

PERFORMANCE-SENSITIVE DEBT FOR YOUNG AND INNOVATIVE FIRMS

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Abstract. *This paper presents a literature review of performance-sensitive debt. Performance sensitivity is based on the idea of relating contractual terms and conditions to the valuation or performance of the firm. The three primary types of performance sensitivity identified in this article refer to covenants, performance pricing and collateralization.*

The first and well-established research stream in analysing performance-sensitive debt is the agency theory questioning how performance-sensitive debt can mitigate information asymmetry or agency conflicts. As this is based on a rationality methodology, it does not completely explain the financing decision making in firms. A more comprehensive perspective can be offered by behavioural finance or strategic management literature, because it allows to study financial issues on an individual level of the firm. Both streams are not very well studied in finance literature, so that it offers many gaps for future research. This paper presents linkages between financial literature and managerial inputs or firm specificities that might help to better explain financing decisions of firms.

Keywords: *Performance-sensitive debt, debt contracting, young and innovative firms, agency theory, behavioural finance, strategic literature*

Introduction

Regarding a high amount of firm bankruptcies resulting in credit default, investors have established mechanisms in debt contracting that allow them to adjust contractual terms and conditions as a response to changing financial situations of the borrower. The nature and the extent of changes in debt contracts are essential to lenders as well as borrowers and therefore have to be studied carefully. Performance sensitivity refers to this aspect as the lender is compensated in accordance to changes in credit risk. For example, if the credit risk increases due to a deterioration of the borrower's creditworthiness the lender can increase interest rates or the debt exposure.

Basically, three different types of performance sensitivity – covenants, performance pricing and collateralization can be identified. Analyses from the US capital market have presented the relevance of covenants by identifying 64% of debt contracts implementing covenants in the years 1996-2001 (Cai et al., 2013). Performance pricing is defined as a novel form of debt contracting that directly connects the interest rate to the borrower's performance. In case the creditworthiness declines interest rates increase, whereas interest decreasing is caused by an improvement of the borrower's performance (Loomis, 1991).

Considering the intensive use of financial covenants and performance pricing in loans and bonds in the US capital market and an increasing relevance in European countries today (Renzis et al. 2010, Roland Berger 2008, Roland Berger 2009) financial literature has begun

to deal with those contractual terms in the last few years. Unfortunately, only a few research papers in the financial area as well as juridical studies exist. Relating to the problem of data availability, covenants and performance pricing have primarily investigated for the US capital market. One exception is the study of Renzis et al. 2010 focusing also on debt contracts from other countries.

Existing financial literature refers to the agency theory by discussing the impacts of covenants and performance pricing on agency conflicts. Therefore, the influences of both contractual terms have been studied separately, before to some extent a combined view is considered. The coexistence of covenants and performance pricing should result in the greatest possible investigation of agency conflicts. If these terms are used as complements or substitutes has been explicitly addressed in one single study (Cai et al. 2013), whereby other studies have casually referred to this question (e.g. Bannier and Wiemann 2013, Cai et al. 2013).

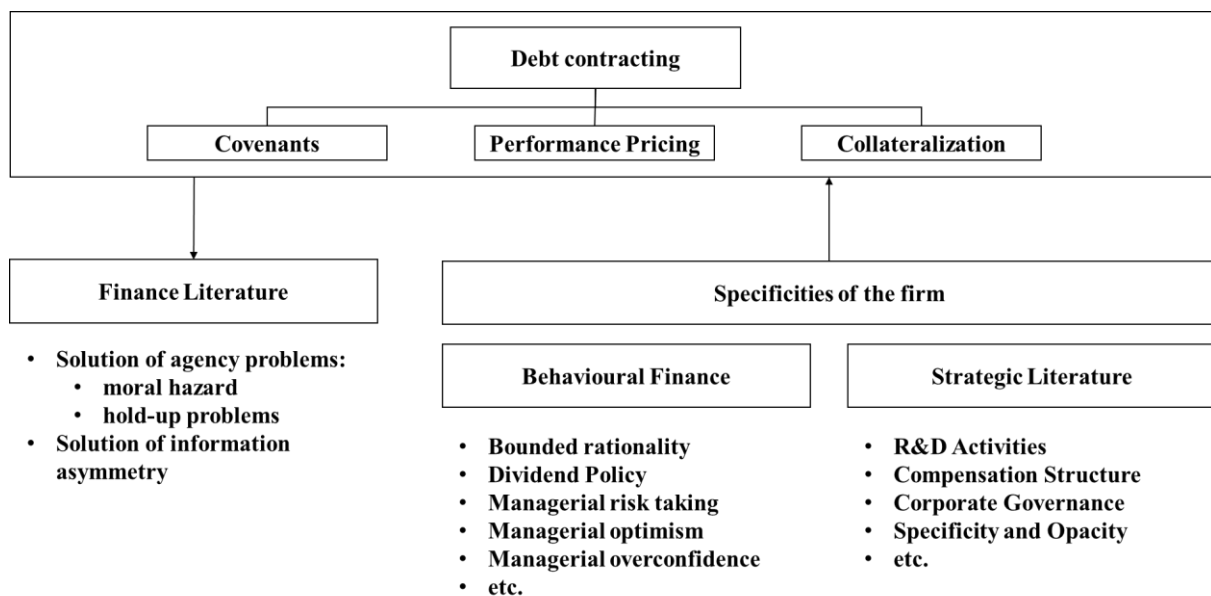


Figure 1: Research streams for the analysis of debt financing.

As the diagram above shows, this study deals with different possibilities to investigate debt contracting through performance-sensitive factors. In financial literature the agency theory has received high acceptance of analysing the use of covenants and performance pricing. As the financial connection between lenders and borrowers is defined as an agency relationship, it is assumed that both agents have to deal with information asymmetry and agency conflicts. Each contracting party is interested to maximize its own value, even if it damages the economic or financial situation of the other agent. This idea refers to rational behaviour of the lender and the borrower which cannot be reflected in reality. As contractual parties act on behalf of their characteristics or attitudes, it would be more appropriate to analyse the use of performance-sensitive debt on an individual level. Behavioural finance contribute to idea by extending traditional rationality assumptions with behavioural of the relevant agents. Basically, this research area can be divided into two approaches referring to either the irrational decision making of investors or managers. Following the emphases of recent studies discussing the impact of managerial traits on the use of performance-sensitive debt (e.g. Sunder et al. 2010, Burg et al. 2014), the present article only considers the second approach, especially optimism and overconfidence of managers. The idea is that managers act irrationally based on different behaviour whereas investors are assumed to be rational and

corporate governance phenomena are reduced to a minimum as they can influence manager's decisions. Optimism and overconfidence of managers refer to their overinvestment on firm's assets because they assume the market to undervalue the company. It should be mentioned, that these behavioural models are very similar to models of agency conflicts or information asymmetry. According to this, a behavioural signalling approach is presented based on the extent of dividends. The manager can signal a positive business development by increasing dividends today.

As behavioural finance is a different research stream to study the financial decisions, especially the use of performance-sensitive debt, this article identifies it as a gap in research and points out that further behavioural aspects have to be combined with financial decision making in the future. Characterisation of the management team is essential for the successful development of young and innovative firms, so that future behavioural-based studies of performance-sensitive debt should limit the sample to this type of company.

Strategic literature is a third stream in research that provides a more comprehensive view on debt contracting. By suggesting a strategic perspective as a framework for the use of performance-sensitive debt, strategic and operational research can extend traditional financial literature on a company level. As a central field in strategic research, this paper refers to the resource-based view (RBV). It is assumed that firms have core resources or capacities that are hard to imitate by outsiders and therefore improve performance. Combining the mechanisms of performance sensitivity depending on firm performance with the idea of RBV, it would be interesting for future research to analyse the impact of strategic factors on the use of performance-sensitive debt.

Financial decisions are very important for the development of the firm and therefore have to correspond with the strategy. This is especially true for young and innovative firms as their existence is depend on the access to capital. As prior studies have shown, they heavily rely on external bank debts, it would be interesting to study the impact of strategic factors on debt contracting. In this context, the emphasize should be on performance-sensitive debt as it provides chances for better credit provisions resulting from innovative activities and high growth potential.

In sum, this study looks at the existing financial literature in two ways. Firstly, behavioural finance makes it possible to analyse financial decision making on a more individual level and secondly, strategic literature provide a framework for financial policy on a company level. By considering both streams in research, the aim is to identify gaps in research of performance-sensitive debt. Therefore, financial literature has been systematically reviewed. As this paper focuses on performance pricing and debt covenants and questions why performance-sensitive features are implemented in debt contracts, these notions are used as selection criterions. Besides footnote chasing, browsing and citation searching, the systematic literature review mainly consists of searching in subject indices. Some of the prior studies are not yet published in journals, because performance pricing is a relatively new issue in finance literature, so that SSRN is a valuable database for this paper. For the identification of future research nearly the same methodology was practiced. However, the selection criterions refer to performance-sensitive debt, financial structure as well as aspects of behavioural finance or strategic management.

Definition of performance-sensitive debt

During the past few years debt contracts have become more performance-sensitive, which means that the contracting parties adapt the contractual terms in such a way that the lending conditions reflect a change in the creditworthiness of the debt holder. On the one hand

performance-sensitive debt can be seen as a corporate governance mechanism for the creditor in order to control the borrower's business development, but on the other hand debt holders can also be protected against the impact and control of the creditor.

Related to the incomplete contracting theory, ex ante performance-sensitive debt is a more efficient government-mechanism of high-risk debt holders than contracts that do not respond to changes in credit risk. The contractual terms and conditions are directly connected to the borrower's performance and imply future contingencies that refer to the credit risk at the time the contract is made (Shadab 2014).

In the following different types of performance sensitivity including covenants, performance pricing as well as collateralization, are described.

Covenants

Covenants are contractual conditions that protect the lender against the credit risk. Basically, covenants can be divided into three categories. First, affirmative covenants require the borrower to perform specific actions. Second, negative covenants refrain the borrower from prior defined actions and as a third category, financial covenants define financial limitations for the firm's performance (Fabozzi 2008, p. 335 f.). Regardless of the categorisation, the main function of covenants is the mitigation of agency conflicts by imposing restrictions ex ante that refrain debt holders from opportunistic actions ex post because of their deterrent effect (Chava and Roberts 2008).

If covenants are subsumed under performance-sensitive debt the monitoring function is considered, since performance sensitivity is based on comprehensive information of the credit relationship (Shadab 2014). Therefore, covenants increase monitoring incentives (Rajan and Winton 1995) and encourage the lender to monitor (Robert and Sufi 2009) because borrowers are required to provide information.

Another perspective of the performance sensitivity of covenants refers to renegotiation. In case, a firm breaches the prior-defined minimum conditions of the covenant, control is transferred to the lender so that he can discipline the borrower by immediately calling for the complete loan repayment (Shadab 2014). Since covenant breaches often do not trace back to bankrupt companies (Prilmeier 2011), they are mostly waived (Roberts and Sufi 2009). Depending on changes in the firm's performance an adaptation of loan terms to the borrower's creditworthiness is required (Nini et al. 2009). Re-negotiation of the contract usually rewards the lender for a higher credit risk, e.g. by increasing interest rates or decreasing the credit amount available (Demiroglu and James 2010). Consequently, performance-sensitive covenants refer to the renegotiation of contractual terms depending on the negative performance of the borrower.

Performance Pricing

Regarding the design of effective debt and bound contracts, financial research has primarily focused on the usage of covenants in the past few years (e.g. Chava and Roberts 2008, Garleanu and Zwiebel 2009, Roberts and Sufi 2009), whereas only a few studies have analysed the structure and the impact of performance pricing (e.g. Asquith et al. 2005, Begley 2012, Cai et al. 2013, Bannier and Wiemann 2013, Panyagometh et al. 2013).

As performance pricing has increasingly gained acceptance in debt contracting, it is considered more effective than covenants. Covenants do not provide full protection against deterioration in credit risk because the creditor cannot react until the covenant is breached and renegotiation causes high costs for the contracting parties. When the financial situation of the borrower is improving, covenants do not provide an adequate possibility to reflect the positive

development of the borrower's creditworthiness, which either result in the prepayment or renegotiation of the loan (Asquith et al. 2005).

The development of performance pricing has led to an increase in efficiency of debt contracting which is justified by a more direct solution for agency conflicts and a reduction in renegotiation effort (Asquith et al. 2005, Shadab 2014). Performance pricing makes the interest rate directly charged on the performance of the company, which can be measured through financial ratios or credit ratings. The interest rate increases when the performance of the firm deteriorates (PPInc) and improvement of the borrower's creditworthiness causes interest rates to decrease (PPDec), respectively (Banner and Wiemann 2013).

The risk of prepayment is mitigated by performance pricing because the improvement of the borrower's performance will automatically lead to a reduction of interest rates and therefore represent the creditworthiness of the borrower in an appropriate way. Besides this, performance pricing reduces the risk of a delayed loan repayment and an increase in the loan amount, because a negative business development will result in an interest rate increase (Asarnow 1995, Beatty and Weber 2000). Finally, performance pricing is a reasonable incentive mechanism for good borrowers as they try to signal their creditworthiness to the lender (Beatty and Weber 2000). By implementing PPDec in debt contracts borrowers accept higher initial interest rates but are immediately rewarded by their positive performance in the future (Asquith et al. 2005, Panyagometh et al. 2013).

Collateralization

Even if further discussion in this paper does not take into account collateralization, this type of performance-sensitive debt is described in order to present a complete view on performance-sensitive debt. Collateralization makes the available credit amount or terms dependent on the underlying quality of collateral. In general, lenders require collateral for providing debt to the borrower, because it can be used in case of bankruptcy and therefore protect the lender from the credit risk. Based on the agency theory, collateralization can mitigate adverse selection because borrowers signal their quality through the provision of collateral. Furthermore, moral hazard is reduced, especially in the case of asset substitution, because the lender is secured by collateral, in case a risky investment fails and causes a liquidity shortage for the debt holder (Shadab 2014).

Performance-sensitive collateralization is based on idea to provide better contractual terms or higher credit amounts depending on the development of available collateral. If the liquidation value of collateral is high, credit risk is relativized and the lender usually offers more favourable loans (Roberts and Sufi 2009). Besides the positive influence of collateral on the gathering of credit, contractual terms are adapted to changes in the firm's assets. One example would be, to increase the loan amount due to an increase in the firm's assets or collateral, respectively (Shadab 2014).

Characteristics of young and innovative firms

Regarding the Stiglitz and Weis model, information asymmetry means the access to debt is very difficult for debt holders (Stiglitz and Weiss 1981). As firms in the start-up phase are informational opaque, many scholars postulate that those firms are not able to receive external debt financing. During the life-cycle these firms are becoming more experienced in financial and organisational management and information asymmetry is decreasing. Furthermore, increasing growth of these firms changes their financial needs as well as expands their financial possibilities (Berger and Udell 1998). From the life-cycle view informational opaque

firms receive external debt not until their growth phase, whereas they can only rely on internal capital like venture capital or equity of family members and friends during an early stage (Berger and Udell 1998). Surprisingly, a survey of Robb and Robinson (2012) has been shown that start-ups rely to a large extent on bank debt, while entrepreneurs provide security through personal assets and therefore have to bear the risk. Considering the great dependence on external bank debt, growth and future development of start-ups are highly influenced by debt lending volume and conditions. This makes it already very important for firms in the start-up phase to focus on effective debt contracting.

The high demand for external debt financing could also be confirmed for the German entrepreneurial market by a study based on the so called “KfW/ZEW Gründungspanel”. This is a database consisting of computer-assisted telephone interviews of start-ups established in 2008. Research and development (R&D) activities are especially important for the business development of young and innovative firms. But financing of those R&D activities is very important for firms and force them to intensively search for appropriate sources of capital. On the one hand, the need for financing can easily exceed internal capital like revenues or owners` capital. On the other hand, external capital is also limited and often based on specific requirements. For getting external capital, young growth firms have to deal with some problems, e.g. they lack traditional securities, there is high uncertainty regarding their business development as well as information asymmetry. It has been found out that credit financing of young and innovative firms is dependent of their growth prospects caused by their R&D activities. Consequently, even if earlier literature has been focused on venture capital, bank debt is the most relevant source of capital for young and innovative firms and has to be analysed more intensively in the future (Fryges et al. 2013).

In addition to the general need for analysing debt financing of young and innovative firms with high growth potential, the use of performance-sensitive debt has been discussed. Prior literature shows that high-growth firms (measured by the market to book ratio) increasingly implement performance pricing in debt contracts, whereas borrowers with only slow business development use traditional debt contracts with fixed interest rates (Bannier and Wiemann 2013). This result is in line with agency-based studies analysing, how debt contracting can mitigate different agency conflicts. Therefore, performance pricing with interest decreasing potential is helping the borrower to signal information to the creditor, whereas interest increasing performance pricing can mitigate moral hazard and is similar to the function of financial covenants. As those conflicts between creditors and debt holders are more intensive for high-growth firms compared to other firms, performance-sensitive debt is most efficient in this case which makes it necessary for them to emphasize on contracting details (for an overview, see Billett et al. 2007).

There are two major advantages for high-growth firms when using performance pricing. First, their positive business development can result in the reduction of interest rates, if they use PPDec. Second, growth prospects are immediately rewarded by using PPInc, because borrowers are compensated for a potential interest increase (Bannier and Wiemann 2013). Combining the specialities of performance pricing in debt contracts of growth firms with the reliance on external bank debt of young and innovative firms, it is questionable if corporate strategy or internal and external factors of firm in their start-up phase as well as in the growth-phase have an impact on this type of contractual terms.

An exact definition of young and innovative or growing firms is very difficult due to the contradictoriness in prior literature (Harms 2004). In general, companies are only considered as growing firms if they are economically-oriented firms (Gutenberg 1983, Fryges 2013) with an exclusion of financial institutions as they face special regulations (e.g. Bannier and Wieman 2013, Cai et al. 2013). According to Voll (2008), a life-cycle model based on the company`s age is not useful because periods of growth can work as a moderator for analysing the provision of performance-sensitive debt. Focusing on one specific branch can be

appropriate. For example, the technological sector has a high growth potential regarding their innovative and research-intensive activities. Furthermore, the sample should apply only to original and independently-founded companies, without building on an existing business structure. The idea behind this is that management's activities or behaviour and consequently the corporate strategy have the greatest influence in this type of company (e.g. Miller and Friesen 1978, Purle, E. 2004, Schulz 2011, p. 35 f., Fryges 2013).

Debt contracting in the Finance Literature

Agency conflicts

Prior literature analysing debt contracting has been focussed on agency theory, because divergent interests of creditors and debtors as well as information asymmetries can lead to opportunism and high costs.

The principal-agent relationship is defined as a contractual relationship where one party (principal) instruct another party (agent) to carry out specific actions and transfer decision making power. On this basis, the fundamental idea of the agency theory is that every party aims to maximize their own values which results in a difference of the interests of the agent compared to the principal's interests (Jensen and Meckling 1976). Prior finance literature based the analysis of debt lending agreements on the agency perspective referring to the idea that the creditor is depending on the borrower's actions once he provides debt capital. On the one hand, the creditor is usually interested in the complete repayment of debt as well as high interest payments but on the other hand, he faces the credit default risk caused by a lack of liquidity or the bankruptcy of the borrower (Terberger 1987).

Information asymmetry is related to problems of adverse selection *ex ante* (the fundamental model was developed by Akerlof 1970) because the creditor does not know all characteristics and strategies of the borrower relevant for debt financing. It is questionable, whether the creditor should provide debt to specific firms and how he can categorize borrowers by implementing an incentive mechanism in debt contracts (Roiger 2007). This idea is often discussed in screening models that allow the creditor to make decisions about the extension and conditions of debt financing based on a prior selection of the borrower's creditworthiness (Shadab 2014). In contrast to this, signalling models refer to the borrowers' perspective and discuss how debt holders can disclose internal or personal information in a realistic way in order to get the most appropriate debt contract form the lender. Information asymmetry can also occur *ex post* and is often known as hidden information of the borrower. Except the occurrence time, this agency problem is very similar to adverse selection, so that contractual incentives can analogically be structured (Roiger 2007).

Different interests of lenders and borrowers can result in opportunism as every party is aiming to maximize its own values. Myers (1977) has argued that risky debt financing usually bears the risk that owners of the firm can only be rewarded by suboptimal investments. Positive net present value projects are not realized by the owners because they pay all the cost but have to share the dividends with investors. As creditors are rewarded in any case, investments can be disadvantageous for firm owners when the costs exceed to dividends. This results in the problem of underinvestment where owners refrain from investing in positive net present values.

Creditors are also confronted with asset substitution meaning that the investment risk is higher than it was expected when the loan was made. Assuming the general debt financing situation where borrowers have convex capital claims and creditors have concave claims, the first party is usually interested to increase the investment risk in order to gain huge profits

whereas lenders fear a loss in their wealth. If the debt level exceeds the equity level of a firm shareholders are motivated to invest in risky projects because they have huge return expectations. If those investments fail, lenders have to bear most of the costs. This makes it possible for borrowers to shift wealth from lenders to themselves (Jensen and Meckling 1976).

Hold-up is another agency conflict that has been discussed in the field of financial contracting. Especially in the case of renegotiation, lenders with bargaining power try to maximize their own values by renegotiating contractual terms and make a profit (Schmidt 2006). In general it is not possible for borrowers to get information about the intention of the lender at the time the contract is made (Roiger 2007). If borrowers do not get alternative financing from other investors, they are dependent on specific lenders who can easily exploit the situation by either increasing the interest payments or refusing a decrease in interest rates when the firm's performance improves (e.g. Rajan 1992, Adam and Streitz 2013).

Debt contracting as a solution for agency conflicts

Debt contracting through covenants

The traditional agency theory of covenants has been developed by Jensen and Meckling (1976), Myers (1977) as well as Smith and Warner (1979). It is argued that managers of a firm are acting opportunistically in order to maximize their own values or the values of the shareholders, respectively. As lenders can be negatively affected by these agency conflicts, they factor this risk into the contractual conditions, known as agency costs. The agency theory of covenants defines covenants as appropriate contractual terms to reduce agency conflicts because the managers are disciplined and the lender is secured in terms of wealth reduction. It is obvious that even if covenants cause high costs for the firm they provide an advantage because they off-set the agency costs of debt or solve agency conflicts, respectively. According to Myers (1977) covenants can mitigate underinvestment if it is not possible to shorten the maturity or use alternative sources of capital.

This theoretical concept states that high-growth and risky firms usually raise credit with long maturity and many covenants, which could also be verified by different empirical studies (Malitz 1986, Begley 1994, Begley and Feldham 1999, Goyal 2001, Nash et al. 2003). The study of Bradley and Roberts (2004) is based on an analysis of private loans and could confirm the result of Smith and Warner (1979) by identifying a negative correlation between covenants and interest rates.

The signalling hypothesis of covenants refers to the information content of the future development of the borrower (Demiroglu and James 2010). Therefore, the strength of covenants is relevant because exceeding a critical limit reveals information about the creditworthiness of the borrower. This signalling effect can be explained by different phenomena. Firstly, prior literature demonstrates that banks monitor borrowers and therefore reduce information asymmetry (Ramakrishnan and Thakor 1984, Fama 1985, Diamond 1991). During the process of due diligence, banks get access to relevant and private information about the borrower's future performance and creditworthiness. As a consequence of debt, contracting this information will indirectly also be communicated to third parties.

Secondly, the results of different theoretical models show that the strength of covenants signals the future business development of the borrower (Gârleanu and Zwiebel 2009). According to this, borrowers have private information about their characteristics and their tendency to behave opportunistically which is disclosed in their choice of covenants. In general, there is a great potential of earnings management and contract violation, if covenants are overly strict. Therefore, borrowers try to convince the lender of their positive

creditworthiness in order to negotiate less strict covenants (Beatty et al. 2002, Demiroglu and James 2010).

Third, a breach of covenant can lead to dramatic consequences and therefore provide incentives for risky borrowers to adapt to the contractual terms or prevent a breach of covenant. If covenants are a matter of negotiation and the borrower has an influence on the design and implementation of covenants, lenders can learn about the working effort of the borrower. In compliance with this idea, Demiroglu and James (2010) argue that the strength of covenants increases when the borrower's performance is expected to increase in the future.

Consequently, the use and structure of covenants have a signalling effect that can be advantageous for both contractual parties and directly address the problem of information asymmetry.

Influence by corporate governance structures

Covenants are an appropriate monitoring instrument for the lender but at the same time it is also expensive (Diamond 1991). Furthermore, an overregulation through the use of covenants can reduce the borrower's freedom to act and can prevent him from making optimal financing and investment decisions (Smith and Warner 1979). As this situation can lead to a reduction in firm value it can also have a negative and value-destroying impact on the lender's interests. Efficient contracting makes it necessary to balance the advantages of monitoring and the negative impacts and therefore require the analysis of alternative contractual terms and monitoring mechanisms (Abu Bakar et al. 2012). To pursue their personal interests lenders are also dependent on additional governance mechanisms. In prior empirical studies diverse board characteristics have been analysed and an advantageous effect could be identified for shareholders as well as for creditors. According to Cremers et al. (2007) the impact on both parties has to be separated as they have different interests. It is not yet clear how that governance mechanisms work in detail and which concrete effect they have on shareholders or stakeholders. Earlier studies have especially analysed the impact of governance structures on financing costs (Bhojraj and Sengupta 2003, Anderson et al. 2004, Blom and Schauten 2006) and credit ratings (Bhojraj and Sengupta 2003, Ashbaugh-Skaife et al. 2006). That the structure of corporate governance has an impact on debt financing is obvious and has been empirically analysed, but only a few studies have questioned the influence of governance structures on covenants (e.g. Fields and Fraser 2012, Li et al. 2013, Chakravarty and Rutherford 2011). These research studies have shortcomings in terms of measuring governance structures, the use of proxies as well as the theoretical identification of relevant governance structures.

Solution through performance pricing

Prior literature focusing on the use and the impact of performance pricing has based the analysis on agency theory. In the centre of this research stream was the question if and how performance pricing can mitigate moral hazard (Bhanot and Mello 2006, Manso et al. 2010, Koziol and Lawrenz 2010) or information asymmetry (Garleanu and Zwiebel 2009, Demiroglu and James 2010, Begley 2012, Panyagometh et al. 2013).

Those studies that do not differentiate between single categories of performance pricing could mainly identify a signalling effect (Koziol and Lawrenz 2010). In a theoretical model, which is in line with the signalling hypothesis of Demiroglu and James (2010), Manso et al. (2010) show that performance pricing is an efficient instrument for the borrower to signal his positive business development in the future and therefore reduce existing information

asymmetry. Furthermore, the signalling hypothesis is fundamental for the study of Panyagometh et al. (2013) developing the results of Manso et al. (2010) by analysing performance pricing more precisely. Regarding their empirical tests, only PPDec is correlated with a positive business development of the firm, indicating that debt holders could improve their performance after the provision of debt. The level of detail is even higher in the study of Begley (2012) by assuming convex loan contracts. The idea behind this convexity is that in case of a deterioration of the borrower's creditworthiness interest rates increase dramatically whereas there is only a slight decrease in interest rates if credit risk declines. The research results have shown that firms signalling their good creditworthiness can obtain better debt financing because lenders offer contracts with advantageous conditions or lower interest rates, respectively.

All in all, the signalling effect of performance pricing could be confirmed at different levels and from the borrower's perspective a positive impact on debt contracting was presented.

One problem caused by an improvement of the firm's performance is the prepayment of debt. Without having appropriate contractual terms addressing a positive development of the borrower's creditworthiness, the firm would prepay the loan and force the lender to renegotiate the loan conditions or decrease the interest rates, respectively. PPDec automatically reduces interest rates if the firm's performance improves and therefore minimize the prepayment risk. Furthermore, PPDec can mitigate adverse selection if the lender incorrectly evaluates the borrowing firm and the prepayment risk is high because of the adaptation to changing financial situations (Asquith et al. 2005).

Besides addressing information asymmetry, performance pricing can mitigate moral hazard if it allows for an increase in interest rates. In contrast to PPDec, PPInc has a lower initial interest rate but provides an opportunity for the lender to sanction the borrower in case of a distortion of his creditworthiness. The idea behind this is the deterrence of the borrower for taking opportunistic actions because he faces the threat of a financial disadvantage (Asquith et al. 2005). These results are questioned by Martin (2009) because an increase in interest rates is related to higher debt costs which can create incentives for asset substitution. Therefore, he argues that it is only possible to reduce suboptimal investment decisions or asset substitution by using PPDec.

Another study differing from the prior results is the empirical study of Bannier and Wiemann (2013). They concentrate on loans for high-growth companies as moral hazard or the credit risk is maximized for this sample. Depending on another categorisation of performance pricing, the results show that performance pricing based on ratings reduce information asymmetry whereas performance pricing based on financial ratios address moral hazard. Even if Bannier and Wiemann (2013) mention that the difference of both studies result from the development of debt contracting, this can also be caused by the types of classification as they have different effects on the borrower's financing decisions. For example, a comparison of PPDec and performance pricing based on financial ratios shows that the first type mitigates adverse selection whereas the second type reduces underinvestment.

Another explanation for performance pricing is the solution of hold-up in long-term lending relationships (Adam and Streitz 2013). The motivation of this research was the more intensive use of performance pricing in private loans compared to public contracts as well as financial ratios being preferred over contractual variables. In private loan there is a high risk of hold-up (Sharpe 1990, Rajan 1992) and an intensive use of covenants increasing the hold-up problem by transferring negotiation power to the lender (Schmidt 2006). The discretion of lenders is being reduced by using performance pricing instead because possible consequences due to changes in the firm's performance are already defined ex ante. As covenants are mostly based on financial ratios performance pricing has to implement the same variables in order to

efficiently mitigate hold-up problems. Consequently, the study of Adam and Streitz (2013) confirm the idea that performance pricing based on financial ratios address hold-up problems whereas performance pricing based on credit ratings have a signalling effect.

Interaction of covenants and performance pricing

As the debt contracts include different types of performance-sensitive debt there is a need for a combined view. In the study of Beatty et al. (2002) the relevance of different contractual terms are first discussed and arguments for complementary as well as substitutive effects of covenants and performance pricing are presented. If the credit risk increases covenants are effective because the lender is able to renegotiate contractual terms and take control over the borrower ex post (e.g. Dichev and Skinner 2002, Gopalakrishnan and Parkash 1995). In cases of reduced credit risk performance pricing would be preferred because changes in interest rates are predefined in the time the contract is made. As both types of contractual terms have contrary effects, one can assume a complementary relationship.

The substitutive effect can be explained by the idea of efficient debt contracting. If the use of performance pricing is classified as an efficiency increase compared to financial covenants, both contractual terms can be considered as substitutes.

In the study of Cai et al. (2013) the correlation of financial covenants and performance pricing is explicitly analysed for the first time. They only have focused on the mitigation of moral hazard and therefore reduced the level of information asymmetry by choosing a sample of public rated firms. On the one side, moral hazard can be reduced by the use of financial covenants or PPInc, whereby they are efficient on different levels of the agency conflict. On the other side, PPDec is used to minimize the credit risk by signalling the borrower's positive performance. This combined view demonstrates that all three types of contractual terms have a different impact on agency conflicts so that they function as complements.

Adam and Streitz (2013) have measured a substitutive effect of financial covenants and performance pricing which they trace to the solution of hold-up problems. As covenants transfer negotiation power to the creditor and increase the hold-up problem, a solution can be reached by complete debt contracts (von Thadden 1995). According to this, a positive correlation between covenants and performance pricing with identical variables could be measured. The conditions of covenants are only relevant in extreme situations when performance pricing does not provide any regulation for a deterioration of the firm's performance anymore.

Some other studies have also analysed the relationship of covenants and performance pricing but this can only be seen as a secondary or by-product of their research (Beatty et al. 2002, Costello and Wittenberg-Moerman 2011, Bannier and Wiemann 2013).

Future Research

Behavioural Finance

When looking at prior studies analysing performance-sensitive debt financing, the majority concentrates on the influences on different agency problems without taking into consideration the borrower or the lender itself (e.g. Jensen and Meckling 1976, Smith and Warner 1979). Corporate finance assumes rational behaviour of both agents and therefore lacking a complete explanation of real investment and financing decisions. Borrowers and lenders cannot be defined as *homo oeconomicus* as they are not rational actors only aiming to maximize their

own values. In reality financing decisions often differ from expected or logic economic behaviour and therefore lead to the expectation that contracting parties act irrationally, meaning that their behaviour is caused by personal characteristics or attitudes (Sunder et al. 2010, Burg et al. 2014) as well as strategic impacts on the firm-level, like corporate governance mechanisms or compensation structure (Tchisty et al. 2011). Consequently, there is a great future research demand for complementing the agency perspective by analysing strategic and behavioural aspects that make the contracting parties choose performance-sensitive debt.

Behavioural finance deviates from the idea of rational financing decisions by considering behavioural aspects of the agents. As an overall or combined analysis of managerial and investor behavioural would be difficult at the beginning of this research stream, there are basically two main models: Firstly, the irrational investor model focusing primarily on the behaviour of investors and secondly, the irrational manager model with an emphasis on managerial traits.

The focus of this paper is on the second approach. According to earlier empirical studies in the area of corporate and entrepreneurial finance, optimism and overconfidence have been considered as central management behaviour, which makes an implementation in the analysis on performance-sensitive debt necessary.

It could be recognized that both assumptions are very similar to models of agency conflicts and information asymmetry. According to this, both streams in agency theory try to recognize significant correlations in the field of corporate and entrepreneurial financing, financial decision making and M&A activities (Baker and Wurgler 2012).

In contrast to the traditional perspective of signalling, behavioural signalling reduces information asymmetry through personal characteristics or attitudes of managers. As there is no basic model for behavioural signalling, it would be conceivable to create a signalling model for different behaviour. One existing study of Baker and Wurgler (2012) has focused on signalling through dividend policy. In this case the signal is the result of a specific choice of dividend payment through which managers can demonstrate financial stability without causing high costs. Like the signalling model of performance pricing (Begley 2012), dividend signalling is based on convexity, which means that even a small reduction in dividends presents a negative financial performance. For the effectiveness of this signalling model it is essential that investors recognize changes in dividends because otherwise they would not have any reason for assessing the company differently.

What should be noticed when analysing managers' behaviour is, that corporate governance mechanisms significantly influence management behaviour, e.g. by regulations in the business judgement rule. When these forces are limited, managers have the greatest influence over business activities because of reduced control and monitoring (Baker and Wurgler 2012).

Bounded rationality is based on the idea, that managers have informational and cognitive limitations which makes it impossible for them to fully understand the complexity of investment and financing decisions. To deal with those problems managers follow specific guidelines or use simple methods, like the limitation of alternatives and options, the practice of routine behaviour or the aim of satisfying decisions instead of optimisation (Wolf 2013, p. 239 f.). This aspect of bounded rationality can have an impact on the design of performance-sensitive debt.

Most empirical studies in the area of behavioural finance have focused on optimism and overconfidence as dominating managerial traits. The relevance of optimism and overconfidence can be justified through their robustness (Ben-David et al. 2010) as well as their relatively easy inclusion into other streams of research like financing decision making (Sunder et al. 2010, Burg et al. 2014).

Optimism is usually measured by two contrary effects. First, managers are convinced that financial markets undervalue the firm because they appear not to detect the real value. Second, managers overestimate their personal abilities regarding the management of the firm which makes them easily choose negative net present value projects (Heaton 2002). In contrast to this managerial trait, overconfidence is a measure for the underestimation of a variance and clearly has to be separated from optimism in research studies. Empirical studies show that future returns of a firm are incorrectly evaluated by overconfident CFOs who influence the financing and investment decisions (Ben-David et al. 2006). Other studies have analysed the influence of overconfident managers on earnings forecasts. On the one hand, overconfidence has an impact on the type of forecasts (Hribar and Yang 2013) and on the other hand, this managerial trait results in more positive forecasts that can easily encourage managers to practice earnings management (Schrand and Zechman 2012). In the behavioural finance literature, Malmendier and Tate (2005a, 2005b, 2008) and Malmendier, Tate and Yan (2011) made a significant contribution to the research of management's overconfidence as they have empirically verified the impact of overconfident managers on the financial structure of a firm. Their results are in line with the idea of management hubris (Roll 1986) and show that overconfident managers make overinvestments and reduce firm value as well as increase their debt levels, consistent with the pecking order theory (Baker et al. 2007).

Landier and Thesmar (2009) have analysed contractual behaviour of optimistic managers. The results have shown that optimistic managers usually do not change their business plans and accept risky contracts that transfer control to investors in bad situations for higher rewards in good situations. Accordingly, optimists rather choose short-term debt instead of less risky long-term contracts.

In conjunction with traditional finance literature, optimism corresponds to the idea of the pecking order theory, which means that optimistic managers favour debt over equity (Heaton 2002, Hackbarth 2009, Graham et al. 2013). Even if this basic model is explained in earlier literature, it is not yet clear how debt is designed when managers behave optimistically. The first study that analysed managerial influence on the use of performance pricing in debt contracts was written by Burg et al. (2014). Their empirical results have shown that the over-optimism of managers is positively correlated with the use of performance pricing in debt contracts. When analysing the use of performance pricing in more detail, it is recognized that most of those contracts include an interest increasing potential. CEOs are willing to accept a higher financial risk regarding potential interest increases after a negative business development, because they are convinced of the firm's performance improvement. By accepting the threat of an interest increase the borrower is immediately rewarded by paying lower initial interest rates.

Another empirical study that refers to performance-sensitive debt, analyses the influence of overconfidence on debt contracting. The central question of this study is whether creditors consider overconfidence of managers and address this behaviour by the implementation of specific contractual terms or debt covenants. The focus is on debt financing as the results of Malmendier and Tate (2005a) show that overconfident managers refer to the pecking order theory and primarily increase their debt level (Sunder et al. 2010).

The empirical analysis of overconfidence corresponds to the measurement of over-optimism in the study of Burg et al. (2014). According to Malmendier and Tate (2005a), they characterize CEOs as overconfident managers if they do not exercise in-the-money options of their company. This long holding period of in-the-money options shows that the managers overvalue the performance the firm. Furthermore, it is argued that the financial and personal commitment of managers to the company is necessary for measuring overconfidence, whereas agency problems do not consider irrational behaviour. As both types of behaviour refer to

different beliefs of managers it cannot be appropriate to use the same measures. This is a critical aspect, future research should focus on.

The empirical results Sunder et al. (2010) show that overconfident CEOs are confronted with tighter restrictions when making financing and investment decisions. Consequently, covenants can be used to mitigate undesirable effects of management behaviour and therefore offers a useful contractual term for creditors to make effective contracts.

A great challenge in behavioural finance is to find an appropriate model or proxy to separately measure optimism and overconfidence of managers. As noticed before, prior studies mostly use the model of Malmendier and Tate (2005a) that defines overconfidence of managers by the holding period of their options. It refers to the idea that managers do not exercise their private options that are tied to the firm, even though they are in-the-money. Only if managers are overconfident they expect a further improvement of the firm performance in the future and therefore find it even more rewarding to exercise the option at a later point in time.

Another aspect that should be recognized in future research is, that the decision making process of young firms have to be separated from the organisation and management structures of other firms because characteristics and behaviour of their management are fundamental factors of success. Depending on their own obsession of power and striving of influence and control, the financial structure of these firms is designed in different ways (Bhaired and Lucey 2010, Ang 1992). Furthermore, investment decisions in risky projects are influenced by the risk aversion of the management. Because of difficulties in measuring those managerial traits, prior empirical research has utilized personal characteristics of managers or entrepreneurs, e.g. by age, gender, know-how and professional experience (Fryges et al. 2013). The review on behavioural financial literature has shown that traditional financial literature should be extended by managerial traits and therefore leads to a more realistic explanation of financing decisions. As this is a relatively new research stream, it offers a great demand on future research. First of all, implementing optimism and overconfidence in financial decision making requires a more accurate and separate measurement.

Even if optimism and overconfidence are well-documented in behavioural literature, one can imagine many more management characteristics that could be significant for financial contracting. To find out more about relevant behaviour of managers and implement a “behavioural framework” in financial models can be an interesting task for future research.

Strategic management

In entrepreneurial research great importance has been attached to personal characteristics of the entrepreneur. Studies in this research area primarily questioned the impact of these characteristics on the company's performance or success (e.g. Gartner 1988 and Fallgatter 2001). In contrast, another strand of research claimed that a complete explanation is not possible if only entrepreneurial traits are analysed and therefore focus on the company level. One main strand therefore refers to the life-cycle model analysing the challenges a firm has to face during every single phase (e.g. Greiner 1972, Chandler 1962), and a second strand examine success factors of growth companies (Manstedten 1997, p. 338 ff.). Combined with the sample selection of companies with high-growth potential, it is necessary to discuss managerial structures or resources on a company level.

Regarding the context of young and innovative companies that depend on external capital, especially bank loans (Hall 2002, Hall and Lerner 2010), prior studies have discussed the relevance of internal resources for external financing mostly focusing on the influence of financial restrictions on R&D activities (e.g. Czanitzki and Hottenrott (2011), Savignac 2008). For example, Hottenrott and Peters (2011) showed that financial restrictions are mostly recognized for firms with a great innovation potential and a lack of capital, whereas the

opposite is the case for firms with a small innovation potential as they do not need much capital.

The correlation between R&D intensity and the capital structure has been examined by Fryges et al. (2013). The interaction between both characters was significant and showed that they positively influence each other. The idea behind this result is, that R&D activities increase the growth potential of companies but on the opposite, there is only a small amount of R&D expenses spend on tangible assets, that are usually used as collateral. As this result demonstrates the importance of credit financing for young companies, it is not yet clear how specific contractual terms, e.g. covenants, performance pricing or collateral, are correlated with R&D intensity. Regarding the uncertainty of young and innovative firms as well as the advantages of performance-sensitive debt it is necessary to get a more detailed understanding of the functionality of specific debt provisions.

Building on that, Barton and Gordon (1987) first claimed that the connection of corporate strategy and finance policy of a firm is an idea that have been introduced by strategic as well as financial researchers. In strategy literature, there was a need for implementing financial aspects in the strategy perspective. In finance literature, a better explanation of capital structure was expected by considering strategic aspects of the firm. In this paper, only the second research idea is relevant.

For an extension of the finance literature those categories of decisions identified in the strategy literature could be used in order to get a better understanding of the financial decision making process. Therefore, Barton and Gordon (1987) have defined five statements that can be relevant for the analysis of performance-sensitive debt. Firstly, risk aversion of the top-management affects the capital structure of a firm. While finance literature attaches importance to financial risk when making financing decisions, the combined view should discuss the impact of the risk-taking of managers due to their influence on the firm. Second, goals of the top management have an impact on the capital structure of the firm. This statement is based on the idea that capital structure is a strategic decision and corporate strategy has to correspond with management`s goals (e.g. Andrews 1980, Chandler 1962). In contrast to financial literature focusing on the wealth-maximization of shareholders, strategy literature considers a wider perspective with more than one specific goal. Third, top management prefers internal financial compared to external capital. As managers consider risk and return aspects (Donaldson 1961) as well as their freedom to act (Pfeffer and Salancik 1978), they make specific capital decisions. This statement should be questioned regarding new research results demonstrating that debt is one of the most important sources of capital for young growth firms (Fryges et al. 2013, Robb, Robinson 2012). Finally, the study claimed that the financial context can have an impact or a moderating effect on the capital structure choice of the top management.

Based on these statements, it would be a challenge for future research to identify relevant strategic categories that have to be implemented in financial models and to investigate the influence of those corporate strategies on financial issues.

One approach to identify and examine corporate strategy refers to the resource-based view (RBV). Researchers of this approach claim that a firm`s business development and strategic position can be adequately explained by an analysis of the internal resources instead of environmental aspects (Barney 1986, Peteraf 1993). Regarding the theoretical basis, assets or characteristics that are unique or hard to copy improve the performance of the firm (Vicente-Lorente 2001).

In strategy research there have been identified many definitions of assets and characteristics that improve a firm`s performance. Some studies do not focus on specific assets but rather state that only the compound and the interaction of different assets can

increase the value of the firm and enhance the competitive capacity (Teece 1990, Prahalad and Hamel 1990).

In the study of Vicente-Lorente (2001) specificity and opacity are examined as significant strategic resources of the firm. The specificity is based on a relationship-based idea meaning that the resource is specific only in conjunction with other factors in the firm. Therefore, the specificity is depending on the firm's survival as it is not valuable to an outside use. Opaque resources are defined as assets that cannot be copied by outsiders due to the lack of information about the asset's nature or relevant processes in the firm. If assets are "identifiable, well-defined property rights or transparent", outsiders can easily access relevant information and therefore reduce the firm's competitiveness. Another characteristic causing opacity is the complexity of processes that are necessary to deal with resources, especially inside knowledge or the social structure of the firm. The empirical research of Spanish companies showed that strategic proxies differ in their impact on the capital structure. First, specific and opaque resources (e.g. internal R&D and specific human capital) are negatively correlated with debt financing and therefore firms with strategic resources are confronted with more restrictions in their financing decisions. Regarding to start-ups this can cause serious problems because strategic resources are essential factors for their growth potential but the limitations of financial decision making are getting even bigger. Therefore, corporate strategy has to agree with the financial policy of the firm. Second, reputational resources (e.g. external R&D and advertising intensity) show a positive correlation due to the information available. In the case of R&D investments, a more detailed analysis is necessary because internal R&D intensity is negatively correlated to debt, whereas external R&D intensity has no relevant effect.

As the study of Vicente-Lorente (2001) has developed a framework to jointly analyse resource-based strategy and capital structure, future research should examine the impact of corporate strategy on different forms debt characteristics, like debt maturity or covenants. According to the strategic aspects, other relevant resources that shape the firm's structure and influence financial decision making of the management should be examined in order to get a sound knowledge about the possibilities and the consequences of designing the strategy and financial policy of the firm.

Conclusion

This study has presented the importance and uniqueness of performance sensitivity in debt contracts, categorised into covenants, performance pricing and collateralization. The most relevant mechanisms of performance-sensitive debt refer to an adjustment of contractual terms by renegotiating or changing interest rates or other contractual terms. Based of the corporate governance perspective, lenders are protected against losses resulting from agency conflicts when using performance-sensitive debt as they can respond to the development of the borrower's performance. Furthermore, the incomplete contracting theory claims that this type of debt contracting results in an increase in efficiency because performance sensitivity provides opportunities to either directly or indirectly adjust contractual terms.

In prior literature performance-sensitive debt, especially covenants and performance pricing, has been based on the agency theory. Primarily, relevant studies questioned, how covenants and performance pricing can solve information asymmetry or agency conflicts. As a covenant breach can lead to dramatic consequences for the borrower, covenants have a deterrent effect and therefore can help to mitigate problems of moral hazard. Performance pricing is categorised into PPInc and PPDec. PPInc hold out the prospect of an interest increase after creditworthiness of the borrower worsens, which is similar to the effects of covenants. Regarding the use of PPDec, it is often claimed that there is a signalling effect. Besides those

results, there are other studies that have demonstrated opposite or different influences on agency problems. For example, the mitigation of hold-up problems could be measured for PPInc whereas covenants increase this agency problem. To this point in time, it is not completely clear how performance-sensitive debt function from an agency theoretical perspective.

Although the agency theoretical perspective on debt financing has significantly contributed to the understanding of the financial decision making process, this study shows links for a more comprehensive interpretation.

Firstly, behavioural finance aims to connect managerial traits to the decision making process in finances. On the management level of the firm future research has to question, if different managerial styles or characteristics have an impact on the use of performance-sensitive debt. Besides the two well-documented behaviour of optimism and overconfidence of managers, there have to be other relevant factors that have an influence on the use of performance-sensitive debt.

Furthermore, strategic researchers claim that the behavioural view is not satisfactory as manager's act in a special company environment, where strategic factors have a great influence. Considering this research stream, a combining framework of corporate strategy and financial policy should be developed. In the sense that strategic literature refers to a resource-based view, future research has to question if strategic resources of the firm have an impact on the use of performance-sensitive debt. If the emphasize is more on the analysis of the structures and processes inside the firm and the influences on financial decision making, another conceptual framework has to be developed and qualitative analysis might be an appropriate method. As the strategy and the management team are success factors for young growth firms, it would be interesting to study the impact on financing decisions, especially the use of performance-sensitive debt, for this sample.

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