Prediction of Return on Equity Using Capital Adequacy Ratio in Commercial Banks: An ANOVA Table Analysis

Meenakshi Chaturvedi
Assistant Professor, School of Management Sciences, Lucknow

Abstract

The purpose of this study is to predict the impact of Credit Risk Management on Profitability of Commercial Banks in India. Data is obtained from different news media, publication and sample banks to describe present scenario of banking sector in India. To analyze the profitability and credit risk management of banks after implementing the Basel II standard, we collected secondary data of ten years (2003 to 2013) from the annual report of banks. Few bar-diagrams have been drawn to compare the performance among six banks. While, to fulfill the research objective, ROE, and CAR is calculated to evaluate the Credit Risk of the Banks. Using these two ratios, researcher constructed the regression model statistics.

Key Words: Credit risk, capital adequacy ratio, return on equity

I. Introduction

Risk and exposure is an intrinsic part of any industry. Banking industry due to its nature and incidence is exposed to different types of risks. India is a fast growing economy and exposed to higher risks. While, in a competitive scenario risk taking is a vital part of financial decision for the survival and growth of the entity. At the same time as sound financial system is considered as the backbone of any country and its economy, security and stability of the financial institutions are yet mainly necessary for the growth of industry, economy and economic well-being of people.

II. Credit Risk

Credit risk arises from the potential that an obligor is either unwilling to perform an obligation or its ability to perform such obligation is impaired resulting in economic loss to the bank. [1]

Credit risk arises from the risk of financial loss as a result of the failure of a customer or counter-party to discharge his contractual obligations. Credit risk exposures of group arise primarily from its lending, investing and trading activities. [2]

Credit risk emanates from the dealings of bank with an individual, corporate, other bank, financial institution or a sovereign. Credit risk is intrinsic to banking and it is as old as banking itself. Credit risk in simple terms is the potential that borrower of bank or counterparty will fail to meet their obligations in accordance with agreed terms as a result, loan facility becomes default due to non-repayment. This leads to diminution in the credit quality of borrowers or counterparties and ultimately diminution in the value of primary and/or collateral assets. Bank's portfolio, losses stem from outright default due to inability or unwillingness of a customer or counterparty to meet commitments in relation to lending, trading, settlement and other financial transactions.

Alternatively, losses result from reduction in portfolio value arising from actual or perceived deterioration in credit quality. Credit risk is related to financial transactions, that is:

- Default by a borrower in making a repayment
- Default in fulfilling the agreement by another bank or financial institution with respect to syndicated arrangements.

Credit risks are very critical in the banking sector and have to be managed with foremost care. Credit risks involve highest level of subjective judgement in spite of constant efforts for quantifying and improving credit decision processes. Credit risk is further divided into following risks:

1. **Borrower/ Counterparty Risk:** Counterparty risk comes from non-performance of a trading partner. The non-performance may arise from counterparty's refusal to perform, due to an adverse price movement caused by systematic factors, or from some other political or legal constraints that were not anticipated by the principals. Diversification is the major tool for controlling non-systematic counterparty risk. Counterparty risk is like credit risk, but it is generally viewed as a more transient financial risk associated with trading than standard creditor default risk. In addition, counterparty's failure to settle a trade can arise from other factors beyond a credit problem. [3]
2. **Intrinsic / Industry Risk:** High single-industry concentrations may monitor both specific industry concentration risk and the forces that affect the fortunes of industry involved.
3. **Concentration/ Commodity Risk:** In a similar fashion, some institutions with significance upon one commodity such as oil, through their lending activity or geographical franchise concern themselves with commodity price risk.

III. Literature Review

[4] Bodla and Verma have designed their paper to study the implementation of credit risk management framework in commercial banks of India. Survey has been conducted to complete this study. The result shows that power of risk management grouped with board of directors in case of 94.4% and 62.5% of the public sector and private sector banks, respectively. This authority is associated with risk policy committee in other banks.

Industry study, periodic credit calls, periodic plant visits, developing MIS, risk scoring and annual review of accounts are the most performed among activities by the bank for risk management.

[6] In this article, author used an econometric model to predict the determinants of credit risk in Indian commercial banks. The model by utilizing a panel data at bank level for 22 public sector banks and 15 private sector banks has shown some unique determinants of the credit risk in the Indian commercial banking sector. The model involved in the study has high R square for both public and private sector banks. The results of this study showed that the lagged nonperforming assets had a strong and statistically significant positive influence on the current non-performing assets.

[4] Credit risk management performance of commercial banks in India is not satisfactory. Finally they conclude their study with the idea that Credit risk management in today's deregulated market is a challenge. The very complexion of credit risk is likely to undergo a structural change in view of migration of Tier-I borrowers and, more particularly, the entry of new segments like retail lending in the credit portfolio.

[5] In this article author tested how active management of bank credit risk exposure through the loan sales market affects capital structure, lending, profits, and risk.

IV. Research Objectives

1. To ascertain why and how credit risk exposure is evolving recently.
2. To find out the relationship between the measures of profitability i.e. ROE and credit risk i.e. CAR.

V. Research Methodology

1. Research Design

This study aims to investigate the awareness about risk management practices within the banking sector of India. Exploratory research design is used to analyze relation between measure of profitability and credit risk faced by commercial banks in India.

2. Study Sample

6 banks (3 public sector banks like State Bank of India, Allahabad Bank, Punjab National Bank, & 3 private sector banks like ICICI Bank, ING Vyshya Bank, IDBI Bank) were approached as sample. Secondary data is collected and assembled from different annual reports on "performance review of the banking system of RBI". The available data covers a period of total 10 years from 2001 to 2011. The data is mainly related to the Capital to Risk Assets Ratio (CRAR) or Capital Adequacy ratio (CAR) and its impact on ROE of the commercial banks that are used to measure their soundness.

3. Data Collection

The data sources for the study are annual reports of 10 years, 2003-2013. Study necessitates looking into risk management disclosure, financial statements and notes to financial statements within the annual reports of sample banks.

4. Data Analysis Tool

Simple regression analysis was used in the study the relation of one dependant variable and independent variables. The regression outputs were obtained by using SPSS. In addition, MS Excel 2007 was applied to confirm the accuracy of results.

Applied Regression Model

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It's been revealed from early studies that determinant for profitability is ROE (Net Income/Total Shareholders' Equity) and for risk management CAR [(Tier I + Tier II)/Risk Weighted Assets].

Regression model was used with independent variables in the study. In the regression model, we have considered the following:

Dependent Variable

Author decided to use ROE as the indicator of profitability in the regression analysis.

Independent Variables

CAR is regulatory capital requirement (Tier 1 + Tier 2) as the percentage of RWAs.CAR is opted as an independent variable.

Regression Analysis Explained

The regression analysis is conducted to find out the following:

The relationship between risk management and profitability in six banks: 10 years period (2003-2013) for 6 banks this in total gives 60 observations;

The employed regression model used is presented below:

Regression equation becomes:

$$\mathbf{ROE = \alpha + \beta CAR + \varepsilon}$$

It is the regression function which determines the relation of X (CAR) to Y (ROE). α is the constant term and β is the coefficient of the function, it is the value for regression equation to predict variances in dependent variable from independent variables.

VI. Analysis — Empirical Findings and Interpretation

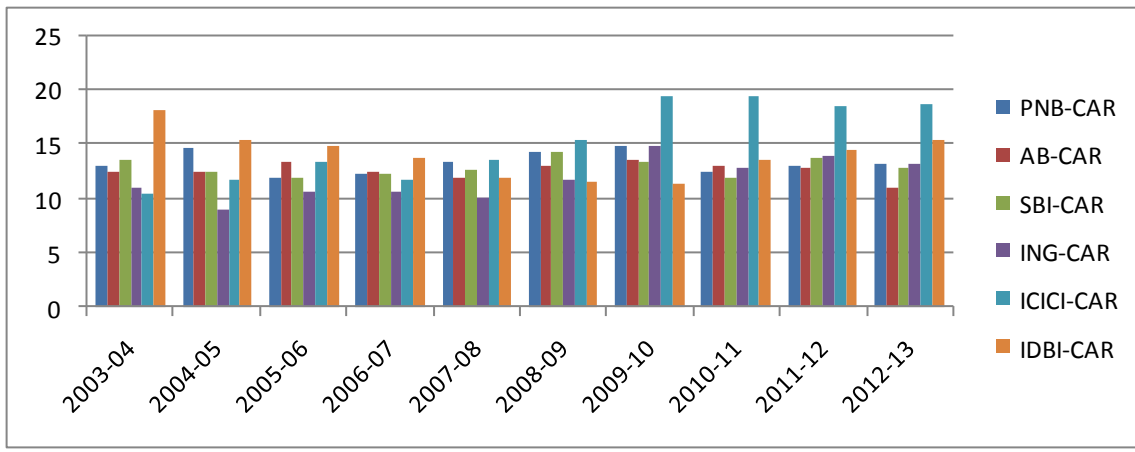

Figure 1: Capital Adequacy Ratio

Figure 1 shows that there were no major changes in CAR of PNB during 2003 to 2013. CAR achieved a higher percentage in 2009-10 to 26.11% and gets the lowest percentage in 2005-06 to 11.95%. CAR of SBI during last ten years was unpredictable. It showed significant ups and downs during last ten financial years. It reached at 14.25% during 2008-09 which was the highest value of CAR and reached at 11.88% during 2005-06 which was the lowest value of CAR. ING Vysya Bank's CAR shows a very insignificant change during last ten years. CAR was at 14.90% during 2009-10 which was the highest value during last ten years. CAR reached 9.09% during 2004-05 also it showed a lowest value of CAR of last ten years. CAR of ICICI shows a significant improvement during last ten years. CAR was at the lowest value 10.40% during 2003-04 and reached 19.54% which was highest value of CAR during 2010-11. CAR has one downfall during 2006-07 and then it improved. There is significant change in CAR of IDBI bank during last ten year. It showed a highest value in 2003-04 as 18.23% and then decreased till 2009-10 at the 11.31%. CAR then improved and reached at 15.36% during financial year 2012-13.

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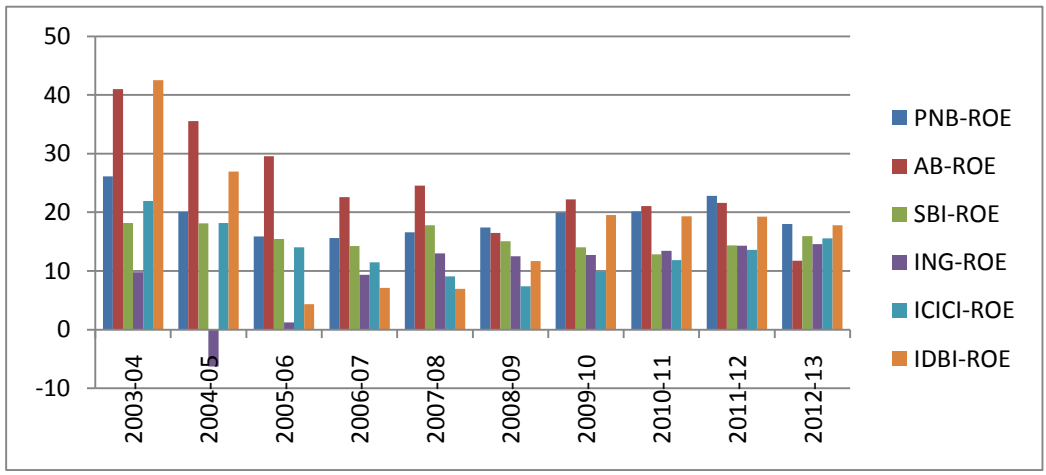

Figure 2: Return on Equity

Figure 2 shows that ROE of PNB has a significant decrease from 2003 to 2006 and after 2006 ROE percentage improved till 2013. The highest percentage of ROE was 26.11% in 2003-04 and the lowest percentage of ROE was 15.6% in year 2006-07. ROE of Allahabad Bank shows a continuous downfall from 2003 to 2013. During last ten years it can be shown that the ROE was at highest in 2003 and reached to lowest value in 2013. In 2003 ROE was at 41.0% which was highest percentage and in 2013 it was 11.8% which was the lowest value of last ten financial years. ROE in State Bank of India had very minor changes during last ten years. It was at 18.19% during 2003-04 which was the highest percentage value and 12.84% shown a lowest percentage during 2010-11. ING Vysya Bank's ROE had very different value during 2004-05 like -6.27% also that was the lowest value. Then ROE improved and reached to 14.60% in 2012-13 that was the highest value of ROE. Negative value showed that ROE had a negative effect on banks performance.ROE of ICICI bank has significant loss from 2003-04 to 2008-09. It started with the highest value of 21.95% in 2003-04 and decreases till 2008-09. In 2008-09 ROE achieved a lowest value of 7.39%. Then it improved till 2012-13 and reached to

15.58%.ROE in IDBI bank was at highest value in 2003-04 with 42.54% and then reached at lowest value in 2005-06 with 4.34%. After that it had a improvement till 2012-13. That significant loss in ROE showed an unstable performance of bank.

Relationship between Credit Risk Management and Profitability among all Six Banks

*ROE	Coef.	**Signif. (P-Value)	N.
CAR	2.461	0.023	10

Table 3: Model Summary of all Six Banks

R^2	Adj. R^2	F	Model Signif. (P-Value)
0.796	0.737	13.626	0.004

Table 4: Model Summary of all the Six Banks

Table 1 and 2 shows regression results for the profitability equation, discussed in methodology part, where ROE is dependent variable. Table 1 shows that CAR has a positive β coefficient 2.461. This indicates that one unit increases in CAR will increase ROE by 2.461 units. The statistical significance of CAR is 0.023 which is a sign of relatively low significance. It implies that CAR predicts ROE with 97.7% probability.

In table 2 R2 represents the prediction level of variance in ROE by CAR, which is 0.796. This means that 79.6% of ROE can be predicted from CAR. It shows a significant relationship between the profitability and credit risk management in All Six Banks. Furthermore, adjusted R2 is 73.7%.

F-distribution table shows the critical value of F is 4.54. In the model the statistic value of F is 13.626, which is much higher than critical value. Likewise, the whole regression model's probability value or the statistical significance is 0.004, lesser than 0.05.

To conclude, the analysis of relationship between profitability and credit risk management in the six commercial banks, CAR contributed positively to banks profitability and has insignificant effect on ROE.

VII. Conclusion

The results obtained from regression model show that, there is an effect of risk management on profitability on reasonable level with 79.6% possibility CAR in predicting the variance in ROE. So, the risk management strategy defines profitability level to an important extent. However, separate analysis of each bank, considering the fact that the sample size is not on statistically satisfactory level, show that not all bank's CAR define ROE.

Samy and Magda (2009) study the impact of capital regulations on bank performance and show that 45, 6% variances in ROE can be predicted by using a set of independent variables. They have used 15 independent variables while we have used one, and the only common independent variable is CAR. Their study suggests that higher capital requirement contributes positively to bank's profitability which is consistent with our findings. According to the researcher's view, if more independent variables are added to the regression model, researcher could have achieved higher predicting ability (R^2) of ROE by independent variables.

VIII. Limitations

The study includes only six commercial banks in India (three public and three private). Therefore, results cannot be generalized to all commercial banks. The number of observations is very small which is not preferable while conducting studies of this kind.

Moreover, only ten observations of each bank are used in the regression analysis which might not provide accurate results.

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