

Effects of Credit Risk Management on Financial Performance: A study on the Indian Commercial Banks

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Abstract

Purpose of the Study: High credit risk is a result of economic downturn of commercial banks and financial institutions. It is inherited with the nature of their business and needed to be managed well for their survival. The present study finds whether credit risk has a dual impact on commercial banks' financial performance in India.

Study design/methodology/approach: For the study, secondary financial data are taken from published annual reports of 20 commercial banks consisting of 12 public sector and 8 private sector commercial banks during 2013-14 to 2018-19. Credit risk of commercial banks is measured through Non-performing loan ratio (NPLR), Capital adequacy ratio (CAD). The financial performance of banks is measured through two alternative measures of profitability namely return on assets and return on equity. Pooled data have been used for multiple regression analysis.

Findings: Empirical study results reveal mixed and varied indications about credit risk management and its influence on the financial performance of commercial banks. The study results also indicate that the profitability of Indian commercial banks is declining due to increase in NPAs. In spite of having a strong capital adequacy ratio, profitability has not increased every year.

Implications of the study: Present study is helpful to the various stakeholders in the banking industry to know how various types of credit risk variables behave with financial performance.

Keywords: *Commercial banks, NPAs, profitability, credit risk management, India.*

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Introduction: The sub-prime mortgage crisis in the US during 2008 has shown how a crisis in the banking sector co-integrates the whole economy. In essence, commercial banks have significant roles in the growing of economy around the world. The banking system also reflects the economic status of the developed countries. In the emerging economies, commercial banks are still performing as social agents of the governments. Therefore, a banking crisis in the emerging economies may lead to banking disequilibrium like a deposit to lending mismatch, non-payment of loans, depositors' run for withdrawals and disruption of socio-economic fabrics of the developing countries. On a strategic note, a better pre-mortem look-out identifies the origins of such a crisis rather than examining the same on a post-mortem basis.

On this strategic objective, the Indian banking sector appears to be a genuine experimental case. The banking stability of a country over time indicates its financial stability (Parab & Patil, 2018) and the Indian banking sector have survived the 2008 financial crisis. But is it prepared for any forthcoming one? In this research direction, the present study examines the financial performance of Indian banks if influenced by their credit risk management.

The literature shows positive effects of credit disbursement on the prices of listed stocks of Indian banks (Bhaumik & Piesse, 2008), negative effect of high credit risk on the economic growth rate of France and Germany (Chaibi & Ftiti, 2014), and bad loans deteriorating the cost-efficiency of the US commercial banks (Berger & Young, 1997) as well. The excessive rapid growth of loans coupled with a fast decline in the Indian state-owned banks' capital indicates the sick financial health of the banks and this may be an early indication of mortgage crisis (Das & Ghosh, 2007). However, timely evaluation of credit risk as a key factor may lead to the success of the financial institutions (Lahsasna et al., 2010). That is, the banks should assess the determinant of credit risk continuously to reduce risk (Annor & Obeng, 2018). In brief, credit risk provides continuous threats to banks' successful lending (Angelini et al., 2007). Due to banks' rapid increase of non-performing assets, a data mining methodology may help banks at the better assessment of credit risk and prediction accuracy (Chen and Huang, 2003; Akkoc, 2012; Gao et al., 2006; Huang et al., 2006; West, 2000). Credit risk management is directly associated with the financial stability of commercial banks (Li & Zou, 2014). A huge bad loan causes low financial performance, and sometimes, this leads to losses in the banking

sector (Salim et al., 2016; Ali & Dhiman, 2019). Bhattarai (2016), and Kaaya & Pastory (2013) have found different types of credit risk variables playing significant impacts on the returns on assets (ROA), and return on equity (ROE) of the banks. Nonetheless, Basel III regulatory framework calls for improving capital adequacy, supervisory, and promoting transparency. High capital adequacy enhances the risk-taking ability of banks (Zong-yi et al, 2008) but at an enhanced financing cost.

Therefore, a pre-mortem analysis of exploring the financial performance of Indian commercial banks as a causal framework for credit risk management during the post-2008 financial crisis period has become a genuine research problem. Specifically, we investigate the impact of credit risk management on the financial performance of commercial banks in India.

The flow of the study goes as - literature review is described in section 2, section 3 cover the hypothesis development, section 4 contains the empirical data and methodology, section 5 reports the results, and section 6 concludes.

Literature Review: Given the vast literature on the research of interest, the present study reviews the commercial banks' credit risk management and their impacts on financial performances from a cross-country perspective of Ghana, Nigeria, Kenya, Nepal, India, and the US. We identify the basic tenets of their relationships and examine their theoretical underpinnings. On the impact of credit risk management on profitability of Ghana's rural bank, Afriyie & Akotey (2012) found a positive impact of non-performing assets on ROE as caused by their higher rates of interest. Annor & Obeng (2018) have found that non-performing loan (NPLR) and capital adequacy ratio (CAD) are positively influenced to profitability of Ghana's commercial bank while loan loss provision ratio (LLPR) is connected to financial performance in negative way. Again, with the listed banks in Ghana, Akomeah et al. (2020) have found that non-performing loan has a negative relation to ROA while the capital adequacy ratio positively is related to financial performance. In brief, with the banks' data in Ghana, there exists a duality of impacts for non-performing assets over the return on assets and return on equity. Is such duality theoretically viable?

Nonetheless, with Nigeria's commercial banks, Kolapo et al. (2012) have reported that non-performing loan and loan loss provision ratios are negatively related to financial performance while loan and advance to total deposit are positively related to financial performance. Abiola & Olausi (2014) have shown that commercial banks in Nigeria demonstrate a positive relationship of profitability with the non-performing loan while high non-performing loan increases their financial performances. In another study, Ajayi & Ajayi (2017) have found that NPA has played a negative role with the

deposit banks' performance. These studies have mostly identified the huge loan default being caused by banks' poor credit risk management

Let us explore a few more cross-country evidences of the said duality. With the Kenyan commercial banks, Fredrick (2012) has found that asset quality and capital adequacy have a negative influence on their financial performance while earning quality is positively related. Muriithi et al. (2016) have showed that the Kenya commercial banks' high non-performing loan and capital to risk weighted asset leads to poor banking performance in both short and long run. On the banks of Jordon, Alshatti (2015) has shown that non-performing loans (NPL) have significant positive relationship to financial performance while leverage has negative relation. On the Nepalese commercial banks, Bhattarai (2016) find that non-performing loan has a significant negative relation to ROA while cost per loan asset is positively related and capital adequacy ratio and cash reserve ratio have insignificant impacts on return on assets. With the Turkish banks' data, Ekinici & Poyraz (2019) have shown that non-performing loan and asset quality negatively influence ROA and ROE while capitalization ratio has a positive impact on ROA. Therefore, the impacts of both non-performing assets and capital adequacy on the bank's financial performance depict a duality – they may either be positive or negative. The said duality can be verified with the developed countries' data as well. With the US commercial banks' data, Imbierowicz & Rauch (2014) have showed that default probability of liquidity risk and credit risk have negative relations and combined management of credit risk and liquidity risk may improve banks' financial stability. Does such duality exist with the Indian commercial banks as well? On the Indian commercial banks' data, Jeslin (2017) has showed that the non-performing assets to assets ratio of SBI only has negative influence on the profitability of the sample banks. In another study, Haque & Wani (2015) have found credit risk has a negative significant coefficient in exploring the financial performance of Indian commercial banks. In an impressing study, Singh & Sharma (2018) have showed NPLR has negative influence on the return of assets of the Indian commercial banks. Parab & Patil (2018) have reviled that only the loan loss allowance and credit deposit ratio positively influence to ROA and ROE.

In brief, from this available literature it confirms that so many literatures have been conducted on credit risk management and performance of Indian banks. But does such duality exist? The present study has been conducted with objective to make an attempt to find out whether credit risk has a dual effect on the financial performance of commercial banks in India.

Hypothesis development: The predicted linkage between credit risk variables and financial performance is discussed in this section. In the banking industry credit creation is primary source of revenue. But when a borrower is unable to return the bank on regular basis for more than 90 days, then that portion of the loan is treated as a non-performing loan. A

high NPL ratio indicates poor credit quality and more loan loss will be charged against earnings as a result banks profitability suffers. Whereas Kurawa & Garba (2014) believe high credit creation causes high-interest earnings. Empirical evidence of Bhattarai (2016) and Serwadda (2018) also found that NPLR has a significant negative relation to banking performance during the study period. However, Kurawa & Garba (2014); Afriyie & Akotey, (2012) mentioned that there is a positive association between NPLR and bank performance during the study period. Another credit risk variable is the capital adequacy ratio. This ratio is alternatively known as the Capital to risk-weighted assets ratio. It protects banks' depository and promotes capital stability and efficiency of banks around the world. A high capital adequacy ratio of a bank indicates that the risk-taking ability of the bank is high. Therefore, the capital adequacy ratio is a determinant of credit risk. According to Basel norms, minimum maintaining capital adequacy is 8% however in India it is 9%. Adequate capital creates an avenue for better functioning and ensures safe operations of banks for retaining public confidence and provides infrastructural support for sound operations (Ho & Hsu, 2010). Zhang et al. (2008) mentioned in their study that change in capital and change in risk is associated significantly and negatively with each other. However, Fredrick (2012) found in his study that the relationship of CAD and profitability of banks measured by ROE is negative and the coefficient is statistically significant during the study period. In another study, Noman et al. (2015) argued that CAD has a mixed relationship with performance.

H₁: I assume that credit risk variables either positive or negative relation to financial performance of banks.

Research design & Methodology: The research is based on secondary data of six years starting from 2013-14 to 2018-19 and consisting of 20 commercial banks in India, including 12 public and 8 private sector banks. I select 20 commercial banks based on market capitalization and availability of all types of data. All secondary data is taken directly from relevant bank's annual report. Present study does not incorporate the year 2019-2020 due to the unavailability of data. To examine the dual effect of credit risk management on the financial performance of select 20 Indian commercial banks, the aforesaid secondary data have been analysed statistically. Since cross-sectional and time-series data have been used in this study, multiple regression analysis has been applied. To determine the dual impact of credit risk on the financial performance of commercial banks in India, the following regression models have been used:

Model 1

$$ROA_{it} = \alpha_i + \beta_1 (NPLR_{it}) + \beta_2 (CAD_{it}) + \beta_3 (BS_{it}) + \beta_4 (DF_{it}) + \beta_5 (LEV_{it}) + \beta_6 (CPLR_{it}) + \varepsilon_{it}.$$

Model 2

$$ROE_{it} = \alpha_i + \beta_1 (NPLR_{it}) + \beta_2 (CAD_{it}) + \beta_3 (BS_{it}) + \beta_4 (DF_{it}) + \beta_5 (LEV_{it}) + \beta_6 (CPLR_{it}) + \varepsilon_{it}.$$

Here, 'it' represents 'i-th bank in 't'-th year.

Dependent Variables: In this study, dependent variable is considered as profitability. The proxy measures of profitability are Return on Assets (ROA) and Return on Equity (ROE). Here, return on asset (ROA), is the main measure of profitability and Return on Equity (ROE) is alternative measures of profitability. The measurement procedure of different measures of profitability is explained below.

ROA: It is a proxy measure of the profitability of the overall business. It is measured as Net profit/ Total assets. (Bhattacharai, 2016; Kolapo et al., 2012)

ROE: it is a measure of company's profitability is related to equity. It is measured as (Net profit/ Shareholders fund) (Bhattacharai, 2016; Kolapo et al., 2012).

Independent Variables: Independent variables are their measurement description is given below.

Non-performing Loan Ratio (NPLR): It is measured as Non-Performing Loan/ Loan and Advance.

Capital adequacy ratio (CAD): It is measured as (Tire 1 capital + Tire 2 capital)/ Risk-weighted Assets.

Control variables: Following four variables have been used in the study as the control variables.

Bank Size (BS): Bank size is measured as a log of the total assets

Deposit Ratio (DR): Deposit ratio is measured as Deposit / Total Assets.

Leverage (LEV): It is measured as Liability/ Owners' equity.

Cost per Loan ratio (CPLR): It is measured as Operating Cost/ Loan and Advance.

Data analysis & Findings of the study: Descriptive Statistics: The table (Table 1) follows descriptive statistics are presented to give a brief overview of about our dependent and independent variables (ROA, ROE,

NPLR, CAD, Leverage, CPLR, Bank size, Depository Ratio) of 20 commercial banks in India from 2013-14 to 2018-19.

Table- 1: Descriptive Statistics

Variables	N	Minimum	Maximum	Mean	S.D
NPLR	120	0.00	0.17	0.0431	0.3687
CAD	120	0.09	0.18	0.1312	0.02256
LEV	120	0.16	1.12	0.8915	0.08296
CPLR	120	0.02	0.04	0.0282	0.00615
BS	120	4.40	6.34	5.3233	0.41390
DR	120	0.56	8.54	0.8661	0.71147
ROA	120	-0.05	0.02	0.0030	0.01133
ROE	120	-0.500	0.23	0.0205	0.15409

Source: Author's computation

The mean value of ROA and ROE is 0.0030 and 0.0205 respectively. It represents that earning capacity of these banks is low. The standard deviation of ROA and ROE is 0.01133 and 0.15409 respectively. It indicates high volatility exists in earning capacity. The mean value of the capital adequacy ratio is 13.12 per cent which represents that these banks are well-capitalized. The mean value of NPLR is 4.31 per cent and the standard deviation is 36.87 per cent which indicates existence of high non-performing loan.

Regression Results:

The following table (Table -2) shows the relationship between the bank's specific credit risk factors with the financial performance of 20 commercial banks in India for 2013-14 to 2018-19 of Model 1 (ROA).

Table: 2: Multiple regression results of 20 sample banks

Variables	Model 1 (ROA)											
	(2013-2014)		(2014-2015)		(2015-2016)		(2016-2017)		(2017-2018)		(2018-2019)	
	Coefficient	t- value	Coefficient	t- value	Coefficient	t- value	Coefficient	t- value	Coefficient	t- value	Coefficient	t- value
(constant)		1.151		1.038		0.639		-2.364*		-0.339		1.018
NPLR	-0.536	-4.101**	0.338	3.767**	0.487	-2.118*	0.513	3.772**	-0.59	4.538**	0.793	3.157**
CAD	0.045	0.225	0.321	2.433*	0.093	0.269	0.659	3.693**	0.224	1.437	0.352	1.376
BS	-0.044	-0.49	0.133	-2.02	0.185	-1.254	0.099	0.909	0.012	-0.131	0.079	0.447
DF	-0.122	-0.979	-0.26	3.082**	0.159	-0.758	0.35	1.915	0.106	0.815	0.264	1.217
LEV	-0.222	-1.535	0.123	0.883	0.061	-0.267	0.019	-0.093	0.319	-1.967	0.337	1.587
CPLR	0.266	2.033	0.433	4.917	0.299	2.120*	0.134	1.465	0.099	1.054	0.105	0.558
Adj R ²	0.885		0.938		0.748		0.88		0.9		0.671	
F - STAT	25.252**		48.587**		10.417**		24.332**		24.495**		7.454**	

Here, '***' '**' represent 1 % and 5% level of Significance respectively.

It is observed that the values Adjusted R² of ROA are 88.5%, 93.8%, 74.8%, 88%, 90%, 67% for the year 2013-2014 to 2018-2019 respectively in respect of financial performance of sample commercial banks. It indicates the power of this model is good. All values of F-statistics are significant and it indicates that models are best-fitted models.

The following table (Table- 3) represents the relationship between the banks' specific credit risk factors with the financial performance of 20 commercial banks in India for 2013-14 to 2018-19 of Model 2 (ROE).

Table: 3: Multiple regression results of 20 sample banks.

Model 2 (ROE)													
	(2013-2014)		(2014-2015)		(2015-2016)		(2016-2017)		(2017-2018)		(2018-2019)		
Variables	Coefficient	t- value											
(constant)		1.911		1.041		0.714		-2.489*		-0.96		-0.453	
NPLR	-1.043	-6.332**	-0.737	-5.398**	-0.644	-2.246*	-0.694	-4.382**	-0.46	-	2.963*	-0.662	-2.297*
CAD	-0.45	-1.781	0.087	0.433	-0.118	-0.273	0.652	3.142**	0.267	1.437	0.364	1.237	
BS	-0.058	-0.515	-0.175	-1.742	-0.175	-0.948	0.157	1.239	0.086	0.813	-0.117	-0.58	
DF	-0.105	-0.665	-0.212	-1.65	-0.081	-0.31	0.455	2.141	0.213	1.37	0.123	0.494	
LEV	-0.14	-0.766	0.432	2.04	-0.161	-0.56	0.152	0.657	-0.46	-	2.371*	0.305	1.249
CPLR	0.247	1.499	0.57	4.247**	0.23	1.303	0.073	0.689	0.014	0.125	-0.005	-0.023	
Adj R ²	0.816		0.855		0.608		0.838		0.857		0.567		
F – STAT	15.064**		19.686**		5.915**		17.409**		19.992**		5.142**		

Here, '**' '*' represent 1 % and 5% level of Significance respectively

It is observed that Adjusted R² values for the year 2013-2014 to 2018-2019 in respect of ROE are 81.6%, 85.5%, 60.8, 83.8%, 85.7%, 56.7% respectively. It represents that the power of the two models is at least 60.8%. All values of the F-stat are found to be significant at 1% level. It means models are best fitted.

The relationship of non-performing loan ratio to ROA (table 2) and ROE (table3) are significant and negative in every year. It indicates that a high non-performing loan ratio decreases the financial performance of commercial banks significantly in every year. Some empirical studies of Bhattarai (2016), Kolapo et al. (2012) and Serwadda, (2018) also found that NPLR has strong negative relation to banking financial performance. Though, Kurawa & Garba (2014), Afriyie & Akotey, (2012) mentioned that NPLR positively associated with performance.

Capital adequacy ratio (CAD) has a positive relationship with ROA (table 2) and coefficient is statistically significant in 2014-15 and 2016-17. While

CAD positively related to ROE (table 3) in 2016-17. It shows that sound capital is able to increase financial performance in those years but it is clear that strong capital adequacy does not have a significant impact on financial performance in every year. The present study is consistent with the study results of (Ho& Hsu, 2010) and inconsistent with (Fredrick, 2012). DF has a significant negative relationship with ROA (table 2) in 2014-15. It indicates larger deposit reduces financial performance due to improper use of the deposit. Leverage negatively related to ROE in 2017-18, and its coefficient is statistically significant. It means a high debt-equity ratio reduces financial performance in this year. The cost per loan ratio (CPLR) has a positive impact on ROE (table 3) in 2014-15 and it is positively related to ROA (table 2) in 2015-16. It means a large operating cost enabled to increase financial performance in those years.

Managerial implications of the study:

The study results provide several implications for the management of Indian commercial banks. Current findings of the study must be helpful for policy making. The non-performing loan ratio and loan loss provision ratio negatively impact the banks' financial performances (ROA and ROE). Therefore, strict regulations relating to loan selection are required and bank managers should be cautious before sanctioning any loan to minimize bad loans. Cost per loan ratio has a positive relationship to the measures of financial performance and it indicates high operating cost increases bank financial performances (ROA and ROE). Therefore, the bank should optimize loan operating and monitoring costs for boosting financial performance. However, these suggestions should be interpreted as extremely cautious. Moreover, for better financial performance Indian commercial banks should have a favourable internal business environment as well as an appropriate credit risk policy.

Conclusions: The study results highlighted some interesting facts about the credit risk management and financial performance of Indian commercial banks. The profitability of commercial banks suffers due to the existence of excessive NPAs. Our study results confirm that the non-performing loan ratio (NPLR) has a significant negative relationship with two measures of profitability (ROA and ROE) every year. However, the conservative capital requirement norm enhances the profitability of commercial banks in 2014-15 and 2016-17. Whereas strong capital adequacy does not mean strong financial performance every year. The finding of the study also indicates that the cost of advancing loans helps to increase the profitability (ROA and ROE) in 2014-15 and 2015-16 of commercial banks. Bank Size has no meaningful relation to the profit-earning capacity (ROA and ROE) of commercial banks. From the study, it is clear that credit risk variables have a dual impact on

credit risk. More specifically credit risk variables behave different effects in different years. Increasing non-performing loans of commercial banks are alarming. Banks should develop a restricted lending policy for reducing the default rate. The capital adequacy ratio does not have significant relation every year. As per study conducted by other authors, bank size plays an important role to manage credit risk and improve financial performance (Bhattacharai, 2016; Kaaya& Pastory, 2013). But the study results fail to prove any positive relationship between bank size and financial performance of sample banks.

The present study obviously suffers from several limitations. The main limitation of my study is the use of sample banks. Only 20 Indian commercial banks have been taken for consideration covering 12 public sectors and 8 private sector banks. Foreign banks operating in India have been not considered. Another limitation of the study is the use of credit risk management variables. Only two dimensions of credit risk factors have been used in the study. Therefore, further study can be conducted with a different model and with a wide range of data set of different types with regard to credit risk management.

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