INDIAN INSTITUTE OF MANAGEMENT ROHTAK

IPM, IMMERSIVE PROJECT 2021

THE MENACE OF NPAS:
A COMPARATIVE STUDY ON BANKS OPERATING IN INDIA

SMIT LAD
Student, IPM01062, Email: ipm01smitl@iimrohtak.ac.in

DR. AMOL SINGH
Faculty Mentor, Email: amol.singh@iimrohtak.ac.in

Abstract

Banking sector is one of long-standing walls of the Indian Economy. The NPA number has always been a matter of interest to public and private banks in India. The NPA amounts not only terrorise their respective companies or banks but also pose a risk to the economy as a whole.The research is conducted to assess the situation of NPAs between 2006 and 2020. Moreover, it assesses NPA's impact on the profitability of banks. It will also aim to assess macro-tech dynamics with respect to NPAs. Furthermore, there will also be a short review of the NPA policies.

Keywords:

Banking, NPAs, GDP, Nifty Bank, RBI, Financial System, Private-Public-Foreign Banks, Correlation, Regression, Student's T-Test

Table Of Contents

Table of Figures

INTRODUCTION

Banking first appeared in India in just the last decade of the 18th century. They have a very strong branch network, also in rural and semi-urban areas. Banking has undergone major changes since the period of financial market liberalisation and restructuring began in 1991. The overall objective was to increase the competitiveness, efficiency and sustainability of the scheme. For a prosperous economy, a stable banking sector is crucial. The bankruptcy could have a detrimental impact on other branches. Unperforming assets are a major concern to Indian banks. NPA is a source of serious concern. NPAs are a reflection of a bank's success. A high level of NPAs suggests a large number of loan defaults, which impact bank earnings and net value, as well as erode the price of capital assets. NPA growth necessitates the need for provisions, which limits net earnings and equity capital.

On the negative hand, the weakening of the Indian banking sector's asset quality is a major threat to the economy. It indicates that the banking system is under increasing strain. As a result, the financial system is under tremendous stress. The Stressed Advances ratio in the banking sector is 12.2 percent, according to the Reserve Bank of India, and the Gross Non-Performing Advances (GNPA) as a percentage of gross advances has risen to 10.2 percent in September 2017 (Wadhwa & Ramaswamy, 2020). The ratio of gross nonperforming advances (GNPA) to gross advances of PSBs hit 13.5 percent in September 2017 (Wadhwa & Ramaswamy, 2020).

In contrast, private sector banks have greater financial stability; however, the number of bad loans made in private banks has increased significantly in recent years. The increasing incidence of bad loans has a major impact on the banking system and the economy.

ORGANIZATION & DETAILS

Technically the study will scrutinize the entire banking system in regards to the commercial banks. However there are classification in the system:

1. Public Sector Banks: These are the nationalised banks, which account for more than 75% of the country's overall banking market. The government owns the vast majority of these banks. Some of them are: SBI, Bank of Baroda, UCO Bank, Union Bank of India.
2. Private Sector Banks: These involve banks in which private owners own a majority stake or shares. Some of them

are Axis Bank, IndusInd Bank, HDFC Bank.

3. Foreign Banks Operating in India: A foreign bank is one that has its headquarters in another country but acts as a private company in India. Some of them are Deutsche Bank, Citi bank, Barclays Bank.

As the NPA is the core issue in the analysis, the concept of NPA is critical to understand. The Reserve Bank of India (RBI) has issued instructions for assessing whether an asset becomes non-performing. The RBI is the central banking institution that oversees India's entire banking system.

1. If interest/principal instalments on Term Credit are past due for more than ninety days, it is a non-performing asset, i.e. NPA.
2. 2. If the balance of overdraft/cash loan is consistently higher than that of a sanctioned limit for 90 days, it is listed as an asset that fails to function, i.e. NPA.
3. A non-performing asset is one that has overdue bills that have been purchased and discounted for more than ninety days.
4. If, regarding the agricultural advance, interest/installment of principal is due for two seasons except for a pre-determined advance no more than two terms, six months, the time shall be regarded as the NPA.
5. Any balance that has been due on other accounts for longer than ninety days has been considered an asset that does not work (NPA).

Important Formulas for Gross NPAs and Net NPAs:

$$Net\ NPA\ =\ Gross\ NPAs\ -\ Provisions$$

$$Net\ NPA\ Ratio\ =\ \frac{Net\ NPA}{Total\ advances}$$

$$Gross\ NPAs\ \ Ratio\ =\ \frac{Gross\ NPAs}{Gross\ Advances}$$

Additionally there is a classification of the NPAs, according to the differerent advances made by the bank:

1. Standard Assets: Assets with basic/nominal risk
2. Substandard Assets: Non-performing assets that have been dormant for less than two years.
3. Doubtful Assets: Non-performing assets that have been in place for more than two years.Loss Assets: These are damages identified by banks, auditors, and RBI inspections.

STATEMENT OF THE PROBLEM

NPAs are a vital cause that has harmed India's financial market. NPAs above a certain threshold become a source of anxiety for all. NPAs have an impact on the process of credit, which in turn has an impact on the economy's production and growth; therefore, proper credit flow is critical. Banks procure funds not only through new deposits, but also through the repurposing of assets acquired by creditors. NPAs reduces the income gained by the banks as they have to make larger reserves for questionable and bad loans. As a result, the study will be carried out with the goal of evaluating the effect of NPA on bank profitability. Additionally it will try to analyze the macroecnonomic trends regarding the NPAs. Moreover, a brief overview of the policies to tackle the NPAs will also be undertaken.

OBJECTIVES OF THE PROJECT

The objectives of the paper are:

1. To review public, private and foreign banking status of NPAs;
2. To identify & analyse the macroeconomic trends with respect to the Gross NPA ratio in India;
3. To examine the effect on banking and the financial sector of the NPA by understand relationship of Bank Nifty, Repo Rate, GDP to Banking NPAs;
4. To assess NPA's effect on banks' profitability;
5. To identify which Indian bank is handling the NPAs best; and which bank worst;
6. To understand if Privatisation could be a solution to NPAs or not;
7. To review the existing policies introduced by RBI and Government to solve the NPA crisis.

LITERATURE REVIEW

Academicians and scholars have conducted extensive studies on commercial banks' non-performing assets (NPAs) in India. This segment examines the researchers' literature in the form of publications.

Swamy, 2013: This paper is mainly aimed at investigating the macroeconomic and endogenous factors effect on NPAs. The researcher concludes by noting that private banks and international banks are more effective in credit management of non-performing assets, and therefore bank privatisation will lead to improved default risk management. Private banks and international banks are handling non-performing assets (NPAs) even more strictly (Swamy, 2013).

Roy, 2014: This study has been conducted in India with the aim of managing NPAs from the perspective of PSBs (Public sector Banks). In the light of the most recent policy decisions and regulatory compliance by the reserve bank, this analyses followed the flow of assets not performed in Indian public sector banks by analysing their financial statements as a key output measure and management of assets not being executed (Roy, 2014).

Joseph and Prakash, 2014: The researcher has addressed the NPA pattern and the reasons that contribute to it. The study showed that for government banks the gross and net NPA percentages are higher than those for private-sector banks. The used architecture is descriptive, and data from secondary sources are collected (Joseph, L, A., and Prakash, 2014).

Saluja and Lal, 2015: They conducted a study contrasting the development of state, private and foreign banks in India with an emphasis on NPAs. The study finds that the NPAs of public, commercial and foreign banks have significantly dealt with a greater quantity of non-priority NPAs than they have been found in the priority market. The findings also show that NPAs are managed differently in different bank groups (Saluja & Lal, 2015).

Kumar Rath, 2016: With the study of a District Co-operative bank, this paper shows that NPAs have a detrimental influence on productivity, capital sufficiency, funds deployment and mobilisation policy, banking system credibility, and the broader economy. Coordinated efforts at all levels are therefore needed to address the NPAs' threat (Kumar Rath, 2016).

Gupta et al., 2020: The research had novel idea of exploring NPA with HDI Index in Asian countries. It indicated that high bank NPAs are caused by the indirect impact of the country's low HDIs (Gupta et al., 2020).

These researches rightfully find the problems with NPA and explores the causes and effects of NPAs on banks. However, they do not recognize the macroeconomic variables in their analysis of causes. Moreover, in terms of effect these research fail to account for investor side, i.e., stock market index return. The research considers a comprehensive answer to bank privatization along with addressing these gaps.

RESEARCH METHODOLOGY

RESEARCH DESIGN

The descriptive & statistical analysis methodology is used in this study. The research will be conducted with secondary data. Data collection took place from the annual report of banks and the RBI site. Correlation, regression, t-test analysis will be used to measure the relationship and its effect.

NATURE AND SOURCE OF DATA

The numerical time series data for several variable heads were collected from RBI Website, Bulletin & DBIE RBI Additionally the economic data of the country was taken from World Bank's Open Database.

Here's link to the data collected and used in the research--**Data Link**

SAMPLE AND SAMPLING TECHNIQUE.

As mentioned previously, the sample is that of commercial banks—divided into three categories: Public, Private & Foreign Banks in India. Conveinence sampling was used to find data from RBI Database.

TOOLS AND TECHNIQUES

1. Correlation Analysis: This approach is used to assess the relationship between Bank Nifty, NPAs, GDP and Repo Rate.
2. Multiple Regression: This approach is used to calculate the total and individual effect of macroeconomic trends on NPAs.
3. T-Test for Unequal Vairances: This approach is used to calculate the relation between NPAs and other factors.

METHOD/S TO BE USED FOR DATA COLLECTION

The secondary data was sourced from RBI and World Bank, and was stored in Micrsoft Excel.

SCOPE OF THE PROJECT

The scope of the project is from year ending March 2006 to 2019/20. Thus, data collection and analysis is covered from this period.

DATA HANDLING AND ANALYSIS

The tools likes Microsoft Excel & R will be used to perform the analytical study. As mention earlier, the correlational, regression & T-test will be put to work. Statistical instruments such as percentages and the CAGR were used to interpret data.

HYPOTHESES

Objective 3

1. H_0: Banking NPAs(Gross NPA) are significant to Bank Nifty.
   H_1: Banking NPAs(Gross NPA) are not significant to Bank Nifty.
2. H_0: Banking NPAs(Gross NPA) are significant to GDP Growth Rate. H_1: Banking NPAs(Gross NPA) are not significant to GDP Growth Rate.
3. H_0: Banking NPAs(Gross NPA) are significant to Repo Rate.
   H_1: Banking NPAs(Gross NPA) are not significant to Repo Rate.

Objective 4

For Public Sector Banks

1. H_0: Net NPAs are significant to Ratio of operating Profits to total assets.
   H_1: Net NPAs are not significant to Ratio of operating Profits to total assets.
2. H_0: Net NPAs are significant to Return on Assets.
   H_1: Net NPAs are not significant to Return on Assets.
3. H_0: Net NPAs are significant to Return on Equity.
   H_1: Net NPAs are not significant to Return on Equity.

For Private Sector Banks

1. H_0: Net NPAs are significant to Ratio of operating Profits to total assets.
   H_1: Net NPAs are not significant to Ratio of operating Profits to total assets.
2. H_0: Net NPAs are significant to Return on Assets.
   H_1: Net NPAs are not significant to Return on Assets.
3. H_0: Net NPAs are significant to Return on Equity.
   H_1: Net NPAs are not significant to Return on Equity.

For Foreign Banks

1. H_0: Net NPAs are significant to Ratio of operating Profits to total assets.
   H_1: Net NPAs are not significant to Ratio of operating Profits to total assets.
2. H_0: Net NPAs are significant to Return on Assets.
   H_1: Net NPAs are not significant to Return on Assets.
3. H_0: Net NPAs are significant to Return on Equity.
   H_1: Net NPAs are not significant to Return on Equity.

DATA INTERPRETATIONS & ANALYSIS

As of 30 September 2020, Rs 8.08 lakh crore represented the gross asset (NPA) or bad loans of Indian banks. Let's break the NPAs into Public, Private and Foreign Banks:

Both Gross and Net NPA ratio are shows as percentage of Net Advances.

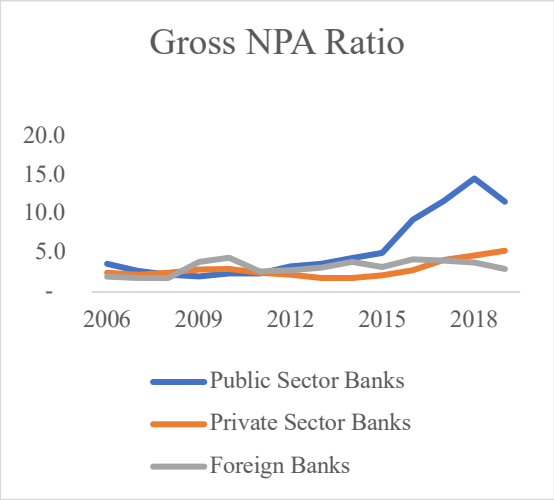


Figure 1 All commercial banks in India-Gross NPA Ratio

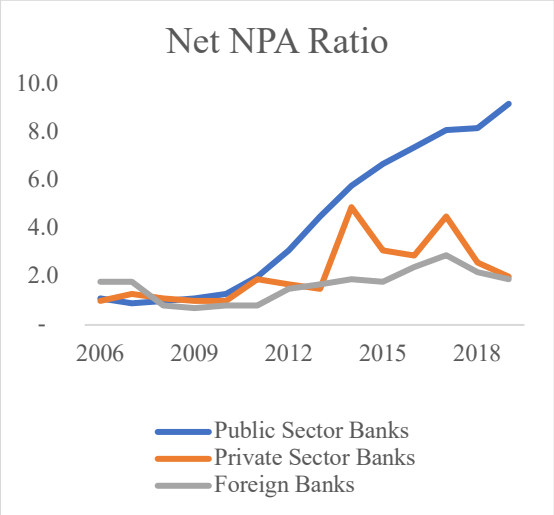


Figure 2 All commercial banks in India-Net NPA Ratio

In spite of these realities, for all commercial banks, state, public and foreign banks, Net NPAs have gradually increased. However, the growth of Net NPAs in public sector is enormous. The NPAs in Public Sector Banks grew at a staggering 16.38% CAGR rate, while Private and Foreign Banks at 5.08% & 0.39% respectively. Foreign Banks operating in India, seems to have done a decent job in controlling the NPAs at their end. The Private too seems to have managed their NPAs , as there is particular trend in their NPAs, while in Public Sector Banks, it is only on rise.

In order to understand the reason behind such high CAGR for public sector banks, an additional comparison between the standard advances of banks was conducted. The data was collected for composition of assets of all three banks. Percentages for each type of advances was calculated.

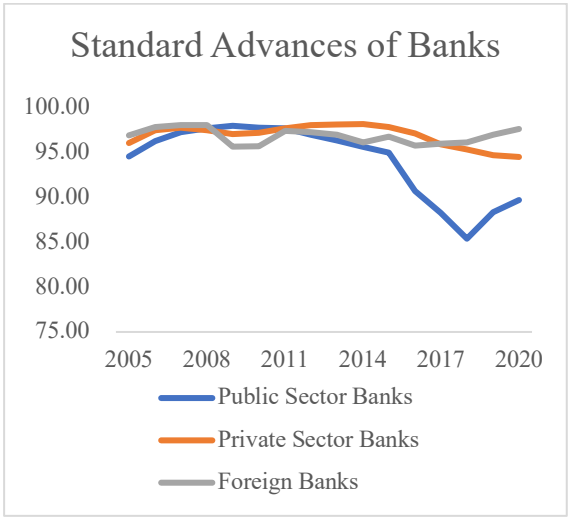


Figure 3 Standard Advances of Banks in India

It was revealed that, one of the strong reasons for such high CAGR in NPAs for public sector banks was a diminishing percentage of standard advances. While the private and foreign banks, maintained a healthy rate of 96-97%. Likewise you can find the other types of advances such as sub-standard, doubtful & loss advances in appendix section.

Addiotionally, to understand such flagging rate of standard advances of public sector banks, composition of NPAs in banks was analyzed.

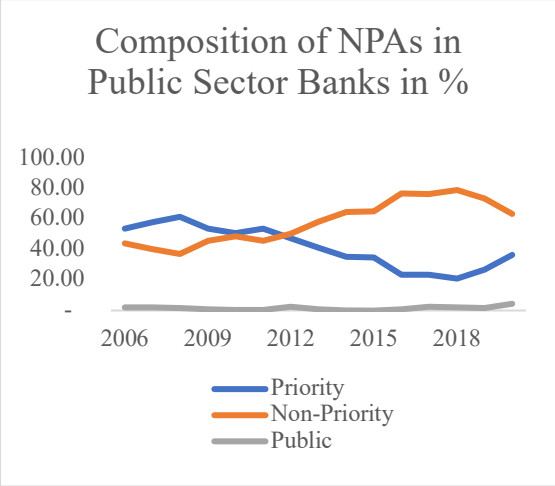


Figure 4 Composition of NPAs in Public Sector Banks

It was noted that the priority sector lending steading declined from 2011-12, while the lending to the non-priority sector has been a spree. The growth rate of Non-priority lending is 21.76%. While the priority and public sector the growth rate is -25% and 5.89% respectively.

So, the priority & non-priority lending areas decided by RBI. Priority Lending includes

1. Agriculture
2. MSME(Micro, Small and Medium Enterprises)
3. Services
4. Export Credit
5. Housing
6. Renewable Energy
7. Social Infrastructure.

While the Non Priority Sector Lending areas includes lending other than priority lending.

Now a clear picture of NPAs have been established. Saddening but reality. Nevertheless, the correlation, regression & t-test studies will make a more clear idea and help is better policy formulations.

In order to understand the understand the macroeconomic trends with the Gross NPAs. Multiple regression equation was made and and analysis conducted. GNPA Ratio was the Gross Non-Performing Assets as Percentage of Gross Advances.

Variables
Dependent Variables
GNPA Ratio - ***GNPA***
Independent Variables
Gross Domestic Product Growth Rate - ***GDP***
Inflation- ***INFL***
Per Capita NNI (Const @2011-12)- ***PCNNI***

Upon running the regression equation, we found the following results:

Regression Statistics	
Multiple R	0.93677814
R Square	0.877553283
Adjusted R Square	0.844158723
Standard Error	1.236219611
Observations	15

A multiple linear regression was calculated to predict Gross NPA ratio based on GDP Growth Rate, Inflation and Per Capita Net National Income(Taking Constant 2011-12). A significant regression equation was found ($F(3,11) = 26.2783$, $p < 0.00002$), with an R^2 of 0.8775. Economy's predicted

GNPA = -3.348 + 0. 1148 (GDP) - 0.33922 (INFL)+0.00014454(PCNNI),

where GDP & INFL is coded or measured as percentage, and PCNNI is coded or measured as rupees. Level of GNPA ratio increased 0.1148 % for each percent of GDP Growth and 0.000144 %. for each Rs. Of Per Capita NNI, while it decreased 0.339922 % for each percent of Inflation. All dependent varaibles proved to be significant predictor of GNPA Ratio.

It is established that the regression exaplained around 87.77% of the variance in the data. While, quantum of change induced in quite low but the relationship is significant one.

Now, to understand the effect of NPAs on the banking and financial sector as whole, student's t-test was conducted between NPAs and Bank Nifty, GDP and Repo Rate. It is important to note that alpha/ margin of error is taken as 0.05 for all calculations. Also two tailed significance test was considered for the study.

First, comparison was between the GNPA Ratio and Bank Nifty:

	GNPA Ratio	*Bank Nifty*
Mean	5.01	0.67
Variance	9.86	202.90
Observations	15.00	15.00
Hypothesized Mean Difference	-	
df	15.00	
t Stat	1.15	
P(T<=t) one-tail	0.13	
t Critical one-tail	1.75	
P(T<=t) two-tail	0.27	
t Critical two-tail	2.13	

A paired-samples t-test was conducted to compare GNPA Ratio and Bank Nifty

conditions. There was a significant difference in the scores for GNPA Ratio (M = 5.01, SD = 3.13) and Bank Nifty (M = 0.67, SD = 14.24) conditions; t(15) = 1.15, p = 0.27. These results suggest that GNPA Ratio really does have an effect Bank Nifty. Specifically, the results suggest that GNPA Ratio increases, the returns on Bank Nifty decreases.

Next comparison between the GNPA Ratio and GDP Growth Rate:

	GNPA Ratio	*GDP Growth Rate*
Mean	5.01	6.84
Variance	9.86	2.10
Observations	15.00	15.00
Hypothesized Mean Difference	-	
df	20.00	
t Stat	(2.05)	
P(T<=t) one-tail	0.03	
t Critical one-tail	1.72	
P(T<=t) two-tail	0.05	
t Critical two-tail	2.09	

A paired-samples t-test was conducted to compare GNPA Ratio and GDP Growth Rate conditions. There was a significant difference in the scores for GNPA Ratio (M = 5.01, SD = 3.13) and GDP Growth Rate (M = 6.84, SD = 1.44) conditions; t(20) = -2.05, p = 0.05. These results suggest that GNPA Ratio really does have an effect GDP Growth Rate. Specifically, the results suggest that GNPA Ratio increases, the returns on GDP Growth Rate decreases.

Next, comparison is between GNPA Ratio and Repo Rate:

	GNPA Ratio	*Repo Rate*
Mean	5.01	6.43
Variance	9.86	1.25
Observations	15.00	15.00
Hypothesized Mean Difference	-	
df	18.00	
t Stat	(1.65)	
P(T<=t) one-tail	0.06	
t Critical one-tail	1.73	
P(T<=t) two-tail	0.12	
t Critical two-tail	2.10	

A paired-samples t-test was conducted to compare GNPA Ratio and Repo Rate conditions. There was a significant difference in the scores for GNPA Ratio (M = 5.01, SD = 3.13) and GDP Growth Rate (M = 6.43, SD = 1.11) conditions; t(18) = -1.65, p = 0.12. These results suggest that

GNPA Ratio really does have an effect Repo Rate. Specifically, the results suggest that GNPA Ratio increases, the returns on Repo Rate decreases. The NPAs and Bank Nifty Returns, the GDP growth rate & repo rate are established to have important relationships.

Now, it is important to learn about change in profitability of Banks induced by the NPAs. Therefore, a student's t-test was conducted between Net NPAs Ratio & :

1. Ratio of Operating Profits to total assets;
2. Return on Assets(RoA)
3. Return on Equity(RoE)

It was conducted fot Public, Private and Foreign Banks spearately. It is important to note that alpha/ margin of error is taken as 0.05 for all calculations. Also two tailed significance test was considered for the study.

For the Public sector banks,

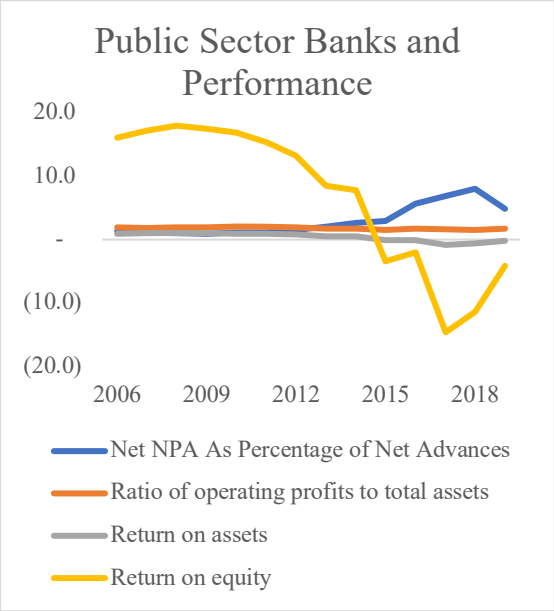


Figure 5 Public Sector Banks and their Performance

Upon running the student's t-test for each pair, following results were obtained (Refer to appendix for detailed tabular form of results) :

1. **Net NPA & Ratio of Operating Profits to total asset:** The t-table value is 2.16 which is greater than t-stat/calculated value 1.75. Furthermore, we cannot dismiss the null hypothesis since our p value is 0.102 above the normative significance level of 0.05. Thus, Net NPAs are significant to Ratio of Operating Profits to total assets.
2. **Net NPA & Return on Assets:** The t-table value is 2.13 which is less than t-stat/calculated value 3.75. Moreover, Due to the p-value of 0.001 below 0.05

we should reject the null-specific hypothesis. Thus, Net NPAs are not significant to Return on Assets.

3. **Net NPA & Return on Equity:** The t-table value is 2.14 which is greater than t-stat/calculated value (-1.21). Furthermore, we cannot dismiss the null hypothesis since our p value is 0.24 above the normative significance level of 0.05. Thus, Net NPAs are significant to Return on Equity.

For the Private sector banks,

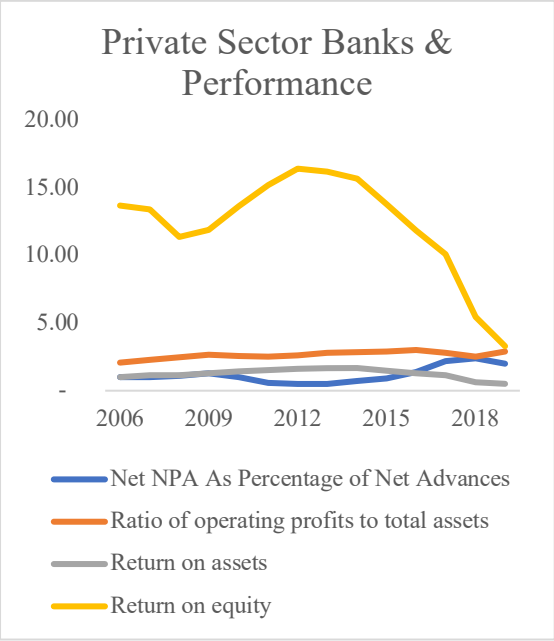


Figure 6 Private Sector Banks and their Performance

Upon running the student's t-test for each pair, following results were obtained (Refer to appendix for detailed tabular form of results) :

1. **Net NPA & Ratio of Operating Profits to total asset:** The t-table value is 2.10 which is greater than t-stat/calculated value (-8.17). Moreover, Due to the p-value of 0.00002 below 0.05 we should reject the null-specific hypothesis. Thus, Net NPAs are not significant to Ratio of Operating Profits to total assets.
2. **Net NPA & Return on Assets:** The t-table value is 2.07 which is greater than t-stat/calculated value (-0.359). Furthermore, we cannot dismiss the null hypothesis since our p value is 0.724 above the normative significance level of 0.05. Thus, Net NPAs are significant to Return on Assets.
3. **Net NPA & Return on Equity:** The t-table value is 2.14 which is greater than t-stat/calculated value (-10.62). Due to the p-value of 0.000004 below 0.05 we should reject the null-specific hypothesis. Thus, Net NPAs are not significant to Return on Equity.

For the Foreign Banks,

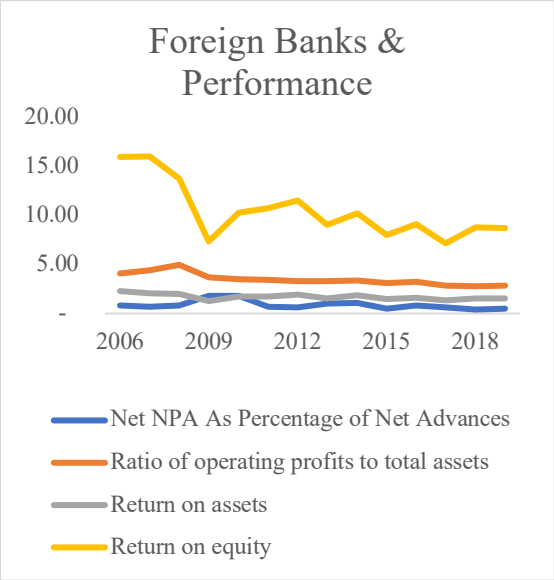


Figure 7 Foreign Banks and their Performance

Upon running the student's t-test for each pair, following results were obtained (Refer to appendix for detailed tabular form of results) :

1. **Net NPA & Ratio of Operating Profits to total asset:** The t-table value is 2.06 which is greater than t-stat/calculated value (-12.9). Moreover, Due to the p-value of 0.00004 below 0.05 we should reject the null-specific hypothesis. Thus, Net NPAs are not significant to Ratio of Operating Profits to total assets.
2. **Net NPA & Return on Assets:** The t-table value is 2.06 which is greater than t-stat/calculated value (-6.003). Due to the p-value of 0.00004 below 0.05 we should reject the null-specific hypothesis. Thus, Net NPAs are not significant to Return on Assets.
3. **Net NPA & Return on Equity:** The t-table value is 2.14 which is greater than t-stat/calculated value (-12.23). Due to the p-value of 0.000000007 below 0.05 we should reject the null-specific hypothesis. Thus, Net NPAs are not significant to Return on Equity.

Now, finding out the best & worst performer bank in terms of NPAs in the taken time period. Ofcourse, the direct method of summing all the Gross NPAs was considerable. Although this may also be distorted, given that the SBI is the highest gross advance lender in the economy. However, the Gross NPAs compared to its advances is quite low. Therefore, the abolsute comparison of quantum of NPAs was ruled out.

The GNPA Ratio formula was applied to each year in the prescribed period and taking average (Refer to the appendix for full rankings).

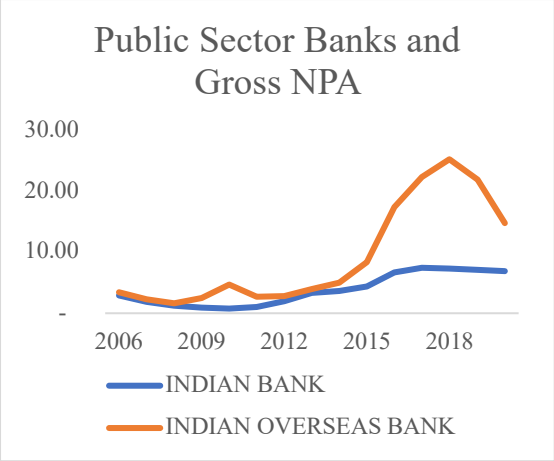


Figure 8 Best and worst performing Public Sector Banks

Among the Public Sector Banks, Indian Bank performed the best and Indian Overseas Bank performed the worst with an average Gross NPA ratio of 3.83 and 9.29 respectively. The State Bank of India, had a moderate Gross NPA ratio of 5.09.

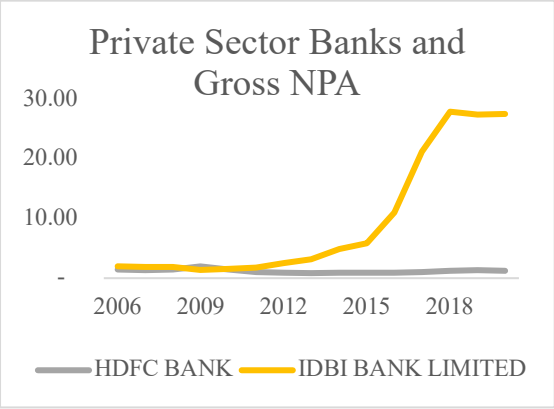


Figure 9 Best and worst private sector banks

In the Private Sector Bank, HDFC Bank Ltd performed the best and IDBI Bank Ltd performed worst with average Gross NPA ratio of 1.21 and 9.48 respectively.

Often, NPA cases are brought to the NCLT, which recovers the bank's amount by the company's liquidation. It is impossible to recover the balance in the event of unsecured loans. If bad ventures continue to pillage, banks will fail. There are also high haircut numbers. Intervene and take action, such as mergers or government rescues bank with taxpayers' funds, through the government and the central bank.

Banking must maintain the CRR and SLR ratios for security reasons, since the central bank manages the fund with the bank. The A considerable number of banks have been insured by DICGC. The latter were founded in 1961 and insure up to or up to a limit of one lakh INR, including capital and interest at a lower rate than other countries in India. This increased by 30,000 INR in 1993 and then stopped rising for the next twenty-five years, notwithstanding the inflation.

The following laws have been forefront in to the crisis of NPAs:

1. Insolvency and Bankruptcy Code, 2016;
2. Securitization and Reconstruction of Financial Assets and Enforcement of Security Interest Act, 2002;
3. Recovery of Debts Due to Banks and Financial Institutions Act, 1993 (Bagga & Lekhi, 2017).

The IBC was enacted to tackle and monitor insolvencies, thus shortening the protocol. These acts were passed in order to encourage the organised running of corporations and to benefit the nation's economy. The SARFAESI Act authorises banks and other financial institutions to bid on debtors' homes or marketable properties in order to recoup credits (Bagga & Lekhi, 2017). In its February 2019 circular, the RBI announced that its aim was to provide faster resolution plans, including accelerated tracking of NPAs, time-bound referral of defaulting entities to NCLT, and a requirement to declare assets as NPAs even though they were only late by one day. They provide faster resolution and regeneration.

RECOMMENDATIONS & SUGGESTIONS

1. There should be an appropriate Asset Quality Ranking method in place to calculate the credit risk associated with the asset.
    a. The banks should constantly track its clients to ensure that customers do not redirect their funds.
    b. The review period of loan accounts be shortened and increased in number of frequencies.
    c. And most important suggestion, is quantifying & digitizing the loan process. Not only will it bring more transparency at ground level but will enable banks and management to apply best of technologies and techniques to predict the behaviour of loan repayment.
2. Banks suspend lending until the matter is resolved, as seen in the case of LIC-owned IDBI Bank, which suspended corporate lending to reach capital adequacy and then resumed lending to current customers in a restricted capacity beginning in October 2019. They froze a loan worth 9500 crore INR, including 721 crore INR from Reliance Communications.
3. Since Nifty Bank is an index for 12 bank stocks that are most liquid, it is not always the whole banking industry. So, we should consider adding some more bank stocks to Bank Nifty to represent the banking industry accurately.
4. To proactively track such accounts more digital technologies and techniques can be used. Use of Big Data and IoT can help prepare for the contingency well in advance.
5. CIBIL needs to be enhanced by linking it to all defaulters of either banking or non-bank company to grasp consumer compatibility about repayment using artificial intelligence.

SUMMARY & CONCLUSION

	PARAMETER/ METRIC	PUBLIC SECTOR BANKS(PSB)	PRIVATE SECTOR BANKS	FOREIGN BANKS	ALL COMMERCIAL BANKS IN INDIA
OBJECTIVE 1	Average GNPA	5.6	2.9	3.2	-
	Average NNPA	4.31	2.18	1.64	-
	Standard Advances	94.2	97	96.9	-
OBJECTIVE 2	GDP Growth Rate	-	-	-	Significant Predictor of GNPA
	Inflation	-	-	-	Significant Predictor of GNPA
	Per Capita Net National Income	-	-	-	Significant Predictor of GNPA
OBJECTIVE 3	GNPA & Bank Nifty	-	-	-	Significant Relationship
	GNPA & GDP Growth Rate	-	-	-	Significant Relationship
	GNPA & Repo Rate	-	-	-	Significant Relationship
OBJECTIVE 4	NNPA & Ratio of Operating Profits to total assets	Significant Relationship	Not Significant Relationship	Not Significant Relationship	-
	NNPA & Return on Assets	Not Significant Relationship	Significant Relationship	Not Significant Relationship	-
	NNPA & Return on Equity	Significant Relationship	Not Significant Relationship	Not Significant Relationship	-
OBJECTIVE 5	Best Performer Bank	Indian Bank	HDFC Bank Ltd	-	HDFC Bank Ltd
	Worst Performer Bank	Indian Overseas Bank	IDBI Bank Ltd	-	IDBI Bank Ltd

Figure 10 Summary Table

Nationalized banks have made a tremendous contribution to the development of a strong economy with a visible social outlook over the last 50 years. 8000 branches have grown to 90,000 branches, with 40,000 concentrated in rural and semi-urban areas, which were tougher accomplishments.

The greater the NPA, the lower the bank's reserves, and hence the loan-giving potential. Higher efficiency is expected in the disposal of NPAs. Banks should have strict debt recovery plans in place. The Banking Regulation Act has since been amended to improve productivity and the smooth operation of the industry. Although the worst bank in regards to GNPA was a private bank, IDBI Bank Ltd, the overall average GNPA of all private banks is 3.03 while that of public sector banks is 12.14. Moreover, IDBI Bank Ltd before 21st January 2019 was a subsidiary of LIC, which is a government company.

According to the analysis, bank privatisation may lead to improved overall management performance.

LIMITATION OF THE PROPOSED PROJECT

The following are the study's shortcomings:

1. The economic measures used in the analysis are thought to be independent of one another, and there is an attempt to build or discover a relationship between them.
2. The income gained by banks are influenced by a variety of factors, but the focus of this analysis is solely on NPA.
3. The study's findings and conclusions are limited to a specific time frame.

FUTURE SCOPE OF RESEARCH

Indian commercial banks have serious problems with rising reserves that have not been carried out (NPAs). In 1969, the banking sector deprived the non-performing assets (NPAs) of their properties. It has had an effect on the Indian banking sector's performance, liquidity, and solvency. The high level of NPAs has had a negative impact on banks' earning potential and profitability. The reduction of NPAs in banks is one of the most difficult problems facing the Indian economy. This research paper and its conclusions can be very useful for banks, policy makers and academics in banking performance assessments, with particular mention of elements of different non-performing assets.

BIBLIOGRAPHY

Bagga, R., & Lekhi, P. (2017). Impact of NPAs on profitability of Indian banks. *International Journal of Applied Business and Economic Research*, *15*(16), 46–53.

Gupta, M., Kumar, N., Sharma, N., Singari, R. M., Chawla, G., & Aggarwal, K. (2020). Statistical Analysis of the Relation between the Developmental Status of Nations and their Banks' NPA using Hypothesis Testing. *International Journal of Management (IJM*, *11*(8), 910–922. https://doi.org/10.34218/IJM.11.8.2020.082

Joseph, L, A., and Prakash, M. (2014). A Study on Analyzing the Trend of NPA Level in Private Sector Banks and Public Sector Banks. *International Journal of Scientific and Research Publications*, *4*(7), 1–9.

Kumar Rath, A. (2016). An Analysis of non-Performing Asset Management by Nayagarh District Central Co. Operative Bank Ltd. Nayagarh, Odisha. *IOSR Journal of Economics and Finance*, *7*(6), 47–53. https://doi.org/10.9790/5933-0706034753

Roy, S. G. (2014). Determinants of Non-Performing Assets in India - Panel Regression. *Eurasian Journal of Economics and Finance*, *2*(3), 69–78. https://doi.org/10.15604/ejef.2014.02.03.005

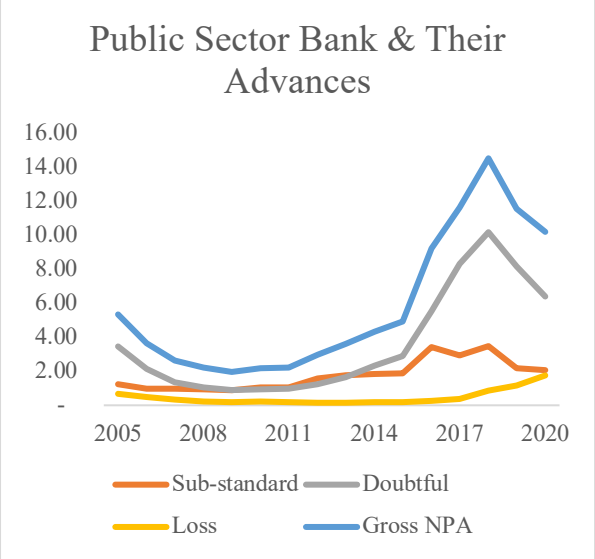
Saluja, R., & Lal, R. (2015). A Comparative Study on Non – Performing Assets of Public Sector Banks in India. *Management Today*, *5*(2), 80–88. https://doi.org/10.11127/gmt.2015.06.07

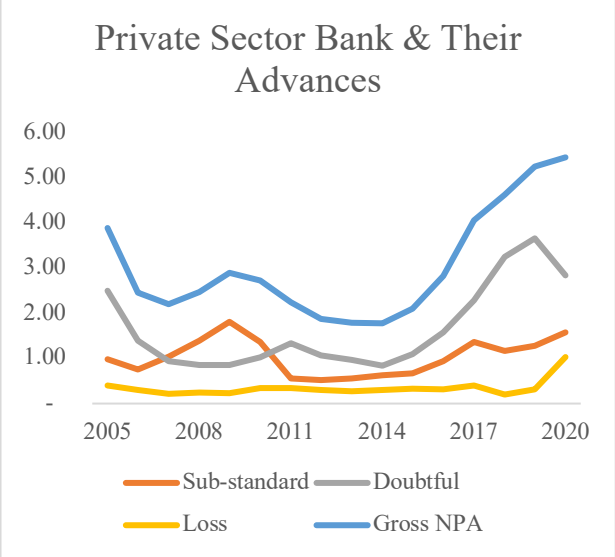
Swamy, V. (2013). *Munich Personal RePEc Archive Impact of Macroeconomic and Endogenous Factors on Non-Performing Bank Assets Impact of macroeconomic and endogenous factors on non performing bank assets*. *49600*.

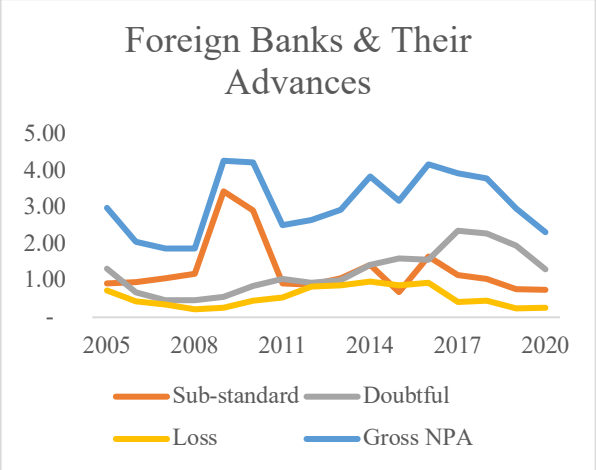
Wadhwa, R., & Ramaswamy, K. (2020). Impact of NPA on Profitability of Banks. *International Journal of Engineering Technology and Management Sciences*, *4*(3), 1–8. https://doi.org/10.46647/ijetms.2020.v04i03.001

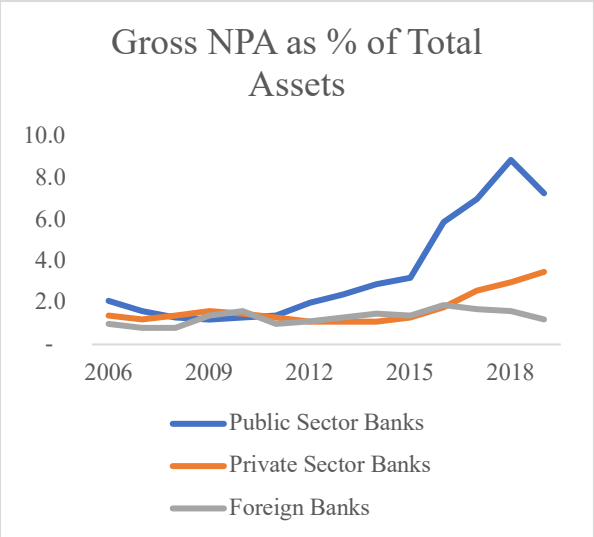
APPENDIX

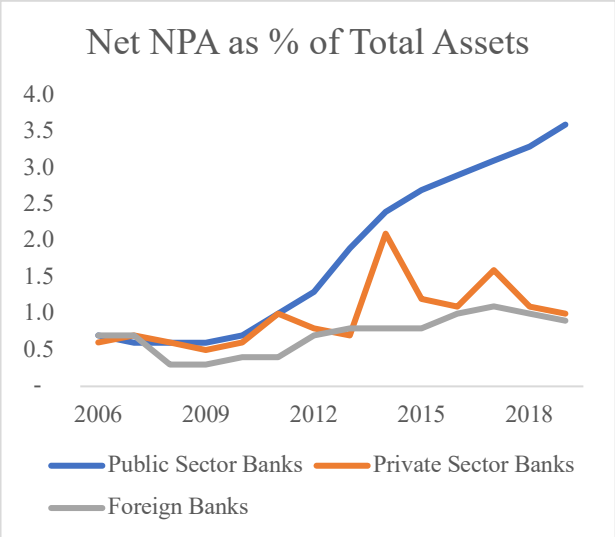
Objective 1:











Objective 2:

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.94
R Square	0.88
Adjusted R Square	0.84
Standard Error	1.24
Observations	15.00

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	3.0000	120.4787	40.1596	26.2783	0.0000
Residual	11.0000	16.8106	1.5282		
Total	14.0000	137.2893			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
Intercept	(3.35)	3.91	(0.86)	0.41	(11.94)	5.25	(11.94)	5.25
GDP	0.11	0.24	0.48	0.64	(0.41)	0.64	(0.41)	0.64
Inflation	(0.34)	0.17	(2.00)	0.07	(0.71)	0.03	(0.71)	0.03
Per Capita NNI (Const @2011-12)	0.00	0.00	4.64	0.00	0.00	0.00	0.00	0.00

Objective 3:

Correlation between variables

	GNPA Ratio	*GDP*	*Bank Nifty*	*Repo Rate*
Banking NPAs-GNPA Ratio	1			
GDP	0.118329311	1		
Bank Nifty	-0.081655209	0.53292751	1	
Repo Rate	-0.434021212	0.0758397	0.35437583	1

Objective 4:

Public Sector Banks: t-Test-- Two-Sample Assuming Unequal Variances

	Net NPA Ratio	*Ratio of operating profits to total assets*
Mean	2.92	1.78
Variance	5.86	0.03
Observations	14.00	14.00
Hypothesized Mean Difference	-	
df	13.00	
t Stat	1.76	
P(T<=t) one-tail	0.05	
t Critical one-tail	1.77	
P(T<=t) two-tail	0.10	
t Critical two-tail	2.16	

	Net NPA Ratio	*Return on assets (ROA)*
Mean	2.92	0.40
Variance	5.86	0.43
Observations	14.00	14.00
Hypothesized Mean Difference	-	
df	15.00	
t Stat	3.76	
P(T<=t) one-tail	0.00	
t Critical one-tail	1.75	
P(T<=t) two-tail	0.00	
t Critical two-tail	2.13	

	Net NPA Ratio	*Return on equity (RoE)*
Mean	2.92	6.76
Variance	5.86	134.32
Observations	14.00	14.00
Hypothesized Mean Difference	-	
df	14.00	
t Stat	(1.21)	
P(T<=t) one-tail	0.12	

t Critical one-tail	1.76
P(T<=t) two-tail	0.25
t Critical two-tail	2.14

Private Sector Banks: t-Test-- Two-Sample Assuming Unequal Variances

	Net NPA Ratio	*Ratio of operating profits to total assets*
Mean	1.19	2.65
Variance	0.38	0.07
Observations	14.00	14.00
Hypothesized Mean Difference	-	
df	18.00	
t Stat	(8.17)	
P(T<=t) one-tail	0.00	
t Critical one-tail	1.73	
P(T<=t) two-tail	0.00	
t Critical two-tail	2.10	

	Net NPA Ratio	*Return on assets (RoA)*
Mean	1.19	1.25
Variance	0.38	0.13
Observations	14.00	14.00
Hypothesized Mean Difference	-	
df	21.00	
t Stat	(0.36)	
P(T<=t) one-tail	0.36	
t Critical one-tail	1.72	
P(T<=t) two-tail	0.72	
t Critical two-tail	2.08	

	Net NPA Ratio	*Return on equity (RoE)*
Mean	1.19	12.31
Variance	0.38	14.97
Observations	14.00	14.00
Hypothesized Mean Difference	-	
df	14.00	

t Stat	(10.63)
P(T<=t) one-tail	0.00
t Critical one-tail	1.76
P(T<=t) two-tail	0.00
t Critical two-tail	2.14

Foreign Banks: t-Test--Two-Sample Assuming Unequal Variances

	Net NPA Ratio	*Ratio of operating profits to total assets*
Mean	0.86	3.49
Variance	0.19	0.38
Observations	14.00	14.00
Hypothesized Mean Difference	-	
df	23.00	
t Stat	(12.95)	
P(T<=t) one-tail	0.00	
t Critical one-tail	1.71	
P(T<=t) two-tail	0.00	
t Critical two-tail	2.07	

	Net NPA Ratio	*Return on assets (RoA)*
Mean	0.86	1.71
Variance	0.19	0.08
Observations	14.00	14.00
Hypothesized Mean Difference	-	
df	23.00	
t Stat	(6.00)	
P(T<=t) one-tail	0.00	
t Critical one-tail	1.71	
P(T<=t) two-tail	0.00	
t Critical two-tail	2.07	

	Net NPA Ratio	*Return on equity (RoE)*
Mean	0.86	10.49
Variance	0.19	8.46

Observations	14.00	14.00
Hypothesized Mean Difference	-	
df	14.00	
t Stat	(12.24)	
P(T<=t) one-tail	0.00	
t Critical one-tail	1.76	
P(T<=t) two-tail	0.00	
t Critical two-tail	2.14	

Objective 5

AVG GNPA		2020	2019	2018	2017	2016	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006
4.99	*All Scheduled Commercial Banks*	8.21	9.08	11.18	9.32	7.48	4.27	3.83	3.23	2.95	2.35	2.51	2.31	2.26	2.52	3.35
4.43	*Nationalised Banks*	-	-	-	12.95	10.69	5.26	4.09	3.24	2.67	1.97	2.03	1.75	2.06	2.69	3.81
12.14	*Public Sector Banks*	10.25	11.59	14.58	-	-	-	-	-	-	-	-	-	-	-	-
6.96	ALLAHABAD BANK	17.11	17.55	15.96	13.09	9.76	5.46	5.73	3.92	1.91	1.80	1.71	1.81	2.01	2.61	3.94
6.26	ANDHRA BANK	16.07	16.21	17.09	12.25	8.39	5.31	5.29	3.71	2.12	1.38	0.86	0.83	1.08	1.41	1.94
5.03	BANK OF BARODA	9.40	9.61	12.26	10.46	9.99	3.72	2.94	2.40	1.89	1.62	1.64	1.27	1.84	2.47	3.90
6.89	BANK OF INDIA	14.78	15.84	16.58	13.22	13.07	5.39	3.15	2.99	2.91	2.64	3.31	1.71	1.68	2.42	3.72
7.17	BANK OF MAHARASHTRA	12.81	16.40	19.48	16.93	9.34	6.33	3.16	1.49	2.28	2.47	2.96	2.29	2.57	3.50	5.53

4.54	CANARA BANK	8.04	8.83	11.84	9.63	9.40	3.89	2.49	2.57	1.75	1.47	1.53	1.56	1.32	1.51	2.25
8.87	CENTRAL BANK OF INDIA	18.92	19.29	21.48	17.81	11.95	6.09	6.27	4.80	4.83	1.82	2.32	2.67	3.16	4.81	6.85
5.90	CORPORATION BANK	13.80	15.35	17.35	11.70	9.98	4.81	3.42	1.72	1.26	0.91	1.02	1.14	1.47	2.05	2.56
3.83	INDIAN BANK	6.87	7.11	7.37	7.47	6.66	4.40	3.67	3.33	1.94	0.99	0.76	0.89	1.21	1.85	2.91
9.29	INDIAN OVERSEAS BANK	14.78	21.97	25.28	22.39	17.40	8.33	4.98	4.02	2.79	2.71	4.71	2.54	1.63	2.34	3.43
6.57	ORIENTAL BANK OF COMMERCE	12.67	12.66	17.63	13.73	9.57	5.18	3.99	3.21	3.17	1.98	1.74	1.53	2.31	3.20	5.95
5.53	PUNJAB AND SIND BANK	14.18	11.83	11.19	10.45	6.48	4.76	4.41	2.96	1.65	0.99	0.63	0.65	0.74	2.44	9.61
7.22	PUNJAB NATIONAL BANK	14.21	15.50	18.38	12.53	12.90	6.55	5.25	4.27	3.15	1.79	1.71	1.77	2.74	3.45	4.10
5.09	STATE BANK OF INDIA	6.15	7.53	10.91	6.90	6.50	4.25	4.95	4.75	4.90	3.48	3.28	2.98	3.04	2.92	3.88
5.15	SYNDICATE BANK	12.04	11.37	11.53	8.50	6.70	3.13	2.62	1.99	2.75	2.65	2.43	1.93	2.71	2.95	4.00
9.13	UCO BANK	16.77	25.00	24.64	17.12	16.09	6.76	4.32	5.42	3.73	3.31	2.15	2.21	2.97	3.17	3.27
6.36	UNION BANK OF INDIA	14.15	14.98	15.73	11.16	8.70	4.96	4.08	2.98	3.16	2.37	2.25	1.96	2.18	2.94	3.84

8.66	UNITED BANK OF INDIA	13.40	16.48	24.10	15.53	13.26	9.49	10.47	4.25	3.41	2.51	3.21	2.85	2.70	3.61	4.66
3.03	*Private Sector Banks*	5.45	5.25	4.62	4.05	2.83	2.10	1.78	1.77	2.09	2.48	2.99	2.92	2.47	2.19	2.41
2.39	AXIS BANK LIMITED	4.52	5.31	6.79	5.21	1.71	1.36	1.29	1.19	1.18	1.28	1.39	1.08	0.81	1.11	1.67
1.08	BANDHAN BANK	1.48	2.04	1.25	0.51	0.15	-	-	-	-	-	-	-	-	-	-
2.28	CITY UNION BANK LIMITED	4.09	2.95	3.03	2.83	2.41	1.86	1.81	1.13	1.01	1.21	1.36	1.80	1.81	2.57	4.32
4.49	CATHOLIC SYRIAN BANK LTD	3.54	4.87	7.89	7.25	5.62	4.96	3.77	2.35	2.35	3.05	3.29	4.56	3.87	4.19	5.76
4.35	DCB BANK LIMITED	2.46	1.84	1.79	1.59	1.51	1.76	1.69	3.18	4.40	5.86	8.69	8.78	1.53	5.14	15.01
2.95	FEDERAL BANK	2.84	2.92	3.00	2.33	2.84	2.04	2.46	3.44	3.35	3.49	2.97	2.57	2.43	2.95	4.62
1.21	HDFC BANK	1.25	1.35	1.28	1.04	0.92	0.89	0.91	0.85	0.95	1.06	1.44	1.98	1.41	1.36	1.40
5.08	ICICI BANK	6.04	7.38	9.90	8.74	5.82	3.78	3.03	3.22	4.83	5.80	6.52	4.32	3.30	2.08	1.51
9.48	IDBI BANK LIMITED	27.53	27.47	27.95	21.25	10.98	5.88	4.90	3.22	2.57	1.79	1.54	1.38	1.87	1.89	1.98
3.50	IDFC FIRST BANK LIMITED	2.60	2.43	3.31	2.99	6.16	-	-	-	-	-	-	-	-	-	-
1.62	INDUSIND BANK	2.45	2.10	1.17	0.93	0.87	0.81	1.12	1.03	0.98	1.01	1.23	1.61	3.04	3.08	2.86
4.98	JAMMU & KASH	10	8.97	9.96	11	8.32	5.97	1.66	1.62	1.54	1.95	1.97	2.64	2.53	2.89	2.51

	MIR BANK LTD	.97			.20										
3.82	KARNATAKA BANK LTD	4.82	4.41	4.92	4.21	3.44	2.95	2.92	2.51	3.27	3.97	3.73	3.66	3.42	3.94	5.13
3.17	KARUR VYSYA BANK	8.68	8.79	6.56	3.58	1.29	1.85	0.82	0.96	1.33	1.26	1.72	1.95	2.03	2.82	3.91
2.30	KOTAK MAHINDRA BANK LTD	2.25	2.14	2.22	2.59	2.36	1.85	1.98	1.55	1.56	2.03	3.62	4.31	2.88	2.57	0.63
6.00	LAKSHMI VILAS BANK	25.39	15.30	9.98	2.67	1.97	2.75	4.19	3.87	2.98	1.93	5.12	2.71	3.51	3.56	4.14
3.91	NAINITAL BANK	13.02	10.65	4.87	5.01	4.42	2.98	2.47	3.09	1.61	1.27	1.81	1.67	1.90	2.00	1.91
2.49	RBL	3.62	1.38	1.40	1.20	0.98	0.77	0.79	0.40	0.80	1.12	2.33	2.13	6.00	6.81	7.59
2.68	SOUTH INDIAN BANK	4.98	4.92	3.59	2.45	3.77	1.71	1.19	1.36	0.97	1.11	1.32	2.18	1.77	3.94	4.99
2.82	TAMILNAD MERCANTILE BANK LTD	3.62	4.32	3.60	2.91	1.84	1.63	2.46	1.31	1.28	1.30	1.37	-	2.25	4.55	7.02
6.41	DHANLAXMI BANK	5.90	7.47	7.35	4.78	6.36	7.00	5.98	-	-	-	-	-	-	-	-
2.00	YES BANK LTD.	16.80	3.22	1.28	1.52	0.76	0.41	0.31	0.20	0.22	0.23	0.27	0.68	0.12	-	-