

# An Analysis of the Profitability of Public Sector Banks in India

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Received: 14 May 2026;

Revised: 28 May 2026;

Accepted: 12 June 2026

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**ABSTRACT:** This study takes 12 nationalised public sector banks in India as its sample, draws on data for 2022-2024, provided by the Indian Banks' Association (IBA), and adopts a fixed-effects panel data model to explore the determinants of these banks' profitability. Taking return on assets (ROA) as the dependent variable, the study incorporates seven explanatory variables including the loan-to-deposit ratio to conduct empirical analysis. It finds that the asset-weighted interest spread has a positive impact on profitability, while the investment-to-deposit ratio and operating expenses produce a significant negative impact. The study proposes that the sustainability of banks' profitability can be enhanced through efficient interest spread management, prudent investment allocation, and cost control.

**KEYWORDS:** Public Sector Banks, Bank Profitability, Return on Assets (ROA), Panel Data Regression Model

## I. INTRODUCTION

India's banking sector serves as the core hub that underpins the operation of the country's economy. By mobilizing household savings, driving the formation of social capital, and channeling stable credit to all production sectors, it effectively delivers its core value of boosting economic growth and maintaining the stability of the financial system. As one of the largest banking systems among emerging economies, India's banking sector operates a dual-led, two-tier structure regulated by the Reserve Bank of India, with its core market participants falling into two primary categories: public sector banks and private sector banks. Of these two groups, public sector banks, which hold majority equity owned by the Indian government, have long been tasked with advancing national development goals including promoting financial inclusion, building rural service outlet networks, and issuing directed lending to priority sectors. Private sector banks, by contrast, center their operations on technological innovation and upgrading, customer-centric service improvement, and enhanced operational efficiency, and pursue fully market-oriented development strategies. Existing authoritative studies note that the core differences between the two types of banks in terms of property rights attributes, governance models, and underlying business models significantly shape their respective cost structures, risk management capabilities,

and asset quality, which ultimately translate into differences in the banks' profitability [6][7].

Currently, India's banking sector is facing a new landscape marked by continuously intensifying industry competition and dynamically adjusting regulatory requirements. For this reason, systematically sorting out and studying the core determinants of the profitability of India's banking sector and its long-term development trends carries extremely important practical reference value for relevant policymakers, market investors, and banking operating institutions.

## II. LITERATURE REVIEW

A large body of prior research has examined the profitability determinants and development trends of India's banking sector, especially its public sector banks. The core outcomes of scholarship in this field can be sorted by research context and timeline as follows: Among local studies, Kumar[5] analyzed the boosting effect of operational efficiency on profitability for Indian public sector banks; Singh et al. [11] adopted a multivariable framework to identify four bank-level profitability determinants: capital adequacy, asset quality, management efficiency, and liquidity. Maiti et al.[7] used panel data analysis to conclude that deposits, loans, investments, and non-performing assets have significant impacts on the profitability of Indian banks; that same year, Bhullar et al.[3] focused on public sector banks and proposed that two internal management variables, operational efficiency and credit risk, are the core drivers of performance. Bandyopadhyay[2] applied dynamic panel estimation to verify the positive association between capital adequacy and the profitability and resilience of public sector banks. At the international level, Kumbirai et al.[6] and Sharma et al. [10] jointly outlined the important role of three factors: capital strength, liquidity management, and cost efficiency, and confirmed that these factors are applicable across different banking systems.

A large body of existing academic research, policy frameworks, and official reports centers on discussing factors that shape the profitability of India's public sector banks. The core consensus among these works identifies asset quality, macroeconomic conditions, and institutional reforms as the three key dimensions that determine the profit levels of this group of banks. In terms of academic research, Das et al.[4] confirm that rising non-performing

assets (NPAs) exert a negative impact on bank profitability by reducing income and increasing provisioning requirements; Sarkar et al.[9] find that macroeconomic variables including inflation, GDP growth rate, and interest rates significantly affect the profit performance of India’s public sector banks. The policy framework introduced by Narasimham Committee[8] laid the foundation for the liberalization of India’s banking sector, the upgrade of prudential regulations, and the expansion of banks’ operational autonomy, driving shifts in the dynamic trend of bank profitability. Multiple annual official reports released by the Reserve Bank of India and the Government of India provide comprehensive evidence of the performance and asset quality of public sector banks, and outline the role of measures such as reform and capital supplementation in strengthening bank profitability. However, most prior studies only analyze single influencing factors in isolation. An integrated assessment that combines all three dimensions is still required to fully explain the profit performance of India’s public sector banks.

**III. METHODOLOGY AND DATA SOURCE**

The present analysis is based on the panel data model, which is an econometric method that integrates cross-sectional and time-series observations to enable simultaneous analysis of individual heterogeneity and time-varying trends.

This model has three core advantages: increasing the number of observations to improve estimation efficiency, reducing the risk of multicollinearity, and controlling for unobserved heterogeneity to avoid estimation bias [1] [12]. Among its variants, the fixed effects (FE) model is suited for micro panel datasets that take individual banks as cross-sectional units, as it can control for time-invariant individual fixed characteristics correlated with explanatory variables. Only when the Hausman test confirms that the fixed effects model outperforms the random effects model can consistent, unbiased estimates of the impact of explanatory variables on bank profitability be produced. Here, the dependent variable is Return on Assets (RROA), and the list of independent variables considered in the model is given in Table 1. Return on Assets (ROA) is one of the most widely adopted core profitability metrics in the current banking industry. It is used to measure the efficiency with which a bank converts its total assets into net profit, and the industry’s universal calculation formula is net profit divided by average total assets. Generally, the higher a bank’s ROA, the stronger its management team’s resource allocation capacity, and the better its overall operating performance.

The panel data model is represented by Eq. 1.  

$$RROA_{it} = \alpha + \beta_1 RCD_{it} + \beta_2 RID_{it} + \beta_3 RSA_{it} + \beta_4 RCAR_{it} + \beta_5 RNNPAADV_{it} + \beta_6 RBUSEMPL_{it} + \beta_7 ROEXP_{it} + u_{it}$$
 (Eq.1)

Table 1: Description of the Variables Considered in the Analysis

RROA	Return on Assets [%]
RCD	Credit Deposit Ratio
RID	Investment Deposit Ratio
RSA	Spread as % Assets
RCAR	Capital Adequacy Ratio-Basel III [%]
RNNPAADV	Net NPA as % to Net Advances
RBUSEMPL	Business per Employee ( Rs. crore)
ROEXP	Operating Expenditure as % of Total Expenses

The data relating to the analysis has been collected from the website of the Indian Banks' Association (IBA) for the period 2022-24. The 12 public sector banks considered in the analysis are: Bank of Baroda, Bank of India, Bank of Maharashtra, Canara Bank, Central Bank of India, Indian Bank, Indian Overseas Bank, Punjab & Sind Bank, Punjab National Bank, UCO Bank, Union Bank of India, and State Bank of India (SBI).

**IV. FINDINGS OF THE STUDY**

In Table 2 we presents the descriptive statistical results of the variables used in the panel regression of public sector banks in this study, with a total of 36 valid observations covered in this analysis. The statistical results are organized along two core dimensions. The first dimension is profitability and capital health, which includes six variables: return on assets (RROA), per capita profit

(RPROFEMPLYEE), loan-to-deposit ratio (RCD), investment-to-deposit ratio (RID), asset interest spread share (RSA), and capital adequacy ratio (RCAR). For each variable, its mean, standard deviation, or value range is listed, paired with corresponding business interpretations of its fluctuation characteristics and industry operational attributes. The second dimension is asset quality and operational efficiency, which includes three variables: ratio of net non-performing loans to net loans (RNNPAADV), per capita business volume (RBUSEMPL), and ratio of operating expenses to total expenses (ROEXP). These variables are also equipped with their statistical values and operational-level interpretations. Overall, all variables have sufficient variability and show no extreme dispersion, making them suitable for the subsequent panel data estimation and research on profitability determinants

Table 2: Descriptive Statistics of Total Return on Assets of Public Sector Banks

Variable	Obs	Mean	Std. Dev.	Min	Max
RROA	36	0.705	0.293	.18	1.5
RPROFEMPLOYEE	36	11.946	6.811	2.57	30.04
RCD	36	68.037	6.868	49.07	80.32
RID	36	33.157	4.927	25.22	43.23
RSA	36	2.521	0.292	1.91	3.2
RCAR	36	15.931	1.287	13.48	18.54
RNNPAADV	36	1.645	1.07	0.20	4.80
RBUSEMPL	36	23.937	4.64	16.33	35.00
ROEXP	36	32.956	2.961	26.59	39.08

(Source: Authors' Own Estimation)

The empirical results of the fixed-effects panel regression conducted in this study on the factors influencing the return on assets (ROA) of Indian public sector banks are detailed in Table 3. First, the overall model validity test was completed: the R<sup>2</sup> of this regression is 0.832, which can explain 83.2% of the variation in ROA. The F-statistic is 11.994, which is significant at the 1% level (p=0.000), confirming that all variables included in the model are jointly significant. Across the study period, the sample banks' average ROA was 0.705%, with a standard deviation of 0.293, indicating moderate volatility in their profitability. A variable-by-variable interpretation of the regression results follows.

Among the statistically significant variables, the coefficient of the ratio of asset interest spread (RSA) is 0.928, which is significantly positive at the 1% level (p=0.001). When all other conditions are held constant, a one-unit increase in interest spread can drive a 0.928-unit increase in ROA, making RSA the core positive driver of profitability, which aligns with the core profit-generating logic of banks' interest-earning business activities. RSA reflects the revenue-generating capacity of banks' deposit and loan intermediation business, and a high RSA generates a positive driving effect on a bank's overall profitability. The

coefficient of the ratio of investment to deposits and loans (RID) is -0.038 (p=0.038), a significant negative value. This indicates that if a bank over-allocates its deposits to investment areas rather than high-yield loans, it will drag down its own profitability. The coefficient of the ratio of operating expenses to total expenses (ROEXP) is -0.053, which is significant at the 10% level (p=0.061). Persistently high operating costs increase banks' burdens, which in turn harms their profit performance.

Among the remaining variables, the ratio of credit to deposits and loans (RCD), capital adequacy ratio (RCAR), ratio of net non-performing loans to net advances (RNNPAADV), and business volume per employee (RBUSEMPL) all lack statistical significance. Among these, RCAR has an insignificant positive coefficient, because maintaining higher regulatory capital does not necessarily translate into improved profitability. RNNPAADV also has an insignificant positive coefficient, as India's provisioning policies and the capital recapitalization measures launched by the government have offset the negative impact of bad loans. Overall, interest spread management and investment allocation decisions are the core drivers of profitability for Indian public sector banks, while operating efficiency, asset quality, and capital adequacy have relatively limited explanatory power for variations in ROA.

Table 3: Panel Data Regression Analysis (Fixed effect) of Return on Assets (ROA) of Public Sector Banks

RROA	Coef.	St. Err.	t-value	p-value	[95% Conf Interval]		Sig
RCD	-.016	.011	-1.49	.155	-.039	.007	
RID	-.038	.017	-2.25	.038	-.074	-.002	**
RSA	.928	.24	3.87	.001	.422	1.434	***
RCAR	.031	.044	0.71	.487	-.061	.123	
RNNPAADV	.013	.044	0.30	.766	-.08	.107	
RBUSEMPL	-.009	.034	-0.26	.797	-.08	.063	
ROEXP	-.053	.026	-2.00	.061	-.109	.003	*
<b>Constant</b>	2.179	1.724	1.26	.223	-1.459	5.816	
Mean dependent var	0.705		SD dependent var		0.293		
R-squared	0.832		Number of obs		36		

F-test	11.994	Prob > F	0.000
Akaike crit. (AIC)	-59.816	Bayesian crit. (BIC)	-47.147
*** $p < .01$ , ** $p < .05$ , * $p < .1$			

(Source: Authors' Own Estimation)

## V. CONCLUSION

This paper employs fixed-effects panel data model to conduct research on the determinants of profitability of India's public sector banks, and summarizes the following core empirical results: The ratio of asset spread to total assets (RSA) exerts a strong positive effect on return on assets, while the ratio of investments to deposits (RID) and the ratio of operating expenses to total expenses (ROEXP) have significant negative impacts on bank profitability. The other six factors, including the loan-to-deposit ratio and capital adequacy ratio, all lack statistical significance. Based on the above conclusions, this paper puts forward multi-dimensional optimization strategies: Internally, banks need to manage asset spreads properly, allocate deposits rationally, strictly control operating costs, strengthen core lending capacity, optimize interest spread structure, and rely on technology to cut costs; at the regulatory end, authorities should advance banking sector reform, speed up digital transformation, and improve risk management systems. Ultimately, by strengthening governance and balancing asset allocation, public sector banks can meet both their own development goals and the mission of financial inclusion.

## CONFLICTS OF INTEREST

The authors declare that they have no Conflicts of Interests.

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