

Impact of Capital Adequacy and NPAs on Bank Profitability: Evidence from Indian Public Sector Banks

Savita Lathwal*, Krishan Kumar**

Abstract

The objective of this article is to analyse how capital adequacy and non-performing assets affect the Indian public sector banks' profitability. Panel regression is used to analyse data from 12 public sector banks of India for the period 2014-2023. A total of 12 hypotheses are tested. The findings indicate that capital adequacy norms exert a beneficial effect on return on assets, return on equity and net interest margin, hence, aiding public sector banks in enhancing their profitability. On the contrary, the profit margin of Indian public sector banks is diminished by non-performing assets, which have an adverse effect on the return on assets, return on equity and net interest margin. Additionally, it was determined that profitability is positively impacted by the credit deposit ratio, whereas business per employee has a negative link with return on assets.

Keywords: Public Sector Banks, Capital adequacy, Profitability, Return on Assets, Return on Equity, Non-Performing Assets, Credit Deposit Ratio, Net Interest Margin, Business Per Employee

Introduction

The banking sector is the most prominent element of the financial system, which helps in the holistic development of an economy. It functions as an intermediary for the mobilisation and distribution of funds for the advancement and expansion of other sectors. With the passage of time, the Indian banking sector has seen extensive transformations. Now it has a wide range of participants, including rural banks, commercial banks, international

banks, private banks, etc. The predominant share of the banking market in India is held by public sector banks (PSBs). These banks are operated by the government of India. Several mergers and consolidations of public sector banks (PSBs) reduce the total number of public sector banks (PSBs). Presently the Indian economy is serviced by only 12 PSBs.

The modern financial system creates instability and risk in the banking sector. The financial crisis of 2007-2008 was the major incident that created the need for a more stable and strong financial system. Unfortunately, the world's financial system has recently been shaken by the COVID-19 outbreak. The capital of banks provides a cushion against unexpected losses, supports expanding business and helps maintain confidence in the banking sector (Sandow et al., 2021). A global regulatory organisation and a subsidiary of the Bank for International Settlement (BIS), the Basel Committee on Banking Supervision (BCBS) is responsible for setting standards to make sure that banks have sufficient capital buffers, manage their risks effectively and follow sound governance practices. These regulations help in creating a financially sound and stable banking system. The Reserve Bank of India (RBI) acts as the nation's central bank and regulates the banking sector in India. The RBI frames banking regulations for Indian banks following international norms.

PSBs of India are heavily burdened with non-performing assets (NPAs). To address these issues, the Indian government has implemented several measures, including the recapitalisation of PSBs and the establishment of a bad bank to take over non-performing assets (NPAs). The

* Senior Research Fellow, Department of Management Studies, B.P.S. Mahila Vishwavidyalaya, Khanpur Kalan, Sonipat, Haryana, India. Email: savitalathwal@gmail.com

** Associate Professor, Department of Management Studies, B.P.S. Mahila Vishwavidyalaya, Khanpur Kalan, Sonipat, Haryana, India. Email: krishanboora@gmail.com

Reserve Bank of India has conducted an asset quality review of all banks to identify potential non-performing assets (NPAs) for them. These helped banks to recognise and address the problem of bad loans and improve their asset quality. The return on assets (ROA) is negatively impacted by non-performing loans, but the capital adequacy ratio (CAR) has no impact on it (Tangngisalu et al., 2020). It was suggested that banks should stabilise their return on assets (ROA) and capital adequacy ratio (CAR) to reduce their non-performing loans.

The CAR and NPAs are two key parameters that determine the profitability of a bank. In the Indian context, no study has been found that particularly addresses the state of PSBs in India with regard to capital adequacy and NPAs by the application of panel data analysis. Hence, this study tries to fill this gap by conducting a panel data regression. The following sections will comprise a review of existing studies, research objectives & hypotheses, methodology and results.

Literature Review

(Tan & Floros, 2013) explored the relationship among risk, capital and productivity of 101 commercial banks from China for the period 2003-2009. The findings revealed that Chinese banks' risk negatively impacts their capital level, while it has a positive impact on their productivity. It was also found that large Chinese banks are more productive and banks with more liquidity are less productive. It was concluded that banks with more liquidity are more capitalised.

(Das et al., 2014) evaluated the degree to which the CAR of Indian commercial banks remained stable during the years 1996 to 2010, as well as the degree to which capital adequacy ratio (CAR) is associated with other factors, such as credit deposit ratio (CDR) and NPAs. The author found variations in capital adequacy ratio (CAR) and significant differences among the banks for implementing capital regulations. The CAR was showing increasing trends in SBI banks and foreign banks and these banks are performing well. On the other hand, some banks are bad performers, such as nationalised banks and old private banks, which recorded lower CAR. Most of the Indian banks maintained a CAR of 10%.

(Nguyen & Nghiem, 2015) identified the connection between default risk, capital sufficiency and the efficiency

of Indian banks from 1990 to 2011. The findings revealed that public banks are more efficient in terms of cost and less efficient in profit as compared to private banks. It is found that a decline in capital ratio and cost efficiency leads to an increase in insolvency risk in the banking sector of India. The authors concluded that banks with greater capital are more lucrative and have a lower chance of default. The CAR is crucial for maximising profit and minimising risk.

(Menicucci & Paolucci, 2016) examined how internal factors affected the profitability of the 28 largest European banks from 2006 to 2015. This study discovered that the return on equity is favourable for banks with greater deposit ratios and European banks' profitability is positively affected by their CAR and bank size. However, profitability is negatively impacted by the asset quality ratio.

(Islam & Rana, 2017) assessed the elements impacting the profitability of fifteen private commercial banks operating in Bangladesh between the years 2005 and 2015. The study found that private commercial banks in Bangladesh were significantly impacted by non-performing loans and operational expenses, the two main criteria that determine the profitability of banks.

(Sarmiento & Galan, 2017) examined how banks' efficiency is affected by their risk-taking behaviour in Columbia for 10 years. The study found that more capital leads to more efficiency for small banks and domestic banks in Columbia. The large banks and foreign banks benefited from higher risk by earning more returns on diversified portfolios. In Columbia it was discovered that large banks operate more efficiently than small banks.

(Chen et al., 2018) identified the root causes of liquidity risk and assessed its influence on the commercial banks' profitability from 12 advanced economies for the period 1994-2006. The authors find that over-dependence on external funds, supervisory factors and liquid asset components are responsible for liquidity risk. It was observed that the ROA and return on equity (ROE) may reduce, but the net interest margin (NIM) was increased by the liquidity risk.

(Majumder & Li, 2018) examined the impact of capital of commercial banks from Bangladesh on their risk and performance. In this study, 30 Bangladeshi commercial

banks are analysed for the period 2000-2015. It was found that commercial bank performance is positively impacted by their capital, which denotes that banks will perform better with higher capital. However, risk harms a bank's performance, the more the risk lesser the performance.

(Raz, 2018) investigated the connection between capital and risk at Indonesia's largest commercial banks. In this study, 15 Indonesian banks are included and their data from 2008 to 2015 has been analysed. The study's findings suggest that an increased capital ratio mitigates the risk associated with the banking system. The author also found that banks may take more risk in travail situations to manage their capital level. It is also observed that the capital level is enhanced due to only systematic risk. The findings revealed that shareholders of Indonesian banks increase their capital only when it becomes a threat to financial stability.

(Suganya & Kengatharan, 2018) looked into how various bank-specific factors affected the financial performance of Sri Lanka's domestically controlled banks between 2006 and 2015. Specifically, the results reveal that return on asset (ROA) is positively correlated with CAR and negatively correlated with operational cost efficiency and non-performing loans. The return on equity (ROE) of commercial banks in Sri Lanka is positively associated with bank size and negatively associated with non-performing loans. In addition, banks' financial performance was unaffected by liquidity.

(Rawlin et al., 2019) analysed the relationship between return on asset (ROA) and internal factors of banks listed on the Nifty for the period 2009 to 2018. It was found that banks' returns on assets are greatly impacted by the size, capital adequacy, interest income and asset quality. It was recommended that the bank's management should focus on improvement in asset quality and capital adequacy to enhance financial performance.

(Roy et al., 2019) endeavoured to ascertain the connection between the liquidity, capital and profitability of a selection of Indian banks. This study utilises data from 32 banks for the period 2005-2017. The study reveals a positive association between liquidity and capital but a negative relationship between liquidity and profitability. The author stated that banks should keep sufficient liquidity to ensure solvency, facilitate lending and safeguard depositors' interests.

(Sarkar et al., 2019) examined Indian commercial banks from 2008 to 2016 to determine the relationship among the bank's efficiency, risk and capital. The findings revealed that older private banks as well as banks from the public sector have inferior managerial staffs which lead to incurring high costs for these banks. It was found that foreign banks are compromising with risk management by controlling costs. It was concluded that capital imposes a negative impact on only PSBs.

(Gandhi et al., 2020) assessed and compared the post-merger financial performance of the Indian banking sector. The analysis has been done by using the CAMEL model, which consists of banks in the public and private sectors. The findings indicate that post-merger only one parameter of CAMEL, capital adequacy, shows improvement in private sector banks, while PSBs witnessed improvement only in asset quality and management efficiency. Deterioration has been recorded in the liquidity and earning efficiency of both public and private banks. It is concluded that there is no such significant improvement in the post-merger financial performance of Indian banks and no significant difference has been recorded in the financial performance of both public and private banks.

(Islam et al., 2020) analysed the impact of credit risk on the financial performance of 22 Bangladeshi commercial banks from 2008 to 2017. The result of the quantile regression model indicates that the leverage ratio and capital adequacy have a negative association with the financial performance of banks. At the same time, loan loss provisions to NPL and cost per loan ratio impose a significant positive impact on the financial performance of banks in Bangladesh. The credit risk inherent in banking operations has a negative impact on the bank's profit. The author recommended that banks should be more strategic in the assessment of credit risk to reduce its negative impact.

(Le et al., 2020) assessed the efficiency of the capital regulations established under Basel III in enhancing the profitability of British and Australian banks from 2000 to 2019. The conclusion is that Basel III's strict capital requirements are unable to increase the bank's profitability and efficiency. A greater capital ratio impairs the performance of the bank. The survey also indicated that British banks perform better than their Australian counterparts.

(Tangngisalu et al., 2020) investigated how CAR and non-performing loans affected ROA of BEI-IDX-listed conventional banks in Indonesia. The study used data from 10 Indonesian banks from 2015 to 2019. The findings indicate that ROA is negatively impacted by non-performing loans, and it is unaffected by the CAR. The author proposed that banks attempt to stabilise their CAR and ROA to reduce non-performing loans.

(Sandow et al., 2021) examined Ghana's banking sector's performance in reference to regulatory capital. In this study, data from twenty banks from 2008 to 2017 were utilised. It is discovered that regulatory capital initially improves the bank's performance but has a negative influence on performance after ROA and return on equity (ROE) reach 1.7% and 1.6%, respectively. It is concluded that capital and bank performance have a bidirectional relationship.

(Kenini, 2022) identified the factors affecting the CAR of private banks in Ethiopia. The study consists of data from 16 private banks for the period 2013-2020. The panel regression model is used for the analysis including CAR as a dependent variable and asset quality, capital adequacy, leverage ratio, liquidity ratio, ROA, ROE and bank size as independent variables. Research indicated that ROA, bank size, capital adequacy, liquidity and leverage ratio significantly influence CAR while ROE and asset quality have no significant impact on CAR.

(Khan, 2022) investigated the impact of specific factors on the profitability of PSBs in India using a panel regression model. The data period spans from 2009 to 2020, and the sample size is comprised of 12 Indian PSBs. The study's findings revealed that ROA positively affects the profitability of PSBs, while financial leverage exhibits a negative relationship with profitability. The credit deposit ratio (CDR) does not show a significant relationship with the profitability of Indian PSBs. The ROA level was better than the Credit Deposit Ratio (CDR) level of PSBs. The author suggests that Indian PSBs should focus on increasing their credit deposit ratio (CDR) level.

(Fritsch & Siedlarek, 2022) attempted to identify the reaction of US banks toward the change in capital ratio introduced under Basel III. In this study, the data from 2010 to 2014 of 675 small and 39 regional banks are used.

The study concluded that small US banks do not respond to Basel III, while regional banks adjust their capital ratio before the announcement of these norms.

(Mamun et al., 2022) investigated the relationship between Bangladeshi banks' capital adequacy and financial performance. This study uses data from 20 Bangladeshi banks for the period 2010 to 2020. The findings of the study indicate that the ROA and ROE are positively associated with the CAR and cost-income ratio (CI ratio). However, the CDR (CDR) is negatively associated with ROA and ROE. As a result, the author concludes that the CAR significantly affects the financial performance of Indian banks.

(Obadire & Obadire, 2023) sought to determine how Basel III regulations had affected the efficiency of African banks before the COVID-19 pandemic. The data period for this study, 2010-2019, covered 45 publicly traded banks from six African nations. According to the conclusion of the study, Basel III has two side effects on the profitability of banks in Africa. The financial performance of African banks is positively impacted by the CAR since more capital leads to increased investment, which enhances bank profits. However, Basel III's liquidity ratio and minimum capital requirements diminish the profitability of banks in Africa.

(Pervez et al., 2023) explored how capital adequacy and NPAs affected the efficiency of commercial banks in India, including public, private and international banks, throughout the period of 2005-2018. The results disclosed that Indian commercial banks' performance is negatively associated with capital adequacy and NPAs. The rise in NPAs declines the lending capacity of banks, which again leads to a fall in bank profitability. Additionally, it has been determined that public banks are surpassed in terms of profit by private and foreign banks.

Research Methodology

The primary aim of this study is to assess the impact of capital adequacy and NPAs on the profitability of PSBs in India. To attain the objectives of this study, the following research questions are framed:

- Does a relationship exist between the profitability and capital adequacy of Indian PSBs?

- Can PSB's in India increase their profits by ensuring sufficient capital?
- Are NPAs a factor influencing India's PSBs' profitability?
- For India's PSBs, what role do NPAs play in determining profitability?

Hypotheses

The subsequent hypotheses are formulated to achieve the aims of the research:

H1: There is no significant relationship between CAR and ROA of Indian PSBs.

H2: There is no significant relationship between CAR and ROE of Indian PSBs.

H3: There is no significant relationship between CAR and Net Interest Margin (NIM) of Indian PSBs.

H4: There is no significant relationship between Net NPA to Net Advance Ratio (NNPAR) and ROA of Indian PSBs.

H5: There is no significant relationship between Net NPA to Net Advance Ratio (NNPAR) and ROE of Indian PSBs.

H6: There is no significant relationship between Net NPA to Net Advance Ratio (NNPAR) and Net Interest Margin (NIM) of Indian PSBs.

H7: There is no significant relationship between CDR and ROA of Indian PSBs.

H8: There is no significant relationship between (CDR and ROE of Indian PSBs.

H9: There is no significant relationship between CDR and NIM of Indian PSBs.

H10: There is no significant relationship between Business Per Employee (BPE) and ROA of Indian PSBs.

H11: There is no significant relationship between Business Per Employee (BPE) and ROE of Indian PSBs.

H12: There is no significant relationship between Business Per Employee (BPE) and NIM of Indian PSBs.

Data Collection and Sample

This study uses secondary data to analyse how Basel III has affected Indian public-sector banks. The data about particular banks have been obtained from the corresponding banks' annual reports and financial statements. This study is conducted on the currently serving twelve public-sector banks and data has been taken from 2014 to 2020. These twelve Indian public-sector banks are as follows:

- Bank of Baroda
- Bank of India
- Bank of Maharashtra
- Canara Bank
- Central Bank of India
- Indian Bank
- Indian Overseas Bank
- Punjab National Bank
- Punjab & Sind Bank
- State Bank of India
- UCO Bank
- Union Bank of India

Variables of the Study

Table 1 represents the selected variables, both dependent and independent variables, for the purpose of determining how capital adequacy and NPAs affect the profitability of PSBs in India.

Table 1: Dependent and Independent Variables

Variables	Indicators	References
<i>Dependent Variables</i>		
Profitability	Return on Assets (ROA)	Rawlin et al. (2019), Suganya and Kengatharan (2018), Pervez et al. (2023), Mamun et al. (2022)
	Return on Equity (ROE)	Suganya and Kengatharan (2018), Pervez et al. (2023), Mamun et al. (2022)

Variables	Indicators	References
	Net Interest Margin (NIM)	Pervez et al. (2023)
Independent Variable		
Basel III (Capital norms)	Capital Adequacy Ratio (CAR)	Rawlin et al. (2019), Suganya and Kengatharan (2018), Pervez et al. (2023), Mamun et al. (2022)
Assets Quality	Net NPA to Net Advance Ratio (NNPAR)	Rawlin et al. (2019), Suganya and Kengatharan (2018), Pervez et al. (2023)
Liquidity	Credit Deposit Ratio (CDR)	Rawlin et al. (2019), Mamun et al. (2022)
Productivity	Business Per Employee (BPE)	Rawlin et al. (2019)

Source: Author's Compilation

Statistical Tools and Models

This study employs panel data regression to determine the effect of CAR, NNPAR, CDR and BPE on ROA, ROE and NIM. A correlation matrix is employed to analyse the association between variables, and multicollinearity is

tested with the help of the Variance Inflation Factor (VIF) and White's Test used for identifying heteroskedasticity. For model specification, the Hausman test was applied. The analysis was carried out with the help of STATA 18.0. The following regression models are framed:

$$\text{Model 1: } ROA_{it} = \beta_0 + \beta_1 CAR_{it} + \beta_2 CDR_{it} + \beta_3 BPE_{it} + \beta_4 NNPAR_{it} + \mu_{it}$$

$$\text{Model 2: } ROE_{it} = \beta_0 + \beta_1 CAR_{it} + \beta_2 CDR_{it} + \beta_3 BPE_{it} + \beta_4 NNPAR_{it} + \mu_{it}$$

$$\text{Model 3: } NIM_{it} = \beta_0 + \beta_1 CAR_{it} + \beta_2 CDR_{it} + \beta_3 BPE_{it} + \beta_4 NNPAR_{it} + \mu_{it}$$

In these models,

i = Cross-sectional dimension

t = Years

β_0 = Intercept

β_1 = Coefficient of parameter

CAR = Capital Adequacy Ratio of Bank i at time t

CDR = Credit Deposit Ratio of Bank i at time t

BPE = Business Per Employee of Bank i at time t

NNPAR = Net NPA to Net Advances Ratio of Bank i at time t

ROA = Return on Assets of Bank i at time t

ROE = Return on Equity of Bank i at time t

NIM = Net Interest Margin of Bank i at time t

μ_{it} = Error term

Data Analysis

Descriptive Statistics

Table 2 provides the descriptive statistics, including minimum, maximum, mean and standard deviation of the selected dependent and independent variables for 10 years.

Table 2: Descriptive Statistics

	N	Min.	Max.	Mean	Std. Deviation
ROA	120	-3.01	1.1	-0.07	0.82
ROE	120	-207.99	52.78	-2.08	25.35
NIM	120	1.77	3.64	2.58	0.40
CAR	120	9.04	18.54	12.78	2.12
NNPAR	120	0.25	15.33	4.84	3.05
CDR	120	51.57	90.96	71.89	7.68
BPE	120	10.25	31.53	17.54	3.97

Source: Author's computation.

From Table 2, it is observed that the average ROA is -0.07%, and some variation is observed among PSBs by a standard deviation of 0.82, where -3.11% represents the minimum value and 1.1% represents the maximum. The average ROE (ROE) is -2.08%, with a significant variation shown by the standard deviation of 25.35 and the minimum value is -207.99% and the maximum value is 52.78%. The NIM shows a mean of 2.58% and variability among PSBs is shown by a standard deviation of 0.40, where 1.77% depicts the minimum value and 3.64% depicts the maximum value. In terms of CAR, the mean is 12.78% and the standard deviation is 2.12%, indicating a wide range of values from a minimum of

9.04% to a maximum of 18.54% across PSBs. On the other hand, the average Net NPAs Ratio (NNPAR) is 4.84%, and the standard deviation of 3.05 shows that there is a lot of variety among PSBs, with values ranging from a minimum of 0.25% to a maximum of 15.33%. The wide range of values observed for the CDR (CDR) among PSBs is ranging from 51.57% at the minimum to 90.96% at the maximum, with a standard deviation of 7.68. The mean CDR is 71.89%. While 17.54% is the average BPE, a standard deviation of 3.97 shows that there is a wide range of values among PSBs, from a minimum of 10.25% to a maximum of 31.53%.

Correlation Analysis

Table 3: Correlation Matrix

Variables	ROA	ROE	NIM	CAR	NNPAR	CDR	BPE
ROA	1						
ROE	0.698	1					
NIM	0.548	0.349	1				
CAR	0.479	0.306	0.532	1			
NNPAR	-0.750	-0.549	-0.610	-0.598	1		
CD	0.307	0.158	0.045	-0.029	-0.259	1	
BPE	0.394	0.207	0.427	0.713	-0.507	0.092	1

Source: Author's compilation.

Table 3 indicates that ROA shows a positive correlation with ROE, CAR, NIM, CDR and BPE at 0.698, 0.548, 0.479, 0.307 and 0.394, respectively. The ROA is only negatively correlated with NNPAR (-0.750), which means NNPAR has an adverse relationship with ROA. It shows that ROE has been positively correlated with ROA, NIM, CAR, CDR and BPE with correlation coefficients of 0.698, 0.349, 0.306, 0.158 and 0.207, respectively. Meanwhile, ROE is negatively correlated with NNPAR (-0.549). NIM has a positive correlation with ROA, ROE, CAR, CDR and BPE at 0.548, 0.349, 0.532, 0.045 and 0.427, respectively. In contrast, it is negatively correlated with NNPAR (-0.610). The CAR shows a positive correlation with ROA (0.479), ROE (0.306), NIM (0.532) and BPE (0.713) and a negative correlation with NNPAR (-0.598) and CDR (-0.029). The NNPAR shows a negative correlation with all other variables. The CDR exhibits positive correlations of 0.307, 0.158, 0.045 and 0.092

with ROA, ROE, NIM and BPE, respectively. There is a negative correlation of CDR with CAR (-0.029) and NNPAR (-0.259). The table shows that BPE has a positive correlation with ROA, ROE, NIM, CAR and CDR with correlation coefficients of 0.394, 0.207, 0.427, 0.713 and 0.092, respectively. The BPE is only negatively correlated with NNPAR (-0.507).

Regression Results

The findings of the panel data regression analysis are presented in Table 4. The dependent variables ROA, ROE and NIM are used as a proxy for banks' financial performance. The independent variables are CAR, CDR, BPE and NNPAR. The values of the VIF for CAR, CDR, BPE and NNPAR are less than 10, showing that our data is free from multicollinearity. The p-value of White's Test surpasses the significance threshold of 0.05, which means

our data is free from heteroskedasticity. The results of the Hausman specification test allow the use of a random

effect model for ROA and a fixed effect model for ROE and NIM.

Table 4: Regression Results

<i>Variables</i>	<i>ROA</i>	<i>ROE</i>	<i>NIM</i>
CAR	.0428247 (0.259)	.0544224 (0.971)	.058729 (0.000) **
CDR	.0152489 (0.029) *	.3358966 (0.372)	.0137171 (0.000) **
BPE	-.006988 (0.702)	.2586105 (0.758)	.0232938 (0.007) **
NNPAR	-.1802214 (0.000) **	-4.766633 (0.000) **	-.047368 (0.000) **
Constant	-.7248668 (0.346)	-8.396082 (0.830)	.6897609 (0.080)
VIF	(2.58, 1.15, 2.11, 1.78)	(2.58, 1.15, 2.11, 1.78)	(2.58, 1.15, 2.11, 1.78)
White's Test	0.180	0.992	0.334
Hausman Test	0.8872	0.0068	0.0000
F-stat	0.0000	0.0000	0.0000
N	120	120	120
R ²	0.5815	0.3096	0.4211
Adj R ²	0.5669	0.2855	0.4009

Source: Author's calculation.

Notes: Numbers outside parentheses show coefficients, parentheses show p-values * and ** shows 5% and 1% significance levels, respectively.

The F-statistics show that all models are statistically significant. The R-squared value (0.5815) for ROA defines that a 58.15% variance in ROA is caused by the selected independent variables (CAR, CDR, BPE and NNPAR). The observation indicates that CAR has a negligible adverse effect on ROA, which leads to accepting the H1. ROA and the CDR are significantly and positively correlated. Hence, H2 is rejected. The BPE is negatively associated with ROA and this association is not statistically significant which leads to accepting the H3. The NNPAR is negatively correlated with ROA but has a significant relationship. Therefore, H4 is rejected.

The R-squared value for ROE is 0.3096 which means a 30.96% change in ROE is due to selected independent variables (CAR, CDR, BPE and NNPAR). The CAR is positively related to ROE, but this relationship is not statistically significant. The result is in support of hypothesis 5; hence, H5 is accepted. The CDR has an insignificant and positive relationship with ROE. Hence, H6 is accepted. The BPE is positively associated with ROE and this association is not statistically significant,

which leads to accepting the H7. The net NPA to net advance ratio is negatively correlated with ROE but has a significant relationship. Therefore, H8 is rejected.

The R-squared value (0.4211) for NIM defines that a 42.11% variance in NIM is caused by the selected independent variables (CAR, CDR, BPE and NNPAR). The findings reveal a significant and positive association of CAR and NIM, which leads to the rejection of H9. The CDR is positively and significantly correlated with NIM. Hence, H10 is rejected. The BPE is positively associated with NIM and this association is statistically significant, which leads to rejecting the H11. The net NPA to net advance ratio is negatively correlated with ROE but has a significant relationship. Therefore, H12 is rejected.

Conclusion and Recommendations

The findings of the study indicate that Indian PSBs witnessed favourable effects from the CAR on their ROA, ROE and NIM. These results are in favour of the capital adequacy requirement assisting PSBs to

increase their profits. However, the ratio of NPAs to total assets has a detrimental effect on all three indicators of profitability (ROA, ROE and NIM). This indicates that the profitability of PSBs in India is diminished by NPAs. The CDR shows a positive association with profitability indicators and helps banks in enhancing their profitability. There exists a favourable correlation between the BPE and the NIM & ROE of Indian PSBs. Nevertheless, the BPE had a detrimental impact on the ROA of PSBs. To sum up, PSBs are helped by capital sufficiency to increase their profitability, but PSBs are hit hard by high levels of NPAs, which lower their profitability. However, the Indian government is continuously working on reducing the higher burden of NPAs of Indian PSBs. Further, PSBs should use effective credit risk management strategies to eliminate the NPAs.

This study has immense importance for banking regulators and the management of banks. The current framework of capital standards is bolstered by the favourable effect that adequate capital has on the PSBs' profitability. Banks should keep on maintaining their capital as per the regulatory framework for further improvement in their performance. The negative impact of NPAs creates an alarming situation for Indian PSBs. It is recommended that the Reserve Bank of India should extend comprehensive assistance to public-sector banks to aid in the reduction of NPAs. PSBs should adopt more robust credit risk management strategies to relieve the burden of NPAs.

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