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DETERMINANTS OF NON-PERFORMING ASSETS OF COMMERCIAL BANKS IN INDIA

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Abstract

Banks' credit growth continues to decelerate in India due to huge non-performing assets (NPAs) overhangs in banks. This study empirically analyzes the determinants of NPAs of scheduled commercial banks in India during 2009-2020, using the panel data methodology. Results indicate that the excessive credit growth in the past increased the surge in the current NPAS. The economic slowdown also aggravates loan delinquencies in Indian commercial banks. While higher priority sector lending creates higher loan delinquencies, higher banks' size and higher profitability reduce it. This study suggests that counter capital buffer, dynamic provisioning and a sound credit appraisal NPA will improve financial stability and monetary policy effectiveness. We hope that these findings are useful for policymakers, bankers and other stakeholders to make appropriate strategies to resolve the NPA issue is India.

Keywords: *Bank credit, non-performing assets/loans, panel regression, Indian banking sector*

JEL Codes: *C23, E51, G11, G21.*

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K. R. Shanmugam

INTRODUCTION

An efficient and healthy banking system is vital for the economic development and growth of a developing nation like India. [1] The Indian banking sector comprises Scheduled commercial banks (SCBs), cooperative banks, regional and rural banks (RRBs) and local area banks. The SCBs account for nearly 95 percent of banking system assets. The SCBs in turn comprise (i) public sector banks, which include the nationalized banks, NBs (majority equity holding being with the Government) and the State Bank of India (SBIs) and its associates banks (majority holding being with SBI), (ii) private domestic (old and new) banks (PBs) and (iii) private foreign banks (FBs).

Although banks are growth drivers, their business is exposed to credit risk, liquidity risk, interest rate risk, market risk, operational risk, management risk etc. But in recent years, major risk faced by banks is the high level of non-performing assets (NPAs). [2] It is basically a primary indicator of credit risk. Bank credit growth is a powerful channel for monetary policy transmission. During the five-year period 2008-2013, the banking system credit in India grew by 137.7 percent only to crash to 48.7 percent in the next five-year period 2013-2018. During 2018-2020, it further declined to 17.7 percent. The credit deceleration raises concerns over monetary policy effectiveness.

[1] . With their major role in credit intermediation process, payment and settlement system and monetary policy transmission, and additional responsibility of achieving the Government's social agenda, the banking industry acts as a catalyst for the economic development of the country.

[2] . A loan asset becomes a NPA or delinquent when it ceases to generate income. i.e., interest, fees, commission or any other dues for the bank for more than 90 days. A NPA is an advance where payment of interest or repayment of installment on principal or both remains unpaid for a period of 2 quarters or more if they become 'past due'. Crop loans are treated as NPAs, if loan installments remain overdue for two/one crop seasons for short/long duration crops. Within NPAs, an asset is termed as "substandard" if it remained an NPA for less than 12 months, beyond which it is termed as "doubtful." The worst quality of NPAs are termed "loss" assets, which are identified as a loss by the bank itself or by the auditors or the RBI, provided the amount is not written off wholly by the bank.

In 2009, India had the lowest non-performing assets (NPA) ratio among the G-20 nations. But its NPA was the second highest, next only to Russia in 2018. According to the Reserve Bank of India (RBI) website, the NPA (Gross) of scheduled commercial banks in India has increased from Rs. 683 billion (2.3 percent) in 2008-09 to Rs. 10388 billion (11.2 percent) in 2017-18. But it declined to Rs. 8981 billion in 2019-20. However, RBI's latest Financial Stability Report warns that NPA levels are likely to get worse again. They may reach 11.2 percent in March 2022 under a severe stress scenario. Several factors, including excessive lending, lax credit standards, poor monitoring, and diversion or siphoning off funds, besides malfeasance and fraud have contributed to high levels of NPAs (Rangarajan and Sambamurthy, 2021).

Various studies such as Fernandez de Lis et al (2000) and Kaushik and Sensarma (2008) discuss on higher incidence of NPAs constraining bank credit flow. First, high levels of NPAs suggest a high probability of a large number of credit defaults that affect profitability and net worth of banks and also erode the value of the assets. Second, prudential guidelines necessitate banks to provide for NPAs, which reduce the overall profit and shareholders' value. Third, psychological factors relating to overall pessimism and lack of confidence in an environment of growing impaired assets dent sanctioning of fresh loans or expansion of existing facilities (Amaresh, 2016).

As the incidence of NPAs constrains the effectiveness of bank credit as a channel of monetary transmission and risks overall financial stability /efficiency of the banking system, it is essential to identify factors determining the NPAs in India. This study is an attempt to empirically identify various determinants of Indian banks' NPAs using the latest 11 year data (2008-09 to 2019-20) and the standard panel data methodology.

Although few studies have already emerged in the Indian context to analyze the problem of bank NPAs (Mohan, 2003; Reddy, 2004; Rajaraman and Vasishtha, 2002; Das and Ghosh, 2003, 2005; and

Amaresh, 2016), this study contributes to the literature in many ways. First, it uses the latest data available while most of the existing studies have used past data. Second, as the definition of the NPA itself has changed over the years, the implications of past studies may not be relevant in explaining the current trend of NPAs in India. A fresh look at the issue with new data is important. This study attempts to do it. Third, most of the exiting studies have analyzed the NPA issue of public sector banks and ignored the problem in private sector banks. The present study considers all banks-private (domestic and foreign) as well as public sector banks because after reforms, all groups of banks work in an increased competitive environment. Finally, most studies use either Gross NPA or Net NPA as the dependent variable. However, there is a significant difference between Gross NPA and Net NPA. Therefore, this study analyzes the determinants of both Gross NPAs and Net NPAs.

The rest of this study proceeds as follows. The following two sections provide an overview of trends in NPAs in Indian banks, and a brief review of the literature. Subsequent sections explain the model, data and estimation method and present and discuss the empirical results. The final section provides the concluding remarks of the study.

OVERVIEW OF NPAs IN INDIAN BANKS: SYLIZED FACTS

The modern banking system of India had its roots in the late 18th century and primarily catered to the needs of the British. After Independence, the nationalization of major private banks in 1969 was an important milestone in the banking system, which made banking accessible to the unbanked population of India. Another wave of nationalization happened in 1980. After that, the public sector banks acquired a place of prominence in the financial inter-mediation process and made significant strides in expanding geographical coverage, mobilizing savings and providing funds for investments in agriculture and small-scale industry.

The highly regulatory environment with interest rates, credit allocation and entry being controlled by the RBI favoured tremendous achievements. However, most banks were plagued with poor profitability and under capitalization with a high proportion of non-performing assets and huge administrative expenditures during the late 1980s (Shanmugam and Das, 2004). Based on the Narasimham Committee's report submitted in November 1991, the RBI introduced various prudential norms to improve the banking productivity, profitability and efficiency. These norms included capital adequacy, income recognition, and provisioning of bad debts etc. Although there have been modifications of these norms over the years, they have aimed at cleaning up the accounts of institutions. Later the deregulation and liberalization measures, increasing competition among commercial banks to retain their share in the market, tremendous growth in cross border transactions and speculative deals in forward exchange contracts and derivative markets were predominant in the last decade. They changed the portfolio behaviour of the banks (Rao, 2018).

The global financial crisis in 2008 too had an impact on the operations of the commercial banks. The RBI introduced the corporate debt restructuring (CDR) scheme, indirectly affecting the asset quality of commercial banks. Fluctuations in non-performing assets (NPAs) have a severe impact on profit t and loss account, reserves and net worth, the capital to risk-weighted assets ratio (CRAR), etc. The debt waiver schemes of the central and state governments for the small and marginal farmers announced periodically affected the stock of NPAs under "agriculture," and also the aggregate stock.

Table 1: Trends in Non-Performing Assets of Commercial Banks in India

Year	All Banks		Public Banks		Private Banks		Foreign Banks	
	Gross	Net	Gross	Net	Gross	Net	Gross	Net
				NPAs (Rs. Billion)				
2008-09	683	316	450	212	200	86	64	30
2009-10	847	387	599	294	213	78	71	30
2010-11	979	417	746	360	218	53	50	12
2011-12	1429	652	1178	594	230	57	63	14
2012-13	1941	987	1656	900	263	80	80	27
2013-14	2644	1427	2283	1306	245	89	116	32
2014-15	3233	1758	2758	1600	341	141	108	18
2015-16	6119	3498	5400	3204	562	267	158	28
2016-17	7916	4330	6847	3831	932	478	136	21
2017-18	10388	5204	8956	4545	1293	644	138	15
2018-19	9354	3545	7395	2851	1836	673	122	21
2019-20	8981	2887	6783	2309	2096	557	102	21
Avg. Growth (percent)	**28.71**	**27.11**	**31.14**	**29.77**	**26.05**	**24.24**	**7.12**	**6.03**
				NPA Ratio (percent)				
2008-09	2.26	1.05	1.97	0.94	2.83	1.22	3.86	1.81
2009-10	2.6	1.11	2.19	1.09	2.89	0.99	4.35	1.84
2010-11	2.45	0.97	2.42	1.09	2.39	0.54	2.59	0.61
2011-12	3.07	1.29	3.32	1.53	2.08	0.48	2.78	0.61
2012-13	3.25	1.68	3.63	2.01	1.85	0.57	3.07	1.02
2013-14	3.85	2.12	4.38	2.56	1.8	0.66	3.87	1.1
2014-15	4.28	2.38	4.91	2.92	2.12	0.89	3.21	0.55
2015-16	7.49	4.43	9.28	5.73	2.85	1.38	4.2	0.77
2016-17	9.34	5.34	11.67	6.89	4.11	2.15	3.96	0.63
2017-18	11.21	5.95	14.58	7.98	4.74	2.42	3.80	0.43
2018-19	9.14	3.69	11.59	4.84	5.33	2.02	3.00	0.53
2019-20	8.29	2.83	10.25	3.75	5.55	1.54	2.34	0.49

Source: RBI: Handbook of Statistics on Indian Economy (various issues).

Table 1 shows the trend in NPAs over the years. The Gross NPAs of all banks increased from Rs. 683 million in 2008-09 to Rs. 10388 billion in 2017-18. But it declined to Rs. 8981 in 2019-20. The average annual growth of gross NPA during 2008-09 to 2019-20 was 28.71 percent. At

the same time, the NPAs annual growth was 31.4 percent in public banks, 26.05 percent in private banks and 7.12 percent in foreign banks. The Gross NPA ratio (gross NPA relative to gross advances) of all banks was 2.26 percent in 2008-09 and increased to 11.21 percent in 2017-18. At the same period, the ratio increased from 1.97 percent to 14.58 percent in public banks, 2.83 percent to 4.74 percent in private banks and 3.86 percent to 3.80 percent in foreign banks. During the same period, the net NPA ratio (gross NPA minus provision relative to gross advances minus provision) of all banks increased from 1.05 percent to 5.95; the NPA ratio increased from 0.94 percent to 7.89 percent in public banks, and 1.22 percent to 2.42 percent in private banks. At the same time, the NPA ratio of foreign banks declined from 1.81 percent to 0.43 percent. Growing NPAs and an increased share of public banks are the major concerns.

BRIEF REVIEW OF LITERATURE

While many studies to emerge to analyze the causes of NPAs (Mohan, 2003 and Reddy, 2004), the impact of NPAs (Fernandez de Lis et al 2000; Rajaraman and Vasishtha, 2002; Kausik and Sensarma 2008; Garg, 2016), the effectiveness of NPA recovery measures in India (Swain, Sahoo and Mishra, 2017; Singh, 2016) etc, only a few studies empirically analyze the determinants of NPAs in India.

Das and Ghosh (2003) empirically examined the relation of nonperforming loans of public sector banks with asset size, credit growth, macroeconomic condition, and operation efficiency indicators. Das and Ghosh (2005) show the linkages between asset risk proxied by NPAs, capital and productivity change in a simultaneous equation framework. They found that higher capital rates reduced the NPA and there was an inverse U relation between NPAs and bank's credit growth.

Ranjan and Dhal (2003) identified various economic and financial factors-terms of credit, bank size induced risk preferences and

macroeconomic shocks during 1993-2003 influenced the NPAs of public sector banks. Arora, Vashisht and Bansal (2009) show a positive relation between total loan disbursement and total NPA of selected banks. Kausik and Sensarma (2008) examine the role of economic growth, banks' size, profitability, ownership etc in determining the NPAs. They also find that the establishment of Debt Recovery Tribunals reduced NPAs. Amaresh (2016) estimated the relation of asset delinquencies (i.e. Net NPAs and Gross NPAs) of 50 banks during 2003-04 to 2013-14 with economic growth, bank size, ratio of priority sector to total lending, capital adequacy ratio, and return on assets, a dummy for public banks and past credit growth using panel random effects model estimation method. He found that excessive credit growth in the past is a major reason that has led to current NPAs. Other factors, such as contemporary economic conditions, capital adequacy and overall levels of efficiency of the banks have also affected the incidence of NPAs.

A few other studies analyzing the factors determining NPAs of banks in other nations. For instances, Lis *et. al.* (2000) showed that GDP growth, debt equity ratios of firms, regulation regimes, loan growth, bank branch growth, bank size, net interest margin, capital asset ratio (CAR) are the major determinants of bank loan losses in Spain; Sergio (1996) empirically proved that business cycle is the primary reason for banks' NPAs in Italy; Hu *et. al.*, (2002) show that the government's share holding in banks negatively affects non-performing loans of Taiwanese banks.

MODEL, DATA AND ESTIMATION

This section explains the data, variables and econometric model used to identify the determinants of bank NPAs in India. Following past studies on the topic, this study specifies the following NPA equation for bank i in year t:

$$NPA_{it} = \alpha + \beta_1 LCG_{it} + \beta_2 GGDP_{it} + \beta_3 SIZE_{it} + \beta_4 PSL_{it} + \beta_5 CAR_{it} + \beta_6 ROA_{it} + \lambda_i + \mu_t + \varepsilon_{it} \quad (1)$$

where the dependent variable, NPA_{it} is ith bank's non-performing assets in year t. The log of real net NPAs (NNPA) and Gross NPA ratio (GNPA) are alternatively employed as dependent variables.[3] LCG is past (i.e., one year lagged) credit growth for the respective banks; GGDP is the real economic growth which captures current economic activity; SIZE is the proportion of advances of the respective bank i to the total advances of all banks in the time period t; PSL is the ratio of primary sector lending to total lending (in percent); CAR is the capital adequacy ratio and ROA is the return on asset. λ_i is bank specific unobserved heterogeneity term capturing individual bank specific unobserved characteristics of banks; μ_t is the time or year effect; ε_{it} is the standard stochastic disturbance term.

The expected impact of GGDP on the incidence of NPA is negative because higher growth can be associated with larger sales and production in the economy, which leads to increased profits for firms and households, which in turn results in increased loan repaying capacity, resulting in lower loan delinquencies. Similarly, higher credit growth in the past is in general associated with greater problems of adverse selection and lending to the less creditworthy. The effect of such wrong decisions could lead to increased NPAs in the future. Therefore, the LCG will have a positive impact on current NPAs.

The size of the bank represents economies of scale and larger scope for diversification of loan portfolio. Larger banks may have better risk management procedures and technology and so this variable may have a negative effect on the NPAs. In India, the priority sector lending is a statutory requirement with a social concern to ensure reasonable amounts of credit to agriculture, MSMEs etc. That is, they are not on the basis of commercial consideration. Many of these loans may not be of good quality and there is a high probability of loan losses. Therefore, the

[3] The gross concept may be appropriate for modeling borrowers' behavior, while the net concept involves a mix of borrowers' as well as lenders' behavior. It is presumed that the net concept incorporates lenders' decisions about loan loss provisions (Ranjan and Dhal (2003).

PSL will have a positive impact of the NPAs. The CAR represents how banks are conservative and cautious in lending to risky assets as compared to capital they possess. The CAR may have negative relation with the NPAs. The ROA is both a profitability and an efficiency indicator. It may have a negative association with the NPAs.

The data sources for all variables except GDP are: Reserve Bank of India's Statistical Tables relating to Banks in India (various issues) and Report of Trend and Progress of Banking in India (various issues). The Central Statistical Organization (CSO) is the source for the GDP data. All data was compiled from these sources for the latest 12 years period (i.e., 2008-09 to 2019-20), covering 82 individual banks from four broad groups of banks, SBIs, NBs, PBs, and FBs. Due to the non-availability of certain variables for a few banks in some years and the merging of banks, the final data set used is an unbalanced panel of 675 observations in the NNPA model and 635 observations in the GNPA model.

The above NPA model equation (1) can be estimated using the standard (static) panel data estimation techniques: fixed effects (FE) or random effects (RE) model. The former assumes a correlation between X variables and the unobserved individual (bank) effect and year effect, while the latter assumes no such correlation. The FE model is estimated using the Ordinary Least Square (OLS) procedure including bank specific and year specific dummy variables along with X variables, while the RE model is estimated using the feasible Generalized Least Square (GLS) procedure (which includes the bank and time effect along with error term). Hausman Statistics is used to select the estimation method suitable for the given data. Table 2 provides the summary statistics of the study variables.

Table 2: Descriptive Statistics of the Study Variables

Variables	Definition	GNPA		NNPA	
		Mean	**Std.Dev**	**Mean**	**Std.Dev**
GNPA	Gross NPA ratio	0.896	0.073	-	-
NNPA	Log of Real Net Non-Performing Assets	-	-	6.035	2.604
LGC	Lagged Credit Growth (real)	0.164	1.604	0.184	1.588
GGDP	Growth of Gross Domestic Product	6.918	1.295	6.905	1.306
SIZE	Proportion of individual bank's advances to total advances of all banks in that year	0.018	0.0287	0.017	0.028
PSL	Ratio of priority sector advances to total advances (percent)	33.888	8.212	34.359	10.295
CAR	Capital Adequacy Ratio	15.253	12.353	17.303	16.398
ROA	Return on Assets	0.669	1.269	0.618	1.414
N	Sample Size	**635**		**675**	

EMPIRICAL RESULTS

As explained in the previous section, this study employs the log of real net NPAs (NNPA) and Gross NPA ratio (GNPA) alternatively as dependent variables. In both cases, the Hausman statistics has supported the two-way fixed effects estimation method. Table 3 reports the panel two-way fixed effects regression estimation results of NPA equations.

In the GNPA equation (Model 1), as expected, all explanatory variables except CAR have appropriate sign. Growth of GDP, banks'size, and return on assets have a negative and significant effect on the GNPA at 1 percent level of significance. The estimated coefficients indicate that the proportion of stressed assets declined by 0.006 unit when GDP growth increases by 1 unit. Similarly, it declined by 1.42 units and 0.03

unit if the bank size and ROA increase by 1 unit, respectively. As expected, both past credit growth and PSL have had positive effects on the GNPA. While the effect of the former is significant at 10 percent, the effect of the latter is significant at 1 percent. Unexpectedly, higher capital adequacy ratio leads to higher gross NPA and this relation is significant at 5 percent.

Table 4: Panel Data Fixed Effects Model Estimation Results of Non-Performing Assets of Banks in India (2008-09 to 2019-20)

Variables	Model 1 GNPA as Dependent Variable		Model 2 NNPA as Dependent Variable	
	Co-eff ,	Std.dev	Co-eff	Std.dev
LGC	0.0018*	0.0009	0.0906***	0.0230
GGDP	-0.0056***	0.0021	-0.4340***	0.0513
Size	-1.4290***	0.2958	29.8999***	7.3480
PSL	0.0009***	0.0004	0.02432***	0.0069
CAR	0.0003**	0.0001	0.0071**	0.0035
ROA	-0.0274***	0.0019	-0.2815***	0.0398
Constant	0.1162***	0.0219	6.901***	0.0486
N	635		675	
R Square				
-within	0.6076		0.5036	
-between	0.0419		0.1368	
-overall	0.2165		0.2857	
Time Effect	Included		Included	
Bank Effect	Included		Included	
Hausman Stat.	27.72		67.67	

Note: ***significant at 1 percent, ** significant at 5 percent, * significant at 10 percent;

In the NNPA equation (Model 2), both economic growth and return on assets have negative and significant coefficients, as expected. The lagged credit growth and priority sector lending variables have a positive and significant relationship with NNPA as expected. Unexpectedly, both CAR and SIZE have a positive and significant impact on NNPA.

CONCLUDING REMARKS

Non-performing assets (NPAs) or bad loans continue to adversely impact many economies around the world and India is no exception. In India, the commercial banks in the last decade faced a global economic slowdown, demonetization, etc. The asset quality of banks deteriorated significantly. The Gross NPA ratio of all Indian banks increased from 2.26 percent in 2008-09 to 11.21 percent in 2017-18. During the same period, the Gross NPA ratio increased from 1.97 percent to 14.58 percent in public banks, 2.83 percent to 4.74 percent in private banks and 3.86 percent to 3.80 percent in foreign banks. This study has made an attempt to identify factors causing high NPAs in Indian commercial banks, using the panel data for 82 banks during 2008-09 to 2019-20. It has employed the log of real NPA (NNPA) and Gross NPA ratio (GNPA) alternatively as dependent variables. The NPAs equations are estimated using two-way fixed effects estimation techniques.

The empirical results indicate that the economic slowdown aggravates loan delinquencies in Indian commercial banks. This, in turn, stems economic revival by suppressing credit growth. Excessive growth during the economic boom cause GNPA in the future, which may be due to poor credit appraisal and adverse selection. The result suggest the need for adoption of counter cyclical capital buffers and dynamic provisioning which will work in a counter cyclical pattern and reduce reinforcement of economic recession and loan delinquency dynamics (Amaresh, 2016). In this direction, the RBI gave a deadline of March 2017 for all banks to clean up their balance sheets, which also required their lenders to set aside a huge chunk of capital in the form of provisioning. As a result, the Gross NPA ratio started declining after 2017-18, but it is still at an alarming level. Additional counter cyclical capital buffer and dynamic NPA provisioning will neutralize the impact of NPAs towards exacerbating pro-cyclicality of bank credit and improve monetary policy effectiveness.

As suggested in Rangarajan and Sambamurthy (2021), a sound credit appraisal involves assessment of the Character, Capacity and Capital of the prospective borrower. The most difficult to evaluate is Character and intent of the borrowers and this may be gauged by the fact that banks classified Rs. 4 lakh crore as frauds and willful defaults during the last 3-4 years. In many cases of bad loans, borrowers have not brought in adequate capital and they only circulated debt from one bank as equity in another project through a web of affiliates. Some of these errant borrowers have dozens of these affiliates and even hundreds of bank accounts. The banks find it difficult to track the movement of funds. This challenge needs to be addressed both by banks and regulators.

The results also indicate that higher bank size and higher profitability reduce loan delinquencies. Higher priority sector lending creates higher loan delinquencies. It indicates the need for opening alternative channels like self-help group mode of microfinance to support these sectors. We hope that these findings are useful to policy makers, bankers and other think-tanks and academic researchers to make appropriate strategies to resolve the NPAs issues of banks in India.

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