



Impact of Non-Performing Assets on Public Banks' Profitability- An Empirical Analysis

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ABSTRACT

In today's scenario, the rising incidence of non-performing advances or loans in the banking industry in India has become a persistent and multi-faceted challenge for banks as it can adversely affect their earning capacity and ultimately lead to a drop in their profitability. Although non-performing advances may significantly affect profitability, certain other factors could potentially have an impact. Thus, by estimating the possible determinants of a bank's profitability, this article specifically attempts to scan the relationship between non-performing assets (NPAs) and profitability empirically. This article is entirely based on secondary data, with all relevant facts and figures gathered from the Reserve Bank of India's official website and the "Capitaline-2000 database." Data from all 12 public sector commercial banks in India, spanning from 1 April 2014 to 31 March 2024, is used as a sample for this study. The study has employed static panel regression to estimate the determinants of profitability of Indian Scheduled Public Commercial Banks. While ROA has been considered as a dependent variable and is taken as a proxy of bank's profitability, the ratio of Net NPA to Net Advances has been viewed as a proxy of NPA and is considered as an independent variable. Moreover, along with NPA, certain other bank-specific determinants of bank profitability like Total Deposit, Net Interest Income to Total Income Ratio, Net Interest Margin, Operating Cost to Total Interest Income Ratio, Capital Adequacy -Tier 1 Capital, and two macroeconomic variables such as Annual Economic Growth Rate and Annual Rate of Inflation have also been used here as determinants of banks profitability. The findings of the study reveal that non-performing assets (NPAs) have a detrimental effect on the profitability of Indian banks and is one of the key factors influencing bank profitability.

Keywords: Banking Sector, NPAs, Panel Regression, ROA, Annual Economic Growth Rate



1. Introduction

The economic growth of every country is primarily influenced by the industrial sectors, with the financial sector serving as the cornerstone. The banking industry, which facilitates the seamless movement of money across the country and circulates money nationwide, is the main backbone of the financial sector. Banks provide valuable services such as credit management, money storage, and assistance with financial transactions, which make the banking industry one of the most popular in the finance sector. Simply put, the banking system is an organization or a network of institutions that provide us with financial services, and of course, a better banking sector inevitably reflects a better national financial situation. However, in today's scenario, the rising incidence of non-performing advances or loans in the banking industry in India has become a persistent and multi-faceted challenge for banks as it can adversely affect their earning capacity and ultimately lead to a drop in their profitability.

Usually, a loan or advance is classified as a non-performing asset (NPA) when the borrower does not repay the due amount in the form of principal and interest within a stipulated period. These non-performing assets (NPA) can have a substantial influence on the banking sector's overall performance as excessive amounts of non-performing assets impair banks' ability to lend money and stimulate economic growth by weakening their financial stability. Any financial institution, including banks, classifies loans, advances, and other credit facilities as assets in their financial statements because they generate income for the bank in the form of interest. An asset, such as a loan, is categorized as non-performing when it ceases to produce income. Lenders face different challenges when they have non-performing assets on their balance sheet, commonly known as non-performing loans. The lender's cash flow is negatively impacted when principal or interest is not paid, which can cause financial difficulties and lower profits. Loan loss provisions lower the capital available for making further loans since they are put aside to cover possible losses. The actual losses incurred from loan defaults are deducted from earnings after they have been calculated. As a result, a bank's income and profitability decline, its ability to lend reduces, and the likelihood of loan defaults and write-offs increases as the percentage of non-performing assets (NPAs) in its loan portfolio rises.

Since profits are vital to an organization's ability to function smoothly, it has been demonstrated that all organizations perform best when they earn healthy profits. The percentage of non-performing assets (NPAs) in the financial statements of the banking sector has a significant impact on the industry's profitability and affects the financial performance of individual concerns across the sector, making it a compelling topic for research. However, the question is whether NPA is the only factor that affects a bank's profitability. Theoretically, the answer is no. Apart from NPA, some other factors can also potentially impact the profitability of a bank. These factors can be broadly categorized into bank-specific and macroeconomic factors. Bank-specific factors include non-performing assets, total deposits, net interest income to total income ratio, net interest margin, operating costs to total interest income ratio, and capital adequacy - Tier 1 capital. Macroeconomic factors include the annual economic growth rate and the annual rate of inflation.

Although non-performing advances may significantly affect profitability, certain other factors could potentially have an impact. Thus, by estimating the possible determinants of a bank's profitability, this article specifically attempts to scan the relationship between non-performing assets (NPAs) and profitability empirically. However, the structure of this paper is



as follows: Part 2 includes a summary of earlier research in the form of a literature review that is available in this pitch; Part 3 focuses on the study's objectives; Part 4 demonstrates the hypothesis; Part 5 outlines the methodology used; Part 6 emphasizes the findings and their interpretation; and the final part deals with the conclusion of the research.

2. Survey of Existing Literature

The RBI began classifying banks' assets in November 1985, but the issue of non-performing assets was not widely known until the Narasimham Committee Report-I (1991). The Committee noted that international standards were not being followed in the asset classification of the current system. As a result, they suggested putting in place an evolutionary system that included bad credit provisioning, asset classification, and income recognition. Even with these steps, non-performing assets (NPAs) continue to pose a serious problem and affect the banking industry's profitability. The majority of earlier research that looked at the connection between NPAs and bank profitability came to the conclusion that non-performing assets (NPAs) negatively affect bank profitability. However, it appears appropriate to perform a brief but comprehensive assessment of the literature on this significant topic before moving further with the current study.

The research study "*Profitability and Credit Culture of NPAs: An Empirical Analysis of PSBs*" was conducted by **Rajput et al. (2012)** in order to determine the kind, scope, and size of non-performing assets (NPAs) in the Indian banking industry as well as the correlation between NPAs and bank profitability measures (ROA). The required information was taken from a number of secondary sources, including bank annual reports, Indian Banking Association Journal, and RBI Bulletin, covering a 13-year period from 1997-1998 to 2009-2010. Correlation and OLS regression models were then used to arrive at the final result. The study's findings, which indicated a declining trend in the ratios of non-performing assets such as GNPA and NNPA, made it abundantly evident that the NPA Ratio and ROA have a strong negative association. Recurring results from the multiple regression model also show that if the trend in non-performing assets (NPAs) is consistently declining, bank profitability may improve. Non-performing assets (NPAs) and profitability have an inverse relationship, which indicates that the bank's potential to experience growth in profitability depends on the NPAs' actual decline.

Ozurumba (2016) undertook a study on "*Impact of Non-Performing Loans on the Performance of Selected Commercial Banks in Nigeria*" to look at the effect of non-performing loans on the performance of a selected group of commercial banks in Nigeria from 2000 to 2013. The impact of non-performing loans, loan loss provisions, loans, and advances on the return on equity (ROE) and return on assets (ROA) of banks was explicitly ascertained. Secondary data from the annual reports and accounts of the chosen banks for the study period were used in the research. The ordinary least squares method and ratio analysis were used to analyze the data. The study's particular conclusion is that while return on equity and return on asset are positively correlated with loans and advances, they have an inverse association with non-performing loans and loan loss provisions, respectively. It follows that non-performing loans have a detrimental impact on the performance of commercial banks, which should not be understated. In addition, they seriously jeopardize the banks' ability to continue operating as corporate businesses. Drawing on the abovementioned conclusions, the study suggests that



banks should uphold stringent credit criteria and that regulatory bodies such as the Apex Bank should closely monitor banks' credit activities.

In their study, "**Impact of NPAs upon Profitability of State Bank of India**," **Kumar and Lall (2016)** attempt to determine the effect of non-performing assets (NPAs) on the profitability of the State Bank of India as well as to evaluate the growth and quantity of NPAs in State Bank of India. The study's secondary data came from the bank's publicly available financial records and statements. Supplementary data produced by the RBI data bank and IBA Bulletin are taken into account. In order to determine the effect of non-performing assets (NPAs) on profitability, correlation analysis was used to scrutinize NPAs with a variety of accounting references and accounting data over a ten-year period, from 2005–2006 to 2014–2015. Based on the study's findings, a substantial relationship was found between net profit and net non-performing assets.

Jayakkodi and Rengarajan (2016) carried out a research study titled "**Impact of non-performing assets on return on assets of public and private sector banks in India.**" to assess the trends in the non-performing asset (NPA) ratio of particular public and private sector banks and to investigate the correlation between the gross non-performing assets (GPA) and profitability measure (ROA) of particular public and private sector banks. This study's prime source of secondary data was the annual reports of the participating banks, from which the researcher obtained information on four significant Indian public and private sector banks. State Bank of India, Punjab National Bank, Bank of Baroda, Bank of India, ICICI Bank, HDFC Bank, Axis Bank, and Federal Bank are among these selected banks. A total of five years, i.e., from 2010–11 to 2014–15, were analyzed for this research article. The Gross NPA Ratio, Net NPA Ratio, Problem Asset Ratio, Depositors Safety Ratio, Shareholders Risk Ratio, Return on Assets Ratio, and Correlation Analysis were used to arrive at the final conclusion. The quality of assets is the primary determinant of the banking system's stability and strength. While net NPA reveals the true burden of banks, gross NPA indicates the caliber of loans that banks have made. Overall, this analysis found that private-sector banks outperformed public-sector banks in terms of efficiency.

Kumari et al. (2017) conducted a study on the "**Impact of Non-Performing Assets (NPAs) on Financial Performance of Indian banking Sector**" to investigate the correlation between selected public and private sector banks' financial performance (ROA) and non-performing assets (NPAs). The required data are gathered from secondary sources such as the official websites of banks, annual reports, journals, magazines, newspapers, etc. With the help of judgmental sampling, five banks from each public and private sector were selected. From 2013 to 2017, a panel data regression model was utilized to investigate the effect of non-performing assets on the financial performance of banks operating in both the public and private sectors. The study's conclusions show that GNPA significantly and favorably affects the financial performance of the Indian banking industry. In a similar vein, NNPA has the same effect as GNPA on the financial performance of the Indian banking industry. According to the study, NPAs have a beneficial and large overall influence on banks' financial performance. The current study expands on earlier research on non-performing assets and recommends that banks in the public and private sectors focus on their GNPA and NNPA, as these factors have an impact on the financial performance of the two banking industries.



In an effort to understand the trends in non-performing assets (NPAs) in terms of valuations, gross NPAs, and net profit, as well as to establish a relationship between NPA and net profit, **Dudhe (2017)** did a research study titled "**Impact of Non-Performing Assets on the Profitability of Banks – A Selective Study.**" This article is based on secondary data for the years 2007 to 2016, including RBI bulletins, statistics tables on Indian banks, numerous publications and websites, and issues of the IBA journal. Correlation and regression analysis are used to arrive at the final conclusion. With the exception of Punjab National Bank and State Bank of India, all other banks' gross non-performing assets (NPA) and net earnings showed an inverse relationship, according to the analysis's final findings. The SBI and PNB demonstrate that year after year, net profits were unaffected by gross non-performing assets.

The study "**A Critical Review of non-performing assets in the Indian banking industry**" was examined by **Agarwala and Agarwala (2019)** in order to determine how each bank contributed to the industry's non-performing assets (NPA) by examining the NPA's growth pattern from 2010 to 2017. Additionally, an investigation was conducted to examine the NPAs' impact on the performance of the banking sector of various bank groupings, including the State Bank of India (SBI) and its affiliates, nationalized banks, and private sector banks. The investigation was conducted based on secondary data gathered from the RBI website. The geometric mean technique was employed to calculate the mean growth rate of gross non-performing assets (NPAs). By contrasting the increase in gross non-performing assets (NPAs) of particular banks with the average growth rate, the result is further refined. The evaluation of banks in the private sector shows that the growth rate of non-performing assets (NPAs) is lower than that of nationalized banks, the SBI, and its affiliates. The growth in bad loans has been astronomically large because the nationalized banks and SBI's partner banks were unable to adequately address the problem.

Nachimuthu and Veni (2019) conducted a research investigation on "**Impact of non-performing assets on the profitability in Indian scheduled commercial banks**" to assess the impact of NPAs on the profitability of Indian scheduled commercial banks. The basis of this research is the census approach. The Reserve Bank of India, the Indian Bank Bulletin, its annual reports, RBI websites, several editions of the Economic Survey, and a variety of news daily publications and magazines covering the current state of the banking industry were the sources of the secondary data. The study spans ten years, from 2007–2008 to 2016–2017. The variables relevant to non-performing assets (NPAs) on the profitability of the banking industry were identified through the use of ratio analysis, regression analysis, tests of equality of means, and cross correlogram. According to the analysis, there was proof that the amount of non-performing assets had increased. The impact of non-performing assets (NPAs) on the scheduled commercial banks' profitability was determined through a variety of methodologies. The relationship between the ratios of gross non-performing assets to gross advances, net non-performing assets to net advances, gross non-performing assets to total assets, and net non-performing assets to total assets was substantial. As a result, the scheduled commercial banks in India have seen a surge in non-performing assets, which has decreased bank profitability.

Wadwa and Ramaswamy (2020) looked at a study titled "**Impact of NPA on Profitability of Banks**" in order to evaluate the effect of non-performing assets (NPA) on banks' profitability as well as whether the Financial heads, which includes total assets, total advances, and total deposits has a substantial influence on NPA. Data on bank non-performing



assets (NPAs) was gathered from RBI publications for the years 2014–2015 through 2018–2019, while financial head data was obtained from the annual reports of specific commercial banks. The five banks from each sector, public and private, with the greatest non-performing asset value were selected as the study's sample based on RBI data. The relationship between net profits and net non-performing assets (NPAs) is ascertained using correlation analysis, and the aggregate and individual effects of financial heads on the NPAs are ascertained using multiple regression. Correlation analysis was used to find that, with the exception of HDFC, there was a negative association between NPA and Net Profits among the chosen banks. Regression analysis was used to show that NPAs had a major impact on Net Profits, but only in the cases of SBI, Axis, and HDFC Bank. It was discovered through linear regression that Net NPA significantly affects Net Profit and that there is a positive correlation between Net NPA and Net Profit at HDFC Bank. It can be determined, therefore, that an increase in NPAs might not translate into increased profitability. The results of multiple regression analysis indicate that while the financial heads alone do not significantly affect bank non-performing assets (NPAs) when the financial heads are considered collectively, the influence on NPA is rather significant for SBI and HDFC banks.

In their study, "*NPAs and Profitability in Indian Banks: An Empirical Analysis*," **Das and Uppal (2021)** estimated the profitability factors in order to investigate the relationship between NPAs and profitability. Covering the study, the researcher selected 39 scheduled commercial banks, out of which 20 were domestic private banks, and 19 were Public sector banks (PSBs), covering the years 2005 to 2019. The important information is taken from secondary sources, such as RBI publications and bulletins, and panel data techniques are used to arrive at a final result. According to the analytical result, operating costs are determined to be adversely correlated with profitability, and growth in non-performing advances has a negative effect on the rate of profit. The estimations from the FE and RE models indicate that the GDP growth rate, non-interest revenue, interest income, and capital sufficiency have all favourably impacted the Indian banks' profit rate. This study suggested that in order for banks to become more profitable, they should lower their NPAs and operating expenses.

3. Objective of the Study

By estimating the possible determinants of a bank's profitability, this article specifically attempts to scan the relationship between non-performing assets and profitability.

4. Hypothesis of the Study

In order to achieve the study's stated objective, the following null hypothesis is put forth: Profitability does not significantly correlate with the factors that are likely to affect a bank's profitability.

Rejection of the null hypothesis indicates a statistically significant correlation between Profitability and the factors that are likely to affect a bank's profitability.

5. Database And Methodology of the Study

This article is entirely based on secondary data, with all relevant facts and figures gathered from the Reserve Bank of India's official website and the "Capitaline-2000 database." Data from all 12 public sector commercial banks in India (Bank of Baroda, Bank of India, Bank



of Maharashtra, Canara Bank, Central Bank of India, Indian Bank. Indian Overseas Bank, Punjab National Bank, Punjab and Sind Bank, State Bank of India, Union Bank of India, and UCO Bank), spanning from 1 April 2014 to 31 March 2024, are used as a sample for this study.

The study has employed static panel regression to estimate the determinants of profitability of Indian Scheduled Public Commercial Banks. Panel data has been used because it enables an assessment of a wide range of firm-specific characteristics. Combining both cross-section observations' time series increases efficiency and information, adds additional degrees of freedom, and lessens variable collinearity.

The following functional relationship has been employed to analyze the determinants of profitability.

$$ROA_{it} = \alpha_0 + \beta_1 NNPA_NA_{it} + \beta_2 LnTD_{it} + \beta_3 NII_TI_{it} + \beta_4 NIM_{it} + \beta_5 OC_TII_{it} + \beta_6 CA_T1_{it} + \beta_7 AEGR_{it} + \beta_8 AROIF_{it} + e_{it}$$

Where α_0 is the intercept term, e_{it} is the residual term, $i = 1, 2, \dots, 12$ number of Banks and $t = 1, 2, \dots, 10$ years. $\beta_1, \beta_2, \dots, \beta_8$ are coefficient of independent variables.

The dependent variable in this study is the Return on Assets (ROA), which is frequently utilized as a proxy for profitability in research due to its appropriateness as a measure of profitability since it expresses a bank's earnings in relation to its total assets. In addition to bank-specific explanatory variables of bank profitability like Net Non-Performing Assets to Net Advances Ratio (NNPA_NA), Total Deposit (LnTD), Net Interest Income to Total Income Ratio (NII_TI), Net Interest Margin (NIM), Operating Cost to Total Interest Income Ratio (OC_TII), Capital Adequacy -Tier 1 Capital (CA_T1), two macroeconomic variables such as Annual Economic Growth Rate (AEGR) and Annual Rate of Inflation (AROIF) have also been used here as independent variables. Table 1 reflects the description of variables and their expected relation with banks' profitability.

Table 1: Description of variables used in the study and their expected relation with banks' profitability

Variables	Description	Expected relation
ROA	Net Income to Total Assets (%)	-
NNPA_NA	Net NPA to Net Advances (%)	Negative
LnTD	Natural Logarithm of Total Deposit	Positive
NII_TI	Net Interest Income to Total Income (%)	Positive
NIM	Net Interest Income to Average interest-earning assets (%)	Positive
OC_TII	Operating Cost to Total Interest Income (%)	Negative
CA_T1	Tier 1 capital as per Basel norm (%)	Positive
AEGR	Annual Economic Growth rate (%)	Positive
AROIF	Annual rate of Inflation (%)	Positive



6. Empirical Findings of the Study

6.1 Descriptive Results

Table 2: Descriptive Statistics of Independent and Dependent Variables

Variables	N	Minimum	Maximum	Mean	Std. Deviation
ROA	120	-3.01	1.5	0.02725	0.868739
NNPA_NA	120	0.2	15.33	4.677167	3.228876
LnTD	120	11.36	15.41	12.96533	0.929443
NII_TI	120	0.08	0.95	0.853417	0.079605
NIM	120	1.32	3.92	2.62575	0.472449
OC_TII	120	0.14	0.36	0.249083	0.047545
CA_T1	120	7.01	15	10.75442	2.188432
AEGR	120	-5.78	9.69	6.006	4.203092
AROIF	120	3.41	6.65	4.973	0.968451

The descriptive statistics of the variables used to estimate the profitability determinants are highlighted in Table 2. Descriptive statistics for the years 2014–15 to 2023–24 are shown in terms of mean, standard deviation, minimum, and maximum for both dependent and explanatory variables. The results reveal that the ROA flows from -3.01 to 1.5, with an average ROA value of 0.027. The findings also indicate that the average NNPA to NA ratio is 4.677, with a range of 0.2 to 15.33. Similarly, Table No. 2 also depicts the mean and standard deviation together with the maximum and minimum values of each remaining explanatory variable.

6.2 Model Diagnosis

6.2.1 Correlation Matrix and Multicollinearity Test

Table 3: Correlation Matrix of the variables

	ROA	NNPA_NA	LnTD	NII_TI	NIM	OC_TII	CA_T1	AEGR	AROIF
ROA	1								
NNPA_NA	-.641**	1							
LnTD	.291**	-.355**	1						
NII_TI	-.081	.097	-.216*	1					
NIM	.584**	-.690**	.427**	-.146	1				
OC_TII	.158	-.314**	.245**	-.366**	.523**	1			
CA_T1	.513**	-.731**	.237**	-.199*	.643**	.540**	1		
AEGR	.263**	-.130	.053	.017	.122	.066	.173	1	
AROIF	.206*	-.525**	.148	-.237**	.375**	.429**	.417**	-.314**	1

** significant at 0.01 level, * significant at 0.05 level



Table 3 displays the correlation matrix of the variables used in this study, along with the significance level. This matrix is helpful for determining how closely the variables are related to one another. The findings indicate that ROA has a highly significant negative correlation with NNPA_NA and a highly significant positive correlation with NIM and CA_T1. According to the correlation matrix, ROA has a somewhat positive significant association with LnTD, AEGR, and AROIF. ROA has an insignificant correlation with the remaining explanatory variables.

Table 4: Multicollinearity Test

Variables	NNPA_NA	LnTD	NII_TI	NIM	OC_TII	CA_T1	AEGR	AROIF
VIF	3.89	1.33	1.22	2.60	2.09	2.92	1.37	2.18
Tolerance value	0.257	0.752	0.820	0.384	0.478	0.343	0.732	0.459

The variance inflation factor (VIF) was used to test for multicollinearity among the independent variables. Usually, a low or negligible multicollinearity and moderate multicollinearity may not be so problematic. Gujarati (2003) asserts that a general rule is that there must be severe multicollinearity that could be troublesome for accurate specification of the regression model if the VIF number is greater than 10. However, for the variables in the regression model, the reported VIF is not higher than 3.89, as shown in Table 4. Therefore, such a very low VIF is not challenging when specifying the accurate model.

6.2.2 Panel Unit Root Test

Using the Levin, Lin, and Chu (LLC) Test (2002), the Unit Root Testing has confirmed the test for stationarity for all variables taken into consideration in the study. The test results in Table 5 clearly demonstrated that the series has no unit root and is stationary, rejecting the null hypothesis of a common unit root in the panel (p-value < 0.05) at different lag lengths. According to the LLC test, all variables are stationary at a constant level, meaning that the variables' statistical characteristics do not alter over time.

Table 5: Panel Unit Root Test

Variables	t-statistic (p-value)	Results
ROA	-5.6033** (0.0000)	Stationary
NNPA_NA	-6.5990** (0.0000)	Stationary
LnTD	-4.3750** (0.0000)	Stationary
NII_TI	-5.9192** (0.0000)	Stationary
NIM	-6.2526** (0.0000)	Stationary
OC_TII	-3.9204** (0.0000)	Stationary
CA_T1	-5.4925** (0.0000)	Stationary
AEGR	-3.7738** (0.0001)	Stationary
AROIF	-3.2772** (0.0005)	Stationary

**Significance at 0.01 level



6.3 Regression Results

Both the fixed effect model and the random effect model have been estimated in order to analyze the factors that influence profitability in Indian public commercial banks. Tables 6 and 7 present the estimation results for the FE and RE models, respectively.

Table 6: Determinants of Public Sector Bank's Profitability: Fixed Effect Estimates

Dependent Variable ROA	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
<i>Explanatory Variables</i>						
NNPA_NA	0.112352**	0.0372911	-3.01	0.003	-0.1863364	0.0383676
LnTD	0.1634587	0.2456704	0.67	0.507	-0.3239444	0.6508618
NII_TI	0.7890566	0.8306446	-0.95	0.344	-2.437032	0.8589186
NIM	0.3819433	0.2387458	1.60	0.113	-0.0917216	0.8556082
OC_TII	7.309997**	2.166322	-3.37	0.001	-11.60792	-3.012076
CA_T1	0.0943271	0.0556827	1.69	0.093	-0.0161457	0.204800
AEGR	0.0410201*	0.0159726	2.57	0.012	0.009331	0.0727093
AROIF	0.0078661	0.0924603	0.09	0.932	-0.1755724	0.1913046
C	1.375171	2.919297	-0.47	0.639	7.166972	4.416630
Number of Observations	120					
Number of Banks	12					
R-Square	0.5486					
Prob [F Statistics]	0.0000					

**Significance at 0.01 level , *Significance at 0.05 level

Table 7: Determinants of Public Sector Bank's Profitability: Random Effect Estimates

Dependent Variable ROA	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
<i>Explanatory Variables</i>						
NNPA_NA	-0.1091067**	0.0331469	-3.29	0.001	-0.1740734	-0.04414
LnTD	0.0830075	0.0673388	1.23	0.218	-0.0489742	0.2149891
NII_TI	-0.1625506	0.7527028	-0.22	0.829	-1.637821	1.31272
NIM	0.5439013**	0.1852658	2.94	0.003	0.1807869	0.9070156
OC_TII	-4.852659**	1.650598	-2.94	0.003	-8.087771	-1.617547
CA_T1	0.0480751	0.0423421	1.14	0.256	-0.0349139	0.1310642
AEGR	0.0416608**	0.0150906	2.76	0.006	0.0120838	0.0712379
AROIF	0.0003138	0.0827143	0.00	0.997	-0.1618034	0.1624309
C	-1.388163	1.496757	-0.93	0.354	-4.321752	1.545426
Number of Observations	120					
Number of Banks	12					
R-Square	0.5668					
Prob [chi-sq. Statistics]	0.0000					

**Significance at 0.01 level



However, when selecting the appropriate model, the null hypothesis of both Redundant Fixed Effect Test and Breusch-Pagan Test is rejected. So, we have conducted Hausman Test. Hausman test determines which of the effects the model has: random or fixed effect. This test recommends the Random Effect Model as appropriate for our study as the 'p' value is greater than 0.05, as shown in Table 8.

Table 8: Hausman Test

chi-sq. Statistics	chi-sq. df	Prob>chi-sq.
4.87	8	0.7712

The empirical results, as presented in Table 7, demonstrate that non-performing assets (NNPA_NA) and profitability (ROA) have an inverse relationship that is statistically significant at the 0.01 level. This suggests that a rise in non-performing assets has a negative effect on a bank's profitability. Additionally, net interest margin (NIM) and ROA have a positive correlation that is statistically significant at the 0.01 level, meaning that the bank is profiting more on loan interest. Operating Cost to Total Interest Income (OC_TII) shows a negative relationship with profitability (ROA), and their association is statistically significant at 0.01 level. Although the Total Deposit (LnTD), Net Interest Income to Total Income Ratio (NII_TI), and Capital Adequacy -Tier 1 Capital (CA_T1) are found to be positively associated with profitability (ROA), their association is not statistically significant. The estimations show that the Annual Economic Growth Rate (AEGR), one of the two macroeconomic explanatory variables, has a positive correlation with banks' profitability (ROA) and is statistically significant at 0.01 level. Although there is a positive correlation between profitability (ROA) and the Annual Rate of Inflation (AROIF), the relationship is not statistically significant.

7. Conclusion

Using a set of bank-specific and macroeconomic explanatory variables, the paper empirically attempted to scan the relationship between non-performing assets and profitability by estimating the likely determinants of profitability. From the panel data estimation of 12 Public Sector Banks, it is observed that non-performing assets (NNPA_NA), net interest margin (NIM), Operating Cost to Total Interest Income (OC_TII), and Annual Economic Growth Rate (AEGR) are the significant determinants of banks' profitability (ROA). While net interest margin (NIM) and Annual Economic Growth Rate (AEGR) are positively and significantly associated with banks' profitability, non-performing assets (NNPA_NA) and Operating Cost to Total Interest Income (OC_TII) are negatively associated with profitability, and this relationship is statistically significant. The findings of the study indicate that Non-Performing Assets (NPAs) have a detrimental impact on the profitability of Indian public banks and it is the most prominent factor adversely affecting the profitability of banks. On the one hand, it lowers their interest income; on the other hand, it also impacts their future deposits and raises their operating expenses because the cost of recovering non-performing assets will rise. Hence, this study seeks to suggest that banks must reduce their NPAs and operating costs to improve their profitability.



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