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The Sensitivity of Bank Stocks towards Risk Management: An Indian Perspective

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Abstract

This paper tries to use the financial statements information of banks concerning the risk management abilities and to find their sensitivity towards bank stocks performance. The theoretical framework is based on the accounting variables of the bank. By identifying the selected ratios, the overall risk management ability of banks is examined with the help of panel data regression with one-way fixed effects. The results shows that the risk management scores or indicators positively impacted the stock returns of the banks.

Key words: *ROE, Net interest margin, credit risk, CAR, Natural hedging strategy, Financing Gap, Non-interest margin, interest rate risk, NPL.*

Introduction

The term "banking" is not a new concept in India. Since from Vedic time itself it was part of Indian culture. The proper structural form of banking system has traces of evidence from 1770's when the English started establishing banks in India. From the very weak structure of banking at the time of independence have changed into a structured, properly governed and monitored mechanism. The nationalization of banks carried out by Government of India with the objective of removing the barriers in banking sector like monopoly of power by few, concentration of bank branches in urban area and diversifying banking services and products to other sectors were all the early steps in this regard (Kapoor, 2004). The liberalization, privatization and globalization new economic policy of the country helped in increasing the distribution of commercial banking in India. The concentration of banking service in urban areas witnessed significant changes (Chakrabarti, 2005).

The financial crisis that happened during 2008 and other subsequent crisis points to the fact that irrespective of multiple monitoring and regulatory bodies financial institutions are always under the threat of crisis. The crisis or the risk is not only attributable to companies alone but for all the elements coming under the umbrella of financial system. The major classification of risk is subject to Basel 2 rules now (Bessis, 2011). So, the

significance of risk management has become an unavoidable norm or practice to follow. The need for risk management in banking sector arises due to the dynamic and complex environment and the changing nature of banking industry. Banks are no more working as an operating system in which only lending and depositing savings occurs. The variety of services provided by the bank to different stakeholders. The risk can be classified into financial and non-financial risk. The financial risk can be subclassified into credit risk and market risk. Financial risk always includes the element of loss. Different kinds of tools are available for credit risk management. They are exposure ceilings, review, risk rating model, risk based scientific pricing, portfolio management and loan review mechanisms. The market risk is caused by the changes in the market level variables like changes in interest rates, inflation and currency rate fluctuations and so on. This type of risk can also measure using tools like liquidity risk, interest rate risk, forex risk, country risk. The major non-financial risk category is operational risk (Kumar, 2013). Corporate risk management also act as a source of value maximization. The basic underlying assumption for this theory is that shareholders are risk averse and the goal of each firm is value maximization or wealth maximization. Therefore, one can say that risk management helps in improving the value of the firm. The objective of this paper is to examine the vulnerability of banking stocks to risk management. The identification of indicators of risk management pertaining to banking sector is the main focus of the study.

A commercial bank deals with mainly five types of risk. They are credit risk, interest rate risk, liquidity risk, solvency risk and operational risk. Recently commercial banks in India are suffering due to Non-Performing Assets. Earlier the public notion of banks existence was for social benefit than profit maximization. Due to this NPA were not given adequate consideration. But due to the legal reforms and adoption of international conventions and principles in banking sector evident changes can be seen (Mahesh, 2010). Many studies have been conducted prior to this study that identifies the indicators of risk management. The further examination of financial statement analysis helped in identifying some new indicators that is relevant in the present scenario of the economy of the country and the same is incorporated in this study. So, this paper is basically an extension of (Rudra Sensarma M. J., 2009).

Vulnerability is a term which can be widely used in terms of stocks of the firms and their risk management. This term is a dynamic term and it can be considered as sequence of events or a consequence of some shocks. So basically, vulnerability can be considered as a reaction towards a particular event or sequence of events. Vulnerability can be of two types. It can be either policy induced or market induced. Market induced vulnerability affects the same group in different countries. (Paul Glewwe, 1998). This paper considers vulnerability as a reaction towards risk management. so, it can be classified under the policy induced type of

vulnerability. That is the firm specific policy induced form. The firm specific risk management practices and how it is impacting the stock performance of the banking related stocks are examined in this study particularly.

THEORETICAL FRAMEWORK

Six indicators are used for measuring risk. And the performance of bank stocks is measured using ROE which is the profit margin. ROE as a performance measure is always an ambiguity among banks because it can be used as performance measure or risk adjusted measure. Here in this paper, we use ROE as a risk adjusted performance measure. The rationale for using ROE as performance measure is because of the underlying theory that the primary objective of maximization of shareholders return. The use of ROE as a performance measure than Net Profit Margin (NPM) is because the profitability is measured in terms of shareholders perspective. There is evidence where we can see ROE is used as a measure associated during financial crisis. Also, it helps in providing information on value creation and incentive contracts (Christophe Moussu, 2017). ROE is decomposed into banks operating efficiency, asset use efficiency and financial leverage. Asset use efficiency is measured using Asset Turnover and financial leverage using equity multiplier. And further ROA and ROE is expressed in terms of net interest income and expenses.

$$ROE = \frac{PAT}{Total\ Assets} * \frac{Total\ Assets}{Equity} \quad (1)$$

$$ROA = \frac{PAT}{Total\ Assets}$$

$$Equity\ Multiplier = \frac{Total\ Assets}{Equity}$$

$$ROA = \frac{II - IE}{Total\ Assets} + \frac{NII - NIE}{Total\ Assets} - \frac{Provisions}{Total\ Assets} \quad (2)$$

Where II is the interest income, IE is the interest expense. NII is the non interest income and NIE is the non interest expense.

ROA = Net Interest Margin + Non-Interest Margin – provision to Total Assets (3).

ROE = (Net Interest Margin + Non-Interest Margin – Provision to Total Assets) * EM (4)

Where EM is the Equity Multiplier.

Interest rate risk

As per the Basel Committee on Banking Supervision (BCBS) interest rate risk is defined as, "exposure of a bank's financial condition to adverse movements in interest rates". Interest rate risk communicate the dimensions of shock and exposure and effect. The shock can be due to the changes in interest rates, exposure is related to the actual positions of concerned bank (Teichert, 2018). By exploring the accounting data one can find the impact of interest rate risk on profits of the banks. This association can be identified from net interest income of a bank.in short one can say that there is a positive association between interest rates and the net interest margin (William B. English, 2018). The ratio of Net Interest Income to Total Assets is used in this paper to measure the interest rate risk.

$$\text{Interest rate risk} = \frac{\text{Net Interest Income}}{\text{Total Assets}} \quad (5)$$

Credit risk

Credit risk need to be properly monitored and managed because banks always suffer from the probability of bad losses. Various mechanisms were used from earlier onwards to capture the risk by banks. Few mechanisms were risk rating systems, risk pricing systems, loan loss prediction systems and loan portfolio management systems (Robson, 1995). Credit risk management has a positive significant relation with the profitability of banks. Non-Performing loans ratio and CAR can be used to examine the credit risk management of banks (Idowu Abiola, 2014). the provisions allocated for bad debt in the balance sheet is an indicator that banks are trying to prevent the incidence of credit risk. So, we can use provisions as a percentage of total assets to show the credit risk management of banks (Rudra Sensarma M. J., 2009).

$$\text{Credit risk} = \frac{\text{Provisions}}{\text{Total Assets}} \quad (6)$$

Solvency risk/ Capital risk

Solvency can be defined as the ability to repay its long-term debt. It is slightly differed from liquidity where it is more focused on more short term or day to day requirements/obligations. When impact of solvency was measured using debt ratio the results does not produced significant association (DAHIYAT, 2016). It was found that CAR is positively related to ROA, liquidity and the provisions and loan loss reserves to total loans

was negatively related with CAR (Osama A. El-Ansary, 2015). Equity multiplier which is the ratio of Total Assets if increased will also increase ROE but it is having a negative relation with capital to assets ratio. If then it acts as a sign of high solvency risk. So, in this paper we use CAR as a proxy for solvency or capital risk.

Natural hedging strategy

The banks can employ hedging strategy using different types of derivative instruments such as options, futures and currency derivatives. They can use hedging tool by increasing the net non-interest income among the total income. So in this paper we use net non-interest income to total assets ratio as the proxy for natural hedging strategy.

$$\text{Natural hedging Strategy} = \frac{\text{Net non-interest income}}{\text{Total Assets}} \quad (7)$$

Financing Gap

Financing gap can be used as a proxy to measure the liquidity risk of banks. Liquidity is measured often using current ratio and quick ratio. But apart from those conventional measure's liquidity can be measured both quantitatively and qualitatively. As per the Basel committee on Banking Supervision (2000) maturity laddering method can be also used to measure liquidity risk. For a bank deposit are stable source of funding and it can be used to fund for the illiquid assets which is nothing but the loans. So, this difference between the assets and liabilities in terms of loans and deposits can be called as financing gap (Yi-Kai Chen, 2018). So here we use the ratio of financing gap to total assets as proxy for liquidity risk.

$$\text{Liquidity risk} = \frac{\text{Financing gap}}{\text{Total Assets}} \quad (8)$$

Non- Performing Loans

The newest form of risk faced by banks in the current time is the non- performing loans. The inadequate measures of identifying and poor monitoring of NPA can lead bank to financial crisis and can even lead to insolvency. NPA can create issues in terms of lending due to shortage of credit further leading to credit risk. So there arise mismatch between lending and borrowing and liquidity crisis eating away the profitability of banks (Joseph, 2014). Therefore, banks in the present context have to be vigilant regarding the monitoring of NPA's as it become more significant element in risk management.

$$NPL = \frac{\text{Amount of non-performing loans}}{\text{Total amount of outstanding loans}} \quad (9)$$

Data

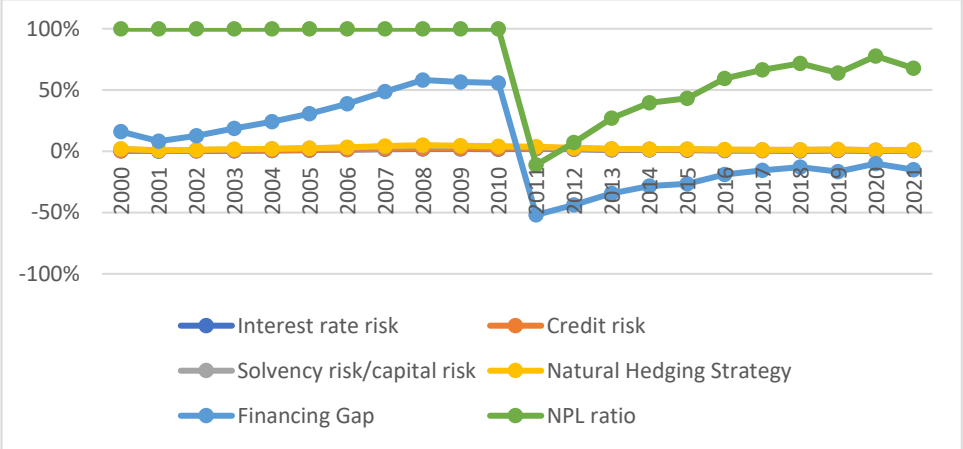
The data was collected for all listed companies under the category of banking services in India from 2000 to 2021. The final sample after removing all the missing observations was 104 and the financial data were collected from CMIE Prowess database. With the help of the data collected using a database the accounting ratios of the risk management of banking stocks were computed. The impact of risk management scores which are calculated from the ratios to the share returns and the annualized return of stocks were also collected.

Risk Management Scores

The risk management scores for the banks were developed by combining the six risk management indicators such as interest rate risk, credit risk, solvency risk/capital risk, natural hedging strategy, financing gap, and NPL ratio. These risk management indicators were combined into a single measure by computing the simple mean of variables using the AVERAGE function as per the year. Many studies make use of risk management scores or risk indexes for defining the risk management of banks such as the study conducted by (Richard Simper, 2017) After computing risk management scores other multivariate techniques were also applied. This study uses Principal component analysis for explaining the factor that explains maximum variation. The use of Principal Component Analysis (PCA) for financial statement analysis has been applied by many studies. By using PCA the variables can be reduced while performing data analysis with minimum loss in original data (Karamizadeh, 2013) The use of PCA in the field of accounting research can be referred from earlier works such as those (Taylor, 1986).

Analysis of results

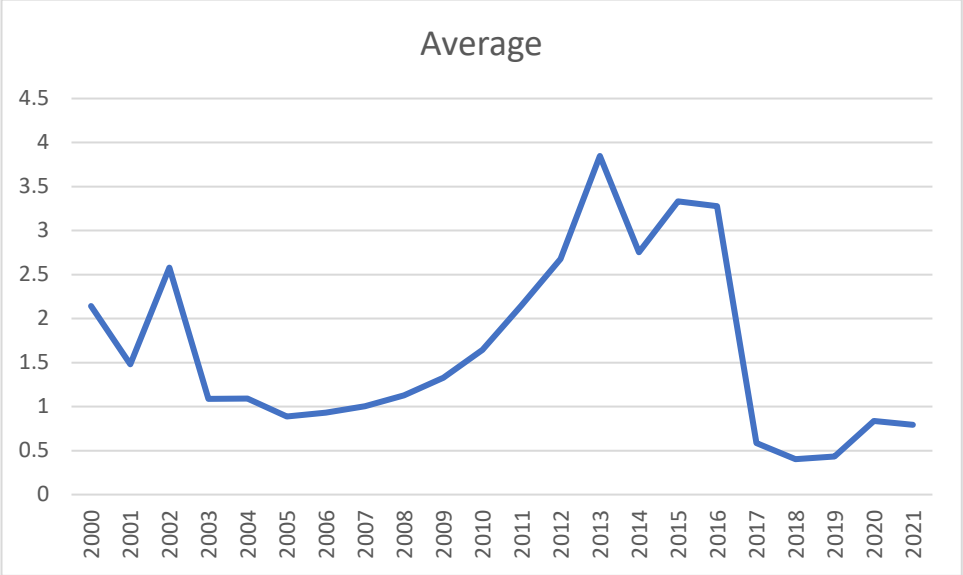
Figure no 1 Trend of risk management variables



The average of the six risk management variables (AVERAGE) gives a graphical representation of the risk management capabilities. (Figure no 1). Trend behavior of the measure of this measure shows that risk management capabilities improved from 2000 to 2010 and a sharp decline in the variables in the year 2010-2011. From 2011 onwards the trend regained the behavior similar to 2000 to 2011 and continued the same trend till 2021. The sharp decline in the year 2010-2011 was mainly due to the asset quality impairment. The other reasons were the continued shocks caused by the failure of banks happened in the year 2009, the catastrophe of falling house prices, and subprime mortgage defaults. The growing NPA's loomed largely from the year 2011 onwards. The sharp decline was also a result of the increased cost of deposits that happened in the year 2011-12 in an elevated interest rate environment. The deterioration in the asset quality which was the other major concern that happened during this period was more evident in public sector banks. Not only did the Gross NPA increase at the system level but also new NPA's also started a steep rise ((Subbarao, 2012). The NPL ratio and Financing gap showed an evident change in their trend behavior and it is caused by the reasons cited above.

Principal component analysis.

Figure no 2 Trend of average score of all the risk management variables



Average of the six risk management variables (AVERAGE) presents us with a precise representative measure of risk management proficiency. Trend behavior of the measure (AVERAGE) shows that risk management proficiency has improved from 2003 to 2012 tremendously and from 2016 the trend is again going downwards. The reason for the decline in the measure might be due to the decline in CAR, the Financing gap, and the increase in NPA. The decline in the measure showcases the banks' poor ability in managing the risk.

Table no 1 Results of principal components analysis

Total Variance Explained							
Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
Interest rate risk	1.566	26.103	26.103	1.566	26.103	26.103	1.563
Credit risk	1.081	18.011	44.114	1.081	18.011	44.114	1.086
Solvency risk/capital risk	1.043	17.378	61.492	1.043	17.378	61.492	1.048

Natural Hedging Strategy	0.971	16.176	77.668				
Financing Gap	0.721	12.023	89.691				
NPL ratio	0.619	10.309	100				
Extraction Method: Principal Component Analysis.							

Based on the extraction in Table no 1 we need only 3 variables to use as risk management indicators in the banking industry than the entire six indicators. The first principal component -is interest rate risk which covers maximum variation in the data with an initial eigenvalue of 1.566 which represents 26.103% of the variance. The other two principal components need to get at least 61% of the variance which is significant with the least data lost in the analysis. The principal Component Analysis shows that the interest rate risk, credit risk, and Solvency/capital risk cover the maximum variation in the data. So, they can be considered as the principal components that affect the risk management of the banks or key indicators among all indicators. The introduction of Basel II norms has made the management of the interest rate risk in India more significant. It is the interest rate that causes changes in the deposit rates and prime lending rates (PLR). In the process of achieving or attaining the deadlines for implementing Basel II, a serious duration mismatch was found in the accrual books. The result of this mismatch was losses in terms of Economic value of Equity (EVE) (Asish Saha, 2009). Even the RBI's "Investment fluctuation reserve fund" cannot be considered a satisfactory way to address interest rate risk in India. This was evident from the observation that banks in India even after holding portfolios similar to government securities still have heterogeneity in terms of interest rate risk exposures (Fund, 2004). The change from Basel I to Basel III has also impacted the credit risk and interest rate risk among banks in India. The profit per employee (PPE) was found to be negatively related to the Net interest margin (NIM). The macro-economic indicators also influenced the Net Interest Margin of the banks. The negative relation of GDP growth rate with NIM was a clear indication of the same. And this relation was found more in Basel II and Basel III norms. The Basel implementation uses CAR as an important tool and the same measure leads to raising the interest rate of lending. The implementation of Basel III regulatory reforms had a direct impact on the credit risk and interest rate risk exposure among the banks (Noor Ulain Rizvi, 2018). Solvency which shows an indication of the financial health of an institution also plays a key role while managing the risk (Deepa Chandraprakash Chandwani, 2022). The depositors are the major stakeholders when it comes to the solvency risk of the banks. The responses from depositors at times of solvency risk are not alike. At times of shock, those depositors who are connected with the loan or the employees of the banks have more impulsive responses. The case of uninsured depositors is also the same. The age of the depositors in

terms of their relationship with banks also determines the reaction of the depositors towards the solvency risk. Those depositors with older accounts with the banks will have the least botheration but at the same time, the account holders with frequent transactions and naïve holders will be more concerned with the solvency risk (RAJKAMAL IYER, 2016).

Stock market response to risk management

The influence of the risk management factors identified and how it impacted the stock returns of the banks is investigated in this section. Apart from the risk management factors identified a new variable is also included while regressing the model. For this ,the current study follows the methodology adopted by (Rudra Sensarma M. J., 2009) where Unexpected Earnings is used to represent earnings and employed the same method for measuring the same. The Unexpected Earnings is measured by calculating the difference in the current year reported net profit and previous year reported net profit.

The regression model used for determinants of stock returns is

$$RET_{it} = \alpha + \beta RET_{market(t)} + \gamma\, UE_{it} + \delta RISKMGMT_{it} + \dot{\varepsilon}_{it} \qquad (10)$$

Where RET_{it} is the where RET_{it} is returns on the i-th bank's stock in year t, RET_{market} is returns on the market which controls for systematic movements in the individual bank returns, UE is UE measured by change in reported net profits , RISKMGMT is risk management indicators orscore and ε̇ is a random error. The risk management term can be proxied either using thesix risk management indicators or the AVERAGE which equals to the single measure for all risk management indicators. The two regression results are presented below. In both regression the bank stock returns is regressed on RET_{market} , UE and risk manaegement indicators. For accounting the the systematic risk part BSE Sensex is employed. The data being panel in nature bank -specific fixed effects is employed in both regressions. The random effects is not included in the paper because it is being rejected with the Hausman test (not presented).

Table no 2: Fixed-Effects (one -way) Regression of stock returns on all risk management variables

Variable	DF	Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	-1.40499	1.0312	-1.36	0.1735
RET_{Market}	1	0.87345	0.16453	4.52	<0.0001
UE	1	-0.00005	0.000065	-0.83	0.2056

Variable	DF	Estimate	Standard Error	t Value	Pr > |t|
IRR	1	9.373661	6.6544	1.41	0.1594
CR	1	-6.57101	11.8696	-0.55	0.5800
SR	1	-1.18073	1.2386	-0.95	0.3408
NHS	1	-6.52649	7.7143	-0.85	0.3978
FG	1	-0.45614	0.8197	-0.56	0.5780
NPL	1	0.056794	0.0225	2.52	0.0118

The results in Table 2 indicate that all variables are statistically insignificant at conventional levels of significance. One problem with this set of regressions is that the six risk management variables may be correlated among themselves, causing problems of multi-collinearity. Thus, to avoid the problem of multi-collinearity the risk management scores developed was taken into consideration.

The variable AVERAGE represents the average of all six risk management indicators.

Table no 3 Regression of stock returns on average risk management score

Variable	DF	Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	-1.65212	0.7668	-2.15	0.0315
RET Market	1	0.73456	0.12768	3.26	<0.0001
UE	1	-0.00005	0.000065	-0.77	0.3239
Average	1	0.088323	0.1085	0.81	0.0047

The regression results (Tables 2 &3) show that the coefficient of market returns is significant which indicates that systematic risk is important in determining stock returns. The coefficient of UE is also positive and significant as expected. Finally,the coefficient of AVERAGE is positive and significant. This indicates that shareholders behaviour shows their preference towards the banking stocks that signals better risk management

practices. To be precise if the banks are employing better mangeemnt practices the impact will be enhanced shareholder wealth in terms of rewarding the shareholders.

Conclusions

This paper tries to examine the sensitivity of banks stocks towards the risk management practices employed by the banks. For this purpose I have computed the risk management scores of banks from the year 2000-2021 by utilizing the accounting information available from the financial statements. The risk management scores is analyzed with the help of factor analysis. The risk management scores shows that risk management proficiency has been improved from 2003-2012 and then declined in the recent years. Finally the impact of risk management scores on stock returns were analyzed and it was found that risk management scores/indicators impacted positively the stock returns of the banks.

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