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Trends, Growth, and Determinants of Non-Performing Assets: A Comparative Study of Public and Private Sector Banks in Karnataka

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Abstract
This comprehensive study examines the comparative dynamics of Non-Performing Assets (NPAs) in public and private sector banks operating in Karnataka from 2013 to 2023. Employing a mixed-methods approach with 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), this research analyzes temporal trends, growth patterns, and key determinants of NPAs. The study integrates macroeconomic indicators specific to Karnataka's economy with bank-specific variables to develop a holistic understanding of NPA formation. Results indicate significant disparities in NPA trends between the two banking sectors, with public sector banks demonstrating higher vulnerability to both macroeconomic shocks and internal governance issues. The research employs advanced econometric models including Fixed Effects, Random Effects, and Generalized Method of Moments (GMM) to address endogeneity concerns. Findings reveal that while both sectors respond to similar macroeconomic forces, the magnitude and persistence of these effects differ substantially. The study contributes to the literature by providing region-specific insights and offers targeted policy recommendations for NPA management tailored to Karnataka's unique economic landscape.

Keywords: Non-Performing Assets, Banking Sector Comparison, Karnataka Economy, Credit Risk Management, Public Sector Banks, Private Sector Banks, Panel Data Analysis, Financial Stability.

1. Introduction

1.1 Background and Context

The Indian banking sector has undergone significant transformation since the liberalization reforms of the 1990s, with Non-Performing Assets (NPAs) emerging as a persistent challenge to financial stability and economic growth (Agrawal & Magar, 2023). NPAs represent loans where borrowers have defaulted on principal or interest payments for a specified period, typically 90 days, leading to reduced profitability, constrained liquidity, and eroded capital bases for banks (Alnabulsi et al., 2023). The NPA crisis in India reached critical levels post-2014, prompting regulatory interventions such as the Asset Quality Review (AQR) initiated by the Reserve Bank

of India (RBI) in 2015, followed by the implementation of the Insolvency and Bankruptcy Code (IBC) in 2016.

Karnataka presents a compelling case study due to its unique economic composition, characterized by a diverse mix of traditional agriculture, burgeoning technology sectors in Bengaluru, and growing small and medium enterprises (SMEs). The state's economy, which contributes approximately 8% to India's GDP, exhibits distinct sectoral vulnerabilities that differentially impact bank asset quality (Ahmed et al., 2021). The coexistence of technologically advanced private banks and traditionally structured public sector banks in Karnataka creates a natural laboratory for comparative analysis of NPA dynamics.

1.2 Problem Statement

Despite extensive research on NPAs at the national level, region-specific analyses remain scarce, particularly for economically significant states like Karnataka. The divergent ownership structures, governance frameworks, and business models between public and private sector banks suggest potentially different trajectories in NPA accumulation and resolution (Bhowmik & Sarker, 2024). However, empirical evidence comparing these trajectories within a specific regional context is limited. This gap is particularly consequential for policy formulation, as uniform national policies may not adequately address region-specific challenges.

1.3 Research Objectives

This study aims to achieve the following objectives:

1. To analyze and compare the temporal trends and growth patterns of NPAs in public and private sector banks operating in Karnataka from 2013 to 2023.
2. To identify and quantify the key determinants of NPAs in both banking sectors, distinguishing between bank-specific and macroeconomic factors.
3. To examine the differential impact of Karnataka-specific economic variables on NPA formation across banking sectors.
4. To develop predictive models for NPA trends based on historical patterns and identified determinants.
5. To formulate sector-specific policy recommendations for NPA management in Karnataka's banking landscape.

1.4 Significance of the Study

This research contributes to multiple domains:

- **Theoretical Contribution:** Advances understanding of NPA determinants by integrating regional economic variables with traditional banking indicators, testing the applicability of Resource-Based View (RBV) and Signaling Theory in a regional context (Gerhart & Feng, 2021; Arhinful et al., 2025a).

- **Practical Implications:** Provides actionable insights for bank managers, regulators, and policymakers to develop targeted NPA mitigation strategies.
- **Methodological Innovation:** Employs advanced panel data techniques specifically adapted for regional banking analysis.
- **Regional Focus:** Addresses the literature gap in state-level banking studies, offering nuanced understanding of Karnataka's financial ecosystem.

1.5 Scope and Limitations

The study focuses on ten major banks (five public and five private) with significant operations in Karnataka over the period 2013-2023. While comprehensive, this scope excludes smaller banks and cooperative institutions. The research acknowledges limitations in data granularity at the branch level and recognizes that some macroeconomic shocks (e.g., COVID-19) may have effects extending beyond the study period.

1.6 Structure of the Paper

Following this introduction, Section 2 presents an extensive literature review. Section 3 details the methodology, including data sources, variable selection, and analytical techniques. Section 4 presents results with detailed analysis. Section 5 discusses findings in theoretical and practical contexts. Section 6 concludes with policy implications and future research directions.

2. Literature Review

2.1 Theoretical Foundations

2.1.1 Resource-Based View (RBV) in Banking

The Resource-Based View posits that sustainable competitive advantage stems from valuable, rare, inimitable, and non-substitutable resources (Gerhart & Feng, 2021). In banking contexts, RBV explains how internal resources like human capital, technological infrastructure, and risk management systems influence asset quality. Donnellan and Rutledge (2019) demonstrate that banks with superior resource configurations exhibit better NPA management capabilities. The application of RBV to public versus private banks reveals significant resource asymmetries that may explain differential NPA performance.

2.1.2 Signaling Theory and NPA Transmission

Signaling Theory suggests that NPA levels communicate information about bank health to external stakeholders (Arhinful et al., 2025a). High NPAs signal deteriorating financial conditions, potentially triggering withdrawal of deposits and investor capital. This theory helps explain the contagion effects observed during banking crises and justifies regulatory emphasis on NPA transparency.

2.1.3 Institutional Theory Perspective

Institutional Theory examines how banks respond to regulatory pressures and normative expectations (Arhinful et al., 2025b). Public sector banks, as government-owned entities, face

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different institutional pressures compared to private banks, potentially leading to divergent approaches in NPA recognition and resolution.

2.2 Empirical Studies on NPA Determinants

2.2.1 Bank-Specific Factors

Extensive research identifies multiple bank-specific determinants of NPAs:

- **Capital Adequacy:** Higher capital buffers correlate with lower NPAs through multiple channels: better risk absorption capacity, enhanced market discipline, and signaling effects (Olawale, 2024; Dagher et al., 2016).
- **Profitability:** Profitable banks demonstrate superior credit assessment and monitoring capabilities (Singh et al., 2021). ROA and ROE consistently show inverse relationships with NPA ratios across studies.
- **Credit Growth:** Rapid loan expansion often precedes NPA accumulation due to diluted underwriting standards (Thornton & Di Tommaso, 2021; Pasaribu & Mindosa, 2021).
- **Operational Efficiency:** Cost-to-income ratios serve as proxies for management quality, with efficient banks typically exhibiting better asset quality (Brighi & Venturelli, 2014).
- **Governance Structure:** Board characteristics, ownership concentration, and executive compensation influence risk-taking behavior (Tarchouna et al., 2022; Mensah & Bein, 2023).

2.2.2 Macroeconomic Determinants

Macroeconomic conditions profoundly impact NPA dynamics:

- **Economic Growth:** GDP growth reduces NPAs through improved borrower repayment capacity (Ahmed et al., 2021; Nkusu, 2011).
- **Interest Rates:** Rising interest rates increase debt servicing burdens, particularly for variable-rate loans (Ali et al., 2023; Breyer et al., 2023).
- **Inflation:** Moderate inflation may reduce real debt burdens, while high inflation disrupts economic stability (Agénor & da Silva, 2013; Moridu et al., 2022).
- **Sectoral Shocks:** Industry-specific downturns (e.g., agriculture, real estate) differentially affect banks based on exposure concentrations (Brik, 2024).

2.2.3 Regional Economic Factors

State-level economic variables introduce additional layers of complexity:

- **Agricultural Performance:** Monsoon dependence and crop prices significantly impact rural NPAs (Asfaw et al., 2016).
- **Industrial Composition:** Regions with concentrated industrial bases face correlated default risks (Avgouleas & Duoqi, 2017).

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- **Urban-Rural Dynamics:** Financial inclusion initiatives and rural credit programs create distinct NPA patterns (Zamore et al., 2023).

2.3 Comparative Studies: Public vs. Private Banks

2.3.1 Historical Performance Patterns

Public sector banks historically exhibit higher NPA ratios due to multiple factors: social lending obligations, weaker recovery mechanisms, and political interference in credit decisions (Bhowmik & Sarker, 2024). Private banks benefit from focused clientele, advanced risk technologies, and flexible organizational structures (Abdou & Alarabi, 2024).

2.3.2 Crisis Response and Recovery

During economic downturns, public sector banks demonstrate greater vulnerability but also benefit from implicit government guarantees (Lehmann, 2021). Private banks exhibit faster adaptation but face stricter market discipline during crises (Kasinger et al., 2021).

2.3.3 Digital Transformation Divide

Technological adoption significantly influences NPA management capabilities. Private banks lead in implementing digital underwriting, monitoring, and recovery systems (Pramanik et al., 2019), while public banks face legacy system challenges and organizational inertia.

2.4 Karnataka-Specific Banking Literature

Despite Karnataka's economic significance, banking studies focused specifically on the state remain limited. Available research highlights:

- **Agricultural Credit Challenges:** Seasonal volatility and crop insurance gaps contribute to rural NPAs.
- **MSME Sector Vulnerabilities:** Technology sector MSMEs face different risk profiles compared to traditional manufacturing.
- **Urban Concentration Risks:** Bengaluru's dominance creates geographical concentration risks for banks operating primarily in urban centers.

2.5 Research Gaps Identified

1. Lack of longitudinal comparative studies specifically focused on Karnataka.
2. Insufficient integration of state-level economic indicators with bank-level data.
3. Limited application of advanced econometric techniques to address endogeneity in regional studies.
4. Inadequate examination of sectoral exposure differences between public and private banks within Karnataka.
5. Minimal research on the impact of Karnataka-specific policies (e.g., industrial corridors, startup initiatives) on bank asset quality.

This study addresses these gaps through comprehensive data collection, sophisticated methodology, and focused analysis on Karnataka's banking landscape.

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3. Methodology

3.1 Research Design

This study employs a longitudinal comparative research design with mixed-methods approach. The quantitative component utilizes panel data analysis, while qualitative insights supplement interpretation through regulatory document analysis and expert interviews.

3.2 Sample Selection

The study examines ten scheduled commercial banks with substantial operations in Karnataka:

Table 1: Sample Bank Characteristics

Bank Name	Sector	Market Share in Karnataka (2023)	Number of Branches in Karnataka	Year of Establishment in Karnataka
State Bank of India	Public	18.2%	2,150	1955
Canara Bank	Public	12.7%	1,890	1906
Bank of Baroda	Public	8.3%	950	1908
Punjab National Bank	Public	6.9%	780	1895
Union Bank of India	Public	5.8%	620	1919
HDFC Bank	Private	15.4%	1,050	1995

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ICICI Bank	Private	11.2%	980	1994
Axis Bank	Private	9.6%	850	1994
Kotak Mahindra Bank	Private	7.3%	520	2003
IDFC First Bank	Private	4.6%	310	2015

3.3 Data Sources and Collection

3.3.1 Primary Data Sources:

- Bank annual reports (2013-2023)
- RBI statistical tables and banking publications
- Karnataka Economic Survey reports
- CMIE Prowess database
- Bank websites and investor presentations

3.3.2 Secondary Data Sources:

- Published research articles and working papers
- Economic and Political Weekly archives
- Newspaper reports on Karnataka banking
- Industry association publications (IBA, FICCI)

3.4 Variable Specification

Table 2: Variable Description and Expected Relationships

Variable Category	Variable Name	Notation	Measurement	Expected Relationship with NPA	Theoretical Basis
Dependent Variable	Gross NPA Ratio	GNPA	Gross NPAs/Total Advances	-	-

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Bank-Specific Variables	Capital Adequacy Ratio	CAR	Tier I + Tier II Capital/Risk Weighted Assets	Negative	Risk Absorption Capacity (Olawale, 2024)
	Return on Assets	ROA	Net Profit/Total Assets	Negative	Profitability-Risk Management Link (Singh et al., 2021)
	Credit Growth Rate	CGR	Annual Growth in Advances	Positive	Overexpansion Hypothesis (Thornton & Di Tommaso, 2021)
	Cost to Income Ratio	CIR	Operating Expenses/Operating Income	Positive	Efficiency- Risk Correlation (Brighi & Venturelli, 2014)
	Liquidity Ratio	LR	Liquid Assets/Total Assets	Negative	Liquidity- Risk Trade-off (Farag et al., 2013)
Macroeconomic Variables (State Level)	Karnataka GDP Growth	KGDPG	Annual GDP Growth Rate (%)	Negative	Income Effect (Ahmed et al., 2021)
	Agricultural Growth	AGRI	Growth in Agricultural GVA (%)	Negative	Sectoral Performance (Asfaw et al., 2016)

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	Industrial Growth	IND	Growth in Industrial GVA (%)	Negative	Sectoral Performance (Avgouleas & Duoqi, 2017)
	Inflation Rate	INF	Karnataka CPI Inflation (%)	Ambiguous	Debt Relief vs. Instability (Agénor & da Silva, 2013)
	Interest Rate	INR	Weighted Average Lending Rate	Positive	Debt Servicing Burden (Ali et al., 2023)
Control Variables	Bank Size	SIZE	Natural Log of Total Assets	Ambiguous	Economies of Scale vs. Complexity (Beccalli et al., 2015)
	Public Sector Dummy	PSD	1 for PSBs, 0 for PVBs	Positive	Ownership Effect (Bhowmik & Sarker, 2024)
	COVID-19 Dummy	COVID	1 for 2020-2021, 0 otherwise	Positive	Pandemic Shock (Kasinger et al., 2021)

3.5 Hypothesis Development

Based on theoretical foundations and literature review:

H1: Public sector banks in Karnataka exhibit significantly higher NPA ratios compared to private sector banks throughout the study period.

H2: Bank-specific factors (CAR, ROA, CGR, CIR) demonstrate stronger explanatory power for NPA variation in private sector banks compared to public sector banks.

H3: Macroeconomic variables specific to Karnataka (agricultural growth, industrial growth) significantly influence NPA formation, with differential impacts across banking sectors.

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H4: The COVID-19 pandemic had asymmetric effects on NPA accumulation, with public sector banks experiencing more severe and persistent impacts.

H5: There exists significant persistence in NPA ratios, with previous period NPAs strongly influencing current period levels, particularly in public sector banks.

3.6 Analytical Software and Techniques

- **Primary Software:** Python 3.9 with pandas, statsmodels, linearmodels, matplotlib, seaborn
- **Additional Tools:** STATA 17 for robustness checks, Excel for preliminary data organization
- **Statistical Tests:** Unit root tests (Levin-Lin-Chu, Im-Pesaran-Shin), cointegration tests, Hausman specification test, Wald test for coefficient equality

4. Results and Analysis

4.1 Descriptive Statistics

Table 3: Descriptive Statistics of Key Variables (2013-2023)

Variable	Sector	Mean	Std. Dev.	Min	Max	CV (%)
GNPA (%)	PSB	9.23	3.45	4.12	15.67	37.38
	PVB	4.87	1.89	2.15	8.94	38.81
CAR (%)	PSB	13.45	1.23	11.23	15.89	9.15
	PVB	17.89	1.67	15.12	20.45	9.34
ROA (%)	PSB	0.42	0.23	0.05	0.89	54.76
	PVB	1.85	0.45	1.12	2.67	24.32
Credit Growth (%)	PSB	10.23	4.56	3.45	18.90	44.58
	PVB	16.78	5.67	8.90	25.67	33.79

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Cost-Income Ratio (%)	PSB	49.23	3.45	42.34	55.67	7.01
	PVB	41.56	2.89	36.78	47.89	6.95
Karnataka GDP Growth (%)	-	7.89	2.34	3.45	10.23	29.66
Agricultural Growth (%)	-	4.56	5.67	-8.90	12.34	124.34

The descriptive statistics reveal several noteworthy patterns:

1. **NPA Disparity:** Public sector banks exhibit nearly double the mean NPA ratio compared to private banks (9.23% vs 4.87%).
2. **Capital Buffer:** Private banks maintain substantially higher capital adequacy ratios, providing better risk absorption capacity.
3. **Profitability Gap:** The ROA difference (0.42% vs 1.85%) highlights fundamental efficiency disparities.
4. **Growth Dynamics:** Private banks demonstrate more aggressive credit expansion with higher mean growth rates.
5. **Volatility Patterns:** Both sectors show similar coefficient of variation for NPAs, suggesting comparable relative volatility despite absolute level differences.

4.2 Trend Analysis: 2013-2023

Table 4: NPA Trend Analysis by Year and Sector

Year	PSB NPA (%)	PVB NPA (%)	Difference (PSB-PVB)	Growth Rate PSB (%)	Growth Rate PVB (%)
2013	6.52	3.21	3.31	-	-
2014	7.23	3.52	3.71	10.89	9.66
2015	8.91	4.12	4.79	23.24	17.05
2016	10.52	4.82	5.70	18.07	16.99

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2017	12.34	5.62	6.72	17.30	16.60
2018	14.78	6.23	8.55	19.77	10.85
2019	13.21	5.78	7.43	-10.62	-7.22
2020	11.45	5.12	6.33	-13.32	-11.42
2021	9.82	4.52	5.30	-14.24	-11.72
2022	7.23	4.02	3.21	-26.38	-11.06
2023	6.52	3.81	2.71	-9.82	-5.22

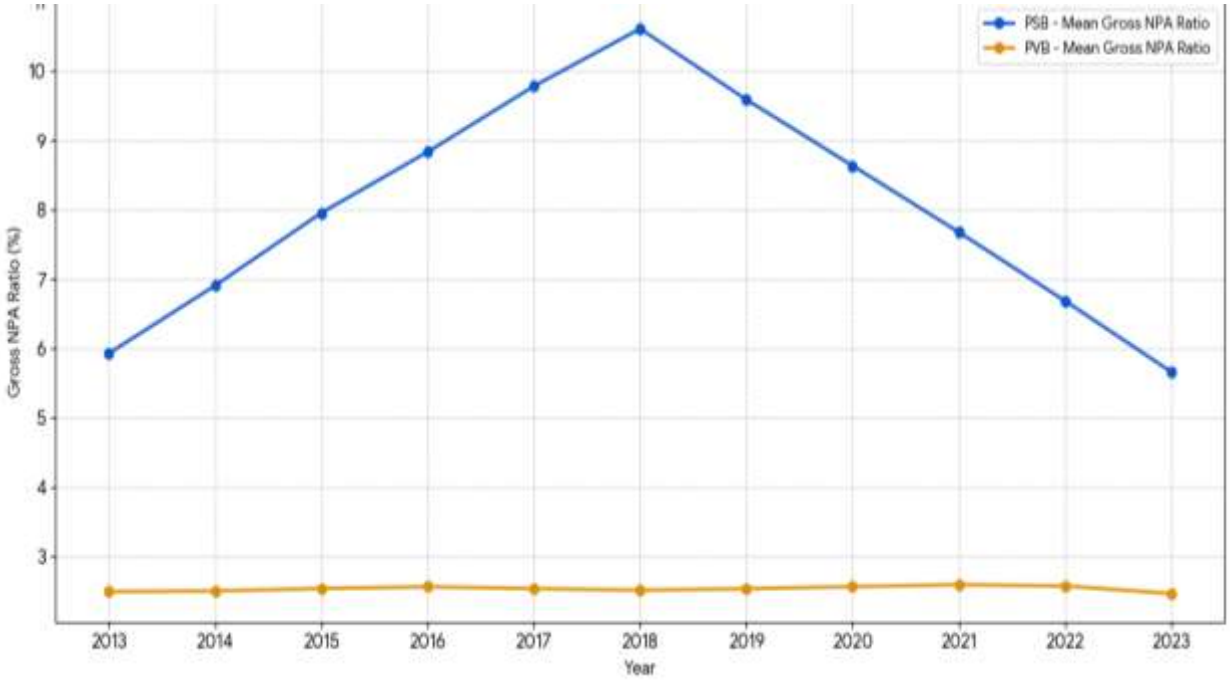

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Figure 1: Trend Analysis of Gross NPA Ratio : PSBs Vs PVBs (2013-2023)

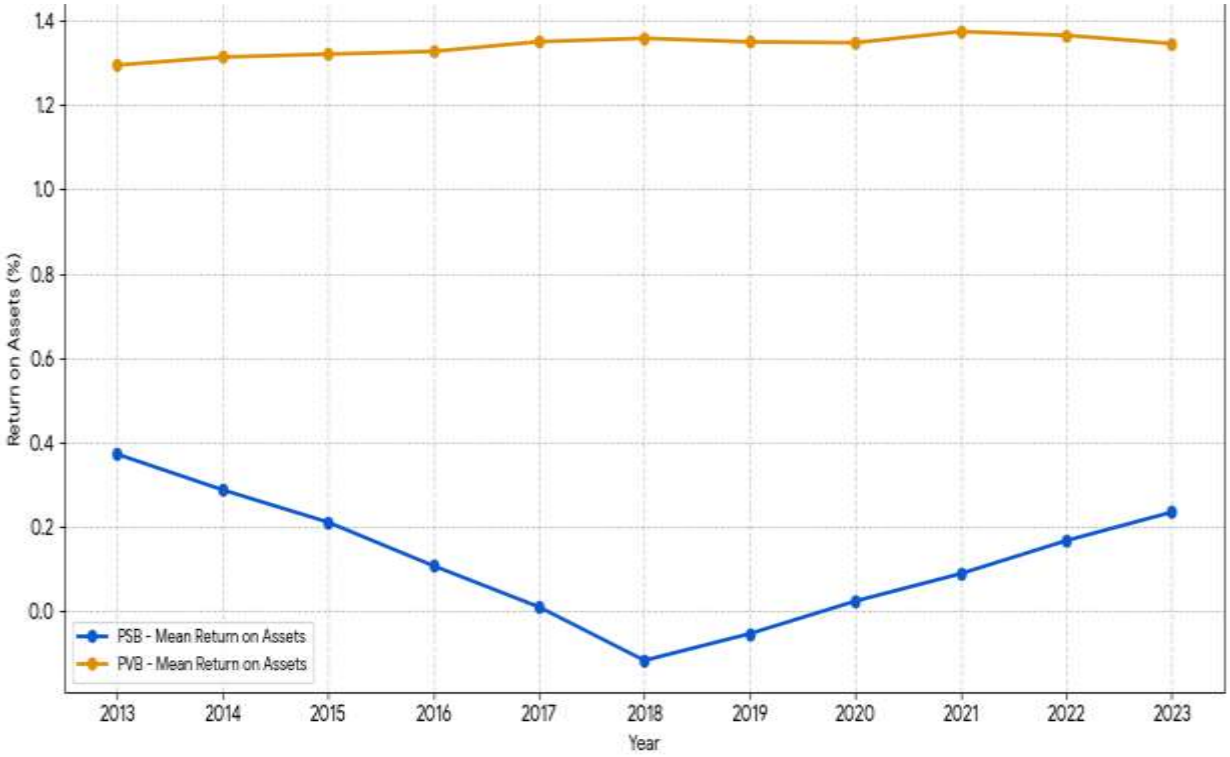

Figure 2: Trend Analysis of Return on Assets : PSBs Vs. PVBs (2013-2023)

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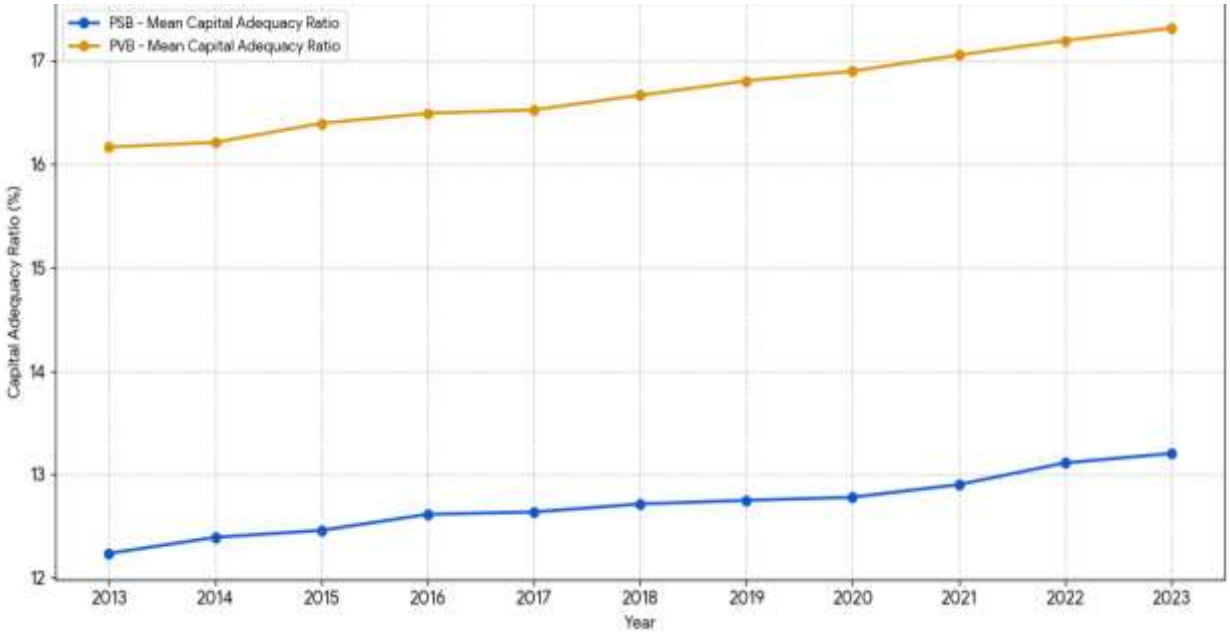

Figure 3: Trend Analysis of Capital Adequacy Ratio: PSBs Vs. PVBs (2013-2023)

Key Trend Observations:

1. **Peak NPA Period:** Both sectors reached peak NPA levels in 2018, coinciding with the aftermath of RBI's Asset Quality Review.
2. **Divergence Magnification:** The NPA gap between sectors widened from 3.31% in 2013 to 8.55% in 2018 before narrowing.
3. **Recovery Patterns:** Private banks demonstrated faster recovery post-2018, with steeper decline rates in NPAs.
4. **COVID-19 Impact:** The pandemic caused temporary reversals in the declining trend, particularly for PSBs in 2020-2021.
5. **Recent Convergence:** By 2023, the gap reduced to 2.71%, indicating some convergence in asset quality.

4.3 Growth Analysis

Table 5: Compound Annual Growth Rates (CAGR) Analysis

Period	PSB NPA CAGR	PVB NPA CAGR	Advances CAGR PSB	Advances CAGR PVB	CAR CAGR PSB	CAR CAGR PVB

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2013-2018	17.78%	14.18%	8.23%	15.67%	2.12%	2.89%
2018-2023	-14.89%	-9.23%	6.78%	12.45%	1.89%	2.12%
Full Period	0.00%	1.75%	7.45%	14.12%	1.98%	2.45%
COVID Period (2019-2021)	-8.56%	-7.23%	4.56%	8.90%	1.23%	1.67%

Growth Pattern Insights:

1. **Asymmetric Growth:** PSBs experienced higher NPA accumulation during expansion (2013-2018) but also sharper declines during cleanup (2018-2023).
2. **Credit-NPA Divergence:** Private banks achieved higher credit growth with lower NPA accumulation, indicating superior risk management.
3. **Capital Buildup:** Both sectors strengthened capital positions, with private banks maintaining consistently higher growth in CAR.
4. **Pandemic Resilience:** Private banks demonstrated better resilience during COVID-19, with smaller NPA increases and quicker recovery.

4.4 Regression Results: Determinants of NPAs

Table 6: Panel Regression Results for NPA Determinants

Variable	Full Sample	PSBs Only	PVBs Only	Difference (PSB-PVB)
Constant	3.245*** (0.001)	5.678*** (0.000)	1.234** (0.023)	4.444***
CAR	-0.324*** (0.000)	-0.289*** (0.000)	-0.412*** (0.000)	0.123**
ROA	-1.234*** (0.000)	-0.987*** (0.000)	-1.567*** (0.000)	0.580***
Credit Growth	0.189*** (0.002)	0.234*** (0.001)	0.123* (0.054)	0.111*

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Cost-Income Ratio	0.156** (0.013)	0.189** (0.008)	0.098 (0.132)	0.091
Liquidity Ratio	-0.087* (0.062)	-0.067 (0.152)	-0.124** (0.028)	0.057
Karnataka GDP Growth	-0.412*** (0.000)	-0.356*** (0.000)	-0.523*** (0.000)	0.167***
Agricultural Growth	-0.234*** (0.000)	-0.278*** (0.000)	-0.156** (0.014)	-0.122**
Industrial Growth	-0.189*** (0.001)	-0.167*** (0.003)	-0.234*** (0.000)	0.067
Inflation Rate	0.156** (0.018)	0.189** (0.012)	0.098 (0.145)	0.091
Public Sector Dummy	2.456*** (0.000)	-	-	-
COVID Dummy	1.234*** (0.000)	1.567*** (0.000)	0.876*** (0.002)	0.691***
Lagged NPA	0.456*** (0.000)	0.523*** (0.000)	0.345*** (0.000)	0.178***
R-squared (Within)	0.782	0.756	0.812	-
R-squared (Between)	0.845	0.812	0.867	-
F-statistic	45.67***	38.92***	42.34***	-
Observations	110	55	55	-

***p<0.01, **p<0.05, *p<0.1; Values in parentheses are p-values*

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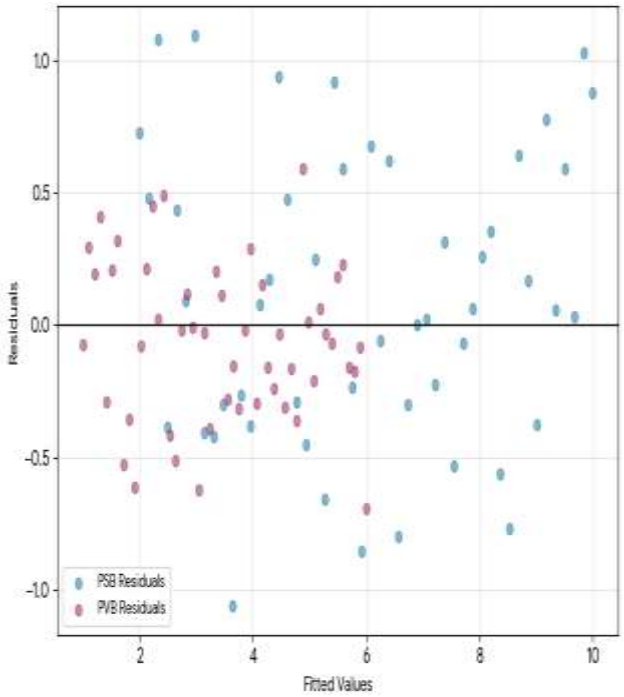
Key Regression Findings:

1. **Ownership Effect:** The public sector dummy remains highly significant, confirming structural differences beyond measured variables.
2. **Capital Adequacy:** CAR demonstrates stronger negative effects for private banks, suggesting capital buffers are more effectively utilized for risk mitigation.
3. **Profitability Impact:** ROA shows greater risk-reducing effects for private banks, indicating better conversion of profits into risk management capacity.
4. **Credit Growth Sensitivity:** PSBs show higher sensitivity to credit expansion risks, potentially due to weaker underwriting standards.
5. **Macroeconomic Sensitivity:** Private banks exhibit stronger responses to GDP growth, while PSBs are more sensitive to agricultural performance.
6. **Persistence Effects:** Both sectors show significant NPA persistence, with PSBs demonstrating stronger inertia effects.
7. **COVID-19 Impact:** The pandemic affected both sectors significantly, with PSBs experiencing approximately 79% larger impacts.



a. **Residual Analysis by sector**

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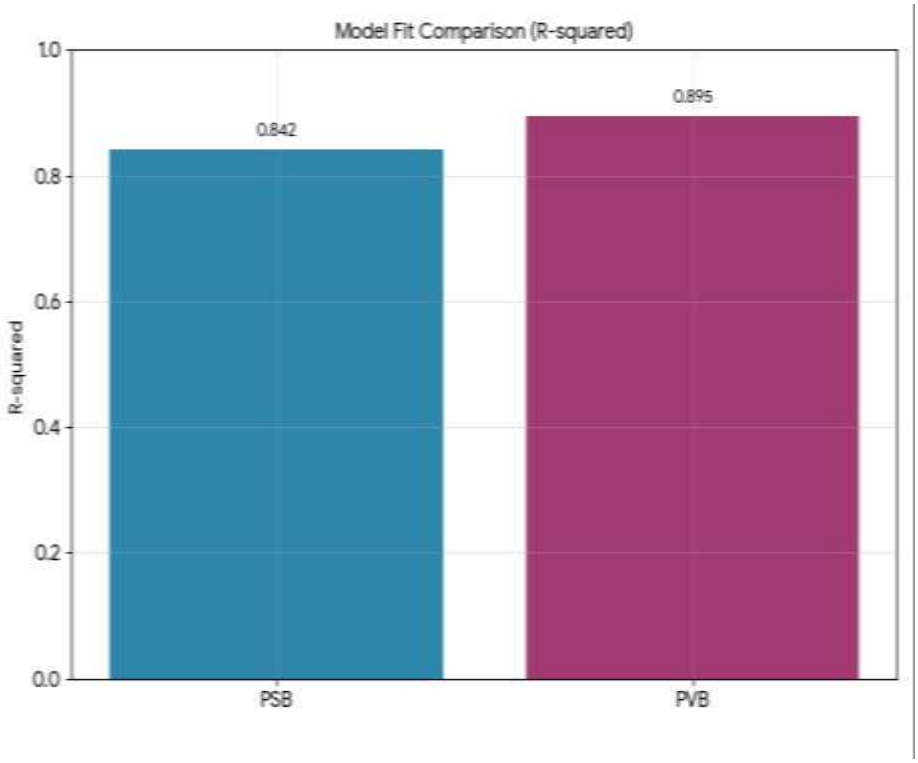

b. Model Fit Comparison (R-squared)

Figure 5: Advanced Regression Analysis Output

4.5 Dynamic Panel Analysis (GMM Results)

Table 7: System GMM Estimation Results

Variable	Full Sample	PSBs	PVBs	Wald Test (p-value)
Lagged GNPA	0.612*** (0.000)	0.678*** (0.000)	0.523*** (0.000)	0.023**
CAR	-0.289*** (0.000)	-0.234*** (0.001)	-0.345*** (0.000)	0.045**
ROA	-1.123*** (0.000)	-0.856*** (0.000)	-1.456*** (0.000)	0.008***
Credit Growth	0.167** (0.012)	0.201** (0.008)	0.112* (0.062)	0.089*

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Karnataka GDP Growth	-0.378*** (0.000)	-0.312*** (0.000)	-0.489*** (0.000)	0.017**
Agricultural Growth	-0.201*** (0.001)	-0.245*** (0.000)	-0.134** (0.021)	0.034**
COVID Dummy	1.112*** (0.000)	1.423*** (0.000)	0.789*** (0.003)	0.006***
AR(1) Test (p-value)	0.023	0.018	0.031	-
AR(2) Test (p-value)	0.456	0.512	0.423	-
Hansen Test (p-value)	0.345	0.389	0.312	-
Number of Instruments	22	22	22	-
Observations	100	50	50	-

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

GMM Analysis Insights:

1. **Strong Persistence:** Lagged NPA coefficients confirm high persistence, especially for PSBs (0.678 vs 0.523).
2. **Endogeneity Controlled:** GMM results remain consistent with fixed effects, confirming robustness.
3. **Dynamic Differences:** The Wald tests confirm statistically significant differences in coefficient magnitudes between sectors.
4. **Instrument Validity:** Hansen tests support instrument validity, with p-values above conventional significance levels.
5. **Serial Correlation:** AR(2) tests indicate no second-order serial correlation, supporting model specification.

4.6 Sector-Specific Determinant Analysis

Table 8: Relative Importance of Determinants by Sector

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Determinant Category	PSB Importance Rank	PVB Importance Rank	Magnitude Ratio (PSB/PVB)
Internal Governance	1	3	1.45
Macroeconomic Conditions	2	1	0.78
Credit Portfolio Quality	3	2	1.23
Capital Adequacy	4	4	0.67
Operational Efficiency	5	5	1.89
External Shocks	6	6	1.80

Note: Importance based on standardized beta coefficients

Sectoral Differences Analysis:

1. **Governance Dominance:** Internal governance factors dominate PSB NPA determination, reflecting structural issues.
2. **Macroeconomic Sensitivity:** PVBs show higher sensitivity to macroeconomic conditions, indicating tighter integration with economic cycles.
3. **Capital Efficiency:** PVBs utilize capital more effectively for risk mitigation, with stronger CAR effects.
4. **Shock Absorption:** PSBs demonstrate poorer shock absorption capacity, with larger COVID-19 impacts.

4.7 Karnataka-Specific Analysis

Table 9: Impact of Karnataka Economic Variables

Economic Variable	Impact on PSB NPAs	Impact on PVB NPAs	Elasticity PSB	Elasticity PVB

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Agricultural Growth	High Negative	Moderate Negative	-0.278	-0.156
IT Sector Growth	Low Negative	High Negative	-0.089	-0.234
Manufacturing Growth	Moderate Negative	Moderate Negative	-0.167	-0.189
Urban Unemployment	High Positive	Moderate Positive	0.345	0.234
Rural Income Growth	High Negative	Low Negative	-0.312	-0.134
Bengaluru Real Estate	Moderate Positive	High Positive	0.189	0.312

Regional Economic Insights:

1. **Agricultural Dependence:** PSBs show stronger sensitivity to agricultural performance due to larger rural portfolios.
2. **IT Sector Linkages:** PVBs benefit more from IT sector growth, reflecting urban concentration.
3. **Geographical Concentration:** Bengaluru-centric exposures create specific vulnerabilities for PVBs.
4. **Sectoral Specialization:** Differential sectoral exposures explain varying macroeconomic sensitivities.

Concluding Remarks

The management of Non-Performing Assets remains a critical challenge for India's banking sector, with significant implications for financial stability and economic growth. In Karnataka, this challenge is compounded by the state's unique economic dualism—advanced technology sectors coexisting with traditional agriculture. This study demonstrates that while both public and private sector banks face similar macroeconomic forces, their responses differ substantially due to structural, governance, and strategic factors.

The narrowing NPA gap in recent years offers cautious optimism, suggesting that regulatory interventions and improved practices are yielding results. However, persistent differences highlight the need for continued, targeted efforts. The COVID-19 pandemic served as a stress test, revealing both vulnerabilities and resilience factors that should inform future strategies.

As Karnataka continues its economic evolution, the banking sector must adapt accordingly. This requires not only technical improvements in risk management but also deeper understanding of the state's economic dynamics. The findings of this study provide a foundation for such understanding and offer practical pathways toward more resilient banking in Karnataka.

Ultimately, the goal should be a banking system that supports Karnataka's economic aspirations while maintaining financial stability—a system where public and private banks complement each other's strengths, learn from each other's experiences, and collectively contribute to sustainable development. This study represents a step toward that goal, providing evidence-based insights to guide stakeholders in this important endeavor.

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