

# LIQUIDATION OF COOPERATIVE BANKS IN INDIA: IMPLICATIONS OF PERFORMANCE INDICATORS FOR LIQUIDATION

Rituparna Das<sup>1</sup>

<sup>1</sup>Centre of Risk Management and Derivatives, National Law University Jodhpur

**Abstract:** *The crisis of 2007-08 posed new challenges for the cooperative banks. On one hand, it has highlighted the importance of liquidity and funding risk for banking activity. The stakeholder-based cooperative banks are faced with the problem of how to improve their access to wholesale funding. On the other hand, the deficiencies in their corporate governance are exposed. In arguing that the indicators of performance of the management give the signal of movement of a cooperative bank towards or away from the position that may attract delicensing or liquidation, this paper analyses and compares a number of urban cooperative banks, based on which a decision may be taken regarding which bank is how distant from failure.*

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## Introduction

The genesis of cooperative banks in India is inspired by the success of the experiments related to the cooperative movement in Britain and the cooperative credit movement in Germany. In India before the nation gained independence, the Urban Cooperative Banks (UCBs) hijacked public confidence from the joint stock banks. During the banking crisis of 1913-14, when fifty seven joint stock banks collapsed, there was flight of deposits from those banks to UCBs. With the legislation of the Government of India Act 1919, the subject of cooperation is transferred from the Central Government to the State Governments. The cooperative banks in India are registered as per the provisions of the State Cooperative Societies Act of the State concerned or the Multi State Cooperative Societies Act, 2002. The Registrar of Cooperative Societies (RCS) of State concerned or the Central Registrar of Cooperative Societies (CRCS), regulate them.

Large cooperative banks with paid-up share capital and reserves of Rs. 1000,00 were brought under the purview of the Banking Regulation Act 1949 with effect from March 1, 1966 and within the jurisdiction of the Reserve Bank of India (RBI). The job of issuing licence to UCBs under Section 22 and 23 of the Banking Regulation Act, 1949 (AACS) to carry on banking business and to open new places of business (branches, extension counters, etc.) respectively is vested with the RBI. Further by force of Section 56 of the Banking Regulation Act 1966, the RBI can inspect any banking company whenever it deems fit. Thus the UCBs are under dual control.

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## **Background**

When the RBI finds the financial performance of an UCB fragile in terms of capital, quality of asset etc, it orders delicensing in the case when the state government cannot arrange merger of the same with a stronger bank. One such case is Bhubaneswar Urban Cooperative Bank in the State of Odisha. On the other hand Rupee Urban Cooperative Bank in the State of Maharashtra is waiting to be merged with Allahabad Bank.

Chakrabarty (2011) noted how failure of Madhavpura Mercantile Co-operative Bank gave birth to contagion risk facing other cooperative banks in Gujarat who were users of its remittance facility. Thakur (2013) reported the criminal litigation by the RBI against Indian Mercantile Co-operative Bank.

In India structurally, most of the UCBs being single-branch banks, have the problem of correlated asset risk which, means the entire bank can come down if a local problem of significant scale affects the area. Their systemic risk has a regulatory concern. To the extent that UCBs often borrow and lend among themselves, the collapse of one UCB can actually destabilise others. In the case where merger is taking place, depositors are fully safe but in the case of delicensing or liquidation, the deposits up to one lakh (one hundred thousand) rupees only are safe. This experience of India is quite in line with what happened in the industrialized countries. There the 2007-08 financial crisis posed new challenges for the cooperative banks. On the one hand it has highlighted the importance of liquidity and funding risk for banking activity. Thus stakeholder-based cooperative banks are faced with the problem of how to improve their access to wholesale funding. On the other hand, the crisis revealed some deficiencies related to their corporate governance.

## **Existing Information on Reasons Behind Liquidation of Cooperative Banks**

The process of liquidation of cooperative banks in India follows the guidelines given by the relevant state government, i.e. Government of Punjab (2000). This document talks about the duties of the Registrar and liquidator, which are post-failure activities and does not contain any reference to economic and financial factors contributing to liquidation. Pandey and Chandrasekharan (2013) succinctly unfolded the factors specific to performance of the Rupee Cooperative Bank that made the delicensing by the Reserve Bank of India. The bad loans are found to have contributed to the ailing health of this bank.

From the reports on failure of the co-operative banks in foreign countries like Greece and UK, some literature may be extracted. Gr Reporter (2012) attributed the failure of three cooperative banks - Achaean Cooperative Bank LLC, Cooperative Bank of Lamia LLC and Cooperative Bank of Lesvos-Lemnos LLC to primarily poor management and abuse. Kelly (2014) attributed the Co-operative Bank in UK primarily to poor management and poor quality of the loan contained in the loan portfolio of merged Britannia Building Society that led to shortfall in capital. Thus indirectly the position of capital is considered to be an indicator of management. If there is excess capital over and above regulatory norms, it indicates sound management and vice versa. So the measurements of all the activities of a bank that determine capital, determine performance of management. Poor management or failure of management leads to failure of the bank. During the post-crisis era Bikker (2010) is a comprehensive paper on bank performance. During the pre-crisis era Basu (2003) is an informative paper on bank failure.

The rest of the paper contains analyses and comparison of a number of urban cooperative banks, based on that decision may be taken regarding which bank is how distant from a situation of failure.

## **Liquidation or Cancellation of License**

When a bank fails it is liquidated or merged. Post detection of irregularities leading to failure, if the Central Bank cancels license of a bank, the financial information about the closed or pre-merger bank becomes no longer available in public domain. These banks remain inaccessible for study. Hence the sample consists of those urban operating cooperative banks, about whom data is available. A measure or index of their performances is required to be developed with which to distinguish between or rate their performances.

## **Concept of Cooperative Bank**

According to the International Co-operative Alliance Statement of co-operative identity, a co-operative is an autonomous association of persons united voluntarily to meet their common economic, social, and cultural needs and aspirations through a jointly-owned and democratically-controlled enterprise. Accordingly a co-operative bank is a financial entity which belongs to its members, who are at the same time the owners and the customers of their bank. Co-operatives are based on the values of self-help, self-responsibility, democracy, equality, equity and solidarity. Thus Co-operative banks are often created by persons belonging to the same local or professional community or sharing a common interest. In the tradition of their founders, co-operative members believe in the ethical values of honesty, openness, social responsibility and caring for others. So cooperative banks generally provide their members with a wide range of banking and financial services (loans, deposits, banking accounts etc). In this way are pursued the following seven co-operative principles: (i) Voluntary and Open membership, (ii) Democratic Member Control, (ii) Member Economic Participation, (iii) Autonomy and Independence, (iv) Education, Training and Information, (v) Co-operation among Co-operatives and (vi) Concern for Community.

Because the co-operative bank members are both owners as well as customers, the first aim of a co-operative bank is not to maximise profit but to provide the best possible products and services to its members. Some co-operative banks only operate with their members but most of them also admit non-member clients to benefit from their banking and financial services.

Co-operative banks differ from stockholder banks by their organization, their goals, their values and their governance. In most countries, they are supervised and controlled by banking authorities and have to respect prudential banking regulations, which put them at a level playing field with stockholder banks. Depending on countries, this control and supervision can be implemented directly by state entities or delegated to a co-operative federation or central body. In India there are broadly two categories of cooperative banks – urban cooperative banks and rural cooperative banks. The urban cooperative banks need to follow the same rule as commercial banks in the case of cash reserve ratio and statutory liquidity ratio (Reserve Bank of India, 2014a). Even if their organizational rules can vary according to their respective national legislations, co-operative banks share common features like (i) they are owned by customers, (ii) co-operative banks are owned and controlled by their members, who democratically elect the board of directors, based on the co-operative principle of one vote per member, and (iii) a sizeable part of the yearly profit, benefits or surplus is usually

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allocated to constitute reserves. A part of this profit can also be distributed to the co-operative members, with legal or statutory limitations in most cases. Profit is usually allocated to members either through a patronage dividend, which is related to the use of the co-operative's products and services by each member, or through an interest or a dividend, which is related to the number of shares subscribed by each member.

### **Concept and Determinants of Bank Performance**

European Central Bank (2010) understands bank performance as a bank's capacity to generate sustainable profitability, and its earnings, efficiency, risk-taking and leverage as key drivers of their performance. European Central Bank (2010) distinguished between three types of measures – (i) traditional measure, (ii) economic measure and (iii) market based measure. Traditional measures mean Return on Assets, Return on Equity, Cost to Income Ratio and Net Interest Margin. Economic measures of performance mean Economic Value Added (EVA) and Risk Adjusted Return on Capital (RAROC). Market based measures mean total share return, price earning ratio (P/E), price to book value (P/B) and credit default swap (CDS). After conducting a survey on preferences of bank analysts, consultants and rating agencies regarding types of performance indicators, European Central Bank (2010) found that bank analysts prefer return on equity as measure of efficiency, price earning ratio as market based measure and coverage ratio as credit risk measure. Consultants prefer cost to income ratio and return on assets as measures of efficiency, credit default swap and price earnings ratio as market based measures and non performing loan ratio as credit risk ratio. Regarding the limitation of return on equity as an indicator of performance, European Central Bank (2010) noted that (i) return on equity failed to discriminate the best performing banks from the others in terms of sustainability of their results against the backdrop of the crises that have been occurring since 2007, (ii) it is a short-term indicator of the current health of institutions and does not reflect the institution's long-term strategy or long-term damage and (iii) It fails in times of stress amidst uncertainty surrounding the medium-term profitability of institutions. The core findings of European Central Bank (2010) are (i) the consistency of risk appetite with the business structure and strategy of a bank is a highly important element in the assessment of a bank's capacity to perform in the future, (ii) it is essential to take account of the quality of assets, the funding capacity and the risk associated with the production of value, and (iii) a good performance measurement framework should incorporate more forward looking indicators and be less prone to manipulation from the markets

Reserve Bank of India (2014b) distinguished between two measures of bank performance from supervisory view point - (i) CAMEL (Capital Adequacy, Asset Quality, Management, Earnings, Liquidity and Systems and Control) and (ii) RBS (Risk Based Supervision). The former is backward looking by nature while the latter is forward looking. Because of a mismatch during the pre-crisis era perceived by the Reserve Bank of India between supervisory responsibilities and available resources necessitating a review of the supervisory processes and the rationalization of the organizational structure for bank supervision there has been a shift towards RBS away from the erstwhile CAMELS approach in the post crisis period.

As per Hughes and Mester (2013) a banks' ability to perform efficiently, i.e. to adopt appropriate investment strategies, to obtain accurate information concerning their customers' financial prospects, and to write and enforce effective contracts – depends in part on the property rights and legal, regulatory, and contracting environments in which they operate; such an environment includes accounting practices, chartering rules, government regulations,

and the market conditions (e.g., market power) under which banks operate. Differences in these features across political jurisdictions can lead to differences in the efficiency of banks across jurisdictions

As per Donald, Wallace and Rose (1974) the performance of commercial banks should be measured by a host of variables which are jointly determined by market structure, demand, and other factors, not by a single proxy variable, such as the loan rate or bank profits (return on equity); the specification of the model should not rest upon a single measure of bank performance (as in the regression studies cited above) but should be multivariate (for example, a set of simultaneous equations). In their opinion bank performance is a multidimensional concept, including both quantitative and qualitative aspects, and cannot be measured by one variable in isolation but by examining several measures of performance jointly interacting; It helps describe the overall relationship between a set of index variables measuring different aspects of bank performance and a set of numerous predictor variables measuring market structure and other factors, if any, to affect performance; further, bank analysis helps determine the weights for each set of predictor variables so that their relative importance in affecting the set of performance measures can be determined.

## **Literature on Measuring Bank Performance**

There is hardly any literature on cooperative bank performance. But there is substantial literature on performances of commercial banks. A review of the same is imperative since the techniques of performance assessment are same.

During the pre-crisis era Basu (2003) attributed bank failure to credit default. During the post crisis era Bikker (2010) reviewed twenty methods that were used to measure banking competition and efficiency for the most important forty countries comprising old and new EU countries, OECD countries and emerging economies. He noted that (i) there is a degree of consensus to the effect that the Anglo-Saxon countries like USA and UK are highly competitive, (ii) France, Germany and Italy are considered to be less competitive owing to strong public interference and inadequate consolidation, (iii) competition in Southern Europe is very modest as a result of lagging development, exemplified by insufficient consolidation and low cost-sensitiveness in bank clients, (iv) off late strong government interference with banks is witnessed in several countries including Germany, (v) it is universally accepted that competence is stronger in developed countries than in emerging economies, with the least developed countries bringing up the rear, and (vi) various indicators produce diverging results for the same countries. This paper examined various types of performances of financial institutions like efficiency, cost, profit and market structure, their mutual relationships, their correlation with competition, models used to estimate competition like Lerner Index, SCP Model, Cournot Model, Boone Indicator and Panzar Rose Model. This paper found following three explanations why various indicators produce diverging results for the same countries - (i) the indicators do in fact measure different things, (ii) competition, efficiency and profitability are all different things and (iii) their definitions are different. This paper revealed competition as a reliable indicator to play a dominant role in assessing the performance of the banks.

By using bank level data Sufian and Habibullah (2009) examined how bank specific characteristics and the macroeconomic environment affected the profitability of the Thailand and Malaysian banking sectors over the period 1992-2003. This paper found that (i) liquidity is negatively related to Thailand banks' profitability, but not in Malaysia, while network embeddedness has negative relationship with Malaysian banks, but not Thailand banks, (ii) as a macroeconomic indicator, economic growth was positively related to Thailand bank

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profitability only during the pre-crisis period and the impact of inflation is positive on Thailand banks' profitability during the crisis and post-crisis periods, while inflation is negatively related to Malaysian banks' profitability during the crisis period, and (iii) the Thailand banking sector has been relatively more profitable during the pre-crisis period, while the opposite is true for the Malaysian banking sector. Sufian and Habibullah (2010) studied the impact of the crisis on Indonesian bank profitability during the period 1990-2005. This paper found that the Asian financial crisis exerts negative and significant impact on the profitability of Indonesian banks, while Indonesian banks have been relatively more profitable during the pre-crisis compared to the post-crisis and crisis periods. In detail, this paper found (i) the sharp decline in the domestic currency had damaging effects on the leading banks' balance sheets and (ii) banks' revenues shrank as banks could not pass on higher rates to distressed corporate borrowers, subsequently resulting in negative interest rate spreads, reducing banks' net income, and damaging their capital adequacy.

Sharma and Panwar (2014) examined the impact of Euro crisis on Indian banks. This paper found this crisis could dent them meagrely in terms of net interest margin, credit growth rate and deposits on savings account and current account because of regulatory restrictions on their exposure to risky assets

Goel and Bajpai (2013) found that Indian banks, due to their conservative approach, have not been much impacted and India remained resilient from the impact of the world's recession. Through two-way ANOVA Test this paper found that (i) there is no variation in operating profit ratio and return on assets among the group of banks during the slot of recession and on these profitability ratios there is no impact of financial crisis of Indian Banking sector, (ii) there is no variation in capital adequacy ratio, (iii) there is no variation in the cash-deposit ratio of banks during recession, (iv) there is no variation in profit per employee, (v) there is variation in business per employee, (vi) there is no variation in credit to deposit ratio and (vii) there is no variation in investment deposit ratio. This paper concluded that (i) the bank are sufficiently equipped to absorb losses occurred due to global recession, (ii) the Indian banks have high liquidity which shows that the banks have effective cash management system and (iii) the Indian Banks are professionally managed and have made them to grow faster and stronger.

Das (2013) attempted to analyze the impact of the financial crisis on the net Interest margin of Indian banks. This paper considered variables of three different types: bank specific, those representing the banking industry, and a third category consisting of macro-economic variables. This paper used univariate and multivariate regression analysis using a wide range of bank-wise panel data for the period 1992 through 2010. This paper examined the impact of the financial crisis on the variables, considered under the monetary transmission literature, such as size, capital and liquidity. When analyzed from the ownership angle, this paper observed that the public sector banks were affected significantly during the crisis. This paper found that, during the second half of the crisis, the margin of banks with low capital and poor liquidity was impaired significantly when compared with banks that had sufficient capital and liquidity support.

Das (2014) examined how the key financial ratios of banks evolve in course of time. This paper applied principal component analysis on the key financial ratios during two financial years from April 2011 to March 2013 of old generation private sector banks in India and found that non performing assets, along with return on assets and net interest margin plays a significant role in deciding profitability.

Shukla (2014) compared (i) the banks of European Region like Greece, Ireland, Portugal, Italy, Spain, France, Germany, UK and Netherlands with respect to sovereign exposure during the post subprime crisis period, (ii) the banks of France, Germany, Greece, Italy, Japan,

Portugal, Spain, UK, USA, Brazil, China, India, Malaysia and Russia with respect to capital to risk weighted asset ratio during the post subprime crisis period, (iii) the banks of USA with respect to sectoral delinquency rates between 1997 and 2006, (iv) the Malaysian banking system with respect to average total assets per institution, capital to risk weighted asset ratio, return on assets, return on equity and net non performing loans during the post subprime crisis period, (v) the banks of Mexico and Brazil during the post subprime crisis period, (vi) the banks of Argentina with respect to total assets, total capital and total loans during the post subprime crisis period, (vii) the banking system of Saudi Arabia with respect to capital adequacy ratio and non performing loans during pre and post subprime crisis period and the banks of India with respect to capital to risk weighted asset ratio, net NPA ratio, ratio of liquid assets to total assets, return on advances, deposits, loans and advances, net profit, gross NPA, net NPA and slippage ratio, during the post subprime crisis period. This paper concluded that banks in India have exhibited resilience during the crisis period but during 2011 and 2012 they are experiencing pressure on their margin, e.g. the CRAR ratios of Indian banks have declined marginally and non-performing assets are on the rise. Indian banks are also exhibiting signs that their asset quality is on the decline.

## **Performance of Urban Cooperative Banks in India**

The performance of Cooperative Banks during the annual year 2012-13 compared to the preceding year is analyzed by Reserve Bank of India (2013). These points in a nutshell are

- (i) concentration of banking businesses in terms of sum of deposits and advances in the western region,
- (ii) increase in concentration of sizes of deposits as well as advances among these banks,
- (iii) sharp increase in both their interest and non-interest incomes,
- (iv) no changes in returns on asset and equity,
- (v) sustained improvement in asset quality,
- (vi) rise in provisions for non performing assets,
- (vii) domination of small enterprise and housing in credit,
- and
- (viii) stable growth in the balance sheets

## **Data**

In line with Reserve Bank of India (2002) the cooperative banks having deposits more than INR 100 crore are required to disclose the data on certain financial variables in their 'Notes on Accounts' to their Balance Sheet in their websites. The details of available data are provided in the 'APPENDIX' to this paper. A number of these variables are in the form of ratios and considered to be indicators of performance. A sample of eight urban cooperative banks is selected based on the information available regarding the following ratios:

1. IIR: Interest Income Ratio
2. CRAR: Capital to Risk Weighted Asset Ratio
3. GNPAP: Gross Non-performing Asset Ratio
4. NNPAR: Net Non-performing Asset Ratio
5. ROAR: Return on Assets Ratio
6. C/D: Credit to Deposit Ratio

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7. OPR: Operating Profit Ratio, i.e. operating profit as a percentage of working funds

Data for two financial years 2012-13 and 2013-14 are collected and laid down in Table 1 and Table 2 respectively regarding above seven ratios in following eight banks:

1. Goa Urban Cooperative Bank
2. Kalyan Janata Sahakari Bank
3. Karad Urban Co-operative Bank
4. NKGSB Co-operative Bank
5. Punjab & Maharashtra Co-operative Bank
6. The Shamrao Vithal Co-operative Bank
7. TJSB Sahakari Bank
8. The Akola Urban Co-operative Bank

Table 1

Determinants of Performance 2012-2013							
Cooperative Bank	IIR	CRAR	GNPAR	NNPAR	ROAR	C/D	OPR
Goa Urban Cooperative Bank	8.66	14.01	17.77	11.42	1.14	0.65259	1.27
Kalyan Janta Sahakari Bank	9.11	12.56	3.74	0	0.99	0.71123	1.65
Karad Urban Cooperative Bank	10.5	11.6	4.34	2.43	0.79	0.62366	1.55
NKGSB Cooperative Bank	9.33	13.43	3.93	2.22	1.1	0.66421	1.51
Punjab Maharashtra Cooperative Bank	9.64	12.83	0.98	0.18	1.67	0.69335	1.47
The Shamrao Vithal Co-operative Bank	10.4	13.36	3.2	1.48	1	0.67007	1.81
TJSB Sahakari Bank	10.2	13.48	3.32	3.32	1.31	0.64067	1.98
The Akola Urban Cooperative Bank	9.25	8.87	11.98	7.19	0.06	0.66563	1.29
Source: Annual Reports of Above Banks							



Table 2

Determinants of Performance 2011-2012							
Cooperative Bank	IIR	CRAR	GNPAR	NNPAR	ROAR	C/D	OPR
Goa Urban Cooperative Bank	9.19	14.8	6.68	0.69	0.68	0.66862	1.91
Kalyan Janta Sahakari Bank	8.47	12.55	3.19	0	0.93	0.72448	1.49
Karad Urban Cooperative Bank	10.1	11.39	3.62	1.79	0.83	0.65799	1.67
NKGSB Cooperative Bank	8.96	13.36	2.41	0	1.06	0.60264	1.45
Punjab Maharashtra Cooperative Bank	9.62	13.28	1.02	0.16	1.63	0.73823	1.45
The Shamrao Vithal Co-operative Bank	10.2	12.78	3.02	0.74	1.05	0.64075	2.03
TJSB Sahakari Bank	9.73	15.03	2.63	2.63	1.29	0.60764	2.25
The Akola Urban Cooperative Bank	8.99	11.81	9.81	4.5	0.66	0.68762	1.54
Source: Annual Reports of Above Banks							

## Method of Analysis

This paper proposes to perform Principal Component Analysis (PCA) that is permissible for the size of data mentioned above. The reason is mentioned below.

If performance of a bank is defined to be determined by different linear combinations of above ratios, it is important to know the best combination, the second best combination etc in terms of their capacity to explain the variance in performance. In PCA literature the above best combination is called Factor, Principal Component or Eigenvector. In this method the number of eight determinants is reduced to two Principal Components. By nature, the concept of performance is qualitative, whereas the determining ratios are quantitative. Using PCA one may qualitatively compare the performances of the banks, i.e. ascertain which bank is performing well or poorly, and which banks are performing similarly. Canonical analysis or multivariate regression is not feasible here. A qualitative variable may be categorical or binary. For running multivariate regression reasonably sizeable time series data of all of the ratios need to be available for the purpose of enough degrees of freedom such as to arrive at meaningful magnitudes of 't' values of the regressors of the ratios and the  $R^2$  value of the regression. But such volume of data is not available in the public domain at the time of documenting this paper, perhaps that is why there is so far no paper on the performance of the cooperative banks in India. Again there is hardly any scope for Logistic Analysis because of non-availability of binary variables like the answers to the question like 'whether a bank is failing or not'. The PCA here is run using XLStat Pro 2014 software. A simple and lucid account of PCA for non-specialists is laid down by Atchley (2007). The technical account of PCA is given in Abdi and Lynne (2010). This paper would first apply PCA towards quantifying the performance of a cooperative bank. If such attempt fails, it would apply Linear Discriminant Analysis and so on.

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## Results in Temporal Comparison

The PCA on the data in Table 1 and Table 2, show that

1. During 2012-2013, there is the strongest negative correlation -0.67 between GNPAR and OPR (Table 3) whereas during 2011-2012 there is the strongest negative correlation -0.8 between GNPAR and ROAR (Table 4). This means one of the ratios may be omitted from the dataset in a year.
2. There is the strongest positive correlation between GNPAR and NNPAR in both the years. It is 0.968 in 2012-2013 (Table 3) and 0.701 in 2011-2012 (Table 3). Hence one of these ratios may be omitted from the data set.

Table 3

Correlation matrix (Pearson (n)): 2012-2013							
Ratios	IIR	CRAR	GNPAR	NNPAR	ROAR	C/D	ORR
IIR	<b>1</b>	-0.005	-0.639	-0.520	0.084	-0.453	0.666
CRAR	-0.005	<b>1</b>	-0.171	-0.109	0.830	0.025	0.395
GNPAR	-0.639	-0.171	<b>1</b>	0.968	-0.434	-0.242	-0.670
NNPAR	-0.520	-0.109	0.968	<b>1</b>	-0.357	-0.411	-0.575
ROAR	0.084	0.830	-0.434	-0.357	<b>1</b>	0.191	0.354
C/D	-0.453	0.025	-0.242	-0.411	0.191	<b>1</b>	-0.073
ORR	0.666	0.395	-0.670	-0.575	0.354	-0.073	<b>1</b>

Table 4

Correlation matrix (Pearson (n)): 2011-2012							
Ratios	NIM	CRAR	GNPAR	NNPAR	ROAR	C/D	ORR
IIR	<b>1</b>	-0.044	-0.304	0.103	0.287	-0.309	0.536
CRAR	-0.044	<b>1</b>	-0.201	-0.215	0.304	-0.334	0.571
GNPAR	-0.304	-0.201	<b>1</b>	0.701	-0.800	0.080	-0.021
NNPAR	0.103	-0.215	0.701	<b>1</b>	-0.368	-0.138	0.229
ROAR	0.287	0.304	-0.800	-0.368	<b>1</b>	0.112	0.011
C/D	-0.309	-0.334	0.080	-0.138	0.112	<b>1</b>	-0.546
ORR	0.536	0.571	-0.021	0.229	0.011	-0.546	<b>1</b>

3. The first principal components F1, F2 and so on in sequence of their capacity to explain the variation in the performance of above cooperative banks for 2012-13 and 2011-2012 respectively are given in Table 5 and Table 6.

Table 5

Principal Components: 2012-2013							
	<b>F1</b>	<b>F2</b>	<b>F3</b>	<b>F4</b>	<b>F5</b>	<b>F6</b>	<b>F7</b>
<b>IIR</b>	-0.363	-0.515	-0.194	-0.183	0.268	0.676	-0.042
<b>CRAR</b>	-0.252	0.503	-0.474	0.131	-0.543	0.354	-0.145
<b>GNPAR</b>	0.507	0.103	-0.243	0.234	0.155	0.327	0.698
<b>NNPAR</b>	0.473	0.055	-0.390	0.178	0.408	0.029	-0.650
<b>ROAR</b>	-0.339	0.499	-0.263	-0.411	0.568	-0.202	0.188
<b>C/D</b>	-0.080	0.444	0.653	0.283	0.274	0.442	-0.143
<b>ORR</b>	-0.450	-0.147	-0.179	0.783	0.214	-0.271	0.104

Table 6

Principal Components: 2011-2012							
	<b>F1</b>	<b>F2</b>	<b>F3</b>	<b>F4</b>	<b>F5</b>	<b>F6</b>	<b>F7</b>
<b>IIR</b>	-0.311	0.288	0.673	0.000	-0.318	-0.490	-0.160
<b>CRAR</b>	-0.362	0.216	-0.651	0.334	-0.037	-0.396	-0.359
<b>GNPAR</b>	0.543	0.288	-0.132	0.196	-0.117	-0.469	0.577
<b>NNPAR</b>	0.340	0.424	0.255	0.443	0.520	0.170	-0.379
<b>ROAR</b>	-0.489	-0.255	0.162	0.444	0.463	-0.081	0.502
<b>C/D</b>	0.207	-0.477	0.107	0.649	-0.508	0.116	-0.162
<b>OPR</b>	-0.282	0.561	-0.056	0.189	-0.376	0.578	0.302

4. For 2012-13, F1 and F2 together explained 72.24% variation in performance of the aforesaid cooperative banks in Figure 1 but for 2011-2012 they explained 66.07% in Figure 2.

# LIQUIDATION OF COOPERATIVE BANKS IN INDIA: IMPLICATIONS OF PERFORMANCE INDICATORS FOR LIQUIDATION

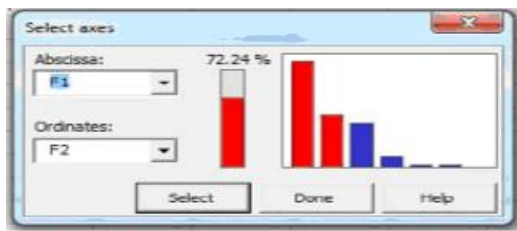


Figure 1



Figure 2

The cumulative variability of different factors in a year is illustrated by scree plots in Figure 3 and Figure 4 for 2012-13 and 2011-12 respectively.

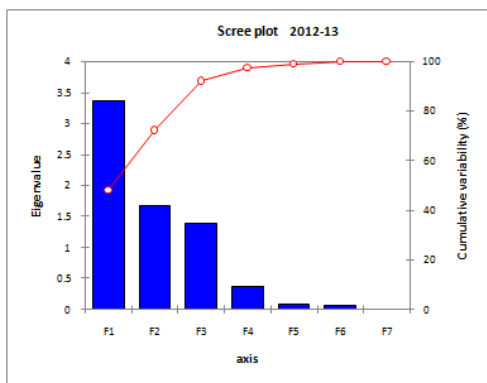


Figure 3

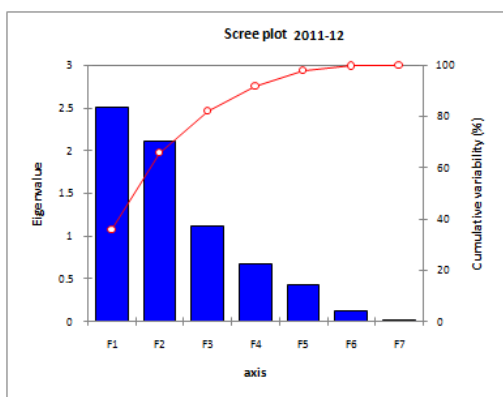


Figure 4

5. The spatial closeness of a ratio to a principal factor is measured by squared cosine. The higher the squared cosine of the variable more is the closeness visible in diagram and *vice versa*. These measures of closeness are laid down in Table 7 and Table 8 for 2012-13 and 2011-12 respectively with bold figures. GNPAR and NNPAR are the closest to F1 and IIR and CRAR are the closest to F2 for 2012-13. For 2011-12, the first and second closest to F1 are respectively GNPAR and ROAR and to F2 are respectively OPR and C/D.

Table 7

Squared cosines of the variables: 2012-13							
	F1	F2	F3	F4	F5	F6	F7
IIR	0.444	<b>0.448</b>	0.053	0.012	0.007	0.035	0.000
CRAR	0.214	<b>0.428</b>	0.313	0.006	0.028	0.010	0.000
GNPAR	<b>0.866</b>	0.018	0.082	0.020	0.002	0.008	0.003
NNPAR	<b>0.753</b>	0.005	0.212	0.012	0.016	0.000	0.003
ROAR	0.387	<b>0.420</b>	0.096	0.062	0.031	0.003	0.000
C/D	0.022	0.332	<b>0.594</b>	0.030	0.007	0.015	0.000
OPR	<b>0.683</b>	0.037	0.045	0.226	0.004	0.006	0.000

Table 8

Squared cosines of the variables: 2011-12							
	F1	F2	F3	F4	F5	F6	F7
IIR	0.243	0.176	<b>0.506</b>	0.000	0.044	0.031	0.000
CRAR	0.330	0.098	<b>0.473</b>	0.075	0.001	0.020	0.002
GNPAR	<b>0.739</b>	0.175	0.020	0.026	0.006	0.028	0.006
NNPAR	0.290	<b>0.381</b>	0.072	0.133	0.118	0.004	0.003
ROAR	<b>0.601</b>	0.138	0.029	0.133	0.093	0.001	0.005
C/D	0.108	<b>0.480</b>	0.013	0.284	0.112	0.002	0.001
OPR	0.200	<b>0.667</b>	0.004	0.024	0.062	0.042	0.002

Hence the number of ratios for performance comparison purpose reduced from seven to six - GNPAR, IIR, OPR, NNPAR, ROAR and OPR. But if we take one of GNPAR and NNPAR and decide to take two ratios with highest squared cosines related to F1 and F2, the number of relevant ratios reduce to four - GNPAR, OPR, IIR and CRAR for 2012-13 and for 2011-12 they are GNPAR, ROAR, OPR and C/D.

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6. Similar to the squared cosines of the variables in Table 7 and Table 8, the squared cosines of the above observations illustrate the positions of eight cooperative banks are given in Table 9 and Table 10 for 2012-13 and 2011-12 respectively.

Table 9

Squared cosines of the observations: 2012-13							
	F1	F2	F3	F4	F5	F6	F7
Goa Urban Cooperative Bank	<b>0.595</b>	0.210	0.193	0.000	0.000	0.001	0.000
Kalyan Janta Sahakari Bank	0.091	0.218	<b>0.590</b>	0.092	0.005	0.000	0.003
Karad Urban Cooperative Bank	0.024	<b>0.766</b>	0.088	0.111	0.007	0.001	0.002
NKGSB Cooperative Bank	0.097	<b>0.376</b>	0.000	0.082	0.366	0.068	0.011
Punjab Maharashtra Cooperative Bank	<b>0.353</b>	0.284	0.139	0.188	0.035	0.000	0.000
The Shamrao Vithal Co-operative Bank	<b>0.737</b>	0.072	0.011	0.079	0.000	0.099	0.001
TJSB Sahakari Bank	<b>0.501</b>	0.046	0.337	0.071	0.016	0.028	0.000
The Akola Urban Cooperative Bank	<b>0.681</b>	0.180	0.134	0.002	0.003	0.001	0.000

Table 10

Squared cosines of the observations: 2011-2012							
	F1	F2	F3	F4	F5	F6	F7
Goa Urban Cooperative Bank	0.030	0.173	<b>0.530</b>	0.004	0.226	0.037	0.001
Kalyan Janta Sahakari Bank	0.115	<b>0.670</b>	0.117	0.001	0.019	0.078	0.000
Karad Urban Cooperative Bank	0.052	0.018	<b>0.749</b>	0.148	0.019	0.000	0.013
NKGSB Cooperative Bank	0.063	0.096	0.164	<b>0.454</b>	0.206	0.016	0.000
Punjab Maharashtra Cooperative Bank	0.219	<b>0.567</b>	0.047	0.151	0.001	0.014	0.000
The Shamrao Vithal Co-operative Bank	<b>0.346</b>	0.214	0.249	0.052	0.116	0.003	0.020
TJSB Sahakari Bank	0.396	<b>0.469</b>	0.020	0.058	0.043	0.013	0.001
The Akola Urban Cooperative Bank	<b>0.877</b>	0.049	0.010	0.035	0.027	0.001	0.001

7. The squared cosines of the cooperative banks with respect to F1 and F2 are plotted in Figures 5 and Figures 6 for 2012-13 and 2011-12 respectively. In PCA parlance each cooperative bank is called an observation in Table 11.

Table 11

Observation	Cooperative Bank
Obs 1	Goa Urban Cooperative Bank
Obs 2	Kalyan Janta Sahakari Bank
Obs 3	Karad Urban Cooperative Bank
Obs 4	NKGSB Cooperative Bank
Obs 5	Punjab Maharashtra Cooperative Bank
Obs 6	The Shamrao Vithal Co-operative Bank
Obs 7	TJSB Sahakari Bank
Obs 8	The Akola Urban Cooperative Bank

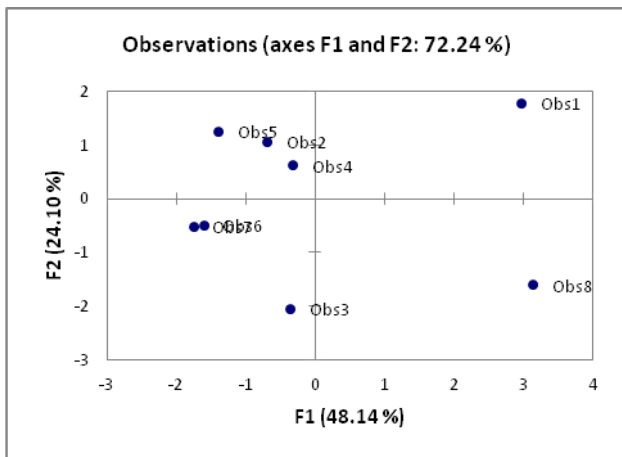


Figure 5

In the above plot Observation 1 and Observation 8 are unique for 2012-13.

# LIQUIDATION OF COOPERATIVE BANKS IN INDIA: IMPLICATIONS OF PERFORMANCE INDICATORS FOR LIQUIDATION

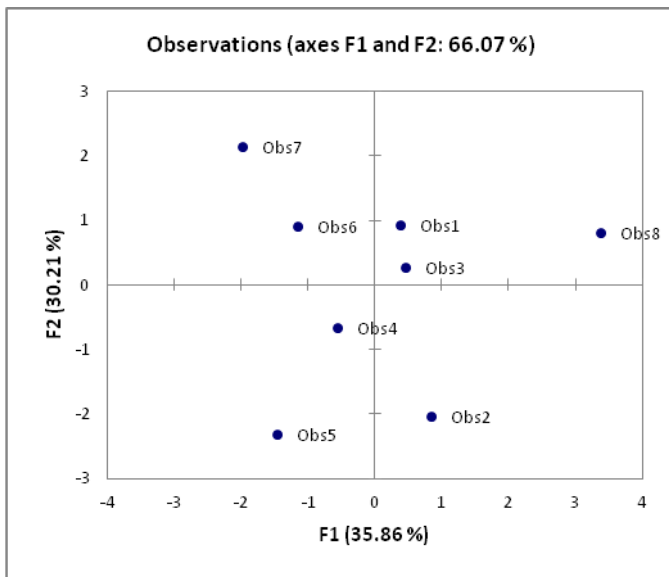


Figure 6

In the above plot Observation 8 is unique for 2011-12.

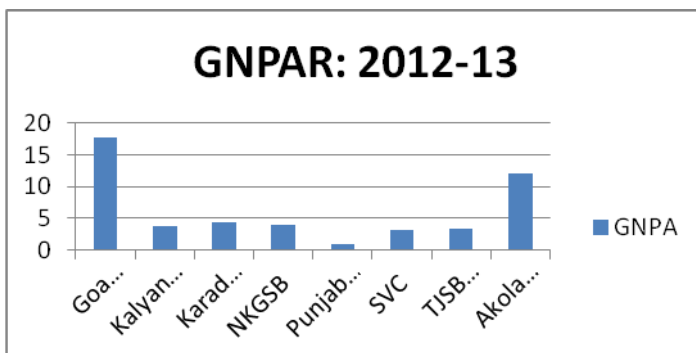


Figure 7

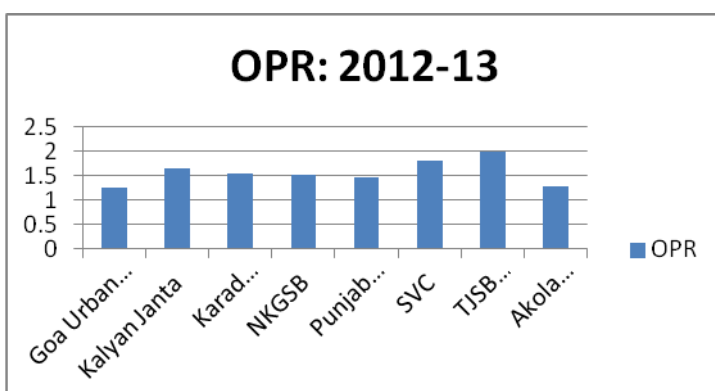


Figure 8



## Validation of Results

For 2012-13, Observation 1 and Observation 8 have distant positions than the rest. These are Goa Urban Cooperative Bank and the Akola Urban Cooperative Bank. For validation of the result for 2012-13 the relevant initial data is examined and it is found that both have similar and very high GNPARG ratio relative to others depicted by Figure 7 and they also have similar but very low OPR relative to others depicted by Figure 8. The reader is suggested to examine the relevant initial data.

## Calculation of Performance

In the above process two cooperative banks having the highest and the second highest GNPARGs and the lowest and the second lowest OPRs. Their performances are calculated as the sum of the seven factors and the factor-scores. The factor scores of each cooperative bank or observation is given in Table 12.

Table 12

Factor Scores: 2012-13							
Observation	F1	F2	F3	F4	F5	F6	F7
Obs1	3.152	1.874	-1.794	0.029	0.040	0.151	0.037
Obs2	-0.725	1.121	1.842	0.727	-0.175	-0.048	0.128
Obs3	-0.382	-2.170	-0.737	-0.827	-0.213	0.068	0.116
Obs4	-0.331	0.651	0.021	-0.304	-0.643	-0.276	-0.111
Obs5	-1.481	1.328	0.930	-1.080	0.468	0.016	-0.026
Obs6	-1.701	-0.532	-0.211	0.557	-0.028	0.623	-0.075
Obs7	-1.858	-0.562	-1.524	0.698	0.334	-0.440	-0.009
Obs8	3.327	-1.710	1.474	0.200	0.216	-0.094	-0.059
Obs9	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Each factor is the weighted average of the seven determinant ratios, the weights being the percentage contributions of the variables to the respective factors. These are given in Table 13.

# LIQUIDATION OF COOPERATIVE BANKS IN INDIA: IMPLICATIONS OF PERFORMANCE INDICATORS FOR LIQUIDATION

Table 13

Contributions of the Variables: 2011-12							
	F1	F2	F3	F4	F5	F6	F7
IIR	13.190	26.553	3.782	3.366	7.195	45.735	0.179
CRAR	6.363	25.342	22.456	1.726	29.483	12.514	2.116
GNPAR	25.707	1.069	5.883	5.470	2.390	10.703	48.778
NNPAR	22.332	0.300	15.201	3.174	16.632	0.086	42.276
ROAR	11.494	24.886	6.901	16.861	32.241	4.096	3.521
C/D	0.647	19.677	42.580	8.034	7.500	19.514	2.048
OPR	20.267	2.173	3.197	61.370	4.559	7.353	1.081

Using Table 13, the values of the seven factors with respect to Goa Urban Cooperative Bank is calculated to be 9.54, 6.51, 6.65, 2.89, 7.55, 7.89 and 13.87 for 2012-13. Now using Table 12 and taking the sum-product of the factors and of contributions of the variables to the factors the performance measure of Goa Urban Cooperative Bank is calculated to be 32.44. The reader may calculate the same way for other banks and may compare among them.

## Conclusion

History of troubled cooperative banks in India accused poor management or failure of management for those which were delicensed or liquidated. This paper argues that the indicators of how management is performance gives signal of which bank is moving toward or away from the position that may attract delicensing or liquidation. Since there is so far no attempt towards measuring the performances of the cooperative banks, this paper is an effort in this direction. It worked upon two samples of key ratios (Gross Non Performing Assets Ratio, Operating Profit Ratio etc) of eight scheduled cooperative banks during two financial years 2012-13 and 2011-12. The Student's 't' Test across samples found no difference between the means of these ratios over two years except Capital to Risk Weighted Asset Ratio. So the quantitative comparison of performance proves to be difficult. Because of lack of time series data, and any comprehensive mathematical formula of performances assessment, the Principal Component Analysis is chosen as a tool to develop a mechanism such as to arrive at a number of composite variables constructed out of the aforesaid key variables, which can produce the much coveted performance measure of a cooperative bank. In the process contrasting scenarios came into observation, for example Goa Urban Cooperative Bank has highest Gross Non Performing Assets Ratio and the lowest Operating Profit Ratio. The results of PCA are validated. Since this paper has been able to quantify the performance of a cooperative bank using Principal Component Analysis with validation, there is no further need for any other analysis like Linear Discriminant Analysis. The regulator needs to give a thought to allow the cooperative banks with miserably poor measure of performance to continue.

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# LIQUIDATION OF COOPERATIVE BANKS IN INDIA: IMPLICATIONS OF PERFORMANCE INDICATORS FOR LIQUIDATION

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## APPENDIX

### Note on Public Availability of Financial Information of Scheduled Urban Cooperative Banks of India#

1. Kalupur Bank, Ahmedabad – data not available\*
2. Mehsana Bank, Ahmedabad – data available
3. Nutan Nagarik Sahakri Bank, Ahmedabad – data not Available
4. Rajkot Nagarik Sahakari Bank, Ahmedabad - data available
5. Sardar Bhiladwala Pardi Peoples Coop Bank, Ahmedabad - website not available\*\*
6. Amanath Cooperative Bank, Bangalore – data not available
7. Andhra Pradesh Mahesh Cooperative Urban Bank, Hyderabad – data not available on 2012-13
8. Vasavi Cooperative Urban Bank, Hyderabad – License cancelled in July 2014-09-20
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10. Abhyuday Co-operative Bank – data not available
11. Bharat Cooperative Bank Pune – Only CRAR data available
12. Bombay Mercantile Co-operative Bank – data not available
13. Citizen Credit Co-operative Bank Ltd., Mumbai - Only C/D data available
14. Cosmos Cooperative Bank – CRAR and C/D available
15. Dombivli Nagari Sahakari Bank – data available on only CRAR, GNPARG and C/D
16. Goa Urban Cooperative Bank - data available
17. Gopinath Patil - data available
18. Greater Bombay Cooperative Bank - data available
19. Jalgaon Janta Sahakari Bank - data not available

## LIQUIDATION OF COOPERATIVE BANKS IN INDIA: IMPLICATIONS OF PERFORMANCE INDICATORS FOR LIQUIDATION

20. Jankalyan Sahakari Bank – data not available
21. Janalaxmi Cooperative Bank – data not available
22. Janata Sahakari Bank, Pune – data not available
23. Kalyan Janata Sahakari Bank – data available
24. Karad Urban Cooperative Bank - data not available on 2011-12
25. Mahanagar Co-operative Bank - website not available
26. Mapusa Urban Co-operative Bank of Goa – data not available
27. Nagar Urban Cooperative Bank- data not available
28. Nasik Merchant Cooperative Bank – data not available
29. New India Co-operative Bank Mumbai – data not available
30. NKGSB Co-operative Bank - data available
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32. Punjab & Maharashtra Co-operative Bank - data available
33. Rupee cooperative Bank – data not available
34. Saangli cooperative Bank – data not available on 2012-13
35. Samrao Vitthal Cooperative bank – data available
36. Sloapur Janta Sahakari – data not available
37. Thane Baharat Bank – only C/D ratio
38. Kapole Cooperative Bank – data not available
39. Zoroastrian Bank - data not available for 2012-13
40. Nagpur Nagarik Sahakari Bank – data not available
41. Shikshak Sahakari Bank – data not available
42. Akola Urban Cooperative Bank – data available
43. Khamgaon Urban Cooperative Bank - data not available

# The financial data under disclosure norm are required to be available in the website as per Reserve Bank of India (2002)

\*website and other information available but financial data not available,

\*\* website not available, hence financial data is not available.