# An Empirical Association between the Credit Risk Management and Banks' Profitability

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## Abstract

In the last several decades, the banking industry has been hit by numerous financial crises. Due to the banking system's financial crisis, which impacted many nations throughout the world, credit risk management has received a lot of traction. Because credit risk dictates a bank's existence, development, and profitability, it must be handled carefully and properly. The goal of this study is to see if there is an empirical link between credit risk management and bank profitability. Return on assets and return on equity are used as dependent factors, whereas credit risk management indicators such as capital adequacy ratio, non-performing assets ratio, and leverage ratio are used as independent variables. The Reserve Bank of India's database and official website were used to gather secondary data. Descriptive statistics, analysis of variance (ANOVA), correlation analysis, and multiple regressions were utilised in the study. It was discovered that bank profitability (ROA & ROE) has a positive and substantial association with CAR, but NPA has a negative and significant link with CAR. On the other side, there is no substantial association between profitability performance (ROA & ROE) and LR. The findings show that non-performing loans, which may expose banks to a lot of volatility, and the global financial crisis have a negative impact on bank profitability.

*Keywords:* *Return on Assets; Non-Performing Assets; Profitability; Return of Equity; Credit Risk*

## I. INTRODUCTION

Banks are now the world's largest financial institutions, having branches and subsidiaries all over the globe. These banks provide a variety of products and services to the general public, and these intermediate activities are very dangerous due to their enormous liquidity. While a result, banks are exposed to a variety of hazards as they do their business. The central issue in managing the lending portfolio is balancing the potential risk with returns, given the risks inherent in bank lending and the need to minimise or contain the risk (since it cannot be avoided entirely), as well as the need for liquidity and profitability consistent with safety and regulatory constraints. Credit management and credit analysis are included in this process. The borrower's ability to repay the loan must be established, as well as the borrower's capacity and capital.

The primary source of income for banks is credit generation. The Basel II Accord stressed credit risk management measures in response to the rising number of non-performing loans. Compliance with the Accord indicates that a competent approach to credit risk management has been followed, which enhances bank performance. Due to the nature of banks' operations, credit risk is one of the most serious hazards they face. Banks promote the sustainability and profitability of their own businesses while also contributing to systemic stability and efficient capital allocation in the economy by effectively managing credit risk exposure.

## II. CREDIT RISK AND CREDIT RISK MANAGEMENT

Credit risk is the possibility that some of a bank's assets, particularly its loans, would depreciate in value and become worthless. Because banks have such a tiny amount of owner capital compared to the overall value of their assets, just a small proportion of total loans must default to bring a bank to the verge of failure. Credit risk management is therefore critical to the health of a bank and, indeed, the entire financial system. The danger of a borrower or counterparty failing to fulfil a commitment is known as credit risk.

Credit risk management in financial institutions has become critical to their long-term survival and growth. It is a systematic strategy to managing uncertainty that includes risk assessment, formulation of risk management strategies, and risk reduction utilising managerial resources. Credit risk management solutions include transferring risk to third parties, avoiding risks, lowering risk's negative impact, and accepting some or all of a risk's repercussions.

Credit risk is dealt with in a variety of ways. The most significant technique begins with suitable counterpart and product selection. A robust risk assessment methodology and competent credit officers are also important considerations in the selecting process. To mitigate risk, banks may need greater collateral from counterparts with a higher default risk. In addition, product pricing should be in line with the expected risk. Second, the credit risk management limitation regulation limits a bank's exposure to a certain counterpart. It prevents the bank's stability from being jeopardised by a single or small number of losses. The amount of credit a counterpart with a specific risk profile may take must be regulated by the bank's criteria. Finally, banks' risk allocation mechanism offers a fair diversification of risks among different types of borrowers, industries, and countries.

## III. DATA AND METHODOLOGY

The study was conducted using an empirical research design. The research was carried out on the top fifteen public sector banks in terms of market capitalization during an 11-year period, from 2008-09 to 2018-19. The data was obtained from a secondary source. Data gathered from the RBI's official websites and bank annual reports. The data was analysed using ANOVA and Multiple Regression. Different estimated models were used to evaluate the links between credit risk management and profitability performance of Indian public sector banks. IBM SPSS 19.0 version was used to analyse the data.

### Selection of Variables

Credit risk management was employed as an independent variable, profitability performance was used as a dependent variable, and public sector banks were used as a group control variable. There were five distinct indicators employed, which are listed below:

| Variables | Variable Name | Calculating Method |
|---|---|---|
| Independent Variables (Credit Risk Management) | Capital Adequacy Ratio (CAR) | Total Capital/RWAs |
| | Non-performing Assets ratio (NPA) | Non-Performing Assets/Total Loans |
| | Leverage ratio (LR) | Total debt/ total equity |
| Dependent Variables | Return on Assets (ROA) | Earnings before Interest and tax to total assets |
| | Return on equity (ROE) | Net Income after tax to Total Equity |
| Control Variable | Market Capitalization | |

### Model specification and estimation

The panel regression model is expressed as:

$$ROA = \beta_0 + \beta_1 \times CAR + \beta_2 \times NPA + \beta_3 \times LR + e_1$$

$$ROE = \beta_0 + \beta_1 \times CAR + \beta_2 \times NPA + \beta_3 \times LR + e_1$$

Where;

ROA = Return on Assets of Public Sector Banks for the period of 2008-2019,

ROE = Return on equity of Public Sector Banks for the study period,

CAR = Capital Adequacy Ratio for the period of 2008-19,

NPA = Non-Performing Assets Ratio for the period of 2008-19,

LR = Leverage Ratio for the period of 2008-19,

$\beta_0$ = Intercept (Constant),

$\beta_1$, $\beta_2$, $\beta_3$ = As the independent variable varies by one unit of variable, the slope shows the degree to which the bank's performance changes, and

$e_{i,t}$ = error component.

## IV. EMPIRICAL RESULTS

### Table 1: Descriptive Statistics of the Variables

| Variable | Variables | N | Mean | SD | Minimum | Maximum |
|----------|-----------|---|------|-----|---------|---------|
| Dependent | ROA | 165 | 0.24 | 1.05 | -4.68 | 2.00 |
| | ROE | 165 | 3.30 | 19.14 | -85.92 | 28.02 |
| Independent | CAR | 165 | 12.21 | 1.35 | 8.69 | 15.38 |
| | NPA | 165 | 4.06 | 3.47 | 0.17 | 16.69 |
| | LR | 165 | 17.19 | 4.15 | -2.24 | 29.99 |

Table 1 shows descriptive statistics for variables like ROA, ROE, CAR, NPA, and LR derived from a database of fifteen public sector banks in India from 2008-09 to 2018-19. Each variable has a total of 165 observations. ROA and ROE (dependant variables) have mean values of 0.24 percent and 3.30 percent, respectively. The mean scores of independent variables CAR, NPA, and LR, on the other hand, are 12.21 percent, 4.06 percent, and 17.19 percent, respectively.

### Table 2: Coefficient of Correlations among variables

| Variables | | ROA | CAR | NPA | LR | Variables | ROE | CAR | NPA | LR |
|-----------|---|-----|-----|-----|-----|-----------|-----|-----|-----|-----|
| Pearson Correlation | ROA | 1.000 | | | | ROE | 1.000 | | | |
| | CAR | 0.561 | 1.000 | | | CAR | 0.550 | 1.000 | | |
| | NPA | -0.747 | -0.532 | 1.000 | | NPA | -0.775 | -0.532 | 1.000 | |
| | LR | 0.012 | -0.156 | -0.147 | 1.000 | LR | 0.083 | -0.156 | -0.147 | 1.000 |
| Sig. (1-tailed) | ROA | - | | | | ROE | . | | | |
| | CAR | 0.000* | - | | | CAR | 0.000* | | | |
| | NPA | 0.000* | 0.000* | - | | NPA | 0.000* | 0.000* | | |
| | LR | 0.438 | 0.023* | 0.029* | - | LR | 0.145 | 0.023* | 0.029* | - |

*Significant at 5 percent level.

The coefficient of correlation between the dependent and independent variables is shown in Table 2. CAR, NPA, and LR, which are independent variables, are connected with ROA with coefficients of 0.561, -0.747, 0.012, and ROE and independent variables with coefficients of 0.550, -0.775, 0.083, respectively. ROA, ROE, and CAR have a substantial and positive link, but ROA, ROE, and NPA have a significant and negative relationship. The association between ROA, ROE, and LR, on the other hand, is not significant.

**Table 3: Model Summary and ANOVA results**

| Model | R | R-Square | Adjusted R Square | Std. Error of Estimate | ANOVA | |
|---|---|---|---|---|---|---|
| | | | | | F | Sign. |
| 1 | 0.773 | 0.598 | 0.590 | 0.67 | 79.703 | 0.000* |
| 2 | 0.792 | 0.628 | 0.621 | 11.78 | 90.566 | 0.000* |
| Predictors (Constant): LR, CAR, NPA<br>Dependent Variable: ROA (Model 1) and ROE (Model 2) | | | | | | |

*Significant at 5 percent level.

Table 3 provides the Model Summary and ANOVA findings, with an R2 of 0.598 indicating that the credit risk management variable predicts a ROA of 59.8 percent. The ANOVA results demonstrate that ROA and CAR, NPA, and LR have a strong association.

Similarly, the Second Model Summary shows that CAR, NPA, and LR predict ROE to the level of 62.8 percent, with R2 (0.628) indicating that there is a significant relationship between ROE and CAR, NPA, and LR, and ANOVA results indicating that there is a significant relationship between ROE and CAR, NPA, and LR.

**Table 4: Coefficients of the Variables**

| Model | Coefficients t test (sign.) | | Standardized beta ($\beta$) | |
|---|---|---|---|---|
| | ROA | ROE | ROA | ROE |
| (Constant) | -1.056<br>(0.293) | -1.336<br>(0.183) | - | - |
| CAR | 3.452<br>(0.001) * | 3.344<br>(0.001) * | 0.212 | 0.198 |
| NPA | -10.446<br>(0.000) * | -11.312<br>(0.000) * | -0.641 | -0.668 |
| LR | -0.936<br>(0.351) | 0.299<br>(0.765) | -0.049 | 0.015 |

*Significant at 5 percent level.

Table 4 shows that the credit risk management variables' coefficients are incorporated in the model for predicting the dependent variables (ROA & ROE). The contribution of each independent variable is compared using standardised beta ($\beta$) values. The negative standardised beta ($\beta$) coefficient indicates that the dependent variable and independent variables have an inverse connection. The NPA with the highest negative beta value contributed the most to explaining the ROA and ROE. The t-test findings show that the sign value of the independent variables (CAR and NPA) is more than 0.05, implying that the contribution of CAR and NPA to the prediction of ROA and ROE is substantial.

## V. CONCLUSION

Better credit risk management results in increased bank profitability. The negative standardised beta coefficient indicates that the ROA, ROE, and NPA have an inverse relationship. The greatest beta values for NPA suggest that NPA had the most important role in explaining ROA and ROE. The capital adequacy ratio and banking profitability performance have a favourable and statistically significant link, according to this study (ROA and ROE). In order to increase profitability, the research proposed that banks should improve loan servicing and minimise non-performing loans. It was also advised that the management take care since the credit risk policy setting does not affect profitability.

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