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Impact Of Non-Performing Assets On The Profitability Of Banks (A Comparative Study Of Public & Private Sector Bank)

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Abstract
This paper analyses the impact of Non-Performing Assets (NPAs) on the profitability of two major Indian Scheduled Commercial Banks: State Bank of India (SBI) and Bank of Baroda. Non-Performing Assets (NPAs) have emerged as one of the critical challenges affecting the stability and profitability of the Indian banking sector. Scheduled Commercial Banks, particularly public sector institutions such as the State Bank of India (SBI) and Bank of Baroda (BoB), have witnessed significant fluctuations in asset quality over the past decade. This study provides an analytical perspective on the relationship between rising NPAs and the overall profitability of these two leading public sector banks. Using secondary data from financial statements, RBI reports, and related policy documents, the paper evaluates how increased provisioning requirements, declining interest income, and impaired asset recovery processes directly impact profitability indicators such as Return on Assets (ROA) and Net Interest Margin (NIM). Additionally, the paper explores structural and regulatory measures introduced to mitigate the adverse effects of NPAs, including Insolvency and Bankruptcy Code (IBC) and asset reconstruction mechanisms. Comparative analysis of SBI and BoB highlights broader trends in public sector banks' risk management practices and resilience to credit stress. The findings suggest that while both banks remain pivotal in driving economic growth, sustainable profitability depends on strengthening credit appraisal processes and adopting proactive measures for risk mitigation.

Keywords: *Non-Performing Assets; Impact of NPA on Profitability; Public Sector Bank; and Private Sector Bank*

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I. Introduction

The stability and efficiency of a nation's banking sector, particularly its Scheduled Commercial Banks (SCBs), play a pivotal role in ensuring sustainable economic growth and stability. In the Indian context, SCBs, including major institutions such as the State Bank of India (SBI) and Bank of Baroda, have consistently grappled with the challenge of managing and mitigating the adverse effects of non-performing assets (NPAs). NPAs refer to loans or advances that no longer generate income for banks due to borrower default. Their persistence adversely affects profitability, erodes asset quality, and undermines the long-term sustainability of banks. Scheduled banks are defined under the Second Schedule of the Reserve Bank of India (RBI) Act, 1934, and include both Scheduled Commercial Banks and Scheduled Cooperative Banks. The SCBs in India are further categorized into six distinct groups on the basis of ownership and operational framework: public sector banks, private sector banks, foreign banks, regional rural banks, small finance banks, and payments banks. Reliable sources such as the RBI's *Statistical Tables Relating to Banks in India* provide critical datasets for examining the performance of these institutions. For instance, comprehensive data covering 40 SCBs and 21 public sector banks for the period 2005–06 to 2018–19 has been utilized in several analyses.

Historical Evolution of the Indian Banking Sector

The development of India's banking sector can be understood in three distinct phases. The first phase (1770–1969) marked the early evolution of modern banking institutions, beginning with the establishment of the Bank of Hindustan in 1770, followed by the General Bank of India in 1786, which failed in 1791. During the colonial period, the East India Company promoted institutional banking by founding the Presidency Banks: the Bank of Bengal (1806), the Bank of Bombay (1840), and the Bank of Madras (1843). These were later

amalgamated in 1921 to form the Imperial Bank of India, a private entity largely owned by European shareholders. The second phase (1969–1991) was characterized by nationalization of banks, beginning in 1969, which expanded the reach of banking services and aligned credit distribution with developmental and social objectives. The third phase, post-1991, marked the era of liberalization and financial reforms, which introduced competition, modernized operations, and integrated Indian banks more closely with global financial systems.

Performance of Scheduled Commercial Banks

In recent years, SCBs have demonstrated improved performance. During the fiscal year 2022–23, their aggregate balance sheet grew by 12.2%, the highest in nine years, largely driven by credit growth in retail and services sectors. Asset quality also improved significantly, with the Gross NPA ratio declining to 3.9% in March 2023 and further reducing to 3.2% by September 2023. Strengthening capital buffers and removal of banks from the Prompt Corrective Action (PCA) framework further underscored the enhanced resilience of the sector.

Asset Classification and NPA Norms

The RBI prescribes detailed norms for asset classification, which serve as a foundation for assessing bank performance.

- Standard Assets: Loans with no default risk beyond normal business fluctuations. Banks are required to provision 0.25% against such assets.
- Substandard Assets: Assets that remain non-performing for up to 12 months, requiring 10% provisioning.
- Doubtful Assets: Loans that remain NPAs for more than 12 months. Provisioning requirements vary: up to one year (20% secured, 100% unsecured), one to three years (30% secured, 100% unsecured), and beyond three years (100% on both secured and unsecured components).
- Loss Assets: Loans identified as irrecoverable, requiring 100% provisioning on all outstanding amounts.

Trends in Non-Performing Assets

A closer examination of NPAs highlights improvement in asset quality across bank groups. Public sector banks significantly reduced their Gross NPA ratio from 7.3% to 5.0% in recent years, indicating better management of stressed assets. Nevertheless, India's GNPA levels remain higher than Net NPAs (NNPAs), and both are elevated when compared to other Asian economies and the United States. The persistence of elevated NPAs in India has historically been linked to structural challenges, including limited legal mechanisms for foreclosure and bankruptcy prior to recent reforms, protracted legal proceedings, sticky loans to public sector undertakings, loan waiver schemes, and mandated priority sector lending. This analysis demonstrates how NPAs continue to be a critical determinant of financial stability in India, even as systemic reforms and prudent regulations have begun to strengthen the overall health of Scheduled Commercial Banks.

II. Literature Review

Multiple studies establish a statistically significant, negative relationship between NPAs and bank profitability. NPAs have been shown to lower both Return on Assets (ROA) and Return on Equity (ROE), with larger impacts noted in public sector banks. Studies on SBI found that, even amid periods of rising NPAs, strict recovery policies and credit appraisal standards helped mitigate losses. In Bank of Baroda, provision costs sharply diminished profits, with several years of net losses during high-NPA periods.

Over the past two decades, the escalating volume of non-performing assets (NPAs) has been a critical concern for the Indian banking sector, notably impacting the profitability of Scheduled Commercial Banks like State Bank of India (SBI) and Bank of Baroda (BOB).

Das and Utpal (2021) found through empirical analysis that rising NPAs significantly reduce banks' return on assets (ROA), affirming the importance of effective asset quality management. Similarly.

Bawa, Goyal, and Basu (2019) observed a strong negative correlation between NPA levels and profitability indicators, indicating that elevated NPAs erode banks' financial performance.

Bepari and Sarkar (2020) demonstrated, through a comparative study of public and private sector banks, that NPAs have a more pronounced negative influence on profitability in public sector institutions, emphasizing the acute challenges for SBI and BOB.

Dudhe (2017) analyzed seven major public sector banks over nearly a decade and confirmed that except for SBI and PNB, all other banks exhibited a significant negative link between gross NPAs and net profits. Furthermore, Karunakar et al. (2008) discussed how ineffective credit risk management and policy implementation exacerbate the NPA issue, directly impacting operational efficiency and profits.

Kaur and Basu (2016) undertook a panel data study of 46 Indian banks, discovering that key ratios related to credit quality, liquidity, and solvency are strongly connected to changes in bank profitability.

K. Rath, and Samantaraya (2015) found that while NPAs and wage bills detract from profitability, effective control of operational efficiency and net interest margins can partially offset these losses. Islam and Nishiyama (2016), in a regional South Asian analysis, further corroborated the robust negative association between non-performing loans and bank profitability, suggesting that the NPA problem is not unique to India but more acute in its public sector banks. Martin (1977) provided early evidence from the US context, establishing that growing NPA ratios are an early warning indicator for bank earnings decline.

More recent Indian evidence from **Shivani Mohan (2022)** emphasizes that higher NPAs minimize interest income and erode bank capital, causing persistent downward pressure on ROA and return on equity (ROE). Rajaraman and Vashishtha (2002) used fixed effects panel regression to show that within Indian PSBs, heterogeneity in NPA trends can be attributed to both operational efficiency weaknesses and broader structural issues.

Raju (2019) and Ray Chaudhuri (2018) have highlighted how asset quality review exercises (AQR) since 2015 have revealed a sharp upsurge in NPAs, especially in SBI and BoB, resulting in corrective provisioning norms that further eat into profits. The study by Pandya (2015) suggested that regulatory-driven priority sector lending does not significantly impact profitability, but rising provisioning due to NPAs does.

Arora and Ostwal (2014) revealed that public sector banks and financial institutions exhibit higher levels of non-performing assets (NPAs) when compared to their private sector counterparts. This conclusion was drawn through the application of a multiple regression model.

Das and Ghosh (2006) utilized data envelopment analysis (DEA) and found that medium-sized public sector banks often operate at higher technical efficiency and generally maintain lower NPAs, further supporting the need for size optimization in PSBs. Sensarma (2006) extended the analysis, indicating that new private sector banks are more cost-efficient than public sector counterparts, with PSBs suffering higher productivity losses due to persistent NPA issues.

Recent studies by Sikdar (2020) and Economic Survey (Union Budget, 2014) reinforce the narrative that, despite regulatory reforms such as the introduction of the Insolvency and Bankruptcy Code (IBC), the NPA problem remains entrenched in India's largest banks. Ultimately, as highlighted by recent RBI data and policy documents, improved governance, technological upgrades, and prudent lending practices are essential for sustainable profitability in PSBs, particularly for SBI and BOB.

III. Research Methodology

Importance of the study:

This research investigates the critical relationship between non-performing assets (NPAs) and profitability in India's major Commercial Banks, specifically State Bank of India, Bank of Baroda, ICICI Bank and HDFC Bank. These institutions serve as fundamental pillars of India's financial architecture, playing essential roles in economic development and credit intermediation. The study's significance lies in addressing the escalating NPA burden that threatens banking sector stability, capital adequacy, and operational efficiency. Rising NPAs directly impair profitability through reduced interest income, increased provisioning requirements, and elevated funding costs, particularly affecting public sector banks where NPA levels have historically exceeded international benchmarks. Examining key profitability indicators—Return on Assets (ROA) and Return on Equity (ROE)—provides essential insights into institutional performance and management effectiveness in navigating asset quality challenges. This analysis enables stakeholders, including regulators, policymakers, and bank management, to develop informed strategies for enhancing performance and ensuring systemic stability. The research is particularly relevant given recent regulatory interventions, including the Reserve Bank of India's Asset Quality Review and implementation of the Insolvency and Bankruptcy Code. Understanding the NPA-profitability nexus contributes to broader discourse on banking resilience and its macroeconomic implications, facilitating sustained credit growth and supporting overall economic expansion.

Scope of the study:

Combining bank non-performing assets is one aspect of the investigation. (both public and pvt) that conduct business in India. The literature study shows that there are very few studies where both the NPA's effect on profitability and the influence of significant financial leaders on NPA have both been studied. Therefore, understanding these facets of NPAs in banks becomes crucial.

Objectives

1. To examine the historical and current trends of NPAs in SBI and Bank of Baroda.
2. To study the relationship between NPAs and profitability indicators (ROA, ROE, Net Interest Margin).
3. To present a comparative analysis of SBI and Bank of Baroda.
4. To analyze the effectiveness of institutional responses and policy measures

Hypothesis

H0: Bank`s profitability is not significantly affected by non-performing assets.
H1: There is insignificant impact of the NPAs on banks of financial heads.

Data Collection & Statistical Tools

This investigation employs a comprehensive secondary data methodology covering the period 2015–2025. Data sources include annual reports of the State Bank of India and Bank of Baroda, ICICI Bank, HDFC Bank and Reserve Bank of India statistical bulletins, Ministry of Finance publications, peer-reviewed academic journals, and credible financial reports. The analytical framework incorporates dependent and independent variables to examine the NPA-profitability relationship. Dependent variables comprise profitability metrics—Return on Assets (ROA), Return on Equity (ROE), and Net Profit (NP)—while independent variables include Non-Performing Asset ratios measured through Net NPA to Net Advances ratios. Control variables such as advances growth rates, provision coverage ratios, and macroeconomic indicators enhance model robustness. Statistical analysis employs correlation analysis and comparative trend analysis to quantify relationships between NPAs and profitability indicators. The methodology incorporates ANOVA tests. The research design ensures methodological rigor through triangulation of multiple data sources and statistical validation techniques, providing comprehensive insights into banking sector performance dynamics.

IV. Data Analysis And Interpretation:

Data analysis and interpretation involve systematically examining collected data using statistical or analytical techniques to identify patterns, relationships, and trends. It aims to transform raw information into meaningful insights. Interpretation connects findings with research objectives, enabling informed conclusions, theoretical validation, and practical implications within the academic and professional context. Following data such as Net Profits; Non-performing assets; and Total Assets have been collected from the annual reports of the selected bank which are analysed in the following tables:

Table No. 01: Net Profits of Selected Bank (Rs. in Crore)

Date	State Bank of India	Bank of Baroda	ICICI Bank	HDFC Bank
2015-16	9,950.65	-5,395.54	9,726.29	12,296.21
2016-17	10,484.10	1,383.14	9,801.09	14,549.64
2017-18	-6,547.45	-2,431.81	6,777.42	17,486.73
2018-19	862.23	433.52	3,363.30	21,078.17
2019-20	14,488.11	546.19	7,930.81	26,257.32
2020-21	20,410.47	828.95	**16,192.68**	31,116.53
2021-22	31,675.98	7,272.28	**23,339.49**	36,961.33
2022-23	50,232.45	14,109.62	**31,896.50**	44,108.71
2023-24	61,076.62	17,788.78	**40,888.27**	60,812.27
2024-25	70,900.63	19,581.15	**47,226.99**	**67,347.36**
Average	**26,353.38**	**5,411.63**	**19,714.28**	**33,201.43**
SD	**26284.66**	**8800.79**	**15459.03**	**19127.70**
CV	**99.74**	**162.63**	**78.42**	**57.61**

Source: Annual Reports of Selected Banks from 2015-16 to 2024-25 and computed with SPSS23

The data on net profits of the selected Indian banks from 2015-16 to 2024-25 reveals substantial differences in financial performance and consistency among State Bank of India (SBI), Bank of Baroda, ICICI Bank, and HDFC Bank is shown in Table No. 1. Notably, HDFC Bank demonstrates the highest average net profit (₹33,201.43 crore) and comparatively low variability (CV: 57.61), indicating steady and robust profitability over the period. In contrast, Bank of Baroda shows both the lowest average net profit (₹5,411.63 crore) and the highest coefficient of variation (CV: 162.63), reflecting significant fluctuations and more volatile profitability, including years of negative profits. SBI, despite being a large public sector bank, experienced periods of negative profits, especially in 2017-18, and reveals considerable variability (CV: 99.74). Its large standard deviation (SD: 26,284.66) underscores inconsistent performance, although net profit improved sharply in recent years. ICICI Bank exhibits moderate growth in net profits with an average of ₹19,714.28 crore and a coefficient of variation that denotes moderately stable returns (CV: 78.42). Overall, the data underscores that private sector banks, especially HDFC and ICICI, have outperformed public sector counterparts not only in net profit growth but also

in maintaining greater profit stability, as evidenced by lower coefficients of variation. These results highlight both sectoral and managerial differences influencing the financial health and consistency of leading Indian banks over the decade.

Table No. 02: Non-Performing Assets of Selected Bank (Rs. in Crore)

Date	State Bank of India	Bank of Baroda	ICICI Bank	HDFC Bank
2015-16	55,807.02	19,046.46	12,963.08	1,320.37
2016-17	58,277.38	18,080.00	25,216.81	1,843.99
2017-18	110,854.70	23,483.00	27,823.56	2,601.02
2018-19	65,894.74	15,609.50	13,449.72	3,214.52
2019-20	51,871.30	21,576.60	9,923.24	3,542.36
2020-21	36,809.72	21,800.00	9,117.66	4,554.82
2021-22	27,965.71	13,364.64	6,931.04	4,407.68
2022-23	21,466.64	8,384.00	51,500.70	4,368.43
2023-24	21,051.08	7,213.34	5,377.79	8,091.74
2024-25	19,666.92	6,994.00	5,589.00	11,320.43
Average	**46,966.52**	**15,555.15**	**16,789.26**	**4,526.54**
SD	**28287.09**	**6287.35**	**14461.84**	**3032.80**
CV	**60.23**	**40.42**	**86.14**	**67.00**

Source: Annual Reports of Selected Banks from 2015-16 to 2024-25 and computed with SPSS23

The data on non-performing assets (NPAs) for the selected banks from 2015-16 to 2024-25 highlights significant contrasts in asset quality management between public and private sector banks is shown in Table No. 2. State Bank of India (SBI) consistently exhibited the highest average NPAs (₹46,966.52 crore), with marked volatility, as seen from its high standard deviation and coefficient of variation (CV: 60.23). Bank of Baroda (BOB), though lower in average NPAs (₹15,555.15 crore) compared to SBI, also faced substantial fluctuations but with relatively more control (CV: 40.42). ICICI Bank experienced spikes, especially in 2017-18 and 2022-23, pushing its CV to 86.14, indicating less consistent asset quality management. In contrast, HDFC Bank maintained the lowest average NPAs (₹4,526.54 crore) among the four, reflecting effective credit assessment and recovery mechanisms, despite a slight increase in recent years. Across the decade, public sector banks like SBI and BOB have struggled more with NPA control than private sector leaders, largely due to legacy loans and slower recovery processes. Meanwhile, private sector banks, especially HDFC, showcased superior NPA management, aided by technological advancements, stricter risk evaluation, and diversified lending portfolios. These trends underscore the persistent asset quality challenges for public sector banks and the stronger adaptability and recovery of private sector counterparts.

Table No. 03: NPA to Net Profits Ratio of Selected Bank (Percentage)

Date	State Bank of India	Bank of Baroda	ICICI Bank	HDFC Bank
2015-16	560.84	-353.00	133.28	10.74
2016-17	555.86	1,307.17	257.29	12.67
2017-18	-1,693.10	-965.66	410.53	14.87
2018-19	7,642.36	3,600.64	399.90	15.25
2019-20	358.03	3,950.38	125.12	13.49
2020-21	180.35	2,629.82	56.69	14.64
2021-22	88.29	183.78	29.82	11.93
2022-23	42.73	59.42	16.16	9.90
2023-24	34.47	40.55	13.15	13.31
2024-25	27.74	35.72	11.83	16.81
Average	**779.76**	**1048.88**	**145.38**	**13.36**
SD	**2494.17**	**1741.35**	**156.85**	**2.13**
CV	**319.86**	**166.02**	**107.89**	**15.93**

Source: Computed with the help of Table 01 and 02 in SPSS 23

The analysis of the NPA to Net Profits Ratio for selected banks reveals considerable variation in mean, standard deviation (SD), and coefficient of variation (CV) across four banks from 2015-16 to 2024-25 is shown in Table No. 3. State Bank of India (SBI) holds the highest average ratio (779.76%) with a very high SD of 2494.17, resulting in a CV of 319.86%, indicating extreme volatility and inconsistent asset quality relative to profitability. Bank of Baroda shows an even higher mean (1048.88%) with a slightly lower SD (1741.35) but still significant variability, reflected in a CV of 166.02%. ICICI Bank presents a lower mean (145.38%) with an SD of 156.85 and a CV of 107.89%, suggesting moderate fluctuations but less extreme than the public sector peers. HDFC Bank demonstrates the lowest mean ratio (13.36%) and SD (2.13), with the CV at 15.93%, indicating stable and consistent performance relative to NPAs. Overall, public sector banks show greater instability in NPA impact on net profits, whereas private sector banks reflect steadier, more controlled risk management in this ratio.

Testing of Hypothesis No. 1

Table 04: Correlation Analysis

Bank	SBI	BOB	ICICI	HDFC
SBI	1.000			
BOB	0.599	1.000		
ICICI	0.427	0.187	1.000	
HDFC	0.212	0.267	0.292	1.000

Source: Computed with the help of Table 06 in SPSS 23

The correlation matrix illustrates in Table No. 04 shown the degree of association between the NPAs of the selected banks. The State Bank of India (SBI) shows the strongest correlation with Bank of Baroda (BOB) at 0.599, reflecting a notable similarity in their asset quality performance. A moderate positive correlation exists between SBI and ICICI (0.427), whereas the relationship between SBI and HDFC (0.212) is relatively weak. BOB demonstrates only minor correlations with ICICI (0.187) and HDFC (0.267), indicating limited co-movement. ICICI and HDFC exhibit a modest correlation of 0.292. Overall, the findings suggest stronger linkages among public sector banks compared to private banks.

Table 05: Anova Test

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	7420705.824	3	2473568.608	1.066	.375
Within Groups	83499857.942	36	2319440.498		
Total	90920563.766	39			

Source: Computed with the help of Table 06 in SPSS 23

Result of Hypothesis 1

The ANOVA test results presented in Table No. 05 shown assess the variations in NPA levels across the selected banks. The between-groups sum of squares is 7,420,705.824 with a mean square of 2,473,568.608, while the within-groups value is much larger at 83,499,857.942 with a mean square of 2,319,440.498. The calculated F-value is 1.066 with a significance level of 0.375, which is above the conventional threshold of 0.05. This indicates that there is no statistically significant difference in the NPA variations among the banks, implying their performance in terms of NPAs does not differ significantly during the observed period.

Table No. 06: Total Advances of Selected Bank (Rs. in Crore)

Date	State Bank of India	Bank of Baroda	ICICI Bank	HDFC Bank
2015-16	1,463,700.42	383,770.18	435,263.94	464,593.96
2016-17	1,571,078.38	383,259.22	464,232.08	554,568.20
2017-18	1,934,880.19	427,431.83	512,395.29	658,333.09
2018-19	2,185,876.92	468,818.74	586,646.58	819,401.22
2019-20	2,325,289.56	690,120.73	645,289.97	993,702.88
2020-21	2,449,497.79	706,300.51	733,729.09	1,132,836.63
2021-22	2,733,966.59	777,155.18	859,020.44	1,368,820.93
2022-23	3,199,269.30	940,998.27	1,019,638.31	1,600,585.90
2023-24	3,703,970.85	1,065,781.72	1,184,406.39	2,484,861.52
2024-25	4,163,312.10	1,209,557.90	1,341,766.16	2,619,608.62
Average	**2,573,084.21**	**705,319.43**	**778,238.83**	**1,269,731.30**
SD	**887842.45**	**295408.78**	**314572.62**	**763706.96**
CV	**34.50**	**41.88**	**40.42**	**60.15**

Source: Computed with the help of Table 03 in SPSS 23

The Total Advances data from 2015-16 to 2024-25 across four banks reveals significant growth trends with varying volatility is shown in Table No. 06. State Bank of India (SBI) exhibits the highest average advances of Rs. 2,573,084.21 crore and considerable variability, reflected in a standard deviation (SD) of 887,842.45 crore and a coefficient of variation (CV) of 34.50%, indicating stable but large-scale growth. Bank of Baroda and ICICI Bank show average advances of Rs. 705,319.43 crore and Rs. 778,238.83 crore, respectively, with similar SDs around 295,000-315,000 crore and CVs near 40%, suggesting moderate relative variability amid steady growth. HDFC Bank stands out with the highest average advances (Rs. 1,269,731.30 crore) but also the highest relative volatility, with a CV of 60.15% due to its SD of 763,706.96 crore. Overall, all banks have steadily increased their advances over the decade, but HDFC's advances show greater proportionate fluctuations, while SBI leads in absolute advance size with moderate variability. This reflects expanding credit portfolios with differing risk and growth dynamics by bank type.

Table No. 07: NPA to Total assets Ratio of Selected Bank (Percentage)

Date	State Bank of India	Bank of Baroda	ICICI Bank	HDFC Bank
2015-16	3.81	4.96	2.98	0.28
2016-17	3.71	4.72	5.43	0.33
2017-18	5.73	5.49	5.43	0.40
2018-19	3.01	3.33	2.29	0.39
2019-20	2.23	3.13	1.54	0.36
2020-21	1.50	3.09	1.24	0.40
2021-22	1.02	1.72	0.81	0.32
2022-23	0.67	0.89	5.05	0.27
2023-24	0.57	0.68	0.45	0.33
2024-25	0.47	0.58	0.42	0.43
Average	**2.27**	**2.86**	**2.56**	**0.35**
SD	**1.76**	**1.83**	**2.05**	**0.05**
CV	**77.37**	**64.14**	**79.93**	**15.34**

Computed with the help of Table 02 and Table No. 06 in SPSS 23

The NPA to Total Assets ratio shown in Table No. 07 for the selected banks from 2015-16 to 2024-25 reflects significant differences in asset quality management between public and private sector banks. State Bank of India (SBI) and Bank of Baroda (BOB) exhibit higher average ratios of 2.27% and 2.86%, respectively, indicating a relatively larger proportion of their assets are non-performing. ICICI Bank shows an average ratio of 2.56%, with notable variability driven by spikes in certain years. In stark contrast, HDFC Bank consistently maintains a very low average NPA ratio of 0.35%, showcasing superior credit risk management and asset quality. The high coefficients of variation (around 77-80%) for SBI, BOB, and ICICI imply substantial fluctuations in their asset quality across years, raising concerns about exposure to credit risks and potential financial instability. Meanwhile, HDFC's low variability (CV: 15.34) confirms consistent control over NPAs. Higher NPA ratios suggest deteriorating asset health, impacting banks' profitability, capital adequacy, and lending capacity. Thus, the data underlines that private sector banks, especially HDFC, maintain healthier loan portfolios, while public sector banks face ongoing challenges with fluctuating and elevated NPA levels.

Testing of Hypothesis No. 02

Table 08: Correlation Analysis

Bank	SBI	BOB	ICICI	HDFC
SBI	1			
BOB	0.949921	1		
ICICI	0.654147	0.580407	1	
HDFC	0.096945	0.037486	-0.30817	1

Source: Computed with the help of Table 06 in SPSS 23

The correlation analysis presented in Table 08 reveals a strong positive relationship between SBI and Bank of Baroda (0.95), suggesting these public sector banks follow similar performance trends. ICICI Bank shows moderate positive correlation with SBI (0.65) and BOB (0.58), indicating some aligned movement, but not as pronounced. HDFC Bank, however, displays very weak or negative correlations with the others—especially a slight negative value with ICICI (-0.31)—highlighting that its performance trends are largely independent, likely due to differing strategies and market focus.

Table 09: Anova Test

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	38.486	3	12.829	4.816	.006
Within Groups	95.902	36	2.664		
Total	134.388	39			

Result of Hypothesis no. 02:

The ANOVA test results in Table 09 demonstrate that there is a statistically significant difference in the means across the groups being compared, as indicated by the F-value of 4.816 and a significance (p) value of 0.006, which is well below the conventional threshold of 0.05. This low significance value leads to the rejection of the null hypothesis, confirming that not all group means are equal. In the context of banking data, this suggests that at least one bank's performance metric—such as profitability or asset quality—differs meaningfully from the others, reflecting distinct operational outcomes or business strategies among the institutions analyzed.

V. Conclusion:

The comprehensive analysis of Non-Performing Assets (NPAs) and their impact on the profitability of selected public and private sector banks reveals significant variations and evolving trends in the Indian banking landscape from 2015-16 to 2024-25. The study establishes that NPAs constitute a critical determinant of banking performance, with pronounced differences between institutional categories and operational strategies.

SBI exhibited the highest average NPAs (₹46,966.52 crore) with extreme fluctuations, while Bank of Baroda, despite lower absolute values, showed considerable instability reflected in high coefficient of variation measures. This contrasts sharply with private sector banks, especially HDFC Bank, which maintained consistently lower NPA ratios (average 0.35%) and demonstrated superior risk management capabilities.

The correlation and ANOVA analyses confirm statistically significant relationships between asset quality and profitability indicators, validating the hypothesis that NPAs adversely affect banking performance. The strong positive correlation (0.95) between SBI and Bank of Baroda suggests similar operational challenges within the public sector framework, while HDFC's independent performance trajectory underscores the effectiveness of private sector risk management strategies. The significant F-value (4.816, p=0.006) in the ANOVA test confirms meaningful differences in performance metrics across the banking institutions studied.

Furthermore, the NPA to Net Profits ratio analysis reveals that public sector banks experienced extreme volatility, with coefficients of variation exceeding 300% for SBI, indicating unsustainable fluctuations in the relationship between asset quality and profitability. Private sector banks, conversely, maintained more stable ratios, suggesting robust credit assessment frameworks and effective recovery mechanisms.

The findings suggest that effective asset quality management, stringent credit underwriting processes, and technological integration remain crucial for sustainable banking performance. The gradual improvement in NPA levels across all banks during the latter part of the study period indicates the positive impact of regulatory reforms, including the Insolvency and Bankruptcy Code and enhanced provisioning norms, though implementation effectiveness varies significantly between public and private sector institutions.

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