

THE IMPACT OF CREDIT RISK MANAGEMENT ON PROFITABILITY OF PUBLIC SECTOR COMMERCIAL BANKS IN INDIA

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Abstract *The banking industry has experienced many financial crises in the past few decades. In the recent times, US subprime lending crisis of 2007-08 has appeared to be as one of the worst financial crisis. Credit risk management has gained lots of importance due to financial crises faced by the banking system which affected many countries across the globe. Credit risk is to be handled carefully and effectively in a banks because it determines the bank's survival, growth and profitability. This present study tries to explore an empirical association between the credit risk management and banks' financial performance. An attempt has been made to know the statistical impact of credit risk management indicators on profitability of public sector commercial banks for the period 2010-2017. The present research focuses on top ten public sector commercial banks selected on the basis of total assets. The panel regression is applied for the purpose of analysis of data. In panel model equation, credit risk management is considered as independent variable measured by non-performing loans ratio (NPLR), loan loss provision ratio (LLPR), capital adequacy ratio (CAR), asset quality ratio (AQ), management (M), earnings (E) and liquidity (L) whereas banks' profitability is taken as dependent variable measured by return on assets (ROA). The results of the research reveal that credit risk management indicators have a significant influence on the financial performance of selected public sector banks in India. The empirical findings indicate that ROA (profitability) is positively related to CAR, management quality and earnings ability whereas it is found to be negatively related to AQ and liquidity.*

Keywords: *Credit Risk, Return on Assets, Non-Performing Assets, Profitability, Capital Adequacy Ratio*

INTRODUCTION

Economic development of any nation largely depends upon its strong financial system. Banking industry is one of the biggest suppliers of credit in an economy. Banks as an intermediary role accelerates the economic growth by offering various financial services to the masses. Financial institutions are essentially significant for the economic development of any nation just like blood arteries are vital for the human beings since they put into force the financial possessions from those who are having it to those who are in need (Shanmugan and Bourke, 2003). Lending is one of the major activities of the banks for generating their revenue. But lending business inherits default risk in case of non-fulfilment of commitments on the part of borrowers. This situation is termed as credit risk which attracts a lot of attention of the banking regulators to devise and review the stringent credit risk management practices so that the risk in lending activities could be controlled well in time at various stages or minimized to zero. Therefore, banks strictly need to follow credit risk management practices for its survival and growth in the long-run and it helps them to sustain and increase the profitability through establishment of adequate

and effective credit risk management policies, systems, environment which involves assessment, identification, monitoring, controlling of credit risk.

Banks generate income from one of their main activities of lending business. They need to focus on credit risk as it influences the profitability (Li and Zou, 2014). The Basel Committee on Banking Supervision (2001) explained credit risk as the chances of occurring loan losses fully or in part, due to risky advances. The performance of banks largely depends upon the credit risk management. Increase in credit risk exposure would lead to decrease in the financial strength of the banks. Risk in lending arises when the borrower or the counter party does not fulfil his/her commitments concerning lending, trading, hedging settlements or the other financial transactions. While providing loans and advances, it had been the core activity of the banks to analyse the financial soundness or capability of the borrowers since its inception. Growth in the derivative markets has enlarged the scope of credit risk almost on the part of the banking sector. According to Basel (1999) credit risk has been explained as the likelihood of debtor or borrower not making their predetermined contractual commitments as and when they fall due on agreed terms. Higher credit risk interrupts

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the monetary position of the banks so badly. Therefore, management of credit risk is most important practice that includes identifying, measuring, aggregating, controlling and continuity in monitoring the credit risk. (Greuning and Bratanovic, 2009).

Increasing non-performing loans is an alarming situation for the banks as it not only put banks into financial stress but can also take them towards shutting down. Default risk or credit risk is so vital to handle for the banks because their survival and growth depends upon it. In view of increasing loan losses, Basel accord norms suggest banking sector to keep optimal capital requirements and reducing the component of credit risk in lending business. The main purpose of Basel norms is to ensure that banks have sufficient capital to absorb the financial shocks and remain solvent at all times. Quality in lending improves only with the intervention of supervisory regulatory authorities who compel banks to improve and follow norms for bringing transparency in operational activities of the banks. Moreover, the norms adhere to the international standards.

According to Psillaki et al. (2010) effective management of credit risk leads to increase in the stability, profitability and optimal allocation of funds. Efficient and effective performance of banking sector supports financial stability of the country (Oke et al. 2012). Literature on banking sector performance states that main aim of the financial institutions is to yield returns and reducing the level of risks taken to achieve this ultimate objective (Hempel et al., 1998). Commercial banks' profitability is the main basis for their product innovation, expansion and effectiveness (Hempell, 2002). At the time of crisis, profitability serves as a cushion for the commercial banks to face shocks and adversities.

Higher profits have tendency to absorb losses and it is the main indicator for measuring bank's performance and efficiency.

In any kind of business firms, profitability is the vital component. Banking companies also assess their business activities undertaken to know their profitability performance. CAMEL (Capital Adequacy, Asset Quality, Management, Earning and Liquidity) analysis is used by the banks to analyse financial performance. Banks adopt CAMEL model analysis to assess various kinds of risks and managing them effectively. Financial ratios have been long practiced by the researchers to evaluate the bank's financial performance. Banks use CAMELS rating for examining their financial health and performance (Rozanni & A. Rahman, 2013). The present research uses CAMEL components along with the other variables such as non-performing loans ratio and loan loss provision ratio to know their relationship with the bank's financial performance/profitability.

The studies in the past have shown that the credit risk management is an important determinant for the survival, growth and profitability of the financial institutions as well as the relationship between credit risk management and profitability in different countries for different periods of time with mixed findings. The present research is an effort to investigate an empirical association between the credit risk management and banks' financial performance. An attempt has been made to know the statistical impact of credit risk management indicators on profitability of top ten public sector commercial banks in India for a period of 8 years from 2010-2017. Results of the study will add to the existing stock of empirical findings in the field.

Table 1: Previous Studies on the Relationship between Credit Risk Management and Financial Performance

Authors	Year	Profitability Indicators	Credit risk management Indicators	Findings
Achou et al.	2008	ROA ROE	NPL/TL (Non-performing loan ratio)	Significant relationship between bank performance and risk management.
Hosna et al.	2009	ROE	NPL/TL, CAR (Capital Adequacy Ratio)	Credit risk management affects profitability. NPLR impacts ROE significantly than CAR.
Kithinji	2010	ROA	Loan Assets to Total Assets ratio, NPLR	Amount of credit and bad loans do not affect profits. Results further reveal that there exist additional factors not considered under study which have an impact on profits.
Aduda and Gitonga	2011	ROE	NPLR	Credit risk management influences profitability.
Fredrick	2012	ROE	CAMEL	All CAMEL components except earnings have weak relationship with ROE.
Boahene et al.	2012	ROE	Ratio of Net Charge Off to Total Loans, NPLR, Ratio of Pre-Provision Profit to Net Total Loans and Advances	Credit risk positively and significantly affects the bank profitability.

Authors	Year	Profitability Indicators	Credit risk management Indicators	Findings
Kolapo et al.	2012	ROA	NPL, Ratio of Total loan & Advances to Total deposit, Ratio of loan loss provision to classified loans	There is a cross sectional invariant impact of credit risk on performance of banks.
Poudel	2012	ROA	Default rate, Cost of per loan assets, CAR	All indicators of credit risk management have a negative relationship with financial performance.
Gakure et al.	2012	Loan performance	Risk identification, risk analysis and assessment risk, monitoring Credit- approval/Sanctions	Risk identification, risk measurement and risk monitoring influenced the performance of unsecured bank loans to a great extent.
Adeusi et al.	2013	ROA ROE	Liquidity Credit Capital risks	A negative relationship between financial performance and doubtful loans was assessed while capital asset ratio was assessed positive and significantly.
Kaaya and Pastory	2013	ROA	Ratio of Loan loss tonet loan, NPLR, Ratio of Loan loss to net loan, Ratio of Impaired loan to Gross loan	Indicators of credit risk are negatively correlated with ROA.
Abiola and Olausi	2014	ROE ROA	NPLR CAR	Greater NPL is shown among the banks that show bad credit risk management practices.
Li and Zou	2014	ROE ROA	NPLR CAR	Credit risk management measures affects the profitability, NPLR affects both ROE and ROA significantly whereas effect of CAR was found to be insignificant.
Alshatti	2015	ROE ROA	CAR, Ratio of Credit interests/ Credit facilities ratio, Ratio of Provision for facilities loss/Net facilities ratio, Leverage ratio, NPLR	All credit risk management indicators influence financial performance significantly.
Gizaw et al.	2015	ROE	NPL LLP CAR	Credit risk management indicators significantly affect profitability.
Singh	2015	ROA	NPL CAR	Credit risk management affects bank performance of public and private Sector banks significantly. Furthermore, a negative relationship between ROA and NPA has been shown.
Muriithi et al.	2016	ROE	Capital to risk weighted assets, asset quality, loan loss provision, loan and Advanceratios	Credit risk affects negatively and significantly to bank profitability in Kenya.
Isanzu	2017	ROA	Nonperforming loans, Capital adequacy ratio, Impaired loan reserve, and Loan impairment charges	Non-performing loan ratio and capital adequacy were found to be significant effect on financial performance.
Noor et al.	2018	Return on Investment (ROI) ROA ROE	POCL (Percentage of classified loan)	POCL was found to be negative and significant effect on ROI but not significant effect on ROA and ROE in the short run.

RESEARCH METHODOLOGY

The present study aims to determine the impact of credit risk management measures on the banks' financial performance. A quantitative research design has been used for achieving this research objective. An empirical investigation is carried out to examine the statistical relationship between the credit risk management indicators and profitability of public sector commercial banks for the period of eight years from 2010-2017. There are total 27 public sector commercial banks

operating in India and out of these top 10 public sector banks (PSBs) have been selected on the basis of total assets as on March 31, 2017 for the purpose of present research.

The present study is based on secondary data source. The data has been collected from the RBI website and statistical tables relating to banks. The panel data regression model is applied to analyse the data. In panel model equation, credit risk management is considered as independent variable measured by non-performing loans ratio (NPLR), loan loss provision ration (LLPR), capital adequacy ratio (CAR),

asset quality ratio (AQ), management (M), earnings (E) and liquidity (L) whereas banks' profitability is taken as dependent variable measured by return on assets (ROA).

The panel regression model equation is described as:

$$ROA = \beta_0 + \beta_1NPLR + \beta_2LLPR + \beta_3CAR + \beta_4AQ + \beta_5Mgt + \beta_6E + \beta_7L + e$$

Where,

β_0 denotes constant parameter

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7$ denote coefficient of independent variables 'e' is an error term

CAR (Capital adequacy ratio)	Independent Variable	CAR=Tier1 capital + Tier2 capital/ Risk weighted assets
AQ (Asset quality)	Independent Variable	Ratio of Net NPA to Net Advances
Mgt (Management)	Independent Variable	Profit per employee
E (Earnings)	Independent Variable	Ratio of Net Interest Income to Total Assets (Net Interest Margin)
L (Liquidity)	Independent Variable	Ratio of Liquid Assets to Total Assets
ROA (Return on assets)	Dependent Variable	Ratio of Net income to Total assets

Table 2: Explanation of Variables Used in the Study

Variables	Indicated as	Explanation
NPLR (Non-performing loans ratio)	Independent Variable	NPLR = Ratio of Gross NPA to Gross Advances
LLPR (Loan loss provision ratio)	Independent Variable	LLPR=Ratio of Provision for NPA to Gross Advances

The panel data is analysed with the help of E-views 8.0 version. Stationary of all the variables are checked with the help of Augmented Dickey-Fuller (ADF) test. All the variables are stationary at logged difference. Further, we summarised the descriptive statistics followed by a test for assessing multicollinearity. Finally, the model is estimated to see the individual effects i.e. Fixed Effect or Random Effect.

RESULTS

Descriptive Analysis

Table 3: Descriptive Statistics

	ROA	NPLR	LLPR	CAR	AQ	Mgt	E	L
Mean	0.5138	5.1323	1.3295	12.2254	2.9186	0.4067	2.3517	9.0088
Median	0.6450	3.5469	0.9333	12.2200	2.0486	0.5145	2.3169	7.8874
Maximum	1.6700	21.2500	4.9150	15.3800	13.2100	2.6000	3.6180	23.6250
Minimum	-1.5333	0.8208	0.1710	9.8700	0.2300	-2.8	1.1114	4.1114
Observations	80	80	80	80	80	80	80	80

Table 3 indicates that banks are earning 0.51% return on assets employed on an average basis. Non-performing loans ratio of 5.13% depicts that selected banks have lower credit defaults on an average basis. Mean value of loan loss provision ratio 1.32% shows that a sufficient amount of funds are kept aside by the banks against bad loans. Banks are keeping 12.22% CAR for its risk weighted assets on an average basis which is higher than the limits as prescribed by RBI (9%) and Basel norms (8%). And the asset quality of banks are reflecting 2.91% on an average basis which means banks under study adopt good credit risk management practices for managing its bad debts. The mean values of other explanatory variables such as management quality

(0.40%), earnings ability (2.35%) and liquidity (9.00%) show that selected banks have a good profitability per employee, net interest income from total assets are quite well and lastly the banks are keeping sufficient amount of liquid assets out of their total assets.

Multicollinearity Analysis

The problem of multicollinearity occurs when two independent variables are highly correlated. To assess the multicollinearity within our data, VIF test is employed using SPSS software. Multicollinearity is supposed to occur when VIF is above 10 (Gujarati, 2004).

Table 4: Collinearity statistics

Independent Variables	Tolerance	VIF
CAR	0.741	1.349
AQ	0.02	50.228
MGT	0.373	2.683
E	0.577	1.733
L	0.493	2.029
NPLR	0.023	43.688
LLPR	0.076	13.099

The Collinearity test statistic results in Table 4 shows that three variables namely asset quality, non-performing loans and loan loss provision ratio have multicollinearity as their respective VIF value is above 10. Therefore, these three variables are excluded from the final analysis.

Analysis of Panel Regression

There are mainly two models for the analysis of panel data: fixed effect model (FEM) and random effect model (REM). The term fixed effect signifies when omitted variables are controlled that may differ between cases but does not vary over time, it is time invariant. Random effect model (REM) is applied when some omitted variables may not be varied over time but vary between cases and other variables may not vary between cases but vary over time (Says, 1989). Hausman test statistics is used to decide between the models i.e. FEM or REM. Running a Hausman test statistic at 5% level of significance has a chi-statistic of 23.19 with five degrees of freedom and a corresponding p-value is 0.00. Therefore, null hypothesis is rejected at 5% level of significance and FEM is preferred over REM. Hence, fixed effect model (FEM) is adopted for the final analysis of data.

Table 5: Results of Panel regression (FEM)

Independent Variables	Coefficients	Std. Error	t-statistic	Sig. Value
CAR	0.247138	0.228063	1.083638	0.2854
MGT	1.004293	0.061907	16.22251	0.0000
E	1.058372	0.184589	5.733677	0.0000
L	0.027107	0.097745	0.277327	0.7830
Constant	-1.490755	0.560978	-2.657420	0.0115
F-statistic	82.66032			0.000000
R-squared	0.968207			
Durbin Watson	1.240060			

Table 5 shows that p-value of F-statistic is 0.00 which is less than 0.05; hence the model is well fitted and appropriate.

Thus, independent variables very well explain the dependent variable or it can be said that credit risk management indicators have an impact on the profitability of banks under study. Furthermore, R-squared value of 0.9682 shows that credit risk management indicators (independent variables) have greater influence on the dependent variable (ROA). In other words, approximately 96% change in dependent variable is jointly explained by the independent variables under study. Moreover, panel regression results of the study indicate that management quality and earning ability variables have a significant impact on the profitability (ROA) of the public sector banks during the study period. On the contrary, it has been found that capital adequacy ratio and liquidity variables do not significantly impact profitability of banks (p-value >0.05).

On the basis of panel regression coefficients as per Table 5, the regression equation of profitability (ROA) may be written as below:

$$ROA = -1.490755 + 0.247138 (CAR) + 1.004293 (Mgt) + 1.058372 (E) + 0.027107 (L)$$

DISCUSSION

The main focus of the present research is to investigate the statistical relationship between the credit risk management indicators and financial performance of the public sector commercial banks taken under study for the period of eight years from 2010-2017. The overall findings of the study show that credit risk management measures significantly impact the profitability of the PSBs during the study period. The relationship between capital adequacy ratio and ROA, is found to be positive. Capital adequacy ratio is the amount of funds available to the banks in case of losses and it also serves as the protection to depositors and promoting the stability in the banks. Positive relationship between CAR and ROA reveals that if CAR increases profitability also increases and vice-versa. Theoretically also, it is expected to have the positive relationship between CAR and profitability. Banks need to keep sufficient amount of funds in capital to remain solvent and absorb adverse situations. According to the empirical results, capital adequacy ratio is found as insignificant variable to explain the financial performance (ROA) of the banks under study.

A positive correlation is reflected by the results between management variable and the profitability of public sector banks under study. Further, as per the statistical results, management variable is found to have a significant impact on the profitability (ROA). Management quality shows the ability of the management in carrying out banking activities efficiently and effectively. In the present research, management quality variable is indicated as the profit

per employee. It reveals the productivity of employees in yielding profits. A positive and statistical significant relationship between management variable and ROA depicts that management efficiently and effectively adheres to various internal and external regulations applicable to banks and performing well.

The relationship between earnings ability variable and profitability (ROA) is found to be positive. It means increase in earnings would tend to result in the increase in profitability of the banks. Earnings show the ability of banks to earn consistently and their potential growth in the future. In the present study, earnings variable is indicated by the net interest margin (net interest income to total assets). Net interest margin ratio shows the ability of the banks to generate its interest income from its total assets. The empirical findings of the research reflects earnings ability variable as significant variable to affect the profitability (ROA) of the banks during the study period.

The statistical relationship between liquidity and profitability has been found to be insignificant and positively related. This means higher liquidity position of the banks would tend to higher profitability. Liquidity parameter states the ability of bank in meeting its financial commitments and it is measured as a ratio of liquid assets to total assets.

Various studies in the past confirm the relationship between credit risk management and profitability and support the findings of the present research in this area. Achou et al. (2008) found a significant association between profitability measured as return on assets (ROA), return on equity (ROE) and credit risk management measured as non-performing loans (NPL). Hosna et al. (2009); Aduda and Gitonga (2011) suggested that there exists a relationship between credit risk management measured as NPL and bank's profitability (ROE). According to Poudel (2012), Kolapo et al. (2012), Gizaw et al. (2015), Kaaya and Pastory (2013) negative relationship has been found between non-performing loan and ROA. On the contrary, Boahene (2012) found a positive relationship between credit risk measures taken as non-performing loans to total loans meaning thereby that instead of increasing bad loans there is an increase in profitability. Abiola and Olausi (2014) found poor credit risk management strategies among sampled banks of Nigeria where profitability is rising even due to loan losses. Adeusi et al. (2013) examined a positive and significant link between capital adequacy ratio and financial performance indicated by ROA and ROE. Li and Zou (2014) examined a significant impact of NPL on the financial performance while an insignificant effect of capital adequacy ratio on ROA and ROE. Fredrick (2012) evaluated strong influence of CAMEL parameters on the profitability indicated by ROE. He observed that capital adequacy, asset quality, management efficiency and liquidity have a weak association with financial performance whereas earning

ability variable is found to have a strong relationship with financial performance.

CONCLUSION

The empirical findings state that credit risk management measures have statistically significant impact on the financial performance of the banks under study. Specifically, management quality and earnings ability parameters are found to be significant variables to affect the profitability of the banks whereas capital adequacy ratio and liquidity measures are found to be statistically insignificant. Furthermore as per the results, ROA (profitability) is positively related to CAR, Management, Earnings and liquidity parameters. According to findings of the study, capital adequacy ratio is positively related to ROA states that banks are maintaining adequate amount of capital funds to absorb adverse situations and remain solvent. Management parameter is found to be highly significant and positively correlated to profitability that reflects management capability in performance of the banks efficiently and effectively. Earnings ability of the banks is found to be positively related to profitability that reflects higher the capability of the banks to earn consistently and grow in the future would tend to increase its profitability. Lastly, liquidity measure indicates a positive association with ROA which means higher liquidity position of the banks will lead to higher profitability.

Results of the present research suggest that the independent variables of the sampled public sector banks significantly impact the profitability during the study period. On the basis of empirical findings, it can be said that credit risk management is a vital parameter in determining the banking performance. Banks should be persistent in developing and revising its credit risk management practices or systems according to changing risk exposures so that default risk in lending could be minimized and ultimate aim of attaining higher profitability is achieved.

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