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Comparative Analysis of Non-Performing Assets in Indian Banks: A Study Using Anova

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Abstract

This research investigates the significant differences in "Non-Performing Assets (NPAs)" across selected Indian public and private sector banks over a five years period (2018-2022). Using ANOVA (Analysis of Variance), this study analyzes the NPA trends in "Punjab National Bank (PNB), State Bank of India (SBI), HDFC Bank, and ICICI Bank". The results indicate significant differences in NPA ratios among these banks, reflecting distinct risk management strategies and financial stability trends. The findings provide crucial insights for policymakers, banking institutions, and financial analysts to enhance their understanding of asset quality management practices.

Keywords; Non-Performing Assets, Indian Banks, ANOVA, Financial Stability, Risk Management.

INTRODUCTION

Any loan or advance that is more than 90 days past due is considered a NPA in India according to the RBI. "An asset becomes non-performing when it ceases to generate income for the bank," stated RBI in a 2007 official circular. (Khalid, 2024)

Following the end of the fiscal year that ended on March 31, 2004, the Reserve Bank of India (RBI) implemented the 90-day overdue criteria for identifying nonperforming assets. This was done in an attempt to better comply with worldwide best practices. There are several kinds of non-performing assets, which are further classified by the length of time that the assets have been considered non-performing. (Singh & Mritunjay, 2024)

Types of NPA

There are four distinct kinds of NPAs that are determined by the dependability of the dues and the amount of time the asset has been non-performing (Rao & Patel, 2015):

1. **Standard Assets:** In most cases, they are thought of as performing assets. Regular assets provide a consistent flow of revenue and are repaid at the specified times. These assets are not non-performing in the conventional sense, but they do have a typical risk profile. Therefore, no further preparations are necessary for Standard Assets.
2. **Sub-Standard Assets:** Any asset that has been non-performing for a period of 90 days to 12 months is considered sub-standard. For this asset, the bank is required to put aside 15% of its total reserves.
3. **Doubtful Assets:** Those that are more than a year late fall into this category. Due diligence on these advances is very risky, and the likelihood of repayment is low. The bank's assets and credibility are at risk from these advances.

4. **Loss Assets:** All parties involved, including the bank, auditors (both internal and external), and inspectors from the central bank, have determined that these assets cannot be recovered. After careful consideration, the bank has concluded that the loan amount cannot be recovered by any means, whether internal or external auditors. Consequently, a loss must be shown on the balance sheet.

The scenario of NPA in India

The percentage of non-performing assets (NPA) held by public sector banks in India is much greater than the percentage held by their private sector counterparts. In comparison to the other main public sector banks in India, the State Bank of India has the biggest amount of non-performing assets (NPAs), which is around 1.86 lakh crore Indian rubles. The next banks in the list are "Union Bank of India, Canara Bank, Bank of Baroda, Punjab National Bank, and Bank of India". (Mishra, 2016)

Jammu & Kashmir Bank, Axis Bank, HDFC Bank, and ICICI Bank are the private sector banks in India with the highest number of non-performing assets (NPAs).

Inadequate fund recycling hinders bank economic growth, which in turn has a negative influence on credit deployment and bank soundness; as a result, banks and other financial institutions should take effective measures to reduce the effects of nonperforming loans (NPA).

The borrower and the bank must have a clear understanding of what constitutes a non-performing asset and a performing asset. The borrower's credit and potential for growth might take a hit if the asset stops performing and interest stops coming due. Thus, it will be more challenging for them to get loans in the future. (Baran, 2024)

The bank or lender gets most of its money from interest payments. Consequently, their ability to attain enough revenue generation and, consequently, their total profitability would be negatively affected by non-performing assets.

Non-Performing Assets (NPAs) are critical indicators of a bank's financial health. NPAs negatively impact profitability, liquidity, and overall economic stability. This study explores NPA trends in four major Indian banks—PNB, SBI, HDFC, and ICICI—to assess their financial stability and operational efficiency over a decade. ANOVA is employed to identify statistically significant differences among these banks, helping to identify strategic areas for improvement in asset quality management.

LITERATURE REVIEW

(Raju, 2020) In this study, the authors used stochastic frontier analysis to examine the effectiveness of Indian banks from 1992 to 1999. There was an imbalance in the data set due to the fact that it included 94 banks from four distinct ownership categories: state-owned, nationalised, private, and foreign. Interest margin, non-interest income, investment, and credit were the four outputs examined in the article. The findings showed that deposits were a major factor in determining output, and that the current levels of production are lower than their potential levels. Additionally, the study discovered that reform efforts implemented since 1992 had failed to increase interest margins in banks and that the technological efficiency of doing so differed significantly across bank groups.

(Bhaskaran et al., 2016) In this study, the authors looked at the correlation between non-performing assets and a number of economic variables, as well as the development of non-performing assets in the priority and non-priority sectors and their respective contributions to the total. In addition, it sought to establish a connection between non-performing assets and corporate debt restructuring. There was a robust relationship between nonperforming assets and corporate debt restructuring. There was a negative correlation between nonperforming assets and GDP growth.

(Agrawal & Goyal, 2021) A number of lending metrics are used to evaluate the efficiency of India's banking sector, with non-performing assets being one of the most significant. Small and medium-sized enterprises (MSME), large industry, commercial operations, and agricultural and related sectors are the primary recipients of loans from the bank. There are three sizes of farmers in the agricultural sector: small, medium, and big. After going over over a hundred studies that are pertinent to the topic (NPAs), we discovered that almost no studies were done on small and marginal farmers NPAS, and even fewer studies were done on priority sector loans and agricultural loans. The researcher also discovered that numerous factors had been overlooked in previous studies while doing this literature study. The variables that have been identified include government policies that waive loans, farmers going into full default, natural disasters, loans being used for unproductive purposes, big family health problems, a lack of communication between the bank and the farmer, increased spending on social needs, banks not providing enough funds

when they lend, banks not explaining the maintenance of the account, repayment, and provisions in case of problems with repayment, unexpected expenses, and farmers not being able to wait for a fair price when selling their produce.

(Kandpal, 2020) Over the course of the study period, a number of big banks from both the public and commercial sectors achieved significant progress. According to the evaluations conducted by CAMEL, several public sector banks outperformed their private sector counterparts in terms of overall group performance as well as performance consistency. The public sector banks (PSBs) in India need to strengthen their customer-friendly banking operations, overall asset management policies, staff performance, and cost control in order to compete on a global scale and keep up with the private sector banks in India. It is possible for non-performing assets to be affected by a variety of factors, including the type of advance, the creditworthiness of the borrower, the security of the collateral, the absence of legitimate oversight, the inadequacy of the credit assessment standard, the death of a family member who earns a living, the borrower's disappointment in their business or their lack of knowledge about entrepreneurship, and the absence of legitimate oversight. The existing system for accepting loan requests from affluent individuals and companies is replete with holes that may be exploited by dishonest firms with the assistance of unscrupulous bank workers. These shortcomings might be exploited by dishonest businesses. The failure of financial institutions to comply with rules may be attributed to their inability to make appropriate use of the information technology tools required to implement the Basel II/III requirements for risk management.

Prior studies have emphasized the crucial role of NPAs in assessing a bank's financial stability. Research highlights that public sector banks often report higher NPAs than their private sector counterparts due to structural and operational inefficiencies. Studies have also shown that stricter regulatory frameworks and improved recovery strategies in private banks contribute to their better NPA management. However, comparative studies using ANOVA to assess sectoral differences remain limited, making this research significant.

RESEARCH OBJECTIVES

- To analyze NPA trends in selected banks over the period 2018-2022.
- To test the significance of differences in NPA levels between public and private sector banks using ANOVA.
- To evaluate the impact of NPAs on financial stability across selected banks.

HYPOTHESES

H_0: "There is no significant difference in NPA ratios across the selected banks."

H_1: "There is a significant difference in NPA ratios across the selected banks."

DATA AND METHODOLOGY

Data was collected from annual financial reports of PNB, SBI, HDFC, and ICICI. The study examines NPA trends from 2018 to 2022. The ANOVA test was employed to compare the variance in NPA levels among the selected banks. Additionally, descriptive analysis and graphical visualizations are included to support the findings.

RESULTS AND DISCUSSION

PNB Analysis

PNB's Gross NPA showed a declining trend from 18% in 2018 to 12% in 2022. However, Net NPA remained relatively high at 4.8% in 2022, reflecting challenges in asset quality improvement. Despite efforts to recover bad loans, PNB continues to face persistent issues in managing its stressed assets.

Figure 1

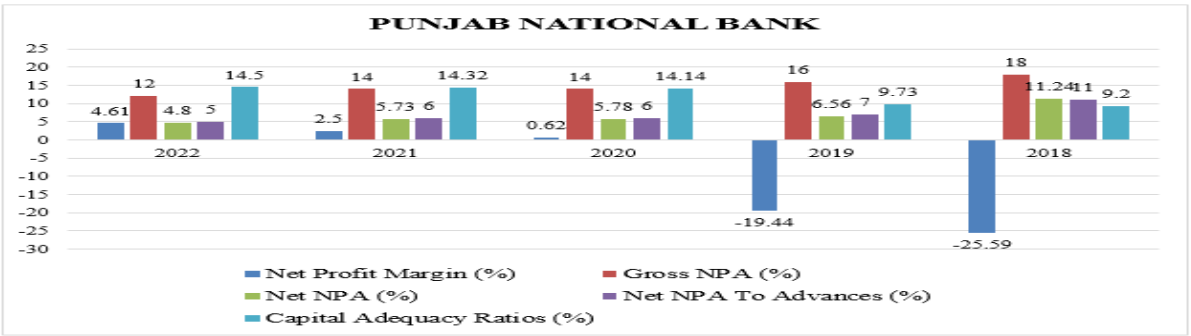
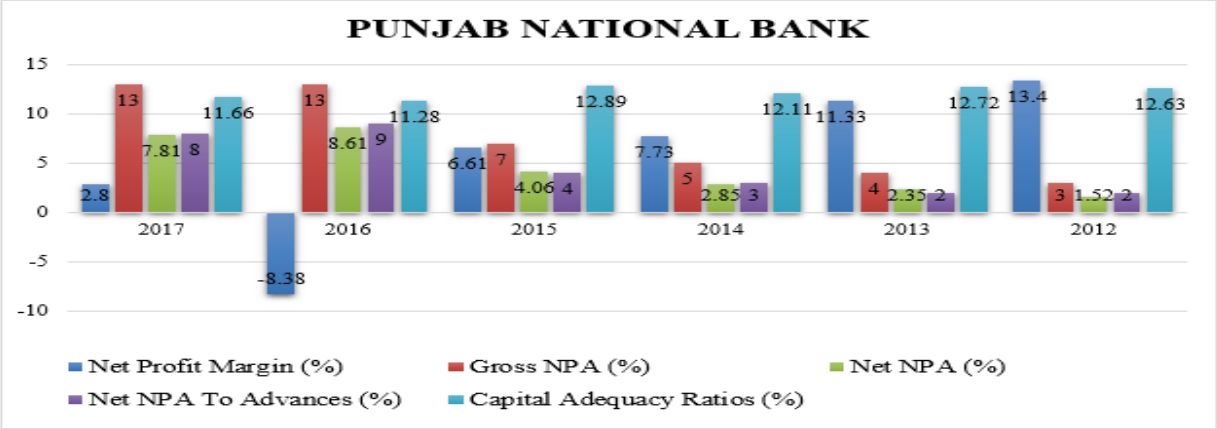


Figure 2



SBI Analysis

SBI's Gross NPA reduced significantly from **11% in 2018** to **4% in 2022**, with Net NPA improving from **5.73% in 2018** to **1.02% in 2022**. SBI's improvement is attributed to aggressive loan recovery strategies, improved credit evaluation frameworks, and enhanced risk management practices.

Figure 3

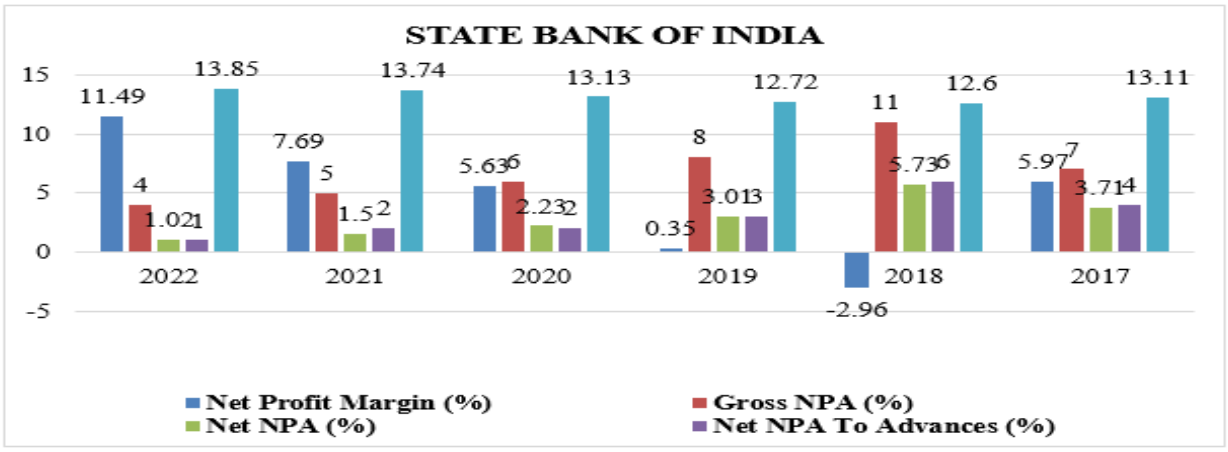
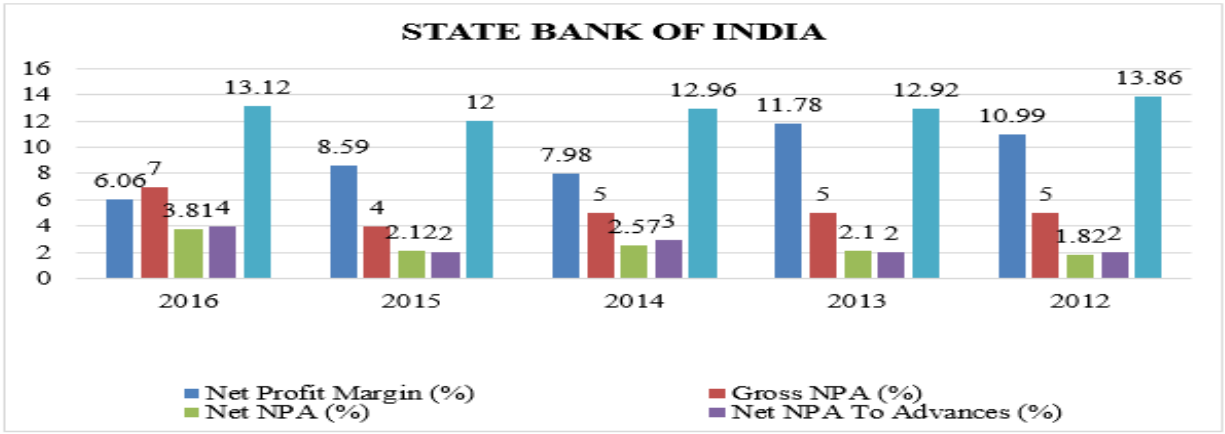


Figure 4



HDFC Analysis

HDFC demonstrated superior asset quality, maintaining a stable Gross NPA of **1%** and Net NPA below **0.4%** throughout the period. HDFC's effective credit risk management, diversified portfolio, and technology-driven monitoring systems have contributed to its consistent performance.

Figure 5

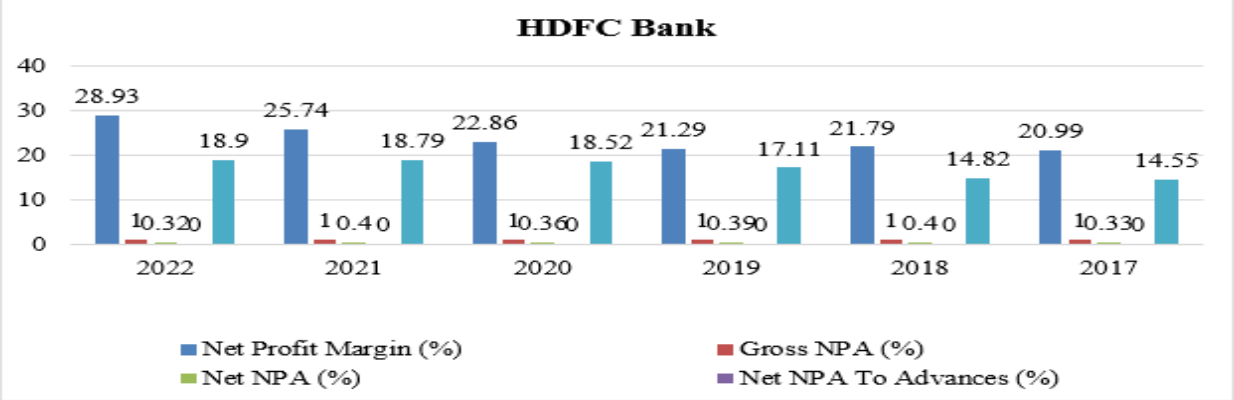
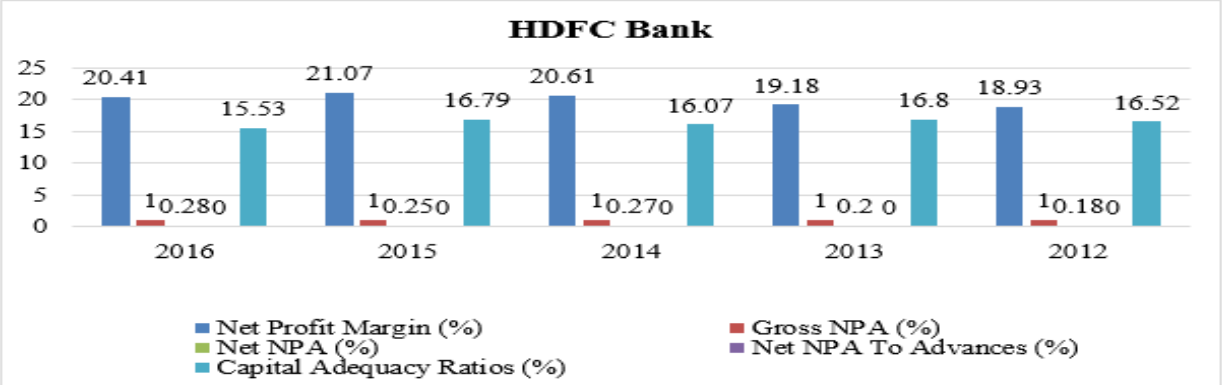


Figure 6



ICICI Analysis

ICICI improved its Gross NPA from 9% in 2017 to 4% in 2022, while Net NPA reduced from 5.43% in 2018 to 0.81% in 2022. The reduction in NPAs was achieved through strategic restructuring initiatives, enhanced monitoring mechanisms, and strengthened recovery practices.

Figure 7

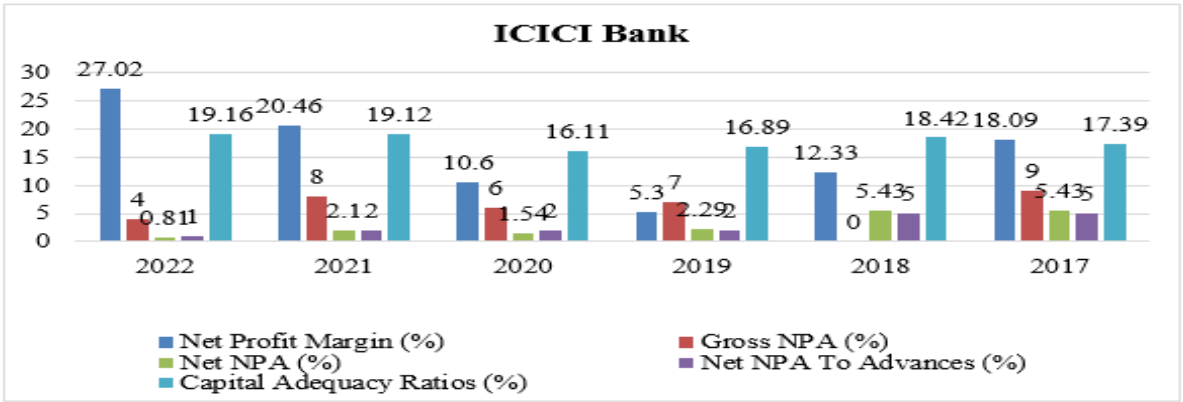
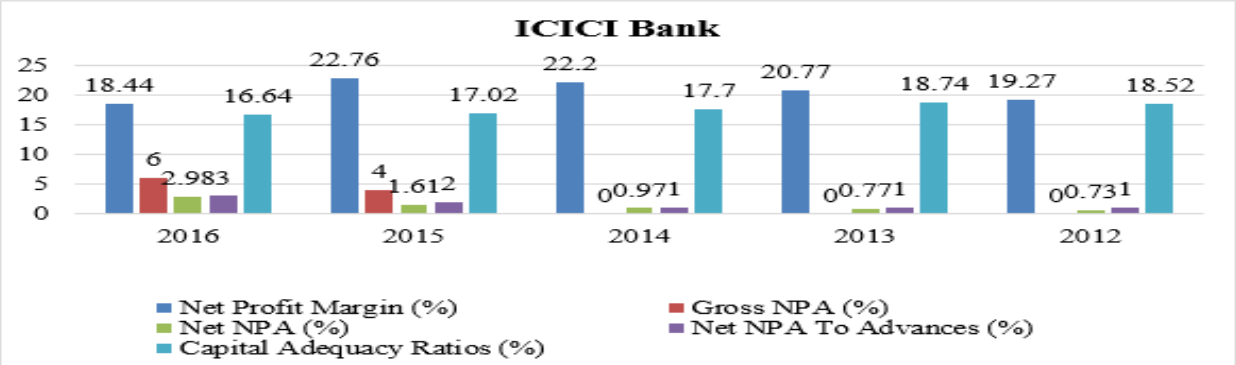


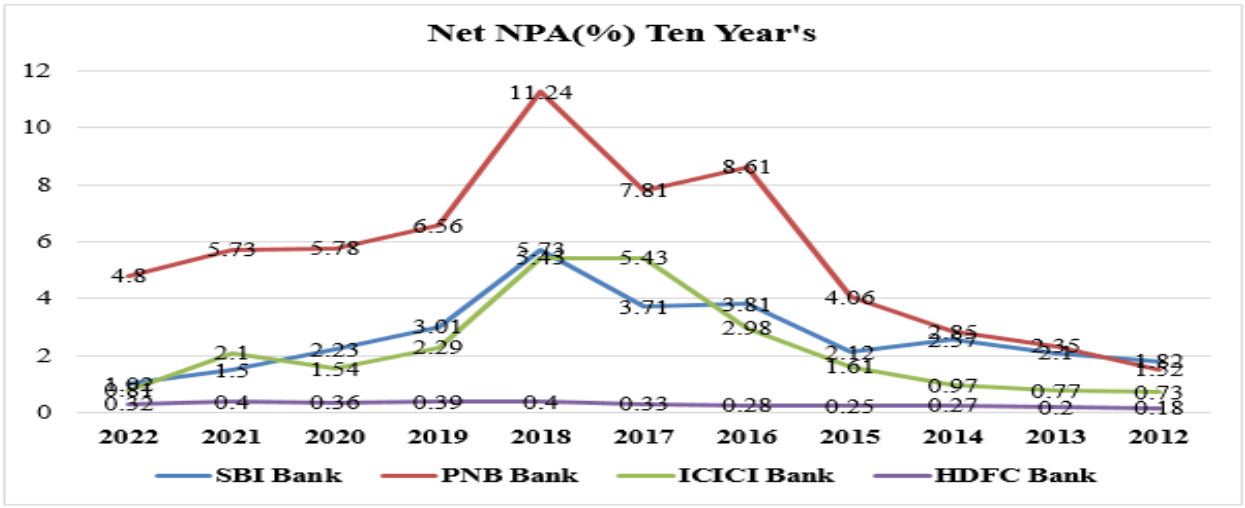
Figure 8



Comparative ANOVA Analysis

The ANOVA results showed a significant difference in NPA ratios between public and private sector banks:

Figure 9



- **F-value:** 15.77
- **P-value:** 6.39E-07 ($p < 0.05$)

Table 1

Anova: Single Factor				
SUMMARY				
Groups	Count	Sum	Average	Variance
SBI Bank	11	29.62	2.692727273	1.749961818
PNB Bank	11	61.31	5.573636364	8.450005455
ICICI Bank	11	24.66	2.241818182	2.990756364
HDFC Bank	11	3.38	0.307272727	0.006061818

Table 2

ANOVA						
Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	156.1213886	3	52.040462 88	15.773678 54	6.39E-07	2.838745
Within Groups	131.9678545	40	3.2991963 64			
Total	288.0892432	43				

These results reject the null hypothesis, confirming substantial differences in NPA levels across the analyzed banks. The findings demonstrate that private sector banks (HDFC and ICICI) maintained significantly lower NPA levels than their public sector counterparts (PNB and SBI), reflecting stronger asset quality management practices.

CONCLUSION

Based on the findings of the research, it is clear that private sector banks such as HDFC and ICICI have more effective non-performing asset management policies than their public sector counterparts such as SBI and PNB. For the purpose of lowering the risks associated with asset quality, the findings highlight the need of enhancing risk management frameworks in public sector banks. Based on the data, it seems that efficient recovery methods, diverse portfolios, and accurate credit assessment are essential components for the decrease of nonperforming assets (NPA).

FUTURE SCOPE OF RESEARCH

Future research can expand this study by incorporating additional banks, exploring sector-wise impacts of NPAs, and analyzing the role of digital banking in asset quality management. Comparative analysis involving global banks can also provide deeper insights into risk mitigation strategies.

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Source for secondary data

1. Annual Reports of SBI, PNB, HDFC, and ICICI (2012-2022)
2. ANOVA Statistical Analysis Framework
3. Reserve Bank of India (RBI) Financial Stability Reports
4. Research Articles on NPA Management in Banking Sector