THE IMPACT OF NON-PERFORMING ASSETS ON BANK PERFORMANCE UNDER BASEL REGIME - EMPIRICAL EVIDENCE FROM INDIA

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Abstract *Banks are the vital financial intermediaries in disbursing credit to deficit units. Their ineffective performance hinders the efficient functioning of an economy. Thus, the present research investigates the effect of non-performing assets (NPAs) on banks' performance in India. The slowdown in the Indian banking sector has led to subdued growth in the Asian banking sector. The study covers 64 Scheduled Commercial Banks (SCBs) from 2008-2018. The findings suggest that NPAs have been significantly eroding the performance of SCBs in India. It signifies that an increase in NPAs deteriorates banks' profit margins and increases provisioning requirements. This decline further reduces depositors' and investors' confidence in banks. Thus, policymakers need to ensure the efficient management of bad loans. Moreover, the study found the capital adequacy ratio (CAR) and net interest margins (NIM) to be positively related in the case of public and private sector banks. This relationship may be due to further tightening of the capital requirements under Basel III norms.*

Keywords: *Indian Banks, Non-Performing Assets, Financial Performance, Capital Adequacy, Basel Norms*

INTRODUCTION

The banking industry acts as a vital component in boosting the economic development of a nation. Any issue related to the banking sector can have significant economic repercussions on the entire financial system. Banks are important intermediaries in the Asian financial markets and are better regulated than the banks in developed nations (Salike & Ao, 2018). India is the second-largest economy in Asia after China. Thus, it contributes significantly in determining the growth of the Asian banking sector.

The Asian banking sector evidenced subdued growth in its revenue and margins from 2014 to 2018. This slowdown was mainly due to low GDP growth in China and India. Further, low asset quality and higher capital requirements in Asia led to this slowdown (McKinsey & Company, 2019).

India's banking industry is grappling with several issues, one of which is related to rising levels of non-performing assets (NPAs). NPAs are the loans that turn bad, as the borrowers default partially or wholly on its repayment (Bawa et al., 2019). NPAs, also called non-performing loans (NPLs), have a decisive effect on banks' financial performance. NPAs are a cause of concern for every stakeholder as it affects smooth credit flow. It affects profitability, as a considerable share of profits have to be allocated to loan loss provisions.

Basel Committee on Banking Supervision (BCBS) outlined NPAs or credit risk as "the risk of loss arising from default by a creditor or counterparty" (BCBS, 2001, p. 10). NPAs escalate banks' credit risk, thereby reducing their ability to lend.

In India, bad loans problem was not accorded due priority by the regulators before the 1990s. However, after the financial system reforms and the introduction of international banking standards, the focus shifted towards NPAs. The Narsimham Committee Report that came out in 1991 introduced these financial sector reforms in India (Pathak, 2010). NPAs of Indian banks are on the rise due to increased credit growth in the past decade. The Reserve Bank of India (RBI) implemented the asset quality review to classify NPAs in

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2015. This classification further led to more assets emerging as NPAs (Das, 2019).

Moreover, banks find it challenging to fulfil the priority sector lending (PSL) norms. The norms require all SCBs to lend to the priority sectors, and this lending should constitute 40% of their lending. RBI identifies (from time to time) specific sectors as priority sectors (presently eight), including agriculture, education, housing, and so on (RBI, 2018) (Kasturi, 2019). According to a report by the RBI, banks failed to meet PSL targets overall. This failure was primarily due to the mounting NPAs in some of the specific sectors like agriculture. Also, NPAs in PSL form one-fifth of the total banking NPAs. Agriculture loans and Micro, Small, and Medium Enterprises (MSME) loans (that come under priority sectors) form 8.6% and 9.5% of the total amount of NPAs, respectively (RBI, 2019). Thus, rising NPAs reduces the efficiency and the development of banks. Due to this, banks refrain from lending and prefer to invest in government securities (Das, 2019).

Viewed from this perspective, the present research investigates the implication of NPAs on the financial and operating profitability of Indian SCBs.

The remainder of the paper is structured as follows: Section II discusses the conceptual framework, Section III enumerates the data sources and methodology used, Section IV constitutes the findings of the study, and Section V describes the concluding results.

CONCEPTUAL FRAMEWORK

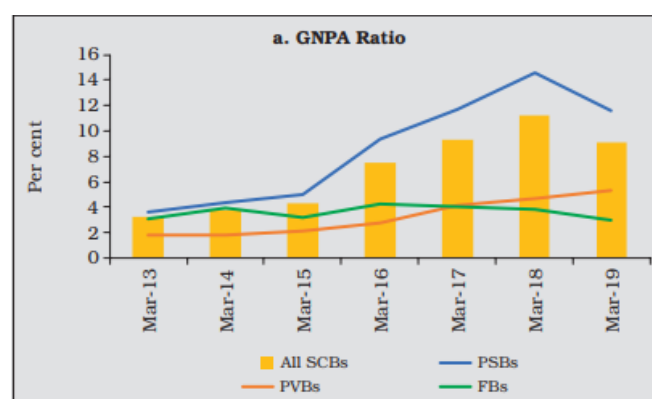### Non-Performing Assets - An Overview

When an asset does not generate income for the bank, it is classified as an NPA. RBI defines NPA as a "credit facility" for which the principal amount or interest remains due for a particular duration. It is a type of loan or advance that is overdue for a period exceeding 90 days. This facility can be a term loan, an overdraft facility, bills payable and bills discounted, and securitisation or derivative transactions. In the case of agriculture, the criteria for identifying NPAs is defined in terms of crop seasons. Thus, the amount of instalment of interest or principal due on loan for a short (long) period will be called as an NPA if the amount continues to be overdue for two (one) seasons (RBI, 2014).

Further, Indian banks are mandated to categorise their NPAs into different types, predicated on the duration for which the asset was non-performing. The first type is called *sub-standard assets*. These are those types of NPAs that are

unpaid for less than 12 months. The second type is called *doubtful assets*. These are the types of NPAs that are due for more than 12 months. The third type is defined as *loss assets*. These are the class of bank assets that are considered uncollectible, that is, they cannot be recovered at all.

Trends in Indian NPAs

Indian NPAs have been increasing over the years due to the credit boom during 2006-2011, which evidenced a spurt in lending by banks. Thus, there was pro-cyclicality in the bank's lending. Until 2016, the asset quality of banks was affected due to factors like inefficient credit standards, delay in project implementation, and ineffective bankruptcy regime. Public sector banks (PSBs) evidenced a huge spurt in NPAs in contrast to private (PVBs) and foreign banks (FBs), as seen in Fig. 1 (RBI, 2019).

Source: Report on Trend and Progress of Banking in India 2018-19 RBI

Fig. 1: Gross Non-Performing Assets (GNPA) Ratio of SCBs in India (RBI, 2019)

Due to mounting NPAs, the RBI introduced several norms to revive banks, such as capitalising PSBs and introducing the Insolvency and Bankruptcy Code (2016). Thus, there seems to be a turnaround in banks' level of NPAs, as evidenced in Fig. 1, for the year ending 2019.

Basel Norms

The BCBS was set up in 1974 after a series of banking crises worldwide. It aims to achieve financial stability by encouraging convergence towards common banking standards and approaches. BCBS provides global solutions to enhance the functioning of banks internationally. Thus, it has laid down various supervisory guidelines in the form of Basel norms (Cos, 2019) (Rizvi et al., 2018).

Basel I

The Basel I accord came into effect in 1988; it primarily emphasised on credit risk and risk-weightage on assets. This accord introduced a new concept called risk-weighted assets (RWAs). International banks were mandated to preserve capital comprising at least 8% of their RWAs. In addition, banks were required to classify assets predicated on the credit risk of these assets. It was required to assign risk weights of 0%, 20%, 50%, and 100% (increasing with more risk) (BCBS, 2001).

Basel II

Basel II was enforced in 2004 because the "one-size-fits-all framework" of Basel I was inadequate. Each bank was considered to have its specific way in managing and measuring risk. Thus, BCBS introduced three pillars. The first pillar considers the aspects of credit risk, market risk, and operational risk of banks. The total minimum capital requirement under all these risks is measured according to the concepts of regulatory capital and RWAs. For the second pillar, bank management needs to strengthen internal processes for setting targets for capital corresponding to each banks' risk profile. The third and last pillar includes market discipline to strengthen the market through enhanced bank disclosures (BCBS, 2004).

Basel III

The aftermath of the global financial crisis of 2008, Basel II, came up in 2010 with an extensive set of reforms that aims to intensify the risk monitoring mechanisms for banks. Basel III was implemented subsequently with effect from 2013 in India. Some of the Basel III reforms involved increasing the minimum common equity requirement to 4.5% and Tier 1 capital to 6% (Cranston et al., 2018). Basel III added a new category of capital buffer called the capital conservation buffer (CCCB), which aims to assure that banks hold sufficient capital to provide for losses at times of distress. Under CCCB, banks are permitted to change their capital requirements according to market cycles. The buffer varies from 0% to 2.5%. Liquidity Coverage Ratio (LCR) and Net Stable Funding Ratio (NSFR) were recommended to address liquidity shortages faced during the crisis by financial institutions (Das, 2020).

In Indian context, the RBI has also implemented the Basel norms for commercial banks. However, the Indian banking sector is burdened with increasing levels of NPAs due to economic slowdown and increased defaults by corporates (Das, 2020).

LITERATURE REVIEW

Scholars have studied NPAs and its determinants from varied perspectives. Management inefficiency, pro-cyclicality, loan growth, moral hazard incentives, and macro-economic variables are some of the factors determining banks' NPAs. Further, the impact of NPAs on banks' profitability has been analysed by several researchers.

In one of the first studies, Berger and DeYoung (1997) tested different propositions as the possible reasons for the increase in NPAs of banks in the United States. Bad management hypothesis states that managerial inefficiency increases future NPAs, as managers end up choosing bad projects. The skimping hypothesis states that banks may save costs of monitoring and administering loans in the short run, but this may create problems of bad loans in the long run. The moral hazard hypothesis highlights the increased portfolio risk managers of undercapitalised banks undertake due to moral hazard incentives.

Several researchers tested these hypotheses later. For instance, Ghosh (2015) supported the moral hazard hypothesis in US banks and noted that inferior credit quality increases their NPAs. Makri et al. (2014) evidenced bank capital and NPAs to be negatively related in banks from Eurozone countries, thus supporting the moral hazard proposition. Similarly, Dhar and Bakshi (2015), Bardhan and Mukherjee (2016), and Chavan and Gambacorta (2016) supported the moral hazard hypothesis for Indian SCBs.

Bolat and Isik (2016) confirmed the bad management hypothesis for Turkish banks, as they evidenced return on assets (ROA) and NPAs to be negatively related. Makri et al. (2014) found similar results for ROE and NPA. In the Indian context, Ghosh (2015) and Bardhan and Mukherjee (2016) supported the hypothesis in terms of ROA, while Dhar and Bakshi (2015) and RBI (2016), who measured profitability in terms of NIM, also observed similar results.

Pro-cyclicality was considered as one of the factors causing the increase in banks' NPAs. Berger and Udell (2004) supported the 'institutional memory hypotheses' in the US banks. This hypothesis states that managers tend to ease credit standards during boom periods and vice versa. Laeven and Majnoni (2003) conducted an inter-country analysis to study the loan loss provisioning of banks. They have noted that banks maintain a low amount of provisions during boom periods and therefore suffer during bust periods. Seo (2016) investigated the pro-cyclicality for Korean banks and found NPAs affect long-term loans. Chavan and Gambacorta (2016) analysed the effect of pro-cyclicality on NPLs in India by deploying the system generalised method of moments (GMM) methodology. They document that loan

growth affects NPAs positively. Their study indicates that PVBs are more pro-cyclical than PSBs, and thus, NPAs of PVBs are affected by a change in interest rates more than the NPAs of PSBs. Goel (2018) studied the cyclicality aspect of NPAs for Indian commercial banks.

The literature further evidenced loan growth as an essential factor in determining credit risk. (Sinkey & Greenawalt, 1991; Keeton, 1999; Borio et al., 2001; Hess et al., 2009). For instance, Hess et al. (2009) concluded that Australian banks' loan growth leads to increased credit losses after two to four years. Similarly, Foos et al. (2010) examined the relationship between loan growth and asset risk for 16 developed nations and found loan growth and loan loss provisioning to be positively related. Chavan and Gambacorta (2016) report that loan growth positively affects the NPAs of Indian banks.

Further, several researchers analysed the effect of macro-economic variables on NPAs. GDP growth was negatively related to NPAs (Thiagarajan et al., 2011; Bardhan and Mukherjee, 2016; Bolat and Isik, 2016). Geng and Zhai (2013) found that interest rate had a positive influence on bank risk. In addition, Ghosh (2015) and Makri et al. (2014) evidenced unemployment and NPAs to be negatively related.

Thus, in most studies, researchers examined the various causes of NPAs in the banking industry. Few researchers examined the effect of NPAs on bank performance. For instance, Sufian and Chong (2008) investigated bank profitability in Philippines and found that credit risk negatively affects banks' profitability. Ekinci and Poyraz (2019) found similar results for Turkish banks. Increased NPAs reduce capital available for further projects and activities, which further depletes their profits. Malim and Masron (2018) investigated determinants of bank returns for Islamic and conventional banks across nations. They note credit risk affects the margins of the latter. Studies in Indian context, relating to NPAs and bank performance, were limited. Bhatia et al. (2012) studied the relationship for PvBs in India. Pandey et al. (2013) explained that increased NPAs negatively influence the capital, profitability, and liquidity of banks.

In view of the foregoing literature, the aim of the present study differs from prior literature (and thus adds to the existing research), as it assesses the effect of NPAs on Indian commercial banks' financial and operating performance under the Basel regulations. Since banks are important financial intermediaries, it is imperative to inspect the implications of bad loans on the profitability of banks. The

rationale is strengthened as India has been witnessing an ever-increasing trend in the level of NPAs.

RESEARCH METHODOLOGY

The present section delineates the methodology deployed to evaluate the influence of NPAs on the bank's profitability.

Data and Sample

For the study, 64 Indian SCBs are considered with 704 firm-year observations. The sample selection criteria were based on the data availability for the variables considered in the research for the entire sample period. The period of study is from 2008-2018 to account for the post-recession period that occurred during the US sub-prime crisis.

Relevant data for the research has primarily been obtained from the RBI's database. Other sources used to fill up any missing data were annual reports of Banks and Bloomberg Finance L.P.

Variables

Based on the literature, this study controls bank-specific and macro-economic variables to gauge the effect of NPAs on banks' performance. The complete list of variables and their measures are enumerated in Table 1.

Dependent Variables

Return on assets (ROA), return on equity (ROE), and net interest margin (NIM) are used as alternative proxies of financial and operating performance.

Independent Variables

Net NPAs to net advances ratio is used to measure the banks' NPAs. Several control variables are deployed in the study. Regulatory requirements of banks, such as capital adequacy ratio and priority sector advances may restrict banks from maximising their profits. In addition, large banks may behave differently to small-sized banks, and thus were controlled in the study. Similarly, GDP and inflation are used as indicators of macro-economic development affecting banks' performance.

Table 1: List of Independent and Dependent Variables Considered in the Study

Independent Variables		
Variables	**Abbreviations**	**Description**
Bank-Specific Variables		
Net NPA to Net Advances (%)	NPA	Net non-performing assets as a percentage of net advances
CAR (%)	CAR	Capital Adequacy Ratio
Bank Size (SIZE)	TA (ln)	Log of total assets of a bank
Ratio of PSL	PSL	Priority sector loans to Total advances
Ratio of Interest Income	II	Interest income to Total income
Ratio of Salary to TI	Salary	Ratio of salary expenses to Total income
Bank Diversification	NII	Ratio of non-interest income to Total income
CDR	CDR	Credit to deposit ratio
Management Efficiency	OPR	Operating profits to Total income
Macro-Economic Variables		
GDP Growth Rate	GDP	Annual percentage growth rate of Gross Domestic Product
Inflation	Inflation	Rate of inflation over the years
Dependent Variables		
ROE	ROE	Return on Equity
ROA	ROA	Return on Assets
NIM	NIM	Net Interest Margin (in percentage) or Interest Spread

Econometric Specification

We have considered the following model:

$$y_{it} = \beta_0 + \beta_1 NPA_{it} + \beta_2 BANK_{it} + \beta_3 MACRO_{it} + \mu_{it}$$

where,

i (index of banks) = 1, 2, 3, 4,…….., 20 (for PSBs)

= 1, 2, 3, 4,……..., 18 (for PvBs)

= 1, 2, 3, 4,………, 26 (for FBs)

t = Number of years from 2008 to 2018

y_{it} is the dependent variable deployed to measure the bank's performance. NPA_{it} is the non-performing asset ratio of bank i at time t. $BANK_{it}$ represents a vector of bank-specific variables, while refers to a vector of macro-economic variables. β_1, β_2 and β_3 are estimates of the parameters NPA ratio, bank-specific variables, and macro-economic variables, respectively. μ_{it} is the error term.

Concerning the estimation method, panel data contains aspects of both cross-sectional and time variation. Thus, to account for dynamicity and heterogeneity, the most common models used to estimate panel regression are the fixed effects (FE) and the random-effects (RE) model. FE model controls all-time constant differences between the cross-sections due to which estimated coefficients in this model could not

be biased. In the RE model, time-constant effects act as predictor variables. RE model is superior to the FE model since the former allows time-constant variables (dummy variables) in the model, which is not possible in the fixed effects model (Tripathi et al., 2018).

Breusch and Pagan Lagrange Multiplier (LM) test for RE was introduced by Breusch and Pagan in 1980 to examine the existence of random effects. It tests the chi-squared distribution with one degree of freedom of residuals generated from RE regression. The null hypothesis of the test specifies the presence of no random effects (Baltagi, 2013). In the present study, the RE model was considered more relevant, as the null hypothesis was rejected through the LM test.

RESULTS AND DISCUSSION

In this section, we enumerate the significant findings of the data analysis and discuss the results obtained. Results for this study were estimated using the tool Stata 14.

Summary Statistics

Descriptive statistics of the variables employed in the study for PSBs, PvBs, and FBs, respectively, are summarised in Table 2. It presents the mean and standard deviation of the variables.

Table 2: Summary Statistics of Variables for Different Categories of Banks for the Period 2008-2018

	PSBs				PvBs				FBs			
Number of Observations	220				198				286			
Number of Banks	20				18				26			
	Mean	**SD**	**Min**	**Max**	**Mean**	**SD**	**Min**	**Max**	**Mean**	**SD**	**Min**	**Max**
NIM	2.28	0.47	0.58	3.62	3.08	0.71	1.08	5.62	3.65	1.69	−1.23	10.46
ROA	0.41	0.81	−2.46	1.67	1.14	0.67	−2.04	2.02	1.41	2.66	−26.22	10.23
ROE	6.93	14.47	−46.63	27.15	12.81	7.92	−26.98	25.03	6.73	7.75	−24.41	31.38
CAR	12.10	1.29	8.69	15.38	15.23	5.09	9.81	56.41	44.34	72.99	0	531.8
NPA	3.44	3.54	0.15	16.69	1.17	1.21	0	5.66	1.86	7.48	−0.05	98.79
II	0.89	0.03	0.77	0.95	0.87	0.05	0.74	0.96	0.73	0.23	0.134	1.111
NII	0.11	0.03	0.05	0.23	0.14	0.05	0.04	0.27	0.27	0.23	−0.111	0.87
CDR	71.60	6.71	46.99	112.62	75.78	12.03	45.88	107.18	504.42	5376.26	0	902655.96
PSL	32.99	5.57	17.53	50.05	34.79	8.46	18.14	60.85	34.12	19.74	0	100
Salary	10.74	2.70	3.97	18.99	10.69	3.73	5.10	34.78	14.84	20.46	0	301.30
Size	6.27	0.29	5.49	6.88	5.64	0.62	4.17	7.03	4.47	1.09	0	6.22
GDP	7.04	1.57	3.89	10.26	7.04	1.57	3.89	10.26	7.04	1.57	3.89	10.26
Inflation	7.72	2.83	3.33	11.99	7.72	2.83	3.33	11.99	7.72	2.83	3.33	11.99

Table 2 reports the descriptive statistics, that is, mean, standard deviation (SD), min (minimum), and max (maximum) for different categories of banks. Variables include net interest margin (NIM), return on assets (ROA), return on equity (ROE), NPA measured as the percentage of net NPA to net advances, SIZE measured as log of bank's total assets, PSL measured as priority sector loans to total advances, II defined as the ratio of interest income to total income, Salary measured as the ratio of salary expenses to total income, CDR measured as credit to deposit ratio, NII that measures bank diversification and is defined as the ratio of non-interest income to total income, CAR measured as capital adequacy ratio of banks, GDP measured as the annual percentage growth rate of gross domestic product, and Inflation measured as the rate of inflation over the years.

*** indicates significance levels at 1%, ** indicates significance at 5%, and * indicates significance at 10%, respectively.

Table 2 shows that average NIM, OPR, and ROA for FBs is higher than that of PSBs and PvBs. PvBs have better ROE than their counterparts. In terms of capital requirements (CAR), FBs maintain very high CAR on average compared to other types of banks. However, the bad loans (NPA ratio) for PSBs are huge compared to other types of banks. It varied from 0.15% to 17% for PSBs. The mean values of bank diversification, that is, NII to TI, suggest that FBs and PvBs have more varied income sources than PSBs.

Regression Results

Table 3-5 summarise the regression results for different types of banks using ROA, ROE, and NIM, respectively, as the dependent variables.

Table 3: Regression Results for Different Categories of Banks with the Dependent Variable as ROA

	PSBs	PvBs	FBs
Dependent Variable: ROA			
NPA	−0.218***	−0.361***	−0.002
	(0.012)	(0.027)	(0.013)
SIZE	0.015	0.073	−0.124
	(0.112)	(0.108)	(0.107)
PSL	0.007	−0.005	0.034***
	(0.006)	(0.005)	(0.005)
II	−3.243***	−0.918	−2.237***
	(0.873)	(0.880)	(0.451)
Salary	0.122	−0.036***	−0.086***
	(0.010)	(0.011)	(0.005)
GDP	−0.017	0.005	−0.221***
	(0.016)	(0.017)	(0.065)
Inflation	−0.001	−0.016	0.107***
	(0.014)	(0.013)	(0.036)
Constant	3.748***	2.580***	4.458***
	(1.210)	(1.198)	(0.833)
R-squared	0.818	0.750	0.627

Table 3 reports the regression results for different categories of banks using the return on assets (ROA) as the dependent variable. Independent variables include NPA measured as the percentage of net NPA to net advances, SIZE measured as log of bank's total assets, PSL measured as priority sector loans to total advances, II defined as the ratio of interest income to total income, Salary measured as the ratio of salary expenses to total income, GDP measured as the annual percentage growth rate of gross domestic product, and Inflation measured as inflation rate over the years.

*** indicates significance levels at 1%, ** indicates significance at 5%, and * indicates significance at 10%, respectively.

Table 4: Regression Results for Different Categories of Banks with the Dependent Variable as ROE

	PSBs	PvBs	FBs
Dependent Variable: ROE			
NPA	−3.860***	−4.341***	−0.060
	(0.198)	(0.319)	(0.053)
SIZE	−1.662	0.570	2.222***
	(1.815)	(1.171)	(0.426)
PSL	0.975	−0.006	0.097***
	(0.101)	(0.062)	(0.0213)
II	−54.245***	−0.468	−5.390***
	(15.022)	(10.060)	(1.794)
Salary	0.199	−0.634***	−0.085***
	(0.164)	(0.130)	(0.020)
GDP	−0.075	−0.167	−0.941***
	(0.282)	(0.199)	(0.257)
Inflation	−0.057	0.069	0.608***
	(0.244)	(0.152)	(0.145)
Constant	74.773***	22.728*	0.749
	(20.593)	(13.592)	(3.318)
R-squared	0.821	0.780	0.743

Table 4 reports the regression results for different categories of banks using the return on equity (ROE) as the dependent variable. Independent variables include NPA measured as the percentage of net NPA to net advances, SIZE measured as log of bank's total assets, PSL measured as priority sector loans to total advances, II defined as the ratio of interest income to total income, Salary measured as the ratio of salary expenses to total income, GDP measured as the annual percentage growth rate of gross domestic product, and Inflation measured as inflation rate over the years.

*** indicates significance levels at 1%, ** indicates significance at 5%, and * indicates significance at 10%, respectively.

Table 5: Regression Results for Different Categories of Banks with the Dependent Variable as NIM

	PSBs	PvBs	FBs
Dependent Variable: NIM			
NPA	−0.019*	−0.017	0.008
	(0.011)	(0.027)	(0.013)
SIZE	−0.165	−0.021	−0.479***
	(0.178)	(0.123)	(0.106)
CDR	0.005	0.022***	0.00003*
	(0.005)	(0.005)	(0.00002)
NII	−1.884*	−0.950	−2.442***
	(1.006)	(1.033)	(0.432)
CAR	0.0859***	0.040***	−0.004***
	(0.021)	(0.007)	(0.001)
Constant	2.163*	1.112*	6.632***
	(1.143)	(0.634)	(0.580)
R-squared	0.297	0.260	0.249

Table 5 reports the regression results for different categories of banks using net interest margin (NIM) as the dependent variable. Independent variables include NPA measured as the percentage of net NPA to net advances, SIZE measured as log of bank's total assets, CDR measured as credit to deposit ratio, NII that measures bank diversification and is defined as the ratio of non-interest income to total income, and CAR measured as capital adequacy ratio of banks.

*** indicates significance levels at 1%, ** indicates significance at 5%, and * indicates significance at 10%, respectively.

Based on the above results, it can be said that NPAs were computed as a proportion of NPLs to total loans; they negatively affect both ROA and ROE as the dependent variables for all types of banks. The negative impact is significant for PSBs and PvBs; however, the relationship is not significant for FBs. The impact is more pronounced in the case of eroding equity returns. Thus, the results confirm the literature, indicating that bad loans have significantly reduced the profitability of Indian banks. In the case of NIM as the dependent variable, although the coefficients are negative, results are significant only for PSBs at a 10% level. This finding further emphasises the deteriorating health of the PSBs, in terms of operating profitability, returns generated on assets employed, and equity shareholders returns.

The impact of size, estimated as the logarithm of banks' total assets indicates that size positively impacts ROA for PSBs and PVBs, but vice versa for FBs. However, the impact is insignificant for all type of banks. In the case of FBs, size has a significant positive impact on ROE, whereas a significant negative impact is observed on NIM. This finding indicates that the FBs have generated significant returns on the shareholders' funds. However, the negative impact on NIM can be due to the fact that Indian banks have been witnessing stringent competition with other financial products. Further, the declining interest rates seem to impact the operating performance of FBs in India. Additionally, some studies suggest that as bank size increases, it leads to higher risk appetite, which leads to more NPAs and less profitability.

Priority Sector Lending (PSL) is a unique feature in Indian banking set up. It is measured as a fraction of priority sector loans to total advances. In India, banks are mandated to lend a certain portion of their advances to the priority sectors, such as agriculture, education, and the housing sector. PSL and profitability (measured using both the proxies ROA and ROE) are positively related for PSBs and FBs. These results are significant only for FBs, while for PvBs, the relationship is negative but insignificant. On overall conclusion that can be drawn is that the PSL does not seem to impact the profitability of PSBs and PvBs. FBs have been able to manage this portfolio better, generating significant returns on them.

The ratio of interest income to total income depicts the diversity in the nature of the income of a bank. Thus, the greater the II, the less diverse the bank's activities and the more dependent the bank is on traditional lending business. Banks with more diversified activities can reduce costs

by achieving economies of scale. Interest income has a significant negative impact on both ROA and ROE in the case of both PSBs and FBs. This finding implies that rising interest income as a percentage of total income has eroded the net returns. Although the PSBs and FBs have managed to increase the proportion of interest income, their loans turning bad are significantly more, thereby reducing their overall profitability. However, the relationship was insignificant for PvBs.

Human resources are one of the most important assets of a bank. The ratio of salary expense to total income measures the operating efficiency of the bank. From the literature examined, it is observed that a higher ratio leads to lower bank profitability. In Indian context, the salary expense seems to have a significant negative impact on the profitability of FBs and PvBs. The burden of rising operating expenses with declining margins seems to be the focal cause of this impact.

The credit to deposit ratio (CDR) is a direct measure of credit extended by banks against their deposits. CDR reflects a bank's liquidity position. Thus, if CDR is high, it depicts a low level of liquidity maintained by the bank. This ratio shows the banks' ability to provide for any loan losses and any withdrawals by its customers. The CDR has a significant positive impact on NIM in the case of PvBs and FBs (although insignificant for PSBs). The positive relationship shows that as these banks have been extending more credit in proportion to their deposits, it has increased the interest income for the banks. However, how such an approach would impact the bank liquidity is outside the scope of this paper.

Similar to the situation the world over, banks in India have been trying to diversify their income sources and generate revenue in the form of fee and commission from other activities. Bank's revenue diversification as measured by non-interest income (NII) reflects the diversification of its activities. If it is high, it means that banks have more diversified sources of income. NII wields a significant negative influence on NIM in the case of FBs and PSBs (albeit insignificant for PvBs). This finding suggests that the resources of the banks are being directed towards non-interest-generating activities that may lead to decreasing NIM.

Capital Adequacy Ratio (CAR) positively (and significantly) influences NIM for PSBs and PvBs. However, for FBs, the relationship is negative, which is reinstated as per the literature. The relationship may be positive due to stricter norms that came into place, such as Basel-III. Thus, banks have to be more cautious in disbursing loans that increase their NIM.

The macro-economic factors controlled in the study are GDP growth and inflation, respectively. GDP and profitability (using both the proxies ROA and ROE) are negatively related. This negative relationship may be because of increased competition and loan disbursements by banks due to higher GDP growth and reduced margins for banks.

Inflation has a significant positive influence on profitability for FBs. Increase in inflation increases interest rates, which further leads to a higher spread for banks in building a higher profit margin. Thus, from the foregoing discussion, it can be said that NPAs have impaired the profitability of banks in India, which may destabilise the banks in future if corrective measures are not undertaken.

CONCLUDING OBSERVATIONS

Banks are considered as critical financial intermediaries in an economy. Its soundness is pertinent to boost the economic development of a nation. NPAs or NPLs are the types of loans that have turned bad. Increase in the level of NPAs affects the financial soundness and performance of banks, as they are unable to recoup their incomes and are further required to maintain higher provisions for these assets. Moreover, increased levels of NPAs reduces the confidence of investors, depositors, and various stakeholders on banks, thereby creating 'runs' on the banking system. Thus, the present research investigated the implication of NPAs on the profitability of SCBs in India.

It was evidenced that NPAs negatively and significantly impact ROA and ROE of PSBs and PvBs. Similar were the findings for NIM as the proxy of profitability, except that they were significant only for PSBs.

Basel norms increased the capital requirements for banks, and thus CAR and NIM were positively related for PSBs and PvBs. However, for FBs, the relationship was negative, which is reinstated as per the literature. Thus, capital requirements force PSBs and PvBs to increase its margin requirements. Liquidity (measured in terms of credit to deposit ratio (CDR)) was positively related to profitability for all type of banks. Also, priority sector lending (PSL) and profitability were positively related for PSBs and FBs, but were negatively related in the case of PvBs. Thus, PSL enhances the profitability of PSBs and FBs, but the same cannot be said about PvBs.

The study highlights specific vital issues for policymakers. Increased NPAs negatively affects banks' profitability and deteriorates the depositor's confidence. The policymakers, therefore, need to implement policies to keep a check on the level of NPAs and ensure their early recognition. Recent

episodes of frauds by corporate sector borrowers have increased NPAs for banks. This increase reflects managerial inefficiency in monitoring asset quality; therefore, a fair mechanism for sanction of loans should be ensured. Increased surveillance, mainly for PSBs, needs to be put in place, since they rely on its funding. In addition, PSBs evidenced the highest level of NPAs and the lowest ROA level compared to other types of banks in the study. Adequate monitoring standards are required to improve their performance.

The present study's scope is restricted to India, and a further cross-country analysis can provide additional insights. Further, lag of variables could be incorporated, and possible simultaneous relationships of NPA and profitability could be studied.

REFERENCES

Baltagi, B. H. (2013). *Econometric analysis of panel data* (5th ed.). Chichester: John Wiley & Sons.

Bardhan, S., & Mukherjee, V. (2016). Bank-specific determinants of nonperforming assets of Indian banks. *International Economics and Economic Policy, 13*(3), 483-498.

Bawa, J. K., Goyal, V., Mitra, S. K., & Basu, S. (2019). An analysis of NPAs of Indian banks: Using a comprehensive framework of 31 financial ratios. *IIMB Management Review, 31*(1), 51-62. doi:https://doi.org/10.1016/j.iimb.2018.08.004

BCBS. (2001). *The new basel capital accord: An explanatory note.* Switzerland: Bank for International Settlements.

BCBS. (2004, June). *International convergence of capital measurement and capital standards a revised framework.* Bank for International Settlements. Switzerland: Bank for International Settlements.

Berger, A. N., & Udell, G. F. (2004). The institutional memory hypothesisand the procyclicality of bank lending behavior. *Journal of Financial Intermediation, 13*(4), 458-495. doi:10.1016/j.jfi.2004.06.006

Berger, A. N., & Young, R. D. (1997). Problem loans and cost efficiency in commercial banks. *Journal of Banking & Finance, 21*(6), 849-870. doi:10.1016/S0378-4266(97)00003-4.

Bhatia, A., Mahajan, P., & Chander, S. (2012). Determinants of profitability of private sector banks in India. *Journal of Commerce and Accounting Research, 1*(2), 14-22.

Bolat, S., & Isik, O. (2016). Determinants of non-performing loans of deposit banks in Turkey. *Journal of Business, Economics and Finance, 5*(4), 341-350.

Borio, C., Furfine, C., & Lowe, P. (2001). Procyclicality of the financial system and financial stability: Issues and policy options. In B. F. Settlements, *Marrying the Macro- and Micro-Prudential Dimensions of Financial Stability* (vol. 01, pp. 1-57). Switzerland: Bank for International Settlements. Retrieved from https://econpapers.repec.org/bookchap/bisbisbpc/01-01.htm

Chavan, P., & Gambacorta, L. (2016). Bank lending and loan quality: The case of India. *BIS Working Papers*, 1-24.

Clair, R. T. (1992). Loan growth and loan quality: Some preliminary evidence from Texas banks. *Economic and Financial Policy Review, q*(iii), 9-22. Retrieved from https://ideas.repec.org/a/fip/fedder/y1992iqiiip9-22.html

Cos, P. H. (2019, October 01). Where next for the basel committee? Retrieved from The Banker Magazine: https://www.thebanker.com/Comment-Profiles/Viewpoint/Pablo-Hernandez-de-Cos-where-next-for-the-Basel-Committee/(language)/eng-GB

Cranston, S. R., Avgouleas, E., Zwieten, K. V., Hare, C., & Sante, T. V. (2018). *Principles of banking law* (3rd ed.). New York,USA: Oxford University Press.

Das, R. C. (2019). Causal links among banks' investments on government securities, GDP and different heads of central plan expenditures in India. *International Journal of Asian Business and Information Management (IJABIM), 10*(1), 78-93.

Das, S. (2019). *Indian banking sector: Current status and the way forward.* Delivered at the National Institute of Bank Management, Pune at the 15th Annual Convocation of Post Graduate Diploma in Management. Pune: Reserve Bank of India. Retrieved from https://www.rbi.org.in/Scripts/BS_SpeechesView.aspx?Id=1075

Das, S. S. (2020). *Banking landscape in the 21st century.* Mumbai: Reserve Bank of India.

Dhar, S., & Bakshi, A. (2015). Determinants of loan losses of Indian banks: A panel study. *Journal of Asia Business Studies, 9*(1), 17-32.

Ekinci, R., & Poyraz, G. (2019). The effect of credit risk on financial performance of deposit banks in Turkey. *Procedia Computer Science, 158*(2019), 979-987.

Foos, D., Norden, L., & Weber, M. (2010). Loan growth and riskiness of banks. *Journal of Banking & Finance, 34*(12), 2929-2940.

Geng, Z., & Zhai, X. (2013). Monetary policy instruments and bank risks in China. *International Journal of Asian Business and Information Management (IJABIM), 4*(2), 57-71.

Ghosh, A. (2015). Banking-industry specific and regional economic determinants of non-performing loans:

Evidence from US states. *Journal of Financial Stability, 20*(C), 93-104.

Goel, P. (2018). Cyclicality of non-performing assets: Evidence from Indian banking industry. *Journal of Commerce and Accounting Research, 7*(3), 13-19.

Hess, K., Grimes, A., & Holmes, M. (2009). Credit losses in Australasian banking. *Economic Record, 85*(270), 331-343.

Kasturi, R. (2019). Credit allocation by Indian commercial banks. *Journal of Commerce and Accounting Research, 8*(1), 1-7.

Keeton, W. R. (1999). Does faster loan growth lead to higher loan losses? *Economic Review, 84(QII)* 57-75. Retrieved from https://ideas.repec.org/a/fip/fedker/y1999iqiip57-75nv.84no.2.html

Laeven, L., & Majnoni, G. (2003). Loan loss provisioning and economic slowdowns: Too much, too late? *Journal of Financial Intermediation, 12*(2), 178-197. doi:10.1016/S1042-9573(03)00016-0

Makri, V., Athanasios, T., & Bellas, A. (2014). Determinants of non-performing loans: The case of Eurozone. *Panoeconomicus, 61*(2), 193-206.

Malim, N. A., & Masron, T. A. (2018). What drives bank margins during and post-crisis? A comparison between islamic and conventional banks. *Asian Academy of Management Journal of Accounting and Finance, 14*(1), 107-126.

McKinsey & Company. (2019). *Bracing for consolidation in Asia-Pacific banking: The quest for scale*. Chicago: McKinsey & Company.

Pandey, S. J., Tilak, V. G., & Deokar, B. (2013). Non-performing assets of Indian banks: Phases and Dimensions. *Economic and Political Weekly, 48*(24), 91-93. Retrieved from https://www.jstor.org/stable/23527401

Pathak, B. V. (2010). *The Indian financial system: Markets, institutions and services* (3rd ed.). Delhi: Pearson Education India.

RBI. (2014). *Master circular - Prudential norms on income recognition, asset classification and provisioning pertaining to advances*. Mumbai: Reserve Bank of India. Retrieved from https://rbidocs.rbi.org.in/rdocs/notification/PDFs/74MIR010714FL.pdf

RBI. (2019). *Report of the internal working group to review agricultural credit*. Mumbai: Reserve Bank of India. Retrieved from https://www.rbi.org.in/Scripts/PublicationReportDetails.aspx?UrlPage=&ID=942

RBI. (2019). *Report on trend and progress of banking in India 2018-19.* Mumbai: Reserve Bank of India.

Reserve Bank of India. (2018). *Frequently asked questions, Reserve Bank of India*. Retrieved April 3, 2020, from https://m.rbi.org.in/Scripts/FAQView.aspx?Id=87

Rizvi, N. U., Kashiramka, S., & Singh, S. (2018). Basel I to Basel III: Impact of credit risk and interest rate risk of banks in India. *Journal of Emerging Market Finance, 17*(1_suppl), S83-S111. doi:10.1177/0972652717751541

Salas, V., & Saurina, J. (2002). Credit risk in two institutional regimes: Spanish commercial and savings banks. *Journal of Financial Services Research, 22*(3), 203-224.

Salike, N., & Ao, B. (2018). Determinants of bank's profitability: Role of poor asset quality in Asia. *China Finance Review, 8*(2), 216-231.

Seo, J.-Y. (2016). Pro-cyclicality of small and medium enterprise (SME) loans according to financing type based on purpose: Evidence from Korean banks. *Asian Academy of Management Journal of Accounting and Finance, 12*(2), 23-36.

Sinkey, J. F., & Greenawalt, M. B. (1991). Loan-loss experience and risk-taking behavior at large commercial banks. *Journal of Financial Services Research, 5*(1), 43-59.

Sufian, F., & Chong, R. R. (2008). Determinants of bank profitability in a developing economy: Empirical evidence from the Philippines. *Asian Academy of Management Journal of Accounting and Finance, 4*(2), 91-112.

Thiagarajan, S., Ayyappan, S., & Ramachandran, A. (2011). Credit risk determinants of public and private sector banks in India. *European Journal of Economics, Finance and Administrative Sciences, 34*(2011), 147-154.

Tripathi, M., Kashiramka, S., & Jain, P. K. (2018). Flexibility in measuring corporate financial performance, EVA versus conventional earnings measures: Evidences from India and China. *Global Journal of Flexible Systems Management, 19*(2), 123-138.