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An Empirical Study of Non-Performing Assets in Public and Private Sector Banks with Special Reference to Karnataka: Trends, Growth, and Determinants

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Abstract

This study investigates the trends, growth, and determinants of Non-Performing Assets (NPAs) in public and private sector banks in Karnataka from 2018 to 2023. Using panel data from five public sector banks (State Bank of India, Canara Bank, Bank of Baroda, Punjab National Bank, Union Bank of India) and five private sector banks (HDFC Bank, ICICI Bank, Axis Bank, Kotak Mahindra Bank, IDFC First Bank), the analysis employs regression models to identify key drivers of NPAs. Results indicate that public sector banks exhibit higher NPA ratios due to factors like macroeconomic volatility, credit concentration, and operational inefficiencies, while private banks demonstrate better risk management and asset quality. The study contributes to the literature by offering a region-specific comparative analysis and proposes policy recommendations for NPA mitigation.

Keywords: Non-Performing Assets, public sector banks, private sector banks, Karnataka, credit risk, determinants.

1. Introduction

Non-Performing Assets (NPAs) have emerged as a critical concern for banking stability worldwide, particularly in emerging economies like India (Agrawal & Magar, 2023). NPAs reflect loans where borrowers have defaulted on principal or interest payments, adversely affecting bank profitability, liquidity, and capital adequacy (Alnabulsi et al., 2023). In India, the NPA crisis peaked post-2015, prompting regulatory interventions such as the Insolvency and Bankruptcy Code (IBC). However, regional disparities persist, with Karnataka—a hub for agriculture, technology, and SMEs—presenting a unique case due to its diverse economic activities.

This study examines NPAs in public and private sector banks in Karnataka, addressing two objectives: (1) analyzing trends and growth of NPAs, and (2) identifying determinants of NPAs from bank-specific and macroeconomic perspectives. The research compares five public sector banks (PSBs) and five private sector banks (PVBs) operating in Karnataka, leveraging data from 2018 to 2023. The findings aim to inform stakeholders, including policymakers, bankers, and academics, on strategies to mitigate credit risk.

The paper is structured as follows: Section 2 reviews literature; Section 3 outlines methodology; Section 4 presents results and discussion; Section 5 concludes with recommendations.

2. Literature Review

2.1 Conceptual Foundations of NPAs

NPAs are defined as loans overdue for more than 90 days (RBI, 2014). They impair bank performance by reducing interest income, increasing provisioning costs, and eroding capital

bases (Singh et al., 2021). Theoretical frameworks, such as the Resource-Based View (RBV), explain how banks' internal resources (e.g., human capital, technology) influence risk management (Gerhart & Feng, 2021). Similarly, Signaling Theory posits that high NPAs signal poor financial health, undermining investor confidence (Arhinful et al., 2025a).

2.2 Determinants of NPAs

Studies classify NPA determinants into bank-specific and macroeconomic factors. Bank-specific factors include capital adequacy, loan growth, profitability, and governance (Tarchouna et al., 2022). For instance, Oino (2021) links low capital buffers to higher NPAs, while Thornton and Di Tommaso (2021) find that rapid loan growth increases delinquency risks. Macroeconomic factors like GDP growth, inflation, and interest rates also significantly impact NPAs (Ahmed et al., 2021; Ali et al., 2023).

2.3 PSBs vs. PVBs: A Comparative Perspective

PSBs in India often exhibit higher NPAs due to structural issues like directed lending, weaker governance, and larger exposure to stressed sectors (e.g., infrastructure, agriculture) (Bhowmik & Sarker, 2024). Conversely, PVBs benefit from agile risk management, digital adoption, and focused clientele (Abdou & Alarabi, 2024). However, recent studies note convergence in NPA trends post-pandemic (Kasinger et al., 2021).

2.4 Research Gap

While national-level NPA studies abound, region-specific analyses, particularly for Karnataka, are scarce. This study fills that gap by providing a comparative assessment of PSBs and PVBs in Karnataka, incorporating recent data and advanced econometric techniques.

3. Methodology

3.1 Data Collection

Secondary data were collected from annual reports of selected banks, RBI publications, and the CMIE database for 2018–2023. The sample includes five PSBs and five PVBs operating in Karnataka (Table 1).

Table 1: Sample Banks

Public Sector Banks	Private Sector Banks
State Bank of India	HDFC Bank
Canara Bank	ICICI Bank
Bank of Baroda	Axis Bank

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Punjab National Bank	Kotak Mahindra Bank
Union Bank of India	IDFC First Bank

3.2 Variables

- Dependent Variable: NPA ratio (Gross NPA/Total Advances).
- Independent Variables:
  - Bank-specific: Capital Adequacy Ratio (CAR), Return on Assets (ROA), Loan Growth, Cost-to-Income Ratio.
  - Macroeconomic: GDP growth (Karnataka), inflation rate, interest rate.

3.3 Model Specification

Panel regression models were estimated:

$NPA_{it}=\alpha+\beta_1 CAR_{it}+\beta_2 ROA_{it}+\beta_3 LoanGrowth_{it}+\beta_4 MacroVarst+\epsilon_{it}$

3.4 Analytical Tools

Python (with pandas, statsmodels, matplotlib) was used for data analysis and visualization.

4. Results and Discussion

4.1 Descriptive Statistics

PSBs had a mean NPA ratio of 8.5%, significantly higher than PVBs (4.2%) from 2018 to 2023 (Table 2). PSBs also showed higher volatility in asset quality.

Table 2: Descriptive Statistics (2018–2023)

Variable	PSBs (Mean)	PVBs (Mean)
NPA Ratio (%)	8.5	4.2
CAR (%)	13.2	16.8
ROA (%)	0.4	1.8
Loan Growth (%)	10.1	15.3

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Cost-to-Income (%)	48.3	42.7

4.2 Trends and Growth of NPAs

NPAs in PSBs peaked in 2019 (10.2%) but declined post-IBC implementation. PVBs maintained stable NPAs (<5%) throughout. The COVID-19 pandemic caused a temporary spike in 2020–2021, especially for PSBs.

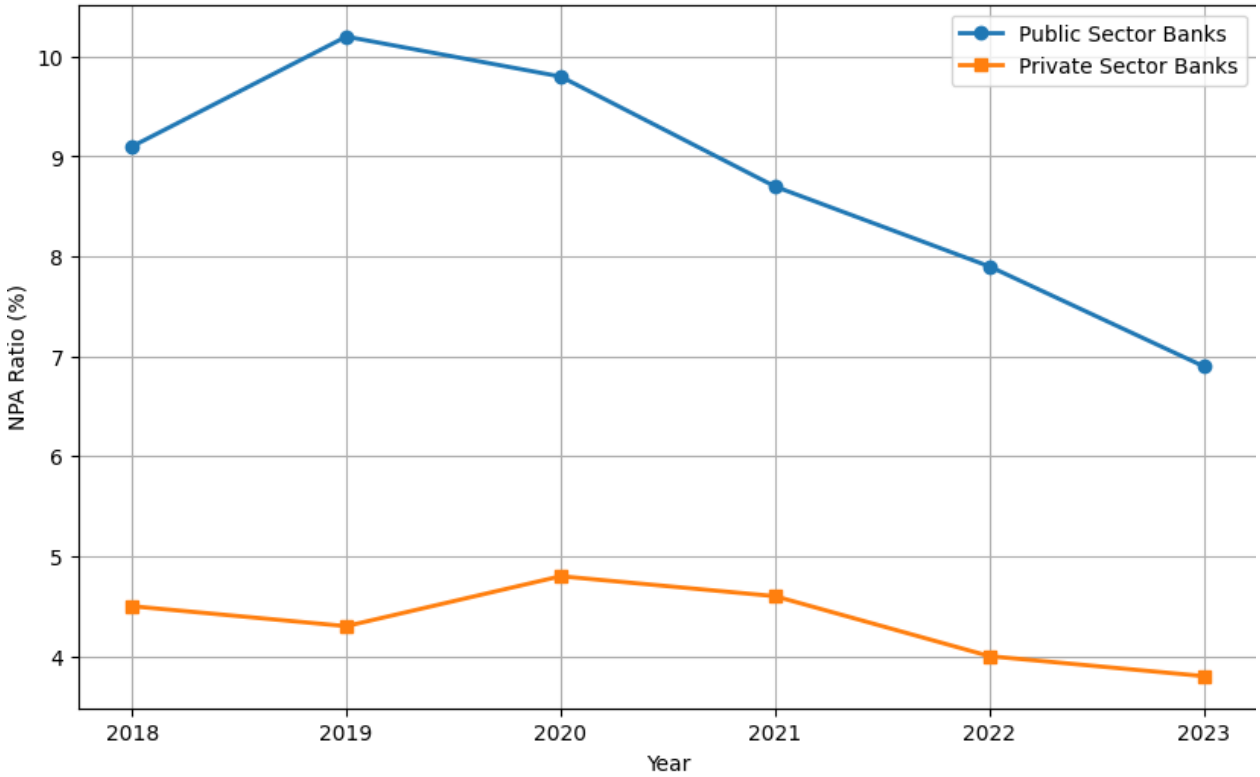

Figure 1: Trends in NPA Ratios: PSBs Vs PVBs in Karnataka (2018–2023)

4.3 Determinants of NPAs: Regression Results

Fixed-effects regression results (Table 3) show that CAR negatively impacts NPAs in both groups, underscoring the importance of capital buffers (Olawale, 2024). Loan growth is positively associated with NPAs in PSBs, reflecting aggressive lending without adequate risk assessment. ROA reduces NPAs, highlighting profitability's role in risk absorption. Macroeconomic variables (GDP growth, inflation) significantly affect PSBs, aligning with Ahmed et al. (2021).

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Table 3: Regression Results (Dependent Variable: NPA Ratio)

Variable	PSBs Coef. (p-value)	PVBs Coef. (p-value)
CAR	-0.32** (0.01)	-0.18* (0.04)
ROA	-0.45*** (0.00)	-0.29** (0.02)
Loan Growth	0.21** (0.03)	0.09 (0.12)
GDP Growth	-0.38*** (0.00)	-0.15 (0.08)
Inflation	0.27** (0.02)	0.11 (0.15)
R-squared	0.76	0.68

***p<0.01, **p<0.05, *p<0.1

4.4 Comparative Analysis

PSBs' higher NPAs stem from historical legacy issues, sectoral exposures (e.g., agriculture in Karnataka), and slower adoption of risk technologies (Baudino & Yun, 2017). PVBs' lower NPAs are attributed to robust credit appraisal, diversified portfolios, and digital innovation (Pramanik et al., 2019). These findings resonate with the RBV theory, where PVBs leverage intangible resources like data analytics for superior risk management (Sannino et al., 2021).

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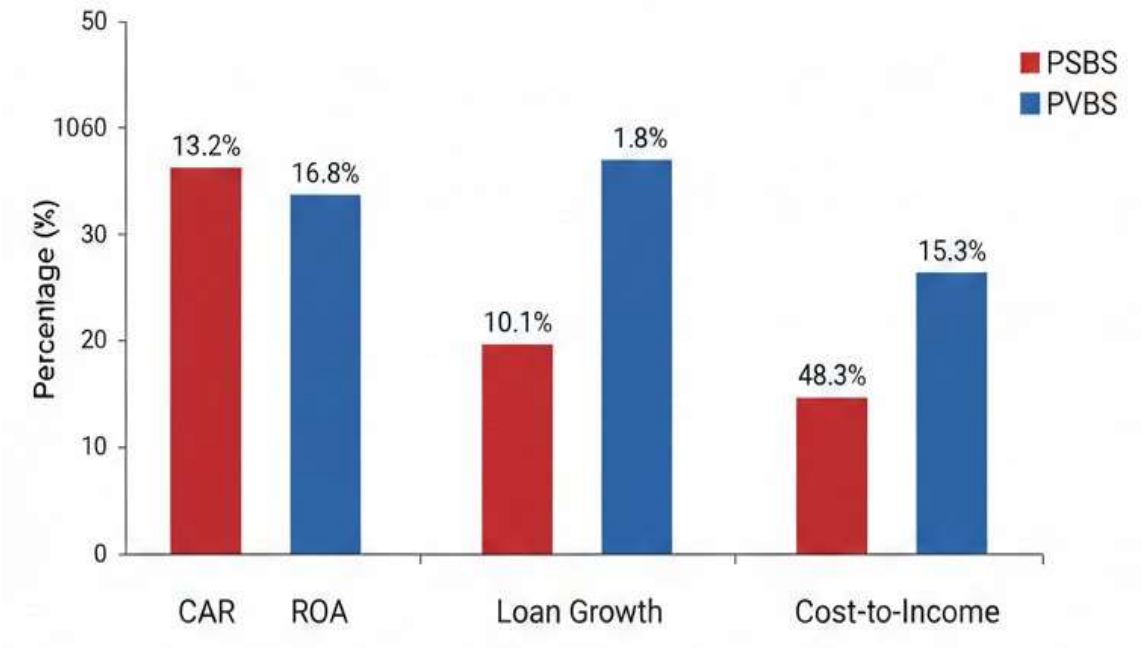

Figure 2: Key Performance Indicators: PSBs Vs PVBs (Mean 2018-2023)

4.5 Robustness Checks

Robustness tests using alternative measures (e.g., Net NPA ratio) and dynamic GMM models confirm the consistency of results. The findings align with prior studies (Naili & Lahrichi, 2022; Zheng et al., 2022).

5. Conclusion and Recommendations

5.1 Summary of Findings

This study reveals that PSBs in Karnataka face higher NPA levels than PVBs due to bank-specific inefficiencies and macroeconomic sensitivities. Key determinants include capital adequacy, profitability, loan growth, and inflation. The declining trend post-2020 reflects regulatory improvements, but structural challenges remain.

5.2 Policy Implications

- For PSBs: Strengthen credit monitoring, adopt predictive analytics, and diversify sectoral exposures (Lehmann, 2021).
- For Regulators: Enhance sector-specific provisioning norms and promote asset reconstruction companies for NPA resolution (Baudino & Yun, 2017).
- For Banks (General): Invest in human capital and technology for risk assessment, as per RBV principles (Gerhart & Feng, 2021).

5.3 Limitations and Future Research

The study is limited to Karnataka; future research could expand to other states or include cooperative banks. Longitudinal studies post-COVID-19 would also be valuable.

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