* , (pp. 1305-1314).
- Sallem, N. R. (2009, November). The Timeliness of Kelantan Local Authorities Financial  
Reports. 1-99.
- Schelker, M., & Eichenberger, R. (2010). Auditors and Fiscal Policy: Empirical Evidence on  
a Little Big Institution. *Journal of Comparative Economics* , 38, 357-380.
- The Star. (2011, September 9). NCER Has Attracted RM6.89bil in Investments. (J. Loh, Ed.)
- Zakaria, Z. (2011). Public Satisfaction in Local Authorities: A Case Study in Kedah.  
*International Review of Social Sciences and Humanities* , 1 (2), 46-54.

## **Risk Coverage in the Top Companies in the D/A/Ch<sup>a</sup> Countries – Development and Future Challenges in the External Risk Reporting in the Corporate Practice**

Christian Theuermann<sup>1</sup>  
<sup>1</sup> FH Graz

***Abstract:** The external risk reporting should be harmonized not only with each other but also with the internal risk reporting and management reporting to be balanced in content. Euler, Fink (2009): 147 ff.). For most of the top companies in the D/A/CH countries risk management is an integral part of modern business management. Whether the reasons for implementing a risk management were purely normative guidelines or beyond an extension of preventive management or owners of the increased interest in the detection of potential risks. Furthermore, in the course of this study can be grateful that many companies in the D/A/CH countries, the issue of external risk reporting is still not taken seriously enough to get this issue and lack of relevance, acceptability and necessary resources. At the same time, however, be noted that the trends are clear in an increase in transparency and open act so as to establish trust with their stakeholders. Risk management and risk reporting, contribute significantly to this achievement. With a continuous risk management and a sophisticated risk reporting, risk potentials identified and companies are managed sustainably. In addition, an effective external risk reporting is essential from the respective corporate cultures.*

***Keywords:** Risk management, risk reporting, risk reporting, risk management process, risk information, risk ratios*

### **Risk management as a necessity of a changed business environment**

The sustainable and successful business is knowledge-based, information-oriented and considers the risk management business as a prerequisite for sustainable business success. For companies and business leaders who want the challenge of the future to meet active, this means a change in the management and control systems, risk systems, the construction of entirely new risk awareness and the development of existing and well established company culture to corporate culture, which integrates risk management as a fixed component (Theuermann 2011: 11-14). Given the current challenging economic environment and the difficult conditions, as well as the increasing number of corporate crises, including counties crises clearly demonstrates that an effective risk management is mandatory in the future as an integral part of sustainable management.

---

<sup>a</sup> D/A/CH: Germany/Austria/Switzerland

Every business activity is inseparable from the reach of opportunities and risks associated. National and international operating companies and institutions are therefore constantly exposed to the risk that negatively by internal or external factors or events influenced the achievement or even the corporate existence is threatened. Which in recent years, massively heightened risk situation of companies is now greater demands on the responsible corporate leaders and their approach to risk. Using numerous and ever-rising corporate bankruptcies and crises is clear that many companies are unable to meet adequately the risks (Schneck 2010: 18). A focused discussion and professionals on the business risks for companies in all industries and size classifications are of essential importance. This is, among other things, that the interest of strong risk-adjusted information in the context of increasing accounting and recognize a growing demand for a risk-oriented approach is the management and controlling. In addition, legislators and industry associations seek to an equally rapid adaptation of laws, regulations and guidelines to ensure that stakeholder interests are protected. To meet these demands, is a holistic and integrated into the business management of corporate risk management imperative. Here comes the external risk reporting to a central importance as an urgent action is needed in monitoring and transparency of the policy of enterprises. However, it is precisely this point, still partly paid too little attention (Theuermann, Knefz-Reichmann, Walzl 2011: 167-170).

An integrated risk management provides transparency regarding the operational risk exposure and reduce the likelihood of a corporate crisis that is caused by wrong decisions. The current business practice and the impact of the financial crisis shows that currently only a few companies have a risk management system that is actually able to show negative trends in time to communicate and take action to reduce risks to actively manage the business value of positive influence

### **The external risk reporting as a decision-related information provision**

Increasing legalistic and regulatory requirements (Schmidt 2001: 234; Shleifer, Vishny 1997: 737-775) dynamic and increasingly complex business environments and constructs and extremely high volatility in the general industry and economic conditions are constantly increasing the need for companies to identify potential risks early and respond to conscious. Driven by the inexorable development is gaining an accurate risk management and an appropriately designed external risk reporting for companies in national and international environment increasingly important in order to exist sustainably and long term.

As part of the external risk reporting can – in principle between an informal and a formal external risk reporting can be distinguished, which are mainly integrated in the management report with a view of the multi-dimensionality – taking into account the market position and potential impact of the information creditors. The formal risk reporting includes those information, which the company in

external reporting mandatory report must be completed or voluntarily. The informal reporting also includes those areas and issues that influential interest groups, the company will be granted (Fröhling 2000: 104). Risk reporting has in recent years, due to regularly occurring crises and turbulence on the financial and capital markets, nationally and internationally and has become increasingly important, therefore, for all active participants in the business world more relevant than ever. The external risk reporting should not be considered as a regulatory ills, but as an opportunity and necessity to build a professional culture of communication. Recipients of external risk reports, the shareholders, investors, but also other stakeholders such as banks, insurance companies, suppliers and customers. Using effective public relations can help to increase transparency of corporate risks and the functioning of risk management, strengthen the understanding of stakeholders and thus increase the corporate value addition (Theuermann, Knefz-Reichmann, Walzl 2011: 2).

The coverage is subject to a high external quality is not followed by the instruments of enforcement, and by the managers liability will be sanctioned (Weber 2010: 208-216). Data for external risk reporting expediently generated from the internal risk reporting and transferred in compressed form in the external risk reporting. Risk reporting is undoubtedly a key component of a successful risk management communication – are called – both internally and externally. The basic objective of a successful risk reporting is to ensure a cross-hierarchical transparency and also to the increasing demands of external stakeholders needs.

The overall objective of the disclosure requirements in some cases is the elimination or reduction of information asymmetries between management and report recipients (Buchheim, Beiersdorf, Billinger 2005: 234-247). A structure built external risk reporting, the key risk-related information communicated timely and understandable content, fulfills an important statutory objectives and contributes to the overall information communication with the external stakeholders. In addition, it also acts increasing transparency and foster trust, which can increase corporate value.

### **Subject and course of study – Statistics and characterization of study participants**

Against this background, in 2011, an empirical study (Theuermann, Knefz-Reichmann, Walzl 2011) on the external risk reporting in the D/A/CH countries conducted (Figure 1).

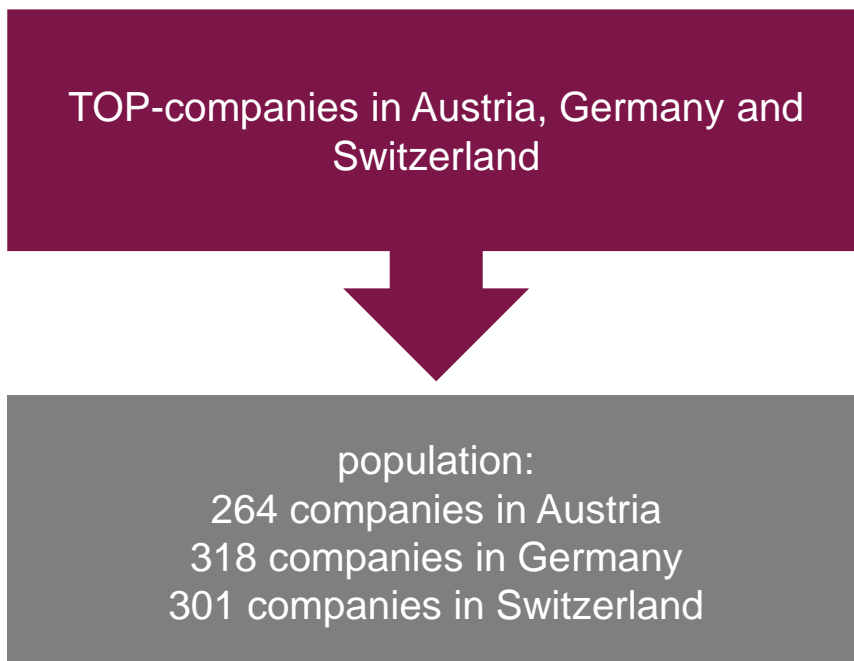


Figure 1: Overall the basic empirical investigation

The study provides an insight into the current state of development of the corporate practice in this subject and points to future trends in particular for the increasing demands of the external risk reporting meet the demands of development.

To this end, each of 100 decision-makers (directors, managers, risk managers, investor relations manager or head of the controlling unit) in the D/A/CH countries with a standardized questionnaire survey (Figure 2).

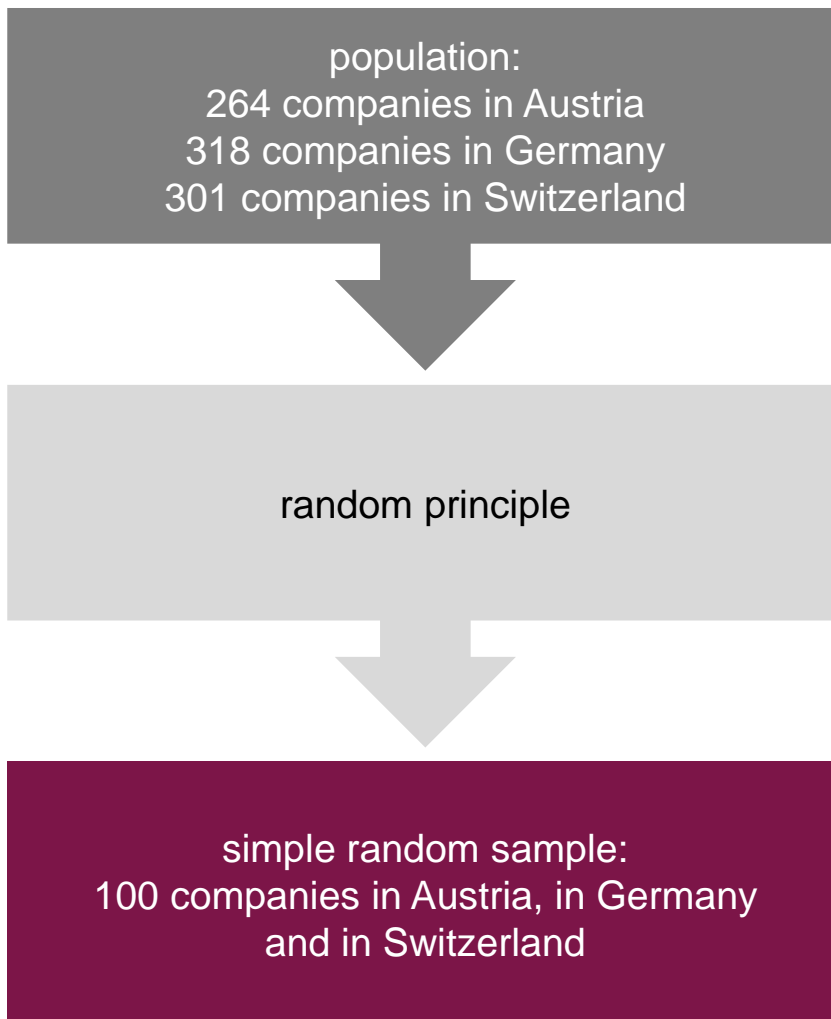


Figure 2: Sample calculation for the investigation

The high response rate of 22% underlines the importance and relevance, which takes these issues with the companies now. Overall, the survey took the TOP companies from the automotive, construction, chemicals and pharmaceuticals, banking and insurance, electronics and engineering, mechanical engineering and industrial, consumer goods, raw materials and energy (Figure 3).

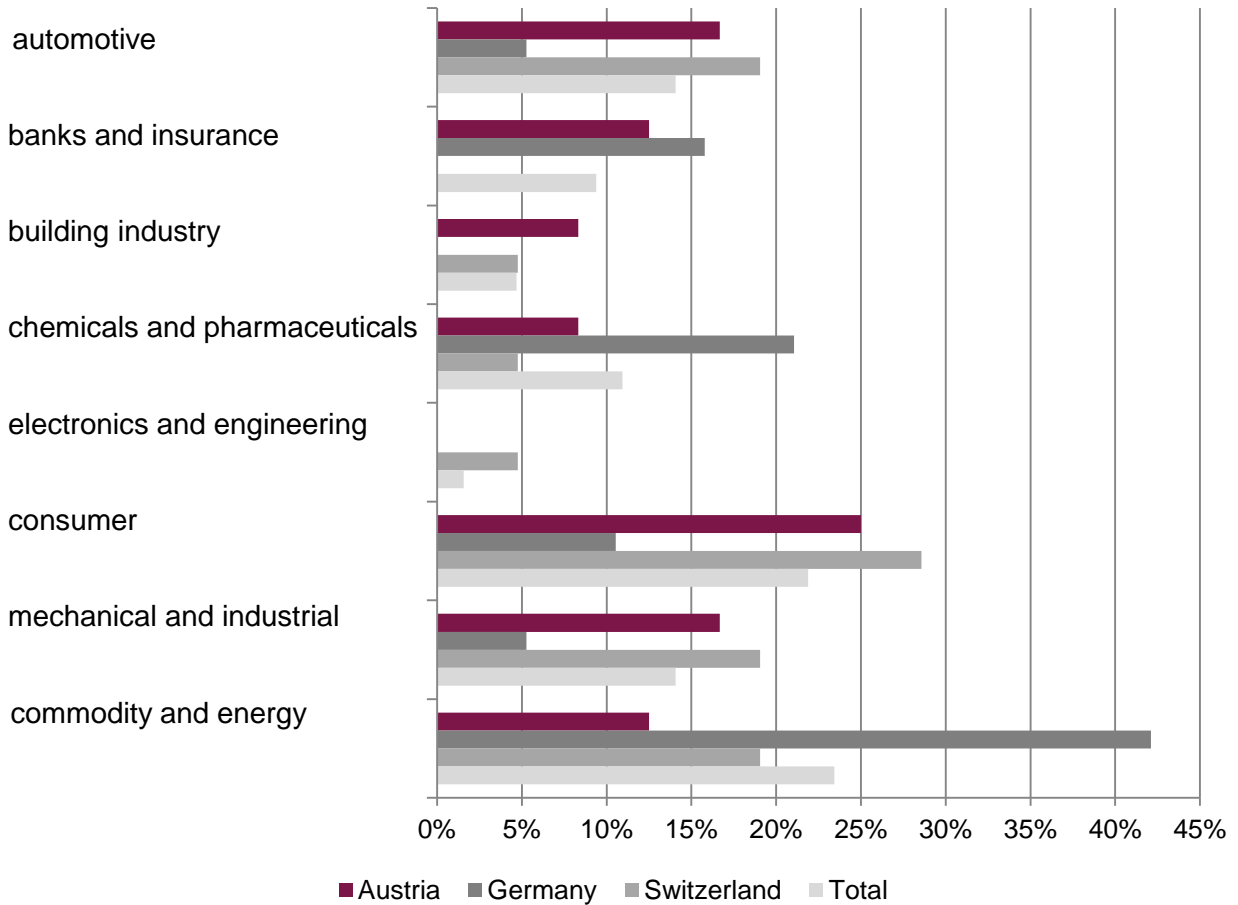


Figure 3: Industry distribution of surveyed companies

These companies employed between 250 and in 2010 more than 15,000 employees (Figure 4)

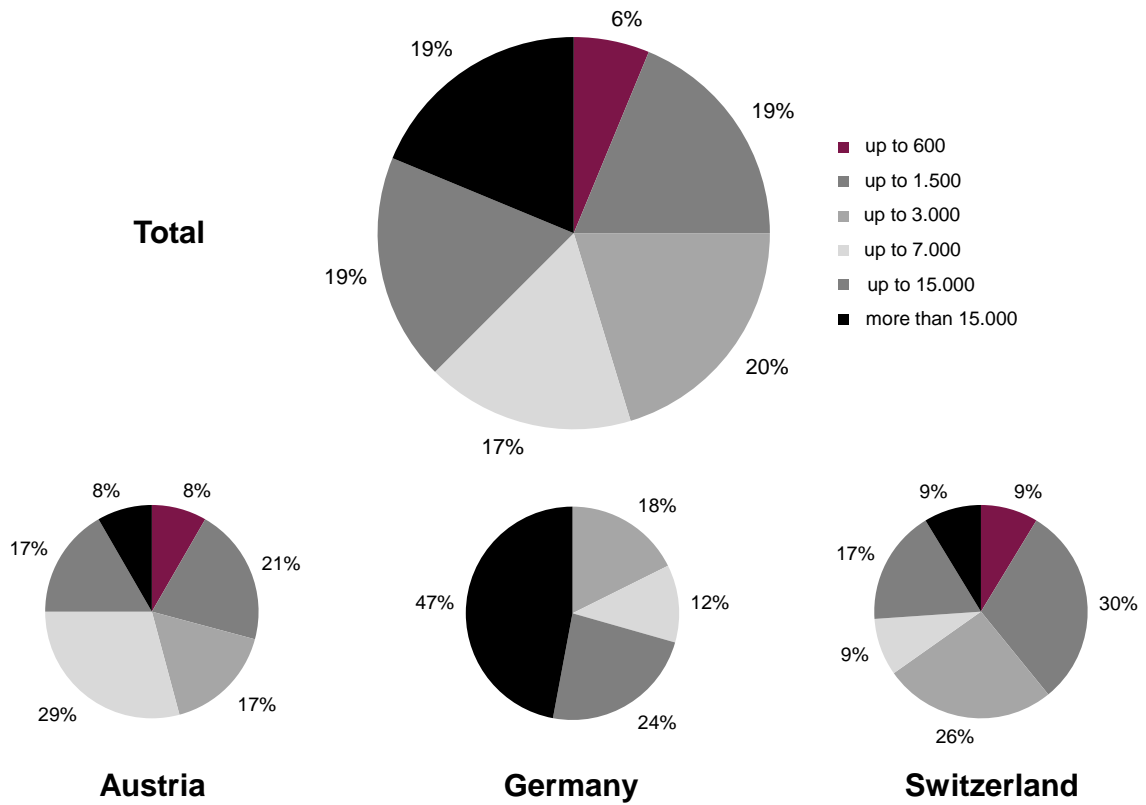


Figure 4: Employee distribution among the study participants



and achieved a turnover, which was in the range of € 50 million to over € 10 billion (Figure 5).

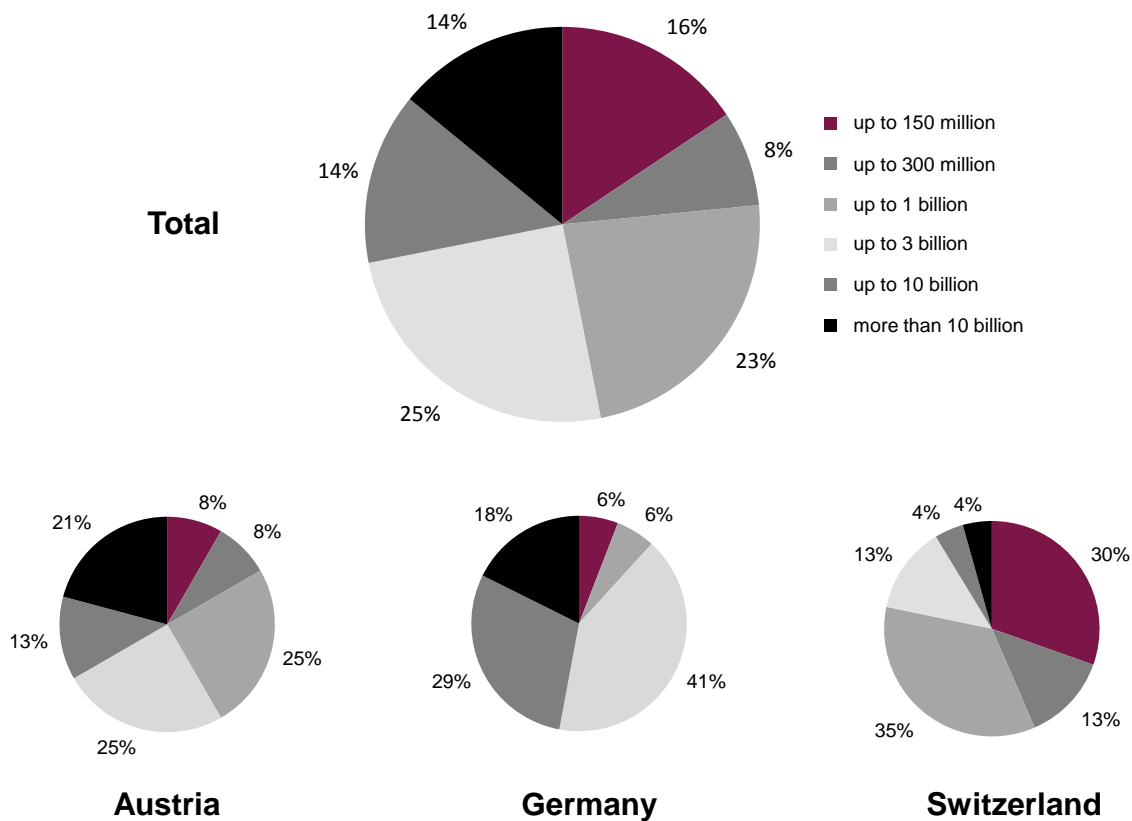
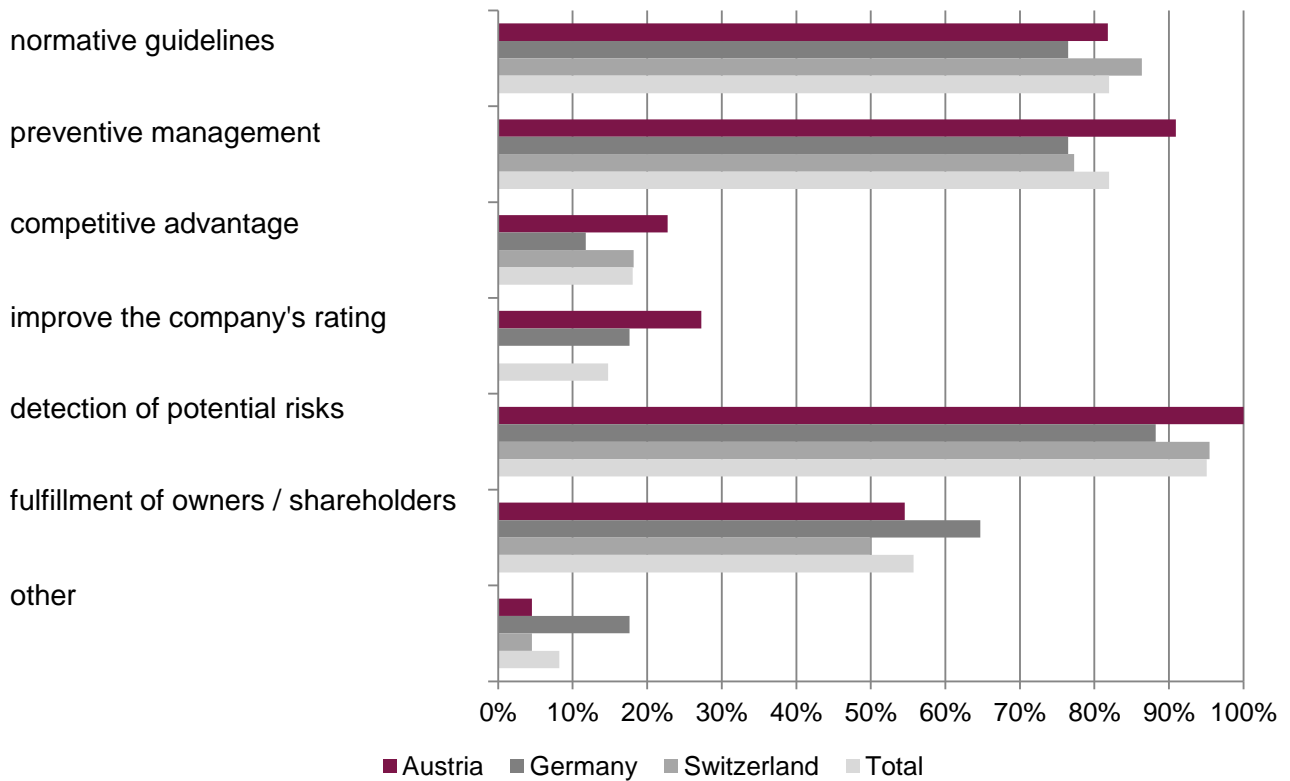


Figure 5: Revenue distribution among the study participants

## Key messages and key findings of the empirical survey in the D/A/CH countries

**A continuous risk management, 95% of top companies implemented the D/A/CH countries and in use.** This high percentage is not surprising, since in all three countries are committed to undertaking an internal control system to install. The design of this law varies from country to country. A risk management system is installed in the companies, however, not only because of legal requirements, standards and industry-specific compliance requirements (more than 80% of the total study participants). More than 90% indicate business considerations as a motive. As the most important or most common reason the lead managers call this the discovery of potential risks (95%). But also a preventive management and normative guidelines companies move to introduce a meaningful and sustainable risk management system (Figure 6).



multiple answers were possible

Figure 6: The main reasons for implementing a risk management

With the ostensible objectives of risk management outweigh the strategic and operational security measures to achieve them (almost 90%). In Swiss companies is about 92% of study participants, which give effect thereto. As the second most important goal (83%) called the management of the D/A/CH countries to secure the company's future success as a central objective for the implementation of a corporate risk management system. In Germany there are nearly 90% of study participants, which they consider to be essential objective.

**At the organizational integration of risk management can be seen fundamental improvement.** The integration of risk management system is mainly linked to the issue of credit transfer and decision-making power. The current survey has revealed that the agendas of risk management and the external risk reporting are still located mainly in the financial and controlling areas of the company (Figure 7).

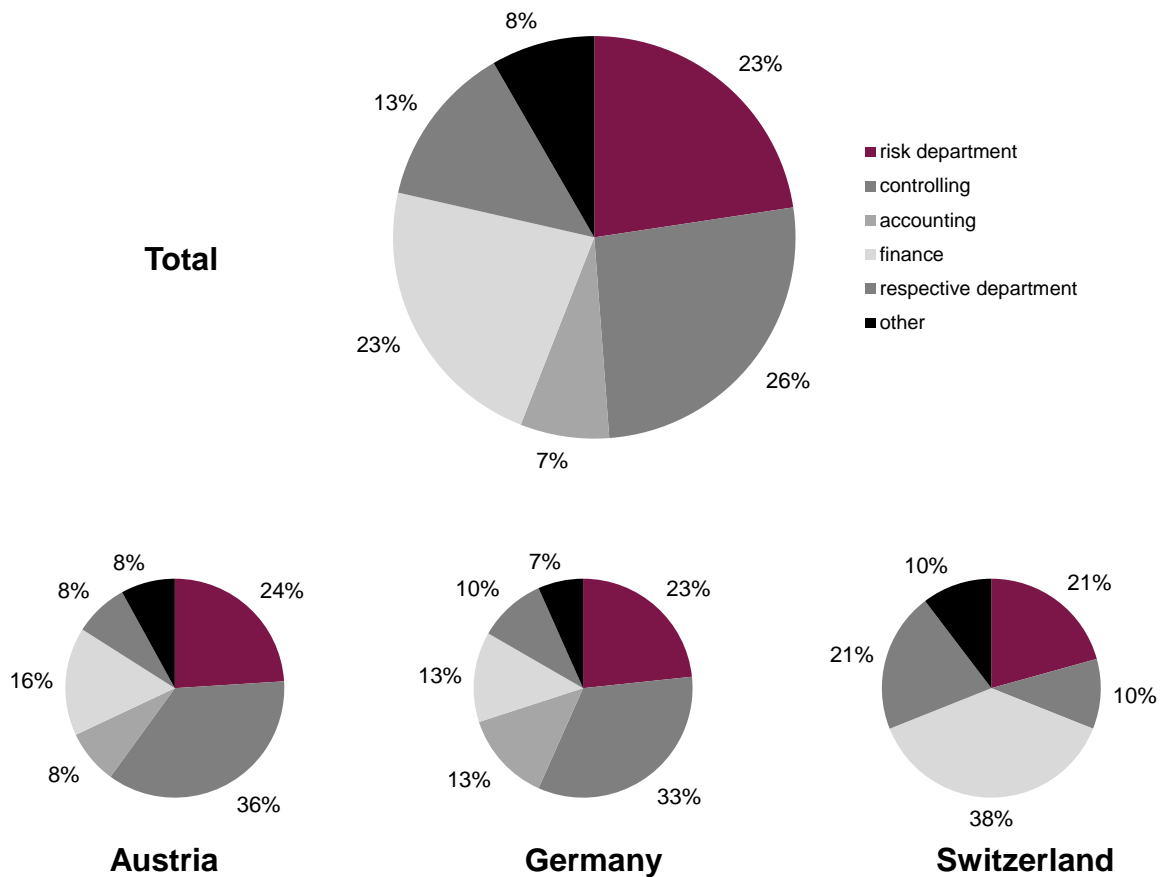
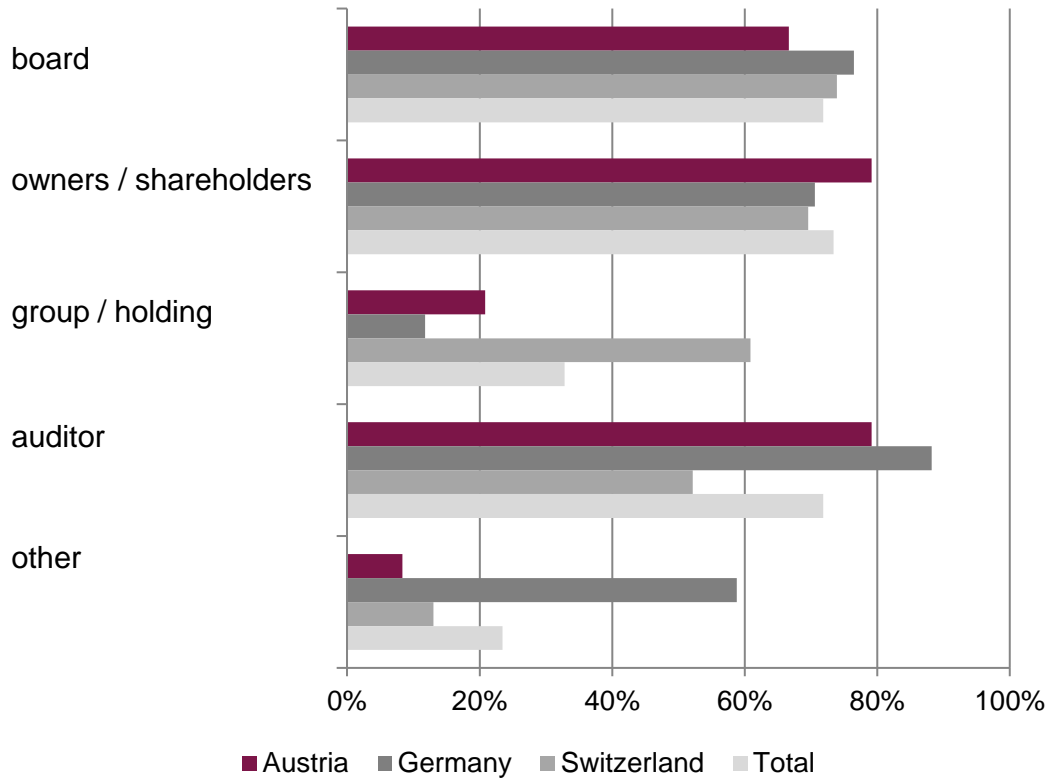


Figure 7: Organizational design of risk management in terms of departmental structure

It should be noted that only 23% of the surveyed enterprises in the D/A/CH countries have installed a separate risk department to dedicate the subject of risk management's full attention. Own risk departments will in future gain in enterprises of importance, because the challenges are growing continuously at a functioning risk management. In order to be sustainable in a dynamic global business world, you have the risk management and goal-oriented professional to be anchored in the company. The external risk reporting in the Annual Report is in the TOP companies already of great importance. The circle of addressees of this report is increasingly greater risk. In addition to owners, boards and auditors taking an interest in the risk report in banks, employees, customers and suppliers. Currently the most common type, the annual report (approximately 53%) in the enterprise application. Among the respondents in Germany, top companies, a trend of quarterly production (already 60%) of the risk reports (Figure 8).



multiple answers were possible

Figure 8: Recipients of risk reports

The future development will generally move in this direction, as this Report transparency and quality can be significantly increased. Positive in this context to note that continuity increases the risk for external reporting.

**An integrated view of corporate risk management system significantly increases the quality of external risk reporting and eventually leads to an optimization of the entire report.** A detailed description of the existing risk management system in the annual report is becoming increasingly important. 84% of TOP-D/A/CH enterprises describe the risk management system in their annual reports, with a preferential or most of the risk management process (90%) will be discussed (Figure 9).

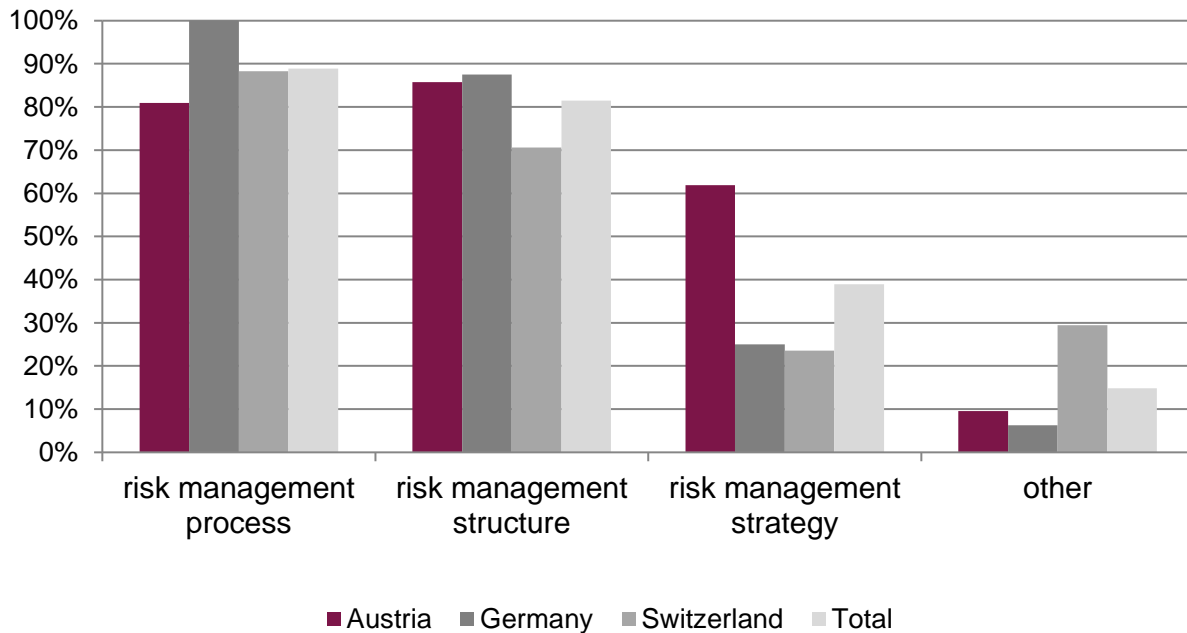


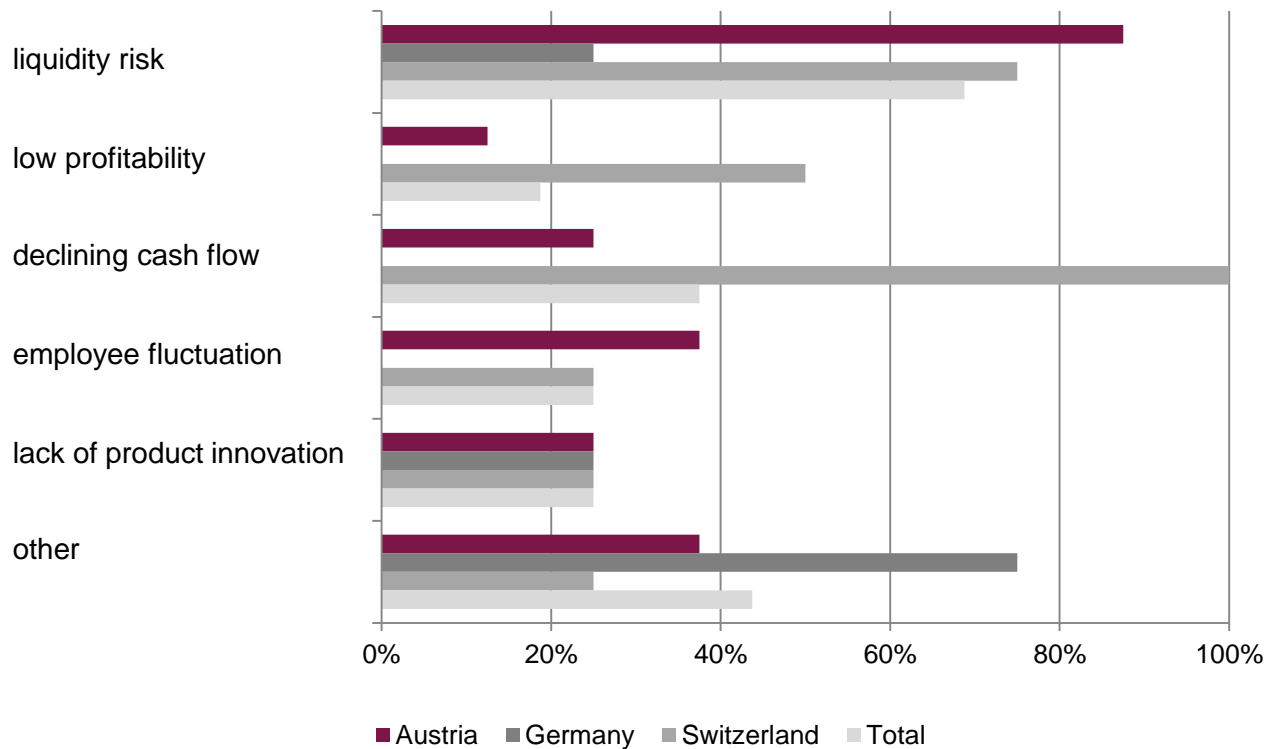
Figure 9: In the annual report described areas of risk management systems

A good 80% of companies surveyed also indicate the specific risk management organization. The description of the risk management strategy have indicated about 60% of Austrian companies as applicable. Usually there is a cumulative description of process, organization and strategy. It is assumed that these percentages will increase further in future. Further be defined in the annual report, the internal control system and the financial risk system or the main risks of a company and disclosed. Almost all respondents (92%) to integrate the identified external risk information in the annual report, this information is represented mainly in the management report. The publication of an internal risk report is made only by a small proportion (20% overall) of the surveyed companies. Here is the DACH region, lagging far behind. A separate presentation of the risk issue in a separate report would be coming to the risk management more important, attention and significance, so the quality could be improved considerably. This will be necessary in the future to all the expectations and needs.

**With the publication of internal risk information, the companies surveyed still rather keep covered.** In terms of reporting, the internal risk information in the annual report, companies are still reluctant and not very informative. Only about a quarter of the study participants leads to release

internal risk information. There is no clearly discernible variations in the entire country comparison. In Austria, approximately 30% of companies provide information in the external to internal risk reporting, in Switzerland it is 24%.

Only 38% of the D/A/CH companies report declining cash flow, lack of product innovation (24%), liquidity risk (68%) or staff fluctuations (24%). Here we see a corresponding improvement to meet the transparency requirements (Figure 10).



multiple answers were possible

Figure 10: Publication of internal risk information in the financial statements

In particular, the staff component and the transparency of the product innovations are under-represented.

The measures targeted publication can also be called as a future challenge in the external risk reporting, since the line between discretion and reasonable information publication is a very narrow. The right mix will be crucial in this regard. The trend is clearly in a heightened risk communication and evidence of the attempt to set specific confidence-building activities. Own risk ratios are used in total, only 30% of all companies surveyed in the external risk reporting. The use of these indicators is in Germany with 47% of the common type, followed by Austria and Switzerland with 29% with only 17% (Figure 11).

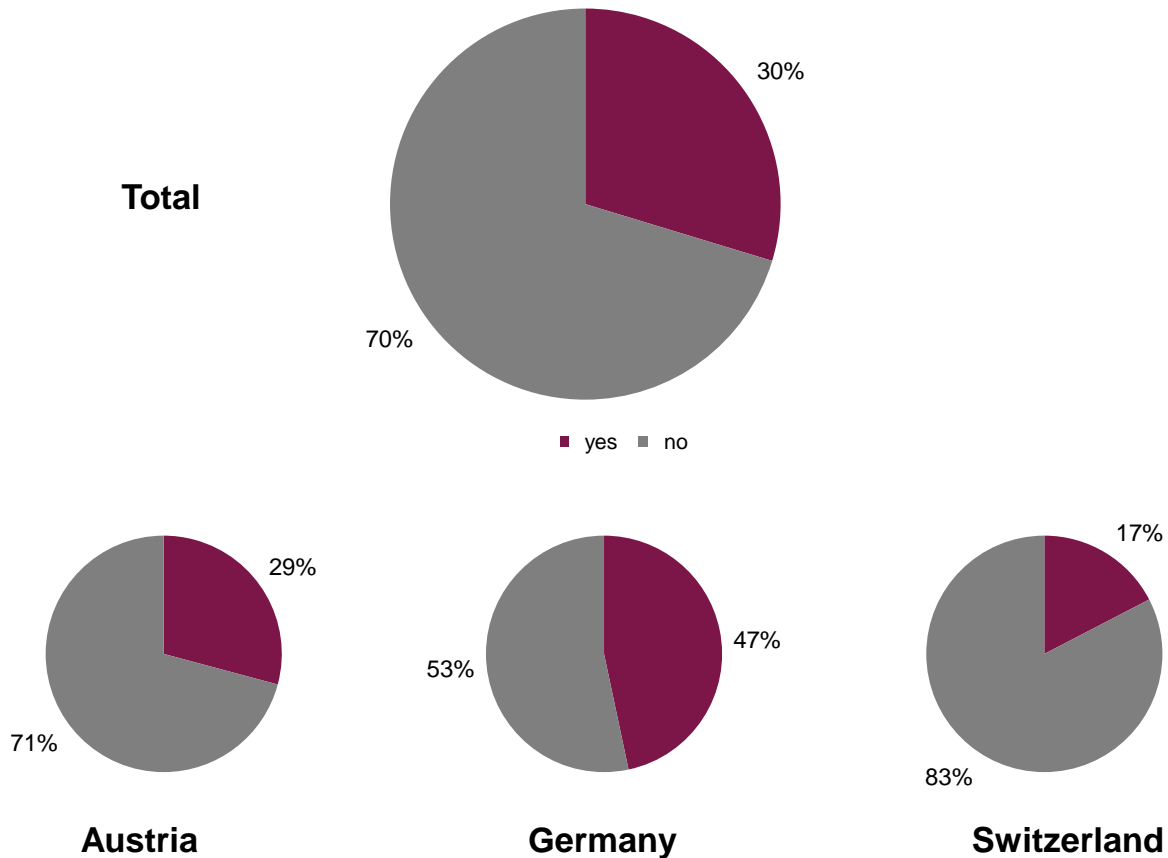


Figure 11: Use of risk indicators in the external risk reporting

The external risk reporting are due to the recent survey in the D/A/CH countries following input indicators: value at risk (58%), risk-bearing capacity (48%) and Cash Flow at Risk (32%). Generally, the value at risk is playing a prominent position of supremacy. The impact of the identified risks to the future success of the company is held by 47% of companies surveyed in risk reporting. As indicators for the assessment be used in cash flow, revenue, profit from ordinary activities, capital and profitability ratios. The external risk reporting is concentrated in 54% of the cases on individual risks, and in 46% of the total risk of a company, the so-called risk aggregation. The focus must be placed in the future even more on the risk of aggregation, as only then the overall risk level can be recorded and taken into account.

**The development of risk reporting the surveyed top companies as a positive thing. 81% of respondents believe that the external risk reporting in the future will win massively important.** This estimate can be attributed inter alia to the economic turmoil at the macroeconomic level, which reinforce this trend. It is becoming increasingly important for companies in the future, both professionally and with increased use of content to pay the external risk reporting to meet the increasing demands for transparency, internal control system, etc., to be fair.

In addition, 84% of top companies believe that current standards and laws of external risk reporting in the years to expand and thus are strict and binding. In Austria are even 92% of the respondents believe that this increase, the requirements (Figure 12).

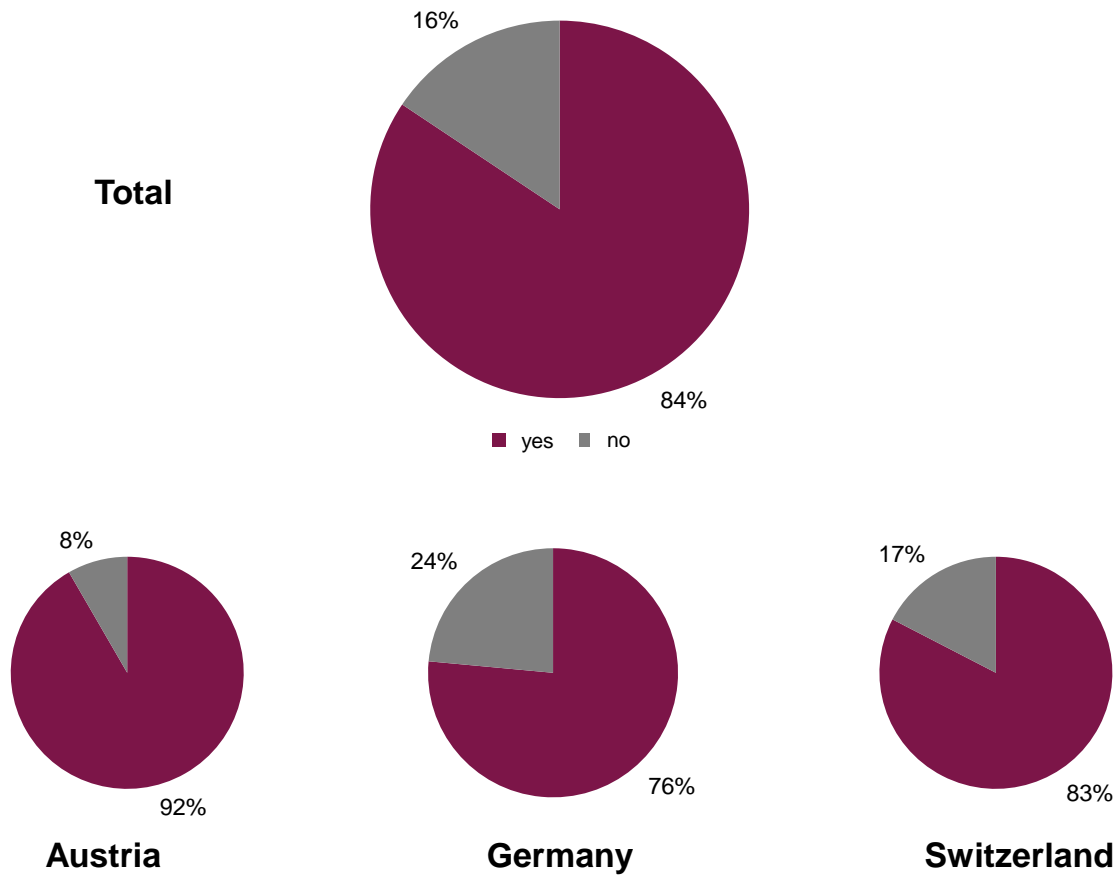
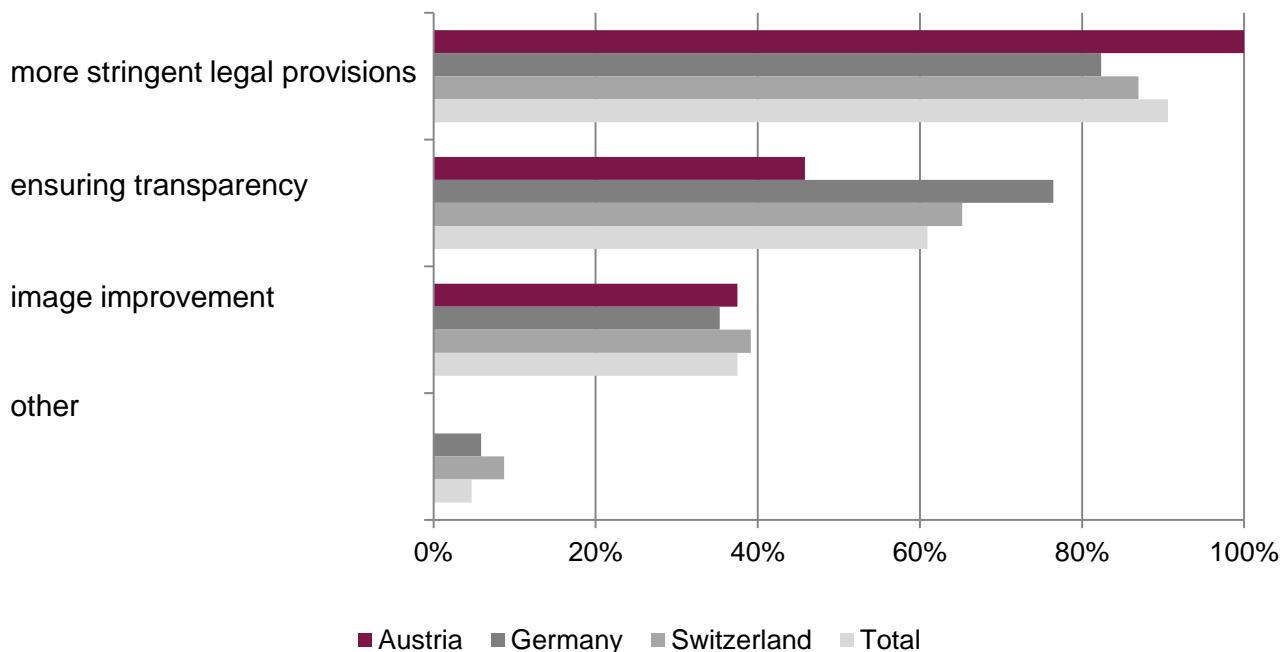


Figure 12: Laws extensions for external risk reporting will increase

An analysis of the reasons why will companies in the future decide to external risk reporting in the Annual Report, there is the assessment of management as follows: The main reason is it consistent (90%) the tightening of legal provisions referred to Austrian companies agree to even 100%, respectively. Besides ensuring transparency takes a greater importance. Nearly 40% of all estimates given are based on the image improvement and other reasons, such as the increase in credit (Figure 13).





multiple answers were possible

Figure 13: The main reasons for the external risk reporting in annual report

Agreement among the business leaders in all countries, that even the best risk reporting incidents such as an economic crisis can not prevent or repel.

## References:

Buchheim, R. & Beiersdorf, K. & Billinger, S. (2005): Die Risikoberichterstattung von Banken zwischen HGB/ DRS, IFRS und Basel II, in: KoR, 6/2005, S. 234-247.

Euler, S. & Fink, T. (2009): Effizienzsteigerung durch eine Balance zwischen Compliance und Performance – Überblick über Integrationsansätze in der Finanzfunktion von Kreditinstituten, S. 147 ff. in: Jelinek, B./Hannich, M. (2009): Wege zur effizienten Finanzfunktion in Kreditinstituten: Compliance & Performance, Wiesbaden: Gabler, 2009.

Fröhling, O. (2000): KonTraG und Controlling: Eckpfeiler eines entscheidungsrelevanten und transparenten Segmentcontrolling und -reporting, München: Vahlen, 2000

Schmidt, S.M. (2001): Corporate Governance in deutschen und amerikanischen Aktiengesellschaften. Frankfurt am Main

Shleifer, A. & Vishny R. (1997): A survey of Corporate Governance, JF 1997 Vol. LII, S. 737-775

Theuermann, C. (2011). Corporate Risk Management in der Unternehmenspraxis – Quantifizierung von Währungsrisiken: Entwicklungsstand und Herausforderungen in Österreichs Topunternehmen zeigen Nachholbedarf auf. CFOaktuell, 5. Jahrgang, Februar 2011, Nr. 1, S. 11-14

Theuermann, C. & Knefz-Reichmann, A. & Walzl, K. (2011): Risikoberichterstattung in den TOP-Unternehmungen der DACH-Länder – Entwicklungsstand und zukünftige Herausforderungen in der

externen Risikoberichterstattung in der Unternehmenspraxis, in: CFOaktuell, 5. Jahrgang, Oktober 2011, Nr. 5, S. 167-170

Theuermann, C. & Knefz-Reichmann, A. & Waltl, K. (2011): Risikoberichterstattung in den Top-Unternehmungen der DACH-Länder – Entwicklungsstand und zukünftige Herausforderungen in der externen Risikoberichterstattung in der Unternehmenspraxis, Graz 2011, FH CAMPUS 02, Studienrichtung Rechnungswesen & Controlling, Körblergasse 126, 8020 Graz

Weber, D. (2010): Ziele und Erfolgsfaktoren der externen Risikoberichterstattung von Kreditinstituten, in: KoR 4/2010, Seite 208-216.

## Investment Decisions under uncertainty: Example of Russian Companies

Andrey Aistov<sup>1</sup>, Ekaterina Kuzmicheva<sup>2</sup>

<sup>1,2</sup>National Research University Higher School of Economics, Russia

**Abstract.** *The paper contains empirical estimates of how behavioral factor (an attitude towards risk), rationality and uncertainty influence on investment decisions (capital investment) of Russian companies. The research is guided by the models of Sandmo (1971), Bo and Sterken (2007). We have tested a hypothesis, that risk preferring companies tend to grow investment, while risk averse companies are more likely to decrease the number of investment projects under uncertainty. The following rational variables, explaining investment policy, are included into the model: sales growth, market power, return on equity, debt to equity ratio, current liquidity. Since the time span of the research includes both the crisis period (years 2008, 2009) and the period before the crisis (2004-2007) we have also estimated the time effect on the companies' investments. The following estimators have been used to get the results: ordinary least squares; fixed effects model; random effects model; panel data models with binary variables controlling time effects; Hausman-Taylor's model, generalized method of moments.*

**Keywords:** *capital investment, attitude towards risk, demand uncertainty*

### 1. INTRODUCTION

Since investment fluctuations aggregated on the country (world) levels seem to explain the future economic country conditions to a large extent, the analysis of corporate investment decisions is the constant object of methodological and empirical research of economists. The last decades abound in the articles devoted to the impact of uncertainty on corporate investment in capital assets. The unquenchable interest in investigation of the uncertainty effect is caused first of all by the fact, that the results of the significance and the sign of uncertainty – investment relationship are quite ambiguous.

Theoretical and empirical research singles out several mechanisms (channels) through which uncertainty affects investment. Till now it is not quite clear, which channel can be recognized as the most substantial one, since from an empirical point of view it is quite difficult to describe each channel separately. Nevertheless most studies specify the negative effect of uncertainty on investment.

The paper contains the results of empirical estimates, data on how uncertainty, behavioral and rational factors of making decisions influence the investment policy of Russian companies. We pay particular attention to testing the impact of investors' attitude towards risk on the

relationship between demand uncertainty and investment volume. This factor (the risk attitude) is known not to be rational, but subjective and behavioral one. It “absorbs”, to a large extent, the mood existing in a company, an industry, a country, and reflects individual investors’ preferences.

It is necessary to point out that most empirical studies of uncertainty impact do not take into account the risk attitude factor. The common problem is that a range of financial models has the prerequisites of the world perfection and economic agents’ (investors’) rationality. A rational investor is the one, who makes a forecast in some objective way without leaving traces of individual preferences on an objective function. Thus, one ignores the psychology of investor’s behaviour, his attitude towards risk. Typically, the rational agent is attributed either a negative attitude to risk or he is considered to be a risk-neutral one. However according to Nickell (1978) only if it is assumed that, capital markets are perfect and certainty exists, one can ignore the preferences of economic agents in considering company’s investment decisions. Consequently, under uncertainty the investors’ behaviour and their utility functions become indispensable for the analysis. This also suggests that firms should be treated as agents, maximizing the expected discounted utility of profits rather than maximizing discounted profits (Bo and Sterken, 2007).

## **2. RELATED LITERATURE**

Sandmo (1971) proves, that under price uncertainty on the competitive market the optimal output of a risk averse firm is smaller than the certainty output. Leland (1972) extends Sandmo’s conclusion on imperfectly competitive firms under demand uncertainty. The effect of uncertainty on the optimal output of a risk averse quantity-setting firm is negative: the risk averse firm will produce less than it would under certainty. Risk preference of quantity-setting firm implies that optimal production will be higher in uncertainty, than in certainty. A risk averse quantity – and price-setting firm tends to set lower both price and production, while the impact of risk aversion on a price-setting firm is ambiguous. Nickell (1978) finds that risk averse firm tends to invest less facing higher uncertainty, while a risk taking economic agent is likely to increase the investment with growing uncertainty. Nakamura (1999) deduces the optimal investment rule, where the decision is determined by the values of output price uncertainty, the degree of relative risk-aversion, and an elasticity of output to labor in the Cobb–Douglas production function. On the basis of the investment function Nakamura shows that the effect of uncertainty on investment can be positive, negative and zero depending on the relationship between a degree of relative risk-aversion and an elasticity of output to labor in a Cobb–Douglas

production function. If a degree of relative risk-aversion is higher than an elasticity of output to labor in a Cobb–Douglas production function, the effect of uncertainty on investment is negative. Saltari and Ticchi (2005) by criticizing Nakamura's approach concerning the value function used to derive the investment function propose an alternative framework of the investment-uncertainty relationship. The main difference between the models is that the former consider a discrete time model with identically, independently distributed output price shocks while the model of the latter is in continuous time with the output price following a Brownian motion. Nevertheless, the main result of researchers is the same: the effect of uncertainty on investment is generally positive except, when coefficient of relative risk aversion is lower than one, but higher than elasticity of output to labor in a Cobb–Douglas production function. Femminis (2008) proves that the result of Saltari and Ticchi (2005) depends on the assumption of complete capital depreciation after production. Rejecting this assumption and taking depreciation parameter into account, Femminis shows that the investment–uncertainty relation is negative for values of the risk-aversion index larger than unity.

Saltari and Ticchi (2007) prove, that the model showing the impact of uncertainty on investment should include the intertemporal elasticity of substitution in addition to the risk attitude factor. The risk aversion cannot by itself explain a negative relationship between aggregate investment and aggregate uncertainty. A negative investment–uncertainty relationship requires that the relative risk aversion and the elasticity of intertemporal substitution are both relatively high or both relatively low. Thus, if the elasticity of intertemporal substitution is low, then increasing uncertainty provokes the growth in investment even if risk aversion is very high.

Bo and Sterken (2007) testing the relationship between demand uncertainty, the risk attitude and companies' investment level on a sample of 94 Dutch non-financial firms show, that on the whole risk averse companies respond to an increase in demand uncertainty by shrinking the investment expenditures, while risk preferring firms tend to invest more.

### **3. THEORETICAL MODEL**

The framework of the model chosen as a basic one for this paper can be found in the work of Sandmo (1971). The model was worked out by Bo and Sterken (2007) to study the corporate capital expenditures. Let us briefly describe the key conclusions of the model.

In certainty at time  $t$  the firm chooses the amount of investment. The model considers short term (1 year) investment decisions: the year  $t$  investment,  $I_t$ , will be used in production in year  $(t+1)$ ; depreciation is not accrued. The labour variable is completely flexible. The firm

chooses the capital amount to maximize the expected utility of profit in the year (t+1). The profit function in the year (t+1):

$$\pi_{t+1}(I_t) = F(K_{t+1}, L_{t+1}) - w_{t+1}L_{t+1} - G(I_t, K_t) - I_t \quad (1)$$

where  $\pi_{t+1}$  is net operating profit for the period (t + 1),  $F(K_{t+1}, L_{t+1})$  is the revenue function,  $K_{t+1}$ ,  $L_{t+1}$  are the beginning-of-period capital stock and the labor input,  $I_t$  is the gross investment of the firm at time t,  $w_{t+1}$  is the nominal wage rate in the period (t + 1), and  $G(I_t, K_t)$  is the internal convex cost function of adjusting the capital stock. The prices of output and capital goods are normalized for simplicity.

Taking into consideration the investors' attitude to risk, the objective function of the firm is the maximization of the expected utility of profit:

$$E[U(\pi_{t+1})] = E\{U[F(K_t + I_t), L_{t+1}] - w_{t+1}L_{t+1} - G(I_t) - I_t\} \quad (2)$$

The sufficient condition for the existence of maximum of (2) does not impose any constraints on the investors, allowing them to be risk averse, risk taking or neutral in certainty.

Further Bo & Sterken include uncertainty into the model, limiting it to demand uncertainty. According to Guiso & Parigi (1999) stochastic demand is an important source of uncertainty faced by a firm, because it absorbs the overall external uncertainty surrounding the firm. Demand fluctuations cause the fluctuations in the revenue function  $F(K,L)$ , which are introduced by two shift parameters  $(\gamma, \theta)$ , so that revenue function under demand uncertainty is  $(\gamma F + \theta)$ . It is assumed that stochastic demand is defined as a mean reversion process.

Under demand uncertainty the profit function becomes:

$$\pi_{t+1}(I_t, \gamma) = [\gamma F((K_t + I_t), L_{t+1}) + \theta] - w_{t+1}L_{t+1} - G(I_t) - I_t \quad (3)$$

The demand uncertainty impact on corporate optimal investment policy is revealed by totally differentiating the first-order condition of utility function with respect to shifts introduced. The substitution of variables by the Arrow-Pratt measure of absolute risk aversion allows Bo and Sterken to conclude, that the sign of the impact of demand uncertainty on investment depends on the sign of the measure of absolute risk aversion. Thus, the results of the model which are crucial for us are the following: uncertainty encourages investment, if the investor is a risk lover; uncertainty is not reflected on the corporate investment volume, if the investor is risk neutral; uncertainty causes a decrease in the investment activity if the investor is not a risk-taker.

Bo and Sterken's theoretical model seems to be a simple and obvious ground for the necessity to include the factor of investors' attitude to risk into empirical models to test uncertainty impact on corporate investment decisions.

## 4. KEY EXPLANATORY VARIABLES OF EMPIRICAL MODELS

### 4.1. RISK AVERSE AND RISK PREFERRING AGENTS

While constructing an empirical proxy for the factor of investors' attitude towards risk we will follow Fisher and Hall's approach (1969), also used by Bo & Sterken (2007).

A firm is assumed to maximize the expected utility  $U(\pi+W)$ , where  $\pi$  is profit (stochastic variable),  $W$  is wealth. A risk premium  $R(\pi,W)$  is a "price" investors are willing to pay to eliminate uncertainty. The authors Fisher and Hall show, that if a company follows the optimal decision rule, then its risk premium can be measured by the moments of the distribution of net returns. Expanding  $U(\pi+W)$  in a Taylor series around the point  $(\pi''+W) = E(\pi+W)$  and taking expected values gives:

$$U(\pi + W) - E[U(\pi'' + W)] = -\sigma_{\pi}^2 \frac{U''}{2!} (\pi''+W) - \sigma_{\pi}^3 \frac{U'''}{3!} (\pi'' + W) - \dots \quad (4)$$

The left-hand side of (4) in a monetary equivalent is a risk premium. The second, third and higher moments set the magnitude of the risk premium. For a risk averse agent as far as  $U'' < 0$  for a concave utility function, the risk premium is growing with higher variances of returns. The impact of the third moment is ambiguous since  $U'''$  could be positive, negative and zero. Higher moments add little information about the characteristics of the distribution and are often ignored (Fisher & Hall, 1969).

When the risk premium is measured, it is possible to extract the value, determining the agent's attitude to risk (Arrow, 1971). In fact the expression (4) reflects the relationship between the risk premium and the measure of risk aversion, since on the right-hand side of (4) the second derivative of the utility function  $U''$  reveals the risk attitude of the agent. In addition, this relationship is established by Arrow-Pratt approximation: the risk premium is shown to be proportional to the square of the risk:

$$\text{Risk - premium} = \frac{1}{2} \sigma_x^2 R_a + \text{terms of higher order} \quad (5)$$

where  $\sigma_x^2$  - is the variance of a stochastic variable (for example, net returns),  $R_a$  is the measure of absolute risk aversion.

Thus, if we estimate the risk premium as the difference between realized profits and risk-adjusted profits as Bo and Sterken do, the corporate risk attitude factor can be derived by defining how much the risk premium can be explained by the second and third moments of profit distribution.

$$\text{Risk - premium}_t = RC * SD_t + b * SKEW_t \quad (6)$$

where  $RC$  is the measure of absolute risk aversion,  $SD_t$  is standard deviation of profits,  $SKEW_t$  is the third moment of the profit rate (skewness).

$$Risk - premium_t = Profit_t^{realized} - Profit_{risk-adj} \quad (7)$$

$$Profit_t^{realized} = Profit_{risk-adj} + RC * SD_t + b * SKEW_t \quad (8)$$

where  $Profit_t^{realized}$  is a net profit a company earns in year t,  $Profit_{risk-adj}$  is a constant over the whole sample period, which shows the impact on profits, that is not reflected through coefficients before standard deviation ( $RC$ ) and skewness ( $b$ ).

To eliminate the size effect net profits were scaled by total assets.

There is a sample of 596 Russian companies at our disposal during the period 2002-2009. Due to the small length of the period studied, standard deviation and skewness in 2004 and 2005 were calculated with only 3 and 4 points correspondingly; for the year 2006 the second and third moments were calculated with 5 points. Starting from 2007 we continue to add the number of points one by one. Table 1 shows the descriptive statistics for the estimated risk attitude coefficients ( $RC$ ).

Table 1

Descriptive statistics for the measure of risk aversion coefficients ( $RC$ )

M	M	St	Sk	Ku	M	M	O
ean	edian	d. Dev.	ewness	rtosis	in.	ax.	bs.
-	-	5.	-	10.	-	3	3
0.1280	0.1422	4729	0.4469	2530	45.2947	1.0810	576

The measure of risk aversion calculated in the way described above is quite a conditional value. However, it allows us to divide investors into those who reject risk and those who prefer risk. The division is done according to the median value. Thus, we will classify the companies which have the value of the risk attitude coefficient lower than the median as preferring risk, and higher than the median – as risk averse.

#### 4.2. THE MEASURE OF UNCERTAINTY

There are several approaches available in empirical literature on how to construct uncertainty measure. The one that is used for this paper is based on estimation of the variance of the unpredictable part of a stochastic process (this approach is applied by Aizenman and Marion (1993), Ghosal (1995b), Ghosal and Loungani (2000), Bo and Sterken (2007)). The sequence of implementation of the method is the following:

- 1) to set a forecasting equation for uncertainty variable;
- 2) to get the residuals by estimating the forecasting equation;
- 3) to calculate the standard deviation of the residuals as the measure of uncertainty.



As we have noted above, the overall uncertainty is constructed through estimation of demand uncertainty. Demand forecast is built on the base of sales history. Sales of a firm are described as a trend-stationary autocorrelated process AR(1).

$$Sales_t = c_0 + c_1Trend + c_2Sales_{t-1} + \varepsilon_t \quad (9)$$

where *Sales* is the volume of company's sales,  $c_0$ ,  $c_1$ ,  $c_2$  are parameters,  $\varepsilon$  is an error term.

The parameters of the model (9) are estimated company by company. The estimated standard deviations of demand shocks  $\varepsilon_t$  are used as the measure for demand uncertainty. The standard deviation of an error term is calculated starting from year 2004 using the data from 2002 to 2004. Each following year adds the observations to be included. Thus the residuals for year 2009 are estimated using the data set during 2002-2009. To eliminate the size effect, the discovered values of residuals are weighed by total assets and then the common logarithm of the parameter is used.

Apart from the summands presented in equation (9) the control variables which are known to influence consumer demand on goods indirectly are added in the model. To these variables we refer: an increase in the nominal wages in the economy, an increase in the number of the employed, an increase in the part of income used for purchase of goods and services, price index in production sector. Extension of the model does not cause any statistically significant changes in parameters' values.

## 5. DATA AND EMPIRICAL ESTIMATES

Russian companies' data are used to test the demand uncertainty impact on corporate investment decisions. To the best of our knowledge, previous empirical works concerning the uncertainty – investment relationship do not deal with Russian market. For the research purposes the database FIRA–PRO was used. It contains the companies' financial statements and key macroeconomic indicators of Russia. The sample consists of 596 companies from seven industries: 1) the production of vehicles, full-trailers and semitrailers; 2) the metallurgical industry; 3) the communications industry; 4) the cellulose, wood pulp, carton industry; 5) the food industry; 6) the plastic and rubber industry; 7) the chemical industry.

Financial statements were collected during 2002-2009 years.

The following model is chosen for testing:

$$\begin{aligned} \left(\frac{I}{A}\right)_{it} = & f_i + f_t + b_1 * SG_{it} + b_2 * SG_{it-1} + b_3 * UM_{less\ risky_{it}} + b_4 * UM_{more\ risky_{it}} + \\ & + b_5 * Pow_{it} + b_6 * \left(\frac{D}{E}\right)_{it} + b_7 * Liq_{it} + b_8 * ROE_{it} + \xi_{it} \end{aligned} \quad (10)$$

where  $I/A$  is a common logarithm of the ratio: “purchase of fixed assets, income-bearing placements into tangible and intangible assets” (from Cash Flow statement) divided by total assets (weighing is used to eliminate a size effect);  $f_i$ ,  $f_t$  are fixed and time effects correspondingly;  $SG$  is a common logarithm of annual sales growth rate;  $UM$  less risky is the uncertainty measure for risk averse companies, it takes on the value of demand uncertainty for companies less inclined to risk, and takes the value of 0 for risk preferring companies;  $UM$  more risky is the uncertainty measure for preferring risk companies, it takes on the value of demand uncertainty for companies more inclined to risk, and takes the value of 0 for companies which reject risk;  $Pow_{it}$  is a company’s market power - the ability to set as higher price as possible in comparison with cost, the variable is calculated as a common logarithm of the ratio of sale proceeds to cost;  $D/E$  is a common logarithm of the ratio of debt to equity;  $Liq$  is a common logarithm of the current liquidity coefficient;  $ROE$  is a common logarithm of return on equity coefficient;  $\zeta$  is an error term (investment shocks which are not explained by regressors).

It is necessary to point out, that as the cash flow statements are presented in the database starting from 2004, the regression (10) is constructed during 2004-2009 (years 2002, 2003 are excluded). However for equations (8), (9) the full period is used.

Table 2 contains the descriptive statistics of the regression (10) variables over the whole period of observations.

Table 2

Descriptive statistics of dependent and explanatory variables

Variable	Mean	Std. Dev.	Min	Max	Skewness	Kurtosis	Obs.
I/A	-3.2762	1.4573	-12.3180	-0.3095	-1.2937	6.3843	3087
SG	0.0834	0.3638	-3.1245	2.5786	-1.5226	13.9112	3570
UM less risky	-0.9612	1.2463	-6.5969	2.7729	-0.9698	2.9761	3576
UM more risky	-1.0083	1.2461	-8.2518	2.1255	-0.9024	3.1649	3573
Pow	0.2347	0.2343	-0.8317	2.6288	1.8470	11.5179	3571
D/E	0.0536	1.4879	-5.2715	9.1960	0.5143	4.4134	3409
Liq	0.4709	0.8322	-2.7610	5.1568	0.5475	4.3364	3574
ROE	2.5821	1.4374	-6.2366	11.2426	-0.8342	6.9508	2893

While estimating the parameters of the regression (10) we deal with panel data. A variable “ind” - industry is included into the model as a control variable. The following estimators are used to get the results: ordinary least squares (OLS); fixed effects model (FE); random effects model (RE); panel data models with binary variables controlling time effects ( $RE_{time}$ ,  $FE_{time}$ ); Hausman-Taylor’s model (HT). Estimation results are presented in table 3.

Table 3

Econometric estimates

Variable	OLS	RE	RE <sub>time</sub>	FE	FE <sub>time</sub>	HT
(1)	(2)	(3)	(4)	(5)	(6)	(7)
SG	0.496*** (0.102)	0.455*** (0.087)	0.144 (0.093)	0.413** (0.094)	0.051 (0.100)	0.459*** (0.087)
SG <sub>(t-1)</sub>	0.585 (0.112)	0.493*** (0.098)	0.427*** (0.097)	0.436*** (0.106)	0.325*** (0.105)	0.498*** (0.098)
UM less risky	-0.135*** (0.032)	-0.085** (0.043)	-0.125*** (0.043)	0.087 (0.090)	-0.007 (0.089)	-0.099** (0.045)
UM more risky	-0.106*** (0.034)	-0.056 (0.045)	-0.086* (0.045)	0.064 (0.089)	-0.052 (0.089)	-0.066 (0.047)
D/E	-0.214*** (0.027)	-0.156*** (0.031)	-0.149*** (0.031)	-0.040 (0.047)	-0.053 (0.046)	-0.090** (0.042)
Liq	-0.322*** (0.047)	-0.230*** (0.051)	-0.214*** (0.050)	-0.151** (0.063)	-0.136*** (0.061)	-0.157*** (0.058)
Pow	0.323** (0.142)	0.189 (0.181)	0.192 (0.180)	-0.251 (0.262)	-0.271 (0.257)	-0.074 (0.251)
ROE	0.125*** (0.022)	0.098*** (0.021)	0.093*** (0.021)	0.092*** (0.024)	0.081*** (0.024)	0.106*** (0.022)
Ind1	-0.226** (0.110)	-0.225 (0.167)	-0.223 (0.168)	-	-	-0.158 (0.184)
Ind2	-0.041 (0.107)	-0.037 (0.164)	-0.028 (0.165)	-	-	0.038 (0.181)
Ind3	0.564*** (0.109)	0.743*** (0.169)	0.770*** (0.169)	-	-	0.896*** (0.188)
Ind4	0.168 (0.112)	0.189 (0.172)	0.168 (0.172)	-	-	0.250 (0.187)
Ind5	-0.033 (0.110)	0.011 (0.172)	0.012 (0.173)	-	-	0.100 (0.189)
Ind7	-0.106 (0.109)	-0.029 (0.168)	-0.020 (0.169)	-	-	0.099 (0.187)
Year 2005	-	-	-0.110* (0.062)	-	-0.124* (0.064)	-
Year 2006	-	-	-0.051 (0.060)	-	-0.057 (0.061)	-
Year 2008	-	-	-0.146** (0.064)	-	-0.144** (0.065)	-
Year 2009	-	-	-0.581*** (0.070)	-	-0.633*** (0.072)	-
Cons	-3.841*** (0.118)	-3.742*** (0.159)	-3.608*** (0.163)	-3.164*** (0.154)	-3.119*** (0.159)	-3.843*** (0.177)
Observations	2044	2044	2044	2044	2044	2044

Notes: standard errors are taken in the parentheses; the significance level is marked by the asterisks: \* p<0.1, \*\* p<0.05, \*\*\* p<0.01.

The most substantial result concerns the significance and the sign of the coefficients  $b_3$ ,  $b_4$  before variables *UM less risky*, *UM more risky*. On the whole it is necessary to stress, that the factor of investors' risk attitude is found to be one of fundamental, while constructing the investment policy by Russian companies during 2002-2009.

The coefficient  $b_3$  before the variable designating the measure of demand uncertainty for risk averse companies is significant and negative. It means that under demand uncertainty companies which tend to risk less, reduce the volume of investment in capital assets. As far as risk preferring companies are concerned, they either lower investment in a more moderate manner, than risk averse investors (according to columns 2, 4 of table 3), or do not decrease investment at all (coefficient  $b_4$  before the coefficient of the measure of demand uncertainty in columns 3, 5, 6, 7 is statistically insignificant). Thus, on the basis of the factor of investors' risk attitude we have managed to distinguish companies' investment decisions under demand uncertainty.

It is necessary to stress, that our results coincide with the conclusions of Bo and Sterken (2007) who have investigated the sample of 94 non-financial companies listed at the Amsterdam Stock Exchange during the period 1985–2000. The researches show that companies, which are prone to risk, intensify investment under demand uncertainty (the coefficient is significant and positive), while risk averse companies decline the activity of investment policy.

Let us clarify the results of the impact of the rational variables included into the model.

The expectations of sales growth (*SG*) encourage the increase of resources directed to investment in tangible and intangible assets (*I/A*).

Hypothetically, companies possessing a higher market power (*Pow*) seem to intensify investment in capital assets. It is a necessary prerequisite for a company to secure its leading position in the market, to maintain the production capacities and realize the possibility to increase sales in case of a favourable price. The hypothesis proves to be true: in fact, companies, which are able to increase the gap between the price set and production cost, tend to increase the investment in capital assets.

The next point to consider is whether the investment policy of the company is influenced by the debt volume. Are the companies possessing more debt (relative to equity) characterized by the opportunistic behaviour and tend to participate in risky investment projects, knowing that they risk not by their own, but by borrowed resources? Or alternatively if a company is burdened with substantial debt, it is likely to stay cautious in relation to possible new investment projects in order not to deteriorate its current state, isn't it? The significant and negative coefficient before the variable (*D/E*) in 4 models out of 6 gives the evidence to affirm, that the higher the

leverage, the more conservative investment policy is. We also have checked if the latter might change, depending on whether it is a risk averse or a risk preferring company. In order to do that, we divided the sample into two subsamples according to the median value of the risk aversion measure. The results proved to be robust for both kinds of attitude towards risk.

Current liquidity coefficient can be treated as a financial restraint to draw away, in particular, the cash assets into investment projects. The negative dependence indicates that the more resources are in current assets, the less funds are directed for capital assets purchasing.

It was also of our interest to test the relationship between the investment volume and the efficiency of company's functioning. To reflect the efficacy, the coefficient of return on equity (*ROE*) is included into the model. It is assumed, that the higher the return on equity, the more accumulated through profits resources is possible to direct for development, i.e. in investment projects. In fact, according to the estimates in the table above, more successful firms (according to this criterion) tend to invest more aggressively.

Since the time span of the research includes both the crisis period (years 2008, 2009) and the period before the crisis (2004-2007) we have estimated the time effect on the companies' investment with  $RE_{time}$  and  $FE_{time}$  models. The year 2007 is chosen as a basic one. According to the results, presented in table 3, we found the increase of investments in 2005-2006 and decrease in 2008 and 2009 in comparison to the base year. This result corroborates the negative impact of crisis on the companies' willingness to invest in capital assets.

## 6. CHECK OF RESULTS' ROBUSTNESS

To check the robustness of the results with regard to the choice of estimator we present Generalized Method of Moments (GMM) estimates below. The sample is divided by two subsamples according to the median value of the measure of risk aversion. Table 4 contains the results of two models (GMM 1, GMM 2) which differ in the range of explaining variables and instruments. While estimating the model GMM 2, we imposed the equality condition of the coefficients in the first equation (for amplitudes) and the second equation (for differences).

Table 4

The GMM estimators

Parameter	GMM 1		GMM 2	
	For risk averse investors	For risk preferring investors	For risk averse investors	For risk preferring investors
(1)	(2)	(3)	(4)	(5)
<i>1<sup>st</sup> equation</i>				
SG	1.376** (0.537)	0.451 (0.928)	0.836*** (0.189)	1.054*** (0.192)
UM	-0.542* (0.288)	-0.037 (0.273)	-0.265** (0.106)	0.252** (0.115)
Power	-	-	-0.063 (0.338)	0.284 (0.380)
Liq	-	-	-0.019 (0.134)	-0.169 (0.104)
ROE	-	-	0.300*** (0.054)	-0.023 (0.029)
Cons	-5.122*** (0.782)	-3.430*** (0.643)	-4.042*** (0.249)	-2.667*** (0.243)
Year 2006	0.978** (0.448)	-0.069 (0.753)	-	-
Year 2007	1.254** (0.529)	0.459 (1.137)	-	-
Year 2008	1.187 (0.870)	-0.197 (0.790)	-	-
Year 2009	0.327 (0.384)	-0.348 (0.583)	-	-
Number of observations	1507	1579	1255	1213
Instruments	SG, UM, Power, Liq, ROE (are written down in differences)		SG, UM, Power, Liq, ROE (are written down in differences)	
<i>2<sup>nd</sup> equation (in differences)</i>				
SG	1.323*** (0.241)	1.797*** (0.207)	0.836*** (0.189)	1.054*** (0.192)
UM	-0.129 (0.253)	0.199 (0.324)	-0.265** (0.106)	0.252** (0.115)
Power	-	-	-0.063 (0.338)	0.284 (0.380)
Liq	-	-	-0.019 (0.134)	-0.169 (0.104)
ROE	-	-	0.300*** (0.054)	-0.023 (0.029)
Number of observations	1202	1258	918	860
Instruments	SG, UM, Power, Liq, ROE		SG, UM, Power, Liq, ROE for the previous period	

*Notes:* standard errors are taken in the parentheses; the significance level is marked by the asterisks: \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

As it follows from table 4, estimation results concerning the risk attitude factor coincide with the results of Hausman-Taylor's model and Fixed Effects model: companies that tend to risk at least do not lower the investment under demand uncertainty.

Estimates of GMM 2 provide more categorical results, by allowing to distinguish investment decisions between risk averse and preferring risk companies. In column 5 of table 4 the coefficient before the uncertainty measure variable for preferring risk companies (UM) is significant on 5% level and positive.

## CONCLUSION

Sharing the arguments of theoretical and empirical research, which criticize the groundlessness of exclusion of the factor of attitude towards risk while constructing the companies' investment policy under uncertainty, in this paper we have tested the demand uncertainty impact on investment in capital assets through the measure of risk aversion channel, using the sample of 596 Russian companies. Apart from the risk factor we have also included into the model the variables which establish corporate investment decisions, such as: sales growth, market power of the company, debt to equity ratio, return on equity, current liquidity coefficient, time effects.

The regression analysis of the panel data constructed provides the evidence, that investment decisions of Russians companies under demand uncertainty are established by both rational and behavioral (risk attitude) factors. The dependence of company's investment volume on its financial performance (values of return on equity, current liquidity, financial leverage) and the position in industry (the market power) is shown. Besides, it is found, that investors' risk attitude is crucial while making investment decisions under demand uncertainty. Risk averse companies tend to decrease investment, whereas for risk preferring companies this tendency was not revealed. In this connection, the theoretical model of Sandmo (1970), developed by Bo and Sterken (2007) seems to be viable for Russian market during 2002-2009: risk-neutrality assumption distorts the modeling.

• **REFERENCES**

1. Abel, A. B. (1983). Optimal investment under uncertainty. *American Economic Review*, 73(1), 228–233.
2. Aizenman, J., Marion, N. (1993). Macroeconomic Uncertainty and Private Investment. *Economics Letters*, 41 (2), 207-210.
3. Aizenman, J., & Marion, N. (1999). Volatility and investment: interpreting evidence from developing countries. *Economica*, 66, 155–179.
4. Arrow, K. J. (1971). Essays in the theory of risk-bearing. North Holland: Markham Publishing Company.
5. Bernanke, Ben S. (1983). Irreversibility, uncertainty and cyclical investment. *Quarterly Journal of Economics*, 98(1), 85-106.
6. Bo, H., & Sterken, E. (2002). Volatility of the interest rate, debt and firm investment: Dutch evidence. *Journal of Corporate Finance*, 8, 179–193.
7. Bo, H., Sterken S. (2007). Attitude towards risk, uncertainty, and fixed investment. *The North American Journal of Economics and Finance*, 18(1), 59-75.
8. Boyle, G. W., & Guthrie, G. A. (2003). Investment, uncertainty, and liquidity. *Journal of Finance*, 58, 2143–2166.
9. Caballero, R. J. (1991). Competition and the non-robustness of the investment-uncertainty relationship. *American Economic Review*, 81, 279–288.
10. Dixit, A. K., & Pindyck, R. S. (1994). Investment under uncertainty. Princeton, NJ: Princeton University Press.
11. Femminis, D. (2008) Risk-aversion and the investment–uncertainty relationship: The role of capital depreciation. *Journal of Economic Behavior & Organization*, 65, 585–591
12. Fisher, I. N., & Hall, G. R. (1969). Risk and corporate rates of return. *Quarterly Journal of Economics*, 83, 79–92.
13. Ghosal, V. (1995). Input Choices under Price Uncertainty. *Economic Inquiry* 33(1), 142-158.
14. Ghosal, V., Loungani, P. (2000). The differential impact of uncertainty on investment in small and large business. *Review of Economics and Statistics*, 82, 338–349.
15. Guiso, L., Parigi, G. (1999). Investment and demand uncertainty. *Quarterly Journal of Economics* 114 (1), 185–227.
16. Hartman, R. (1972). The effects of price and cost uncertainty on investment. *Journal of Economic Theory*, 5, 258–266.



17. Hartman, R. (1976). Factor demand with output price uncertainty. *American Economic Review*, 66, 675–682.
18. Leahy, J.V., and Whited T.M. (1996). The Effect of Uncertainty on Investment: Some Stylised Facts. *Journal of Money, Credit and Banking*, 28, 64-83.
19. Leland, H. E. (1972). Theory of the firm facing uncertain demand. *American Economic Review*, 62, 278–291.
20. McDonald, R., & Siegel, D.R. (1986). The value of waiting to invest. *Quarterly Journal of Economics* 101(4), 707-27.
21. Minton, B. A., & Schrand, C. (1999). The impact of cash flow volatility on discretionary investment and the costs of debt and equity financing. *Journal of Financial Economics*, 54, 423–460.
22. Nakamura, T. (1999). Risk-aversion and the uncertainty-investment relationship: A note. *Journal of Economic Behavior & Organization*, 38, 357–363.
23. Nickel S. J. (1974). On the role of expectations in the pure theory of investment. *Review of Economics Studies*, 41(1), 1-19.
24. Nickell, S. J. (1978). The investment decision of firms. Cambridge, MA: Cambridge University Press.
25. Pindyck, R.S. (1986). Capital Risk and Models of Investment Behavior. Sloan School of Management, MIT, mimeo.
26. Pindyck, R.S. (1993). A note on competitive investment under uncertainty. *American Economic Review* 83, 273–277.
27. Saltari, E., Ticchi D. (2005). Risk-aversion and the investment-uncertainty relationship: a comment (2005). *Journal of Economic Behavior & Organization*, 56, 121–125
28. Saltari, E., Ticchi D. (2007). Risk aversion, intertemporal substitution, and the aggregate investment–uncertainty relationship. *Journal of Monetary Economics* 54, 622-648
29. Sandmo, A. (1970). The effect of uncertainty on saving decisions. *Review of Economic Studies*, 37, 353–360.
30. Sandmo, A. (1971). On the theory of the competitive firm under price uncertainty. *American Economic Review*, 61, 65–73.
31. Xie, F. (2009). Managerial flexibility, uncertainty, and corporate investment: The real options effect. *International Review of Economics & Finance*, 18(4), Pages 643-655.

## Relation between Market Value Added and Earning Per Share and Price to Earnings Ratio

Farzaneh Heidarpour<sup>1</sup>, Rezvan Hejazi<sup>2</sup>, Hamid Eskandari<sup>3</sup>

<sup>1,3</sup> Islamic Azad University-Central Tehran Branch

<sup>2</sup> Alzahra University, Tehran,Iran.

**Abstract.** *The present research aims at exploring the relationships among the market value added (as an economic criterion for performance assessment) and earnings per share and price to earnings ratio (as financial criteria of performance assessment). The statistical population under investigation consists of all companies listed in Tehran Exchange Stock during 2005-2009 including 125 companies. Testing and analyzing the hypotheses through the multiple regression model and single-variable models has led to one single conclusion indicating that there is a significant linear relationship between the square logarithm of the market value added and the earnings per share both for the overall 5-year period in question and for each of the years 2005 to 2009, while there is no significant linear relationship between the square logarithm of the market value added and price to earnings ratio. In the model explained, the relationship between earnings per share and the square logarithm of the market value added is a positive relationship for which the correlation coefficient is 32%.*

**Key Words:** *Market Value Added, Earning Per Share, Price to Earnings Ratio.*

### 1. Introduction

Modern stock companies are a mixture of different groups such as, managers, stockholders, and creditors. These groups interact through formal/informal contracts in a stocks company. It was believed for many years that all parts in a joint stock company seek a common goal; however this belief gradually has lost its fan during last 25 years when many controversies found between different parties' interests in a joint stock company (Jensen and Mc Ling 312:1976). All these controversies are organized in a theory known as "Agency theory". According to Jensen and Mc ling:

*Agency relation is comprised of a contract entered between stockholders to appoint one or more identities as representatives for conducting specific services on their behalf. Among the services- subject to the contract- includes authorities to make specific decisions (Jensen and Mc Ling 312:1976).*

Assumption that both parties are seeking their own interests implies that in some cases, the representatives fail to place interests of their stockholders at top priority. Stockholders on the other hand, may provide enough motivation for representative by paying tempting salary and allowances to representative and also devise supervising systems and defining boundaries to lessen effects of such controversy of interests. There are plenty of solutions for extending supervising systems, including direct manipulation in managerial affairs by stockholders, drawing up contract based on managers' bounces, preparing variety of financial statements at

different occasions regarding fiscal performance and also employing fiscal and economic tools (Tousi and Gomezjemia, 1994).

There are different supervising techniques to observe managers' actions. Major drawbacks have found in some of these techniques, which generate misleading information when applied for preparing fiscal reports. Different approaches have been suggested by different parties in company at different times. Adopting new techniques by beneficiaries is to cover deficits of traditional models. Along with discussing new standards for performance assessment, this work studies relation between traditional and modern standards.

## **2- Theoretical Framework**

Increasing value of stockholders is the prime goal of majority of companies, which is clearly the mere goal of stockholders. Moreover, adopting this goal ensures dedication of rare resources in most optimized way, so that stockholders' value is maximized through maximizing difference of market value and realized capital by stockholders. According to the definition, this difference is what we call market value added, and the more market value added, the better managers' performance. In some cases, market value added is defined as total market value minus paid capital by stockholders. For many enterprises, financing consists of ordinary stocks, debts and preferred stocks. We can estimate total capital provided by stockholders based on the value reported in financial statements. Total market value of a company includes market value of stockholders of ordinary stocks, debts and preferred stocks. Considering that price of stocks can be easily discovered from the market but finding market value of debts is not easy. Financial analysts consider reported debt value in financial statements as estimated market value of debt. This study investigates how market value added (as an economic index of performance evaluation) can explain earning per share and price to earnings ratio (as a financial index of performance evaluation).

Necessity of this study is economic profit of market value added from information contents merits for assessing managers' performance and creating stockholders value. Moreover its aim is to justify market value added can be used instead of earning per share and P/E ratio.

## **3- Literatures**

In a study titled "whether EPS speculations by managers reflect future income?" Yound and others (2009) proved a hypothesis, which implies more transparent financial information leads to higher future income. In addition, they investigate whether speculation of earnings per share by manager and related characteristic affect reactive coefficient of future profit or not. Findings showed that reactive coefficient of future profit has a significant effect on speculations when general and accurate speculations are required. They argued that more accurate and comprehend speculations help investors to make better decisions. Moreover, they found that in comparison with annual and long-term speculations, quarterly and short-term speculation increase turnover to future income ratio step by step. Therefore, even short-term and quarterly speculations help stockholders to have better perspective regarding future incomes. It implies for merits of quarterly profit speculations as suggested by "USA Chamber of Commerce", "CFA institute", "Institute for commercial round tables for moralities in companies" and "board of conference".

Wet and Hall (2009) argued in their study titled "relation between economic and market value added, and debt to net assets ratio" that, it is a generally held belief that companies ought to maximize market value added (not limited to total market value) toward maximizing stockholders' value. The best way to this end is to maximize economic value added, which reflects capacity of the organization to earn more income out of fixed amount of capital. Spread sheet model relies on three items (debts to net operational asset ratio, debts to financial net income ratio and debts to economic value added net assets ratio) to study effect

of debts to net income ratio. The model uses five difference scenarios with five different levels of debts to operational net assets ratio, debts to net financial assets ratio, debts to net economic value added to define relation (if any) between different types of debt to net income ratios and also their effects on profit, economic value added and market value added (consequently on company).

Results showed that, debts to net assets ratio generally include economic value added created by all three factors. However, there is no difference found between debts to total net assets including scenarios, which only encompass different financial bodies. Analyses made it clear that effect of debt to high net financial asset justified by low cost of capital (debt to net value of economic value added ratio). In another report, it was argued that debt to total net assets ratio comprises economic value added for all scenarios with similar fix cost would remain unchanged (only when weighted average of capital cost remains unchanged).

Morr (2008) argued in his research titled “improving accuracy of P/E estimates” that better estimate of P/E may be improved by using improved standards and scales. These indices are taken into account as weighted mean of bonds. Some sort of retrogressive approach on using treasury data as a factor of P/E leads to more accurate type of P/E. In addition, accuracy of information is achievable through applying P/E justification methods or analytical estimate of previous models.

Calculating P/E ratios of market the study introduced a valuable example for reassessing what is known as “market”. The study used S&P500 index to exempt bonds, which are significant portion of the market. The new P/E ratio of the market, which is weighted coefficient of P/E to S&P Index deficits, and drawback ratio is discussed as P/E ratio.

There is a more accurate estimate of P/E beside weighted coefficient. According to the results, it is possible to find R2 value using weighted coefficient without using previous P/E data. Weighted coefficient provides better chance for P/E based research in market.

Milonovich and Tesoui (1996) studied relation between market added value and performance measurement indices in computer industries. Among indices discussed in the study are: economic value added, earning per share, and stockholders’ value performance (pp.107). The study found highest relevancy for economic value added (reported R2 for economic value added, profit growth per share, earning per share and stockholders’ value performance is 42%, 34% and 39% respectively).

Nazarieh (2000) studied relation between earning per share and economic value added in mine non-metal producer in TSM during 1993-1998. Results showed no relation between economic value added and earnings per share. However, the former was found to be better than the latter for the specific industry under study. To explain the difference, the study mentioned imperfect market, high financing cost to income ratio, lack of relation between EVA and earnings per share.

#### **4- Necessity of the study**

Traditional indices are based on profit accounting data. Because of many factors including failing to consider cost of financing through stockholders value, failing to consider effects of future events and decisions such as finding new markets and access to new technologies, introduction of new products, strikes, new regulations and laws, etc. and believing on conservative approaches, general belief is that pessimism is preferred to optimism (Hendrickson and Breda ,1148: 1992). Adopting retrogression perspective, failing to taken intangible assets, and intellectual capital into account despite their role in creating value process and many techniques to manipulate profit and lose accounts are among the factors preventing managers to make reasonable decisions. In this regard, investors and stockholders need other indices to measure real performance of companies. One of the main basis of

economic value added is managers are in charge of creating value and maximizing stockholders value. There must be measure therefore, to investigate commitment of managers to this goal, which needs be employ a basis motivating managers. Value added model is able to meet this demand and tell stockholders how managers contribute in creating value.

Despite its advantages over other traditional techniques, there have been many criticisms to value added technique. Trying to answer such criticism, many researchers are working to find better indices to justify and perfecting current indices. Depending to historical records and calculating costs of chances for investors based on book value and distortion of results is one of such criticism. Researcher consequently introduced a refined version of the index (Barbara & Blome 2003:64) such as refined economic value added, balance economic income and market value added. Knowing this, necessity of this study is that is survey economic profit of market value added from information contents point of view and its merits for assessing managers' performance and creating stockholders value. Moreover its capacity to justify earning per share P/E ratio is under focus in the study.

## 5- Hypotheses

- 1: There is a relation between MVA and earning per share
- 2: There is a relation between MVA and P/E ratio.

## 6- Variables:

First step to test the hypotheses is to introduce an accurate and reasonable definition of variables which enable us to measure different factors in the study. There are two sets of independent and dependent variables defined in this study as follows:

### 6-1- Dependent Variable

#### Market value added (MVA)

Stewart (1991) introduced new index for value creating companies known as market value added. When total market value of a company exceeds invested resources of the company, it means that management of the company has created value for stockholders. In contrary, when market value is less than invested resources, the company has lost stockholders' value.

According to Stewart, difference between market and book value of a company is defined as:

$MVA = \text{market value} - \text{utilized investments in company}$

Frezati (2000) argued that MVA implies for difference between market value and economic investment (investments) in the company.

$MVA = \text{market value} - \text{investments in company}$

Where, utilized investment implies for all items of stockholders value such as capital, reserves, savings, accumulated profit and debts. To interpret MVA is similar to P/E ratio, with one difference which says MVA is a definite index while P/E is a relative one. Therefore, when MVA is positive, price/profit ratio is more than one, and when it is negative, the ratio is less than one (Maclinen 9:1998).

From Stewart's viewpoint MVA illustrates who much of MVA is added to /deducted from stockholders investment. Successful companies increase their market value, which leads to increase in investment resources, and vice versa. Success of companies in creating MVA (stockholder's value) depends on rate of income. Should company's income be more than costs of capital, stockholder will sell their stocks in the market with interest, and income rate is less than cost of capital, stockholders have to sell their stock with lose. In other words, positivity or negativity of MVA depends on company's income/costs of capital rate. This is the case for calculating economic value added. So that positive economic value added implies for growth of MVA and vice versa. Relation between economic value added and MVA is:

$MVA = \text{current value of all future economic value added}$

$$\frac{EVA_1}{(1+k)^1} + \frac{EVA_2}{(1+k)^2} + \dots + \frac{EVA_n}{(1+k)^n}$$

MVA implies for current net value of previous plans and future profitable chances, which shows how a company utilizes its investment successfully and predict future profitable changes to make proper planning. MVA therefore, is equal with current value of company's economic values and/or expectable balance profit in future. The relation between economic value added and MVA is:

Market value = MVA + investment made in company

When income of a company is equal to cost of investments made in the company, MVA is equal to zero, and when income is less than cost of investment, economic value added is negative and reasonable market value is less than utilized investment with negative MVA. A company with income more than cost of capital has a positive economic value added; it means the company receives profit from the market. In this regard, main goal of each company should be to maximize MVA and consequently stockholders' value.

## 6-2- Independent Variables

Independent variables in the study are earning per share (EPS) and price to earnings ratio (P/E).

**Price to earnings per share ratio:** P/E is yielded by dividing share market value to earning per share, and is one of the main indices in market.

P/E interpretation: P/E is one of the most useful indices for assessing stocks based on market price, though it may not be used as the sole criterion for decision making, as the P/E of every company should be taken into account relative to growth perspective. Should speculation of company's growth fails to generate P/E of the company, stocks are overpriced.

Low P/E rates must not necessarily interpreted that stock pricing is less than natural value of stock, but it means that market believes in short-run the company will face with many issues, and there is no guarantee for increase of stock price.

**Earning per Share (EPS):** criterion for performance assessment is profit reported in financial statements. Based on the definition, the same objections on the previous index imply for this one. There are many ways to manipulate profit and lose statement by managers (Stewart 58:1991). In addition, another drawback on EPS is failing to take into account cost of financing. Using this index for assessing company's performance assures the managers those stockholders are free source of financial resources. Mayfield (1997) argued that EPS may be manipulated by investing in project with profit less than cost of financing, which leads to increase of stock profit. Moreover, managers show less interest for investing in R&D projects as they decrease profit. In some cases, this situation misleads investors (pp.32). Jackson (1996) argued that EPS and P/E are not capable to identify differences at systematic and specific risk level of a company for scheduling cash flows (pp. 99). Hanlon and Peasnel (1996) suggested that applying EPS as performance measurement tool by managers should be fostered, and argued that financial resources provided by stockholders are free resources (pp.44).

EPS is resulted from earning after tax (EAT) of company divided by number of issued stocks. Earnings per share may totally paid to stockholders or reinvested and/or a combination of the both.

$$EPS = \frac{EAT}{N}$$

Where, N: number of issued stocks

### **7- Statistic group and its size**

Statistic group is comprised of all companies in Tehran Stock Exchange (2005-2009) which have following conditions:

Admitted in Tehran Stock Exchange up to 20 Mar. 2005

Having fiscal year ended in 20 March of each year

Not an investing company

Being permanently active with high liquidity in market

Submitting all financial information for time period between 2005 to 2009.

Finally 124 companies remained in the study group for 2009 and 125 companies for other fiscal year. So that, during a five year period 624 companies were under study.

### **8- Research Methodology**

Required information in the study was gathered through library research of books and magazine and also articles on the Internet. Data required for field study was provided by Tehran Stock Exchange in form of financial statements, weekly reports, daily market transaction and Tehran Stock Exchange web site.

Raw data was analyzed using Excel Microsoft Office. Data processing comprised of drawing descriptive statistics of variables such as average and standard deviation and correlation and regression tests.

### **9- Findings**

There are two methods for investigate relations between variables. First, variations of each dependent variables of every company will be studied separately on yearly basis. Second, relations between dependent/independent variables are studied for the whole period.

First we will have look on linear relation between market value, EPS and P/E through correlation test. In this case, normality of the variables was tested using Kolomogrov-Smirnov test, so that for abnormal variables Spearman correlation coefficient is used.

Afterward, EPS and P/E relation with market value variable was tested by using enter ward method in a multiple regression model. Regarding regression models and in case of abnormality of market value, the study used square logarithm and retesting to make sure about normality of the variables.

Watson statistics was used for researching self-dependency between data.

The criterion for judging about is P-value. So that for  $P < 0.05$ , with accuracy of 95%, the hypothesis of lack of any relation between EPS and P/E and MVA is rejected, therefore the hypothesis is confirmed, otherwise there is rejected.

To test normality of market value added through the whole period, K-S test was used. Table 1 lists the results.

Table1. Normality tests on MVA for 5 years

Normality test	K-S statistics	P value
Market value added	8.208	$\leq 0.0001$

Considering  $P < 0.05$ , hypothesis  $H_0$  regarding conformity of the variables' distribution with normal distribution is rejected.

To test normality of square logarithm of MVA through the whole period, the study used K-S test. Table 2 lists the results.

Table2. Normality test on square logarithm of MVA for a period of 5 years

Normality test	K-S statistics	P value
Market value added	0.912	0.376

Considering  $P > 0.05$ , hypothesis  $H_0$  regarding conformity of the remaining of this model of normal distribution may not be rejected.

Tables 3 and 4 list results of multiple regression model regarding surveying relation between EPS and P/E with square logarithm of MVA for the whole five years.

Table3. Multiple correlation coefficients of EPS and P/E with square logarithm of MVA for the whole 5 years.

Five years	Multiple correlation coefficient	Base coefficient	Justified base coefficient	Watson-Dorbin's statistic
	0.32	0.10	0.10	2.051

Table4. Multiple regression coefficients of EPS and P/E with square logarithm of MVA for the whole 5 years.

Five years	Non-standard ( $\beta$ )		Standard coefficient	T statistics	P value
	Value	Estimate error			
Fix value	49.86	0.33	-	151.57	0.000
EPS	0.0015	0.0002	0.32	8.45	0.000
P/E	0.00	0.04	0.00	-0.12	0.907

Considering  $P < 0.05$  for EPS, it hints that hypothesis  $H_0$  is rejected and with accuracy of 95% there is a linear relation between square logarithm of MVA and EPS for the whole 5 year. Therefore, the variable will remain in the model.

As listed in table 5,  $P > 0.05$  which shows that hypothesis  $H_0$  regarding no linear relation between variable of square logarithm of MVA and P/E. Therefore, there is not enough evidence regarding any linear relation between square logarithm of MVA and P/E, so the variable needs to be removed from the model.

Table 5 and 6 list results show final linear regression model to investigate relation between square logarithm of MVA and EPS for the whole 5 years.

Table5. Correlation coefficient of EPS and MVA for the whole 5 years.

Earnings per share	Correlation coefficient	Base coefficient	Justified base coefficient
Five years period	0.32	0.10	0.10



Table6. Regression coefficient of EPS for the whole 5 years.

Five years	Non-standard ( $\beta$ )		Standard coefficient	T statistics	P value
	Value	Estimate error			
Fix value	49.83	0.22	-	224.38	$\leq 0.0001$
EPS	0.0015	0.0002	0.32	8.45	$\leq 0.0001$

According to standard coefficient listed in table 5, 10% of square logarithm of MVA is justified by EPS.

As illustrated in table 6, since  $P < 0.05$ , hypothesis  $H_0$  is rejected and with accuracy of %95 the study found a meaningful linear relation between square logarithm variables of MVA and EPS.

### 10- Conclusions

Analysis on hypotheses based on regression model shows that there is a meaningful linear relation between square logarithm variables of MVA and EPS on yearly basis and the whole 5 years, and there is no meaningful linear relation between square logarithm variables of MVA and EPS on yearly basis and the whole 5 years.

The study found 10% justified correlation in the model, and the variable only explains 10% of square logarithm variable of MVA. The model shows a positive but weak relation between earnings per share and square logarithm of MVA. Correlation coefficient of this relation is 32%. Correlation coefficient and standard coefficient showed weak correlation between MAV and EPS. Taking into account, weakness of coefficient of correlation, MVA coefficient and EPS, the study improved capacity of MVA as an economic index to justify small portion of EPS variation (performance measurement index).

### References

1. Bausch A. E., Barbara, W. and Blome M. (2003). "Is Market Value-Based Residual Income a Superior Performance Measure Compared to Book Value-Based Residual Income?", Working Paper, No. 1. Justus-liebig-Universitat.
2. Hall JH. and Wet (2009)" The Relationship between EVA - MVA and Leverage".
3. Hanlon J. O. and Peasnel K. (1996) "Measure for Measure" Accountancy, Vol. 117, Issue 1232, pp. 44-46.
4. Hendriksen, E. and Berda V. (1992)" Accounting Theory" 5<sup>th</sup> ed. New York: IRWIIN.
5. Makelainen E. (1998). "Economic Value Added as a Management Tool", Online at: <<http://www.evanomics.com/evastudy/shtml>>. [16 Jul. 2005].
6. Jackson, A. (1996) "The How and Why of EVA at CS first Boston", Journal of Applied Corporate Finance, Vol. 9, No. 1, pp. 98-103.

7. Mayfield, J. (1997). "Economic Value Management", Management Accounting, Vol. 75, No. 8, pp. 32-33.
8. Milunovich, S. and Tsuei A. (1996) "EVA in the Computer Industry", Journal of Applied Corporate Finance, Vol. 9, No. 1, p 104.
9. Morr D. J. (2008) Improving P/E Estimation Accuracy. The University of Memphis.
10. Nazarieh Z. (2000) "Studying Relation between Profit and Economic Value Added Share in Mine and Non-Metal Industries" M.A. Thesis. Allameh Tabatabaie University.
11. Stewart, G. B. (1991). The Quest for Value: A Guide for Senior Managers. New York: Harper Business Publisher.
12. Yound U.S., Jong Chui H., Zibart L. D. "Do Management EPS Forecasts Allow Returns to Reflect Future Earnings?" Implications for the Continuation of Managements Quarterly Earnings Guidance.

## Beyond Stress Testing: Modelling Liquidity and Interest Rate Risks for (real) Corporate Measures

Filippo Antonio Dal Prà<sup>1</sup>, Guido Max Mantovani<sup>2</sup>

<sup>1</sup> Veneto Banca group

<sup>2</sup> Ca' Foscari University

**Abstract** *The financial crisis exploited the poorness of real liquidity risk perception in the banking system. The paper suggests a wiser uses of econometrics tools can be more effective in detecting banking risk in order to reduce bias in the decision processes. A methodology to better focus the real bank exposition to interest rate risk is proposed fixing several bugs related to the assessment of its connections with: (i) the credit risk embedded in loans; (ii) the concentration risk of assets and liabilities relating to specific customers; (iii) the volume risk, particularly for unexpected changes. The Veneto Banca experience and performance are used as gymnasium for a possible method development aiming to propose a standard for a more comprehensive corporate risk approach in banking, even for Regulators.*

**Keywords:** *Liquidity risk, ALM, corporate risk, risk premia*

**JEL Classifications:** *G21, E27, F47, D92*

### **Introduction**

Financial crisis clearly deployed the weakness of the global banking system but the academic community is still searching for an affordable explanation of its causes. Risk sources existing before the crisis cannot be clearly focused using traditional (i.e. widely used) risk-analysis tools adopted in the best western banking practice (i.e. bulk-so-unwise use of econometrics). Such hidden risks are the basic reason for both missing points, driving markets to overestimate the return-to-risk ratio of the banking industry and driving think-tanks to suggest the use of bulkier and more complex technical solutions.

The liquidity risk seems to be one of the most missed point. Several assets were declared “toxic” while actually being simply “illiquid”; their returns were declared “fair” because compared to risk-levels supposing a “full marketability” at no costs; the equity constraints in the banking system were regulated aftermath. One of the mostly lost quest was concerned with the trade-off between the time horizon of investments and their liquidity. The longer is the first according to the preferred investors’ habitat, the stronger is to be the equity constraint of the financial intermediaries supporting the investors: Franco Modigliani docet!

The corporate view of risk (in banking) is another absent-minded point. Financial intermediaries aren’t a simple portfolio or elementary risks, based on a stable long term covariance matrix (usually because mean-reversion matters!). This being the case, their existence should immediately evaporate through unbundling arbitrages based on complete markets. Banking risk is corporate-body-mix of risks having flexible (i.e. difficult to model) relationships made up of stable covariance matrix in the managerial expected range of variability along with more complex relationships because crafted by managerial decisions.

Thus, corporate reaction to risks matters, reducing the unbundling opportunity. Being driven by managerial decisions, the corporate reaction requires to be strongly supported by correct risk perception at corporate level. Bulky econometrics methods can drive unfair estimation of the corporate risk due to their inability to detect real relationships of specific risks in the corporate body (i.e. the corporate reaction).

The liquidity risks web into the banking corporate body is a typical example. The economic impact of changes in market short term interest rates cannot be completely modeled without considering both their impact over the investors' attitude to commit to a specific banking investment and their effect to the premia dimension of other risks, particularly the credit risk one.

In this paper we suggest a different approach aiming to demonstrate how the actual (i.e. corporate) use of the models can increase their efficacy more than their bulkiness. The paper is composed as follows: Section 1 presents the referring theoretical framework for modeling the liquidity risk in banking economics and its inner methodological quests for corporate implementation; Section 2 reports the inner results of a pilot project aiming to fit an affordable methodology for model implementation at corporate level jointly run by Veneto Banca Group and Ca' Foscari University inside the "Master in Strategic Innovation" executive program; Section 3 depicts the resulting figures from model application to the Veneto Banca's economics along with some insights to obtain the maximum increase in the organization reactivity of the bank through the corporate use of the model; Section 4 concludes with suggestions for a wider use of the methodology.

### ***1. Literature review and theoretical models.***

Interest rate risk exposure and liquidity constraints inside a bank may be analyzed by defining the nature of assets and liability items according to a specific standards. The liquidity constraint is related to assets and liabilities to which the bank is committed to rapidly convert them into cash. This being the case, such items are usually tracking the interest rate movements, either because they are formally indexed to market rates, either because their attitude to rapid cash conversion requires a continuously updated return. The inner liquidity risk for any financial intermediary is not the exogenous change in market rates but the mismatch between assets and liability standards: any gap could leverage the corporate margin changes against to market volatility.

Entrop, Wilkens and Zeisler (2009) strike out the importance of fixing standards to classify asset and liability nature for liquidity. They start from the idea that the interest rate risk is systematic and it may directly affect the stability of the financial system, and examine whether the framework proposed by the Basel Committee for the quantification of interest rate risk in banks is adequate. If the guidelines were to be too simplistic or inadequate, bank supervisors could misjudge the interest rate risk of banks and react inappropriately to external shocks. The Authors show that the estimate of the level of interest rate risk is strongly influenced by the parameters of Basel Committee which may lead to a misinterpretation of the level of risk which the bank is exposed if its structure is different from that envisaged by Basel. For this reason the Authors suggest that banks should use an internal (i.e. "customized") model to define the exposure to changes in interest rates. Lopez (2004) gets to a very similar conclusion by examining the standards for interest rate risk definition embedded in the previous Basel agreement. The principles strongly support the idea that banks' internal risk assessments should form the basis for supervisory oversight of their interest rate risk profiles.

Thus, according to these authors the internal classification matters. The expression "at sight ordinary<sup>1</sup> customers" usually means a mix of technical forms, both on liability and asset side of the banking balance sheet having at least two inner characteristics: (a) a fixed maturity, since they are characterized by having a contractual maturity formally exposed (at least for the single report) but against which there is a substantial persistence and stability of relations taken together; (b) an explicit rule for determining the rate, either in terms of periodicity of review, nor in terms of parameters of the target market. The most typical example are deposits and investments having a customer loyalty greater than the actual maturity of the contract. The average weight assume the deposits of total interest-bearing liabilities in the Italian banking system is on average 50%.

The reported weight assumes that the demand items in the composition of the budget of a commercial bank and the reduced level of elasticity between the rates charged to customers and market rates, cause a significant interest rate risk in case of change of the latter, with a heavy impact on the income statement (and economic value). This risk is not always properly measured and only a few (big) banking groups are covering such a quest<sup>2</sup>. Dell'Ariccia and Marquez (2010) identify different sources of risk as important determinants of banks' corporate structures when expanding into new markets. Subsidiary-based corporate structures benefit from greater protection against economic risk because of affiliate-level limited liability, but are more exposed to the risk of capital expropriation than are branches. Thus, branch-based structures are preferred to subsidiary-based structures when expropriation risk is high relative to economic risk, and vice versa. Greater cross-country risk correlation and more accurate pricing of risk by investors reduce the differences between the two structures. Furthermore, a bank's corporate structure affects its risk taking and affiliate size. Even if the analyses abstracts from a number of real world considerations that may affect a bank's choice of corporate structure, they illustrates how banks can design their organizational structures to better cope with two primary sources of risk (political risk and credit risk). The predictions of the model for banks' organizational forms are consistent with the empirical literature. Moreover, the analysis has implications for the relative sizes of branches versus subsidiaries, and for the risk-taking incentives of the different structures.

Fraser, Madura and Weigand (2002) examine bank stocks' sensitivity to changes in interest rates and the factors affecting this sensitivity. They focus in whether the exposure of commercial banks to interest rate risk is conditioned on certain balance sheet and income statement ratios. They find out: (i) a significantly negative relation between bank stock returns and unanticipated changes in interest rates over a period of relatively unstable interest rates (1991–1996); (ii) that bank interest rate risk is invariant to bank size classification. Thus the evidence that variation in interest rate risk can be explained by readily observable bank characteristics is relevant to bank managers who want to manage their risk exposure, regulators who want to oversee changes in exposure and investors who revalue bank stocks in response to interest rate movements.

Wright, Houpt, Tlou and Hacker (1996) infer about factors that may be affecting the level of interest rate risk among commercial banks and estimate the general magnitude and significance of this risk. The results of the analysis suggest that the simple model used can be useful for broadly measuring the interest rate risk exposure of institutions that do not have

---

<sup>1</sup> In the present paper the words "at sight" mean budget items that make up the assets, bank overdrafts and subject to collection, for the liabilities, the current accounts and savings deposits. The indexed accounts included in this series as the bargaining power of the intermediary credit is small enough to take action to change the spread and/or parameter and/or the frequency of repricing.

<sup>2</sup> In Italy this kind of operation has been performed only by Banca Intesa and Unicredit.

unusual or complex asset characteristics. Interest rate risk does not currently appear to present a major risk to most commercial banks. Nevertheless, for individual institutions, interest rate risk must be carefully monitored and managed, especially by institutions with concentrations in riskier or less predictable positions. According to Duan, Sealey and Yan (1999) banks manage interest rate risk by choosing asset and liability portfolios in order to monitor changes in the value of target variables that result from changes in interest rates. The authors present a comparison of numerical models based on options and conventional ones. The results show that the two approaches can give very different values for exposure to interest rate risk, especially during periods with higher than average rate volatility and/or credit risk for banks with higher than average. Authors pay attention on the fact that it is not possible to say that one is always best.

Alessandri and Drehmann (2010) try to infer about a corporate view of risks including credit, market and liquidity risk, in that paper the authors derive an economic capital model which consistently integrates credit and interest rate risk in the banking book but it doesn't address the issue of what is the appropriate level of capital for a bank. They focus instead on the question of how this level of economic capital is influenced by interactions between credit and interest rate risk. The main result of the analysis is that simple capital exceeds integrated capital. In other words: a simple approach to aggregate credit risk and interest rate risk in the retail loan book doesn't lead to an underestimation of risk, compared to an approach that takes into account the interactions between the two sources of risk. The difference between the two depends on various features of the bank.

Trying to represent accurately in terms of risk and profitability for "non-maturity" items, econometric modelling should then recognize the two distinctive features: (a) the limited degree of indexing rates (especially for the collection), so we can process the products (collection) exposed to similar fixed-rate instruments; (b) the high persistence of aggregate thereby assimilating items analyzed in liabilities / assets medium to long term. In detail, the quantification of the impact of a shock to market rates on income and economic value can be made to articulate the research through the use of two econometric models: (i) those referred to rates, which describes the dynamics the interest rate on sight, and identifies a product indexing formula that ties the rate charged to customers at the market rate; (ii) those analysing the volumes particularly in terms of stock persistence.

The **model for interest rate risk measurement** requires first to identify a relationship *pricing* heuristics, and this is estimated by placing a link between the rates of demand items with market rates through an error-correcting econometric model ECM which is composed of two separate reports: long-term relationship (or equilibrium) and short-run relation (or dynamic).

The long-term relationship provides a measure of how changes in market rates  $\Delta rm_t$  are reflected in changes in the rate of demand items and it is represented by the following formula:

$$r^* = \alpha + \beta \cdot rm_t$$

where the parameters are:

$r^*$	bank rate long-run equilibrium consistent with the observed value of $rm_t$
$\alpha$	spread on constant rate
$\beta$	long-term elasticity of bank rate in comparison with the market rate

$rm_t$	market rate reference observed at time $t$ (typically 1 month Euribor)
--------	--

It should be noted that the bargaining power of banks ensure that changes in market interest rates do not reflect immediately and symmetrical changes in interest rates granted to customers. For this reason, the short-run relation of the model ECM is designed to measure the phenomenon of stickiness, highlighting the manner and timing of rate adjustment of demand items at the market rate of reference. It can be represented by the following formula:

$$\Delta r_t = \theta \cdot (r_{t-1} - r_{t-1}^*) + \gamma^+ \cdot |\Delta rm_t^+| - \gamma^- \cdot |\Delta rm_t^-|$$

where:

$\Delta r_t$	variation in the rate applied by the bank between $t$ and $t-1$
$\theta$	rate of absorption( <i>meanreverting</i> )of bank rates to market rates
$r_{t-1}$	the rate applied by the bank observed at time $t-1$
$r_{t-1}^*$	long-run equilibrium base rate
$\gamma^+, \gamma^-$	bank interest rate sensitivity, respectively, to the rise and descent of the market
$\Delta rm_t^+, \Delta rm_t^-$	respectively: changes in positive (negative) of the market rate at time $t$ compared to $t-1$

Taken together the long-term relationships and a formula describing the short index of “atypical”, where the rate applied to the customer depends on the imbalance between the past values of the rate of the product and the market rate ( $\beta$  and  $\theta$  parameters)and changes in current the market rate (positive or negative, represented by  $\gamma^+$  and  $\gamma^-$ ).

Combining the two relations are obtained:

$$\Delta r_t = \theta \cdot (r_{t-1} - \alpha - \beta \cdot rm_{t-1}) + \gamma^+ \cdot |\Delta rm_t^+| - \gamma^- \cdot |\Delta rm_t^-|$$

Assuming then that before the shock on the market rate is in equilibrium, the instantaneous response of the rate parameters depends only on the  $\gamma^+$  and  $\gamma^-$  parameters. If after the shock, the market rate does not undergo further changes, the speed of adjustment of the rate depends on the imbalance that has yet to be absorbed and on the  $\theta$  parameter.

**The model for volumes analysis** should represent the *maturity* of demand items as realistic as possible, highlighting the high degree of persistence of aggregates. For this purpose we assume that the volumes do not remain constant on the holding period agreed, but design a progressive decline in a virtual amortization profile and transform so the amount of demand items placed in a portfolio at maturity. This profile is the result of a historical analysis of volumes, suitably smoothed through a filter statistics to grasp the historical trend from which to draw the *décalage*. In literature there are numerous treaties smoothing methods, such as the Hodrick-Prescott filter, Kalman, moving average, cubic spline ... In this work we applied the first one. In short, given a set of historical data  $x_t$  that is supposed to be composed of a historical trend  $\tau$  and of a cyclical component  $c_t$  superimposed on the trend, the HP filter isolates the cyclical component, solving the following minimization problem:

$$\min_{\{\tau_t\}_{t=1}^T} \left[ \sum_{t=1}^T (y_t - \tau_t)^2 + \lambda \sum_{t=2}^{T-1} ((\tau_{t+1} - \tau_t) - (\tau_t - \tau_{t-1}))^2 \right]$$

where the *penalty parameter*  $\bar{\epsilon}$  is the smoothing parameter that allows to adjust the sensitivity of the trend to short-term fluctuations.

The analysis is carried out starting from the natural logarithm of unit volumes, as for each  $t$ . It is applied to the HP filter and we calculated the historical volatility of the logarithmic series around the trend and determinates the most stable component (so-called *core* deposits). In this way, from the statistical analysis of the volumes' persistence we identified two components: a stable (*core*) and a highly volatile (*non-core*). In logarithmic terms, the core component of unit volumes,  $\hat{v}(T)$ , is defined as follows:

$$\hat{v}(T) = \tilde{v}(T) + \sigma(\tilde{\epsilon}_v) \cdot q_{(1-\alpha)}$$

Where :

$\tilde{v}(T)$	trend obtained by applying the volume Hodrick Prescott filter to the natural logarithm
$\sigma(\tilde{\epsilon}_v)$	volatility around the trend
$q_{(1-\alpha)}$	value of the standard normal distribution at a confidence level equal to $\alpha$ (Used the 99 th percentile)

Once the core component is identified, we detected the persistence profile and we determined a profile of likely minimum volumes (*mpa*, *minimum probable amount*). Under a fixed confidence  $\alpha$  level, the amount statistically certain to be present next month is obtained by the following equation:

$$mpa(T+h) = e^{\hat{v}(T) + \sigma(\tilde{\epsilon}_v) \cdot q_{(1-\alpha)} \cdot \sqrt{h}}$$

where  $h$  is the number of periods is defined on the repayment of virtual items on demand. Once Mpa is established, the “depreciation charge” (*dc*) of at sight items in each period  $h$  is given by the following equation<sup>3</sup>:

$$dc(T+h) = mpa(T+h-1) - mpa(T+h)$$

As it is easy to guess, being the model for the analysis of volume data based on logarithmic data, the evolution of mpa volumes decreases exponentially over time with asymptotic nature and tends to zero. The remaining debt still exists existing at time  $T+H$  is then redistributed evenly between  $T$  and  $T+H$ , redefining the mpa profile.

$$dc^*(T+h) = dc(T+h) + \frac{1}{H} \cdot e^{\hat{v}(T) + \sigma(\tilde{\epsilon}_v) \cdot q_{(1-\alpha)} \cdot \sqrt{H}}$$

Mpa\* therefore becomes as follows:

$$mpa^*(T+h) = e^{\hat{v}(T)} - \sum_{i=1}^h dc^*(T+i)$$

In terms of the unit volumes the core component is given by:

$$core = e^{\hat{v}(T)}$$

while the volatile component is obtained as the difference between the actual volume and the core component:

$$Nocore = V(T) - core$$

<sup>3</sup> In this paper, the number of period ( $h$ ) is assumed to be 120 (ten years).



## ***2. Toward a new approach.***

The model currently applied by Veneto Banca Group (a medium size, fast growing Italian bank) to determinate the parameters of the ECM model and the volumes persistence is obtained through historical data provided by the Management Control. Customers are divided into three distinct groups:

- “wholesale” customers, that are classified by the Management Control as directional
- “Intra-group” customers, that are the relations with legal entities of the group;
- other customers, defined for simplicity “retail”.

The first two customer types are not treated with econometric models for two reasons:

1. For “wholesale” customers: the average balance on cash accounts is so substantial that it is unrealistic to assume their place in a short time if the customer turns his savings to another bank.
2. Intercompany relations are used for the natural functioning of society and they are settled by market rate.

So, being conservative, the balance on current accounts with these two types of customers are actually treated as sight items, both from the point of view of the rate adjustment and from the point of view of the term presence (it is assumed that rates are overnight). Instead, the relations with “retail” customers are subjected to the econometric estimations.

This methodology presents some limits. The main regards the “clustering” between “wholesale” and “retail” that is made by the business segment: this attribute is likely to change over time because of different trade policies. Each customer, in fact, may be changed from a segment to a different at any time without its behavior actually changes. The other limit points out in case of growth by external acquisition of a bank or branches. These two issues make it difficult to build a deep homogeneous time series over 32 months (32 monthly observations, which are data available from the Management Control). The historical depth recommended for the determination of the model is at least five years even if it leads to a good approximation already with 20 observations.

To overcome these problems and thereby increase the depth of time series and getting a more steady and objective outcomes, we have grouped the at sight forms of funding and lending according to the segment of economic activity (SAE). This attribute is stable over the time because it is not susceptible to commercial clustering. Furthermore, we thought to historicize the data for individual counterparties, so that, at the time of analysis, it is possible to reconstruct a consistent time series with the latest situation. In this way, in fact, we enucleated relations that at the reference date have the distinction of being intercompany even if they aren’t in the old estimation thus solving the second problem. With the SAE, we decided to separate the technical forms of funding and lending in two sub-series, through the Basel III recommendations, assembling in two distinct categories (retail, wholesale). The econometric estimates conducted and described in the following sections confirm that this subdivision allows to identify clusters statistically different from each other and at the same homogeneous within them.

### ***2.1 Analysis of concentration risk***

The two main clusters obtained according to the specifications of the previous section are further analyzed to determine if they meet the model core assumptions of volumes

persistence. This feature could be read through the concentration ratio. More funding/lending is concentrated, more it is difficult for the credit intermediary to be able to quickly replace the customer and then to have stable volumes onward. For this reason we calculated the Hirschman – Herfindahl’s concentration ratio. In Table 1 (third column), we report the results.

Balance sheet side	Serie	HH index	Equivalent number	Customer number
Asset	Retail	0.005450	183.46	48,546
Asset	Wholesale	0.006372	156.95	33,852
Liability	Retail	0.000145	6,878.26	279,033
Liability	Wholesale	0.043344	23.07	39,322

Table 1: Hirschman – Herfindal index

All coefficients tend to zero, because the market quota of every single customer is little. So, it seems to be in a perfect market, without concentration. But, if we estimate an absolute concentration ratio, estimating for example the top 20 customer weight on the total, we reach to another conclusion (see table 2).

Balance sheet side	Serie	Weight of top 20 customer
Asset	Retail	25.601%
Asset	Wholesale	15.454%
Liability	Retail	3.265%
Liability	Wholesale	48.619%

Table 2: Concentration ratio

The difficulty of correctly interpreting the results of HH indicator and consequently the impossibility to convey a clear and simple message to decision makers impose to try to “normalize” the index, through the equivalent number  $N^4$ . This facilitates the evaluation of the concentration degree.

The scientific literature doesn’t give any indication about the optimal concentration ratio. For this reason, we want compare the above described indicators with the system’s ones. We contact the Central Bank of Italy in order to obtain time series and benchmark indicators. Unfortunately the detail, with which information is collected, it is not enough to create the indexes in the same manner as we did and then make a comparison. In fact, in recent years, the data for *at sight instrument* are collected only by distinguishing between geographical areas and not by the sector of economic activity. In the absence of a systemic confrontation index, we decided to use the interview method to understand what the optimal concentration for the most senior executives is.

The two pertinent questions were as follows: (1) In your opinion, how much should be the top twenty customers weight on the total to haven’t funding concentration? (2) Considering that the concentration percentage influences the degree of capitalization, how much should the first twenty customers weigh on the total?

There wasn’t any mathematically clear indication to nor the first nor the second question. The explanation is simple: an objective threshold can’t be defined because it depends on the bank’s size, on the context in which it operates and on the strategy it intends to pursue.

<sup>4</sup> This index  $N$ , calculated as the reciprocal of the HH’s value, expresses the number of customers of the same size necessary to produce the given value of HH. The value for retail funding is 0.0001454. Its reciprocal is then 6,876 and indicates that value is reached in the presence of 279,033 customers of the same size.

Regarding the first, in theory the concentration degree should decrease when the size of the financial intermediary increases. In reality, however, as the bank is bigger as it has the ability to offer services to customers of larger size and then to be chosen as counterpart. Regarding the second point, approximately 50% of the Italian banking system bearing liabilities consists of demand deposits. In May 31<sup>st</sup>, Veneto Banca Group is at 42.5%. The leaders, therefore, believe that it isn't worth replacing the funding of most important customers with other funding forms, usually more expensive.

In conclusion, the degree of current concentration doesn't arouse any concern to managers. For our purposes this answer is not useful because if the top-twenty-customer-concentration level is not perceived as alarming, the demand instruments may treat them as a core component. But since the first customers have a market share of 48.6%, this conclusion seems in contrast with the prudence principle. In the absence of a benchmark, the determination of the threshold (above which the econometric model can't be applied because it is in contrast with the immediate-substitution principle) it has been set empirically. We establish that the weight of the first twenty customers shall not exceed 5% of the total technical form. The number of customers has been established according to the inquiries of rating agencies, which regularly require the top ten or twenty customers for their studies<sup>5</sup>.

The following tables outline for all items the thresholds, the total balance, customer number, and the top-twenty-customer weight<sup>6</sup>. Alongside this ratio the Gini coefficient<sup>7</sup> has also been reported. As a result, with the criterion of the relative weight of the top twenty customers who at first glance would seem the result of a *naif* approach, the Gini index is on average less than or equal 0.003 (see the green rows). This level highlights the customers' "lack of concentration". This approach has been respected for all series analyzed and it has been tested both on the first point of the series that last one. It betrays a substantial stability over time of the threshold level at which discriminate against the concentration.

---

<sup>5</sup> This means that our analysis is hardly influenced by this assumption.

<sup>6</sup> In the next paper we will illustrate that in Northern Italy the no-concentration threshold is higher than in Center and South. For example, if we analyze the retail series (liability side) we can demonstrate that in the North the richness is not concentrated, thanks to an homogeneous distribution of families wealth. Instead, in south regions, there are some concentrated areas. These results should mark that the bank capitalization depends on wealth distribution.

<sup>7</sup> We prefer this concentration index because It is the simplest communicable. In fact, it can take a value ranging from 0 to 1 (the case of a single client).

B/S side		Liability		Series		Wholesale	
UPPER LIMIT AMOUNT	STOCK (€/mil.)	CUSTOMERS (number)	AVERAGE (€)	Top 20 customer (stock)	Top 20 customer (weight %)	GINI COEFFICIENT	
<=5.2 mil.	1,934.11	40,646	47,584.26	92.98	4.81%	0.26%	
<=10 mil.	2,276.97	40,697	55,949.33	164.02	7.20%	0.43%	
<=20 mil.	2,803.4	40,735	68,820.42	323.48	11.54%	0.70%	
<=40 mil.	3,294.9	40,752	80,852.47	550.13	16.70%	1.21%	
none	6,207.01	40,771	152,240.81	2,952.08	47.56%	18.27%	

B/S side		Liability		Series		Retail	
UPPER LIMIT AMOUNT	STOCK (€/mil.)	CUSTOMERS (number)	AVERAGE (€)	Top 20 customer (stock)	Top 20 customer (weight %)	GINI COEFFICIENT	
<=0.5 mil.	3,083.45	277,070	11,128.78	9.80	0.32%	0.02%	
<=1.5 mil.	3,275.92	277,325	11,812.57	26.14	0.80%	0.05%	
none	3,440.78	277,378	12,404.66	106.10	3.08%	0.77%	

B/S side		Asset		Series		Wholesale	
UPPER LIMIT AMOUNT	STOCK (€/mil.)	CUSTOMERS (number)	AVERAGE (€)	Top 20 customer (stock)	Top 20 customer (weight %)	GINI COEFFICIENT	
<=12 mil.	3,905.92	34,074	114,630.38	194.91	4.99%	0.30%	
none	4,628.18	34,091	135,759.60	756.80	16.35%	7.33%	

B/S side		Asset		Series		Retail	
UPPER LIMIT AMOUNT	STOCK (€/mil.)	CUSTOMERS (number)	AVERAGE (€)	Top 20 customer (stock)	Top 20 customer (weight %)	GINI COEFFICIENT	
<=0.85 mil.	319.90	50,238	6,367.69	15.45	4.83%	0.26%	
<=0.89 mil.	323.40	50,242	6,436.88	16.11	4.98%	0.27%	
none	638.56	50,323	12,689.17	206.51	32.34%	9.98%	

## 2.2 The Ecm model

On the basis of the above illustrated methodology, we estimate the ECM model's parameters for every single series. We run the regression following the full model (one stadium approach) and its decomposition in the long/short period relation (two stadium model). In the next table, we report the regression results ( $R^2$ ). Since models are esteemed with data paucity (due to the short historical depth), we prefer the two stadium model because it is able to gather better the variability. Probably, with more observations, it is just sufficient the one stadium model.

Series	Full model	Two stadium model
Asset side – retail	0.5184	0.5462
Asset side – wholesale	0.6132	0.6386
Liability side – retail	0.8476	0.8697
Liability side – wholesale	0.9435	0.9664

Thanks to a careful analysis, we also define a logical *work-flow* for the model's application. First of all, the parameters' meaningfulness is based on a *probability value* equal to 5% (p-value). Under this percentage we reject the null normality hypothesis. Analyzing the long term relation, it could happen that the parameter  $\alpha$  or the  $\beta$  are not acceptable. If it should happen at first one, we do not discover some theoretical limits, as it represents the intercept value, or in economic terms, it is equivalent to the mark-up when  $\beta$  is 1. Even if not

significant, the  $\alpha$  parameter has to be forced to the minimum rate recognized to the customer. Different reasoning for the  $\beta$ . If it should be negative or not significant the linear interpolation has no sense<sup>8</sup>. Only in one of our analysis, we found a case of insignificant  $\beta$ . To get round this problem, we investigated the events happened in that society. Specifically, some massive manoeuvres were made to avoid a customer hemorrhage. Calculating the regression from the last manoeuvre date, the  $\beta$  became significant.

About the short period relation, we consider that the bank rates' sensitivity to the market rate changes must respect the following constraints, due to the bank's bargaining power:

Item	Constrain
Assets item	$\gamma^+ \geq \gamma^-$
Liability item	$\gamma^+ \leq \gamma^-$

In other words, if we are analyzing the series "assets retail" and the parameter  $\gamma^-$  turned out not significant, the dynamic relation would become:

$$\Delta r_t = \theta \cdot (r_{t-1} - r_{t-1}^*) + \gamma^+ \cdot |\Delta rm_t^+|$$

On the other hand, if the parameter  $\gamma^+$  turns out not significant while  $\gamma^-$  is acceptable, the used equation become:

$$\Delta r_t = \theta \cdot (r_{t-1} - r_{t-1}^*) + \gamma^+ \cdot |\Delta rm_t^+| - \gamma^- \cdot |\Delta rm_t^-|, \text{ where } \gamma^+ = \gamma^-$$

Of course, we should think on the contrary when we analyze the liability series.

The results of the estimation must then be compared between system *benchmarks* and between asset and liability parameters. In Italy, the  $\beta$  on the savings deposits is included between 0.3 and 0.4 (with an  $R^2$  index at least to 60%-70%; the volumes core percentage is between 80% and 85%); in the asset side it should be included between 0.6 and 0.85 ( $R^2$  near to 50% and core percentage should be between 75% and 80%.) Other considerations should be placed on the parameters' values (asset vs. liability instruments) and their impact on the risk measures. In particular, the parameter  $\beta$  has big influence on the asset *sensitivity* (lower on the liability's one). The last parameter ( $\theta$ ) has importance in the short period and therefore it has a greater influence on earnings analysis.

We also tried to consider the operating risk impact of the management time decision, delaying the series to a period (one month) and seeing if the model is more consistent. It turns out the graph below, in which we can clearly reject the hypothesis of autoregression in the equilibrium relation. That is confirmed by the statistical test *Augmented Dickey Fuller* (ADF) and by the  $R^2$  index (respectively equal to 0.8518 for the ECM model - yellow line - and 0.2398 for the model ECM\*\* which is the delayed one).

<sup>8</sup> We have to use linear regression because of software constraints. Otherwise we could not calculate the impact on earnings and on value because of changing in rates.

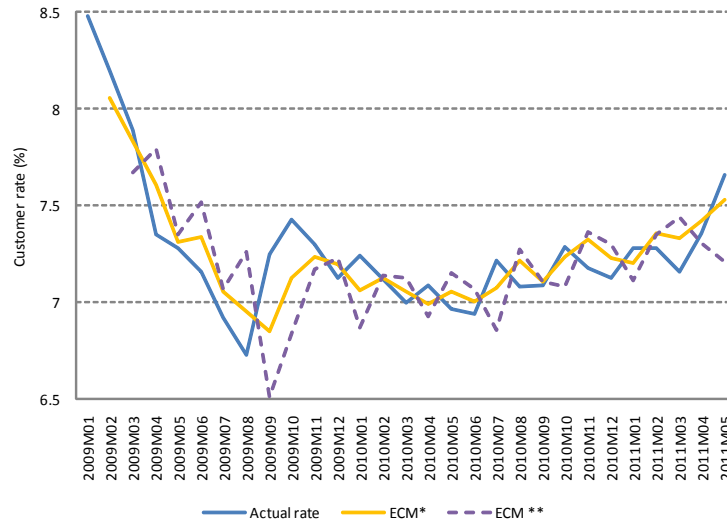


Figure 1: ECM model's consistence – retail asset side series

Further investigations are executed on each series to verify if clusters are statistically homogeneous and differentiated between them. Afterwards we illustrate reasonings on the retail and wholesale data.

Distribution	Values (€)
Mean	12,316.99
Standard deviation	77,477.25
Median	50,000.00
Mode (range)	0-10,000 €
95th percentile	1,500 k
99th percentile	10,000 k
Cash account's total amount	3,436 m

Figure 2: Statistical distribution of retail's savings account

As regards the first cluster an anomalous behavior seems to be visible (figure 3). It suggests the presence of two distinct phenomena. They could be explained through two different distributions, one normal and a uniform. Therefore we calculated the average and the standard deviation and we subdivided the series in two subseries: the first, which the threshold level is determined adding the standard deviation to the average; the second, consider all the customers with the settlement superior than level, but lower than 500,000 Euro (statistics are explained in fig. 2). It turns out that the behavior of the two series is perfectly identical from the distributive point of view and therefore we decide not to divide the series. However there is also the anomaly to justify. But, if we insert the time value, it is explained by a massive manoeuvre (please for widenings, see subsection 3)

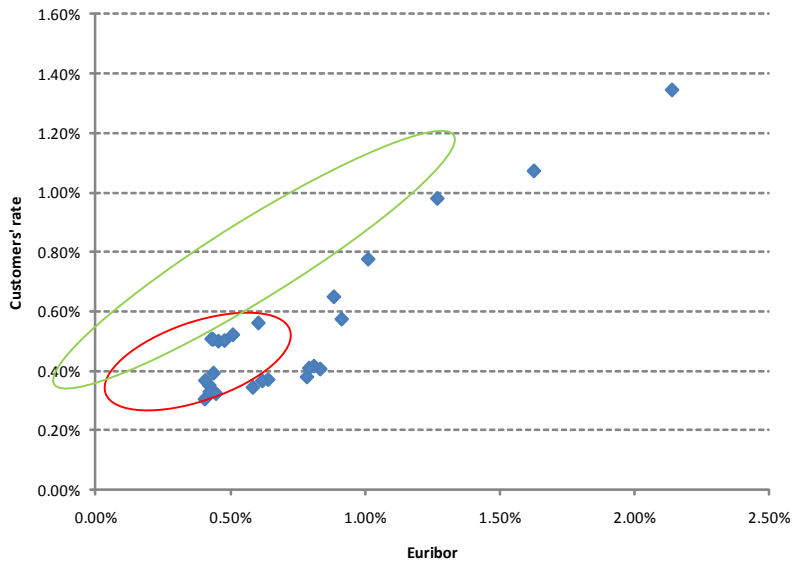


Figure 3: Correlation between Euribor and Customers' rate (upper limit: 500,000 €)

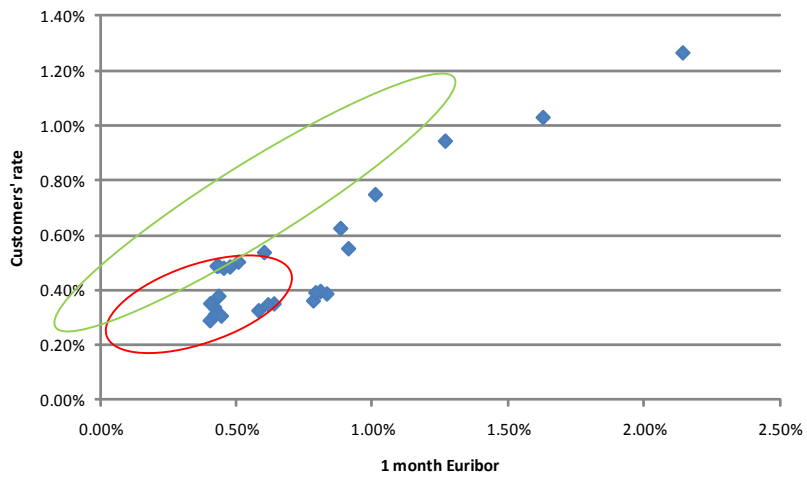


Figure 4: Correlation between Euribor and Customers' rate (upper limit: 90,000 €)

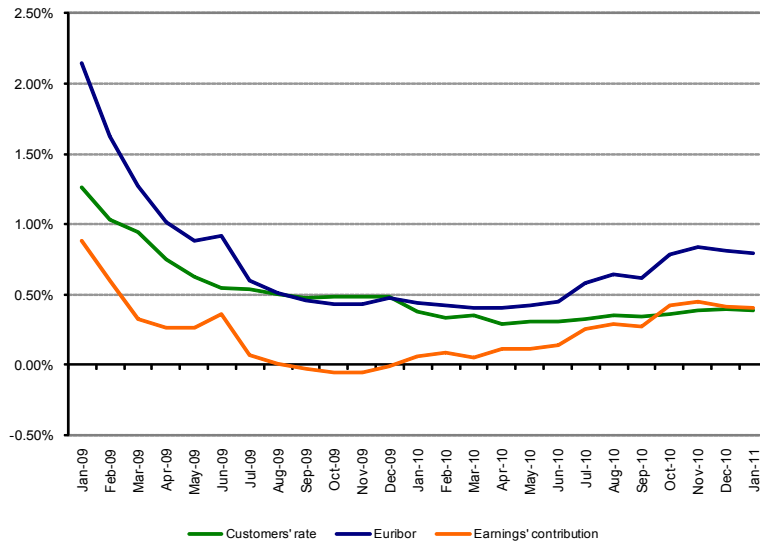


Figure 5: Rates' time series – retail (upper limit 90,000 €)

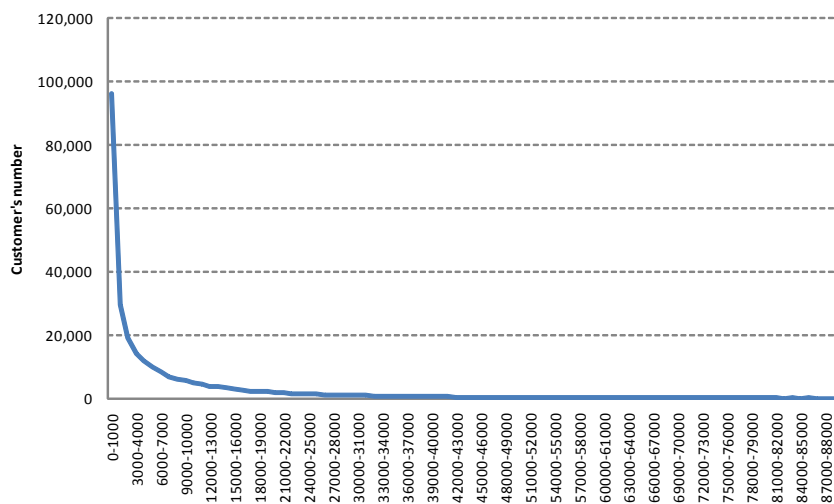


Figure 6: Customers' saving account distribution up to 90,000 € (1k € range)

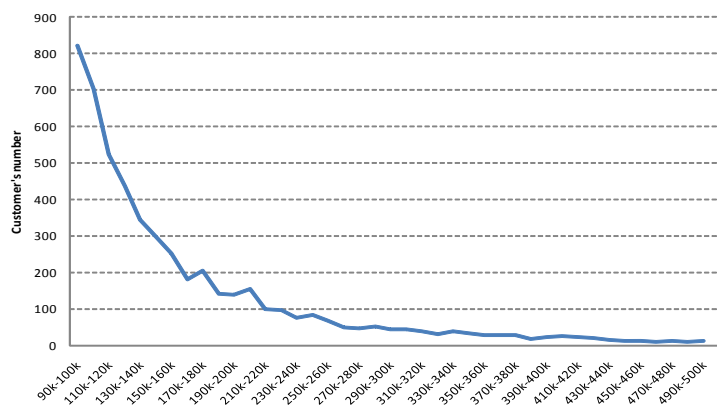


Figure 7: Customers' saving account distribution from 90,000 to 500,000 € (10k € range)



Concerning the asset-side cash accounts, we may consider that when the customer size increases, rates relationship raises. That could be inferred by the some graphs comparison (fig. 8,9,10), in which the correlation of the market rates with those paid from the customers moves up according to the increasing of the cash account middle settlement. Also in this case, we also tried to subdivide the series with settlements up to 7.5 million in three under series: the first with a top amount equal to 1.5 million; the second, between 1.5 million and 7.5 and the last one with maximum amount till 7.5. For each of them we calculate the long period relation with the aim to demonstrate that both the parameter  $\alpha$  and  $\beta$  are different. If they diverge we have to split the series in two subseries. Again, we observe that the customer's behavior in each of the two series is homogeneous: the difference is only on the intercept's value. Note the value of  $\alpha$  parameter that is greater than the Italian market risk premia (about the 4%) for the series with settlement lower than 1.5 million (fig. 9).

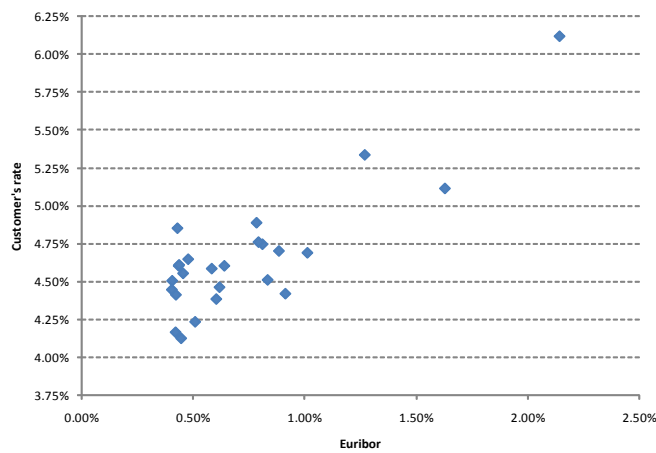


Figure 8: Correlation between Euribor and wholesale customer's rates (up to 7.5m €) – asset side

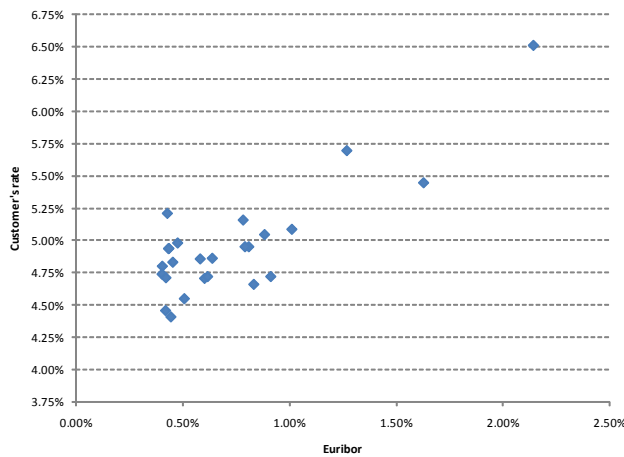


Figure 9: Correlation between Euribor and wholesale customer's rates (up to 1.5m €) – asset side

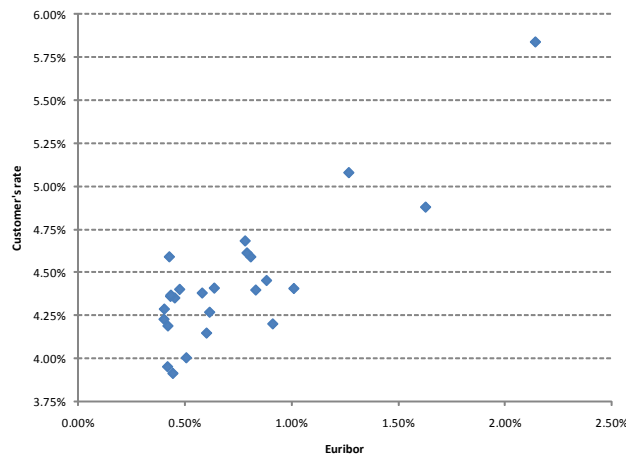


Figure 10. Correlation between Euribor and wholesale customer's rates (from 1.5m to 7.5m €) – asset side

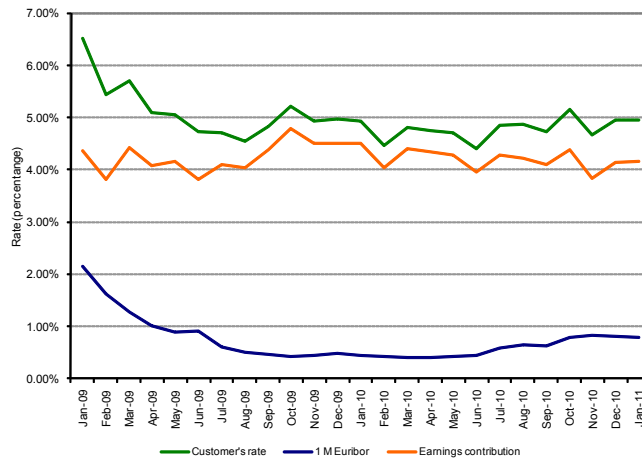


Figure 11: Rates' time series – Wholesale (up to 7.5k)

### 3. The Veneto Banca experience

The Veneto Banca experience best explains the benefits arising from adoption of the above methodology. In the specific case, analyses were conducted both at level of the total series and level of the not concentrated series (see the below table). From them we can draw numerous reflections. Firstly, we can notice the concentration effect on the ECM model's parameters (just the equilibrium relation). In this case, we have to verify if parameters are influenced by the concentration level. If they are, it means that it influences the research result. This case happens only for wholesale liabilities: however, it is justified by huge volume in game respect to retail ones.

	Series	Upper limit *	Alfa	Beta	R <sup>2</sup>
Asset side	Retail	none	5.34%	0.8654	0.5705
		890,000	6.68%	0.7822	0.7518
	Wholesale	none	3.62%	0.8662	0.8419
		12,000,000	4.07%	0.8833	0.8143
	<b>Total (Asset)</b>	<b>none</b>	<b>3.79%</b>	<b>0.8618</b>	<b>0.8242</b>
Liability side	Retail	none	0.13%	0.5525	0.7273
		none	0.13%	0.5525	0.7273
	Wholesale	none	0.48%	1.1837	0.9564
		5,200,000	0.14%	0.9668	0.9027
	<b>Total (Liability)</b>	<b>none</b>	<b>0.48%</b>	<b>1.1837</b>	<b>0.9564</b>

\* In euro.

Analyzing the asset-side retail series (fig. 12) we have noticed that in specific historical moments the customer rates increases when market rate decrease. This seems in contradiction with what the macroeconomic model establishes.

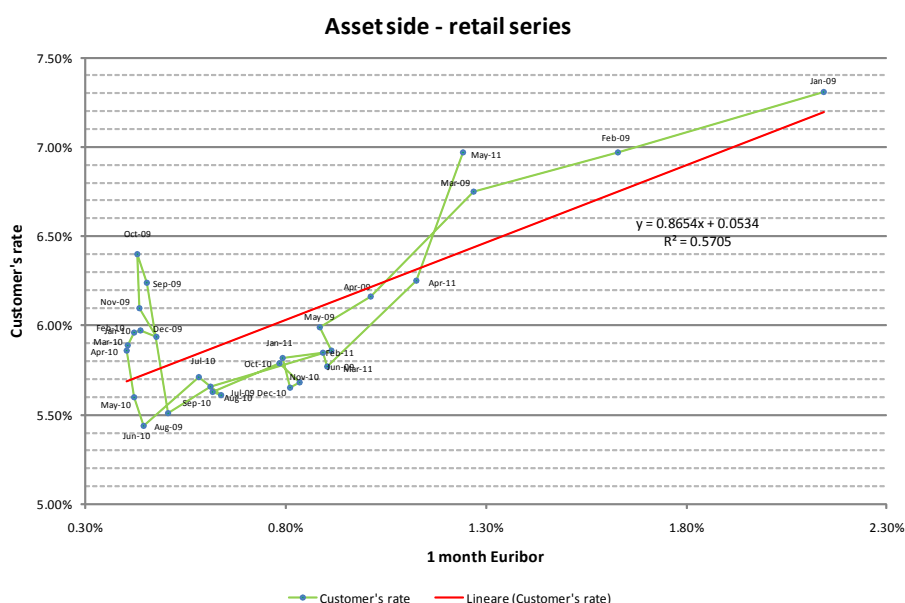


Figure 12: Correlation between Euribor and retail customer's rate (Upper limit: none)

For example, we go into more depth on the period between August and September 2009. Against 5 basis point contraction of one month euribor, the customer rate increases by almost 52 bps. Such jump is due the application of massive manoeuvres, that was reabsorbed in about 8 months. Between January 2009 and May 2011 happened four manoeuvres, two during the rates rising phase (June 2010, July 2010) and two in decrease phases (April 2009 and August 2009). From the graph 12 we can evict that the only one that truly had some effect was the August one, while other 3 were reabsorbed quicklier (two months at the most). We wonder about their real usefulness. In any case, the realization of the manoeuvres affects the result of the ECM.

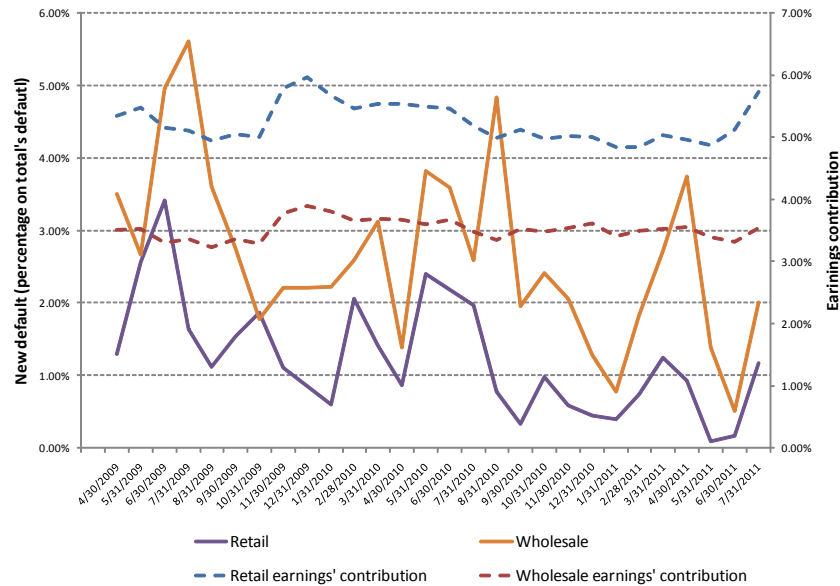


Figure 13: Relation between Earnings' cash account contribution and new default

To eliminate this distortive effect, we reflect on manouvres' guidelines. One of them could be attributable to the worsening of the customer *credit spread*. Unfortunately, this hypothesis is not verifiable, as the office responsible for credit monitoring does not monitor the phenomenon for single customer. As proxy, we could consider the new delinquent trend. If it increases in the incriminated period, would mean that the increase of the customer's rates due to the manoeuvre effect is originated by the *credit spread* and therefore is not explicable with interest rate risk but with credit ones. As consequence, for the ECM determination, we must purify the series from this phenomenon. This would allow a greater model trustworthiness on the future forecasts. This hypothesis opens two problems:

1. the new default dynamics could follow the customer rates after a certain time;
2. the relation between the interest rate risk and the credit one does not consider the risk aversion.

Therefore if the default and the asset/liability rates increase at the same time, the risk remuneration increases due to greater *risk appetite* (in line with the RAROC theory. As we can see in fig. 16, there is no relation between new default dynamics and cash account income. So, it should be important to advise the commercial department of this issue.

Concerning the retail-liability series, we can notice that the graph line depicts a lengthened C. The differential between the top side and the lower summarizes the risk premia that the bank was able to obtain in two years. In fact between May 2009 and May 2011 the rate paid to customers is lower of almost 46 basis point. It would be interesting to investigate about the event that produced the turning point. It could be due to a missed bond emission, to a new company policy or to the turning around to another funding form. Considering these motivations, in additions to the written-above about the credit risk, we can conclude the model ECM is unsuited to forecast because it considers only one of many complex and articulate phenomenon.

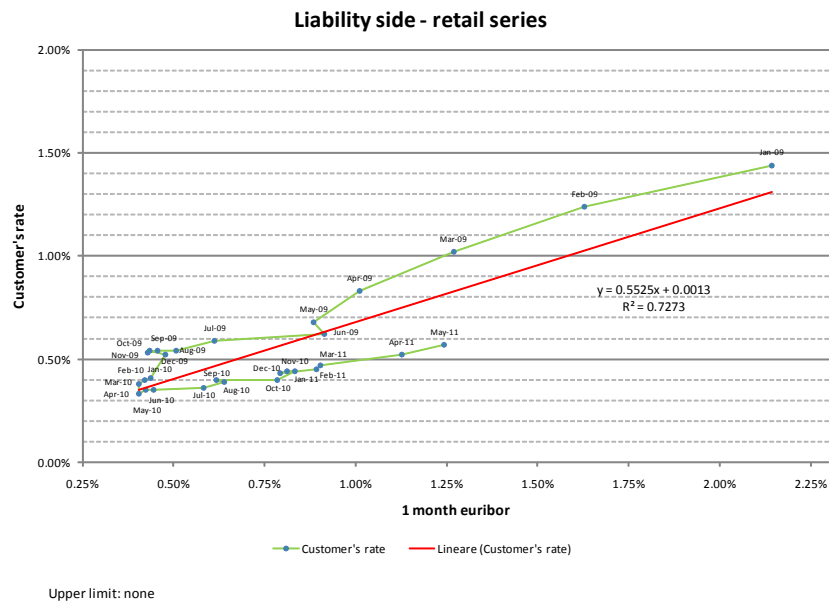
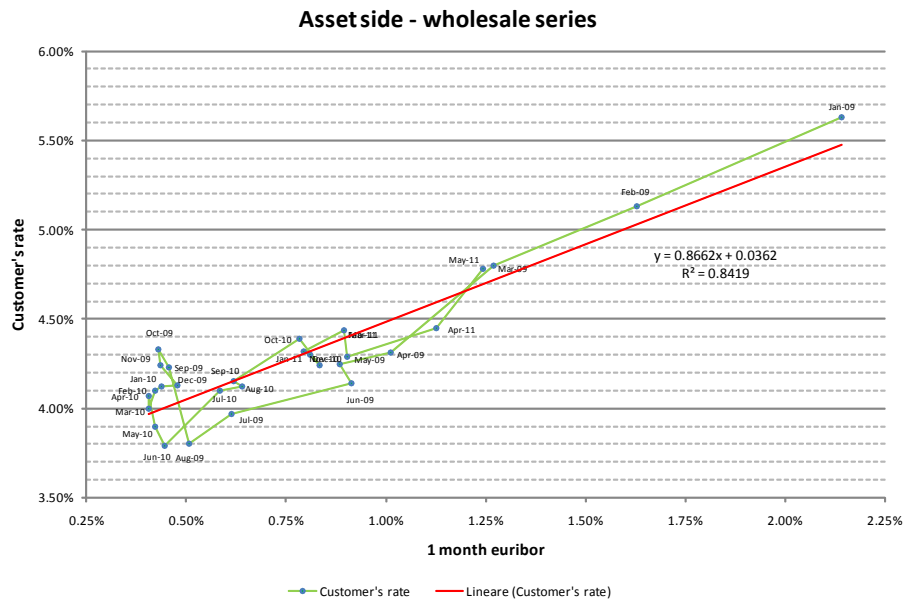


Figure 14: Correlation between Euribor and retail customer's rate (Upper limit: none)

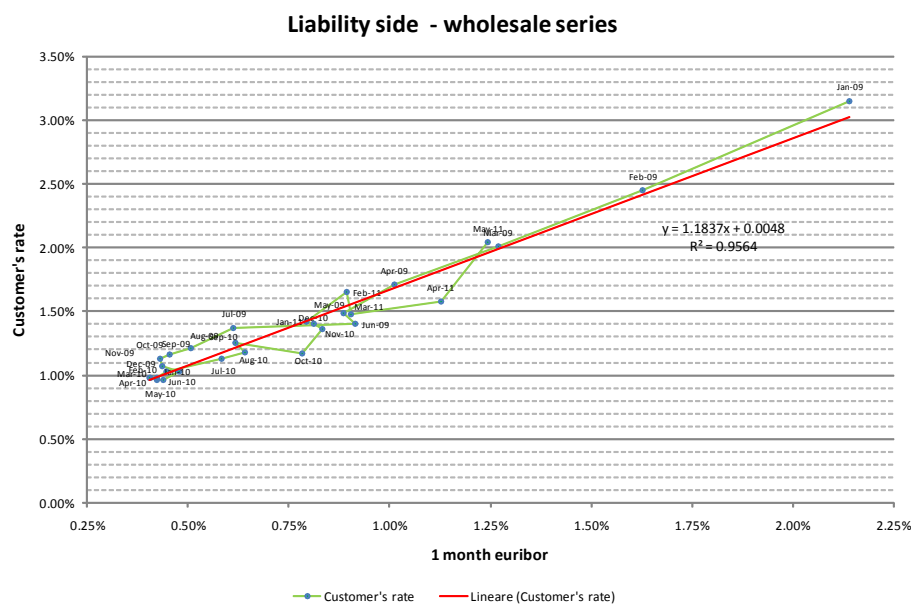
Would be interesting verifying the existence of a positive correlation between the attribute "be partner" and the rate applied the customer. If confirmed, it means that we have created a synthetic saving share because the shareholder obtains a greater yield in cash accounts. But, if we can't confirm this hypothesis, the liability-side  $\beta$  would be more worrisome, being superior to the system average. Moreover, due to the considerable concentration level, it would be opportune to move the liquidity risk on the market, inviting top customers to buy our bonds on the market or preference shares (with a yield equal to the no-preference-share plus one little percentage that is littler then cash account rate). This way would protect the bank both from the liquidity risk and the interest rate one, allowing a greater level and stability of the financial-margin interest.

Comparing the liability-side  $\beta$  of wholesale customers with the asset-side one we can infer that this last one finances the liability concentration; covering the extra yield recognized to bigger customers. Would be useful verifying if these customers are shareholders. If so, the remuneration (1.18 times the euribor rate) is acceptable and therefore the  $\beta$  value is an appearance characteristic of the bank's business model.



Upper limit: none

Figure 15: Correlation between Euribor and wholesale customer's rate (Upper limit: none)



Upper limit: none

Figure 16: Correlation between Euribor and wholesale customer's rate (Upper limit: none)

### 3.1 The new model impact on the risk indicators

The parameters used to measure the impact of the new methodology on risk indicators are summarized in the following table. The first five columns refer to ECM parameters, and in addition, the core percentage used in the volumes model is represented in the last one column.

Balance sheet side	Series	ALFA	BETA	GAMMA PLUS	GAMMA MINUS	THETA	% CORE
Asset	Retail	6.675%	0.782	0.704	0.704	-0.468126	96.448%
Asset	Retail	0.129%	0.553	-	0.371	-0.232517	94.272%
Liability	Wholesale	4.066%	0.883	1.000	0.958	-0.387386	97.070%
Liability	Wholesale	0.141%	0.967	-	0.841	-0.393967	91.841%

Figure 17: Applied parameters (ECM e volumes)

In case of instantaneous and parallel +100 bps shock, the effect of the new modeling on earnings is important. In Veneto Banca, we estimate a reduction in profits resulting from demand items of 14.18 million, compared with 10.45 of the old methodology. If we consider the overall effect on earnings, it results that the bank gains 13.9 million when rates upward (actual model), instead of 10.2 (new modelization).

Balance sheet	ACTUAL MODEL			NEW MODEL			GAP	
	Outstanding	Delta Earnings	Beta	Outstanding	Delta Earnings	Beta*	Outstanding	Delta Earnings
<b>ASSET</b>								
At sight modelization	5,025.1	39.2	0.75	4,424.4	39.1	0.78	-600.8	-0.1
At sight items (no model.)	853.8	8.5	1	1,454.6	14.5	1	600.8	6.0
of which intercompany	593.6			593.6				
of which istitutional	260.3			861.1				
Other maturity items	16,803.3	130.6		16,803.3	130.6			
Modelization coverage (%)	85.5%			75.3%				
Total - Asset	22,682.3	178.3		22,682.3	184.2			5.9
<b>LIABILITY</b>								
At sight modelization	-6,658.0	-33.9	0.46	-5,493.3	-31.9	0.70	1,164.7	2.0
At sight items (no model.)	-2,432.0	-24.3	1	-3,596.7	-36.0	1	-1,164.7	-11.6
of which intercompany	-102.6			-102.6				
of which istitutional	-2,329.4			-3,494.1				
Other maturity items	31,786.6	-106.2		31,786.6	-106.2			
Modelization coverage (%)	73.2%			60.4%				
Total - Liability	-22,696.6	-164.4		-22,696.6	-174.1			-9.7
<b>TOTAL</b>	<b>-14.3</b>	<b>13.9</b>		<b>-14.3</b>	<b>10.2</b>			<b>-3.7</b>

\* Weighted value

Figure 18: Impact on Earnings

We can see the same effect on the change in economic value. In view of the same shocks, between the old and the new method there is a delta of 39.15 million. If we consider the overall position, with the new methodology the bank loses 57.3 million, instead of 18.3.

Balance sheet	ACTUAL MODEL			NEW MODEL			GAP	
	Outstanding	Delta Value	Beta	Outstanding	Delta Value	Beta*	Outstanding	Delta Value
<b>ASSET</b>								
At sight modelization	5,025.1	-46.6	0.75	4,424.4	-43.2	0.78	-600.8	3.4
At sight items (no model.)	853.8	0.0	1	1,454.6	0.0	1	600.8	0.0
of which intercompany	593.6			593.6				
of which istitutional	260.3			861.1				
Other maturity items	16,803.3	-125.7		16,803.3	-125.7			
Modelization coverage (%)	85.5%			75.3%				
Total - Asset	5,879.0	-172.3		5,879.0	-169.0			3.3
<b>LIABILITY</b>								
At sight modelization	-6,658.0	101.3	0.46	-5,493.3	58.8	0.70	1,164.7	-42.5
At sight items (no model.)	-2,432.0	0.1	1	-3,596.7	0.1	1	-1,164.7	0.0
of which intercompany	-102.6			-102.6				
of which istitutional	-2,329.4			-3,494.1				
Other maturity items	31,786.6	52.8		31,786.6	52.8			
Modelization coverage (%)	73.2%			60.4%				
Total - Liability	-9,090.0	154.1		-9,090.0	111.6			-42.5
<b>TOTAL</b>	<b>-3,211.0</b>	<b>-18.2</b>		<b>-3,211.0</b>	<b>-57.3</b>			<b>-39.1</b>

\* Weighted value

Figure 19: Impact on Economic Value

Looking at Figure 19, we note that the beta of liabilities is the element that affects the results. In conclusion, the capital absorbed for interest rate risk protection with the methodology

actually in use is far below what it should be if we considered the combined effect of the concentration risk, credit and interest rate.

#### ***4. Conclusions***

The paper aims to demonstrate that wiser uses of econometrics tools can be more effective than the adoption of bulkier instruments in detecting banking risk. The real next strategic innovation in this field will be more concerned with methodologies fixing communication bugs inside the banking organization. This is because the corporate risk is portfolio of specific risks mixed with the ability of the organization to react to stressing changes to specific sources of risk. Increasing decision making efficacy will increase banking reaction and reduce real exposure.

The liquidity risk is no more an exception. Its impact is to be assessed according to the entire banking system, particularly for possible reaction in credit risk premia. Strategic decisions and commercial policies defined at corporate level can unexpectedly bias banking reaction. Complex econometric solutions may generate information asymmetries (i.e. an inflating information risk) between decision makers and the technical departments deputed to its treatment. Regulators should pay more attention to the methods to be used for assessing risk, since the effect could be more effective to the stability of the financial system.

The paper demonstrate the huge contribution that a wiser use of risk detection tecnologies may give to the banking organization. Using the real experience emerging from a pilot project run by Veneto Banca Group inside the Master in Strategic Innovation of Ca' Foscari University. The emerging solution depicts a possible benchmark to carry on the liquidity risk detection even in banks greater than the group proposing it. Regulators could suggest it to reduce contagion effects but Banks could adapt it in order to increase their return-to-risk ratio.

#### ***References***

**A. Kanagala, M. Sahni, S. Sharma, B. Gou, J. Yu**, “A probabilistic approach of Hirschman-Herfindahl Index (HHI) to determine possibility of market power acquisition” - Power Systems Conference and Exposition, 2004

**Basel Committee on Banking Supervision**, “Basel II: International Convergence of Capital Measurement and Capital Standards – A revised framework” - Bank for International Settlements, June 2004

**Basel Committee on Banking Supervision**, “Basel III – International frame work for liquidity risk measurement, standards and monitoring” – Bank for International Settlements, December 2010

**Basel Committee on Banking Supervision**, “Principles For The Management And Supervision Of Interest Rate Risk” – Bank for International Settlements, January 2001

**Basel Committee on Banking Supervision**, “Principles for the Management and Supervision of Interest Rate Risk” - Bank for International Settlements, July 2004

**Basel Committee on Banking Supervision**, “Range of practices and issues in economic capital modelling – consultative paper” - Bank for International Settlements, August 2008



**Comptroller's Handbook**, "Interest Rate Risk" – Comptroller of The Currency Administrator of National Banks, Narrative June 1997 and Procedures March 1998

**David M. Wright e James V. Houpt, Leeto Tlou e Jonathan Hacker**, "An analysis of commercial bank exposure to interest rate risk"- Federal Reserve Bulletin, February 1996

**Donald R. Fraser, Jeff Madura and Robert A. Weigand**, "Sources of Bank Interest rate risk" - The financial review 37 (2002) 351 – 368

**Giovanni dell'Ariceia and Robert Marquez**, "Risk and the Corporate Structure of Banks" - Journal of finance, Vol. LXV, n°3. June 2010

**J. Duan, C.W. Sealey e Y. Yan**, "Managing banks' duration gaps when interest rates are stochastic and equity has limited liability" - International Review of Economics and Finance, n°8, 1999

**James H. Stock and Mark W. Watson**, "Introduction to econometrics" – Pearson Education, July 2005

**Jeff Madura e Emilio R. Zarruk**, "Bank exposure to interest rate risk: a global perspective" - The Journal of Financial Research, Vol. XVIII n°1, 1995

**Jose A. Lopez**, "Supervision interest rate risk management" - FRBSF Economic Letter, n°2004-26, September 17, 2004

**Mary E. Barth, Leslie D. Hodder e Stephen R. Stubben**, "Fair value accounting for liabilities and own credit risk" - The Accounting Review, Vol. 83, n°3, 2008

**Oliver Entrop, Marco Wilkens e Alexander Zeisler**, "Quantify the interest rate risk of banks" - European Financial Management, Vol. 15, n°5, 2009

**Piergiorgio Alessandri and Mathias Drehmann**, "An economic capital model integrating credit and interest rate risk in the banking book" - ECB Working Paper no. 1041, April 2009

**Piergiorgio Alessandri e Mathias Drehmann**, "An economic capital model integrating credit and interest rate risk in the banking book" – Bank of England, Summary of working paper n°388, June 2010

**Robert F. Engle and C. W. J. Granger**, "Co-Integration and Error Correction: Representation, Estimation and Testing" – Econometrica, Vol. 55, No. 2, 251 – 276, March 1987

**Weitzu Chen, Chi-Chun Liu e Stephen G. Ryan**, "Characteristics of securizations that determine Issuers' retention of the risk of the securitized assets" - The Accounting Review, Vol. 83 n°5, 2008

# The Impact of Adopting IASs on Social, Economical and Political Environment of Iran

Rezvan Hejazi<sup>1</sup>

<sup>1</sup>Alzahra University, Tehran-Iran

***Abstract.** Due to the importance of comparability of financial reporting and global trade growth, regulators, investors, great corporations and auditing institutions find the international and coordinated standards so significant. Therefore there is a reasonable motivation to investigate the impact of social, economical and political of accounting standards on environment of Iran. In this research, Delphi method and Cochran formula respectively have been employed to collect data and estimate sample size. Using of library studies and questionnaires data were collected.*

*The result of data analysis showed that the international accounting standards have significant impact on social, economic and political of Iran environment. However, there wasn't a significant difference between reported perceptions of three groups; academics, accountants and auditors.*

***Key words:** Accounting Standards, International Accounting Standards, IASs, Social Impact, Economic Impact, Political Impact.*

## Introduction

International harmonization of financial accounting standards has been the goal of many professional and academic accountants for many years, but progress has been slow in achieving this goal. There have been impediments to the creation of a uniform set of accounting standards for financial reporting purposes on a worldwide basis, not the least of which have been cultural, economic, and legal differences among countries. However, the process of international accounting harmonization has now entered a new phase. From January 1, 2005, all companies domiciled in the European Union with shares listed on securities exchanges must prepare their consolidated accounts in accordance with International Financial Reporting Standards (IFRS) issued by the International Accounting Standards Board (IASB). This event presents an opportunity for accounting researchers to analyze trends in research on international accounting harmonization and to assess where this research may proceed from here (Baker & Barbu, 2007).

Global Accounting Harmonization has been defined in various synecdoche's, "harmonization is perceived as a process whereby all countries adhere to uniform accounting standards for financial reporting purposes" (Nobes, 1981) and "harmonization it's the attempt to bring together different systems. It is the process of blending and combining various practices into an orderly structure, which produces a synergistic result" (Samuels et.al. 1985). As the growing magnitude of financial globalization was increasing, the need for establishing a single set of accounting

standards that would be authoritative in the international arena was becoming essential (Stergios & Laskaridou, 2008).

The requirement of constant global financial reporting cause to establish of International Accounting Standards Committee (IASC). IASC made its way through the financial reports, the image of commercial corporations, economy or even through communities. On the other hand, the history of accounting reflects a dynamic model of social development and also indicates how accounting and its surrounding influence each other. This dynamic model which reflects the social- economical condition determined the required methods in accounting. It is clear that accounting is a social phenomenon. Accordingly, applying a group of special and pre-determinate standards show varied changes in receptive environment. This research is an attempt to answer the question of whether the adaption of the international accounting standards would have any important impacts on the economic situations in Iran or not?

The international accounting uniformity, whether it is standardization or harmonization, it is still under the stage of development, analysis, comparison and argument. Furthermore, there are proponents and opponents for such a topic as it is part of the globalization movement. Numerous studies have done by researchers about this issue, namely, Homayoun Sheykh-al-Eslami (1995) found that the lack of national accounting standards and the use of the importing standards is the big reason of different financial reports among auditors. The absolute adoption of accounting methods of the other countries without considering the milieus in Iran dilapidate the credit of auditors and their financial statements. In a study by Larson & Kenny (1995) proved that the adoption of international accounting standards would have no significant impact on the capital development and the economical progress in these countries. Juhmani (1998) showed that the adaption of international accounting will not change the content of financial data. Ball and others (2000) found that applying the international accounting standards themselves do not make the financial statements automatically clear, but they are useful for an integrated, juridical, economical and global system so that to reach a uniform and optimum sufficiency. Kirby (2001) studied the consequences of international competition in the form of complete transparency given out by the uniformity of standards and concluded that while accepting the implementation of ISA, we must be more considerate. Tarca (2007) analyzed the effects of different factors of international uniformity on the selection of an accounting method with regard to the extent of different trends of the corporations which were not harmonious with the accepted principles of accounting of the United States. Her findings showed that the accepted accounting principles of the U.S., equivalence and accordance of distinct procedures are far more beneficial than the accepted and useful methods in international accounting standards (IASs). Hung and Subramanyam (2004) discovered that in some areas such as the evaluation of clerical value in comparison to national accounting standards play a more significant role, though in other cases like pure profits the reverse is true. Alshariari, and Al-Abdullah (2005) declared that the adaption of international accounting standards by Jordan would show the social, economical and political hazards in this country. Ahmad Kamran and Ali Jahangir (2006) realized that Bangladesh, India and Pakistan can practice the regional integration because of their social, cultural and economical similarities and also the likeness of their commercial property of accounting, organizational structure and many other environmental factors. Zhang and Wu (2008) concluded that the international accounting standards bring about beneficial tools for the goal of evaluation of and external performances of commercial units and supervision on them.

## Hypotheses

The main objective of this study is to investigate "The Impact of Adopting IASs on Iran environment through three dimensions; social, economical and political, from the perspective of academics, auditors and accountants".

Six hypotheses were designed to measure this question. Content of hypotheses 1, 2 and 3 are: "on the basis of comments of academics, auditors and accountants, acceptance of international accounting standards has a significant, social, economic and political impact on environment of Iran". Also the content of hypotheses 4, 5 and 6 are: "there is significant difference between comments of academics, auditors and accountants regarding the impacts of social, economic and political acceptance of international accounting standards on the environment of Iran."

## Methodology

The research methodology has been developed in a way to demonstrate the model of the study, dimensions of the study, hypotheses and the aspects related to sampling, data and methods of statistical analysis, **Delphi** method and **Cochran** formula have been used respectively for data collection and estimating sample size. The research data were collected from two sources of library studies and questionnaires.

Table 1 is used as the unit of scaling the queries in data collection. In this study as a survey research, the questionnaire contains five possible answers for each question, regarding "**Likert Scale**". The answer choice starts from "completely agree" with 5 scores to "completely disagree" with 1 score. The average score of over 3 is positive. And the average score of fewer than 3 would reject the research hypothesis. In order to perform a pre-test, we pilot the questionnaire among 20 people to validate it. And we also used "**Cronbach's Alpha Coefficient Correlation Questionnaire**" to insure the reliability of the questionnaire.

All the numbers in table 2 are greater than 0.05,so the questionnaire is reliable. In order to measure the validity of the questionnaire, we consider three kinds of the content, constructive and concurrent validity. The content validity depends on the judgments of the referees. At the phase of experimental data collection, the questionnaire was studied through the pre-test. Since the two tests were not taken simultaneously, we couldn't determine the concurrent validity, however, we measured the structural (face) validity by comparing the results of this study with similar studies done in other countries (Azar & Momeni, 2000).

The given questionnaire is of four parts that includes the general knowledge of the interviewees, social questions, economical questions and political questions respectively. The general knowledge contains six personal questions about gender, education, profession, occupation, experiences, and age. The social, economical and political question each includes 18 questions to

evaluate the impacts of economical, social and political perception of acceptance of the international accounting standards in Iran.

In the researches that required the sampling system, the amount of the samples should be in a way to enable us to generalize these results to the entire population. To confirm the size of the sampling of the statistical population as well as the number of the participants (respondents) that had been collected after distributing questionnaires, we used the formula from the test of data-sufficiency of respondents (table 3). According to table 3, the results are all fewer than 0.1, the number of respondents is efficient in sizedata analysis methods.

All the presented hypotheses are defined in the form of statistical theories of H0 and H1. The hypotheses were tested at the level of significance of 0.05. In other words, the type one error or Alpha is 0.05 and the level of confidence is 0.95. The data were analyzed by descriptive statistical scale containing the average, standard deviation, and dispersion coefficient; and were analyzed through statistical inference of one-way ANNOVA and Tukey HSD test.

The statistical tests of the hypothesis of this study will be explained later. In this study, we used Microsoft Excel to organize and analyze the data (the collected questionnaire); as well as SPSS version. 18.

## **Findings**

### **Descriptive analysis of social dimension questions**

Questions 1 to18 are designed to determine the presence or absence of the social impacts of the acceptance of the International Accounting Standards (IASs) in Iran. In this part, the entire participant generally accepted that the average point of the questions is above 3, except for questions 7, 17 and 18. Therefore from the point of views of all participants, the acceptance of IASs can have social significant impacts through the aforementioned factors on Iran.

The answers to the questions number 6, 2 and 13 had the highest grade of 3/96, 3/86 and 3/83 as being considered having the most impacts on Iran's Social milieus among other questions. None of the respondents confirmed that questions 7, 17, 18 would have any significant influences on social situations in Iran by the average point of less than 3. They also had rather identical answers to questions 13, 16, 2, 12 than other questions by the dispersion coefficient of 0/21, 0/21, 0/23 & 0/23 respectively which is a strong support to the result regarding the theme of these questions. Moreover; they also had rather different answers to questions 7, 5, 18 than other questions by the dispersion coefficient of 0/38, 0/37 and 0/34 respectively which is not a strong support to the result regarding the theme of these questions. Thus, the acceptance of the international accounting standards is due to the following factors which would impose a social impact on Iran.

Table 4, shows the statistics of the questions of social dimension after separation of the three groups and also the importance of the proposed characteristic in the question from the sight of respondents and according to declarations of the research sample about the social impacts of accepting the international accounting standards the agreement values of respondents (from the highest to the lowest mean value

of assessment) is arranged. The numbers of social dimension questions in respect of importance are 6, 2, 13, 3, 10, 16, 11, 1, 9, 12, 4, 14, 8, 5, 15, 7, 17 & 18.

According to the data presented in table 4, the impacts of accepting the IASs on Iran's social situations are as follows:

- Strengthening the concept of transparency through full disclosure principle(6<sup>1</sup>)
- Relationship closeness between beneficiary groups in organizations(2)
- Training and promoting employees (13)
- Good relations between producers and users of financial information (3)
- Accepting the concept of social accounting (10)
- Transparency in the disclosure of positive and negative environmental impacts (16)
- Increasing the social role of corporates (11)
- Maintaining social dimension of system formulation and development of accounting (1)
- increasing social responsibility to other countries (9)
- publishing reports related to social assistance (12)
- Supporting the role of accountants, auditors and academics (4)
- Improving workplace conditions (14)
- Reducing conservative investment behavior (8)
- Confidence in market information for investing (5)
- Providing more social benefits (15)

Meanwhile according to the views of the given case in the following elements, accepting the international accounting standards is not yet confirmed socially.

- Participation of companies in developing of Institutions with social activities (7)
- Providing the social justice (17)
- Increasing Investment Risk Behavior (18)

---

<sup>1</sup> Numbers in parentheses are related to the number of questions

**Descriptive analysis of economic dimension questions:**

Questions 1 to 18 are designed to determine the presence or absence of the economic impacts of the acceptance of the International Accounting Standards (IASs) in Iran.

In this economic part, the entire participant generally accepted that the average point of the questions is above 3, except for question 13. Therefore from the point of views of all participants, the acceptance of IASs can have economic significant impacts through the aforementioned factors on Iran.

The answers to the questions number 5, 3, 6 and 1 had the highest grade of 4/09, 3/94, 3.87 and 3/87 as being considered having the most impacts on Iran's Economic milieu among other questions. None of the respondents confirmed that question 13 would have any significant influences on economic situations in Iran by the average point of less than 3.

They also had rather identical answers to questions 16, 3, 5 than other questions by the dispersion coefficient of 0/22, 0/22 & 0/21 respectively which is a strong support to the result regarding the theme of these questions. Moreover; they also had rather different answers to questions 18, 13, 9 than other questions by the dispersion coefficient of 0/35, 0/33 and 0/33 respectively which is not a strong support to the result regarding the theme of these questions. Thus, the acceptance of the international accounting standards is due to the following factors which would impose an economic impact on Iran.

In table No.5 the statistics of the questions of economic dimension after separation of the three groups and also the effectiveness importance of the proposed characteristic in the question from the sight of respondents is shown and according to declarations of the research sample About the economic effects of accepting the international accounting standards The agreement values of respondents (from the highest to the lowest mean value of assessment) is arranged. The numbers of economic dimension questions in order of importance are 5, 3, 16, 12, 1, 15, 17, 11, 10, 2, 6, 18, 14, 4, 7, 9, 8, 13.

According to the data presented in table 5, the impacts of accepting the IASs on Iran's economic situations are in order as follows:

- Increasing of local investors in domestic and foreign companies (5)
- Preparation of national economy to benefit from international economics (3)
- Encouraging international investors to invest in Iran (16)
- Improving foreign views of the Iranian economy (12)
- Supporting to achieve economic goals (1)
- Helping Iranian companies to earn royalties from international famous companies (15)
- Attracting multinational companies to establish branches in Iran (17)
- Forcing to join the World Trade Organization (WTO) and subsequently creating economic advantages for products (11)

- Increasing government revenue by improving the calculations and subsequently increasing domestic capital investments  $\rightarrow$  (10)
- Improving Iran economy (2)
- Creating a competitive atmosphere in the quality of Iranian products and subsequently increasing the international competitiveness of products (6)
- Encouraging Iranian companies in establishing foreign branches, followed by creating multinational companies in Iran (18)
- Attracting economic donations, concessions and assistance
- Creating new jobs and leading to reduce unemployment in the labor market (4)
- Increasing exports (7)
- Improving RLS exchange rate (8)
- Increasing foreign currency reserves (9)

Meanwhile according to the views of the "Reducing foreign debt "(13), accepting the international accounting standards is not yet confirmed economically.

#### **Descriptive analysis of political dimension questions:**

Questions 1 to18 are designed to determine the presence or absence of the political effects of the acceptance of the International Accounting Standards (IASs) in Iran.

In this part, the entire participant generally accepted that the average point of the questions is above 3, except for questions 4, 7 and 11. Therefore from the point of views of all participants, the acceptance of IASs can have political significant impacts through the aforementioned factors on Iran.

The answers to the questions number 3, 8 and 12 had the highest grade of 3/96, 3/86 and 3/83 as being considered having the most effects on Iran's Political milieus among other questions. None of the respondents confirmed that questions 4, 7, 11 would have any significant influences on political situations in Iran by the average point of less than 3.

They also had rather identical answers to questions 3, 13, 12 than other questions by the dispersion coefficient of 0/23, 0/21 & 0/21 respectively which is a strong support to the result regarding the theme of these questions. Moreover; they also had rather different answers to questions 3, 13, 12 than other questions by the dispersion coefficient of 0/38, 0/37 and 0/34 respectively which is not a strong support to the result regarding the theme of these questions. Thus, the acceptance of the international accounting standards is due to the following factors which would impose a political impact on Iran.

- Joining the WTO (the world trade organization) (8)



## The Impact of Adopting IASs on Social, Economical and Political Environment of Iran

- Globalization of economy (12)

According to the data presented in table 6, the impacts of accepting the IASs on Iran's political situations are in order as follows:

- Enabling Iran to participate as part of the international environment.(3)
- Developing Iran's foreign policies and its relationship with other developed countries.(14)
- Being appropriate to the political situation of Iran (18)
- Having options to choose between the IASs and other Standards in the world (6)
- Imposing the political preferences through the acceptance of the standards by effective groups in the process of developing countries. (9)

The following assumptions led to hidden political aspects of international accounting standards. So from respondents' point of view by accepting international accounting standards the political aspects of it will be imposed on Iran.

- To meet the interests and the needs of all countries including developing countries by globalization.(13)
- To conform the IAS and the GAAP (Generally Accepted Accounting Principles) because of numerous amount of multinational corporations in the U.S.(17)
- To conform the international accounting standards with GAAP due to the influence of the American GAAP over IAS (15)
- To conform the international accounting standards with GAAP due to the high quality of the American standards (16)
- To impose the political preferences of developed countries over the developing ones through the economic tools in the forms of International Standards (1)
- Hidden political aspects on the professional role of accounting (5)
- To coin standards regarding the especial economic and political interests (2)
- To increase the Domination of the developed and powerful countries through the acceptance of the international standards and introducing other standards accordingly.(10)

Meanwhile according to the views of the given case in the following elements, accepting the international accounting standards is not yet confirmed politically.

- Using International Accounting Standards as a political tool to influence the economics of the developing countries (11)

- Accepting the international accounting standards In Iran is due to is the political pressure on this profession (4)
- Using International Accounting Standards as a kind of political domination.(7)

*Table (1): Sample size by Cochran formula*

	Academics	Auditors	Accountants	Total
Community size (N)	157	1085	435	1677
Sample size (n)	87	166	135	388

*Table (2): Cronbach's Alpha Test*

Test	Social Impact Reliability Statistics		Economic Impact Reliability Statistics		Political Impact Reliability Statistics		Total Reliability Statistics	
	A	N of Items	$\alpha$	N of Items	A	N of Items	$\alpha$	N of Items
Cronbach's Alpha								
$\alpha$	.784	18	.908	18	.754	18	.863	54

*Table (3): Sufficient number of respondents Test*

Test	Academics	Auditors	Accountants	Total
Community size (N)	157	1085	435	1677
Number of responses collected	62	93	83	238
Sufficient number of respondents (ci)	0.0968	0.0972	0.0968	0.0588

Table (4): Descending table of mean, standard deviation and coefficient of dispersion for social questions

Social Questions	Academics			Auditors			Accountants			Total		
	M	SD	CV	M	SD	CV	M	SD	CV	M	SD	CV
6	3.83	1.1	0.29	3.79	1	0.26	4.27	0.8	0.19	3.96	0.98	0.25
2	3.36	1	0.3	3.97	0.8	0.2	4.12	0.69	0.17	3.86	0.87	0.23
13	3.62	1	0.28	3.66	0.76	0.21	4.19	0.55	0.13	3.83	0.81	0.21
3	3.41	1.08	0.32	3.68	0.98	0.27	4.08	0.81	0.2	3.75	0.99	0.26
10	3.25	1.19	0.37	3.77	0.77	0.2	3.8	0.79	0.21	3.65	0.93	0.25
16	3.62	0.94	0.26	3.63	0.8	0.22	3.67	0.63	0.17	3.64	0.78	0.21
11	3.19	1.23	0.39	3.9	0.75	0.19	3.65	0.96	0.26	3.63	1	0.28
1	3.37	1.11	0.33	3.75	0.9	0.24	3.64	0.99	0.27	3.61	1	0.28
9	3.3	1.21	0.37	3.58	1.05	0.29	3.82	0.61	0.16	3.59	0.99	0.28
12	3.4	0.93	0.27	3.53	0.83	0.24	3.55	0.61	0.17	3.5	0.79	0.23
4	3.14	1.24	0.39	3.66	0.96	0.26	3.54	1.26	0.36	3.48	1.16	0.33
14	3.33	0.99	0.3	3.35	0.93	0.28	3.49	1.06	0.3	3.4	0.99	0.29
8	3.04	1.18	0.39	3.24	1.04	0.32	3.59	1.08	0.3	3.31	1.11	0.34
5	3.17	1.19	0.38	3.1	1.16	0.37	3.22	1.21	0.38	3.16	1.18	0.37
15	2.97	1.05	0.35	3.16	0.85	0.27	2.95	0.91	0.31	3.04	0.93	0.31
7	2.95	1.13	0.38	2.97	1.13	0.38	2.7	1.03	0.38	2.87	1.1	0.38
17	2.94	1.01	0.34	2.7	0.92	0.34	2.73	0.93	0.34	2.78	0.95	0.34
18	2.82	1.19	0.42	2.7	0.87	0.32	2.7	0.81	0.3	2.73	0.94	0.34

Table (4): Descending table of mean, standard deviation and coefficient of dispersion for social questions

Social Questions	Academics			Auditors			Accountants			Total		
	M	SD	CV	M	SD	CV	M	SD	CV	M	SD	CV

CV=coefficient of variation, SD= standard deviation, M=mean

Table (5): Descending table of mean, standard deviation and coefficient of dispersion for economic questions

Economic Questions	Academics			Auditors			Accountants			Total		
	M	SD	CV	M	SD	CV	M	SD	CV	M	SD	CV
5	4.05	1	0.25	4.08	0.86	0.21	4.14	0.93	0.22	4.09	0.92	0.22
3	3.84	0.91	0.24	3.89	0.99	0.25	4.08	0.61	0.15	3.94	0.86	0.22
16	3.86	0.89	0.23	3.86	0.89	0.23	3.9	0.67	0.17	3.87	0.82	0.21
12	3.79	1.25	0.33	3.83	1	0.26	3.93	0.78	0.2	3.86	1	0.26
1	3.78	0.94	0.25	3.59	1.06	0.3	4.07	0.76	0.19	3.81	0.95	0.25
15	3.75	0.75	0.2	3.53	1.08	0.31	4.12	0.5	0.12	3.79	0.87	0.23
17	3.74	1.07	0.29	3.6	1.05	0.29	3.99	0.65	0.16	3.77	0.95	0.25
11	3.61	1.21	0.34	3.74	0.94	0.25	3.63	1.09	0.3	3.67	1.07	0.29
10	3.53	1.04	0.31	3.55	1.01	0.3	3.94	0.72	0.18	3.55	0.97	0.27
2	3.21	1.23	0.38	3.44	1.1	0.32	3.66	1.07	0.29	3.46	1.14	0.33
6	3.66	1.1	0.3	3.25	0.99	0.3	3.43	0.99	0.29	3.42	1.03	0.3

Table (5): Descending table of mean, standard deviation and coefficient of dispersion for economic questions

Economic Questions	Academics			Auditors			Accountants			Total		
	M	SD	CV	M	SD	CV	M	SD	CV	M	SD	CV
18	3.32	1.31	0.39	3.16	1.23	0.39	3.48	0.95	0.27	3.31	1.17	0.35
14	3.41	0.99	0.29	3.19	1	0.31	3.35	0.79	0.24	3.3	0.95	0.28
4	3.19	0.85	0.27	3.06	0.88	0.29	3.33	0.68	0.2	3.19	0.81	0.25
7	3.16	0.92	0.29	3.02	1.02	0.34	3.27	0.84	0.26	3.14	0.93	0.3
9	3.04	0.82	0.27	2.96	1.12	0.38	3.22	1	0.31	3.07	1.01	0.33
8	3.07	0.8	0.26	2.82	1.06	0.38	3.33	0.83	0.25	3.06	0.94	0.31
13	2.76	1.07	0.39	2.75	0.99	0.36	2.94	0.77	0.26	2.82	0.94	0.33

CV=coefficient of variation, SD= standard deviation, M=mean

## References

Azar, A. (2000). *Statistics and its Application Management*. Tehran: SMT publications. [In Persian]

Baker,C., Barbu, E.M. (2007) ' Trends in research on international

accounting harmonization' *The International Journal of Accounting*, 42, 272–304.

Ball, R. , A. Robin & J.S. Wu (2000). 'Incentives versus Standards: Properties of Accounting Income in Four East Asian Countries, and Implications for Acceptance of IAS.' *Simon School of Business Working Paper No. FROO-04*; Boston JAE Conference Oct, 2002. Available at <http://papers.ssrn.com/abstract=216429> retrieved on November 13, 2004.

Hung, M., & K.Subramanyam (2004). 'Financial Statement Effects of Adopting International Accounting Standards: The Case of Germany.' At Available <http://papers.ssrn.com/abstract=622921> retrieved on December 6, 2004.

IFRS. (2008). *An AICPA Backgrounder*. At Available [http:// IFRS.com](http://IFRS.com)

Juhmani, O. (1998). 'The Stock Market Response to the Introduction of International Accounting Standards in Jordan.' *The Arab Journal of Accounting*,2 (1), pp. 95-127.

Kamran, A. & A. Jahangir (2006). 'The Legal and Institutional Framework for Corporate Financial Reporting Practices in South Asia.' At Available <http://papers.ssrn.com/so13/Papers.cfm?abstract id=947362> retrieved February 06, 2007.

Kirby, AJ. (2001). 'International competitive effects of harmonization.' *The International Journal of Accounting*,36.

Larson Robert K. & S. Kenny York (1995). 'An Empirical Analysis of International Accounting Standards, Equity Markets, and Economic Growth in Developing Countries.' At Available <http://papers.ssrn.com/so13/Papers.cfm? abstract id=2565> retrieved March 31, 2000.

Nobes, C.W. (1981). An empirical investigation of international accounting principles: A comment. *Journal of Accounting Research*, Spring, 268–80.

Samuels, J M et.al. (1985). *International Accounting: A Surve*. Croom Helm Ltd, Kent.

Stergios. A , Laskaridou, E.C' Have met IASs Accounting Harmonization? The case of Greek Listed Companies'International Conference on Applied Economics.

Tarca, A.(2007) 'Achievement to international harmonization through Selection of accounting procedures' Traslated by H. Hemmati. *Accountant Magazine* 179. [In Persian]

Zhang, I. & J. S. Wu (2008). 'The Voluntary Adoption of Internationally recognized Accounting Standards and Firm Internal Performance Evaluation.' The Bradley Policy Research Center Financial Research and Policy Working Paper No. FR 08-07 January 23, 2008. At Available <http://papers.ssrn.com/so13/>

# Carbon Markets in Times of Economic Uncertainty: A Weak-Form Efficiency Investigation of the Phase II EU ETS

Scott J. Niblock<sup>1</sup>

<sup>1</sup> Southern Cross Business School, Southern Cross University

**Abstract.** *In this paper I examine the weak-form efficiency status of the European carbon market over periods of sustained market volatility and economic uncertainty (i.e. 2008-2012). 1,035 daily spot price data observations from the Phase II European Union Emissions Trading Scheme (EU ETS) are employed, along with random walk and trading rule profitability tests. To establish the evolution of weak-form efficiency, the time period under investigation is further divided into two distinct crisis periods, i.e. Global financial crisis (GFC) period and European sovereign debt crisis (ESDC) period. Period 1 random walk test findings support the proposition of price return predictability during the GFC. Conversely, Period 2 random walk test results show that return predictabilities are virtually non-existent during the ESDC (a trend which is also apparent over Combined Periods). Trading rule profitability findings reveal that after applying simple trading rules (that account for risk and transaction costs), return predictabilities cannot be manipulated to profit above a naïve buy-and-hold strategy. Despite extreme market volatility and ongoing climate change policy ambiguity, it appears that the EU ETS is becoming more weak-form efficient.*

**Keywords:** *EU ETS, predictability, random walk, volatility, weak-form efficiency*

## 1 Introduction

In recent times, global financial markets have encountered extreme volatility. Chevallier (2011, p.99) states that “volatility measures whether an asset has been trading quietly or with wide swings”. When investors react collectively to unusual financial/economic “events”, there is a tendency for impulsive trading behaviour, thus resulting in heightened market volatility. Financial fiascos such as the Global Financial Crisis (GFC) (2008-2010) and European Sovereign Debt Crisis (ESDC) (2010-2012) are classic examples of such volatility<sup>1</sup>. Driven by the United States (U.S.) housing bubble in 2007-08, the GFC rapidly consumed leveraged entities and wreaked havoc on the real economy<sup>2</sup>. In response to this unprecedented crisis, the U.S. and other Western economies simultaneously manufactured

---

<sup>1</sup> The GFC and ESDC are considered to be among the most destructive and controversial crisis events since the Great Depression.

<sup>2</sup> The GFC (or sub-prime crisis, global credit crisis, liquidity crisis, etc) was primarily caused by the securitisation of the U.S. mortgage market, i.e. bundling of sub-prime mortgages into derivatives and synthetic products, and the excessive financial leverage associated with such products.

massive economic bailout packages to assist financially crippled banks, insurance companies, financial service providers and multinational corporations, in an attempt to thwart a collapse of the global financial system. With the realisation that not only had the GFC paralysed the global financial system but government balance sheets as well, the GFC manifested into the ESDC in early 2010. This dangerous new phase of the crisis resulted in numerous stimulus packages, quantitative easing and government bond purchases being coordinated by the European central bank (ECB) and directed towards distressed Euro-zone economies (i.e. Portugal, Italy, Ireland, Greece and Spain) in the hope that such actions would: (1) bolster domestic demand; (2) prevent further increases in bond yields; and (3) strengthen the broader European economy.

Whether the above mentioned policy responses have solved the problems associated with the GFC and ESDC remains a moot point. However, it is abundantly clear that the myriad of capital injected into the global financial system since the onset of the GFC has led to burgeoning Western government expenditures and exponential debt levels. For instance, drastic fiscal policy measures have added to already staggering debt/budget deficit levels for the U.S. and most of Europe (Klepsch & Wollmershäuser 2011). Other consequences brought about by these financial crises include, but are not limited to, the write-down of “toxic” sub-prime mortgage assets and the collapse of major banks, availability of credit, weakening consumer/business confidence, falling housing starts and manufacturing output, asset illiquidity and devaluation, historically low interest rates, rising bankruptcies and unemployment, stagnant economic growth, and social unrest (Maydybura & Andrew 2011; McNicholas & Windsor 2011). Although these events are comparable to previous meltdowns, few have anticipated the depth and severity of the current financial puzzle (Klein et al. 2009).

The ongoing crises represent a serious threat to the stability of capital markets and the global economy (Liebreich et al. 2009). Arguably, the inability to price risk effectively has resulted in heightened price volatility and economic uncertainty (Maydybura & Andrew 2011). During the GFC, and more recently the ESDC, global markets have demonstrated significant price falls, witnessing a growing connection between financial and commodity markets (particularly energy markets) (Koch 2011). This is consistent with the notion that asset returns from capital markets exhibit higher dependence during periods of economic or market downturns, thus challenging the usefulness of portfolio diversification (Gronwald et



al. 2011). What remains uncertain however, is whether carbon markets can be considered as an alternative investment option, and if so, are they resilient to financial crises such as the GFC and ESDC? Of particular interest is their weak-form efficiency status. Few studies have investigated weak-form carbon market efficiency amid crisis settings and sustained market volatility, thus presenting an opportunity for further investigation.

Therefore, the aim of this paper is to investigate the weak-form efficiency status of the European carbon market during crisis periods. A time-series approach is employed using 1,035 daily spot price data observations from Phase II (2008-2012) of the European Union Emissions Trading Scheme (EU ETS), and random walk hypothesis (RWH) procedures such as unit root tests, serial correlation coefficient, runs and variance ratio tests are carried out. Trading rule profitability tests are also employed. To establish the evolution of weak-form efficiency, the time period under investigation is further divided into two distinct crisis periods, namely the Global financial crisis (GFC) period and European sovereign debt crisis (ESDC) period. The remainder of this paper is organised as follows: Section 2 contains a review of the literature. Section 3 outlines the data and methodology required to carry out the analysis. Empirical results are presented in Section 4. The paper is concluded in Section 5.

## **2 Literature review**

Following the establishment of the primary carbon market (i.e. the EU ETS) in 2005, policy makers have been greatly concerned about the operational efficiency of the market (Chevallier 2011). A notable feature of the performance of the EU ETS since inception has been the volatility of prices for European Union Allowances (EUAs). Carbon price volatility could be attributable to (i) a decrease in industrial production and energy demand; (ii) an increase in funding needs of companies; (iii) energy prices; (iv) weather patterns; and (v) the implementation of policy measures, regulatory changes and government intervention (i.e. yearly compliance events and growing uncertainties in post-Kyoto international agreements) (Chevallier 2011; Gronwald et al. 2011; Koch 2011; Maydybura & Andrew 2011). The Phase I over-allocation of EUAs has also been a key contributor to carbon market volatility since the resultant price crash (Chevallier 2011). All of these underlying drivers provide the impetus to sell emissions allowances, and as such, can promote poor price signals for emissions abatement (Silverstein 2010). Further, large price volatility is problematic in the efficient functioning of the European carbon market since it tends to increase the actors' uncertainty and potentially discourages long-term investment into environmentally sound

technologies (Borghesi 2010). Given these constraints, it is questionable whether the EU ETS can meet Fama's (1970, 1991, 1998) strict assumptions of an informationally efficient market<sup>3</sup>.

Despite them being a key policy response to what is claimed to be one of the most important global challenges humankind has ever encountered, carbon markets have received limited academic attention (particularly with regard to market efficiency studies). Carbon markets appear to display characteristics similar to those of emerging markets but whether they can be considered informationally efficient remain a point of controversy. Do carbon prices contain *all* available information? Are carbon price signals allowing the efficient allocation of resources throughout the carbon economy? These questions of market efficiency are of upmost importance to carbon stakeholders for two primary reasons: 1) the aim of carbon trading schemes (i.e. EU ETS) is to regulate polluting companies via economically efficient climate change policy - a policy approach which assumes that the market is *prima facie* "weak-form efficient" (Abeysekera 2001); and 2) an efficient carbon market, or otherwise, will shape policy, influence regulation, drive investment in "green" technologies and promote emissions abatement (Albrecht et al. 2006).

The uncertainty surrounding the efficiency status of carbon markets has therefore prompted empirical efficiency investigations. Alberola (2006), Benz & Hengelbrock (2008), Boutaba (2009), Chevallier (2010), Milunovich & Joyeux (2007), and Uhrig-Homburg & Wagner (2009) discovered short and long-run dynamic relationships in European carbon markets, suggesting joint price discovery is occurring between spot and forward prices. Such findings suggest that carbon markets are already liquid, transparent, useful for investment, hedging and risk mitigation purposes, and displaying a reasonable degree of informational efficiency.

More recent studies have expanded on these statistical relationships by exploring the weak-form efficiency status of the EU ETS. Lu & Wang (2010) examine weak-form efficiency applying daily EUA prices in Phase I (2005-2007) and Phase II (2008-2010). The findings indicate that Phase II allowances display weaker rejection against the RWH than in Phase I. Upon dividing Phase I and Phase II into two sub-periods, respectively, the authors

---

<sup>3</sup> A thesis better known as the "efficient market hypothesis" (EMH).

further reveal that the latter half of Phase I allowances showed considerably less robust rejection against the RWH (which could be attributable to the EU ETS allowance over-allocation announcement on 26 April 2006 and subsequent policy responses). Similarly, Montagnoli & de Vries (2010) investigate the weak-form efficiency status of the EU ETS by employing daily price data for Phase I (2005-2007) and Phase II (2008-2009). Again, the results indicate that Phase I price patterns are non-random, whereas Phase II confirms signs of random walk price behaviour. Charles et al. (2011) also study the martingale difference hypothesis using daily and weekly EU ETS prices over Phase I (2005-2007) and Phase II (2008-2009) periods. Phase I results show price return predictability, suggesting that abnormally large returns could have been derived through active trading, while Phase II findings reveal that spot and forward price changes are random. The general conclusion from this research is that European carbon markets appear to be demonstrating greater levels of weak-form efficiency as they develop.

On the other hand, Daskalakis & Markellos (2008) find that Phase I (2005-2006) spot and forward European carbon returns are non-random and that basic technical trading strategies can be employed to generate substantial risk-adjusted profits. Feng et al. (2011) also show that the Phase I (2005-2008) carbon price does not follow a random walk, displays evidence of short-term memory and is mildly chaotic. The general consensus from this research is that despite displaying general market characteristics, European carbon market returns are not consistent with the behaviour that is expected from a weak-form efficient market.

The evidence presented to-date implies that European carbon markets are weak-form efficient (with the exception of Daskalakis & Markellos' (2008) and Feng et al.'s (2011) study). However, the out-dated data samples employed in these studies (i.e. Phase I and up to 2010 in Phase II) is a cause for concern, particularly in light of ongoing climate change policy uncertainty and the extreme volatility displayed in financial markets due to the GFC and ESDC. It is therefore appropriate to empirically scrutinise the weak-form efficiency status of the Phase II EU ETS from 2008-2012.

### **3 Data & Methodology**

#### **3.1 Data**

1,035 daily closing spot Phase II EUA price and volume data observations from 2008 – 2012 are employed. The sample is further divided into two sub-samples covering *Period 1* (25 February 2008 to 12 February 2010 – 515 observations) and *Period 2* (15 February 2010 to 10 February 2012 – 520 observations). The price variable under investigation is categorised as *EUAS*. Monthly 10-year German government bond yields are considered to be the most appropriate risk-free rate (*RFR*) reference, and are averaged across the periods examined. *EUAS* price and volume data are collected from “BlueNext”, while *RFR* data are obtained from the ECB. Log returns of the price series are derived using the continuously compounded formula:

$$R_t = \ln\left(\frac{P_t}{P_{t-1}}\right), \quad (1)$$

where  $P_t$  is the price series at time  $t$ ,  $\ln$  is the natural logarithm, and  $R_t$  represents the log return series. Note:  $R_t = \ln(P_t) - \ln(P_{t-1}) = \Delta \ln P_t$ . The statistical software used to analyse this data is EViews 7.2.

### 3.2 Serial correlation coefficient tests

A serial correlation coefficient is estimated from two observations of the same time-series at different dates. A statistically significant positive coefficient indicates that a trend exists in prices, whereas a statistically significant negative coefficient confirms the existence of a reversal in prices. Both the significant trend and reversal of prices can be used to help predict price return movement. Furthermore, this test of the random walk may be based on the serial correlation coefficients themselves or more powerful tests may be constructed from the sum of squared serial correlations (i.e. the Ljung & Box (1978) test). The model for the individual serial correlations coefficient of series  $Y$  at lag  $k$  is:

$$\tau_k = \frac{\sum_{t=k+1}^T ((Y_t - \bar{Y})(Y_{t-k} - \bar{Y}_{t-k})) / (T - K)}{\sum_{t=1}^T (Y_t - \bar{Y})^2 / T}, \quad (2)$$

where  $\bar{Y}$  is the sample mean of  $Y$  and is the correlation coefficient for values of the series  $k$  periods apart. If  $\tau_k$  is non-zero, it indicates that the series is serially correlated. If  $\tau_k$  falls geometrically with increasing lags, it suggests that the series obeys a low-order AR process.

If  $\tau_k$  reduces to zero after a small number of lags, this infers that the series obey a low-order moving average (MA) process.

In this paper, individual tests are applied to log  $EUAS_t$  returns across *Period 1*, *Period 2* and *Combined Periods* to examine whether carbon is serially correlated. Lags  $k$  are selected as one through twenty. Test statistics are determined by the standard error bounds of the serial correlation coefficients and computed as:

$$\pm 2/(\sqrt{T}), \quad (3)$$

where  $T$  is the number of observations. If serial correlations are within the standard error bounds, the null hypothesis is accepted at either the 5% or 1% significance levels. Otherwise, the null hypothesis is rejected.

To check the joint hypothesis that all the serial correlation coefficients  $\tau_k$  are simultaneously equal to zero, the Ljung & Box (LB) (1978)  $Q$ -statistic is utilised. The LB  $Q$ -statistic at lag  $k$  tests for no autocorrelation up to order  $k$  and is computed as:

$$Q_{LB} = T(T + 2) \sum_{j=1}^k \frac{\tau_j^2}{T - j}, \quad (4)$$

where  $\tau_j$  is the  $j$ -th autocorrelation,  $T$  is the number of observations, and  $k$  is the maximum lag length. Unlike the (unchosen) alternative Box & Pierce (1970) test, the LB  $Q$ -statistic provides a finite-sample correction for small samples that produces a more superior fit to the chi-square distribution. Furthermore, by calculating the squared serial correlations, the LB  $Q$ -statistic is constructed to reveal departures from zero serial correlations in both direction and at any lags (Campbell et al. 1997).

The joint hypothesis testing is also performed on log  $EUAS_t$  returns. Lags  $k$  are selected as twenty. If the LB  $Q$ -statistic is smaller than the critical value, the joint null hypothesis is accepted at either the 5% or 1% significance levels, and the carbon market is considered to follow a random walk. Otherwise, the joint null hypothesis is rejected and evidence of non-random walk behaviour is apparent. Note: LB  $Q$ -statistic critical values are obtained from EViews 7.2.

### 3.3 Runs tests

The non-parametric runs test is created to establish whether the changes between observations are random or ‘non-random’. A ‘run’ is classified as series of successive observations with the same signs: for instance, ‘+’ symbolises a positive return, ‘-’ represents a negative return, and ‘0’ stands for a zero or unchanged return. The runs test presumes that if the price changes are random, the actual number of runs should approximately equal the expected number of runs (Fama 1965). Consequently, too many or too few actual runs are inconsistent with randomness. Wallis & Roberts (1956) illustrate the expected number of runs ( $M$ ), and the standard error of runs ( $S_M$ ) of the runs test:

$$M = \frac{t(t-1) - \sum_{i=1}^3 \eta_i^2}{t} \quad (5)$$

$$S_M = \left\{ \frac{\left[ \sum_{i=1}^3 \eta_i^2 \left\langle \sum_{i=1}^3 \eta_i^2 + t(t+1) \right\rangle - 2t \sum_{i=1}^3 \eta_i^3 - t^3 \right]}{t^2(t-1)} \right\}^{1/2}, \quad (6)$$

where  $t$  signifies the number of observations,  $i = 1, 2$  and  $3$  denotes the signs of plus, minus, and no change respectively, and  $\eta_i$  represents the total numbers of changes of each type of signs. However, only positive and negative returns changes, not unchanged returns, are considered in this testing (Geary 1970; Mood 1940). The standard normal statistic in the runs test of the actual number of runs ( $A_c$ ) being equal to the expected number of runs ( $M$ ) is:

$$z = \frac{A_c - M \pm (1/2)}{S_M} \sim T(0,1), \quad (7)$$

where  $1/2$  is the correction factor for continuity adjustment, in which the sign of the continuity adjustment is positive if  $A_c \leq M$ , and negative if  $A_c \geq M$  (Wallis & Roberts 1956).

In the context of this paper, the runs test is applied to  $\log EUAS_t$  returns across *Period 1*, *Period 2* and *Combined Periods* to examine whether carbon market returns display randomness. When the absolute level of the  $z$ -statistic is less than the critical value, the null hypothesis is accepted at either the 5% or 1% significance levels. If the actual number of runs is equal to the expected number of runs, the carbon market follows a random walk. Otherwise, the null hypothesis is rejected and the carbon market shows evidence of non-random walk behaviour. Note:  $z$ -statistic critical values are obtained from EViews 7.2.

### 3.4 Variance ratio tests

The Lo and MacKinlay (LOMAC) (1988) variance ratio test compares variances of differences of returns calculated over different intervals in order to establish the predictability of asset prices. Notably, LOMAC claim that the variance ratio test is more robust than the serial correlation coefficient and runs tests. The basis of the test is that the variance estimated from  $q$ -period returns should be  $q$  times as large as the variance approximated from one-period returns. LOMAC construct two variance ratio test statistics for random walk properties. Firstly, an assumption is made that the  $\varepsilon_t$  are *i.i.d* Gaussian with variance  $\sigma^2$ . This assumption is referred to as the *i.i.d* or “homoskedastic” hypothesis. Alternatively, the *i.i.d* assumption can be weakened to allow for general forms of heteroskedasticity and dependence. This assumption is termed the martingale difference sequence (*m.d.s*) or “heteroskedastic” hypothesis. Estimators for the mean of first difference and the scaled variance of the  $q$ -th difference are defined as:

$$\hat{\mu} = \frac{1}{T} \sum_{t=1}^T (Y_t - Y_{t-1}) \quad (8)$$

$$\hat{\sigma}^2(q) = \frac{1}{Tq} \sum_{t=1}^T (Y_t - Y_{t-q} - q\hat{\mu})^2, \quad (9)$$

where the corresponding variance ratio is:

$$VR(q) = \hat{\sigma}^2(q) / \hat{\sigma}^2(1). \quad (10)$$

A variance ratio of less than one implies that price returns of short intervals tend toward mean reversion over a longer interval. Conversely, a variance ratio exceeding one implies that price returns of short intervals are inclined to trend over a longer interval. The variance estimators may also be adjusted for bias by replacing  $T$  in Equations (8) and (9) with  $(T - q + 1)$  in the no-drift case, or with  $(T - q + 1)(1 - q/T)$  in the drift case. The variance ratio  $z$ -statistic:

$$z(q) = (VR(q) - 1) \cdot [\hat{\sigma}^2(q)]^{-1/2}, \quad (11)$$

is asymptotically  $N(0,1)$ , where  $\hat{a}^2(q)$  is the appropriate choice of estimator. Under the *i.i.d* hypothesis the estimator is:

$$\hat{a}^2(q) = \frac{2(2q-1)(q-1)}{3qT}, \quad (12)$$

while under the *m.d.s* assumption the kernel estimator is:

$$\hat{a}^2(q) = \sum_{j=1}^{q-1} \left( \frac{2(q-j)}{q} \right)^2 \cdot \hat{\delta}_j, \quad (13)$$

where,

$$\hat{\delta}_j = \left\{ \sum_{t=j+1}^T (y_{t-j} - \hat{\mu})^2 (y_t - \hat{\mu})^2 \right\} / \left\{ \sum_{t=j+1}^T (y_{t-j} - \hat{\mu})^2 \right\}^2. \quad (14)$$

Since the variance ratio restriction holds for every  $q > 1$ , it is appropriate to evaluate the *z*-statistic at several selected values of  $q$ . Chow & Denning (CHODE) (1993) propose a joint *z*-statistic that examines the maximum absolute value of a set of multiple variance ratio *z*-statistics. The *p*-value for the CHODE joint maximum *z*-statistic using  $m$  variance ratio *z*-statistics is bounded by the probability for the Studentized Maximum Modulus (SMM) distribution with parameter  $m$  and  $T$  degrees-of-freedom. This bound is approximated using the asymptotic ( $T = \infty$ )SMM distribution.

In the context of this paper, LOMAC and CHODE variance ratio tests are applied to log *EUAS<sub>t</sub>*, returns across *Period 1*, *Period 2* and *Combined Periods* to determine whether the carbon market follows a random walk. To assist the comparison of this study with Wright's (2000) investigation,  $q$  is selected as 2, 5, 10 and 30. When the absolute level of the *z*-statistic is less than the critical value for LOMAC and CHODE, the null hypothesis is accepted at either the 5% or 1% significance levels, respectively. Null acceptance supports the proposition that returns are uncorrelated. Otherwise, the null hypothesis is rejected, asserting that carbon market returns are serially correlated and evidence of non-random walk behaviour is apparent. Note: *z*-statistic critical values are obtained from EViews 7.2.

### 3.5 Trading rule profitability tests



Basic trading rules are applied in an attempt to determine carbon market return profitability and confirm previous testing. If the market in question is weak-form efficient then the technical trading rules employed should not generate risk-adjusted profits (net of transaction costs) larger than those of a buy-and-hold (BH) approach (Fama 1970, 1991, 1998). In this paper, 15-day exponential moving averages (EMAs), random walk (RW) predictions, and a buy-and-hold (BH) strategy are examined across *Period 1*, *Period 2* and *Combined Periods* of the European carbon market. The EMA trading rule assumes that a buy/sell signal is produced when the price rises above/falls below a nominated moving average. For example, for the EMA (15), an investor takes a long/short position every time the price is above/below the 15-day moving average. The RW rule states that the price today is the best indicator of the price in the future. Therefore, a buy/sell signal is produced when the price today is above/below the price yesterday. Finally, the BH rule makes the assumption that prices will always rise, so the investor continuously holds a long position throughout the trading period (Daskalakis & Markellos 2008).

Buy-sell signals from the trading rules are used to generate daily profits or losses. The profitability of each rule is determined by calculating the profitability index, profit factor, average daily return and cumulative return (both before and after transactions costs). The profitability index is the ratio of winning days over the total number of trading days. The profit factor is calculated as the gross profit from the cumulative winning days divided by the gross loss from the cumulative losing days. It is desirable that a trading strategy has a profit factor larger than one and a profitability index exceeding 50% (Daskalakis & Markellos 2008).

In order to establish the risk/reward trade-off for each trading rule, the standard deviation and the Sharpe ratio are also estimated. The standard deviation indicates the total risk of the trading rule. The Sharpe ratio is a measure of the excess return of the trading rule over the risk free rate, which in this paper, is assumed to be an average of monthly 10-year German government bond yields (over specified periods) per unit of total risk. Therefore, a low/high Sharpe ratio implies a high/low risk trading strategy.

To carry out the trading rule profitability tests effectively, a few assumptions and limitations of the analysis should be observed. First, due to the data set only consisting daily closing price observations, long or short trading positions are executed at the end of the day. Second, brokerage and other trading costs are referred to as “transaction costs” and equate to

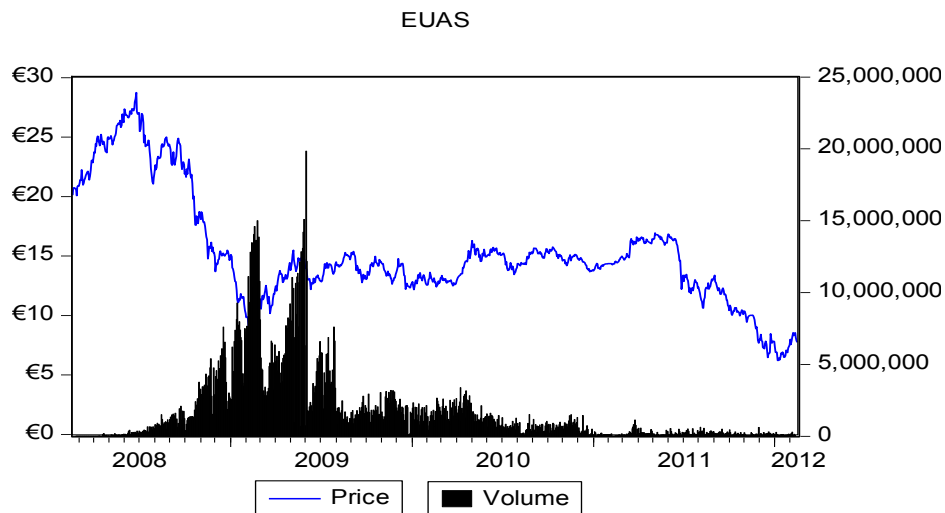
one (1) percent per trade (Daskalakis & Markellos 2008; Shambora & Rossiter 2007). For example, transaction costs are incurred every time a buy (long) and sell (short) signal is generated and a new position is taken (including the reversal of the old position). Third, forward markets are not included in the trading rule profitability testing (or other analyses in this paper) due to the findings of previous carbon market studies. For instance, Alberola (2006), Benz & Hengelbrock (2008), Boutaba (2009), Chevallier (2010), Milunovich & Joyeux (2007), and Uhrig-Homburg & Wagner (2009) confirm that EU ETS forward markets are operating as efficient unbiased estimators of the future spot price. If efficient price formation is occurring between spot and forward carbon markets, then it is only necessary to include the spot market in such analyses. Finally, short sales are not permissible in the EU ETS spot market. However, for the purpose of this investigation, it is assumed that they can be carried out in over-the-counter (OTC) transactions with other EU ETS market participants (Daskalakis & Markellos 2008).

## **4 Results**

### **4.1 Summary statistics**

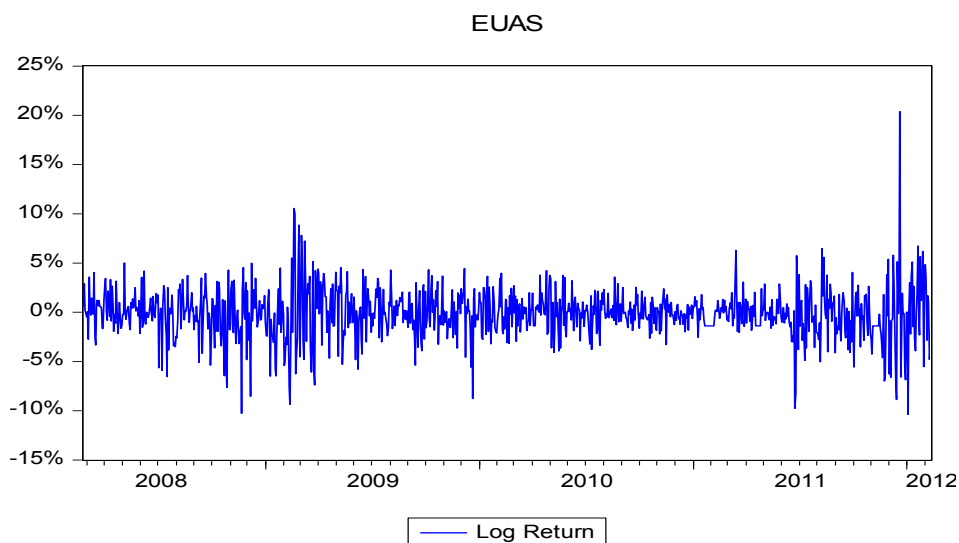
Summary statistics are illustrated in Figures 1 and 2 and Table 1 below. The carbon price series shows a decrease in trading volume from *Period 1* to *Period 2*. The significant fall in volume in *Period 2* suggests that a combination of lacklustre leadership on global climate change policy and economic uncertainty due to both the GFC and ESDC may have had a material effect on trading activity. It also appears that hedging, investment and speculation activity in carbon has become less desirable for market participants during the crisis periods, thus stymieing liquidity and raising further concerns over the market's efficiency status.

Figure 1 Phase II EU ETS price & volume



Source: BlueNext

Figure 2 Phase II EU ETS volatility



Source: BlueNext

Nominal return underperformance is also evident across the periods. Large negative annualised returns reveal poor investability, which are more than likely attributable to the ongoing economic crises. Price volatility is also evident in the carbon market, albeit with lower levels of volatility in *Period 2* (which is somewhat surprising given the economic turmoil surrounding the ESDC - but less so when trading volumes are taken into consideration). Carbon investments clearly demonstrate a larger degree of risk during *Period 1*, with market immaturity, climate change policy uncertainty and the GFC all likely drivers

of such volatility. Overall, the investment characteristics observed are not an unusual phenomenon, as emerging markets, like carbon, tend to display similar price behaviour during their early stages of growth.

**Table 1** Summary statistics

<b>EUAS</b>	<i>Period 1</i>	<i>Period 2</i>	<i>Combined Periods</i>
Observations	515	520	1,035
Volume	1,458,970,280	281,156,200	1,740,126,870
Average Daily Volume	2,832,952	540,685	1,681,282
Min. Return (%)	-10.29	-10.38	-10.38
Max. Return (%)	10.55	20.38	20.38
Mean	-0.0009	-0.0019	-0.0014
Annualised Return (%)	-21.63	-47.50	-34.88
Standard Deviation (%)	2.68	2.41	2.55
Skewness	-0.218	0.789	0.216
Kurtosis	4.592	14.397	8.550
Jarque-Bera (JB)	58.441**	2,868.012**	1,336.200**

Notes: \*\* Statistical significance at 1% level.

#### 4.2 Serial correlation coefficient tests

Individual and joint serial correlation coefficient test results are presented in Table 2. The individual results show that the carbon markets exhibit statistically significant serial correlation coefficients mainly at short-order lag lengths. In *Period 1*, serial correlation coefficients are significantly different from zero at the 5% level for lags 1, 2, 18 and 19. In *Period 2*, serial correlation coefficients are significantly different from zero at the 5% level for lags 10 and 19. Across *Combined Periods*, serial correlation coefficients are significantly different from zero at the 5% level for lag 1 and at the 1% level for lag 2. Note: coefficients at larger lag intervals, while significant, may be evidence of white noise in the data and should be treated with caution.

**Table 2** Serial correlation coefficient tests

<b>EUAS</b>			
Lag	<i>Period 1</i>	<i>Period 2</i>	<i>Combined Periods</i>
1	0.091*	0.004	0.066*
2	-0.110*	-0.018	-0.084**
3	0.054	0.056	0.055
4	0.079	-0.014	0.051
5	-0.013	-0.022	-0.013
6	-0.035	0.011	-0.021
7	-0.040	-0.044	-0.041
8	0.044	0.032	0.041
9	-0.010	0.057	0.006
10	0.062	-0.092*	0.019
11	-0.027	0.030	-0.013
12	-0.039	0.032	-0.017
13	-0.012	0.037	-0.000
14	0.039	0.021	0.036
15	0.014	0.020	0.018
16	-0.013	0.037	0.003
17	0.058	0.047	0.056
18	0.090*	-0.063	0.043
19	0.086*	-0.109*	0.032
20	-0.015	0.005	-0.009
<b>Q-stat</b>	32.323*	22.671	30.974

Notes: LB *Q*-statistics are computed using twenty lags. \* Statistical significance at 5% level. \*\* Statistical significance at 1% level.

The findings show that the carbon market displays a small degree of return predictability in first and second order serial correlation coefficients in *Period 1* and *Combined Periods*, but not in *Period 2*. Specifically, there is trend in first order and reversal in second order carbon market returns (as indicated by the significant positive and negative coefficients, respectively). However, it is uncertain whether these correlation coefficients would provide investors with large risk-adjusted returns after trading costs. For instance, the largest correlation coefficient discovered, being 0.110 in *Period 1* ‘lag 2’, only has an  $R^2$  of 1.21%). The disappearance of statistically significant first and second order serial correlation coefficients in *Period 2* could also be considered further evidence of random walk behaviour.

To confirm whether all the serial correlations coefficients between the lags of one and twenty are simultaneously equal to zero, joint LB  $Q$ -statistics are investigated. The joint test leads to the rejection of the null hypothesis at the 5% significance level for *Period 1* only. This suggests that correlation coefficients are simultaneously not equal to zero. However, this does not hold for *Period 2* and *Combined Periods*, implying that the carbon market appears to be following a random walk.

### 4.3 Runs tests

Results for the nonparametric runs tests are highlighted in Table 3. The null hypothesis is rejected at the 5% level for *Period 1* and *Combined Periods*, but not for *Period 2*. The findings indicate that actual runs of first differenced returns are less than their expected runs, and  $z$ -statistics show trend patterns for *Period 1* and *Combined Periods*. The departure from randomness in one-day returns suggests an element of return predictability in both *Period 1* and *Combined Periods*, albeit with less magnitude in the *Combined Periods*. Again, the lack of return predictability in *Period 2* supports the previous serial correlation coefficient findings. Overall, the statistical results of the runs tests mostly reject the RWH.

**Table 3** Runs tests

<b>EUAS</b>	Act	Exp	Std Error	$z$ -stat
<i>Period 1</i>	232	257.984	11.324	-2.295*
<i>Period 2</i>	254	260.283	11.370	-0.553
<i>Combined Periods</i>	486	517.843	16.065	-1.982*

Notes: The price series are differenced once. 'Act' is actual runs, 'Exp' is expected runs, 'Std' is standard, and  $z$ -statistic is (actual runs - expected runs)/standard error of runs. \* Statistical significance at 5% level.

### 4.4 Variance ratio tests

Results are illustrated in Table 4. LOMAC findings show that the carbon price series rejects the null hypothesis at the 1% significance level in *Period 1* and the 5% significance level in *Combined Periods*. The joint CHODE results reject the null hypothesis at the 5% significance level in *Period 1* only. Conversely, *Period 2* variance ratio results are far less robust. In this period, LOMAC and joint CHODE findings show that the carbon price series fails to reject the null hypothesis at either the 5% or 1% significance levels. The evidence presented suggests that European carbon market returns did not initially follow a random

walk in Phase II. However, a lack of reported return predictability in *Period 2* and *Combined Periods* is an indication of both random walk behaviour and weak-form market efficiency. To confirm the weak-form efficiency status of the EU ETS, it is necessary to carry out trading rules and compare to a buy-and-hold (BH) approach over the periods in question.

**Table 4** Variance ratio tests

EUAS	Vector	VR	z-stat	CHODE
				Joint z-stat
<i>Period 1</i>	2	1.119	2.687**	2.687*
	5	1.110	1.148	
	10	1.148	0.992	
	30	1.161	0.593	
<i>Period 2</i>	2	1.011	0.245	
	5	0.985	-0.158	
	10	0.946	-0.364	
	30	0.859	-0.521	-0.521
<i>Combined Periods</i>	2	1.070	2.268*	2.268
	5	1.055	0.810	
	10	1.059	0.565	
	30	1.028	0.144	

Notes: LOMAC is the individual variance ratio (VR) test of Lo & MacKinlay (1988). CHODE Joint z-statistic is the variance ratio test of Chow & Denning (1993). Vectors match Wright's (2000) study. LOMAC tests are computed with log first differences, drift, no unbiased variance corrections, no heteroskedastic robust standard errors, and asymptotic normal approximations. CHODE joint z-statistics are bound by the individual z-statistics and SMM distribution. \* Statistical significance at 5% level. \*\* Statistical significance at 1% level.

#### 4.5 Trading rule profitability tests

Results are presented in Table 5. *Period 1*, *Period 2* and *Combined Period* findings demonstrate that of the three trading rules employed, only the BH approach was able to consistently generate a higher net cumulative return over its counterparts. The BH yields the highest net cumulative return, while the RW produces the lowest net cumulative return. The outperformance of the BH approach over the remaining trading rules also highlights the impact of frequent trading and transaction costs on return performance. Note: EMA (15) and RW comprehensively defeated BH before trading costs were taken into consideration. Similar deductions can be drawn if risk is taken into account. Standard deviations indicate

that the variability of the BH approach is the lowest. The Sharpe ratios suggest that the BH approach yielded the highest risk-adjusted return, while the RW trading rule delivered the lowest risk-adjusted return.

**Table 5** Trading rule profitability in the Phase II EU ETS spot market

<b>EUAS</b>	<b>EMA (15)</b>	<b>RW</b>	<b>BH</b>
<i>Period 1</i>			
Trading Days	501	515	515
# Buy Signals	31	118	1
# Sell Signals	30	117	1
# Winning Days	266	281	262
Cumulative Winning Days (%)	532.906	622.663	498.296
# Losing Days	235	234	253
Cumulative Losing Days (%)	-587.849	-866.659	-527.026
Profitability Index	0.531	0.546	0.509
Profit Factor	0.907	0.718	0.945
Average Daily Return (%)	-0.110	-0.474	-0.056
Gross Cumulative Return (%)	65.057	224.004	-26.730
Transaction Costs (%)	-120.000	-468.000	-2.000
Net Cumulative Return (%)	-54.943	-243.996	-28.730
Standard Deviation (%)	3.006	3.440	2.673
Sharpe Ratio	-19.541	-72.029	-12.166
<i>Period 2</i>			
Trading Days	506	520	520
# Buy Signals	34	130	1
# Sell Signals	33	129	1
# Winning Days	265	260	264
Cumulative Winning Days (%)	420.086	415.296	392.008
# Losing Days	241	260	256
Cumulative Losing Days (%)	-504.730	-915.232	-430.776
Profitability Index	0.524	0.500	0.508
Profit Factor	0.832	0.454	0.910
Average Daily Return (%)	-0.167	-0.961	-0.075
Gross Cumulative Return (%)	47.356	16.064	-36.768
Transaction Costs (%)	-132.000	-516.000	-2.000
Net Cumulative Return (%)	-84.644	-499.936	-38.768
Standard Deviation (%)	2.751	3.157	2.426
Sharpe Ratio	-31.889	-159.347	-17.252



<b>EUAS</b>	<b>EMA (15)</b>	<b>RW</b>	<b>BH</b>
<i>Combined Periods</i>			
Trading Days	1021	1035	1035
# Buy Signals	66	247	1
# Sell Signals	65	246	1
# Winning Days	534	541	527
Cumulative Winning Days (%)	960.081	1038.959	891.631
# Losing Days	487	494	508
Cumulative Losing Days (%)	-1120.679	-1784.218	-955.802
Profitability Index	0.523	0.523	0.509
Profit Factor	0.857	0.582	0.933
Average Daily Return (%)	-0.157	-0.720	-0.062
Gross Cumulative Return (%)	99.402	238.741	-62.171
Transaction Costs (%)	-260.000	-984.000	-2.000
Net Cumulative Return (%)	-160.598	-745.259	-64.171
Standard Deviation (%)	2.879	3.310	2.550
Sharpe Ratio	-56.854	-226.106	-26.374

Notes: EMA, RW and BH refer to the exponential moving average, random walk and buy-and-hold trading rules, respectively.

The application of trading rules shows that large risk-adjusted profits (net of transaction costs) are not possible across all periods under investigation, inferring that the European carbon market is increasingly behaving in a manner which is consistent with the weak-form EMH.

## 5 Conclusions

This paper has revealed robust evidence of non-random walk behaviour in *Period 1* of the Phase II EU ETS, but not in *Period 2* or *Combined Periods*. With statistically significant findings evident in *Period 1*, it is clear that random walk tests support the proposition of price return predictability in the European carbon market during the GFC. This is important as it shows that variation in carbon market returns can be explained by the returns of preceding days during global-centric crisis events and periods of extreme market volatility (which could have favourable outcomes for profit seeking investors). On the other hand, random walk testing in *Period 2* of the Phase II EU ETS demonstrated that return predictabilities are virtually non-existent (a trend which is also apparent over *Combined Periods*). Despite the phenomenon of sustained market volatility due to the ESDC and lower EUA trading volumes, it is possible that the EU ETS followed a random walk during this

period by its ability to overcome earlier design mishaps (i.e. Phase I EUA over-allocation), learn from the GFC, and create more resilient policies. This finding adds to the growing body of carbon market efficiency literature (Charles et al. 2011; Lu & Wang 2010; Montagnoli & deVries 2010) that suggest the EU ETS is becoming more efficient over time.

To confirm reported return predictabilities, along with the weak-form efficiency status of the Phase II EU ETS, trading rules were applied. The results show that after applying simple trading rules (that account for risk and transaction costs), return predictabilities cannot be manipulated to profit above a naïve buy-and-hold strategy in the European carbon market. This finding has ramifications for those who challenge or question the validity of EMH theory – including policy makers, practitioners, academics and active investors. Overall, it appears that the EU ETS is achieving a greater level of weak-form efficiency. If the EU ETS is becoming more weak-form efficient, and can continue to do so without being hampered by poor policy and/or further economic “events”, the cap-and-trade mechanism may prove to be an effective global climate change policy tool. Nevertheless, the promotion of transparent price signals for long-term investment into environmentally friendly technologies and emissions abatement must surely remain the policy focus of such trading schemes.

## References

- Abeyssekera, S.P. (2001). Efficient markets hypothesis and the emerging capital market in Sri Lanka: Evidence from the Colombo stock exchange - a note. *Journal of Business Finance and Accounting*, 28(1-2), 249-261.
- Alberola, E. (2006). The informational efficiency of the EU ETS: An empirical evaluation on the spot and futures prices. Working Paper, France: University of Paris.
- Albrecht, J., Verbeke T., & De Clercq, M. (2006). Informational efficiency of the U.S. SO<sub>2</sub> permit market. *Environmental Modelling and Software*, 21(10), 1471-1478.
- Benz, E.A., & Hengelbrock, J. (2008). Liquidity and price discovery in the European CO<sub>2</sub> futures market: An intraday analysis. Paper presented at the 21<sup>st</sup> Australasian Finance and Banking Conference; 16-18 December, The University of New South Wales, Sydney, Australia.
- Borghesi, S. (2010). The European Emission Trading Scheme and Renewable Energy Policies: Credible Targets for Incredible Results? Working Paper, Fondazione Eni

- Enrico Mattei, Italy: University of Siena. Accessed 20 February 2012. Available online: <http://www.bepress.com/feem/paper529>.
- Boutaba, M.A. (2009). Dynamic linkages among European carbon markets. *Economics Bulletin*, 29(2), 499-511.
- Box, G.E.P., & Pierce D.A. (1970). Distribution of residual autocorrelations in autoregressive integrated moving average time series models. *Journal of the American Statistical Association*, 65(332), 1509-1526.
- Campbell, J.Y., Lo, A.W., & MacKinlay, C.A. (1997). *The Econometrics of Financial Markets*. Princeton, New Jersey: Princeton University Press.
- Charles, A., Darné, O., & Fouilloux, J. (2011). Testing the martingale difference hypothesis in CO<sub>2</sub> emission allowances. *Economic Modelling*, 28(1-2), 27-35.
- Chevallier, J. (2010). A note on cointegrating and vector autoregressive relationships between CO<sub>2</sub> allowances spot and futures prices. *Economics Bulletin*, 30(2), 1564-1584.
- Chevallier, J. (2011). Detecting instability in the volatility of carbon prices. *Energy Economics*, 33, 99-110.
- Chow, V.K., & Denning, K.D. (1993). A simple multiple variance ratio test. *Journal of Econometrics*, 58(3), 385-401.
- Daskalakis, G., & Markellos, R. (2008). Are the European carbon markets efficient? *Review of Futures Markets*, 17(2), 103-128.
- Fama, E.F. (1965). The behaviour of stock market prices. *Journal of Business*, 38(1), 34-105.
- Fama, E.F. (1970). Efficient capital markets: A review of theory and empirical work. *Journal of Finance*, 25(2), 383-417.
- Fama, E.F. (1991). Efficient capital markets: II. *Journal of Finance*, 46(5), 1575-1617.
- Fama, E.F. (1998). Market efficiency, long-term returns, and behavioural finance. *Journal of Financial Economics*, 49(3), 283-306.
- Feng, Z.H., Zou, L.L., & Wei, Y.M. (2011). Carbon price volatility: Evidence from EU ETS, *Applied Energy*, 88, 590-598.

- Geary, R.C. (1970). Relative efficiency of count of sign changes for assessing residual autocorrelation in least squares regression. *Biometrika*, 57, 123-127.
- Gronwald, M., Ketterer, J., & Trück, S. (2011). The Relationship between Carbon, Commodity and Financial Markets: A Copula Analysis. *The Economic Record*, 87, 105-124.
- Klein, R.W., Ma, G., Ulm, E.R., Wang, S., Xiangjing, W., & Zanjani, G. (2009). The Financial Crisis and Lessons for Insurers. Report, Society of Actuaries.
- Klepsch, C., & Wollmershäuser, T. (2011). Yield Spreads on EMU Government Bonds – How the Financial Crisis Has Helped Investors to Rediscover Risk. *Intereconomics*, 3, 169-176.
- Koch, N. (2011). Co-movements between carbon, energy and financial markets. Working Paper, Accessed 20 February 2012, Available online: <http://ssrn.com/abstract=1975749>.
- Liebreich, M., Greenwood, C., von Bismarck, M., & Gurung, A. (2009). Green investing: Towards a clean energy infrastructure. Report, World Economic Forum, 1-54.
- Ljung, G.M., & Box, G.E.P. (1978). On a measure of lack of fit in time series models. *Biometrika*, 65(2), 297-303.
- Lo, A.W., & MacKinlay, C.A. (1988). Stock market prices do not follow random walks: Evidence from a simple specification test. *The Review of Financial Studies*, 1(1), 41-66.
- Lu W., & Wang, W. (2010). Weak-form efficiency of European Union emission trading scheme: Evidence from variance ratio tests. *International Journal of Green Economics* 4(2), 183-196.
- Maydybura, A., & Andrew, B. (2011). A study of the determinants of Emissions unit allowance price in the European Union Emissions Trading Scheme. *Australasian Accounting Business and Finance Journal*, 5(4), 123-142.
- McNicholas, P., & Windsor, C. (2011). Can the financialized atmosphere be effectively regulated and accounted for? *Accounting, Auditing and Accountability Journal*, 24(8), 1071-1096.

- Milunovich, G., & Joyeux, R. (2007). Market efficiency and price discovery in the EU carbon futures market. Discussion Paper, Australia: Division of Economic and Financial Studies, Macquarie University.
- Montagnoli, A., & deVries, F.P. (2010). Carbon trading thickness and market efficiency. *Energy Economics*, 32(6), 1331-1336.
- Mood, A.M. (1940). The distribution theory of runs. *The Annals of Mathematical Statistics*, 11(4), 367-392.
- Shambora, W.E., & Rossiter, R. (2007). Are there exploitable inefficiencies in the futures market for oil? *Energy Economics*, 29, 18-27.
- Silverstein, D.N. (2010). A method to finance a global climate fund with a harmonized carbon tax. *MPRA Paper No. 27121*, Accessed 20 February 2012, Available online: <http://mpra.ub.uni-muenchen.de/27121/>.
- Uhrig-Homburg, M., & Wagner, M.W. (2009). Futures price dynamics of CO<sub>2</sub> emission certificates - An empirical analysis. *Journal of Derivatives*, 17(2), 73-88.
- Wallis, W., & Roberts, H. (1956). *Statistics: A New Approach*, Glencoe, Illinois: Free Press.
- Wright, J.H. (2000). Alternative variance-ratio tests using ranks and signs. *Journal of Business and Economic Statistics*, 18(1), 1-9.

# Turkish Experience in Bank Solution in Last Two Decades; Fraud and Corruption of Shareholders and Managers in Turkish Banking System

Ayşe Hayali<sup>1</sup>, Selin Sarılı<sup>2</sup>, Yusuf Dinc<sup>3</sup>

<sup>1,2,3</sup>Marmara University, Turkey

***Abstract.** In the last two decades, 20 national banks were taken over by the Savings Deposit Insurance Fund (SDIF) due to not only bad governance, but also shareholders' and managers' fraud. In this period, the Turkish national economy had been facing an unprecedented gigantic financial crisis ever. Thus, it was then an obligation to take proper actions, such as making new regulations and reconstructing entire financial system. It was inevitable to establish a new regulatory body to create a stronger and more resilient banking system, while solving problem banks and collecting noncurrent loans embedded at undertaken banks. This research, firstly explains how fraud and corruption were made by the bank owners and managers. This study's main purpose is trying to explain the measures taken against bank managers' fraud and corruption with the need for new precautions by considering the real cases in Turkish banking system. Not only will we explicate all the processes, but also we will be focusing on the mission of the BRSA, its benefits to the Turkish banking system by healing whole system and taking serious actions against corruption and fraud.*

***Keywords:** fraud, corruption, bank management fraud, regulation*

## 1. Introduction

The purpose of this paper is to research on the bank managers' fraud, corruption and the experienced fraud techniques in last two decades in Turkish banking system. Examples of corruption experienced during this period, revealed the weakness of supervisions. Regulations on banking supervision and audit have a great importance on today's strong Turkish banking system. It's important to understand the term of fraud and corruption to recognize the recovery period of the system.

Fraud can be defined as any and all means that a person uses to achieve an unfair advantage over others. In other words, fraud is using a person's or institution's assets in an unfair manner (Pehlivanlı, 2011:3). Fraudulent acts include lies, suppressions of the truth, tricks, and cunning. Fraud perpetrators are often referred to

as white-collar criminals often involve a violation of a trust or confidence (Mbuya, 2010:9).

As defined by the Association of Certified Fraud Examiners “Report to the Nations on occupational Fraud and Abuse” (2012) , fraud entails the use of one’s occupation for personal gain through the deliberate misuse or theft of organization’s assets or resources. Where opportunity exists, fraud often occurs. Fraud includes the improper usage of resources and the misrepresentation of facts to obtain gain. It is related to the misallocation of resources, or the distorted reporting of the existence and availability of resources.

Management fraud is the representation of false documentation of transactions or withholding of relevant information, resulting in a material impact on the financial statements and in financial deficit to the shareholders or creditors (Mbuya, 2010:19). Management frauds are the most crucial of business improprieties because, to a large extent, the soundness of the capital market relies on the confidence that financial statements are not fraudulent. When management can override controls, there is no obvious reason for auditors to revise their evaluation of management integrity when controls are weak, because managers can commit fraud regardless of control strength. (Caplan, 1999:114)

Management fraud can also be defined as the intentional reporting of misleading financial information, the theft of company assets by top management, or both. Management fraud is usually committed by those high enough in an organization to override internal controls. Management fraud is inevitable because no controls, past or present, exist to completely control management’s actions. Management has a power of control on internal audit, and can generally do as desired, including overriding controls whenever they prevent management from attaining its objectives. Management fraud can therefore not be prevented by internal control because internal control works under governance of top management and it is unlikely that management would implement controls against itself. Only management can stop itself from committing fraud and reporting fraudulent financials (Mbuya, 2010). Management fraud has wide ranging ramifications that affect the stakeholders of an organization (Saksena, 1993:121)

Various fraudulent transactions made by the managers are directly related to the moral values of managers (Velthouse and Kandogan, 2007:153). The ethical climate in the Turkish business environment is also at a critical stage, and the business

community as a whole is troubled by ethical problems. (Atakan and Tezolmez, 1999,17-34).

In order to fight fraud it is imperative first to gain a proper understanding of the phenomenon. Dr. Donald Cressey, a famed teacher and pioneer in fraud research and an important expert developed the Fraud Triangle Theory to explain why people commit fraud. Dr. Cressey came to the conclusion that the propensity for fraud occurred when three critical elements came together: motive, opportunity, and rationalization (Biegelman & Bartow, 2006: 32 ). Fraud is a complex phenomenon involving not only the opportunity for fraud, but also the motivation and rationalization thereof. (Rossouw & others, 2000: 893)

Since ancient times, in almost every society, various levels of corruption have been observed. There is nearly a consensus in the literature that corruption deteriorates economic development and investments, causes waste of resources, distorts income distribution, harms democracy and ethics (Bayar, 2010:106).

The term of corruption is a fact which is hard to describe but easy to notice. It seems to be impossibly hard to prove a corruption. Corruption manifests itself in different ways. The most frequent occurrence is in the form of bribes that may be used to influence the award of public contracts, acquire various benefits from government, lower tax liabilities, obtain licenses, expedite government processes, affect judicial decisions, or lower penalties (Aguilar, Gill, Pino, 2000: 2). Particular behaviors usually point out the corruption but finding out a corruption and urging them to judicial branch usually need existence of conflicts of interest. As can be seen in the previous sentences, the fact of corruption emerges on personal interest and is mostly detected through conflict of interests. Although the words fraud and corruption are often used interchangeably, a strict distinction between these two is maintained in their definitions. In the context of banking, fraud and corruption have been defined as follows: “fraudulent and corrupt practices include the solicitation, payment or receipt of bribes, gratuities or kickbacks, or the manipulation of loan decisions of banks or finance institutions through any form of misrepresentation (Aguilar, Gill & Pino, 2000:1). When a bank is involved in fraud, corruption or any other illegal or improper activity, this may threaten the reputation not only of the bank concerned but also of the whole banking system (Gunay & Hortacsu, 2011:13) In this paper, the focus will solely be on bank managers' fraud and owners' corruption.



## 2. Literature Review

In the research about understanding and fighting fraud; G.T Rossouw, L.Murder and B. Barkhuysen (2010) explain fraud as a complex phenomenon involving not only the opportunity for fraud, but also the motivation and rationalization thereof. What is needed are multi-disciplinary and interdisciplinary approaches that will deal with all dimensions of fraud. It is thus imperative that the strict isolation and often animosity between disciplines should be replaced with toleration and appreciation for the respective contributions of the various disciplines in understanding and fighting fraud.

There are several factors that cause management fraud. Saksena (1993), in his research, analyzed the relationship between environmental factors and management fraud in two categories. The categories were Internal Antecedent Factors, and External Antecedent Factors. He found that the relationship between internal antecedent factors and management fraud is not statistically significant. Firms where management fraud was detected were characterized by greater heterogeneity in the environment. Dennis Caplan (1999) examined an auditor's decision to investigate for fraud, when a manager with exogenous incentives to misreport chooses the quality of internal controls. The survey has three main results. First, circumstances in which managers with strong incentives to commit fraud prefer weak controls; thus, the choice of controls is informative about fraud risk. Second, auditors have incentives to make control recommendations that are not cost-beneficial to honest managers and demonstrate that both results hold even when managers can override controls. The last result is that auditors exert less effort investigating for fraud, conditional on the audit evidence, when controls are weak.

Hansen & others (1996), found that an audit conducted in accordance with generally accepted auditing standards may not detect management fraud because audit procedures that are good at detecting errors may not be as effective at detecting irregularities such as management fraud.

Several recent articles about fraud literature also focus on ethical values of managers. Betty Velthouse and Yener Kandogan (2007) found that executives must accept their leadership responsibilities to define ethical behavior and to pursue it relentlessly as a top-priority goal.

Povel, Singh and Winton (2007), studied which factors determine whether firms commit fraud or not. They mentioned that the one such factor is how carefully

investors can be expected to scrutinize the firms in which they may invest. The extent of monitoring, in turn, depends on investors' expectations about the state of the economy, and their expectations about firms' fraud decisions. Their analysis reveals that the incidence of fraud does not always respond as expected to changes in circumstance.

In the prevention of corruption, supervision is an important primary matter. Beck, Kunt and Levine (2005) investigated the relationship between bank supervision and the degree to which bank corruption is an obstacle to firms raising external finance and provides evidence on different theories of bank supervision. The results indicate that countries with stronger supervisory agencies, countries where supervisory agencies can intervene banks, tend to have firms that face greater obstacles to obtaining bank loans.

Another related research, Akerloff and Romer's theory of looting helps explain why the dominant economic paradigm with respect to financial fraud that deems regulation unnecessary, has repeatedly been refuted by the empirical data. The author believes it can be viewed as a form of corruption. Akerloff and Romer show that profit maximizing managers may pursue unprofitable business, even when it bankrupts their company and harms their customers and other stakeholders.

### **3. Exercised Techniques of Bank Fraud**

One of the most commonly implemented deceit techniques used by the banks, and one of the most important one in terms of Turkish economy and banking sector in general, is the technique named as "Balance Sheet Make Up". Why do banks feel the need for make up? Most of all, and perhaps the most innocent reason amongst others, is the need to inflate the balance sheet volume or the size of bank's assets. Because, the size of the assets is one of the most important and highly valued indicators, along with some other items like the deposits, loans, premises, etc., when it comes to ranking in the league of major banks. The underlying factor for a bank's balance-sheet makeup is most likely to present a forecast for their shareholders, depositors, customers, international investors, local and foreign creditors, corresponding banks or agents, independent auditing firms and government authorities, in order to display a better, a more positive outlook. Such made up balance sheets might aid to serve for the purposes of; scaling up of assets whilst focusing on volumes (bank-to-bank transactions), hiding losses in the financial statements or pretending as if the bank was

profitable, presenting the bank as more credible than it really is, in the view of the corresponding banks and depositors, creating unrealistic profits that enables the bank to distribute higher dividends, declaring lower profits in order to avoid higher corporate taxes or tax deferrals, and manipulating the bank's share values (if any) that are listed with the stock exchange.

For the reasons listed above, it is found that many banks, acting in cooperation with one another in line with various agreements concluded by and between the same, get involved in various bank-to-bank deposits, loans, etc. transactions that take place especially towards the end of each fiscal year, in order to polish their financial statements. In those mutually agreed bank-to-bank transactions it is found that various details such as the principal amounts, maturity periods, interest rates, foreign currency types, etc., are identical. In some cases, it is even possible to get a third party entity involved in a specific transaction so as to weaken or distract the regular audit processes (Murat Turker, personal interview, 2012).

Banks, as institutions built upon trust and eminence, do especially place emphasis on higher profits. While regular establishments tend to opt for declaring lower profits due to taxation concerns, banks, on the contrary, especially opt for declaring highest possible commercial (not fiscal) profits or, keeping losses as low as possible; in order to obtain more prestigious standing. For these purposes, some of the widely used methods are writing more-than-usual income accruals for the interest-earning assets, writing less-than-usual assessments of expenditure for interest-bearing liabilities, reflecting in the financial statements yet-to-be earned incomes as if they were already earned, skipping of provisions that are to be set aside for potential contingencies by law. For instance, a bank may willingly skip to include in its financial statements a customer's unpaid credit facility which is already suspended but not actually transferred into the bank's non-performing loans (NPLs), which, under usual practises, would have required the bank to set up a contingency fund that is calculated in ratio with the amount of security available and duration of pursuance for recovery. In essence, such practises help lower the bank's expenses on paper which in turn help increase the bank's unreal profits or hide some of the losses.

One other fraud technique used very commonly by the banks, especially in recent times, is extending loans beyond the legal limits, to any controlling shareholders. However, maximum amount of credit facilities that may be extended to any real person or entity, a risk group, bank's controlling shareholders or group and

high ranking officers are defined by law. Any and all amounts extended in excess of the amounts defined by law are considered as placements that are subject to penalty or a judicial punishment if repayment of such credits failed since the same would have made such unpaid credits as misappropriated amounts. However, banks, in order to bypass such provisions of the law to realise their objectives, may chose to establish bubble companies or implement certain methods such as back-to-back credit transactions and fiduciary credit transactions (Murat Turker, personal interview, 2012).

In most cases, exploitation of bank's resources is manifested in the form of credit facility irregularities. Such irregularities may include some actions like; to extend credit facilities to non-credible or sub-prime persons or entities, to extend credit facilities much higher than actual levels of financial strength, business volume, flow of funds and cash cycle, not to obtain sufficient securities, to participate in companies that are financially weak and irregularities in evaluations during bank mergers and acquisitions.

In cases where a bank is unable to extend a credit facility to a group company due to reasons such as legal limits, cash flow, morality, financial strength and creditworthiness of its shareholders and administrators, prominence in the marketplace, etc., then such credits facilities, often at amounts more than legally available, are extended through its affiliated companies or through some other third party companies in relationship with that company as buyers, sellers, suppliers, subcontractor or by way of other means or, by establishing a bubble shell company, by which all legal requirements are bypassed.

Another method of enabling the controlling shareholders group enjoying credit facilities is fiduciary credit method. In this method; a fiduciary agreement is executed by and between the parties, said agreement contains a clause whereby if the borrowing party should fail to pay the loan / credit in full, then the bank shall have the right to execute the funds deposited with it by means of exchange barter, interest rates payable on the deposited funds, and the interest rates applicable to the extended credit facility, are usually the same, maturity periods of the deposited funds and duration of the repayment of the credit facility are usually similar, amount of funds initially deposited must be same or more than the credits extended, prominent establishments

may be acting as intermediaries in consideration of certain benefits such as interest rate margins, transaction commissions, etc.

Such transactions normally conclude either by the repayment of the credit facilities on due dates or, in case of default, by an assignment executed by the main bank that in turn the initial depositor becomes the debtor.

Back-to-back loan is a type of credit facility extension method implemented when a bank does not allow its own controlling shareholders' companies (group companies) to use any credit facilities due to reasons, such as: credibility, cash flow, financial data, legal placement limits, other legal curbs, etc. whereby two or more banks come to an agreement under which fiduciary credit facilities are extended to the companies owned by the banks. Thus, while the legal limits are short circuited, both the irregular credits may be extended to the companies that are not normally eligible to obtain such credits, and the volume of the available credit facility is inflated up to the levels of Cartesian multiple that is made of the number of banks and companies involved. There, certain aspects, such as the principal amount of credit facility, value date, maturity period, and interest rate are either same as other or very similar to one another. In case of default in repayments on due dates, such credits are mutually assigned by the banks and the debt in question has been referred back to the bank.

One of the most tragic experiences that Turkish Banking Sector had to encounter in recent times was to collect deposits; under the name of "money order", for the benefit of their offshore participations and the placements made on such participations that were in due course were extended as credit facilities to local companies without the implementation of any limits whatsoever.

Offshore centres are the centres that are established within the geographical borders of a country but not subject to local jurisdiction where relevant legal regulations are almost loose and arbitrary with almost non-existing surveillance and auditing procedures coupled with lots of tax advantages and, much suitable for black or grey economy; since "the customer confidentiality" based upon the Memorandum of Understanding (MoU) made between the two countries is a paramount essence of this MoU and therefore free of any legal liabilities and foreign exchange limitations. (Sariibrahimoglu & others, 2000:9). Since certain costs, such as; establishment, branch / liaison office network, personnel, premises and fixed costs, overheads etc, are at minimum levels, such centres are those financial institutions that does not provide much security for monies deposited for they can easily be established by very

small amounts of capital coupled with minimum requirements against maximum leverage ratio; in other words, high risk – high income.

#### **4. Reconstruction Period in Turkish Banking System**

Failure might take place in markets when markets are left on their own without any intervention. For this reason, regulations have great deal of importance for effective functioning of the markets. Regulations are put forward as preventive regulations and protective regulations. It is aimed to avoid crises that might take place with the preventive regulations and to protect the depositors after possible crises through protective regulations. (Sayar, 2003:97-99)

As a result of the banking corruptions that put Turkey into economic crisis, 25 Turkish banks were taken over by the Saving Deposit Insurance Fund of Turkey (SDIF) during 1993-2003 period. Acts of corruption that the Turkish banks were subjected to during the period has cost Turkish Treasury some USD 65 billion including interest.

SDIF had been in the position to pay for all of the depositors, who have had bank accounts in bankrupted banks during the crises. However, the banking system had been caught unguarded against shocks due to insufficient regulations. It has been understood that the regulations, which had been put forward after the crises in question, was insufficient and Banking Act has been constituted in order to bring back the confidence of the public, which had been shaken with the malpractices that banking directors had performed. Banking Regulation and Supervision Agency (BRSA) has been constituted with the renewed act with number of 4389, which has become in force on 19th of June 1999. This act has been rather important turning point for the banking system of Turkey. BRSA has been a autonomous organisation within the act that had been in force for the issue of regulating and supervising of banks as being in harmony with the international field (DPT, 2003:16-17)

One of the functions of the Saving Deposit Insurance Fund (SDIF) is insurance underwriting for deposits. However, SDIF is also responsible within the organisation of the BRSA for management, supervising and to re-function the problematic banks, which had been delegated to the fund, back to the economy (Bumin&Ateş, 2008:51).

As it has been stated in article 3 of the act, the “Banking Regulation and Supervision Agency” which is public entity and which has administrative and

financial autonomy, has been established in order to provide for the application of this act and other related legislations within the framework of the authorities indicated in the act, also the performing of regulations being inclusive, to supervise the application and to bring to a conclusion, to provide for the deposits to be under guarantee, to perform other duties as these are stated within the Act and to use its authorities.

The establishment is liable and is authorised to prevent every kind of transactions and applications, which could endanger the rights of depositors and which could endanger the regular and assured functioning of banks and which could cause for serious amount of loss within the economy and to take and apply the required decisions and precautions for effective functioning of the loans system (Banking Act:5411).

It has become rather important during the crises experiences, which had taken place, that the problems, which had caused the problems, should be determined and arrangements should be put forward in relation to those problems. Turkey has entered such a period following the experiences that had been gone through and reorganisation process had been started for the banking system (Eris, 2007:9).

The most important step about the regulations that had been put forward for the banking sector, without any doubt, has been taken after the crises that has been seen during years of 2000-2001. Banks had been caught with open positions during the crises as the economic crises had been added on to the banking malpractices and the assets on the balance sheets of the banks had melted down. A need had arisen after all of these matters that had been seen through to create the supervision mechanism (Gürsoy, 2009:182-186).

Full amounts of the deposits had been ceased to be guaranteed under the cover of the insurance and only the amount that is equivalent to 50.000 TL had been made to be covered under the guarantee of the SDIF. It has been made difficult to establish a bank and to own a bank and it has been made mandatory for the banks to establish risk monitoring departments.

It has been aimed to be in harmony with the European Union and with the international accounting and auditing standards with the Banking Act and with the process of managing the banking system through centralised organization. Preparation of balance sheets in harmony with internationally accepted standards, transparency of the activities of the banks and supervising of them in effective way (Chambers, 2004:5).

Insufficiencies for the issue of supervising can sometimes cause crises within the financial markets. For this reason, independent internal and external auditing of the banks and making public of the balance sheets of banks have come into forefront.

The capital adequacy ratio, which is applied in Turkey during the harmonization process with the Basel II, is 8%. The capital adequacy has a function of being the bumper both against the losses that banks may face and to prevent the losses that depositors might suffer (Işeri, 2004:78). Nevertheless, BRSA has started to apply the capital adequacy ratio as 12%, with reserve differential of 8% +4% following the fluctuation that has been lived through in 2006 by considering the unfavorable conditions, which might take place within the international markets. By this way, stronger capital base is constituted and therefore the flexibility of the banking system is provided. Sanctions have been imposed on banks that could not comply with the capital adequacy requirements and permission has not been granted for them by the BRSA for opening of new branches (BDDK, 2009:40).

Bankruptcy of the bank, whose permission for activity had been terminated, is asked to be declared, amount of the deposits are determined and payments for the depositors are made. Resolution process continues for the banks, whose management had been taken over and the banks are brought back to economy by transferring resources to the banks (BDDK, 2010:42).

New practices have been implemented for the banking system by BRSA following large scale malpractices that had taken place within the banking system. Some of the new practices are; tightening of the auditing of the bank branches, enlargement of the scope of the supervision, supervising of the banks by having access for the data systems of the banks, and constituting of effective internal audit, internal control and risk management and it was tried to provide the transparency. In addition to these, processes to establish a bank has been made difficult, tight regulations have been imposed for the issue of banking licenses, which had been easier before the crises (BDDK, 2010:50).

When the structures of the banks, which have been delegated to the fund, are looked in to, it can be seen that they have many common features. It can be seen that the principle activity of the banks in question had not been the banking, except for 3 of them, as the macro economic instability that had been lived through during 2000's had damaged the balance sheets of banks, which were not so strong (Bumin&



Ateş,2003:70). Without any doubt, the ease of obtaining banking licences until the period previous to the reorganization had its effects on this matter. Another common feature of the banks that are in question that they also had activities in sectors like, tourism, construction, outside of the banking sector and it was the problem that the deposits collected had been granted as loans for their own establishments.

In response to the frauds committed by bank managers in Turkey it was aimed at having healthier system structure through the new regulations in the Banking Laws. Banking Regulation and Supervision Agency included various stipulations narrowing the scope of the saving deposits covered under insurance in a decision made by it. In this sense, offshore accounts are excluded from insurance coverage through limitations related to the coverage of the deposit insurance. (2003:1143)

Another regulation made after the frauds committed by senior managers is that the same person may not assume the positions of the managing director and the Chairman (5411:23). Any and all resources used by the shareholders having the management and supervision for their interests, loans granted to their relatives and any and all other resources of the banks of which banking permits have been revoked shall become receivable of the Treasury without any further transaction. (Turkish Penal Code 5020: 15/a)

Any person who will fail to submit the required information and documents required for the preparation of the consolidated financial statements of the entities regulated under the banking laws and the information and documents requested by the entities and supervisors authorized by the applicable laws shall be sentenced to imprisonment from one year to three years and the judicial fine. (5411:153)

For any misleading and wrong statements and documents provided by the entities under the Banking Law to the courts and competent bodies and auditors and any person who sign any and all documentation in the published documents shall be sentenced to imprisonment from one year to three years and the judicial fine. (5411:155)

Any person who will be responsible for exclusion of the transaction, recording of transactions wrongfully, and sign under them or the supporting documents therefore shall be sentenced to imprisonment from one year to three years and the judicial fine. The officers of the independent audit firms which approve such documents deliberately shall be sentenced to punishment in the same manner. (5411:156)

Any person who destroys, removes, change or makes inaccessible the data in a communication system or sending the present data to any other place shall be sentenced to imprisonment from one year to three years and the judicial fine. If such acts are committed in a bank the fine will be increased by half. (5411:244)

The chairman of the board and the directors of the bank who misappropriated money or documents or shares with monetary value that he/ she is obligated to protect and supervise will be sentenced to the punishment from six years to twelve years and shall also cover the losses and damages of the bank. If the crime will be committed through fraudulent activities to cover the crime, the person will be sentenced to imprisonment not being less than twelve years and the judicial fine; however the judicial fine may not be less than three times of monetary losses. (5411:160)

The obtainment of a person of the shares representing ten percent or more of the capital through direct or indirect shareholding in a bank or the shares of a partner exceeding ten percent, twenty percent, thirty-three percent or fifty percent through new share acquisitions, and the reduction of the shares under such ratios shall be subject to the approval of the Agency. (5411:18)

Shares of a joint stock company shall give their holder the right to participate in management of the joint stock company. Therefore, the applicable laws stipulate rules to prevent the acquisition of the bank shares by those who are not eligible to be a partner in a bank. There are also measures to prevent the management of the banks by those who lack the required expertise, since such will impose risk on the banking system.

Banks are not allowed to grant loans to and to buy the bonds or similar instruments of their directors of the board, general managers, assistant general managers and other officers having the authority to grant loans and the partnerships and corporations in which the their spouses and children under their custody have more than twenty percent or more solely or jointly with others as well as the unions, funds, associations or foundations established by and for the employees of the bank. (5411:50)

## **5. The Case of Turkey**

As a result of the banking corruptions during the turn of New Millennium that put Turkey into economic crisis, 25 Turkish banks were taken over by the Saving Deposit Insurance Fund of Turkey (SDIF) during 1993-2003 period. Acts of

corruption that the Turkish banks were subjected to during the period has cost Turkish Treasury some USD 65 billion including interest. İmar Bank, Sümerbank and Egebank are reviewed here as prime examples to those acts of corruption, fraudulent actions and failures as to hold a light to this research study of ours.

### ***İmar Bank***

All things considered about İmar Bank, whose banking license revoked due to unbelievably designed fraud methods, the story of the bank and the group is rather interesting.

As soon as that bank was acquired by the Fund, data processing centre was simply brought down by the bank's former administrative officers and all of the legal books and main and auxiliary records were either shifted away or destroyed, and as a result of that it was proved rather difficult and a painstaking affair for the government officials to investigate and audit the bank's records in circumstances where all evidence were destroyed. Investigations carried out under such difficult circumstances showed that the documents and records submitted by the bank to government officials were simply manipulated by the former administrative officers of the bank and that the bank had collected from the ordinary folk, under the name of deposits and treasury bond sale, much more than it was initially recorded in the bank's financial books and records, and that the taxes collected from such depositors by means of stoppage were not at all passed on to fiscal authority (TMSF, İmar Bank, 2009: 51).

In essence, İmar Bank's officers and bankers collected unregistered deposits. Investigations and audits held into the İmar Bank's records showed that all such transactions were simply left unregistered or partially registered and declared, and therefore the amount of actual deposits collected were kept secret from the government authorities. Since the right of execution of authority granted for the branches of that bank were rather inadequate, even the most basic banking transactions, as well as reporting and information flow and exchange, were kept subject to initial approval or consent of the headquarters which in turn enabled İmar Bank's management to have all initiatives in terms of operations, as well as handling, controlling and execution of all transactions, also including the fraudulent ones, under a single authority. (Fort & Hayward, 2004: 4)

Also investigated were the income tax and fund deduction transactions, as well as the special transactions tax, that the bank was to apply to interests earned on deposits as levied by the Bank's Internal Audit Unit which proved to be

underreported. As a result of the said investigations, it was found that, during 1999 – 2003 period, income tax and fund deductions, which are applicable to interest earned on monies deposited with the banks pursuant to usual banking practises, were made, but the actual amounts of such income tax and fund deductions initially realised by the branches were later recorded in the bank's financial records and books in greatly reduced amounts reduced on records by the headquarters of the bank by reverse entries and interventions (Pehlivanli, 2011: 104). It was also found that such amounts, that were reduced and approved by the headquarters, were then instructed to the branches as being the amounts due to Inland Revenue, which they were so paid up by the branches (TMSF, Imar Bank, 2009: 57).

Imar Bank credit facility transactions, too, as it was the case for many other transactions, were handled under a single hand and all approvals in connection with such credit facilities were adopted by the CEO Kemal Uzan and General Manager of the bank where the responsibilities of the credit department personnel in general were kept limited to operational matters and transactions. In addition, credit facilities extended without the knowledge of the branches and branches were only left to handle and execute the relevant paperwork. Investigations held into the financial affairs of that bank proved that all of the credit facilities as cash injections, as of July 3 2003, were exclusively extended to Uzan Group alone (BDDK,2010:43).

Another and one of the most important corrupt practises realised by the owners of the Imar Bank is illegal collection of deposits and extension of credit facilities by an offshore bank which resulted in that bank's making huge unduly profits.

Imar Offshore is an offshore bank established by Uzan Group based in Turkish Republic of North Cyprus. Due to its special legal status, Imar Offshore is bound to realise its banking business practises outside the national borders of Turkish Republic of North Cyprus. Imar Bank is the sole exclusive corresponding bank of the Imar Offshore which in turn means that Imar Offshore must and should only realise its usual banking activities, such as, collecting deposits and extending credit facilities, via Imar Bank.

While a portion of the resources that were transferred by the said bank to Uzan Group were never recorded in the books and financial records of the Uzan Group

companies, another portion of such transfers were recorded as “Imar Offshore Credits”.

In line with the investigations carried out by the Bank’s Independent Certified Auditors, it was also found that, by depositing the funds at Imar Offshore, funds were wire transferred abroad for the name of Uzan Group and that funds were accumulated in the accounts of real persons and companies who were under the umbrella of Uzan Group, and so that Imar Offshore accounts were exclusively used as a tool for the purposes of transferring funds to Uzan Group. (TMSF, Imar Bank, 2009: 59)

In short, there were a considerable number of fraudulent transactions of various types executed within and by the Uzan Group companies. Primary purpose of such fraudulent transactions were to derive benefits for Uzan family through eroding the profits –normally destined to be distributed or subjected to taxation– and transferral of funds from Imar Bank.

In order to cover up such fraudulent transactions, so they could not be a subject matter to any initial suspicion, all those fraudulent transactions were deliberately made to involve many different companies by means of rather complex transactions and routing. Furthermore, such fraudulent transactions, made all the more complex by other transactions by the group companies in order to covert the reality, and even bubble companies were established and ledger journals and other legal records were manipulated.

### ***Sumerbank***

Another fraud and corruption case was Sumerbank and similar operations occurred in 1999. Sumerbank was established as a governmental institute in 1933. Main purpose of company was textile production. It had a rapid growth in years and became a holding which had business units in many sector and also banking. Banking unit of holding separated and had the title ‘Sumerbank A.S’. Sumerbank A.S privatized and sold to Garipoglu Group in 1995.

Corruption in balance sheet and a steady ‘run’ caused liquidity problems and founding of main shareholder Garipoglu Group were the reasons that caused SDIF to take over the bank.

Main reason for takeover was founding Garipoglu Gorup directly or indirectly. Bank’s assets included mostly founded credits for Garipoglu Group though these loans were non-performing. Uncollected interests of these loans increased and reached huge amounts and corrupted Bank’ balance sheet.

Not only directly founding Garipoglu Group but also transferring money by using fake companies to the group was other problems. Fiduciary credits and back to back credits used for covering risky aspects of financial activities. Deposit money in Efektifbank Off-Shore and Efektifbank's founding the group increased risks of the group. Many kinds of shareholder fraud and corruption can be found in case. First reason for takeover was paying cost of privatization by using Bank's sources.

The main shareholder started directly found own group companies after cost-free holding the Bank's control. Garipoglu Group had limited financial capacity and financed themselves by bank credits. That was why credits from Sumerbank were non-performing and interest of these credits increased in rediscount accounts. These non-performing credits corrupted the Bank's balance sheet and caused liquidity problems. The Bank collected costly deposits for solving liquidity problems. This caused negative effects on income-cost balances of bank and took place as main reason for the loss of Bank.

The Bank was used for funding the group companies in many methods. Group was founded by using back to back credit lines thereby risk weight and illegality about credit limits of Banking Law was hidden. Group risk was much higher when back to back credits added to total. These kind of credits made default and risk was fall on Sumerbank. In this case Sumerbank and Garipoglu Group established back to back credit lines which reached the amount of \$ 43,6 m.

Beside back to back credits Garipoglu also used fiduciary credits for founding Group companies and to hide risk weight and disobeying to the credit limits of Banking Law. Group was also founded by using fake companies and third party companies. Moreover, some improperly founded loans were also damaged the Bank's balance sheet and cost so much.

### ***Egebank***

Egebank was very similar to Sumerbank in the mean of fraud and corruption. Main reason for takeover of Egebank was again shareholder's exploitation though exploitative shareholder operations have been started before the Bank had purchased by Demirel Group, Bayraktar Group and Mehmet Sami Erdem were former owners of the Bank.

Main shareholder's credits grammatically reached to 53.3% over the Bank's total cash credits during 1994 to 1999. Beside, founding main shareholder from the Bank's own sources, mismanagement of risk, overbranching activity, high deposit cost, costly advertisement campaign, costly decoration and restoration expenses were other important reasons for takeover. (Kelkitlioğlu, 2001:27-30)

All these cost and expenses paid by obtaining costly collected found. These costs added to loss of previous years and all caused weak equities of shareholders and liquidity problems. Shareholders' equity was negative TL 93 m in 1998. It was negative TL 618 m when the takeover happened in 1999 (TMSF, Egebank, 2009:44). Liquidity ratios had a negative trend after 1995 and reached lowest levels in 1998.

As explained before exploitations and frauds caused the Bank's bail-out. All these transactions were hidden by using some false entries by management of the Bank. SDIF had taken over the bank out of necessity, in 1999.

Main problems in the Bank's balance sheet, started with the purchase of the Bank. The cost of purchase paid by using the Bank's own sources. Costly sources of the Bank used for purchase of the Bank by the last owner. Three different methods used for these transactions; (Kelkitlioğlu, 2001:35)

- First Method: Former owners of the Bank arrange letter of guarantees for last owner to have cash loans from different banks. These loans paid by the Bank's sources after purchase.
- Second Method: Former owner's debts to the Bank were taken over by the last owner Group as a portion of cost of purchase.
- Third Method: Former owner's interest payments from loans from the Bank were taken over by the last owner as a portion of cost of purchase.

These methods used for free-purchase of the Bank by using Bank's own sources. Last owner group bought the Bank without any cash payment; by the way former owner had no debt to the Bank anymore. The bounds which were given by last owner group to former owner group as guarantee of payment for takeover of shares were taken under guarantee of the Bank, too. All these operations were improper and were not ethic either.

In 1998, for the purpose to procure credit opportunities, non-cash credit facility of USD 67.2 m was allocated by the Bank on behalf of last owner group during the period when the Bank was in the helm of former owners. Letter of

Guarantees were given within the scope of these credits on behalf of last owner group companies.

The received credits against the above mentioned Letters of Guarantee is spent by former ones during the process of Bank's purchase. The repayment for the said credit was provided by two different domestic banks back to back credits as well as the credits that are used by shell corporations and companies who are owned by close acquaintances of last owner group. Thereby, against the written engagement given by the Group on October 1998 and Treasury statement, the noncash credits given by the Bank has changed to cash credits.

As announced earlier; transfer of all Bank shares from former to the last was arranged in 1998 including the transfer of liabilities and conciliation agreement. Within the scope of the abovementioned agreements, the last Group Companies took on the credit debt owed to Egebank by former one. Eleven separate companies of the former owner group had a total of 13.7 million in debt which was transferred to three separate last owner group companies along with founders of the group. For the said transfer, a letter of release was issued by Egebank.

Credit was allocated through way of back to back credit method within the Group by a domestic bank. These credits were indirectly deposited to the account of group founder on various dates. After founder used these funds to increase the capital of the companies in the Group, the remainder of the total amount was used to pay the interest debt accumulated on 1998. The amount used for the abovementioned purposes totals TRY 3.4 million of the Bank's resources.

Also, to pay for Egebank's purchase, former owner group was given promissory notes prepared by the last owner group. Egebank was listed as guarantor of these promissory notes, therefore associating the Bank with the debt of the Group.

The Bank's resources were used by the Group other than the purchased of Egebank. The last owner Group's debts owed to other banks were paid off giving wrongful information including addresses that did not exist and it was later exposed that most of them were shell corporations. Letter of Guarantees which were the case of directly founding of the Group were compensated by the Bank, because of default of companies.

Not only direct founding but also back to back credit operations used for founding the Group companies. Back to back credits used for founding controller



shareholder's companies both under former owner Group control and the last owner Group. Some of these credits were fiduciary.

Cost of equity injection even paid by Bank' own sources. The board of directors resolution about shareholder's equity injection TRY 12 m to TRY 25 m made by using the Bank sources. Mechanism of using the Bank's sources for the needed TRY 13 m injection was a bit complex and an example of simurfing.

Purchasing the Group Companies shares was another method to found the Group. Beside direct credit lines to Group companies, another method for founding was purchasing shares of these companies. In this case Egebank bought two of the group companies shares for TRY 5,1 m. Egebank paid 7 times higher than market price of these companies Many other fraud and corruption activity occurred during the years of the last owner group control over the Bank.

Some third party companies, actually these were shell corporations which seems unrelated to the Group companies but not in fact, founded as an indirectly founding channel of the Group companies. These transactions cost TRY 9,1 m and USD 20 m. The managers of the Bank exploited the Bank's sources beside shareholder corruptions and exploitation. Loans to some group or third party companies were transferred directly managers of the bank. Illusory profit created by false entries and fictitious dividend distributed through years. Some added to reverse found. Bank' sources were exploited in this way.

Group companies also founded trough Egebank Off-Shore which was one of the Group companies. Bonuses were given to the staff of Egebank to increase deposits in Egebank Off-Shore. In USD terms 85 m was collected till 1999 and the Group companies founded in a total of USD 73 m.

Lastly huge amounts of advertisement and decoration expenses were paid through 1998 and 1999 to absorb financial damage from fraud and corruptions through increasing deposits. These kinds of expenses increased around % 1000. It was around USD 120 m in the date of takeover. Actually accountants could not calculate how much of these transactions were real and how much of it were transferred to group companies.

At the end, all of these improperly and corruptly management exploitations caused the Bank' takeover by SDIF. Damaged country's economy and caused huge amount of cost on taxpayers.

## Conclusion

Before it reached its today well-established structure, Turkish Banking System has experienced all types of cunning, corruption etc that can be happen, most clever techniques were tested, regulatory and supervisory instruments that evolved after these experiences reached a point so that even if most powerful crisis affected our banks in a limited manner.

Moreover, the banks which are the assurance foundations got the power on economic activity in Turkey. This system was established in such a strong and reliable way so that since 2001 none of the economic components lose their confidence to the system.

Today, regulation of banking in Turkey has the quality and ability to find solutions for the economy of countries that experience financial crisis.

Regulations of financial markets become a heated debate after the last crisis and in this context, examination of the reasons and results of the Turkey's performance is important and necessary for the sustainable overall global economic system.

Turkey not only fight with twin crises in 2001 but also experienced frauds in banking and financial crisis that results from the poor organized bank balance sheets. After the crises that gave rise to great deficits in economy of the country and banking system, banking system reached a strong structure by a late reorganization program in banking. Not only the regulations about banking fraud but also some other developments such as improvement of capital structure of banks, control of risks and strengthening of balance sheet structure has given rise to today's improved banking system. After the foundation of BRSA and changes in Banking Law, the global crisis that affects developed countries' financial systems and economies, could not impose any negative effect on Turkish banking sector.

## References

- Aguilar, M. A., Gil, J. B. S., Pino, L. (2000). Preventing Fraud and Corruption in World Bank Projects, USA: The World Bank.
- Aytuğ, H., Koehler, G. J. & Pathak P. (2010). Detecting Management Fraud in Public Companies, *Management Science*, 56(7), 1146-1160.

- Bakdur, A. (2003). Bankacılık Sektörünü Düzenleyen Kurumların Yapıları e Türkiye İçin Öneri, Ankara, Devlet Planlama Teşkilatı, Yayın No:268.
- Bankacılık Düzenleme ve Denetleme Kurumu, (2009). Krizden İstikrara Türkiye Tecrübesi, Çalışma Tebliği, Gözden Geçirilmiş 2. Baskı, Ankara.
- Bankacılık Düzenleme ve Denetleme Kurumu, (2010). Krizden İstikrara Türkiye Tecrübesi, Çalışma Tebliği, Gözden Geçirilmiş 3. Baskı, Ankara.
- Bankacılık Düzenleme ve Denetleme Kurumu, (2012). Bankacılık Sektörü Basel II İlerleme Raporu, Ankara.
- Bankacılık Düzenleme ve Denetleme Kurumu, (2010). Sorularla Basel III, Risk Yönetimi Dairesi, Ankara.
- Bankacılık Düzenleme ve Denetleme Kurumu, (2011). Bankacılık Sektörü Yeniden Yapılandırma Programı, Ankara.
- Bankacılık Kanunu, (2005). 5411, Tertip:5, Cilt: 45
- Bakdur, A. (2003), Bankacılık Sektörünü Düzenleyen Kurumların Yapıları: Ülke Uygulamaları ve Türkiye İçin Öneri, Devlet Planlama Teşkilatı, Uzmanlık Tezi, Yıllık Programlar ve Konjonktür Değerlendirme Genel Müdürlüğü, Mali Piyasalar Daire Başkanlığı, Yayın No:2678, Eylül.
- Bayar, G. (2010). Türkiye’de Yolsuzluk- Ekonometrik Bir İnceleme, *ODTÜ Sosyal Bilimler Enstitüsü Dergisi*, 28(1), 105-131.
- Beasley, M. S. (1996). An Emprical Analysis of the Relation Between the Board Director Composition and Financial Statement Fraud, *The Accounting Review*, 71(4), 443-465.
- Beck, T., Kunt A. D. & Levine R. (2006). Bank Supervision and Corruption in Lending, *Journal of Monetary Economics*, 53, 2132-2163
- Biegelman, M. T. & Bartow, J. T. (2006). Executive Road Map to Fraud Prevention and Internal Control, USA:John Wiley&Sons, Inc.
- Bozkurt, N. (2009). İşletmelerin Kara Deliği Hile Çalışan Hileleri, İstanbul:Alfa Basım.
- Bumin M. & Ateş F. (2008). Sorunlu Bankaların Çözümlemesi, Türkiye Deneyimi, ISBN:978-9944-341-96-7, Ankara,
- Caplan, D. (1999). Internal Controls and the Detection of Management Fraud, *Journal of Accounting Research*, 37(1), 101-117.
- Chambers, N. (2004). Kriz Dönemi ve Sonrasında Bankaların Finansal Yapısının Analizi, İstanbul.

Çolak, F. & Yiğidim A. (2001). Crisis in Turkish Banking Sector, Nobel Yayın Dağıtım.

Deshmukh, A. & Millet I. (1999). An Analytic Hierarchy Process Approach to Assessing The Risk of Management Fraud, *The Journal of Applied Business Research*, 15(1), 87-102.

Eining, M. M., Johns D. R. & Loebbecke J. K. (1997). Reliance on Decision Aids: An Examination of Auditors' Assessment of Management Fraud, *Auditing: A Journal of Practice&Theory*, 16(2).

Ekin, S. A. & Tezölmez, S. H. (1999). Business Ethics in Turkey: An Emprical Investigation with Special Emphasis on Gender, *Journal of Business Ethics*, 18, 17-34

El-Gamal, M. A. & İnanoğlu, H., (2005). Inefficiency and Heterogenity in Turkish Banking 1990-2000, *Journal of Applied Econometrics*, 20(5), 641-664.

Erdoğan, N. (2002). Dünya ve Türkiye'de Finansal Krizler, Türk Bankacılık Sektöründe Yeniden Yapılandırma Uygulamaları, Kamu Bankaları Deneyimi, Yaklaşım Yayınları, Ankara.

Eriş, H. (2007). Türk Bankacılık Sistemi, Gelişimi, Durumu ve Sunduğu Seçenekler, Bildiriler, Konferanslar, Makaleler, Marmara Üniversitesi, Finansal Piyasalar Araştırma ve Uygulama Merkezi, Yayın No:1, İstanbul.

Fort, J. L. & Hayward, P. (2004). The Supervisory İmplications of the Failure of İmar Bank, ([http://www.forecasturkey.com/Articles/Government/UT/rapor\\_20040831.pdf](http://www.forecasturkey.com/Articles/Government/UT/rapor_20040831.pdf), 22.04.2012).

Günay, N. I. & Hortaçsu, A. (2011). Bank Managers Percetion of Ethical and Legal Conduct in Emerging Markets During the Post-Crisis Period:Evidence from Turkish Banking Sector, *BDDK Bankacılık ve Finansal Piyasalar*, 5(2), 11-49.

Gürsoy, M. (2009). Ekonomik e Finansal Krizler Dünü ve Bugünü, İstanbul, MG Yayınları.

Hansen J. V., McDonald, J.B., Meisser, W. F. & Bell T. B. (1996). A Generalized Qualitative-Response Model and the Analyses of Management Fraud, , 42(7), 1022-1032.

İşeri, M. (2004). Son finansal Krizler Ertesinde Türkiye'de Bankacılık, İstanbul,

Kaufmann, D. (1997). Corruption: Defects, *Foreign Policy*, 107,114-131.

Kelkitlioğlu, M. (2001). Hortum Egebank Nasıl Soyuldu, İstanbul: Metis Yayınları.

Pehlivanlı, D. (2011). Hile Denetimi Metodoloji ve Raporlama, İstanbul: Beta Basım.

Mbuya, J. C. (2010). Proactive Fraud Management Guide The Management of Fraud in the Banking Industry, USA: Lambert Academic Publishing.

McMillan, E. J. (2006). Policies&Procedures to Prevent Fraud and Embezzlement, USA: Joh Wiley&Sons, Inc.

Özatay, F., Sak, G., Garber, P. & Ghosh, A. (2002). Banking Sector Fragility and Turkey's 2000-01 Financial Crisis (With Comments and Discussion), *Brookings Trade Forum*, 121-172

Paulino, J. M. (2008). The Fraud of Money&Banking The Birth of the New Financial Order, USA:Jose M. Paulino.

Saksena, P. (1993). The Relationship Between Environmental Factors and Management Fraud: An Emprical Analysis, *International Journal of Commerce and Management*, 11(1), 120-139.

Povel, P., Singh, R., & Winton A. (2007). Booms, Busts and Fraud, *The Review of Financial Studies*, 20(4),1219-1254

Rossouw, G. J., Mulder, L. & Barkhuysen, B. (2000).Defining and Understanding Fraud: South African Case Study, *Business Ethics Quarterly*, 10(4), 885-895

Sariibrahimoğlu & others, (2000). Offshore Banking & Trust, Fraud & Money Laundring, Ankara: Odak Ofset.

Sayar, Z.A.R. (2003). Bankaların Halka Açılması ve Banka Yatırımcılarının Korunması, İstanbul, Sermaye Piyasası Kurulu, Yayın No:146.

Şalman, B. Ş. (1998). The Global Crisis and the Turkish Economy; New Policy Challenges and Ecpectations fort the Near Future, The Central of the Republic of Turkey Research Department, Ankara, December.

Tasarruf Mevduatı Sigorta Fonu, (2009). Egebank, Raf Temizliği, Ankara: Artus Basım.

Tasarruf Mevduatı Sigorta Fonu, (2009). İmar Bankası, Raf Temizliği, Ankara: Artus Basım.

Tasarruf Mevduatı Sigorta Fonu, (2009). Sümerbank, Raf Temizliği, Ankara: Artus Basım.

Velthouse, B. & Kandogan, Y. (2007). Ethics in Practice: What Are Managers Really Doing, *Journal of Business Ethics*, 70(2), 151-163.

Zahra, S. A., Priem, R. L. & Rasheed, A.A., (2005). The Antecedents and Consequences of Top Management Fraud, *Journal of Management*, 31, 803-828.

## The External Auditor's View on Risk Disclosure – Empirical Evidence from Austria

Waltraud Öller<sup>1</sup>, Korona Sylvester<sup>2</sup>, Dorothea Greiling<sup>3</sup>  
<sup>1,2,3</sup> Johannes Kepler University

**Abstract.** *In recent years risk disclosure has received notable attention in legislation and also in international academic research. The purpose of risk disclosure is to provide information to external stakeholders to assist them in their decision-making. However, the impact of risk disclosure on stakeholders' decision-making is hardly investigated and thus, effectiveness of risk disclosure is still undetermined. In this paper we attempt to contribute to the understanding of the effectiveness of risk disclosure by scrutinizing the understandability and credibility of risk information. For this purpose we conducted nine in-depth expert interviews with certified public accountants of the Big Four auditing companies in Austria. Our findings suggest that risk disclosure, although generally in accordance with the law, is perceived as difficult to understand and therefore likely not to be considered in stakeholders' decision-making. In addition, auditors doubt that an external audit can substantially increase credibility of risk information. Furthermore, external auditors question that they have sufficient information and expertise to verify risk disclosure and the risk management system. The interviews also revealed a critical view on further legal requirements for risk disclosure and suggest that credibility of risk disclosure has to be achieved above all by the management.*

**Keywords:** *audit of risk management, empirical research, risk disclosure, risk management, risk reporting, role of auditor*

### 1. Introduction

The disclosure of risk information in the annual financial statement has become an issue of great interest not only for financial reporting practice but also for regulatory bodies and international academic research. As external stakeholders suffer in their decision-making from information asymmetry, the disclosure of risk information in financial reports is an important means to provide further information for external stakeholders and thus to reduce managements' information advantage (Healy & Palepu, 2001). Due to its high prognostic relevance information on company risks and risk management is supposed to play a crucial role for stakeholders' perception of the company's future development. Therefore risk disclosure is considered to have a substantial impact on stakeholders' decisions (Koonce et al., 2005).

Hence, from the beginning of this millennium several empirical studies have investigated the extent of companies' risk disclosure, its contingent factors, and how companies adhere with legal regulations in risk reporting (Beretta & Bozzolan, 2004, Ewelt et al., 2009, Filipiuk, 2008, Kajüter, 2001, Kajüter & Winkler, 2003, Kajüter & Esser, 2007, Lajili & Zéghal, 2005, Leitner-Hanetseder & Winkler, 2010, Lightstone & Driscoll, 2008, Linsley & Shrivess, 2006, Linsley & Lawrence, 2007, Othman & Ameer, 2009, Taylor et al., 2010). However there is

neither clear empirical evidence that risk reporting indeed contributes to overcoming information asymmetry nor is there systematic empirical research on the factors influencing the effectiveness of risk disclosure. Risk disclosure can be deemed effective if the information provided will influence the decision making of external stakeholders (Ruhnke, 2003). Linsley & Lawrence (2007) therefore call for further research on the effect of risk disclosure on stakeholders' decision making.

From previous theoretical and empirical research it can be assumed that the effectiveness of risk disclosure depends, *inter alia*, on its understandability (Jones & Shoemaker, 1994, Linsley & Lawrence, 2007) and its credibility (Ewert & Wagenhofer, 2000, Healy & Palepu, 2001, Wagenhofer, 1990a). Risk information with a difficult or very difficult reading level is not comprehensible for all users of the information and thus it is not effective (Linsley & Lawrence, 2007). In addition, due to conflicting incentives, it is not clear for external stakeholders whether information provided by the management is trustworthy. Therefore, one possible mechanism to increase credibility of disclosed information, as proposed by theoretical literature, is to audit managements' disclosure by an independent third-party like financial intermediaries or external auditors. (Ewert & Wagenhofer, 2000, Healy & Palepu, 2001, Wagenhofer, 2004). There are already several empirical indications that external audits can increase credibility of financial statements (Gibbins et al., 1990, Healy & Palepu, 2001). However, the actual effect of an external audit on the credibility of financial statements in general is far from clear (Healy & Palepu, 2001).

Furthermore, due to its prognostic character, the accuracy of risk disclosure in particular that of risk forecasts are not *ex-ante* verifiable (Dobler, 2008, Ewert & Wagenhofer, 2000). Instead, risk forecasts can only be tested on plausibility (Dobler, 2008) and thus it can be concluded that the effect of an external audit on credibility of risk information is limited. In addition, Woods & Humphrey (2008) point out that, due to the fact that the Sarbanes Oxley Act (SOX) demands from external auditors to verify the management's assessment of internal control and risk management system, they have to evaluate management's ability to deal with the company's risk. This implies that external auditors have to objectively assess something which they can only subjectively judge. Therefore, the question arises to what extent risk information is auditable. Consequently, Woods & Humphrey (2008) conclude that there is significant need for empirical evidence on the role of external auditors in risk management and risk disclosure.

In our research we pursue two objectives: On the one hand, we intend to enhance the understanding of the role of auditors in risk disclosure and want to clarify whether external auditors see themselves in the position to contribute to a higher credibility of risk information. On the other hand, we investigate whether auditors see a necessity for a more understandable risk information.

Therefore, our contribution to academic research is threefold: First, we try to contribute to the discussion on risk disclosure by shifting the focus from the quantity of risk information to the quality of such information in terms of its understandability and credibility. Second, we would like to enlarge the research field of risk disclosure by integrating evidence on the role and self-concept of external auditors in risk disclosure. Finally, we would like to advance the discussion on further regulations and standard setting in risk disclosure by discussing implications on auditing and on risk disclosure.

Therefore, we provide empirical evidence on both the understandability and the credibility of risk information. Nine in-depth expert interviews with certified public accountants of the Big Four auditing companies in Austria were conducted in December 2010 and January 2011. Our

interview partner were all specialist in risk management auditing. The semi-structured interviews were guided by a field manual focusing on the auditors' assessment of the actual risk disclosure of Austrian companies and on potential means to improve its understandability and credibility.

Our research reveals that external auditors perceive actual risk disclosure by Austrian companies as too complicated to be fully understood by external stakeholders. In addition, external auditors themselves lack information and appropriate expertise to truly verify risk disclosure and the risk management system. As a result, respondents question whether an external audit can substantially increase credibility of risk information. Consequently, its effectiveness is doubted. In addition, our research reveals that auditors have a skeptical view on further legal regulations. Instead, they would prefer advancing international standards for risk disclosure and for the audit of risk information and risk management. Overall, our results suggest that credibility of risk disclosure has to be achieved above all by the management.

The remainder of the paper is structured as follows. In the subsequent two sections we discuss the theoretical and legal background of risk information and the role of external auditors in risk disclosure. Section 3 gives a literature overview of current empirical results in the field of risk disclosure and risk auditing. Section 4 describes our research method followed by section 5 which is dedicated to the presentation of our empirical results. Section 6 provides a discussion of our empirical results and finally in section 7 we propose our conclusions from the research.

## 2. Theoretical background

In order to overcome information asymmetry, the disclosure of management's private information plays a crucial role not only in capital markets but also in social welfare (Akerlof, 1970). Two problems arise from the separation of ownership and control:

First, the management of a company typically has better and more information on the company's performance and its future perspectives than external stakeholders (Healy & Palepu, 1993, Lambert, 2001, Wagenhofer, 2004). Due to this information asymmetry investors in imperfect markets (along with other stakeholders) cannot achieve optimal, utility maximizing decisions, which leads to inefficient markets. The lack of information gives rise to an undervaluation of "good" quality and an overvaluation of "bad" quality in the market. This consequently reduces the incentives for entrepreneurs to provide "good" quality and finally causes the breakdown of the market (Akerlof, 1970).

Therefore, it is assumed that in imperfect markets disclosure can reduce information asymmetry and increase benefits for both the stakeholders and the company. Financial economics literature suggests that companies profit from disclosure by increasing stock market liquidity and attracting institutional investors (Amihud & Mendelson, 1986, Diamond & Verrecchia, 1991, Kim & Verrecchia, 1994). In addition, the reduced uncertainty for investors is supposed to decrease the company's cost of capital (Botosan, 1997, Healy et al., 1999, Verrecchia, 1999). Investors and similarly other stakeholders take advantage from enhanced information, as they can evaluate investment possibilities more appropriately, which reduces the risk of adverse selection and miss-pricing ((Akerlof, 1970, Healy & Palepu, 1993).

Disclosure, however, imposes costs for the company. Therefore, the extent of disclosure is dependent on cost of disclosure, proprietary costs (Dye, 1986, Verrecchia, 1983, Wagenhofer, 1990b), legal requirements and litigation costs (Dye, 1986, Skinner, 1994).



Second, the separation of ownership and control causes agency problems resulting from conflicting interests. Management is not necessarily acting in the best interest of the owners but has a tendency to realize perquisites for its own advantage (Jensen & Meckling, 1976). Thus, management has incentives not to disclose all private information even if both, the company and external stakeholders, would benefit from the disclosure and therefore information asymmetry will persist (Greiling, 2009, Lambert, 2001).

Healy & Palepu (2001) suggest different possibilities to reduce information asymmetry and to align conflicting interests: First, optimal contracts provide incentives for the management to disclose information and matches the interests of management and stakeholders. Second, control authorities and control systems monitor the management and contribute to good corporate governance. Third, information intermediaries, like financial analysts and rating agencies provide additional information for stakeholders and reveal management's misuse of company's resources. Finally, legal requirements enforce disclosure. The effectiveness of the mentioned alternatives to reduce information asymmetry depends on economic and institutional factors. As influencing factors Healy & Palepu (2001) indicate the possibility to install and monitor optimal contracts, the amount of disclosure and proprietary costs, the effectiveness of regulations and incentive problems of information intermediaries.

Consequently, actual risk disclosure is as well dependent on economic and institutional factors. In their conceptual work Jorgensen & Kirschenheiter (2003) investigate the effects of disclosure costs, of uncertainty about management's private information and of uncertainty about firm-specific risks on management's voluntary risk disclosure. They conclude that there is a non-disclosure equilibrium at sufficiently high costs and a full-disclosure equilibrium at low costs. Additionally, they show that in industries where there is high uncertainty about the firm-specific risk, it is more likely that managers voluntarily disclose risk information. Dobler (2008) also analyses the effect of legal regulations on risk disclosure. He suggests that even in the case of mandatory risk disclosure managements' incentives to disclose information matter as the manager can chose to disclose meaningless information. Dobler (2004) notes that information on risk is, due to its prognostic character, ex-ante not verifiable and therefore its credibility is problematic and discretion in risk reporting is possible. Consequently, it can be concluded that the effectiveness of risk information is questionable as rational decision-makers will only consider information in their decision-making which they perceive as trustworthy (Ewert & Wagenhofer, 2000, Wagenhofer, 1990a).

One possible mechanism to increase credibility of disclosed information proposed by theoretical literature is to audit management's disclosure by an independent third-party like an external auditor (Dobler, 2004, Healy & Palepu, 2001, Lambert, 2001, Wagenhofer, 2004). The external auditors' main function is to assure the correctness and legal compliance of disclosed information (Ruhnke, 2003). However, in case of risk reporting the question arises whether external auditors are in the position to verify the correctness of the information disclosed. External auditors themselves might act out of self-interest and attempt to limit their effort and liability (Dobler, 2004). Additionally, they are not always as independent from the company they have to audit as it is necessary (Ewert & Wagenhofer, 2000). Finally, especially for prognostic information it is not clear whether auditors have the knowledge, expertise and necessary information to evaluate risk information (Holm & Birkholm, 2007).

Disclosed risk information can only be effective, when it is considered in stakeholders' decision-making. For this purpose information has to be easy understandable because otherwise the stakeholders perceive the cognitive efforts for using the information as too high and therefore they are likely to ignore the information. This makes the information useless and consequently disclosure is not effective Hodder et al. (2001).

In general, risk disclosure is supposed to reduce information asymmetry between the management and the external stakeholders. The effectiveness of risk disclosure apparently depends on institutional and environmental factors. As the review has shown there is already a substantial body of literature which addresses the issue from a theoretical perspective by developing models. In comparison the body of empirical studies is much less advanced.

### **3. Legal background**

In contrast to theoretical arguments for risk disclosure, past empirical evidence has shown that the incentives for the management to disclose risk are not sufficient to guarantee comprehensive and meaningful information on risks and risk management. Considerations of negative side effects like costs of disclosure, proprietary costs and the risk of litigation are supposed to off-set positive effects of disclosure and call for legal regulations on risk disclosure (Woods et al., 2004). Thus, many countries have imposed legal requirements for risk disclosure.

Austrian corporate entities are obliged to have an internal control system and to disclose all substantial and going-concern risks and uncertainties in their management report. However, except for risks resulting from financial instruments, which are subject to further disclosure rules according to the Fair-Value-Directive (European Directive 2001/65/EG), there is no obligation to quantify risks or to report on their effects on financial figures. Similarly international accounting standards are focused on the disclosure of risks resulting from financial instruments (IFRS 7).

Since 2008 publicly traded companies have to describe the main features of the group's internal control and risk management system in relation to the process of financial reporting. For these companies it is also compulsory to install an audit committee and to compose a corporate governance report.

According to the Austrian two-tier-board system the legal obligations in risk management for the management board, the supervisory board and the external auditor are separated. Therefore, the prime responsibility of the management board in risk management is to govern the company with adequate care to ensure going-concern and to inform all other stakeholders on risks affecting the company. Although not explicitly demanded by law, these tasks require by common interpretation the installation of an appropriate risk management system.

The supervisory board has to monitor the management's actions also in risk management. Therefore the management board has to keep it informed on risks and risk management matters. With the assistance of the external auditor the supervisory board has to confirm the effectiveness of the risk management and internal control system and verify the financial statement.

Additionally, public traded companies are obliged to install an audit committee which again has a monitoring function in risk management and internal control. In order to guarantee comprehensive verification, the Austrian Code of Corporate Governance determines that at least one member of the audit committee must have sound knowledge and expertise in financial matters.

Finally, the third control entity in risk management are external auditors. Auditors have an assurance function for external stakeholders guaranteeing by the auditor's opinion the correctness and legal compliance of the financial statement (Ruhnke & Lubitzsch, 2010). Corresponding to Austrian Commercial Code the external audit has to be effected in accordance with the international standards of auditing (=ISA).

Thus, the external auditors have to verify the financial statement including all information concerning risks and risk management and they have to test the effectiveness of the risk management and internal control system.

In general, disclosed information is tested on the principles of completeness, reliability, clarity and comparability. For prognostic information, however, external auditors can only verify whether this information is reasonable and in accordance with internal planning and expectations and does not lead to misinterpretation of the company's future development. However, external auditors are obliged by ISA to have sufficient understanding of the company and its environment to "identify and assess the risks of material misstatement of the financial statement" (ISA 315). Therefore auditors shall also be in the position to evaluate all substantial business risks of the company (Austrian Chamber of Auditors, 2008).

If companies report on the risk management system itself, this information is not tested on completeness, but only verified with regard to its correctness and whether it does not lead to an inappropriate impression of risk management (Austrian Chamber of Auditors, 2008).

The audit of internal control and risk management system tests only whether the design of the system is appropriate and therefore, is not intended to verify the management's ability to control risk. If there are any weaknesses in risk management and in the internal control system, the external auditor has to inform the supervisory and the management board but does not necessarily have to draw a qualified opinion (Goworek, 2009).

Furthermore, the assessment of the effectiveness of risk management is demanded by the Austrian Corporate Governance Code (Comply-or-Explain Rule) which is not subject of the external audit. Instead, the external auditor only declares that the company has composed a Corporate Governance Report.

Thus, Austrian legal requirements do not regulate the audit of risk disclosure in detail. There are no instructions on how to detect considerable risks not disclosed. The extent of the audit of risk management is neither specified clearly in the law nor in the expert opinions of the Austrian Chamber of Auditors.

Compared to other countries the mandatory audit of the risk management system in Austria differs in some aspects. In contrast to § 404 Sarbanes Oxley Act (SOX) the audit of risk management and internal control system under Austrian law has a narrower scope. Whereas under SOX the audit of internal control is a verification of the management's assessment of the internal control system and its effectiveness (Woods & Humphrey, 2008) and is filed with the Securities and Exchange Commission (SEC), the audit in Austria is limited to an evaluation of the design of the system and is for internal use only. In addition, detected weaknesses in the risk management system do not in any case cause a qualified opinion.

In contrast to the German Law of Corporate Control and Transparency (Gesetz zur Kontrolle und Transparenz im Unternehmensbereich, (KonTraG) 1998), which explicitly demands an early recognition system and related internal control procedures (e. g. Böcking & Orth, 2000, Dobler, 2003), Austrian Law does not specify obligatory components of risk management further. Thus, also the scope of the audit is less specific and is restricted to testing general appropriateness of system-design.

The major objective of an external audit of disclosed information is to reduce the risk of false and missing information and thus to increase credibility of the disclosed information (Dobler, 2004, Ruhnke, 2003). However, in the case of prognostic information assessment is limited to a test on plausibility. External auditors can only control whether assumptions are reasonable,

deductions logical and information systems adequate (Dobler, 2004). This limitation gives rise to an expectation gap on the appropriateness of risk disclosure between the public and external auditors (for the expectation gap in general see Liggio, 1974).

#### **4. Risk reporting and the auditor's role - a literature review**

To establish a sound understanding of risk disclosure and to promote effective legislation, Linsley et al. (2006) and Solomon et al. (2000) called for more academic research in the field of risk disclosure. Since then, the body of empirical evidence has been growing. To give a short overview, the existing body of research on risk disclosure shall be categorized in three different research streams: 1) the relation between risk disclosure and capital market which comprises primarily theoretical research on incentives of risk reporting by the management, and some empirical studies on the effects of risk disclosure on capital markets, 2) content analysis of financial statements which mainly investigate volume of risk information, compliance of risk information with legal requirements and factors influencing the extent of risk disclosure and finally 3) the user side of risk reporting which intends to clarify the usefulness of risk disclosure as source of information mainly for investors.

The academic discussion on incentives for risk reporting is based on the more general discussion of managerial motivation to voluntarily disclose private information in financial reporting. An overview of theoretical concepts explaining managements' incentives for disclosure is presented in Dye (2001) and Verrecchia (2001), empirical results in accordance with these concepts are shown by Healy & Palepu (2001). Although this literature does not specifically deal with risk disclosure, its results have influenced the evolving discussion on risk reporting essentially.

Theoretical concepts concerning risk disclosure are developed by Dobler (2008) and Jorgensen & Kirschenheiter (2003). Dobler (2008) also discusses the effect of an external audit on the credibility of risk information. He concludes that, verification of risk information being a rather subjective judgment, an audit of risk forecast can only act as "costly signal to users", and thus, its value is hardly observable.

Deumes & Knechel (2008) and Hill & Short (2009) in their empirical work show that companies with high information asymmetry between management and investors are more likely to disclose risks than companies with less information asymmetry. In addition, Hill & Short (2009) contest an increase in risk disclosure over time and a negative effect of directors' shareholding on risk disclosure.

Empirical research on the effects of risk disclosure on capital markets include studies investigating impacts on securities prices (e. g. Dietrich et al., 2001, and on trading volume due to changes in investors' uncertainty (e. g. Kravet & Muslu, 2011, Linsmeier et al., 2002).

A recent study by KPMG in corporation with the University of Graz investigates the impact of increased mandatory risk disclosure due to IFRS and Austrian Accounting Standards on the reporting practice of Austrian companies. The results of this study suggest that in particular the compliance with disclosure requirements under IFRS 7 are perceived as complicated and thus costly (Šimic, 2010).

The major portion of empirical studies, however, is part of the second stream of research and focuses on the volume of risk disclosure, the degree to which companies fulfill legal requirements, and on factors influencing the extent of risk disclosure. Beginning with Solomon et al. (2000) who questioned institutional investors on the impact of risk disclosure on their investment decision, and driven by the introduction of legal regulation on internal

control and risk management, a vivid discussion on risk disclosure and its compliance to legal requirements has evolved. The majority of these empirical studies are content analyses of financial statements describing the extent of risk disclosed.

Especially in Germany, due to its comprehensive legal requirements according to the German Law of Corporate Control and Transparency, several empirical studies investigate the compliance of risk management with German legal requirements by content analysis (Ewelt et al., 2009, Filipiuk, 2008, Kajüter, 2001, Kajüter & Winkler, 2003, Kajüter & Esser, 2007). The results of these studies generally show that there is a great variety in risk disclosure even if it is mandatory and that risk information is mainly qualitative.

Similarly, the empirical results of other countries (Beretta & Bozzolan, 2004, Lajili & Zéghal, 2005, Lightstone & Driscoll, 2008, Linsley & Shrivess, 2006, Linsley & Lawrence, 2007, Othman & Ameer, 2009, Taylor et al., 2010) underline that risk disclosure varies between the companies and that bigger companies tend to have a more comprehensive risk disclosure (Linsley & Shrivess, 2006, Kajüter & Esser, 2007). The results of Beretta & Bozzolan (2004) additionally suggest that companies tend to avoid disclosing the impact of risk and risk strategies on their future development.

Filipiuk (2008) compared risk disclosure of German companies from 2002 to 2005. Her result suggest that the compliance with law has improved over time. Similarly, the most recent content analysis of risk disclosure in Austria shows that risk reporting in general obeys legal requirements (Leitner-Hanetseder & Winkler, 2010).

However, the extent of risk disclosure in the financial statement is not necessarily an appropriate indicator of how informative risk disclosure really is. Linsley & Lawrence (2007) therefore critically note that the usefulness of risk reporting is dependent upon the readability and not on the volume of disclosed information. Their empirical results suggest that risk information is generally difficult to read and therefore its use in the decision process is unclear (Linsley & Lawrence, 2007). Also Ewelt et al. (2009) come to the conclusion that more information is not equal to better information. Thus, to come to a better understanding of the effect of risk disclosure on decision-making, Linsley & Lawrence (2007) call for further research on the understandability of risk information. Nevertheless, we are not aware of any further empirical work investigating the effectiveness of risk disclosure for stakeholders' decision-making.

Finally, the third stream of research investigates the effect of risk disclosure on investor decision-making. However, there is only little evidence concerning the use of risk reporting in decision making. Hodder et al. (2001) note in their analysis of FRR 48 that provided information must be in a form that it can be used in the decision-process directly without further calculation and adjustments. Otherwise investors perceive cognitive efforts for transferring the information such high that they will not consider the information in their decision-making. This makes the information useless and consequently disclosure of this information is not effective. Hodder et al. (2001) therefore conclude that more quantitative information in respect of the impact of risks and the effect of risk management could lead to an improved risk assessment by investors.

In their study Arnold et al. (2009) investigate the impact of information on the effectiveness of internal control over financial reporting in decision making of professional and nonprofessional investors. Their main findings suggest, that the use of information differs between the two groups. Professionals take more time analyzing the information, consider

more complete sets of information and have a greater focus on financial statement information Arnold et al. (2009).

Due to the lack of further empirical results, the effect of current risk disclosure on stakeholder decision-making is still ambiguous and further research on the precondition for the use of risk information is compulsory for understanding the relation between risk disclosure and stakeholder's decision-making. Additionally, the results of Arnold et al. (2009) suggest that multiple stakeholders will have different needs for information, and that stakeholders with no financial background will be at a disadvantage in terms of understanding risk information.

In the academic discussion on risk disclosure, empirical results dealing with audits and the role of auditors are lacking almost completely. Although, internal and external audits are perceived to play a crucial role for the effectiveness of risk management and risk reporting and therefore are subject to legal requirements, in many countries, there is only little research concerning the role of external auditors in risk disclosure.

One possible benefit of an audit is the supposed increase in credibility of financial reports (Ruhnke, 2003). Prior accounting research revealed several empirical indications that external audits can increase credibility of financial statements (Berry et al., 1987; Epstein & Pava, 1993; Gibbins et al., 1990, Healy & Palepu, 2001). Healy & Palepu (2001) argue that the fact that capital providers ask for an independent audit as a condition for financing shows that they perceive that an external audit increases the credibility of financial information. On the other hand empirical evidence shows that qualified opinions due to their late publication do not provide new information for investors. Therefore they are supposed to be irrelevant for investors' decision-making. In addition doubts about the auditors' independence and the auditors' concern to limit their own liability rather than to increase credibility might have an impact on the auditors' possibilities to increase credibility of financial statements. Healy & Palepu (2001) therefore concludes that the impact of audits on the credibility of financial statements is ambiguous.

Concerning the audit of risk disclosure and risk management Woods & Humphrey (2008) argue that auditing of risk disclosure and risk management has a complementary and supportive function for risk management. Whereas the importance of the audit of risk disclosure is perceived to grow with increasing significance of risk management, the role of auditors remains unclear and doubts exist whether external auditors' expertise is sufficient to meet the new demands (Woods & Humphrey, 2008). Similarly Holm & Birkholm, 2007 argue that the refocusing on the assurance function by audit firms has enlarged ambiguity on the "nature of auditing".

In addition, Woods & Humphrey (2008) points out that due to the fact that SOX demands external auditors to audit the risk management system and thus the management's ability to deal with company's risks successfully, auditors have to objectively assess something which they can only subjectively judge. Therefore, the question arises whether risk information is auditable at all. Thus, Woods & Humphrey (2008) conclude that there is significant need for empirical evidence on the role of external auditors in risk management and risk disclosure.

## 5. Methodology

Current empirical research in risk disclosure has a strong focus on content analysis of risk information and mainly investigates the extent of risk disclosure. Thus, by analyzing the understandability and credibility of risk disclosure we propose shifting the focus from the

quantity of risk information to qualitative factors of risk information which can be assumed to influence the effectiveness of risk information.

Therefore in our research we pursue two objectives: We intend to answer the question whether external auditors see themselves in the position to contribute to a higher credibility of risk information. In this context we also want to clarify the role of external auditors in risk disclosure compared to the supervisory board and the management board. Second, we aim to contribute empirical evidence on the understandability of risk information as it is perceived by auditors and on their position on whether there is a need for more understandable risk information.

As both concepts – understandability and credibility - are subjective perceptions, we have chosen a qualitative approach to the field. Qualitative research also appears to be appropriate as it allows a broader look onto the subject-matter of research, which is especially useful in a newly developed research field (Ahrens & Chapman, 2007, Lamnek, 2008).

For the research semi-structured interviews which were guided by a field manual were conducted. The guiding questions of the field manual were deducted from an analysis of the existing empirical evidence on risk disclosure. As there is little empirical evidence in Austria, it was decided to include German studies in the analysis. For this purpose seven empirical studies (six content analysis of financial statements and one quantitative questionnaire) were analyzed and compared on the identified critical aspects on risk disclosure. From this analysis three categories of questions were established: form of risk disclosure, content of risk information and corporate governance aspects. To each of the category several open questions intended to motivate the interviewee to freely communicate his experience in the field of risk disclosure have been included in the field manual.

To answer our research questions it was assumed to be most appropriate to interview external auditors. First, auditors have to evaluate financial statements on completeness, reliability, clarity and comparability. In addition, they guarantee by their opinion that the financial statement draws a fair picture of the company's future development. For this purpose, they themselves have to judge whether risk disclosure is reasonable and does not lead to misinterpretation. Therefore, auditors should have specific experience which enables them to evaluate the understandability of risk information. Second, due to their assurance function, auditors should be best suited to judge their potential for increasing credibility of risk information.

The empirical material consists of nine semi-structured expert interviews with members of the Big Four audit firms in Austria. All of our respondents were specifically responsible for auditing or consulting of companies of the non-financial sector in risk reporting and risk management. The interviews have been conducted between December 2010 and January 2011. Each interview took about 60 minutes and was recorded digitally and transcribed. The questions were based on the structured interview guide, which later during the evaluation of the empirical data helped to make reasonable and valid comparisons.

With the empirical material, a qualitative content analysis according to Mayering (2008) was conducted. Therefore, all transcripts have been paraphrased and generalized, non-relevant paraphrases have been deleted. The generalized statements have then been coded into common themes which could be assigned to the following main categories: understandability, external auditor's role in risk disclosure and supervisory board's, audit committee's and management board's role in risk disclosure. Finally, paraphrases from all interviews with

identical code were combined, interpreted and results were deducted and critically compared with the theoretical background (Mayering, 2008).

## 6. Empirical results

### 6.1 Understandability of risk disclosure

Risk disclosure is effective if the information provided will have an impact on the decision making of stakeholders (Ruhnke, 2003). However, external stakeholders will only use information disclosed in financial statements if they are able to understand it. Thus, the understandability of risk information is a precondition for the effectiveness of risk disclosure. The results of our empirical study suggest that risk disclosure generally is not understandable for external stakeholders without further background information on the company and expert knowledge in financial matters. Thus, an addressee-oriented risk information is not achieved.

The interviews revealed that the respondents in general agree that risk disclosure of Austrian companies complies to legal requirements. However, they unanimously suppose that the actual risk disclosure practice by Austrian companies, even though in line with legal requirements and already improved within the last years, can still not serve properly as decision support for external stakeholders:

*“Risk disclosure is compliant with legal requirements. However, to really get the picture you have to have more background information. What will be disclosed externally is probably not enough to draw a comprehensive picture of the company.”<sup>1</sup> (Interview A)*

In general, the interviewed auditors criticized that important information for decision-making is missing. Risks are rarely quantified, consolidated and linked with other information in the financial statement. Therefore, risk disclosure does not reveal the effects of stated risks on company’s development and prognostic data. In addition, due to missing information on risk positions of prior periods, the development of risks over the years is not visible for outsiders either. Several auditors also criticized that chances are rarely included in risk disclosure. Therefore, most of the respondents conclude that risk reporting is supposed to be more a matter of compliance rather than a matter of decision-support for external stakeholders.

Furthermore, several of the interviewees noted that a categorization of risks is not done systematically and a general accepted definition of substantial risks is often missing. As a result, comparability of risk disclosure is not guaranteed.

*“What is not clear is whether the stated potential losses and claims cover all, and whether changes are considered accordingly. Are the stated risks the most relevant risks? ... it is the overall picture which is missing. ... The question is what is material?” (Interview G)*

In addition to the lack of categorization, several auditors stated that some categories like financial risks seem to be more often reported than others. This imbalance in risk reporting is supposed to be a result of the comprehensive legal requirements for disclosure of financial risks.

---

<sup>1</sup> As the interviews were conducted in German all direct quotes are translated from the transcripts by the authors.



*“Risks are reported not according to materiality but according to other criteria. Risks are reported when they are communicable. Also, some risks will be reported, because they are expected to be and not because they are material risks.” (Interview G)*

*“Financial, production and sales risks are the main categories of risks to be reported. Also, the loss of know-how is considered – but only in terms of IT-risks like theft of data, server break-down, and so on. Loss of know-how due to loss of personnel is rarely considered in risk disclosure.” (Interview E)*

On the other hand, all interviewees mentioned an information overload in risk disclosure. Due to poorly structured, fragmented, complicated and partially excessive reporting, auditors suppose that stakeholders will have great difficulties reading out the bottom line and using the information for decision-making.

*“Generally speaking the quality of risk disclosure is poor. Most notably information necessary for decision making [of stakeholders] is missing. Also, risk information is to heterogenic, to comprehensive, to detailed and does not match with the addressees knowledge and expertise.” (Interview C)*

Although external auditors see a consistent categorization, quantification and consolidation of risks generally as an improvement of risk disclosure, they are also critical to a more standardized and formulaic approach to risk reporting. A compulsory standard on risk categories is supposed to never be complete for all companies and could lead to simply working off check lists with the danger of ignoring firm specific risks. Contrary to Hodder et al. (2001) who conclude that more quantitative information will increase usefulness of risk information for investors, in our research quantification of risks is seen more critically. It is only perceived as beneficial by our interviewees if also the assessment of values is disclosed comprehensibly. In addition, some respondents doubt the usefulness of quantification for all risk categories.

As for some risk categories, such as strategic risks and personnel risks, quantification is subject to various assumptions, this could lead to a lack of accuracy and result in a misleading impression of certainty by readers of the financial statement.

Thus, effectiveness of risk information could be increased according to our interviews by focusing on crucial information - which is supposed to be a prioritized list of risks according to their importance - and presenting this information in a clear, consistent and simple manner. This implies that all risk information should be grouped together and put into a clear and comprehensible structure. Risk should be quantified only if appropriate and the stated figures should be accompanied by qualitative information explaining assumptions of valuation, effects of risk and relevant risk management strategies. In order to give an understandable overview on the risk situation, substantial risks should be clearly prioritized and also presented in well-arranged diagrams.

Similar to other empirical studies (Ewelt et al., 2009, Kajüter & Winkler, 2003, Solomon et al., 2000), it was emphasized that the development of general standards is important in order to achieve higher quality of risk disclosure. In this context, our study revealed a clear preference for standards rather than for further legal requirements. As major drawback of an extension of legal requirements, it was indicated that regulations would turn risk management even more to a matter of compliance.

According to the interviews, general standards, however, are better adoptable to firm-specific needs and therefore, are supposed to be more helpful in providing comprehensible and understandable risk information.

Consistent with the conclusion of Ewelt et al. (2009), it was pointed out that for better information quality standards for risk reporting should be enlarged by guidelines on the qualitative description of risks. Such guidelines would enable the companies to provide their reports more concisely and comprehensibly.

## **6.2 External auditor's role in risk disclosure**

The theoretical argument for auditing is that it increases credibility of information (Dobler, 2004, Healy & Palepu, 2001, Lambert, 2001, Wagenhofer, 2004). However, expectations by stakeholders on the influence of external audits might exceed the actual effects of auditors' work on credibility of disclosed information. Thus, in our study we investigate the auditors' role in increasing credibility of risk information. The results of our empirical study suggest that for auditing of risk disclosure a considerable expectation gap may exist. In our interviews we identified four sources for deviations between stakeholders' expectations and auditing practice.

First, the expectation on the scope of the audit may exceed actual auditing practice. Austrian Law and Corporate Governance Code demand an external audit of risk disclosure in the financial statement and of the effectiveness of risk management system.

In accordance with Austrian Commercial Code risk disclosure is to be checked by external auditors only for its plausibility and consistency with the financial statement and the management report. However, our interviewees note that the external audit is not supposed to guarantee that all substantial risks are disclosed.

*“The external auditor is often seen as someone who helps the company to get back on track if something has gone wrong. However, the duties of the external auditor are much more restricted. He only audits the financial statement of last year. Thus, prognostic information and risk simulation are not main subjects of his duties. (Interview BB)*

Several auditors stated that, as there are no instructions for external auditors on how to detect undisclosed risks and as they have to rely on the information provided by the management, they do not see themselves in a position to identify such risks.

Consequently, an unqualified opinion states only that risk information is plausible and in line with other information. It does not, however, assure that all substantial risks of a company are identified and under control, which according to several interview partners could be supposed by users of the financial statement.

Especially for the assessment of the effectiveness of a company's risk management the interviewed auditors see additional factors for deviating expectations. Several auditors explain that the assessment of the effectiveness of the company's risk management can be misperceived as testing the company's ability to deal with risks. However, the scope of the audit is much narrower and tests only the appropriateness of the system for dealing with the company's risks. The auditor's assessment of the risk management then determines according to the business risk audit what will be audited and how.

*“The auditor does not in principle verify and assess the risk management system. This is a typical case of an expectation gap in Austria. The legal obligation of the auditor is to verify the assets, financial position and results of a company.” (Interview F)*

Furthermore, actual audit practice differs from best-practice proposals in literature. In order to monitor the effectiveness of the risk management system Gleißner (2008) suggests output-tests for comparing actual information delivered by the risk management system to planned information, and deviation-tests, for verifying whether deviations from budget are related to risks. However, our interviewees agreed that they during the audit verification of the risk management system is usually limited to the design of the process and spot tests. This procedure is supposed to be less time consuming and easier to handle. One interviewee explained that although this procedure is perceived to be less appropriate to verify the effectiveness of the risk management system, it is largely used in practice, as the additional time for running a more appropriate test procedure usually will not be paid by clients.

Second, also the significance of the audit opinion on the actual effectiveness of risk management could be overestimated by stakeholders. Our interviewees agreed that substantial weaknesses in the risk management system would cause a qualified opinion or even the rejection of the opinion. However, it was also stated during the interviews that it is common practice that the effectiveness of the risk management is audited separately and not as part of the yearly audit of the financial statement. Consequently, findings from the audit of risk management are usually not stated in the opinion.

*“We do not verify the effectiveness of the risk management within the annual audit. We do this only when we are assigned to it separately.” (Interview G)*

The audit of risk management is demanded by the Austrian Code of Corporate Governance as a comply-or-explain rule. Any deviations from this rule have to be explained in the Corporate Governance Report which, however, is not audited in detail. Auditors only have to assure that the company has composed a Corporate Governance Report. The interviewees therefore agreed that external stakeholders could be misled by an unqualified opinion supposing the company has an effective risk management system and thus has control over its risk exposure.

Third, some of the interviewed auditors noted that the possibility to verify risk information is limited and thus the significance of the audit might be overestimated by stakeholders. Risk information is prognostic information and therefore it is problematic to be verified. Consequently, Austrian Commercial Code demands that risk disclosure is checked by external auditors only on whether it is plausible and consistent with the financial statement and the management report. Thus, external auditors do not guarantee that all information is accurate and that all risks are disclosed in the financial statement.

*“We have to look whether risk disclosure is consistent with the financial statement and whether there is no false information given. However it is always a discussion on what shall be included.” (Interview A)*

Finally, auditors doubt whether their knowledge, expertise, available information, time and personnel resources are adequate for auditing risk disclosure and risk management. External auditors hardly have all the necessary information for evaluating a company's risks, as for this task a sound knowledge of the company and its environment is indispensable. Therefore, the quality of evaluation is dependent on the information auditors receive from a company's management. In addition, some respondents point out that auditors do not have the appropriate expertise in evaluating risk management.

*“The external auditor is not able to test the risk management accordingly during the annual audit. For that, the external audit lacks expert knowledge and time. The assessment of risk management should not be effected by auditors but by real experts in this field. (Interview B)*

Thus, the interviews have clearly shown several aspects of an expectation gap, and this puts particularly the addressee of the information in a weaker position. Expectations of stakeholders concerning scope and quality of the audit and the significance of auditor's opinion for the effectiveness of risk management and the accuracy of risk information are not met in several aspects. Thus, the question arises whether an enlargement of audit scope and liability could lead to a narrowing of the expectation gap or if instead other measures are better suited to increase credibility of risk information. This shall be analyzed in the following discussion.

### **6.3 Supervisory board's, audit committee's and management board's role in risk disclosure**

As our study revealed serious doubts on the auditor's possibilities to increase credibility of risk disclosure in a second step we attempt to evaluate, whether supervisory boards and audit committees, as internal monitoring authorities, could contribute to more credible risk disclosure.

For the supervisory board it was indicated that in general the reports provided by the management include information on substantial risks and risk management. Therefore, the supervisory board should be able to evaluate company's risk exposure. However, for challenging risk information it is perceived as indispensable that the supervisory board disposes of sound knowledge in economic and financial matters and has a comprehensive understanding of the company and its environment.

*"Nowadays responsibility of the supervisory board has increased. Thus, they have to understand the business of the company." (Interview E)*

Concerning audit committees the interviewees draw a positive picture of their role, as they suggest that the installation of an audit committee to monitor risk management could have a positive effect on the company paying more attention to risk management matters.

*"The audit committee contributes to a more vivid discussion of risk management. Compared to the past risk management is dealt with more systematically now." (Interview B)*

In this context, it was stated that the audit committee in general accomplishes its monitoring role and a regular communication between auditor and audit committee has evolved. However, it was also criticized that the cooperation of all monitoring entities is limited to the annual sessions and therefore the interviewee would appreciate intensifying cooperation. In addition, the interviewed auditors emphasized again the importance of sound knowledge of financial matters as a prerequisite to an effective monitoring. Similar to the supervisory board, the audit committee can only perform its monitoring function effectively, if at least part of its members have a sound economic and financial background and know the company's business.

Thus, the interviews suggest that monitoring risk disclosure and risk management by supervisory board and audit committee will only be effective if they dispose of sufficient expert knowledge to critically question management's information on company's risk.

Considering these limitations for external auditors, supervisory boards and audit committees to increase trust in risk disclosure, the role of the company's management is crucial to establish credibility of risk disclosure.

*"I think that it is positive, if the addressee is informed about all substantial risks. In which manner this is done by the management, whether risks are quantified or qualitatively*

*described, this should be decided by the management itself. It is the managements' responsibility to provide the appropriate information.” (Interview B)*

In this context our interviews suggest that a promoter for comprehensive and credible risk disclosure is the company's risk management itself. It was assumed that companies with a sound risk management system are more likely to also have a good and comprehensive risk disclosure. The interviewees therefore suggest that the deficiencies in risk disclosure mainly result from the fact that companies still see risk management as a matter of legal compliance without benefit for the company. Risk management therefore is not integrated in the management system and is not implemented company-wide. Consequently, the required risk information is not available directly as “by-product” of the risk management system, but has to be composed solely for reporting matters. This procedure causes additional costs, unwillingness to generate the information properly, and thus insufficient use of risk disclosure.

In addition, the compensation system for management is perceived as an important means to align management's objectives and risk preferences with those of other stakeholders. In this context the interview suggests that a transformation in compensation systems has taken place since the financial crisis. Systems with short-term performance measures will be increasingly replaced by balanced remuneration systems that focus on medium- and long-term development of enterprise value. In this context the respondents emphasized that it is indispensable to consider the interest of all stakeholders in remuneration systems as otherwise the development of stock prices will be overvalued.

## **7. Discussion**

Our empirical findings suggest that Austrian companies in general comply with all legal requirements for risk disclosure. The results therefore are in line with current empirical evidence in Austria (Leitner-Hanetseder & Winkler, 2010) and Germany (Ewelt et al., 2009, Filipiuk, 2008) and support the findings of Filipiuk (2008) that compliance of risk disclosure improves over time. However, our study also reveals a need for improved understandability and credibility of risk information.

The prime objective for risk reporting is to provide information to external stakeholders to put them in a position to evaluate the risks faced by the company and thus, to assess the company's future performance (Linsley & Shrivess, 2006). In this context our empirical results suggest that actual risk disclosure is not adequate for this task. Reports are incomplete, overloaded, unstructured and not comparable. Consequently, external stakeholders cannot estimate properly the company's risks. The interviewed auditors demand a consistent and complete presentation of risks faced by the company in order to increase effectiveness of risk disclosure. For this they recommend to concentrate reporting on substantial risks with the objective of giving a clear and consistent impression of the company's overall risk exposure.

The respondents are, however, skeptical on a mandatory quantification of all risks. As some risks are difficult to measure, a mandatory quantification of risks demands various assumptions for the calculation. These assumptions could cause a misleading perception of certainty by users of financial statements. Furthermore, risk quantification would induce additional disclosure costs which could, according to Verrecchia (1983), result in a reluctance to disclose risks that are costly to quantify. This may be true even if risk quantification is mandatory as risk information is not fully verifiable and therefore allows discretion (Dobler, 2008). Consequently, mandatory quantification could lead to the disclosure of risks that are easy to quantify, like financial risks, and to the non-disclosure of risks that are difficult to

quantify, like strategic or personnel risks. This unbalanced disclosure could then be misinterpreted by users of financial statements. Thus, instead of mandatory quantification of risks the interviewees suggest a clear and understandable qualitative, or graphical demonstration of all risks.

Our interviews also suggest that auditors see their function in risk disclosure limited to assuring compliance with legal requirements. They consider themselves not as consultant for their clients to improve the quality of risk disclosure. Our empirical data suggest two factors explaining this perception: First, budget for auditing is limited and thus companies are not willing to pay in excess. Additional consulting work would not be paid for by clients. Second, user-friendly risk disclosure is not perceived as a value adding task by companies. Instead, it is seen as matter of legal compliance. This finding is in line with other empirical research that suggests that risk disclosure and risk management is primarily driven by legal requirements (e. g. Collier et al., 2007).

Therefore, our interviews revealed a critical view on further legal regulations for risk disclosure. Our respondents suggest that legal requirements are no appropriate means to assure useful risk information. As already suggested by former research (Leitner-Hanetseder & Winkler, 2010), legal requirements shift the attention in risk reporting to the fulfillment of mandatory disclosure irrespective of the individual risk portfolio. The legal obligations lead to an imbalance in the risk reported, with a too great extent of disclosure on financial risks.

Instead of further regulations, the interviewees would suggest promoting the development of general standards that enable companies to improve effectiveness of risk information and would also assist auditors in verifying risk disclosure. However, the effectiveness of these standards will also be dependent on the view companies have on risk disclosure. Only if companies perceive risk disclosure as value adding task they will be willing to invest into quality risk disclosure.

Furthermore, our empirical research was intended to evaluate different means and especially external auditors' role in increasing credibility of risk information. Theoretical research suggests that stakeholders who decide rationally will consider information only if they perceive it as credible. The verification by independent external auditors plays a crucial role for assuring credibility of information, especially for information disclosed in the financial statement (Ewert & Wagenhofer, 2000). However, risk disclosure, in particular a risk forecast, is not ex-ante verifiable (Dobler, 2008, Ewert & Wagenhofer, 2000) and thus the role of auditors in risk disclosure is unclear.

Our interviews revealed a considerable expectation gap resulting from exaggerated expectations by external stakeholders about the possibilities and abilities of external auditors in verifying risk information. External audit is, however, reduced to check risk information on plausibility and whether it is in line with the annual financial statement. In this context respondents doubt whether the accordance with the financial statement is significant for risk disclosure, since the annual financial statement includes only little prospective information. According to the interviewees, it would be more important that auditors identify all substantial and going-concern risks. For this comprehensive evaluation of the risk management system, specialist knowledge and industrial experience is indispensable.

However, our interviews revealed that auditors themselves doubt whether they have sufficient expertise and resources for doing so. Especially in the context of the business risk audit this deficiency may have critical impact. In Austria, auditors are obliged to comply with ISA and design the audit as business risk audit. For that and according to ISA 315 auditors should have

sufficient knowledge to verify not only the strategy and objectives of the company but also its core business risk. However the interviews have shown, that within the annual audit, auditors doubt that they are able to do so.

Furthermore, the interviewees questioned whether certified public accountants have sufficient expertise for assessing effectiveness of the company's risk management and argued that specialized management consultants might be better qualified to audit risk management. To a certain extent these findings support the argument by Holm & Birkholm (2007) who note that the role of external auditors is weakened due to the increasing importance of internal auditors for risk management and suggest that audit firms should develop new expertise in internal control and risk management. Overall, our empirical results suggest that external auditors see their function in risk disclosure limited to assuring legal compliance. Due to missing information and expertise, however, they cannot guarantee full disclosure of risk, nor can they assure that risks are managed effectively by the company.

In addition, the respondents were also skeptical on the abilities to increase credibility by internal monitoring functions like the supervisory board and the audit committee. Similar to external auditors, it was argued that these monitoring entities are dependent on the management's information and that for challenging this information great expertise is indispensable.

However, irrespective of the verifying entity, the assessment of risk disclosure remains problematic, as an evaluation of the accuracy of prognostic information can only be effected by analyzing ex-post deviation from forecasts (Dobler, 2008, Ewert & Wagenhofer, 2000, Wagenhofer, 1990a). In this context, sanctioning of deviations is proposed as means to increase managements' incentives for risk disclosure. However, fear of claims may result in disclosing meaningless information (Dobler, 2008, Ewert & Wagenhofer, 2000). This critical view on sanctioning inaccuracy of risk disclosure is shared in our interviews. On the one hand, respondents agreed that the fear of claims could lead to meaningless risk disclosure. On the other hand, our interviewees argue that further legal requirements would result in companies' view on risk disclosure as a matter of compliance.

Overall our empirical results suggest that it is not legal regulation which induces useful and credible information, but rather greater attention to good corporate governance and a company-wide perception of risk management as a value adding management task. An integrated, company-wide risk management approach provides all necessary information for risk disclosure without further efforts and therefore is seen as important promoter of credible risk information by the respondents.

## **8. Conclusion**

The objective of this study was to enhance understanding of risk disclosure by contributing empirical evidence on the understandability and credibility of risk disclosure. In our study we focused on the view of external auditors in that area. In accordance to agency theory external stakeholders suffer in decision making from an asymmetry of information as for them it is more difficult and often impossible to receive all accurate information for their decision. On the other hand, management as agent is in certain circumstances reluctant to disclose information as this could jeopardize the achievement of its personal objectives. Therefore, legal requirements for risk disclosure are expected to decrease information asymmetry. However, it is also argued that only understandable and credible information will be considered in decision-making by stakeholders and that external auditors are perceived to increase credibility of disclosed information. Therefore, this study investigates external

auditors' perception of the understandability of risk disclosure and of their role in increasing credibility of risk disclosure.

The findings of our research suggest that risk disclosure, although in accordance with the law, is generally not seen as addressee-friendly. Consequently, auditors suppose that the users of financial statements will not be able to consider risk information properly in their decision-making. Hence, external auditors doubt the effectiveness of actual risk disclosure. Additionally, external auditors do not perceive themselves as promoters of better risk disclosure as they see their function limited to assure compliance with the legal requirements.

What is more, external auditors themselves lack sufficient information and expertise to truly verify risk information and the risk management system. As a result, respondents doubt that an external audit can substantially increase credibility of risk information. They questioned whether external auditors are the best entity to verify risk disclosure and risk management and they have a skeptical view on further legal regulations. Instead, the interviewed auditors would prefer advancing international standards for risk disclosure and for the audit of risk information and risk management.

The interviews also revealed a critical view on the ability of audit committees and supervisory board to increase credibility. These monitoring bodies are still supposed to lack sufficient expertise to challenge the management's risk information.

Overall, our results suggest that credibility of risk disclosure has to be achieved above all by the management board. This implies that the management has to demonstrate credibly that it will act for the benefit of all stakeholders. Thus, our results underline the importance of balanced remuneration systems for the management. In addition, the interviews suggest that the perception of risk management within the company as value adding integrated management task is crucial for the effectiveness of risk disclosure from an auditors perspective.

The objective of this paper was to give a first insight on the effectiveness of risk disclosure by contributing empirical evidence on the understandability and credibility of risk information. Due to its explorative character, this paper has some limitations. The interviews show the respondents personal view and therefore generalization of the results should be made with care. All our interview partners are members of the Big Four Audit companies and are mainly in charge of auditing big companies in Austria. Thus, there might be a bias to bigger companies. Our empirical material nevertheless contributes to the understanding of the effectiveness of risk disclosure.

The results also reflect the implications from the Austrian two-tier board system and further research in other countries would be beneficial for comparison.

From our empirical research several implications for practice may arise: First, our empirical evidence can contribute to the ongoing discussion in many countries on increasing quality of risk information by different means. Our interviews show a critical view on further legal regulations. Instead, promoting the development and use of international standards is a more appropriate way to improve risk disclosure.

In addition our interviews showed that for supervisory board as well as for auditors a sound understanding of the company's business and environment is indispensable for performing an assurance function for external stakeholders.



Second, our results concerning the role of external auditors should enhance the discussion on the value adding function of audits and thus auditors. Audit firms might invest in special knowledge in risk management and internal control and consequently turn into experts also in the field of risk management. These audit firms would then be able to offer services to their clients exceeding checking compliance with the law.

Finally, our empirical data also suggest that the perception of risk management within the company as an integrated, value adding management task, instead of a matter of compliance, is crucial for the effectiveness of risk disclosure. Thus, the importance of an integrated approach to risk management is underlined by our research.

Our explorative study also offers new perspective for additional academic research. First, it would be beneficiary to test our empirical results by a quantitative study with a representative sample. Second, especially for the understandability of risk disclosure it would be also of great interest to ask shareholders or financial analysts on how they understand and use risk information in decision making and whether there are differences to the view by the auditors.

Finally in connection with the development of international standards for risk disclosure further academic research on the possibilities and drawbacks of stricter legal requirements and more adaptable standards would be advantageous.

Furthermore, additional empirical research on the role of external auditors in risk reporting also in other countries could contribute substantially to the understanding of the role of external auditors.

## References

- Ahrens, T., & Chapman, C. S. (2007). Doing Qualitative Field Research in Management Accounting: Positioning Data to Contribute to Theory. In C. S. Chapman, A. Hopwood, & M. D. Shields (Eds.), *Handbook of management accounting research* (pp. 299–318). Amsterdam: Elsevier.
- Akerlof, G. A. (1970). The Market for "Lemons": Quality Uncertainty and the Market Mechanism. *The Quarterly Journal of Economics*, 84, 488–500.
- Amihud, Y., & Mendelson, H. (1986). Asset pricing and the bid-ask spread. *Journal of Financial Economics*, 17, 223–249.
- Arnold, V., Bedard, J. C., & Phillips, J. S. & Steve G. (2009). The Impact Of Risk On Investor Decision Processes And Outcomes In The Post-Sox Environment (Working Paper, 118445. Accessed on <http://www.finrafoundation.org/web/groups/foundation/@foundation/documents/foundation/p118445.pdf>, 2011-09-21.
- Austrian Chamber of Auditors (Kammer der Wirtschaftstreuhänder, KWT) (2008). KFS/PG10: Prüfung des Lageberichts. Accessed on [http://www.kwt.or.at/PortalData/2/Resources/downloads/downloadcenter/Fachgutachten\\_Pruefung\\_Lagebericht.pdf](http://www.kwt.or.at/PortalData/2/Resources/downloads/downloadcenter/Fachgutachten_Pruefung_Lagebericht.pdf), 2011-10-12.
- Beretta, S., & Bozzolan, S. (2004). A framework for the analysis of firm risk communication. *The International Journal of Accounting*, 39, 265–288.

- Berry, A., Citron, D., & Jarvis, R. (1987). The information needs of bankers dealing with large and small companies: *With particular reference to proposed changes in legislation*. London: Certified Accountant Publications.
- Böcking, H.-J., & Orth, C. (2000). Risikomanagement und das Testat des Abschlußprüfers. *Betriebswirtschaftliche Forschung und Praxis*, 2000, 242–260.
- Botosan, C. A. (1997). Disclosure Level and the Cost of Equity Capital. *The Accounting Review*, 72, 323–349.
- Collier, P. M., Berry, A. J., & Burke, G. (2007). Risk and Management Accounting: Best Practice Guidelines for Enterprise-wide Internal Control Procedures. Oxford: Cima Publishing.
- Deumes, R., & Knechel, R. W. (2008). Economic Incentives for Voluntary Reporting on Internal Risk Management and Control Systems. *Auditing: A Journal of Practice and Theory*, 27, 35–77.
- Diamond, D. W., & Verrecchia, R. E. (1991). Disclosure, Liquidity, and the Cost of Capital. *The Journal of Finance*, 46, 1325–1359.
- Dietrich, R. J., Kachelmeier, S. J., & Kleinmuntz, D. N. & Linsmeier, T. J. (2001). Market Efficiency, Bounded Rationality, and Supplemental Business Reporting Disclosures. *Journal of Accounting Research*, 39, 243–268.
- Dobler, M. (2003). Auditing Corporate Risk Management - A critical Analysis of a German Particularity (Munich Business Research Paper No. 2001-03, SSRN working paper 640862. Accessed on [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=540862](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=540862), 2011-10-25.
- Dobler, M. (2004). Risikoberichterstattung: *Eine ökonomische Analyse*. Frankfurt am Main: Lang.
- Dobler, M. (2008). Incentives for risk reporting - A discretionary disclosure and cheap talk approach. *The international Journal of Accounting*, 43, 148–206.
- Dye, R. A. (1986). Proprietary and Nonproprietary Disclosures. *Journal of Business*, 59, 331–366.
- Dye, R. A. (2001). An evaluation of "essays on disclosure" and the disclosure literature in accounting. *Journal of Accounting and Economics*, 33, 181–235.
- Epstein, M. J., & Pava, M. L. (1993). The shareholder's use of corporate annual reports. Greenwich: JAI.
- Ewelt, C., Knauer, T., & Sieweke, M. (2009). Mehr = besser? Zur Entwicklung des Berichtsumfangs in der Unternehmenspublizität am Beispiel der risikoorientierten Berichterstattung deutscher Aktiengesellschaften. *Zeitschrift für internationale und kapitalmarktorientierte Rechnungslegung*, 10, 10, 706–715.
- Ewert, R., & Wagenhofer, A. (2000). Neuere Ansätze zur theoretischen Fundierung von Rechnungslegung und Prüfung. In L. Lachnit (Eds.), *Investororientierte Unternehmenspublizität* (pp. 31–59). Wiesbaden: Gabler.

- Filipiuk, B. (2008). *Transparenz der Risikoberichterstattung, Anforderungen und Umsetzung in der Unternehmenspraxis*. Wiesbaden: Gabler.
- Gibbins, M., Richardson, A., & Waterhouse, J. (1990). The Management of Corporate Financial Disclosure: Opportunism, Ritualism, Policies, and Processes. *Journal of Accounting Research*, 28, 121–143.
- Gleißner, W. (2008). *Grundlagen des Risikomanagements*. München: Vahlen.
- Goworek, M. (2009). Risikomanagement: Grundlage eines nachhaltigen Unternehmenserfolges. In C. Mitter, & T. Wohlschlager (Eds.), *Aktuelle Herausforderungen des Risikomanagements* (pp. 1–44). Stuttgart: Ibidem-Verl.
- Greiling, D. (2009). *Performance Measurement in Nonprofit-Organisationen*. Wiesbaden: Gabler.
- Healy, P. M., & Palepu, K. G. (1993). The Effect of Firms' Financial Disclosure Strategies on Stock Prices. *Accounting Horizons*, 7, 1–11.
- Healy, P. M., & Palepu, K. G. (2001). Information asymmetry, corporate disclosure, and the capital markets: a review of the empirical disclosure literature. *Journal of Accounting and Economics*, 31, 405–440.
- Healy, P. M., Hutten, A. P., & Palepu, K. G. (1999). Stock Performance and Intermediation Changes Surrounding Sustained Increases in Disclosure. *Contemporary Accounting Research*, 16, 485–520.
- Hill, P., & Short, H. (2009). Risk disclosures on the second tier markets of the London Stock Exchange. *Accounting & Finance*, 49, 753–766.
- Hodder, L., Koonce, L., & MacAnally, M. L. (2001). SEC market risk disclosure: implications for judgement and decision making. *Accounting Horizons*, 15, 49–70.
- Holm, C., & Birkholm, L. P. (2007). Risk and Control Developments in Corporate Governance: changing the role of the external auditor? *Corporate Governance*, 15, 322–333.
- Jensen, M. C., & Meckling, W. H. (1976). Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure. *Journal of Financial Economics*, 3, 305–360.
- Jones, M. J., & Shoemaker, P. A. (1994). Accounting narratives: a review of empirical studies of content and readability. *Journal of accounting literature*, 13, 142–184.
- Jorgensen, B. N., & Kirschenheiter, M. T. (2003). Discretionary Risk Disclosures. *The Accounting Review*, 78, 449–469.
- Kajüter, P. (2001). Risikoberichterstattung: Empirische Befunde und der Entwurf des DRS 5. *Der Betrieb*, 3, 105–111.
- Kajüter, P., & Esser, S. (2007). Risiko- und Chancenberichterstattung im Lagebericht - Eine empirische Analyse der HDAX-Unternehmen. *Zeitschrift für internationale Rechnungslegung*, 2, 381–390.
- Kajüter, P., & Winkler, C. (2003). Risikoberichterstattung der DAX100-Unternehmen im Zeitvergleich. *Zeitschrift für kapitalmarktorientierte Rechnungslegung*, 5, 217–228.

- Kim, O., & Verrecchia, R. E. (1994). Market liquidity, and volume around earnings announcements. *Journal of Accounting and Economics*, 17, 41–68.
- Koonce, L., MacAnally, M. L., & Mercer, M. (2005). How do investors judge the risk of financial items? *The Accounting Review*, 80, 221–241.
- Kravet, T., & Muslu, V. (2011). Informativeness of Risk Disclosures in Corporate Annual Reports (SSRN Working Paper 1736228. Accessed on [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=1736228](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1736228), 2011-10-08.
- Lajili, K., & Zéghal, D. (2005). A Content Analysis of Risk Management Disclosures in Canadian Annual Reports. *Canadian Journal of Administrative Sciences*, 22, 125–142.
- Lambert, R. A. (2001). Contracting theory and accounting. *Journal of Accounting and Economics*, 32, 3–87.
- Lamnek, S. (2008). *Qualitative Sozialforschung* (4th edition. Weinheim: Beltz PVU.
- Leitner-Hanetseder, S., & Winkler, J. (2010). Status quo der Risikoberichterstattung deutscher und österreichischer kapitalmarktorientierter Unternehmen. *Zeitschrift für internationale Rechnungslegung*, 2010, 561–570.
- Liggio, C. D. (1974). The Expectation Gap: The Accountant's Legal Waterloo? *Journal of Contemporary Business*, 1974, 27–44.
- Lightstone, K., & Driscoll, K. (2008). Disclosing elements of disclosure: a test of legitimacy theory and company ethics. *Canadian Journal of Administrative Sciences*, 25, 7–21.
- Linsley, P. M., & Lawrence, M. J. (2007). Risk reporting by the largest UK companies: readability and lack of obfuscation. *Accounting, Auditing & Accountability Journal*, 20, 620–627.
- Linsley, P. M., & Shrives, P. J. (2006). Risk reporting: A study of risk disclosures in the annual reports of UK Companies. *British Accounting Review*, 38, 387–404.
- Linsley, P. M., Shrives, P. J., & Crumpton, M. (2006). Risk disclosure: An exploratory study of UK and Canadian banks. *Journal of Banking Regulation*, 7, 268–282.
- Linsmeier, T. J., Thornton Daniel B., Venkatachalam, M., & Welker, M. (2002). The Effect of Mandated Market Risk Disclosures on Trading Volume Sensitivity to Interest Rate, Exchange Rate, and Commodity Price Movements. *The Accounting Review*, 77, 343–377.
- Mayering, P. (2008). *Qualitative Inhaltsanalyse, Grundlagen und Techniken* (10th edition. Weinheim: Springer.
- Othman, R., & Ameer, R. (2009). Market risk disclosure: evidence from Malaysian listed firms. *Journal of Financial Regulation and Compliance*, 17, 57–69.
- Ruhnke, K. (2003). Nutzen von Abschlussprüfungen: Bezugsrahmen und Einordnung empirischer Studien. *Zeitschrift für betriebswirtschaftliche Forschung*, 55, 250-280.
- Ruhnke, K., & Lubitzsch, K. (2010). Determinants of the Maximum Level of Assurance for Various Assurance Services. *International Journal of Auditing*, 14, 233–255.

- Šimic, M. (2010). Finanzberichterstattung und Management finanzieller Risiken in Zeiten sich ändernder Rechnungslegung und der Wirtschaftskrise (– eine empirische Studie des Center for Accounting Research der Universität Graz in Kooperation mit der KPMG Linz. Accessed on <http://www.uni-graz.at/acce1www-finanzberichterstattung.pdf>, 2011-07-08.
- Skinner, D. J. (1994). Why Firms Voluntarily Disclose Bad News. *Journal of Accounting Research*, 32, 38–60.
- Solomon, J. F., Solomon, A., & Norton, S. D. & Joseph, N. L. (2000). A Conceptual Framework for Corporate Risk Disclosure Emerging from the Agenda for Corporate Governance Reform. *British Accounting Review*, 32, 447–478.
- Taylor, G., Tower, G., & Neilson, J. (2010). Corporate communication of financial risk. *Accounting & Finance*, 50, 417–446.
- Verrecchia, R. E. (1983). Discretionary Disclosure. *Journal of Accounting and Economics*, 5, 179–194.
- Verrecchia, R. E. (1999). Disclosure and the cost of capital: a discussion. *Journal of Accounting and Economics*, 26, 447–478.
- Verrecchia, R. E. (2001). Essays on disclosure. *Journal of Accounting and Economics*, 32, 97–180.
- Wagenhofer, A. (1990a). Informationspolitik im Jahresabschluss. Heidelberg: Physica.
- Wagenhofer, A. (1990b). Voluntary disclosure with a strategic opponent. *Journal of Accounting and Economics*, 12, 341–364.
- Wagenhofer, A. (2004). Accounting and Economics: What We Learn from Analytic Models in Financial Accounting and Reporting. In C. Leuz, D. Pfaff, & A. Hopwood (Eds.), *The Economics and Politics of Accounting* (pp. 5–31). Oxford: Oxford University Press.
- Woods, M., & Humphrey, C. (2008). Monitoring of the Risk Management System and the Role of Internal and External Audit. In M. Woods, P. Linsley, & P. Kajüter (Eds.), *International Risk Management* (pp. 123–141). Oxford; Burlington, MA: Cima Pub.
- Woods, M., Dowd, K., & Humphrey, C. (2004). Credibility at Risk? The Accounting Profession, Risk Reporting and The Rise of VaR (CRIS Discussion Paper Series – 2004.III. Accessed on <http://www.nottingham.ac.uk/business/cris/papers/2004-3.pdf>, 2011-10-08.

## FINANCIAL INCLUSION IN INDIA: DO MICROFINANCE INSTITUTIONS ADDRESS ACCESS BARRIERS?

Savita Shankar<sup>1</sup>

<sup>1</sup> Asian Institute of Management, Manila, Philippines.

**Abstract.** *Financial inclusion, implying expanding access to financial services to those currently not accessing them, is an important objective in many developing countries. This article analyses if microfinance institutions (MFIs) adequately break down barriers to financial service access in India. Two lines of enquiry were followed: the spread of microfinance penetration in the country was analyzed and field interviews of 103 MFI field officers were conducted. It is found that while MFIs do break down many barriers to financial inclusion, there are limitations in the extent of their outreach to those excluded. First, MFI penetration in the country is skewed and excludes some areas neglected by the banking sector, suggesting a need for policy incentives to encourage expansion to those areas. Second, even in areas in which MFIs operate they are unable to provide services to some financially excluded individuals on account of their methods of operation. To provide greater and more long lasting access to more individuals there is a need for MFIs to consider adopting more flexible operating models and offer portability of accounts. There is also a case for skill based training to enable greater access to MFI membership.*

**Key word List:** *Micro finance, Financial inclusion, India, Micro credit, Banking, Financial Access, Micro finance institution.*

### 1. Introduction

There is recognition that in countries at all income levels, there are population groups that are not adequately serviced by the formal financial system. Financial inclusion involves expanding their access to the financial system at an affordable cost.

Early definitions of financial exclusion viewed it in the larger context of social exclusion. Leyshon and Thrift (1995) defined financial exclusion processes as those which serve to prevent certain social groups and individuals from gaining access to the formal financial system. A 2006 UN report on building inclusive financial sectors for development defined an inclusive financial system as one which provides credit to all

“bankable” individuals and firms; insurance to all insurable individuals and firms; and savings and payment services for everyone. Financial inclusion does not imply that everyone will use all available financial services rather everyone has the option to use them. A continuum of financial services needs to be made accessible to individuals as they improve their standard of living. More recently, financial inclusion has been defined by the World Bank (2008), as the absence of price and non-price barriers in the use of financial services.

Low and irregular income is often the primary reason that contributes to financial exclusion on both supply and demand sides. The reasoning is that it leads to lack of availability of suitable financial products, as well as lack of motivation to open accounts due to inability of the individuals to save. Studies in the UK context have also found that the lowest income group is twice as likely to not be accessing financial services (Kempson, 2006).

In developing countries, the growth of microfinance institutions (MFIs) which specifically target low income individuals are viewed as potentially useful for promotion of financial inclusion. Even though MFIs at present, mainly offer only credit products; as they grow, they are likely to expand their product range to include other financial services. By partnering with MFIs, mainstream financial service providers could expand their outreach.

This paper addresses the question of how adequately MFIs break down barriers to financial inclusion. Two lines of enquiry were followed to address this. First, secondary data on microfinance penetration in India was analyzed to examine if MFIs address geographic barriers to access by penetrating areas neglected by the banking sector. Second, interviews of 103 MFI field officers were conducted to ascertain whether in areas

of MFI operation, they address barriers to access by serving financially excluded individuals desirous of availing financial services.

The next section is about the importance of financial inclusion and the common barriers in this regard. This will be followed by a section on the lending models adopted by MFIs in India. The fourth section analyses MFI penetration and the spread of banking services. The fifth section presents the findings of field interviews with MFI field officers. The final section draws conclusions.

## **2. Financial Inclusion: Importance and Common Barriers**

The importance of financial inclusion stems from various factors. First, an inability to access financial services could lead financially excluded entities to deal mostly in cash, with its attendant problems of safe-keeping. Second, the lack of access to safe and formal saving avenues could reduce their incentives to save. When saving occurs, safety and interest rate benefits may not be to the extent available in the formal system. Inadequate savings could lead households to depend on external sources of funds, in times of need. Often these sources are unregulated and with high interest rates. High interest rates increase the risk of default by borrowers. Third, the lack of credit products means inability to make investments and significantly improve their livelihoods. As a result, small entrepreneurs often lack an enabling financial environment to grow. Fourth, the lack of remittance products leads to money transfers being cumbersome and high risk. Fifth, the lack of insurance products means lack of opportunities for risk management and wealth smoothening<sup>i</sup>.

Access to an organized financial system implies availability of standardized financial products from regulated institutions. Savings products, small value remittances, insurance products and purchases on credit make financial planning easier. Savings products enable



consumption smoothing over time. Remittance products are safer than cash payments, not only to prevent theft, but also to document proof of payment. More importantly, credit histories are built which enable borrowing at more favorable terms in the future. With increasing automation, financial service providers rely on existing databases rather than personal interaction in order to make offers to customers. This puts financially excluded individuals at a distinct disadvantage as they are unlikely to feature in such databases. (Leysshon et.al., 1998).

It is commonly argued that the economy as a whole benefits through financial inclusion (Mohan, 2006). First, it could be an important tool to reduce income inequality in the economy. Low income individuals are often those not accessing financial services. Once access is provided, these individuals have greater potential to improve their income levels. Second, more financial resources become available for efficient intermediation and allocation. Third, greater financial stability may be expected if financial activity moves from unregulated to regulated institutions. Fourth, access to finance promotes more start-up enterprises, who often contribute to risk taking, employment and processes of creative destruction<sup>ii</sup> (Schumpeter, 1942).

As financial inclusion by definition implies increasing the coverage of the formal financial system, it may be expected to contribute to the development of a financial system. The relationship between financial development and growth has been studied by a number of economists. There is an agreement that the two are related, but there is a lack of consensus on the direction of causality (Fitzgerald, 2006). A number of empirical studies however suggest that development of the financial system spurs growth in an economy (King and Levine, 1993; Aghion, Howitt and Mayer-Foulkes, 2003 and Rajan and Zingales, 2003).

A study using data on 109 developing and developed countries by Calderon and Liu (2003) showed that the direction of causality was generally from financial development to economic growth. Moreover, economic growth is likely to be beneficial to the poorest segment of the population, as indicated by the results of a study by Beck, Demirguc-Kunt and Levine (2007). They used data from a sample of 72 developed and developing countries for the period 1960-2005 and found a positive relationship between financial depth [as measured by the ratio of private sector credit to gross domestic product (GDP)] and the change in the share of the lowest quintile in total national personal income. Similar results have been obtained by Burgess and Pande (2005) who studied the effect of the rural bank branch expansion which took place in India during the period 1977 to 1990, as a result of a specific rule. The rule was that a bank could open a branch in an area with other existing bank branches, only if it also opens branches in four other areas with no bank branches. It was found that there was a significant fall in rural poverty and increase in non-agricultural output.

Measuring financial inclusion is a challenge due to the difficulties in differentiating between voluntary and non-voluntary financial exclusion<sup>iii</sup>. The former refers to the population that has the ability to access financial services, but does not voluntarily do so. This segment of the population needs to be excluded from estimations of financial exclusion, posing measurement challenges. A census or household survey may be the only way to obtain such data but very few such surveys on use of financial services are available<sup>iv</sup>.

Researchers therefore focus on measures of use of financial services. A basic measure used is the number of credit and deposit accounts (per thousand adult persons). This measure however has limitations, as there may be individuals or firms with multiple accounts. There also may be accounts which exist on paper but are inactive for long

periods. Beck, Demirguc-Kunt and Martinez Peria (2007) compiled bank loan and deposit data for a cross section of 57 countries through surveys of bank regulators. Both loan and deposit data show wide variations among countries<sup>v</sup>. While the ratio of deposit and loan accounts relative to the population increases with increase in per capita income, the average deposit or loan account balance relative to income per capita decreases with income, indicating that poor people and small enterprises are better able to make use of these accounts in high income countries.

Another proxy measure is the number of bank branches either per million people or as a proportion to the total area. This measure provides an approximate indicator of the average distance from a household to a bank branch, representing the physical barrier to access. Each of the indicators mentioned above provides partial information on the inclusiveness of the banking system.

Honohan (2008) has developed a composite data set to measure financial services access for 160 countries, which is a “synthetic headline indicator” of access, measuring the percentage of adult population with access to an account with a financial intermediary. The data set is based on a regression model using available data from regulators and household surveys. The results show a wide variation in financial access across countries, ranging from 100 percent in Netherlands to five percent in Tanzania and Nigeria. The measure for India is 48 percent indicating the need for measures to promote financial inclusion in the country.

### **Barriers to Financial Inclusion**

Collins et al. (2009) studied more than 250 financial diaries of low income individuals in Bangladesh, India and South Africa. Their findings show that each household uses at least four types of informal financial instruments (such as interest free loans and informal

savings clubs) in a year, with the average being just under ten. The cash turnover through these instruments (i.e. the gross amounts routed through them) was large (77 percent to 300 percent), relative to the net income of the households. This suggests that low income individuals do need access to financial services, and the existence of barriers that prevent their use of formal sector services.

There are many complex factors that prevent rapid progress towards the goal of financial inclusion. In the UK, the Financial Inclusion task force (which monitors access to basic banking services) has differentiated between supply and demand side factors of financial exclusion, in its action plan for 2008-2011. The supply side factors include non-availability of suitable products, physical barriers and non-eligibility on account of documentation issues. On the demand side, financial literacy and financial capability are regarded as important factors by the task force. While financial literacy refers to the basic understanding of financial concepts, financial capability refers to the ability and motivation to plan financials, seek out information and advice and apply these to personal circumstances.

### **Supply Side Factors**

On the supply side, lack of appropriate financial products is an important barrier. Often, the terms and conditions of banks are not suitable to low income groups. Minimum balances required to open accounts are at times found to be too high, and accounts are closed by some banks due to infrequent use. In the UK context, where substantial research on financial inclusion has been carried out, the fact that overdrawing on conventional current accounts, resulting in account closure, has been identified as a reason for persisting financial exclusion (Kempson, 2006). Safeguards to prevent cases of

over-drawing can be useful in ensuring that financial inclusion, when it is achieved, is not temporary.

Another common supply side barrier to financial inclusion is the physical barrier stemming from distance to bank branch or automated teller machine (ATM). Inability to provide documentation such as identity proof required by formal financial institutions is another frequently faced barrier. Banks are required by regulators to conduct sufficient identity checks before opening accounts. These regulations sometimes result in lack of access to genuine customers.

### **Demand Side Factors**

One of the demand side factors is financial literacy, which is a prerequisite for first time users of financial services. Another demand side factor is financial capability which is important in view of increasing complexity of financial products. The need for financial capability development is important throughout people's lives, as financial markets and personal circumstances change (Mitton, 2008). Finally, there are the demand side factors of psychological and cultural barriers which stem from mistrust of banks, either due to negative experiences or negative perceptions. These factors lead to self exclusion from formal financial services.

### **Indicators of Access Barriers**

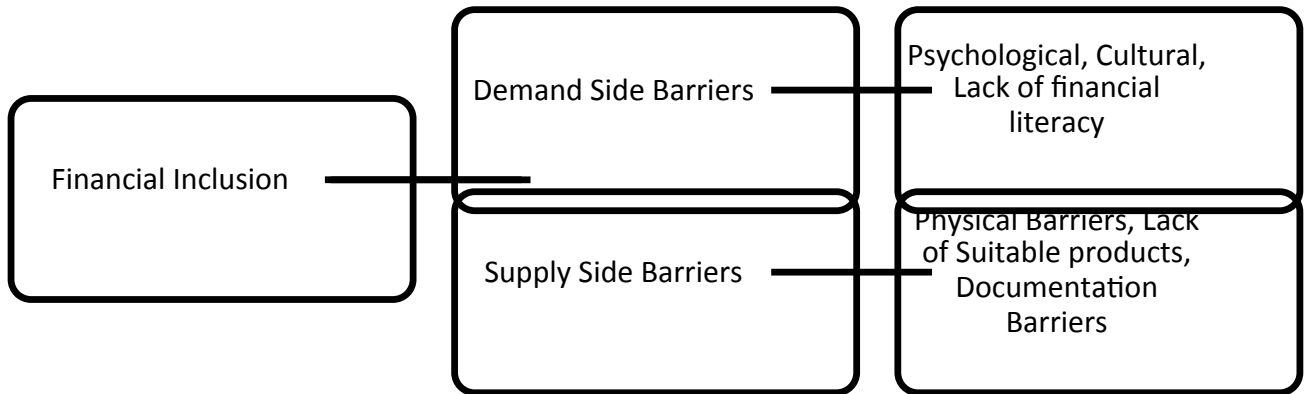
Based on a survey of up to five large banks in 99 countries, Beck, Demirguc-Kunt and Martinez Peria (2007a) developed indicators of access barriers to loans, savings, and payments services of banks. It includes indicators of physical barriers such as geographic branch penetration and ATM penetration per population<sup>vi</sup>. In addition, documents required for account opening, minimum account balances required to be maintained on

accounts and annual fees charged are also included. Beck et al. present the last two indicators relative to the respective country's per capita GDP in order to provide a sense of the affordability of the products.

As may be expected, the results relating to geographic and demographic penetration show wide variations in access barriers across countries<sup>vii</sup>. The number of documents required to open a savings account varied from one in the case of 13 countries, to more than four in the case of Bangladesh and Zimbabwe. In India, it was more than two but less than four. However an important point to be noted is that the survey by Beck et al. was conducted during the period 2004-2005. In November 2005, RBI introduced the concept of no-frills accounts in India. Hence subsequent to the survey, the number of documents required may be expected to have reduced in India<sup>viii</sup>. Minimum account balances in the case of savings account was zero in 18 countries, though it was as high as 74 percent of per capita GDP in the case of Nepal. In India, it was five percent of per capita GDP. This too is expected to have become close to zero subsequent to the survey, as a result of introduction of no-frills accounts.

Indicators of access barriers show a negative correlation with actual use of financial services confirming that they can exclude individuals from using bank services (Beck et al., 2007a). **Figure 1** below summarizes the barriers to financial inclusion.

**Figure 1: Barriers to Financial Inclusion (Source: Author)**



### 3. MFIs in India and Access Barriers addressed by them

A majority of MFIs in India use group based models of lending. While there are variations in methodology, the most common model among large, rapidly growing MFIs in India is the joint liability group model, based on the model originally used by Grameen Bank<sup>ix</sup>.

In this model, the MFI raises funds from various sources (donors, equity investors and lenders) and then on-lends them directly to low income women who form themselves into groups usually with those in the same neighborhood. While loans are given to individuals, the group as a whole is jointly responsible for repayment of the members' loans. A group usually has five members, with six to eight groups forming a centre.

The MFI has a team of field officers who help in the formation of groups and later provide them training. Each group has a leader who helps in coordination among group members. After training of groups, there is an assessment of the group by the MFI branch manager which involves visits to the residences of members. This process is called as “group

recognition test (GRT)". Thereafter, the groups meet regularly on a weekly basis in the neighborhood where the members reside. Loans are disbursed soon after the GRT. Most MFIs (other than those registered as banks or cooperatives) in India are not permitted to collect savings of members so the primary financial service offered is credit. Often credit life insurance is provided which means that in case of death of the member, the loan is written off. This usually requires payment of a small premium at the time of loan disbursement.

All members in a group usually get the same amount of loan, the tenure of which is around 50 weeks. All disbursements and repayments are made in the weekly centre meetings which typically take place in the early hours of the morning. The meetings are conducted by the MFI field officers who insist on strict discipline to ensure that the meetings take place punctually and are concluded within a particular time frame. All records of transactions of the group are maintained by the field officer. Progressively higher loan amounts are considered by the MFI on successful repayment of loans. This prospect acts as a significant incentive for loan repayment.

### **Access Barriers addressed by MFIs**

MFIs have a number of features which make them in some ways appropriate channels for addressing some common barriers to financial inclusion.

### **Supply side barriers**

First, MFIs provide financial products more or less tailored to the requirements of low income groups. For instance, in the case of MFI loans, collateral is not usually insisted upon and loan repayment amounts are small and frequent. Second, they usually provide convenient forms of delivery of financial services, often by regular visits to the neighborhoods of customers, making physical access particularly easy and attractive. Third, they do not usually



have elaborate documentation requirements. Loan officers in MFIs usually rely on address checks and neighbor references rather than documents.

### **Demand Side Barriers**

Microfinance can also address demand side barriers to financial inclusion such as cultural and psychological barriers and lack of financial literacy and financial competence. MFIs motivate potential members by explaining the benefits of usage of the financial products. The loan officers of MFIs are drawn from local populations, who usually communicate effectively with potential customers and give them opportunities to obtain clarifications on any concerns they may have. They also provide basic training to first time customers on financial concepts. The group model provides companionship to first time users of financial services. The fact that all transactions are conducted in group meetings ensures a degree of transparency and sense of security to members. All these design features suggest that microfinance may be a suitable means to promote financial inclusion. The next two sections draw on empirical data to ascertain the extent to which MFIs actually break down barriers to financial inclusion.

## **4. Analysis of MFI penetration and spread of banking services in India**

India has a strong network of public sector banks but availability of banking services in different parts of the country is non-uniform. In places where there is inadequate availability of banking services, the supply side barriers to financial inclusion are particularly high, making availability of MFI services particularly useful. Even though banks often themselves do not provide service tailor made for low income groups, they often partner with Non Government organization (NGOs) through the self help group bank linkage program promoted by the National Bank for Agriculture and Rural Development (NABARD). Hence low income groups in areas with bank branches are often able to access financial services

through this route. In this section, we seek to assess if MFIs fill in spatial gaps in banking services by showing high levels of penetration in areas neglected by the banking sector.

To assess the availability of microfinance in a state, the state-wise Microfinance Penetration Indices (MPI) computed by Srinivasan (2009), which indicate a state's share in microfinance relative to its share in the country's population were used<sup>x</sup>. States with MPI greater than 0.5 have microfinance shares which are at least half their population share. Such states are classified as having "high microfinance coverage". Regions with MPI equal to or lower than 0.5 are considered as having "low microfinance coverage". As the MPI by definition should be around 1.0 for the state to be represented in the proportion of its population, a ratio of 0.5 indicates that 50 percent progress has been made.

For banking penetration, the average population served per bank branch in each state is used. This is a frequently used measure of financial inclusion with regard to banking services. The national average for the population per bank branch is 15,000 and hence regions having higher than 15,000 are considered as having "low banking coverage" while those having lower than 15,000 are considered as having "high banking coverage".

The results from the analysis of MPIs and data on bank branches are summarized and displayed in the form of a matrix (**Table 1**) which is obtained by cross-tabulating microfinance coverage with banking coverage.

**Table 1: Matrix on Availability of Microfinance and Banking Services**

	<i>Low Availability of Microfinance</i>	<i>High Availability of Microfinance</i>
<i>Low Availability of Banking Services</i>	Central Region	North Eastern Region Eastern Region
<i>High Availability of Banking Services</i>	Northern Region	Southern Region Western Region

(Source: Author)

The matrix in **Table 1** leads to the following observations:

1. In the North Eastern and Eastern regions of the country where the number of bank branches relative to the population is low, microfinance has made considerable progress in increasing access to financial services.
2. In the Northern region, where bank branches relative to the population is high, microfinance penetration is low.
3. The Southern and Western regions of the country have higher than average number of bank branches relative to their population but also have high microfinance penetration.
4. The Central region seems to have lower access to both bank branches and microfinance.

##### **5. Findings from interviews with MFI field officers**

As explained in Section 3, field officers of an MFI are the contact points between the MFI and its members. They perform the critical roles of group formation, training and monitoring,

and as such are likely to be well aware of the ground-level realities. In order to tap into this valuable resource, field officers were interviewed on the reasons why MFI membership is inaccessible or temporary in the case of some financially excluded individuals.

Interviews with field workers were conducted in the state of Tamil Nadu<sup>xi</sup> at Grama Vidiyal Microfinance Limited (GVMFL), the 9<sup>th</sup> largest MFI in India<sup>xii</sup> during the period June to August 2009. Headquartered in Tiruchirapalli district in Tamil Nadu, GVMFL has been working exclusively with women since it started operations in 1996. As on March 31, 2009<sup>xiii</sup>, GVMFL had 408,685 members and 154 branches in 27 out of the 30 districts in Tamil Nadu and in the neighboring union territory of Pondicherry. The loans outstanding stood at Rs. 2 billion. By April 2010, GVMFL had 862,482 members and loans outstanding of Rs. 5.9 billion. GVMFL had also expanded geographically and has 230 branches.

Field officers were interviewed in 12 branches of the MFI around Tiruchirapalli. These included four urban branches, four semi-urban branches and four rural branches. At each branch, all field officers attached to the branch who were available at the time of the study were interviewed resulting in 103 interviews. As the study was conducted after obtaining approval of senior MFI personnel, all field officers approached participated in the study.

The interviews for field officers followed a standardized format which as defined by Berg (2001) as a formally structured schedule of questions. A pilot of the questionnaire was administered to GVMFL field officers in December 2007. The interviews were conducted in the local language, Tamil. The interviews were conducted at the MFI branch as all field officers report at the branch after finishing their group meetings in the morning. The detailed comments of each field officer were transcribed on individual copies of the question format. As these were 103 in number, numeric codes were assigned to expected responses for each question at the time of framing the questionnaire. When new categories of responses emerged, additional numeric codes were assigned by the researcher. Each questionnaire with

the associated codes for each question, was then entered into a Microsoft excel sheet. Using the pivot table function the frequency of each code was counted for each question and the responses were organized into tables. The pivot tables were then summarized for presentation. This was the manner in which the processes of data reduction and data display were carried out in this case.

Of the 103 field officers in twelve branches of GVMFL who were interviewed, 22 were women. There was no significant difference observed in responses of male and female field officers and hence these are not separately reported. The average number of years of “microfinance” experience of the field officers was a little over 2 years. As the microfinance sector in India is relatively young, GVMFL as it expanded recruited field officers with various backgrounds. Some had been studying prior to joining the MFI while others had accounting or marketing experience in other businesses prior to doing so. The typical educational qualification of the field officers was a Bachelor’s degree or a diploma.

The questions asked of field officers with regard to access barriers were as follows:

“Q1: Have you come across a situation where a financially excluded member could not access group microcredit?

Q2: If yes, approximately how frequently do you come across such cases?

Q3: What are the main reasons? Please rank them

Q7: What are the main reasons why members drop out of groups?”

101 out of 103<sup>xiv</sup> field officers interviewed mentioned that they do regularly come across individuals who want to join the group, but are not able to for various reasons. While the second question asked the field officers also attempted to obtain a quantification of the average number of individuals excluded during each group formation exercise, it was

found that most field officers were unable to estimate these numbers. This is because during the group formation stage, the focus of field officers is solely on forming groups. The officers have not been encouraged to collect information regarding those who do not successfully join the group. This could possibly be because as the market for microfinance so far has been largely untapped, branches are able to achieve the required targets without being forced to give much thought to these aspects.

The field officers were then asked to list out the main reasons why they are usually unable to do so. The first three reasons mentioned by each field officer were tabulated and the frequency with which each reason featured in the responses was calculated. Responses obtained in urban, semi-urban and rural areas were grouped and analyzed as the location of the member may have an impact on these factors. **Table 2** summarizes the results relating to this question.

**Table 2: Field officers' Responses: Main reasons for Individuals not being able to join microfinance groups**

<b>REGION</b>	<b>Reasons for not being able to join Microfinance groups</b>	<b>Percentage of Field officer responses that referred to the reason.</b>
<b>URBAN</b>	Inability to attend weekly group meetings	35%
	Lack of address proof	28%
	No economic activity to engage in	16%
<b>SEMI-URBAN</b>	Inability to attend weekly group meetings	38%
	Lack of address proof	28%
	No economic activity to engage in	20%
<b>RURAL</b>	Lack of address proof	31%
	Inability to attend weekly group meetings	25%
	No economic activity to engage in	16%

(Source: Author)

**Table 2** indicates that the same three reasons were cited in urban, semi-urban and rural areas as the main reasons for lack of access to microfinance. These were inability to attend weekly group meetings, lack of address proof and not having an economic activity to engage in. In rural areas, “lack of address proof” ranked highest while in urban and semi-urban areas “inability to attend weekly meetings” emerged as the most important reason.

With regard to the first reason, it was mentioned by field officers that some low income women worked as day laborers at distant locations (such as factories or construction sites) and so had to leave for work early in the morning much before group meetings are usually held<sup>xv</sup>. This meant that these women had to lose their daily income if they wanted to join a group.

On the second reason regarding lack of address proof, it was mentioned that at times women did not have an address proof when they move into a village after marriage. They also hesitate to go through the processes required to obtain it, as they are often afraid to go by themselves to Government offices. This issue appears to be particularly important in rural areas.

For the third reason, on lack of economic activity, field officers gave examples of low income women who are rag-pickers who sometimes approach MFIs for loans. As they do not have a particular income generating activity into which they can invest the loan funds, MFI field officers as well as other group members are hesitant to include them in groups.

The researcher found while discussing with branch managers that there were also many instances of members dropping out of groups. Most MFIs including GVMFL do not specifically track this figure, as usually a member who drops out is replaced with a new member.

As these drop-out members are unable to access microfinance in an ongoing manner, information regarding the main reasons for members dropping out was gathered and a question on this was added to the questionnaire for field officers. **Table 3** summarizes the findings in this regard.

**TABLE 3: Field officers' Responses: Main reasons causing members to drop out.**

<b>REGION</b>	<b>REASONS FOR DROPPING OUT</b>	<b>Percentage of Field officer responses that referred to the reason.</b>
<b>URBAN</b>	Migration	38%
	Inability to attend centre meetings	23%
	Default	16%
<b>SEMI-URBAN</b>	Migration	32%
	Marriage	18%
	Inability to attend centre meetings; Default	15%;15%
<b>RURAL</b>	Default	29%
	Migration	24%
	Marriage	21%

(Source: Author)

It seems that migration, marriage, default on the loan and inability to attend centre meetings are the main reasons why members are forced to drop out. When families migrate, there is no provision for members to transfer their account to the new location, even if the MFI has a presence there. This implies that members have no choice but to drop-out. On moving to the new location, they have to once more commence the process of forming a group, providing address proof and undergoing training before they are able to access microcredit. When women get married, as they typically move to the area where their husbands reside, they have to again drop-out of their existing MFI. If they want to access microcredit in the new location, they have to again go through the membership process. "Default on the loan" refers to a situation when a member either is unable to repay a part of the loan or repays it with considerable difficulty. Such members usually drop-out before the next loan cycle. "Inability to attend centre meetings" refers to



situations when circumstances change and a member is no longer able to attend centre meetings. Usually this is due to change in job location such as, when members decide to take up jobs in nearby cities requiring them to leave house early in the morning. As they are no longer able to attend the centre meetings, they drop-out of the MFI.

These findings indicate that there are individuals who may want to access microfinance but are not able to do so due to a number of reasons. First is the requirement to regularly attend weekly group meetings in the mornings. Second, even though documentation requirements of microfinance institutions are minimal, there are some individuals who are not able to comply with them. Typically, they do not have a proof of address. While field officers state that such individuals can visit the local Government officials and obtain a letter of proof fairly easily if they are residents of the place; it appears that a number of them are hesitant or lack the resources to do the needful. Third, the lack of an economic activity is a significant barrier to accessing microcredit. There is perhaps need for such individuals to obtain some skill training prior to joining a microfinance group.

The findings also indicate that current access to microfinance services does not necessarily imply ongoing access to financial services as in a number of cases it is found that the access is purely temporary as members drop-out. There is a need for greater portability of microfinance accounts in order to address drop-outs due to migration and marriage. To address the drop-outs due to default on loans, access to savings services would be useful to enable such members to continue their use of financial services and prepare for contingencies. This is particularly important as they no longer have access to loans. Drop-outs on account of inability to attend centre meetings need to be addressed perhaps by offering these members the option to avail branch based services.

The findings of the field officer interviews were discussed with the senior management of GVMFL. It was found that the executives were aware that GVMFL did not reach all women who do not presently have access to financial services, even in the areas in which it operated. GVMFL branches, which were set up based on market studies by GVMFL managers, typically had a target to reach 4,000 families in a radius of five kilometers in rural areas and ten kilometers in urban areas. Usually only poor women who had an ability to engage in an income generating activity were selected. Data regarding the coverage of financially excluded population covered was not collected by them. But the MFI executives mentioned that almost all their customers did not have bank accounts and hence were financially excluded.

GVMFL's focus was on replicating their model in other areas and so was expanding geographically. GVMFL's growth strategy did not specifically involve trying to cover other individuals not having access to financial services in the areas they were already operating in.

The above suggests that microfinance providers tried to reach low income women in areas surrounding their branches who were able to engage in an income generating activity and comply with the requirements of the group lending model. All financially excluded individuals were not expected to be covered. The focus, rightly from their viewpoint was on quality of loan portfolio. Moreover, once branches reached the benchmark number of members, they focused on maintenance of portfolio by gradually increasing loan amounts and replacing members who dropped out. The growth strategy of the MFI was focused on expanding geographic outreach and not through continuously increasing penetration in areas already covered. This focus on increase in geographic coverage is observed in a number of MFIs. This strategy enables rapid increase in

outreach within a short span perhaps enabling the MFP to attract the attention of potential investors and lenders.

## **6. Conclusions**

While financial inclusion is an objective in many developed and developing countries, the most cost effective means for financial inclusion needs to be evolved depending on the culture as well as the institutional and legal infrastructure in the country. For instance, matched savings programs have been tried in Australia and USA. However such programs require high budgetary resources and may not be a feasible option in the case of many low income countries. MFIs represent a good vehicle for promotion of financial inclusion in developing countries such as India.

On analyzing the geographic spread of microfinance services, the study finds that microfinance penetration in the country was non-uniform, with state specific contextual factors playing a major role in driving microfinance growth. A comparison of the spread of microfinance services with that of banking services, found four distinct regional categories. While the Southern and Western regions were characterized by widespread availability of both kinds of services, the Central region had low availability of both kinds of services. The Eastern and North Eastern regions showed high availability of microfinance but not banking services, while the Northern region showed high availability of banking but not microfinance services. This suggests the need to develop the microfinance sector in inadequately served regions. Targeted incentive packages at the national level to encourage the spread of microfinance to these areas could be useful.

The interviews with field workers suggests that there are individuals who want to access microfinance, but are not able to do so due to various reasons. These include

requirements such as attendance at weekly group meetings, documentation such as address proof, and a lack of a market-oriented economic activity. The findings also indicate that microfinance does not imply ongoing access to financial services, as it is found in a number of cases that access is temporary as members drop-out. There is a need for greater portability of microfinance accounts, in order to address drop-outs due to migration and marriage. Such portability could also reduce overall resource costs of providing microfinance services.

In summary, while MFIs do break down many barriers to financial inclusion, there are limitations in that MFI penetration in the country is skewed and excludes some areas neglected by the banking sector, suggesting a need for policy incentives. Further, to provide greater access for a longer duration of time, there is a need for MFIs to consider adopting more flexible operating models, providing skills training and offering services such as portability of accounts.

---

<sup>i</sup> Assuming individuals are risk averse, insurance increases total utility by serving as a wealth smoothening mechanism. The reduction in wealth due to payment of an insurance premium in a “no-loss” scenario is more than offset by the saving due to insurance in a “loss” scenario, particularly as the marginal utility of money diminishes with increase in wealth.

<sup>ii</sup> Creative destruction refers to the process of entry by new entrepreneurs by creating value through innovations, in the process eroding the value of older firms who may lose out as a consequence.

<sup>iii</sup> While there have been a number of studies regarding financial development and growth, they usually use aggregated indicators of financial depth rather than that of access. Typical indicators used are ratio of credit availed by the private sector to GDP, the turnover of shares relative to stock market capitalisation and the spread between lending and deposit interest rates (World Bank, 2008).

<sup>iv</sup> In fact, such data are available only in the case of around 44 countries, half of which are in the European Union (Honohan, 2008).

<sup>v</sup> In Greece there are 776 loan accounts per 1000 persons while in Albania there are only 4 for every 1000 persons. In Austria, there are more than 3 deposit accounts per individual, while in Madagascar there are only 14 for every 1000 individuals. The data set does not include India.

---

<sup>vi</sup> Number of bank branches and ATMs per 1,000 kilometers; and bank branches and ATMs per 100,000 people

<sup>vii</sup> Geographic branch penetration varies from 0.11 in Namibia to 636 in Singapore (India: 22.5) while geographic ATM penetration varies from 0.07 in Nepal to 2642 in Singapore (data not available for India). Demographic branch penetration varies from 0.41 in Ethiopia to 95 in Spain (India: 6.3) while demographic ATM penetration varies from 0.06 in Bangladesh to 135 in Canada (data not available for India).

<sup>viii</sup> However even to open no-frills accounts, both identity and residence proof are required, which is a challenge for many low income individuals, particularly migrant workers. Issue of unique identification number to Indian residents which is currently being implemented is expected to help in this matter.

<sup>ix</sup> Grameen Bank in 2002 introduced changes in its lending methodology and did away with the joint liability nature of its groups.

<sup>x</sup> Another indicator reported, the Microfinance Poverty Penetration Index compares a state's microfinance share with its share in the population of individuals below the poverty line. This is not used as many MFIs do not use the "below poverty line" benchmark preferring instead to do their own poverty assessment. Moreover, as pointed out by Robinson (2001), microfinance may be more useful for the better off among the poor who may be slightly above the poverty line. As at present there is no measure available which measures the microfinance penetration as a proportion of this segment within each state, the MPI which measures microfinance penetration as a proportion of the population of the state seems to be the best available option.

<sup>xi</sup> The interviews of field officers were conducted in Tamil Nadu, which was not directly affected by the Andhra Pradesh crisis of 2010, which occurred due to instance of multiple borrowing and aggressive collection practices leading to alleged instances of suicides by microfinance borrowers and consequent restrictive legislation by the state Government. Moreover the data collection for the study took place June to August 2009 prior to the crisis.

<sup>xii</sup> CRISIL (2009), "India's top 50 MFIs".

<sup>xiii</sup> As the study was conducted in the period June-August 2009, the figures as on March 31, 2009 have been provided.

<sup>xiv</sup> It is quite likely that the 2 who said they had not come across such situations were overcautious in trying to play safe and not say anything that could possibly show their employer in negative light.

<sup>xv</sup> Group meetings typically start around 6.30 or 7.00 a.m. These workers leave their homes by 6 a.m.

## References

Aghion,P., Howitt,P. and Mayer-Foulkes,D., 2003. The effect of financial development on convergence: Theory and evidence. *The Quarterly Journal of Economics*. 120(1), pp.172-222.

Beck,T., Demirguc-Kunt,A. and Levine,R.,2007. Finance, Inequality and the Poor *Journal of Economic growth*, 12(1), pp.27-49.

Beck,T., Demirguc-Kunt,A. and Martinez Peria,M.,2007. Reaching Out: Access to and use of banking services across countries. *Journal of Financial Economics*, 85(1), pp. 234-266.

Beck,T., Demirguc-Kunt,A. and Martinez Peria,M.,2007a. *Banking Services for everyone? Barriers to bank access and use around the world* Policy Research Working Paper 4079. Washington DC: World Bank.

Berg,B.,2001. *Qualitative research methods for the social sciences*. Boston: Allyn and Bacon

Burgess,R. and Pande,R.,2005. Can rural banks reduce poverty? Evidence from the Indian social experiment. *American Economic Review*, 95(3), pp.780-95.

Calderon,C. and Liu,L.,2003. The direction of causality between financial development and growth. *Journal of Development Economics*. 72(1), pp. 321-334.

Collins, D., Morduch, J., Rutherford, S. And Ruthven,O. (2009). *Portfolios of the Poor*. New Jersey: Princeton University Press.

CRISIL. (2009). *India's top 50 MFIs*  
<[http://www.crisil.com/pdf/ratings/CRISIL-ratings\\_india-top-50-mfis.pdf](http://www.crisil.com/pdf/ratings/CRISIL-ratings_india-top-50-mfis.pdf)>  
Retrieved 30.11.2011.

Fitzgerald, V., 2006. Financial Development and Economic Growth. Background paper for *World Economic and Social Survey 2006*.

Kempson,E.,2006. *Policy level response to financial exclusion in developed economies: lessons for developing countries*. Bristol: The Personal Finance Research Centre.

King, R.G. and Levine, R.,1993. *Finance and Growth : Schumpeter might be right*. Quarterly Journal of Economics, 108, pp.717-737.

Leyshon, A. and Thrift, N.,1995. Geographies of financial exclusion – financial abandonment in Britain and the United States. *Transactions of the Institute of British Geographers*, Vol. 20 No.3, pp.312-341.

Leyshon, A., Thrift. N. and Pratt, D.,1998. Reading Financial Consumers: Texts, Consumers and Financial Literacy. *Environment and Planning D-Society and Space*, Volume 16, Issue 1, pp. 29-55.

Mitton,L.,2008. *Financial inclusion in the UK: Review of policy and practice*. Joseph Rowntree Foundation.

Mohan, R.,2006. *Economic Growth, Financial Deepening and Financial Inclusion*. Address at the Annual Bankers' Conference, 2006.

Rajan,R.G. and Zingales, L.,2003. *Saving Capitalism from Capitalists* New York: Crown Business.

Schumpeter, J.A.,1942. *Capitalism, Socialism and Democracy*. New York: Harper and Brothers.

# The Relationship between IFRS, Earnings Losses Threshold and Earnings Management

Hui-Sung Kao<sup>1</sup>

<sup>1</sup> Feng Chia University (Taiwan)

**Abstract.** *More and More countries used International Financial Reporting Standards (IFRS) to report financial statement. Taiwan also will adopt IFRS in 2013. In prior researches indicate IFRS could increase relevance of financial statement, but also increase the opportunity of earnings management. The purpose of this study use china's data and experience to explain the relationship between IFRS and earnings management. The second, if firm faced on the earnings losses, the firms of using IFRS have more discretionary accruals. Finally, this paper further demonstrates the relationship between IFRS and neutrality of financial statement, when the firm has earnings losses or not. This could provide us a reference of using IFRS. The result of this study expects to provide contribution of issue and research design in academic. It can provide some contribution on the literatures of IFRS and earnings management. In the empirical results, there are no evidence demonstrate adopt IFRS will increase the earnings management. Besides, the findings indicate used IFRS would enhance the neutrality of financial statement. But, these phenomena only happen in these firms that have positive earnings. Therefore, if firm faced on the earnings losses, the manager often has earnings management behavior after using IFRS. Thus, when the firm has earnings losses and adopts IFRS, it usually decreases the neutrality of financial statement. On management implication, this study anticipates to give some reference of judging and deciding for stakeholders using financial statement after adopting IFRS. Furthermore, this empirical result could suggest the government and regulator to practice some important and integrity method to prevent the earnings management phenomena of the manager after adopting IFRS.*

**Keywords:** *International Financial Reporting Standards (IFRS), Earnings Losses, Earnings Management, Discretionary Accruals, Neutrality*

## I. INTRODUCTION

The most important purpose of financial reports is to be useful in decision making. Therefore, it is necessary to enhance the relevance and reliability of information provided in financial reports so that users of financial reports can obtain the financial information required for decision making. International Financial Reporting Standards (IFRS) intends to enhance the relevance of financial reporting but increases the areas where subjective judgment is used. This may come at the expense of reliability. Therefore, the introduction of IFRS requires an examination of



whether it will encourage the motivations and opportunities of earnings management. It should also be accompanied with an evaluation framework and preventive measures.

Many papers examining IFRS argue that its principle-based philosophy may allow more room for earnings management (Dye and Sunder, 2001). Haller (1998) suggests that IFRS has to be flexible so that it is applicable to different countries around the world. The principle-based approach allows adjustments necessary for the nature of transactions and the environment of different countries, but this may also create leeway for earnings management. According to IAS 16 Property, Plant and Equipment, both cost model and revaluation model are allowed for the follow-up evaluations of property, plant and equipment. While the fair price orientation of IFRS helps to reflect the true value of company assets, it also leaves room to the unscrupulous to manipulate numbers.

Thomas and Hervé (2008) explored the effects of IFRS on earnings management by comparing the situations before and after the introduction of IFRS. They focus on Australia, France and the UK as the three first adopters of IFRS. The results show that earnings management has not been reduced post the introduction of IFRS. Instead, earnings management became even more pronounced in France. Huifa, Qingliang, Yihong and Zhijun (2010) find that most indicators to accounting quality show improvements post the adoption of IFRS in Europe Union. However, this comes with the expense of more frequent earnings stabilization. This finding is worthy of note when Taiwan introduces IFRS.

Earnings management is the engagement of the company's management in the change of material activities, or discretion and manipulation, seeking to change accounting earnings in financial reports. It is the discretion and manipulation by leveraging the leeway in accounting treatments in order to report the accounting results meeting with the expectations of stakeholders (Schipper, 1989; Healy and Wahlen, 1999). Past studies on the motivation of earnings management, such as Burgstahler and Dichev (1997), argue that management initiate earnings management to avoid earnings losses or earnings decreases. However, Dechow, Richardson and Tuna (2003) suggest that companies in small profits or suffering from insignificant losses exhibit similar earnings management behavior. They apply similar manipulation techniques and generate positive results by using discretionary accruals. Therefore, this paper focuses on the attempts to avoid earnings losses.

Many countries have been practicing IFRS for years, but the cultural characteristics of these countries are very different from those of Asian nations. It is,

in fact, necessary to learn from the experience in China if Asian countries are planning for the relevant corporate governance measures post the introduction of IFRS. Since the economic reforms in 1978, the economic structure in China has been gradually becoming a market mechanism. The capital market in China was created with the inception of Shanghai Stock Exchange at the end of 1990 and Shenzhen Stock Exchange in early 1991. The establishment of these two stock exchanges aims to prevent transactions in the black market. At that time, to attract foreign capital but also to regulate foreign exchange, China divided the markets into A shares (for the Chinese public) and B shares (for foreign investors). It also adopted a dual system where IFRS and Chinese Accounting Standards (CAS) co-exist. A-share listed companies produce financial reports by following CAS whereas B-share listed companies report in IFRS. The companies issuing both A shares and B shares in Shanghai Stock Exchange and Shenzhen Stock Exchange have to produce financial reports in both accounting standards (Kao and Wei, 2010). Meanwhile, the legal system of a country also affects the quality of financial reporting (Ball, Kothari and Robin, 2000). Investors' protection and legal reinforcement also have significant influence on the quality of financial reporting and the frequency of earnings management (Leuz, Nanda and Wysocki, 2003; Ball, Robin and Wu, 2003). This paper examines the unique phenomenon of the Chinese capital market and investigates the effects of country specifics and legal system differences on the research issues. First, the cultural background in China is similar to that in Taiwan. Second, it is possible to examine whether companies exhibit different earnings management behavior in the same legal system as a result of the IFRS introduction.

In sum, this paper attempts to refer to the experience of the Chinese capital market as the lesson for other Asian countries in the introduction of IFRS regarding the prevention of earnings management following IFRS adoption. This paper aims to examine the companies listing both A shares and B shares in Shanghai or Shenzhen and explore whether such companies enjoy greater leeway in earnings management due to variances of accounting standards and the adoption of IFRS. In addition to the comparison of the differences in earnings management under CAS and IFRS, this paper also takes into account whether the threshold effects of earnings losses encourage earnings management behaviour. Meanwhile, this paper verifies the neutrality of financial reporting quality under IFRS in order to provide a reference to Asian countries in IFRS adoption.

The remainder of this paper is organized as follows. Section 2 provides a review of the literature. Section 3 explains research design including the data sources, sample selection, variable definition and empirical model. The empirical results and

analysis are presented in the section 4. Finally, the conclusions, suggestions and research limitations are presented in section 5.

## **II. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT**

The concept statements of IFRS asset that the main qualities required for financial reporting include relevance and faithful presentations. The concept of neutrality, emphasized by the US GAAP, is no longer mentioned. This raises the question whether IFRS may not be able to avoid earnings management given its focus on the enhancement of relevance in financial reporting. Although IFRS imposes greater responsibilities on the management, it still leaves room for earnings management. Will this create more room for earnings management if the threshold factors and incentives for earnings management are taken into consideration? This section reviews IFRS, summarizes literature addressing earnings management and illustrates the relationship between IFRS and earnings management. Meanwhile, it discusses whether the threshold effects in the avoidance of earnings decreases enhance the possibility of earnings management. Finally, it explores whether the IFRS adoption leads to the loss of financial reporting neutrality. Below is an explanation of the effects of IFRS on earnings management.

### **2.1. International Financial Reporting Standards (IFRS)**

IFRS was originated from International Accounting Standards Committee (IASC) in 1972. The purpose was to promote international accounting standards to facilitate capital market globalization and international transactions. The development in China has been rapid and dramatic over recent years, since its conversion of a planned economy to a market economy. Shanghai Stock Exchange and Shenzhen Stock Exchange were established in late 1990 and early 1991, respectively. However, government control is still prevalent. Meanwhile, most of the listed companies are transformed from state-owned enterprises and the Chinese government remains the single largest shareholder of most listed companies (Kao and Wei, 2010). On Shanghai Stock Exchange and Shenzhen Stock Exchange, A shares are exclusively for the Chinese public and B shares are exclusively for foreign investors. A-share listed companies produce financial reports under CAS whereas B-share listed companies produce financial reports under IFRS. In 2007, China adopted Chinese New Accounting Standards, a step closer to IFRS. Also, China opened the B-share market to domestic residents in 2001 and allowed qualified foreign institutional investors (QFII) to invest in A shares in 2003 (Kao and Wei, 2010). Recently, Asian countries have been adopting IFRS in order to pursue globalization

and synchronize with international capital markets. Currently, more than 115 countries around the world have stipulated that companies should produce financial reports under IFRS. This means IFRS as the standards regulating the global capital market has made it easier to compare financial reports of companies from different countries. The principle-based philosophy of IFRS emphasizes the importance of accounting judgment and management responsibility (Taiwan Stock Exchange Corporation).

## 2.2. IFRS and Earnings Management

The principle-based approach of IFRS may allow leeway and opportunities for earnings management (Dye and Sunder, 2001). However, there are not very relevant studies. Few papers explore the relationship between IFRS and accounting information quality. The results suggest that IFRS enhances relevance but does not have significant influence on reliability (Kao and Wei, 2010). In fact, IFRS enhances the discretion of company management and adopts a relatively relaxed benchmark for profits & losses. This creates opportunities for earnings management. Haller (1998) argues that the global applicability of IFRS means flexibility in standards. The principle-based approach encourages adjustments, without violating principles, to reflect transactional nature and country environments. However, this may increase the opportunities of earnings management. Thomas and Hervé (2008) explore the effects of IFRS on earnings management by comparing the situations before and after the introduction of IFRS. They focus on Australia, France and the UK as the three first adopters of IFRS. The results show that earnings management has not been reduced post the introduction of IFRS. Instead, earnings management became even more pronounced in France.

In addition, Atwood, Michael, James and Linda (2011) compare IFRS and US GAAP. The results show that the continued losses are lower but continued earnings are not any much higher under IFRS. Sofie, Ann, and Marleen (2007) suggest that the US GAAP and IFRS have different predictive power over earnings. George and

Sotiris (2010) examine the financial reports of listed companies in Greece and delve into the effects of the transition from Greek GAAP to IFRS. The results indicate that the costs associated with the transition to IFRS include earnings management. In fact, the effects seem to be adverse during the first year of IFRS adoption. However, the financial policies show significant improvements in later days. Niclas (2011) examines the situation in Sweden by investigating the voluntary adoption of IFRS and reporting incentives. The results suggest that the voluntary adoption of IFRS before 2005 provides companies the flexibility in discretion and earnings management. This causes an increase in shareholders' equity.

On the other hand, IFRS has its advantages. Chua and Taylor (2008) find that

IFRS increases transparency, quality and comparability. Susana, José I and José A (2007) indicate that listed companies in Spain have to produce consolidated financial reports under IFRS as required by European Union. A comparison of Spanish GAAP and IFRS shows that there are significant variances in accounting numbers and financial ratios under the two accounting standards. They point out that IFRS provides better comparability so they support IFRS adoption. Brenda and Ann (2005) doubts whether the voluntary adoption of IFRS is relevant to the reduction of earnings management. They examine listed companies in Germany and notice no different earnings management behavior under German GAAP and IFRS. They argue that the adoption of high-quality standards is necessary and essential to the minimum protection of investors. Chen, Tang, Jiang and Lin (2010) examine the situation of 15 member states of European Union and find that most indicators to accounting quality can be improved post the IFRS adoption. It can also reduce earnings management behavior, lower the absolute value of discretionary accruals and yields better accrual quality.

In sum, there are no consistent conclusions in literature. The Chinese capital market adopts two different accounting standards for the same companies. Also, the cultural background is similar with Taiwan. Therefore, this paper examines A-share and B-share listed companies in China in the investigation on whether the IFRS adoption allows more room for earnings management. It is hoped that the research findings can serve as a reference to the adoption of IFRS in Asian countries. Therefore, this paper establishes H1:

**H1 : There are positive relationship between IFRS adoption and earnings management.**

### **2.3. IFRS, Earnings Losses and Earnings Management**

Reaching the earnings threshold often enhances the motivation and incentive for earnings management. Burgstahler and Dichev (1997) indicate that to avoid earnings losses, management is engaged in earnings management. Under such circumstances, the IFRS adoption often presents extra opportunities for earnings manipulation because the standards allows more room for management judgment (Haller, 1998; Dye and Sunder, 2001; Thomas and Hervé, 2008; George and Sotiris, 2010; Niclas, 2011).

In Taiwan, Lin, Chiu and He (2009) analyze whether the management will be engaged in earnings management in the event of three earnings thresholds, i.e. prior earnings, positive earnings and consensus earnings, as three earnings threshold incentives. The results find that prior earnings and consensus earnings act as

incentives for earnings management. These two types of thresholds are significantly and positively correlated with earnings management. However, the correlation between positive earnings threshold and earnings management is not significant. Tsai and Yang (2006) explore the effects of corporate governance mechanism on the management in meeting with earnings thresholds and earnings management. The study indicates that in the event of negative earnings or low earnings in the previous year, the companies are engaged in earnings management. Also, a better corporate governance mechanism can mitigate the earnings management meant to reach earnings threshold. Chen, Tang, Jiang and Lin (2010) suggest that post the IFRS adoption, earnings are smoother and companies recognize greater losses. Atwood, Michael, James, and Linda (2011) compare IFRS and US GAAP and find that continued losses are lower but continued earnings are not significantly higher under IFRS.

Some literature argues that IFRS increases the likelihood of earnings management (Haller, 1998; Dye and Sunder, 2001; Thomas and Hervé, 2008; George and Sotiris, 2010; Niclas, 2011). It raises the question whether companies facing earnings threshold incentives, e.g. the avoidance of earnings losses, will be incentivized to be engaged in earnings management (Burgstahler and Dichev, 1997; Lin, Chiu and He, 2009; Tsai and Yang, 2006). In other words, earnings management may be even more pronounced under IFRS for companies seeking to avoid earnings losses. Therefore, this paper examines A-share and B-share listed companies in China and investigate whether earnings management is more evident under IFRS when companies attempting to avoid earnings losses. The results can serve as a reference to regulators in Asia in the implementation of measures to prevent earnings management under IFRS. Therefore, this paper establishes H2 is as follows:

**H2 : In order to avoid earnings losses, there are positive relationship between IFRS adoption and earnings management.**

#### **2.4. IFRS, Earnings Losses and Neutrality**

On the other hand, some literature argues that IFRS does not affect earnings management behaviour (Brenda and Ann, 2005; Chen, Tang, Jiang and Lin, 2010). This highlights the importance of financial reporting neutrality under IFRS. Neutrality of financial reporting refers to the freedom from bias in the information provided in financial reports. This means accountants do not seek to affect the judgment or decision-making of users to achieve certain purposes, with the selection or expression of information (Cheng, 2009). Brenda and Ann (2005) suggest that there are no differences in earnings management under IFRS or under German GAAP. This paper, however, attempts to explore whether IFRS affects financial

reporting even if it does not affect earnings management or allow more room for earnings management. Management creates certain outcomes via accounting decisions. Usually, companies do not seek to present specific earnings results if earnings are positive. However, in the event of negative earnings, companies are more likely to utilize accounting discretion and make accounting decisions to present specific earnings results. Therefore, companies are likely to leverage the subjective judgment allowed in IFRS if they are faced with negative earnings. The generation of biased accounting information via the selection of accounting methods or recognition will weaken the neutrality of financial reporting information.

This paper infers that financial reporting neutrality is maintained under IFRS if companies report positive earnings. However, the principle-based approach of IFRS allows more room to the management may undermine financial reporting neutrality in the event of earnings losses. Therefore, this paper examine A-share and B-share listed companies in China and explore any effects on financial reporting neutrality in the event of positive and negative earnings under IFRS. The results can serve as a reference to the regulators in Taiwan in the implementation of accompanying measures for IFRS adoption. Therefore, this paper establishes H3 and H4 is as follows:

**H3 : When firm be in the positive earnings, there are positive relationship between IFRS adoption and neutrality of financial statement.**

**H4 : In order to avoid earnings losses, there are negative relationship between IFRS adoption and neutrality of financial statement.**

In sum, this paper delves into the effects of IFRS on earnings management. It also explores whether the magnitude of earnings management is more pronounced under IFRS when companies seek to avoid earnings losses. Finally, it examines whether financial reporting neutrality is maintained in the event of positive and negative earnings. This paper does not only investigate the relationship between IFRS and earnings management, but also analyses whether financial reporting neutrality, an important quality of financial information, is maintained. It also explores whether financial reporting neutrality is any different in the event of positive and negative earnings. This paper suggests the domestic regulators take necessary preventative measures post IFRS introduction. These are the purposes and contributions of this study.

### III. RESEARCH DESIGN

This paper performs a multiple regression model and analyses the correlation between IFRS, earnings management and financial reporting neutrality in the event of positive and negative earnings. The results can serve as a reference to the domestic regulators in Taiwan in the formation of accompanying measures post IFRS adoption.

Below is an explanation of the research methods.

#### 3.1. Data Sources and Sample Selection

This paper uses the unique phenomena of stock market in China. Due to A shares adopt China GAAP to compile financial statement and B shares use IFRS to compile that. This study examine the 42 companies issuing both A shares and B shares on Shenzhen Stock Exchange and 44 companies issuing both shares on Shanghai Stock Exchange. As each of these company provides observations of A shares and B shares, this paper samples a total of 172 company data per year in 2002~2009. This sample companies issue the both financial statement of China GAAP and IFRS. The purpose is to examine the relationship between financial reporting standard and earnings management (neutrality) under different accounting systems, China GAAP and IFRS. Furthermore to discuss the situation of positive earnings and negative earnings for operating result of firm. A total of 1,268 observations are in this research sample. The empirical data is sourced from China Finance and economic database of TEJ, a database offered by Taiwan Economic Journal.

#### 3.2. Empirical Model—Multiple Regression Model

This paper assesses the effects of IFRS on earnings management when companies report positive earnings and when companies seek to avoid earnings losses. It explores whether financial reporting neutrality remains intact. Also, this paper incorporates the list of variables that influence earnings management and financial reporting neutrality found in literature into the model as control variables. The analysis is performed with a multiple regression model. The illustration of empirical model is as follows:

##### 3.2.1. *IFRS, Earnings Losses and Earnings Management*

Hypothesis 1 investigates whether IFRS allows more room for earnings management. This serves as a lesson for IFRS adopters. Hypothesis 2 verifies



whether companies have more incentives for earnings management when they are faced with earnings losses. The empirical model (1) to demonstrate the hypothesis 1 and hypothesis 2 are as follows:

$$EM_{i,t} = \beta_0 + \beta_1 IFRS_{i,t} + \beta_2 ELOSS_{i,t} + \beta_3 IFRS * ELOSS_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 LEV_{i,t} + \beta_6 BM_{i,t} + \beta_7 ROE_{i,t} + \beta_8 DIVP_{i,t} + \beta_9 BIG10_{i,t} \quad (1)$$

### 3.2.2. IFRS, Earnings Losses and Neutrality

Hypothesis 3 examines whether IFRS undermines financial reporting neutrality. This serves as a warning sign for IFRS. Hypothesis 4 validates whether financial reporting neutrality is further damaged when companies are faced with earnings losses. The empirical model (2) to demonstrate the hypothesis 3 and hypothesis 4 are as follows:

$$NEU_{i,t} = \beta_0 + \beta_1 IFRS_{i,t} + \beta_2 ELOSS_{i,t} + \beta_3 IFRS * ELOSS_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 LEV_{i,t} + \beta_6 BM_{i,t} + \beta_7 ROE_{i,t} + \beta_8 DIVP_{i,t} + \beta_9 BIG10_{i,t} \quad (2)$$

### 3.3. Variable Measurements

The variable measurement of this empirical model illustrate as follows:

#### 3.3.1. Dependent variables: Earnings management (EM) and Neutrality (NEU)

##### A. Earnings management (EM)

The first dependent variable of this study is earnings management (EM). This paper uses the Modified Jones model of Dechow, Sloan and Sweeney (1995) to measure it. Capture the error term, discretionary accruals, of Modified Jones model as a proxy variable of earnings management. Existing accounting literature suggests that the cross-section and modified Jones model is superior to time series models (Defond and Jiambalvo, 1994; Bartov, Gul and Judy, 2001). Therefore, this paper refers to Dechow, Sloan and Sweeney (1995) by applying the modified Jones model with cross-section industry data for regression analysis. The error term is the discretionary accruals. The Modified Jones model is as follows:

$$TA_{i,t} = \alpha_0 + \alpha_1 \frac{1}{ASSETS_{i,t-1}} + \alpha_2 \frac{(\Delta REV_{i,t} - \Delta REC_{i,t})}{ASSETS_{i,t-1}} + \alpha_3 \frac{PPE_{i,t}}{ASSETS_{i,t-1}} + \varepsilon_{i,t} \quad (3)$$

The definition is as follows:

$TA_{i,t}$  : j industry, i firm, t period the total accruals. It measures by net

income from continuing operations minus the cash flows from operating activities.

$\Delta REV_{i,t}$  : j industry, i firm, t period the variation of operating revenue.

$\Delta REC_{i,t}$  : j industry, i firm, t period the variation of the net account receivable.

$PPE_{i,t}$  : j industry, i firm, t period the gross numbers of property , plant and equipment (PPE).  $ASSETS_{i,t}$  : j industry, i firm, t period the total assets in the end of period.

$\varepsilon_{i,t}$  : j industry, i firm, t period the error term.

t : Estimate period.

### ***B. The Neutrality of financial statement (NEU)***

This paper measures financial reporting neutrality (NEU) with discretionary accruals and non-operating incomes. The percentage of discretionary accruals ( $DA_{it}$ ) and the percentage of non-operating incomes ( $NOI_{it}$ ) are added. Discretionary accruals (DA) are estimated with the modified Jones model and cross-section industry data. Non-operating incomes (NOI) are the net non-operating incomes (non-operating incomes minus non-operating expenses) of the current period, deflated with the total assets of the previous period. The second dependent variable of this study is neutrality. The measurement of the Neutrality is as follows:

$$\text{Neutrality } (NEU_{i,t}) = DA_{i,t} + NOI_{i,t}$$

### **3.3.2. *The independent variable***

The independent variables of this paper are including IFRS and earnings losses (ELOSS). The measurement of independent variables is as follows:

#### **A. *International Financial Reporting Standards (IFRS)***

Use dummy variable to measure IFRS. When firm adopt IFRS is defined as 1; the non-adoption of IFRS is defined as 0.

#### **B. *Earnings Losses (ELOSS)***

This paper evaluates earnings with net incomes during the current period. If companies incur losses due to poor management or operations, the management teams tend to manipulate earnings to reduce reported losses and minimize factors detrimental to the management (Palmrose 1986). The reported losses may already be the results of loss control with accounting choices. Hence, this paper infers that the likelihood of earnings management or the compromise of financial reporting neutrality is high in the event of losses. Establish dummy variable to measure ELOSS. If the net income during the period is smaller than 0, the dummy variable for company ELOSS is defined as 1; otherwise, it is defined as 0.

### **3.3.3. *Control variables:***

Earnings management and financial reporting neutrality may also be subject to the effects of other factors. Therefore, this paper summarizes the list of factors that affect earnings management and financial reporting neutrality found in literature and incorporates them into the model as control variables. Control variables include Company size (SIZE), Debt ratio (LEV), Book value /market value ratio (BM), Return on equity (ROE), Payout ratio (DIVP) and Top ten CPA firm (BIG10). Their measurement illustrate as follows:

#### **A. *Company size (SIZE)***

Company size reflects certain company characteristics. Literature indicates a correction between company size and discretionary accruals but there is no conclusive findings regarding the direction of such a correlation. The larger the company, the lower the information quality in financial statements is (Atiase, 1985). On the other hand, some argue the larger the company size, the more comprehensive earnings information is provided (Chaney and Jeter, 1992). As literature suggests, there is a correlation between company size and earnings management, discretionary accrual. Company size (SIZE) is as the control

variable of this study. SIZE is measured with the natural logarithm of total assets at the end of the period.

***B. Debt ratio (LEV)***

Literature indicates that the higher the debt ratio, the more likely the management is engaged in earnings management by undercutting financial reporting neutrality, so as to avoid default risks (Dhaliwal, Salamon and Smith, 1982). In contrast, some scholars argue that the higher the debt ratio, the more closely creditors watch and monitor company behavior. Hence, the management becomes conservative (Jiang and Yeh, 2007). As literature suggests, there is a correlation between debt ratio and earnings management, neutrality. Thus, this paper controls debt ratio in empirical model. Debt ratio (LEV) is measured with total liabilities at the end of the period divided by total assets at the end of the period.

***C. Book value /market value ratio (BM)***

This paper refers to the balance sheet perspective of Feltham and Ohlson (1995) and indicates that book/market multiples are a measure for the conservatism of financial reporting information. The lower the book/market ratio (book value divided by market value), the higher the conservatism of financial reporting information, the less likely the management is engaged in earnings manipulation and the lower the likelihood of any bias in financial reporting information. This implies a high quality and neutrality of financial reporting information. Book value /market value ratio is as the control variable of this paper. Book/market multiple (BM) is measured with book value of shareholders' equity at the end of the period divided by the market value of one at the end of the period.

***D. Return on equity (ROE)***

According to Freeman, Ohlson and Penman (1982), there is a negative correlation between return on equity and future earnings fluctuations. In other words, return on equity is an important factor in the forecast of company earnings. This paper believes that the relevance of return on equity to earnings forecasts may be one of the targets for earnings management to the detriment of financial reporting neutrality. Thus, this paper control return on equity in empirical model. Return on equity (ROE) is measured with net income divided with shareholders' equity at the end of the period.

### ***E. Payout ratio (DIVP)***

Companies may manipulate earnings upward to meet earnings targets and dividend policies. On the other hand, companies may nudge earnings downward when earnings have reached or exceeded targets, so as to reduce tax burdens (Kasanen, Kinnunen and Niskanen, 1996). Such manipulations cause a bias in financial reporting information and undermine neutrality. As literature suggests, there is a correlation between payout ratio and earnings management, neutrality. Thus, payout ratio is as the control variable of this paper. Payout ratio (DIVP) is measured with the natural logarithm of (cash dividends + stock dividends) / EPS at the end of the period.

### ***F. Top ten CPA firms (BIG10)***

Literature suggests that large accounting firms yield better auditing quality and hold a conservative attitude due to their efforts to protect their reputation. The larger the accounting firms, the more able they are to control the magnitude of earnings management (Becker, Defond, Jiambalvo and Subramanyam, 1998; Francis, Maydew and Sparks, 1999; Francis and Krishnan 1999). The auditing market in China is different from Taiwan. The top 10 accounting firms in China are Pan-China Certified Public Accountants, Lixin Accounting Firm, Ascenda Certified Public Accountants, RSM China Certified Public Accountants,

Shinewing Certified Public Accountants, Lixin Dahua Certified Public Accountants Firm, Shenzhen Pengcheng Certified Public Accountants, Daxin Certified Public Accountants, Reanda Certified Public Accountants, Jingdu Tinwha Certified Public Accountants, HuaPu TianJian Certified Public Accountants and Zonzun Certified Public Accountants (TEJ). This paper expects the companies audited by these top ten CPA firms report lower earnings management and better financial reporting neutrality. Thus, this paper controls auditing by top ten CPA firms in empirical model. The dummy variable for auditing by top ten CPA firms (BIG10) is defined as 1; otherwise it is defined as 0.

## **IV. Empirical Result**

### **4.1. Descriptive Statistics and Analysis**

Table 1 summarizes the descriptive statistics of all variables in this study. The mean of Earnings management (EM) of sampled companies is -0.3119, and the

median is -0.2715. This indicates to adjust downward earnings is general. In terms of the Neutrality of financial statement (NEU), the mean of the NEU is 0.9969 and the median is 1.0297. That means financial statement of the majority companies have neural. The mean of International Financial Reporting Standards (IFRS) adopting by sample companies is 50.63%. In the general, a half of sample companies use IFRS. The mean and the median of Earnings Losses (ELOSS) is 18.61% and 0, that means quintile sample companies get earnings losses.

In terms of the control variables, the mean of company size (SIZE) of sampled companies is 21.6924, and the median is 21.6726. The mean of debt ratio (LEV) of sampled companies is 84.01%, and the median is 52.73%. That means debt ratio of the majority companies is high. The mean of the book value /market value ratio (BM) is 4.9060 and the median is 1.1079. That means conservatism of financial statement in the majority companies is acceptable. The mean of return on equity (ROE) is 8.18% and the median is 6.70%. That indicates stockholder can earn 7 to 8 dollars by investing per 100 dollars. But as Max and Min of return on equity (ROE), this paper discovered some companies can earn max returns but some companies have operating losses, stockholder get the negative returns. The mean of payout ratio (DIVP) is -0.3629 and the median is 0. If payout ratio doesn't take nature log, it present cash dividend and stock dividend divided with EPS at the end of the period is 69.57%. In average, when firm earn 1 dollar of EPS, it will be pay 69.57% on dividend policy. The mean of top ten CPA firm (BIG10) is 27.60% and the median is 0. That means 27.60% sample companies is auditing by top ten CPA firms. In average, the phenomena of auditing by top ten CPA firms are non-popular. There are two thirds companies is auditing by non-top ten CPA firms.

**Table 1 Descriptive Statistics (N=1,268)**

<b>Variables</b>	<b>Mean</b>	<b>Median</b>	<b>Max.</b>	<b>Min.</b>	<b>Std. Dev.</b>
<b>EM</b>	-0.3119	-0.2715	45.6824	-303.1662	8.7914
<b>NEU</b>	0.9969	1.0297	1.9621	0.0110	0.4206
<b>IFRS</b>	0.5063	1.0000	1.0000	0.0000	0.5002
<b>ELOSS</b>	0.1861	0.0000	1.0000	0.0000	0.3894
<b>SIZE</b>	21.6924	21.6726	25.6477	16.6663	1.2907
<b>LEV</b>	0.8401	0.5273	100.5961	0.0056	5.4246
<b>BM</b>	4.9060	1.1079	117.5933	-74.3674	10.5359
<b>ROE</b>	0.0818	0.0670	13.0566	-3.3899	0.7035
<b>DIVP</b>	-0.3629	0.0000	13.9099	-4.1271	0.7447
<b>BIG10</b>	0.2760	0.0000	1.0000	0.0000	0.4472

<sup>a</sup> **EM:** Earnings management. It measure by discretionary accruals of Modified Jones model. **NEU:** Financial reporting neutrality. It measure with discretionary accruals add non-operating incomes. **IFRS:** IFRS measure by when firm adopt IFRS is defined as 1; the non-adoption of IFRS is defined as 0. **ELOSS:** Earnings losses. If the net income during the period is smaller than 0, the dummy variable for company ELOSS is defined as 1; otherwise, it is defined as 0. **SIZE:** Company size. It is measured with the natural logarithm of total assets at the end of the period. **LEV:** Debt ratio. It is measured with total liabilities at the end of the period divided by total assets at the end of the period. **BM:** Book/market multiple. It is measured with book value of shareholders' equity at the end of the period divided by the market value of one at the end of the period. **ROE:** Return on equity. It is measured with net income divided with shareholders' equity at the end of the period. **DIVP:** Payout ratio. It is measured with the natural logarithm of (cash dividends + stock dividends) / EPS at the end of the period. **BIG10:** Top ten CPA firms. The dummy variable for auditing by top ten CPA firms (BIG10) is defined as 1; otherwise it is defined as 0.

## 4.2. Correlation coefficient analysis

The Pearson correlation coefficients in between variables are as shown in Table 2. As seen, most of the correlation coefficients between variables are below 30%<sup>1</sup>, suggesting a low level of correlation. The correlation coefficient between the variable of International Financial Reporting Standards (IFRS) and the book value /market value ratio (BM) at 41.05% is the maximum. There is a negative correlation between IFRS adoption and financial reporting conservatism. IFRS improves relevance but not conservatism. Hence, the positive correlation is expected. The second largest, the correlation coefficient between the variable of company size (SIZE) and payout ratio (DIVP) is follows at -37.31%. When the company size is large, the cash or stock dividends as a percentage of earnings per share declines, and the debt ratio is lower. The third largest correlation coefficient is between the variable of the company size

<sup>1</sup>  $r \leq 0.3$  : low correlation;  $|0.3| < r < |0.7|$  : medium correlation;  $r \geq |.7|$  : high correlation.

(SIZE) and debt ratio (LEV) at -31.10% of significant negative correlation. This paper infers that this is possibly a focus on equity instruments of large companies (rather than on debt instruments) in fund raising. However, most of the other correlation coefficients are below 30%, indicating that the co-linearity problem maybe not exists. Hence, there is no problem of co-linearity in between various variables of the empirical model of this study (Kutner et al., 2004).

**Table 2 Pearson Correlation Coefficients (N=1,268) <sup>b</sup>**

Variables <sup>a</sup>	EM	NEU	IFRS	SIZE	LEV	ELOSS	BM	DIVP	BIG10	
<b>EM</b>	1.0000									
<b>NEU</b>	0.0275	1.0000								
<b>IFRS</b>	0.0291	0.1386***	1.0000							
<b>SIZE</b>	0.0097	0.0869	-0.0045	1.0000						
<b>LEV</b>	0.0012	-0.0422	0.0142	-0.3110***	1.0000					
<b>ELOSS</b>	-0.0561*	-0.0988**	0.0142	-0.2815***	0.1227***	1.0000				
<b>BM</b>	0.0104	0.1541***	0.4105***	0.2649***	-0.2156***	-0.0374	1.0000			
<b>ROE</b>	0.0021	0.0465	0.0170	-0.0351	-0.0070	-0.1576***	-0.0317	1.0000		
<b>DIVP</b>	-0.0220	-0.0317	0.0044	-0.3731***	0.0489	0.2418***	-0.0372	-0.0383	1.0000	
<b>BIG10</b>	0.0161	0.0091	-0.0007	0.2859***	-0.0685	-0.1684***	0.0102	0.0282	-0.2068***	1.0000

<sup>a</sup> **EM:** Earnings management. It measure by discretionary accruals of Modified Jones model. **NEU:** Financial reporting neutrality. It measure with discretionary accruals add non-operating incomes. **IFRS:** IFRS measure by when firm adopt IFRS is defined as 1 ; the non-adoption of IFRS is defined as 0. **ELOSS:** Earnings losses. If the net income during the period d is smaller than 0, the dummy variable for company ELOSS is defined as 1; otherwise, it is defined as 0. **SIZE:** Company size. It is measured with the natural logarithm of total assets at the end of the period. **LEV:** Debt ratio. It is measured with total liabilities a t the end of the period divided by total assets at the end of the period. **BM:** Book/market multiple. It is measured with book value of shareholders' equity at the end of the period divided by the market value of one at the end of the period. **ROE:** Return on equity. It is measured with net income divided with shareholders' equity at the end of the period. **DIVP:** Payout ratio. It is measured with the natural logarithm of (cash dividends + stock dividends) / EPS at the end of the period. **BIG10:** Top ten CPA firms. The dummy variable for auditing by top ten CPA firms (BIG10) is defined as 1; otherwise it is defined as 0.

<sup>b</sup> Table 2 shows the Pearson correlation coefficients. \*\*\* (\*\*) (\*) Indicates significance at 1% (5%) (10%).



### **4.3. The results of multiple regression analysis**

#### ***4.3.1. IFRS, Earnings Losses and Earnings Management***

Table 3 lists the results of the multiple regression analysis earnings management under IFRS. It shows that the adoption of IFRS does not increase earnings management. This is consistent with Brenda and Ann (2005). While IFRS increases the autonomy of the management, the management does not step up the magnitude of earnings management if companies are in net profits. Hence, Hypothesis 1 is not supported. The findings of this paper lessen our worries about IFRS adoption. However, companies are more likely to leverage the room and accounting choices granted under IFRS for earnings management in the event of losses. At this juncture, there is a significant and positive correlation between IFRS adoption and earnings management (1% significance level). Hence, Hypothesis 2 is supported.

The next step is to measure the magnitude of earnings management, i.e. discretionary accruals, by dividing them into positive discretionary accruals (PDA) and negative discretionary accruals (NDA). The purpose is to understand whether there are differences in upward earnings manipulations and downward earnings manipulations under IFRS. When companies are in losses, they are more likely to adjust earnings upward by utilising positive discretionary accruals (PDA) with accounting decisions beneficial to earnings presentations. Hence, Hypothesis 2 is supported. When companies are in losses, they are more likely to adjust earnings downward with negative discretionary accruals (NDA). This proves the incentives for Big Bath and phenomenon of earnings management. Hence, Hypothesis 2 is again supported.

The empirical results of control variables show that most of the coefficients are in the expected directions. However, the statistical significance is relatively weak. There is a negative correlation between dividend yields (DIVP) and earnings management (EM), but a significant and negative correlation between dividend yields (DIVP) and positive discretionary accruals (PDA). This means that a high stock payout mitigates the upward adjustment of earnings. This finding is different from literature.

#### ***4.3.2. IFRS, Earnings Losses and Neutrality***

Table 4 summarizes the analysis on the correlation between IFRS and financial reporting neutrality. It shows IFRS enhances financial reporting neutrality. However,

financial reporting neutrality is compromised in the event of earnings losses. This paper also finds that IFRS enhances financial reporting neutrality (coefficient of

0.0992) when operating results and earnings are positive. Hence, Hypothesis 3 is supported. However, financial reporting neutrality will gradually wear off under IFRS when companies are faced with earnings losses (coefficient of -0.0878). Hence, Hypothesis 4 is supported. The findings can serve as a reference to IFRS-adopting countries. It is suggested that regulators should enhance the monitoring of companies in losses under IFRS by establishing relevant control measures or monitoring mechanisms. This will prevent earnings management of companies operating in the red and protect the neutrality of financial reporting information.

**Table 3 IFRS, Earnings Losses and Earnings Management: OLS Model**

Variables <sup>a</sup>	Predict Sign	Dep. Var. : EM	Dep. Var. : PDA	Dep. Var. : NDA
		H1 & H2	H1 & H2	H1 & H2
<b>Intercept</b>		1.5184	3.5453	1.0636
<b>IFRS</b>	+	0.0035	-0.1322	0.0560
<b>ELOSS</b>	?	-2.7392 ***	-0.2057	-3.9713 ***
<b>IFRS*ELOSS</b>	+	2.7727 ***	2.5077 ***	2.9854 **
<b>SIZE</b>	?	-0.0777	-0.1372	-0.0749
<b>LEV</b>	+	0.0072	-0.0190	0.0220
<b>BM</b>	?	0.0010	-0.0124	0.0046
<b>ROE</b>		-0.1251	-0.1272	-0.0793
<b>DIVP</b>	+	-0.1315	-0.3898 **	-0.0449
<b>BIG10</b>		0.1638	-0.2219	0.3347
		<b>Adjusted R<sup>2</sup></b> 0.81%	<b>Adjusted R<sup>2</sup></b> 6.13%	<b>Adjusted R<sup>2</sup></b> 1.21%
<b>Sample Period:</b>		<b>N=1,268</b>	<b>N=448</b>	<b>N=820</b>
<b>Year 2002 to Year 2009</b>	<b>F-Value (P-Value)</b>	<b>F-Value (P-Value)</b>	<b>F-Value (P-Value)</b>	<b>F-Value (P-Value)</b>
	=1.14 ( 0.1639 )	=3.18 (0.0005)	=1.1 (0.1783)	

<sup>a</sup> **Intercept:** Intercept term; **EM:** Earnings management. It measure by discretionary accruals of Modified Jones model. **PDA:** Positive discretionary accruals. **NDA:** Negative discretionary accruals. **IFRS:** IFRS measure by when firm adopt IFRS is defined as 1; the non-adoption of IFRS is defined as 0. **ELOSS:** Earnings losses. If the net income during the period is smaller than 0, the dummy variable for company ELOSS is defined as 1; otherwise, it is defined as 0. **SIZE:** Company size. It is measured with the natural logarithm of total assets at the end of the period. **LEV:** Debt ratio. It is measured with total liabilities at the end of the period divided by total assets at the end of the period. **BM:** Book/market multiple. It is measured with book value of shareholders' equity at the end of the period divided by the market value of one at the end of the period. **ROE:** Return on equity. It is measured with net income divided with shareholders' equity at the end of the period. **DIVP:** Payout ratio. It is measured with the natural logarithm of (cash dividends + stock dividends) / EPS at the end of the period. **BIG10:** Top ten CPA firms. The dummy variable for auditing by top ten CPA firms (BIG10) is defined as 1; otherwise it is defined as 0. <sup>b</sup> The P-value are reported in table 3. \*\*\* (\*\*)(\*) Indicates significance at 1% (5%) (10%).

Table 4 concerning control variables, company size (SIZE) and financial reporting neutrality (NEU) are significantly and positively correlated (10% significance level). This shows the larger the company, the more neutral financial reporting information is provided. Book/market multiples (BM) and financial reporting neutrality (NEU) are also significantly and positively correlated (10% significance level). This indicates that a financial reporting focused on conservatism does not demonstrate high neutrality. Return on equity (ROE) and financial reporting neutrality (NEU) are also significantly and positively correlated (10% significance level). This implies that with higher return on equity, the financial reporting is more neutral.

In sum, IFRS does not necessarily create more earnings management. However, management may wish to, and will be able to, manage earnings in the event of negative earnings and given the leeway allowed in IFRS. Meanwhile, although IFRS enhances financial reporting neutrality, companies may be engaged in earnings management in the event of earnings losses. This will dampen the neutrality of financial reporting. This paper suggests that the regulators should step up the monitoring and management of companies in the red and come up with appropriate measures to prevent earnings management and enhance financial reporting neutrality post IFRS adoption.

**Table 4 IFRS, Earnings Losses and Neutrality: OLS Model**

Variables <sup>a</sup>	Predict Sign	Dependent Var. : NEU H3 & H4 (Coefficient) P-Value <sup>b</sup>	
<b>Intercept</b>		0.6141	0.0050 ***
<b>IFRS</b>	+	0.0992	0.0000 ***
<b>ELOSS</b>	?	-0.0432	0.1660
<b>IFRS*ELOSS</b>		-0.0878	0.0705 *
<b>SIZE</b>	?	0.0154	0.0810 *
<b>LEV</b>		0.0002	0.4735
<b>BM</b>	?	0.0039	0.0010 ***
<b>ROE</b>	+	0.0230	0.0850 *
<b>DIVP</b>		0.0036	0.4165
<b>BIG10</b>	+	-0.0179	0.2570
		<b>Adjusted R<sup>2</sup> 4.42% N=1,268</b>	
<b>F-Value (P-Value)</b>	6.46 ( 0 )	<b>Sample Period: Year 2002 to Year 2009</b>	

<sup>a</sup> **Intercept:** Intercept term; **NEU:** Financial reporting neutrality. It measure with discretionary accruals add non-operating incomes. **IFRS:** IFRS measure by when firm adopt IFRS is defined as 1; the non-adoption of IFRS is defined as 0. **ELOSS:** Earnings losses. If the net income during the period is smaller than 0, the dummy variable for company ELOSS is defined as 1; otherwise, it is defined as 0. **SIZE:** Company size. It is measured with the natural logarithm of total assets at the end of the period. **LEV:** Debt ratio. It is measured with total liabilities at the end of the period divided by total assets at the end of the period. **BM:** Book/market multiple. It is measured with book value of shareholders' equity at the end of the period divided by the market value of one at the end of the period. **ROE:** Return on equity. It is measured with net income divided with shareholders' equity at the end of the period. **DIVP:** Payout ratio. It is measured with the natural logarithm of (cash dividends + stock dividends) / EPS at the end of the period. **BIG10:** Top ten CPA firms. The dummy variable for auditing by top ten CPA firms (BIG10) is defined as 1; otherwise it is defined as 0.

<sup>b</sup> The P-value are reported in table 4. \*\*\* (\*\*) (\*) Indicates significance at 1% (5%) (10%).

## V. CONCLUSION AND SUGGESTION

While IFRS enhances the relevance of financial reporting, many studies argue that its principle-based approach may create extra leeway for earnings management (Dye and Sunder, 2001). This paper examines the IFRS adoption in China in the investigation on the relevance between IFRS and earnings management. It also validates whether earnings management becomes even more pronounced under IFRS in the event of earnings losses. Meanwhile, this paper explores whether IFRS enhances financial reporting neutrality. It also examines whether IFRS undermines financial reporting neutrality in the event of negative earnings. The empirical results of this paper can serve as a reference for the IFRS-adopting countries in the formation of accompanying measures. The issues that may arise under IFRS

highlighted in this paper may also shed light to regulators, academics and practitioners.

This paper first explores the effects of IFRS adoption on earnings management and finds that it does not increase the magnitude of earnings management. Meanwhile, in the event of earnings losses, companies under IFRS exhibit pronounced earnings management. Therefore, this paper suggests that the regulators should step up their monitoring mechanism and preventive measures. They should pay extra attention to the management of such companies. In addition, this paper finds that the IFRS adoption enhances the neutrality of financial reporting information. However, this advantage may be challenged due to varying operating results of reporting companies. If the operational results are worse, the management may be more likely to leverage the flexibility allowed in IFRS and manipulate earnings for specific purposes. This creates a bias in financial reporting information and undermines reporting neutrality. The findings of this paper can serve as a reference for governments in promoting accompanying measures for the IFRS adoption in order to provide an increase in earnings management.

This paper explores the relationship between IFRS adoption, earnings management and financial reporting neutrality. It also explains the pronounced earnings management when companies are in face of earnings losses and the resulting undermined neutrality of financial reporting information. This paper highlights the issues governments should take heed and provides a set of recommendations for regulators and authorities in the planning of relevant measures. For financial report users and stakeholders, the findings of this paper shed light on new perspectives and serve as a reference to the decision-making and interpretation concerning financial reports. This benefits their investment decisions. In terms of contributions to management implications, the conclusions of this paper serve as a reference to company directors in the enhancement of monitoring responsibilities of CEOs and senior managers in the event of earnings losses. Finally and academically, this paper makes up the insufficiency of literature concerning earnings management and IFRS, and highlights the improvement of IFRS benefits.

## **VI. REFERENCE**

### **7.1. Chinese**

Chang, R. D. and C. J. Fang. 2006. Effects of the Information Disclosure and Evaluation System on Earnings Management. *International Journal of Accounting Studies*. 42: 1-22.

- Chang, R. D., C. J. Fang and Y. C. Tseng. 2007. Central Agency Problem and Earnings Management: An Investigation of Board Structure and External Monitoring Mechanism. *Journal of Management*. 24(1): 17-39.
- Kao, H. S. and T. H. Wei. 2010. The Effect of IFRS, Information Asymmetry and Corporate Governance on the Quality of Accounting Information: An Empirical Study of the A, B Share in Mainland China's Stock Market. *2010 NTCB Conference of Business Administration*. Taipei.
- Lin, S. P. 2006. *The Relationship between Ownership Structure, Related party Transaction, and Earnings Management - Evidence from China's Listed Firms*. Master thesis. Dep. of Accounting in National Cheng Kung University.
- Lin, Y. C., P. Y. Chiu and W. T. Ho. 2009. Earnings Thresholds Effect and Earnings Management. *Journal of Accounting and Finance Development* 2(2): 1-16.
- Taiwan Stock Exchange Corporation (TWSE)*. 2001. <http://www.twse.com.tw/ch/listed/IFRS/about.php>.
- Tsai, L. C. and Y. F. Yang. 2006. Corporate Governance and Earnings Management to Meet Performance Thresholds. *Soochow Journal of Economics and Business*. 53: 33-72.
- 7.2. English**
- Atiase, R. K.. 1985. Predisclosure information, firm capitalization and security price behavior around earnings announcements. *Journal of Accounting Research* : 21-36.
- Atwood, T. J., S. D., Michael, N. M., James, and A. M., Linda. 2011. Do earnings reported under IFRS tell us more about future earnings and cash flows? *J. Account. Public Policy* 30:103-121.
- Ball, R., S. P. Kothari, and A. Robin. 2000. The effect of international institutional factors on properties of accounting earnings. *Journal of Accounting and Economics* 29 (1):1-51.
- Ball, R., A. Robin, and J. S. Wu. 2003. Incentives versus standards: properties of accounting income in four East Asian countries, and implications for acceptance of IAS. *Journal of Accounting and Economics* 36(1-3): 235-270.

- Bartov, E., F. A. Gul, and Judy S. L. Tsui. 2001. Discretionary Accruals Models and Audit Qualifications. *Journal of Accounting and Economics* 30(3): 421-452.
- Becker, C. L., M. L. Defond, J. Jiambalvo, and K. R. Subramanyam. 1998. The effect of audit quality on earnings management. *Contemporary Accounting Research* 15 (Spring) : 1-24.
- Brenda, V. and V. Ann. 2005. Earnings management under German GAAP versus IFRS. *European Accounting Review* 14 (1): 155-180.
- Burgstahler, D., and I., Dichev. 1997. Earnings Management to Avoid Decreases and Losses. *Journal of Accounting and Economics* 24: 99–126.
- Chaney, P. K., D.C. Jeter. 1992. The effect of size on the magnitude of long-window earnings response coefficients. *Contemporary Accounting Research* 8: 540-560.
- Chen H., Q. Tang, Y. Jiang, and Z. Lin. 2010. The Role of International Financial Reporting Standards in Accounting Quality: Evidence from the European Union. *Journal of International Financial Management & Accounting* 21 (3): 220-278.
- Chua, W. and Taylor, S. 2008. The rise and rise of IFRS: An examination of IFRS diffusion. *Journal of Accounting & Public Policy* 27: 462–482.
- Daniel, Z., Sonda, C., and Yosra, M. S. 2011. An analysis of the effect of mandatory adoption of IAS/IFRS on earnings management. *Journal of International Accounting, Auditing and Taxation* 20:61-72.
- Dechow, P. M., S. A. Richardson, and I. Tuna. 2003. Why Are Earnings Kinky? An Examination of the Earnings Management Explanation. *Review of Accounting Studies* 8: 355–384.
- Dechow, P. M., R. G. Sloan and A. P. Sweeney. 1995. Detecting earnings management. *The Accounting review* 70(2): 193-225.
- DeFond, M. L., and J. Jiambalvo. 1994. Debt covenant violations and manipulation of accruals. *Journal of Accounting and Economics* 17 (1-2): 145-176.
- Dhaliwal, D., G. Salamon, and Smith. 1982. The effect of owner versus management control on the choice of accounting methods. *Journal of Accounting and Economics* 4(July): 41-53.

- Dye, R., and S. Sunder. 2001. Why Not Allow FASB and IASB Standards to Compete in the U.S.? *Accounting Horizons* 15: 257-272.
- Feltham, G. E., and J. A. Ohlson. 1995. Valuation and clean surplus accounting for operating and financial activities. *Contemporary Accounting Research* 11(Spring): 689-731.
- Fleming, P. D. 1991. The growing importance of International Accounting Standards. *Journal of Accountancy* 172:100-105.
- Francis, J., E. L. Maydew, and H. C. Sparks. 1999. The role and of Big6 auditors in the credible reporting accruals. *Auditing: A Journal of Practice & Theory* 18: 17-34.
- Francis, J., and Krishnan. 1999. Accounting accruals and auditor reporting conservatism. *Contemporary Accounting Research* 19( Spring ): 135-165.
- Freeman, R., J. Ohlson, and S. Penman. 1982. Book rate-of-return and prediction of earnings changes: an empirical investigation. *Journal of Accounting Research* 20 (Autumn): 3-42.
- George, I., and R. Sotiris. 2010. The post-adoption effects of the implementation of International Financial Reporting Standards in Greece. *Journal of International Accounting, Auditing and Taxation* 19: 55-65.
- Hakim, B. O., and Z. Daniel 2006. A study of earnings-management motives in the Anglo-American and Euro-Continental accounting models: The Canadian and French cases. *The International Journal of Accounting* 41: 406-435.
- Haller, A. 1998. The relationship of financial and tax accounting in Germany: a major reason for accounting disharmony in Europe. *The international Journal of Accounting* 27(4): 310-323.
- Healy, P. and J. Wahlen. 1999. A review of the earnings management literature and its implications for standard setting. *Accounting Horizons* 13: 365–383.
- Huifa, C., T. Qingliang, J. Yihong, and L. Zhijun. 2010. The Role of International Financial Reporting Standards in Accounting Quality: Evidence from the European Union. *Journal of International Financial Management and Accounting* 21(3):220-278.



- Jiang, J. X., and H. M. Yeh. 2007. The effects of debt monitoring, corporate governance and auditor fee dependence on earnings conservatism. *Taiwan Accounting Review* 6 (2): 173-208.
- Kasanen, E., J. Kinnunen, and J. Niskanen. 1996. Dividend-based earnings management: empirical evidence from Finland. *Journal of Accounting and Economics* 22: 283-312.
- Krishnan, G.. 2003. Does big 6 auditor industry expertise constrain earnings management? *Accounting Horizons* 17: 1-16.
- Leuz, C., D. Nanda, and P. D. Wysocki. 2003. Earnings Management and Investor Protection: an international comparison. *Journal of Financial Economics* 69(3): 505-528.
- Niclas, H. 2011. Soft Adoption and Reporting Incentives: A Study of the Impact of IFRS on Financial Statements in Sweden, *Journal of International Accounting Research* 10 (1): 61-83.
- Palmrose, Z. 1986. Audit fees and auditor size : Further evidence. *Journal of Accounting Research* 24(1): 97-110 .
- Ruder, D., C., Canfield, and H. Hollister. 2005. Creation of world wide accounting standards: Convergence and independence. *Northwestern Journal of International Law and Business* 25: 513-588.
- Schipper, K. 1989. Commentary on Earnings Management. *Accounting Horizons* 4(3): 91-102.
- Sofie, V. M., G. Ann, and W. Marleen. 2007. Attribute differences between U.S. GAAP and IFRS earnings: An exploratory study. *The International Journal of Accounting* 42 : 123-142.
- Susana, C., I. J. Jos´e and A. L. Jos´e. 2007. Adoption of IFRS in Spain: Effect on the comparability and relevance of financial reporting. *Journal of International Accounting, Auditing and Taxation* 16: 148-178.
- Thomas, J., and S. Herv´e 2008. Do accounting standards matter? An exploratory analysis of earnings management before and after IFRS adoption. *J. Account. Public Policy* 27: 480-494.



## **Mergers and Acquisitions: Revisiting the Issue of Value Creation in the New Member States of European Union**

Darius Saikevicius<sup>1</sup>

<sup>1</sup> Faculty of Economics, Vilnius University, Saul\_tekio av. 9 - III r., 10222 Vilnius, Lithuania

***Abstract.** During the last takeover wave in the period of 2001-2009 both the volume and the value of merger and acquisition transactions reached record heights. Nevertheless, the question of whether mergers and acquisitions create surplus value has never been more relevant than during the same period of 2001-2009 as well. It turned out that numerous transactions which were structured during the recent wave destroyed total combined shareholder value instead of increasing it. The general issue of value creation in merger and acquisition transactions is addressed in the study by analyzing a sample consisting of transactions that took place in the New Member States of European Union during the period of 2004-2011. Two important questions surrounding the issue are investigated: the paper examines whether value creation differs in domestic and cross-border transactions and what is the effect of timing of merger and acquisition transactions in terms of economic cycle. There is no evidence found that transactions concluded during crisis period create more value than those at the pre-crisis timeframe. The results of the paper support the conclusions of previous studies by academics that cross-border mergers and acquisitions create more value than domestic transactions.*

***Keywords:** Mergers and acquisitions, M&A, Takeovers, Cross-border mergers and acquisitions, Announcement effect.*

### **Introduction**

Although experiencing cyclical patterns and fluctuating greatly, merger and acquisition (hereinafter also referred as “M&A”) activity has shown a clear trend of high growth worldwide since 1960s (Martynova and Renneboog, 2005). Particularly high growth rates of M&A activity have been observed during the last decades when record levels have been reached in terms of both transaction volume and total M&A deal size (Mergermarket, 2011). Thus, M&A market has become an important mechanism of corporate control transfer and has earned lots of attention from many parties, including business professionals, regulators and academics.

However, there is much controversy associated with the rise of M&A market, as the increasing number of transactions is raising important questions. There are reasonings in the academic literature provided that takeovers are damaging to the morale and productivity of organizations and are therefore damaging to the economy in general (Jensen, 1986). At the same time there are significant evidences found that M&A market actions represent productive entrepreneurial activity that improves control and management of assets through allocation of assets to more productive uses (Jensen, 1986).

Addressing the issue of M&A controversy it is worthwhile mentioning that here academics make a clear distinction between local and cross-border M&As. Whereas local

M&A transactions are often analyzed in the context of synergies obtained from a merger or takeover transaction (for instance: Damodaran, 2005), possible integration gains or less often competition changes in specific industry (all rather microeconomic questions), scientific literature provides us with vast resources on cross-border M&A activity and its outcomes on both micro- and macroeconomic level.

Cross-border M&A is treated by scientists (Norman et al., 2004) as a part of foreign direct investments (FDI) and thus is usually opposed to investments into new assets - the so called „greenfield“ FDI. Conceptually, these two types of FDI are completely different as greenfield FDI create value by bringing new investment in physical assets. Contrary, M&A not necessarily increase productive capacity due to the fact that cross-border M&A transactions only involve the foreign purchase of existing assets (Norman et al., 2004). Nevertheless, cross-border M&A has been growing much faster than greenfield FDI during the last decades. This shift was partially influenced by privatizations around the globe. Thus, the processes of privatization become another factor contributing much of the controversy to the phenomenon of M&A.

Privatization can be defined as the transfer of ownership and control of State-owned enterprise (Bortolotti et al., 2000) and it has been a major trend for last two decades in transition economies in Eastern and Central Europe and contributed a lot to the surge in M&A activity in the region. However, as privatization is not only economic process but also has an important political dimension (Bortolotti et al., 2000) the countries in Eastern and Central Europe have not avoided disputes over privatization. These disputes in turn have led to increased controversy in public over M&A transactions (a usual form of privatizations in the region) in general.

M&A activities have been a usual form of transactions for almost fifty years in North American and Western European markets (Martynova and Renneboog, 2005). However, in Central and Eastern European countries these transactions have only increased to a significant number in 1990s, after the fall of regimes in the region and sudden shift to market based economies. M&A was greatly fostered in the New Member States of EU coming from the region of Central and Eastern Europe in 2004 when ten new Member States joined the club of EU and thus once again attracted attention of foreign investors.

Up to now, most of the studies examining the effects of M&A announcements have been focusing on Western European and North American markets. Meanwhile, there were scarce scientific resources on M&A and abnormal returns resulting from these types of transactions in Central and Eastern European countries. In this context author of the paper addresses the general issue of value creation in merger and acquisition transactions by analyzing a sample consisting of transactions that took place in the New Member States of European Union during the period of 2004-2011. Two important questions surrounding the issue are investigated: the paper examines whether value creation differs in domestic and cross-border transactions and what is the effect of timing of merger and acquisition transactions in terms of economic cycle.

The sample of New Member States of EU has been analyzed in the paper: Bulgaria, Czech Republic, Cyprus, Estonia, Hungary, Latvia, Lithuania, Malta, Poland Romania, Slovakia, Slovenia. The analysis covers 8 year period which starts on 2004.01.01 and ends on 2011.12.31. The start of the time frame has been chosen due to the fact that 2004 was the year marking the significant EU enlargement process when ten New Member States (EU-10) joined EU (Romania and Bulgaria, which together with EU-10 form the EU-12 block of countries which is analyzed in the paper, joined EU in 2007).

There is no evidence found in the investigation presented in the paper that transactions concluded during crisis period create more value than those at the pre-crisis time frame. However, findings of the paper support the conclusions of previous studies by academics that cross-border mergers and acquisitions create more value than domestic transactions.

The paper is organized as follows. Section 2 reviews the empirical evidence on the value creation in merger and acquisition transactions. In section 3, there is analysis' data and methodology presented. Section 4 presents findings of the analysis. Section 5 concludes.

## Literature review

The effect of M&A transaction announcement and sequent changes in the target's and bidder's stock prices have been the subject of numerous researches by academics since the end of the 1970s. Great part of these academic studies have been comprehensively summarized by Martynova and Renneboog (2005). Authors of the study investigated empirical evidence on profitability of corporate takeovers and compared it across decades.

Martynova and Renneboog (2005) presented findings that the magnitude of the post-announcement abnormal gains is similar across all takeover waves. However, the abnormal returns are significantly different across the decades. Changes in insider trading and takeover regulation introduced in the US may have contributed to these changes. Overall, Martynova and Renneboog (2005) report that post announcement variations in returns are determined by significant differences related to attitude towards the bid (hostile versus friendly), legal environment of both bidder and target, means of payment, type of bid (tender offer etc). For instance, target shareholders in successful but initially hostile M&As are offered higher premiums than those in friendly M&As. When a hostile bid is made, the target share price immediately incorporates the expectation that opposition to the bid may lead to upward revisions of the offer price.

Although majority of the studies analysing the creation of value in M&A transactions include the investigation of M&A announcement returns of both – acquirer and target, however, the clear separation is made and different patterns prevail in acquirer and target returns. For this reason, scientific literature evidence on acquirer and target returns resulting from M&A transactions will be summarized separately in further paragraphs.

As far as the acquirer's returns are concerned, the preliminary results of literature review are contradictory. Whereas Langetieg (1978), Dodd (1980), and more recently Chang (1998) as well as Mitchell and Stafford (2000) report that the acquirer's shareholders sustain losses, Asquith (1983) and Eckbö (1983) found positive abnormal returns of 0.2% and 0.1%. Analysing the studies carried out during the last three decades it can be concluded that these have failed to answer the question of acquirer returns in a unanimous way. For instance, Martynova and Renneboog (2005) summarizing the findings of 17 prior studies state the fact that these are split almost evenly between positive and negative acquirer returns. The authors add that when the value creation effects in different M&A waves and over a longer time windows of one or two months surrounding the announcement are considered, the acquirers' abnormal returns are significantly positive (3.2 to 5.0%) for the third takeover wave (which lasted from 1950s to 1973), significantly negative (-1.0% to -1.4%) for the fourth M&A wave (1981 to 1989), and close to zero in case of the fifth wave (1993 to 2001).

As conclusive argument in the literature analysis of acquirer gains can be a research performed by Andrade et al. (2001) reporting that a great portion of both positive and negative returns are statistically insignificant. However, there is one contrargument in the case of acquirer gains, namely the transactions where developed-market acquirers gain control of developed market targets: evidence presented in the paper of Chari et al. (2004) show that developed-market acquirers experience a statistically significant gain of 2.4% when they announce M&A transactions in emerging markets. This outcome is very important for the further research of this paper as it gives a clue for possible reasearch direction: the New Member States of EU are considered as transition economies with economic growth rates which are close to those observed in emerging markets.

When returns of a target in M&A transactions are analyzed, majority of empirical studies find significant returns at the event or around the event of announcement of a transaction. As Martynova and Renneboog (2005) reports after examining numerous studies in the field of M&A announcement returns, for all merger waves stock prices of target firms significantly increase at and around the announcement of a bid. Moreover, findings of the authors show that the magnitude of the post-announcement abnormal returns is similar when analyzing different takeover waves.

Different other authors in their separate studies also support the conclusion that target's returns are positive and statistically significant: Jensen and Ruback (1983) after reviewing 13 studies on the abnormal returns around M&A announcements found that the average abnormal returns to target firms' shareholders are of 30% and 20% for the successful tender offers and mergers, respectively. Eckbö (1983) also reports material positive cumulative average abnormal returns on the announcement day and the subsequent day. Dodd and Ruback (1977) examined abnormal returns around the time of a M&A transaction announcement and found that shareholders of target earned positive and significant gains. Asquith and Kim (1982) analyzed returns to stock holders of target firms around the date of the initial announcement or completion of a merger and summarized their findings stating that the shareholders of target firms increased their wealth as a result of the transaction.

Having reviewed the scientific evidences on returns incurred by both acquirers and targets a parallel question of distribution of gains can be answered. Relying on previously discussed evidences and following the more explicit observations on distribution of wealth created in M&A transactions by Jensen and Ruback (1983), Andrade et al. (2001) it can be concluded that the biggest share of the combined returns from M&A transactions is accrued by target's shareholders leaving no (in case of domestic M&A transactions) or smaller proportion (in case of cross-border M&As) of gains for the shareholders of the acquiring firms (Chari et al., 2004).

Another factor which needs to be considered when analysing abnormal returns resulting from M&A transactions is the level of control acquired during a transaction. Chari et al. (2004) examined the question of shareholder wealth creation in case of majority control acquisition. The results show that the magnitude of value creation increases when acquirer gains majority control of target in comparison to the results for the full sample of the study of the authors. The average total combined acquirer and target announcement return is 5.89% in market-adjusted terms over the three-week window and is significantly higher when compared to transactions where the acquirer does not gain majority control. An average joint value increase is even twice as high if a prior relationship between both of the parties of a transaction (the acquirer and the target) exists: the average total combined returns in case of acquisition of majority control in the context of existing prior relationship between the acquirer and the target stands at 12.8%. According to the reasoning presented in the study of Chari et al. (2004), acquisition of majority control is even more important in emerging economies with low developed capital markets and poor protection of the minority shareholder rights.

Going further into analysis of factors which have material effect on additional value creation in M&A transactions, the choice of the payment method is often highlighted by academics as crucial aspect. Antoniou and Zhao (2004) find that the bidder's returns are lower when the operation is financed with stocks. Travlos (1987) shows negative abnormal returns when the acquisition is financed with stocks and zero or positive abnormal returns when the acquisition is financed with cash.

Another important factor included in numerous studies is the strategy behind the acquisition: are the acquirers diversifying their activities and investing into new areas or the target is active in the same industry and acquisition is aimed at exploiting synergies or alternatively expanding internationally. Martynova and Renneboog (2005) find significant

positive abnormal returns for the acquirers announcing industry-related acquisitions and insignificant returns of the acquirers announcing diversifying acquisitions. Chari et al. (2004) reports that in case of diversification strategy in M&A transaction total combined returns are not significantly affected by an announcement.

Economic cycles constitute another very important factor determining M&A activity and having effect on returns generated by M&A transactions. During downturn periods, managers and stockholders turn to more risk-averse position and set higher cost of capital than it is during growth periods (Chevalier and Redor, 2005). As Lubatkin and O'Neill (1987) conclude, these changes result in decreased number of M&A transactions during the times of economic downturn. However, the decrease in number of transactions does not necessarily mean that also the decrease in quality of the transactions should take place simultaneously. Quite contrary, universal logic offers another conclusion stating that smaller number of transactions, higher risk-adversity of deal-makers as well as higher cost of capital required should result in transactions which are less opportunistic and have clear strategy of value creation. However, previous studies do not clearly answer the question whether value creation resulting from M&A transactions differs in economic growth and downturn periods.

Moeller et al. (2005) investigated impact of economic cycles on the shareholder's wealth. Findings of the authors show that one of the most significant periods of loss in M&A transactions has been recorded between 1998 and 2001.

Chari et al. (2004) tested, whether such to downturn periods specific factors as the presence of liquidity-constrained or financially distressed targets and increase in the bargaining power of acquirers in M&A transactions have an effect on cross-border M&A activity. It was initially assumed that the aforementioned factors should lead to greater gains by acquirer and target in cross-border M&A activity. However, the findings of the test were statistically insignificant.

Having reviewed the impact of economic cycles another important issue, namely, the M&A cycles and their effect on target and acquirer shareholders return has to be dealt with. Harford (2003) highlights the fact that total combined M&A transaction returns taking place in periods other than the upward moving part of a takeover wave are usually significantly lower. It is also reported that the highest combined M&A gains are realized at the beginning of a takeover wave. Moeller et al. (2005) confirms the aforementioned fact with evidence showing that the takeovers with the biggest losses occurred during the second half of the 1993 to 2001 wave.

Summarizing empirical evidences on the issue of value creation in M&A transactions should be noted that results of literature review are in many cases contradictory. However, some common patterns have been found: at the moment of the announcement stock market reaction creates additional wealth, but most of the gains fall to the shareholders of target companies. When historic data is analyzed, magnitude of the gains and their distribution between acquirer and target differ a lot across the M&A waves. Differences also occur due to certain aspects of specific transactions, e.g. payment method, the level of control acquired, strategy (diversification versus synergy) of a transaction, geographic focus (emerging versus developed market targets), economic cycle phase at the date of transaction announcement etc.

## **Data and methodology**

The analysis part of the paper is based on data retrieved from the following databases: transaction data has been obtained from Mergermarket, BVdep Amadeus, Bloomberg and Reuters databases, whereas the main sources to retrieve stock market data have been Bloomberg, Reuters and the webpages of local stock exchanges of the countries included in the sample. The data covers all public M&A transactions involving at least 4% ownership

of the target company. The sample of New Member States of EU includes twelve countries from the region of Central and Eastern Europe, namely: Bulgaria, Czech Republic, Cyprus, Estonia, Hungary, Latvia, Lithuania, Malta, Poland Romania, Slovakia, and Slovenia. The analysis covers 8 year period which starts on 2004.01.01 and ends on 2011.12.31. The start of the time frame has been chosen due to the fact that 2004 was the year marking the significant EU enlargement process when ten New Member States (EU-10) joined EU (Romania and Bulgaria which together with EU-10 form the EU-12 block of countries which is analyzed in the paper joined EU in 2007).

On each specific transaction the following data has been collected: the date on which the transaction was announced, the date on which the transaction became effective, target and acquirer name, country of domicile, industry sector. If such information has been publicly disclosed, the following information has been also collected: percentage of shares acquired, percentage of shares owned before the transaction, value of a transaction. Once the list of M&A transactions has been available, the aforementioned information has been supplemented with stock price information data extracted from Bloomberg (Reuters and the local stock exchanges have been chosen as a secondary source of information in case Bloomberg does not provide such information). Returns are denominated in the local currency. Total average combined gain resulting from M&A transaction is calculated as market capitalization weighted average.

The database compiled by the author of the paper covers 747 M&A transactions that involved a publicly traded target from the New Member States of EU. After eliminating those transactions the stock market price data of which was not available and those transactions which do not qualify for the further analysis (in most cases because of smaller transaction than 4% of shares of a company) 283 transactions were included into the final sample. The structure of the sample according to target and acquirer location is provided in Table 1.

Table 1. Breakdown of M&A transactions in EU-12 during the period of 2004-2011

<b>Target location structure</b>		
<b>Country</b>	<b>Total number of transactions registered</b>	<b>Transactions included in the sample</b>
Bulgaria	58	38
Cyprus	108	51
Czech Republic	8	6
Estonia	25	11
Hungary	81	28
Latvia	3	2
Lithuania	101	19
Malta	12	7
Poland	266	67
Romania	52	32
Slovakia	4	3
Slovenia	29	19
<b>In total</b>	<b>747</b>	<b>283</b>
<b>Acquirer location structure</b>		
<b>Region</b>	<b>Total number of transactions registered</b>	<b>Transactions included in the sample</b>
EU-15	178	96
EU-12	47	21
Non-EU acquirer	82	24
Local acquirer	440	142
<b>In total</b>	<b>747</b>	<b>283</b>



As one can see from Table 1, approximately one third of the total number of transactions in EU-12 during the period of analysis fell to Poland, which is not surprising result as Poland is the biggest economy in the EU-12 country group. However, a conclusion that the biggest economies are represented with the largest number of transactions cannot be drawn, as the number of M&A transactions in other biggest economies of EU-12 is much lower and such countries as Cyprus and Lithuania show higher volume of transactions. On acquirer side it should be noted that the vast majority of transactions were intra-EU M&As, as only 82 transactions out of 747 in total sample were transactions with a non-EU country on acquirer side. Going further a trend is observed that local M&As prevail versus cross-border M&As (440 out of 747). In terms of cross-border M&As majority of acquirers came from EU-15 which is not a surprising fact bearing in mind the economic integration inside the EU block of countries and more specifically one of the four essential freedoms of EU – free movement of capital.

The breakdown of the transactions included in the sample according to the year of M&A transaction is provided in Figure 1.

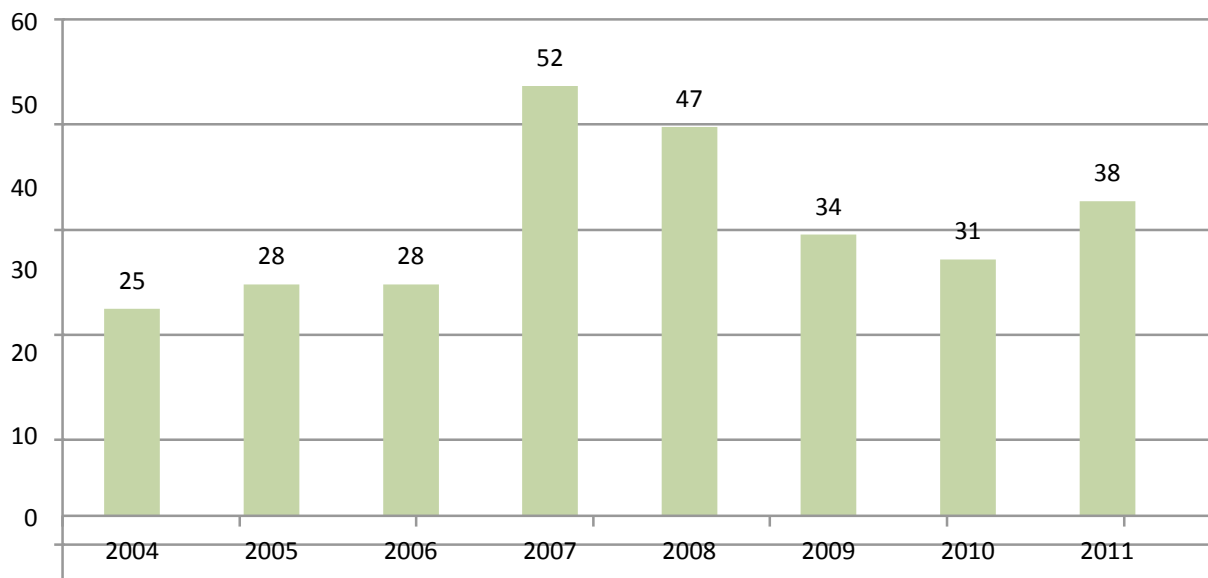


Figure 1. The breakdown of the transactions included in the sample according to the year of announcement

Information reflected in Figure 1 corresponds to the worldwide M&A cycles: the number of transactions has been constantly growing until the peak in 2007, downward trend prevailed until 2010 when the M&A activity in EU-12 reverted and already in 2010 showed clear signs of recovery.

Analysis of the sample has been based on the assumption of market efficiency. If we assume that markets are efficient, stock prices and their alterations provide us with an efficient metric to evaluate the fundamentals of a company. As a result, the fluctuations in company's stock prices after M&A transaction announcement objectively capture the effect of M&A transaction on its value. This approach comes from event studies and has been firstly introduced in by Fama et al. (1969) and since then has been widely employed by academics analyzing wealth creation process in M&A transactions. The approach has a limitation, as it only deals with stock market reaction and does not include factual realization of the value

over time, e.g. it does not answer the question of whether the value creation assumed by the stock market was in reality materialized by increased financial results of the companies involved in a specific M&A transaction. However, event studies' approach is considered to be reliable in statistical terms (Andrade et al., 2001) and offers useful insights: on the date when M&A transaction is made public, alterations in stock market prices gives us valuable information about the value creation as a result of the transaction and gains or possible losses from the transaction to the acquirer and target respectively. Additionally total combined returns can be calculated as well.

Daily stock market prices have been employed to calculate two types of returns for the acquirer and target companies (total combined returns have been also calculated in three different ways). The first parameter is the raw return over the relevant time frame of 5 trading days around (5 days before and 5 days after, 11 days in total) the transaction announcement. The second metric applied is the cumulative abnormal returns.

Following Chari et al. (2004) cumulative abnormal returns have been calculated using the following market model:

$$R_{it} = \alpha_i + \beta_i R_{mt} + \varepsilon_{it}. \quad (1)$$

The coefficients  $\alpha_i$  and  $\beta_i$  in the model are estimated for each specific company over a one-year interval starting eighteen months prior to the announced acquisition and ending six months before the announcement (as it has been offered by Chari et al. (2004)). The coefficients are then employed to calculate the estimated returns in the time frame of the M&A announcement. The abnormal return is derived calculating the difference between the actual return and the estimated return for the time frame of the announcement.

## **Findings of the study**

Based on the previous studies reviewed in the literature part of the paper it can be concluded that M&A transactions create additional value in terms of total combined value for both acquirer and target. This also holds true for the target, which according to some studies (Jensen and Ruback, 1983; Andrade et al., 2001) gains the lion's share from a transaction. However, there is a lot of controversy involved when acquirer's gains are concerned.

The summarized data of the sample presented in Table 2 verifies the findings of other studies and reports that M&A transactions create additional value in terms of total combined value for both acquirer and target. In fact, in case of EU-12 countries total average combined gain resulting from M&A transaction is equal to 3,34% (in terms of market capitalization weighted average) or 2,81% if one takes median as more accurate metric to evaluate the sample. As the findings of majority of other studies in the field show, major part of return is accrued by the target (6,63% change of stock price on average versus 2,72% in case of acquirer).

Further findings reflected in Table 2 show that cross-border M&A transactions create more value than the same transactions taking place inside the country: in all the groups of foreign acquirers (EU-15, EU-12, non-EU) average total combined return is greater compared to the same metric of local acquirer group. This is an important finding as on one hand it confirms the results of other academic authors on the other answers one of the major questions raised in this paper, namely, whether cross-domestic M&As are creating additional value as compared to domestic transactions.

Another finding noticed in the summary statistics of the sample reported in Table 2 is that all investors engaged in M&A transactions can be lined up in an order according to performance of their targets after the announcement of M&A transaction. Following conclusions can be drawn (due to high variations which result from low number of non-EU and EU-12 acquirer subsamples and few one-off transactions in these groups, averages do not show objective view and in this case median is taken as the main metric to draw conclusive statements): most welcomed investors come from EU-15 (target's share price increases on average 5,03%-6,17% after the announcement) followed by non-EU acquirers (4,79%), local acquirers (3,27%) and EU-12 acquirers (2,07%).

Table 2. Average returns in M&A transactions in EU-12 during the period of 2004-2011

	Total combined return	Acquirer return	Target return
<b>Complete sample</b>			
Average	3,34%	2,72%	6,63%
Median	2,81%	1,76%	4,49%
N	283	283	283
<b>EU-15 acquirer group</b>			
Average	2,85%	2,32%	6,17%
Median	2,33%	1,75%	5,03%
N	96	96	96
<b>EU-12 acquirer group</b>			
Average	4,49%	2,89%	11,42%
Median	2,01%	2,00%	2,07%
N	21	21	21
<b>Non-EU acquirer group</b>			
Average	3,65%	2,44%	11,70%
Median	1,89%	0,66%	4,79%
N	24	24	24
<b>Local acquirer group</b>			
Average	2,45%	2,01%	4,52%
Median	1,32%	1,06%	3,27%
N	142	142	142

The standard regression model is used to test whether the various characteristics of M&A transactions would affect the total combined CAR (cumulative abnormal returns). Below there is provided standard regression specification employed for further analysis:

$$CAR_{t_1t_2} = \alpha_i + \beta_i D_i + \gamma \sum CV_j + \mu_i \quad (2)$$

$CAR_{t_1t_2}$  represents cumulative abnormal return from day  $t_1$  to day  $t_2$ , intercept  $\alpha_0$  measures the magnitude of the average announcement return over the time frame,  $D$  is a dummy variable taking a value of 1 or 0,  $CV_j$  represents control variables,  $\mu_i$  represents error terms.

## Mergers and Acquisitions: Revisiting the Issue of Value Creation in the New Member States of European Union

Table 3. Regressions: Controlling stake, economic downturn, domestic and cross-border transactions

Variable	1	2	3	4	5
Intercept	0,027 (10%)	0,003 (10%)	-0,002	0,002	0,002
D1: Controlling stake		0,043 (5%)			
D2: Economic downturn			0,021		
D3: Domestic transaction				0,020 (10%)	
D4: Cross-border transaction					0,028 (5%)

Table 3 presents the results of regressions where the dependent variable is total combined CAR during the time frame of 5 trading days around (5 days before and 5 days after, 11 days in total) the transaction announcement. Mean coefficient estimates are reported by also denoting statistical significance in brackets (in case of statistically insignificant estimates nothing is denoted next to the estimates). The coefficient estimate on the constant equals to 0,027 in the first column and is statistically significant at the 10% level, thus enabling us to draw a conclusion that total combined returns increase significantly in the time frame of 11 days around M&A announcement. D1 estimate which denotes controlling stake acquired stands at 0,043 and is significant at 5% level. It reports that acquisition of controlling stake increases total combined CAR by 4,3% during analyzed time frame of 11 days.

Dummy variable D2 representing transactions taking place during economic downturn having the value of 0,021 lacks statistical significance. Further estimates D3 and D4 (representing domestic and cross-border transactions respectively) are both statistically significant. However, cross-border transactions create more value (2,8%) at the higher statistical significance level (5%) as compared to domestic transactions (2% CAR increase at 10% significance). This finding conforms to the results observed while analyzing Table 2.

The question of what is the effect of timing of merger and acquisition transactions in terms of economic cycle addressed in Table 4, where value creation in pre-crisis, crisis and post-crisis periods is being analyzed and compared.

Table 4. Regressions: M&A returns during different economic cycle phases

Variable	1	2	3	4	5	6
Intercept	0,004 (10%)	-0,002	0,001	0,002	0,001	0,003
D5: 2004-2007	0,037 (5%)			0,015		
D6: 2008-2009		0,021			0,016 (10%)	
D7: 2010-2011			0,052 (10%)			0,021 (10%)
D1: Controlling stake				0,027 (10%)	0,028 (10%)	0,019

Results of regressions presented in Table 4 report that 11 day CAR of M&A transactions that took place during the pre-crisis period of 2004-2007 stands at 3,7% compared to 2,1% of crisis transactions (2007-2008) and 5,2% of post-crisis transactions (2010-2011). Crisis estimate being the lowest is also statistically insignificant whereas pre-crisis and post-crisis estimates are both significant. However, the level of significance changes, when next to timing additional variable representing controlling stake is added. Then all of the regressions become significant thus stating the fact that also crisis transactions generate high returns, but only in cases where controlling stake is acquired. This can be explained by the fact that acquisitions where majority stake is acquired are much more welcomed during the crisis period due to the fact that majority owners are expected to have not only willingness but also needed capacities to ensure effective operations of targets, especially troubled ones.

## Conclusions

As discussed in the paper, there is a lot of controversy involved when investigating M&A activity around the globe. At the very center of the debates surrounding M&A transactions, there is the question arising whether mergers and acquisitions result in surplus value creation. This question has also been addressed in the paper with specific focus on value creation differences in domestic and cross-border transactions as well as the effect of timing of merger and acquisition transactions in terms of economic cycle.

A sample consisting of transactions that took place in the New Member States of European Union during the period of 2004-2011 has been chosen for the study. The block of countries analyzed in the paper has a short history of M&A activity and thus has not been covered in previous studies.

The conclusion of previous studies by scientists that cross-border mergers and acquisitions create more value than domestic transactions has been supported in the paper. Based on the sample results, major part of gains from M&A transactions in EU-12 fell to target. In addition, there was no evidence found that transactions concluded during crisis period create more value than those at the pre-crisis time frame. According to performance of their targets after the announcement of M&A transaction investors engaged in M&A transactions can be lined up in the following order: most welcomed investors come from EU-15 followed by non-EU acquirers, local country acquirers and EU-12 acquirers.

## References

- Andrade, G., Mitchell M. L., Stafford E. (2001). New Evidence and Perspectives on Mergers. *Journal of Economic Perspectives* 15 (2), 103-120.
- Antoniou A., Zhao H. (2004). Long-run post takeover return: the impact of overlapping return, takeover premium, and method of payment. *Working Paper*, Centre for Empirical Research in Finance (CERF), Durham Business School.
- Asquith, P. (1983). Merger Bids, Uncertainty, and Stockholder Returns. *Journal of Financial Economics* 11, 51-83.
- Asquith, P., Kim, H. E. (1982). The Impact of Merger Bids on the Participating Firms' Security Holders. *The Journal of Finance*, 37, 1209-1228.
- Bortolotti, B., Siniscalco, D. and Fantini, M. (2000). Privatisation and Institutions: A cross Country Analysis. *CESifo Working Paper Series No. 375*.
- Chang, S. (1998). Takeovers of privately held targets, methods of payment, and bidder returns. *Journal of Finance* 53, 773-784.
- Chari, A., Ouimet, Paige P. and Tesar, L. L. (2004). Cross Border Mergers and Acquisitions in Emerging Markets: The Stock Market Valuation of Corporate Control. *EFA 2004 Maastricht Meetings Paper No. 3479*.
- Chari, A., Ouimet, Paige P. and Tesar, L. L. (2004). Acquiring Control in Emerging Markets: Evidence from the Stock Market. *SSRN*.
- Chevalier A., Redor E. (2005): The influence of the non-financial characteristics of the bidder and the target on the payment methods in mergers and acquisitions: a forty years international survey. *Paper presented at the European International Business Academy*.
- Damodaran, A. (2005). The Value of Synergy. *SSRN*: <http://ssrn.com/abstract=841486>.

## **Mergers and Acquisitions: Revisiting the Issue of Value Creation in the New Member States of European Union**

- Dodd, P. (1980). Merger Proposals, Management Discretion and Stockholder Wealth, *Journal of Financial Economics* 8, 105-137.
- Dodd, P., Ruback R. (1977). Tender offers and stockholder returns: An empirical analysis. *Journal of Financial Economics* 5 (3), 351-374.
- Eckbo, B.E. (1983). Horizontal Mergers, Collusion, and Stockholder Wealth. *Journal of Financial Economics* 11(1-4), 241-274.
- Fama E., L. Fisher, M. Jensen, and R. Roll (1969). The Adjustment of Stock Prices to New Information. *International Economic Review*, 1-21.
- Harford, J. (2003) Efficient and Distortional Components to Industry Merger Waves. *Journal of Financial Economics AFA 2004 San Diego Meetings*.
- Jensen, M., Ruback R. (1983). The Market for Corporate Control: The Scientific Evidence. *Journal of Financial Economics, Vol. 11, No. 1*, 5-50.
- Jensen, M. (1986), The Takeover Controversy: Analysis and Evidence. *Midland Corporate Finance Journal, Vol. 4, No. 2*.
- Langetieg, T. (1978). An Application of a Three-Factor Performance Index to Measure Stockholders Gains from Merger. *Journal of Financial Economics* 6(4), 365-384.
- Loayza, N., Calderon, C. A., Servén, L. (2004). Greenfield Foreign Direct Investment and Mergers and Acquisitions: Feedback and Macroeconomic Effects. *World Bank Policy Research Working Paper No. 3192*.
- Lubatkin, M. and O'Neill, H. (1987). Merger strategies and capital market risk. *Academy of Management Journal, n.30*, p. 665-684.
- Martynova, M., Renneboog, L. (2005). A Century of Corporate Takeovers: What Have We Learned and Where Do We Stand? (previous title: The History of M&A Activity Around the World: A Survey of Literature). *ECGI - Finance Working Paper No. 97/2005*.
- Mitchell, M. , E. Stafford (2000). Managerial Decisions and Long-Term Stock Price Performance. *Journal of Business* 73, 287-329.
- Moeller S., Schlingemann F., Stulz R. (2005). Wealth destruction on a massive scale? A study of acquiring firm returns in the recent merger wave. *Journal of Finance, n°60*, p .757-782.
- Travlos N. (1987). Corporate takeover bids, methods of payment, and bidding firm's stock returns. *Journal of Finance, n°43*, p. 1-19.