

A Comparative Study of the Financial Performance of Public and Private Sector Banks in India: Evidence from Profitability, Asset Quality and Operational Efficiency

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Abstract—In India the role of the banking sector in fostering the economic development is significant with respect to the mobilisation of saving, availability of credit and the various productive economic activities. This study compares financial performance of public and private sector banks in India over the period from 2020-21 to 2024-25 on selected financial parameters profitability, asset quality and operational efficiency. This study is descriptive and analytical in nature which has been done by secondary data collected mainly from the publications of Reserve Bank of India. Net Interest Margin (NIM), Gross Non-Performing Asset (GNPA) ratio and Operating Expense Ratio are used as key financial performance indicators. Data analysis is done using descriptive statistics, Welch's t-test, Pearson correlation and Ordinary Least Squares (OLS) regression. The results showed that the private sector banks have an extremely high NIM when compared with the public sector banks and the average GNPA ratio was also lower in the private sector banks. However, the public sector banks showed significant improvement in asset quality during the study period. The correlation analysis shows there is a significant negative correlation between GNPA and NIM. The regression results also confirm the significant negative relationship between GNPA and bank profitability. The study finds that asset quality is a significant factor that is associated with banking profitability, and the profitability of the private sector banks is better in interest margin profitability during the study period.

Index Terms—Public sector banks, private sector banks, financial performance, profitability, non-performing assets, operational efficiency, India

I. Introduction

Banks play an important role in the Indian financial system, as they collect savings, lend money and channel it to productive sectors of the economy. Commercial bank performance and stability are thus crucial for economic development and financial stability. The Indian banking sector consists of public sector banks, private sector banks, foreign banks, other banks etc., with the major players being the public sector banks and the private sector banks. While both are subject to the regulatory regime of the Reserve Bank of India, their ownership, governance, business models, technology and risk management and operations can be different, which could result in variations in their financial results. The banking system recently showed improvement in asset quality, as per the RBI data, GNPA ratio and NNPA ratio of the scheduled commercial banks by end-March 2024 were 2.8 per cent and 0.6 per cent respectively.

The financial performance in banking has a multidimensional nature and it is not possible to assess it with the sole consideration of absolute profits. The three elements of profitability, asset quality, capital strength and operational efficiency offer a more holistic perspective of bank performance. Return on Assets (ROA) is a measure of how well banks can use their assets to earn income and Return on Equity (ROE) is a measure of profits against shareholders' funds. ROA is calculated as net profit/total assets and ROE is calculated as net profit/capital plus reserves and surplus. Core intermediation function performance is indicated by Net Interest Margin (NIM) and Gross and Net NPA ratios are important indicators of asset quality. Low asset quality can result in lower income from interest, higher provisioning needs, and negative impact on profitability. The empirical analysis of the last 31 years (2005–2019) on data of 39 Indian public and private banks shows that there is a negative relation between NPA and bank profitability.

In the backdrop of the above, the present study conducts a comparative empirical evaluation of the financial performance of the selected public sector banks and the private sector banks in India. The study takes into account profitability, asset quality, operational efficiency, and secondary bank level data is collected mainly from Statistical Tables Relating to Banks in India by RBI as well as the audited financial statements of selected banks. Bank-level information on assets, liabilities, earnings, expenses, CRAR, GNPA, NNPA and other banking statistics is available from the RBI's banking statistics data base, which are available on an annual basis, thus enabling a systematic comparison. Descriptive statistics and trend analysis, along with t-test, ANOVA, correlation and regression analysis are used to investigate whether there are any significant differences in the performance of public sector banks and private sector banks and to study the factors affecting the profitability of banks.

II. Review of Literature

Das and Uppal (2021) studied the relation between non-performing assets and profitability amongst the commercial banks in India. The study included 39 public and private sector banks for the period 2005–2019, and used bank-specific and macroeconomic variables to account for profitability. The findings confirmed that NPAs (net profit after tax) and operating costs had a negative influence on bank profitability while interest income, non-interest income, capital adequacy and economic growth had positive influences. The authors found that proper management of NPA and controlling the operating cost of banks is necessary for enhancing the profitability of banks. The study opens up avenues for more comparative research on whether asset quality has differential effect on profitability of public and private banks.

Mohanty (2021) did a comparative analysis between the selected public and private sector banks in India based on the financial data from 2016-17 to 2020-21. They examined the profitability ratios, liquidity ratios, and asset-quality ratios and used mean, graphical analysis and t-tests for comparison. The results showed that overall financial performance between the selected banks is significantly different and also differences

in liquidity and profitability characteristics were found. The research found that the financial ratios are good indicators of differences in performance across ownership groups. Additional studies can expand the sample and time frame and also look at profitability, asset quality and efficiency.

The study by Jose and **Jnaneswar (2021)** examines the trends of NPA levels and profit earning in the top five public and private sector banks in India. Secondary bank-level data were used and trend and correlation analysis was conducted to analyze the relation between asset quality and profitability. The results showed that there were disparities in terms of ownership group management of NPA and profitability performance. The authors highlighted the importance of effective asset management of problem assets for enhancing the financial health of banks. Other bank-specific characteristics should be controlled for in future research to determine if NPA has continued impact on profitability.

In his study, **Bandyopadhyay (2022)** analyzed the impact of capital infusion on the financial performance of public sector banks in India, focusing on asset quality, profitability, operational efficiency and market performance. To analyze the data, a balanced panel dataset comprising 21 public-sector banks for nine years during the study period was used, and a two-step dynamic panel Generalised Method of Moments (GMM) method was employed. The research showed that the government injecting capital into public-sector banks was a major factor affecting their performance and that the capital strength was important in determining the profitability and financial stability of public-sector banks. The study found that capital adequacy was a critical measure that could not be analysed as a standalone measure of bank performance, and that asset quality and efficiency be analysed together rather than as a standalone measure. This study can be extended in future by comparing between the impact of capital adequacy, NPAs and operational efficiency of public and private sector banks.

Rakshit and Bardhan (2022) explored the relationship between competition, efficiency and risk-taking and profitability of Indian commercial banks in general and also analyzed the difference between the different bank ownership. The study explored bank-specific and macroeconomic and institutional factors affecting profitability, with data from banks for the period 1996 to 2016. The results revealed that competition and rise in NPAs negatively influenced bank profitability while cost, revenue and profit efficiency positively influenced bank profitability. The authors concluded that asset quality as well as the operational efficiency plays an important role in determining financial performance in the Indian banking sector. Further research can expand upon the data obtained after the pandemic and compare the profitability, asset quality, and capital adequacy and efficiencies of public and private sector banks.

Srinivas and Pawar (2023) studied the effects of non-performing assets on the financial performance of some selected public sector banks and private sector banks in India. The study took three public sector banks namely SBI, Union Bank of India and Canara Bank, and three private sector banks namely HDFC

Bank, Axis Bank and ICICI Bank for the ten-year period between 2012–13 and 2021–22. Secondary data were analysed by means of mean, standard deviation, coefficient of variation, compound growth rate and regression analysis to assess the relationships between the NPAs and financial-performance indicators. The study proved that NPAs are significant and have important implications on profitability, asset quality, liquidity and capital adequacy and also highlighted the need for a sound approach to stressed assets to improve banks performance. Future research will be able to include more banks and add other aspects of bank performance such as ROA, ROE, NIM and operational-efficiency to create a better bank comparison between public and private banks.

Othman et al. (2024) compared the financial status of public sector and private sector banks in India by applying the CAMEL model which comprises of capital adequacy, asset quality, management quality, earning ability and liquidity. A total of 12 public sector and 20 private sector banks were evaluated over the period 2019-2023 and the results of the composite ranking as well as the independent-samples t-tests were used to find differences in the financial performance of the banks. The results showed that there were differences in the performance of the banks on various aspects of the performance, with Kotak Mahindra Bank being the best on all the aspects of the performance and HDFC Bank being best on asset and management quality among the banks considered. The authors found that financial performance is very different in banks, and that multi-dimensionality is important than profitability. Future studies may be extended over a longer time period and may employ panel regression to understand the relationship of asset quality, capital adequacy and operational efficiency with profitability of public and private sector banks in detail.

III. Research Gap

The profitability of Indian banks, NPAs, liquidity and efficiency have already been studied in detail in the existing literature, some of which have studied only a single dimension and some of which have focused on banks with a small number. There is still room for a comprehensive study of profitability, asset quality and operational efficiency of large-scale of public sector and private sector banks in a common longitudinal period. Building on the lack of previous research, the present study uses a balanced bank-year dataset and various statistical methods to locate performance differences as well as profitability determinants.

IV. Objectives of the Study

1. To **compare the financial performance of selected public and private sector banks in India** with reference to profitability, asset quality and operational efficiency.
2. To examine the **relationship between asset quality and profitability** among the selected public and private sector banks.

V. Hypothesis of the Study

H₀: There is no significant difference in the financial performance of public and private sector banks in India.

H₁: There is a significant difference in the financial performance of public and private sector banks in India.

VI. Research Methodology

The study is descriptive, comparative, analytical and is an empirical study with quantitative and secondary data that are longitudinal. The study will be conducted with five public sector banks – State Bank of India, Bank of Baroda, Punjab National Bank, Canara Bank and Union Bank of India and five private sector banks – HDFC Bank, Kotak Mahindra Bank, Axis Bank, ICICI Bank and IndusInd Bank. There will be about 100 bank-year observations (10 banks x 10 years) over a 10-year study period, but with some consistency of data in bank-years due to bank mergers and structural changes. The secondary data will be acquired from the statistical tables relating to banks in India released by the Reserve Bank of India, database on Indian economy, and annual audited reports of the respective banks. As per the confirmation of RBI, all the banking ratios such as asset, liability, earning, expense, Capital Adequacy, GNPA, NNPA etc. data of banks is available at the bank level which is available in its annual Statistical tables.

The financial performance will be measured with the help of Return on Assets (ROA), Return on Equity (ROE) and Net Interest Margin (NIM) as indicators of profitability, Gross NPA, Net NPAs as indicators of asset quality and appropriate cost/operating indicators as indicators of operational efficiency. Bank performance will be summarised in descriptive statistics such as mean and standard deviation and year-wise changes identified through trend analysis. An independent-samples t-test will be used to compare public sector and private sector banks and an ANOVA may be used to check for differences between the individual banks. Pearson correlation will be used to test the relationship between asset quality and profitability, and regression/panel regression will be used to test the effects of GNPA, NIM, capital adequacy, efficiency and bank size on profitability. Normally all hypotheses will be tested at the 5% level of significance ($p < 0.05$).

VII. Data Analysis and Interpretation

The data analysis mainly covers the comparative financial performance of selected public sector banks and private banks in India in the selected study period of ten years. Financial performance is assessed through various indicators that reflect profitability, asset quality and operating efficiency of banks, such as Return on Assets (ROA), Return on Equity (ROE), Net Interest Margin (NIM), Gross Non-Performing Assets (GNPA), Net Non-Performing Assets (NNPA) and a suitable measure of operating efficiency. To analyze the data, the year-wise trend analysis, descriptive statistics, independent-samples t-test, Analysis of

Variance (ANOVA), Pearson correlation and regression analysis are used. A significance level of 5% ($p < 0.05$) is used for testing all statistical hypotheses.

Table 1: Year-wise Financial Performance of Public and Private Sector Banks in India

Year	Bank Type	Net Interest Margin (%)	Gross NPA Ratio (%)	Total Income (₹ crore)	Operating Expenses (₹ crore)	Operating Expense Ratio (%)
2020-21	Public Sector Banks	2.45	9.10	8,30,345	2,03,855	24.55
2020-21	Private Sector Banks	3.58	4.90	5,42,035	1,30,451	24.07
2021-22	Public Sector Banks	2.44	7.30	8,31,900	2,20,091	26.46
2021-22	Private Sector Banks	3.58	3.80	5,72,397	1,56,613	27.36
2022-23	Public Sector Banks	2.70	5.00	9,71,421	2,44,064	25.12
2022-23	Private Sector Banks	3.90	2.30	6,90,557	2,02,616	29.34
2023-24	Public Sector Banks	2.80	3.50	12,12,665	2,95,090	24.33
2023-24	Private Sector Banks	3.90	1.90	9,41,870	2,39,146	25.39
2024-25	Public Sector Banks	2.60	2.60	13,65,244	3,03,100	22.20
2024-25	Private Sector Banks	3.60	1.80	10,70,709	2,61,471	24.42

As shown in Table 1, the financial performance of public and private sector banks is given for the years 2020-21 to 2024-25. For private sector banks, their Net Interest Margin (NIM) was consistently higher throughout the period ranging from 3.58 per cent to 3.90 per cent, as against the public sector banks whose NIM was from 2.44 per cent to 2.80 per cent. The Gross NPA ratio declined significantly for both groups when it comes to asset quality. The GNPA ratio of the public sector banks has fallen significantly, from 9.10 per cent in 2020-21 to 2.60 per cent in 2024-25, while private sector banks' ratio dropped from 4.90 per cent to 1.80 per cent respectively. The total income and operating expenses of public sector banks were more during the period in absolute terms. The Operating Expense Ratio, however, was generally lower in the public sector banks, especially in the later years, at 22.20 per cent in 2024-25 as against 24.42 per cent in case of private sector banks. Overall, the year-wise results reveal that the asset quality and the profitability measured as interest margin of private banks are better when compared to their counterparts in public banks,

whereas the asset quality and the operating-cost ratios have improved significantly in the public banks, as compared to their private counterparts.

Table 2: Descriptive Statistics of Financial Performance Indicators of Public and Private Sector Banks

Indicator	Bank Type	N	Mean	Std. Deviation
Net Interest Margin (%)	Public Sector Banks	5	2.598	0.157
Net Interest Margin (%)	Private Sector Banks	5	3.712	0.172
Gross NPA Ratio (%)	Public Sector Banks	5	5.500	2.636
Gross NPA Ratio (%)	Private Sector Banks	5	2.940	1.286
Operating Expense Ratio (%)	Public Sector Banks	5	24.533	1.543
Operating Expense Ratio (%)	Private Sector Banks	5	26.116	2.211

The average performance of financial institutions in terms of profitability for public sector banks and private sector banks for five years is compared in table 2. The average NIM for the private sector banks was 3.712 per cent versus 2.598 per cent for public sector banks, which shows better average interest-margin profitability in the private sector. The average Gross NPA ratio of public sector banks was 5.500 per cent while it was 2.940 per cent for private sector banks, indicating better average asset quality in private sector banks. The relatively high standard deviation of GNPA of public sector banks (2.636) also signifies that there was a lot of variation among the banks with regard to asset quality during the period, which is primarily due to the huge reduction in NPAs over the period. Average Operating Expense Ratio of public sector banks and private sector banks were 24.533 per cent and 26.116 per cent respectively in terms of operational efficiency. A lower operating expense ratio (OER) indicates lower operating expenses as a percentage of income, making the public sector banks a bit more efficient on this specific metric. Consequently, descriptive statistics show that the public banks had a lower average operating expense ratio, while the private banks did better in terms of profitability and asset quality.

Table 3: Welch's t-Test for Differences in Financial Performance between Public and Private Sector Banks

Indicator	Public Mean	Private Mean	t-value	p-value	Decision
Net Interest Margin (%)	2.5980	3.7120	-10.7155	0.0000	Significant
Gross NPA Ratio (%)	5.5000	2.9400	1.9020	0.1065	Not significant
Operating Expense Ratio (%)	24.5333	26.1159	-1.3125	0.2299	Not significant

The t-test results in Table 3 are used to check the statistical significance of the differences between public and private sector banks. The t-value in NIM is -10.7155 , which shows the difference between the two groups is statistically significant when $p < 0.001$. The results show that private sector banks had a higher mean NIM (3.712 per cent) compared to public sector banks (2.598 per cent) suggesting that the interest-margin profitability of private banks in the study period was much higher. The average GNPA ratio of public sector banks (5.500 per cent) was large, compared to the private sector banks (2.940 per cent), but the difference between them is not significant at 5 per cent ($t = 1.902$, $p = 0.1065$). Likewise, the Operating Expense Ratio of public banks (24.533 per cent) and private banks (26.116 per cent) do not differ significantly ($t = -1.313$, $p = 0.2299$). As a result, the statistical evidence shows that there are significant ownership-group differences in the profitability measured by NIM but not in the operating expense ratio or GNPA for this sample over a 5-year period.

Table 4: Pearson Correlation between Profitability, Asset Quality and Operational Efficiency of Banks

Relationship	Pearson r	p-value	Interpretation
GNPA ↔ NIM	-0.679	0.031	Significant negative relationship
Operating Expense Ratio ↔ NIM	0.451	0.191	Not significant
GNPA ↔ Operating Expense Ratio	-0.048	0.896	Not significant

Table 4 shows the correlation between profitability, asset quality and operational efficiency. The correlation between the two variables, GNPA and NIM is significant and negative ($r = -0.679$, $p = 0.031$). This suggests that the rise in non-performing assets has been correlated with a decline in interest-margin profitability, and a rise in asset quality has been correlated with an increase in NIM. The Operating Expense Ratio and NIM show a positive relationship ($r = 0.451$), but with too few samples the data are not statistically significant enough to support a systematic relationship between the two variables ($p = 0.191$). Likewise, there is a very weak negative correlation of GNPA with Operating Expense Ratio ($r = -0.048$, $p =$

0.896) which is not statistically significant. In summary, the most significant result of the correlation analysis is that asset quality deterioration is negatively correlated with bank profitability.

Table 5: Model Summary of Regression Analysis for Determinants of Bank Profitability

Model Statistic	Value
R ²	0.636
Adjusted R ²	0.532
F-value	6.117
Model p-value	0.029
Durbin-Watson	2.685

Table 5 shows the overall regression model with Net Interest Margin as the bank profitability measure, Gross NPA Ratio as the asset quality measure and Operating Expense Ratio as the operational efficiency measure. The model has an R² of 0.636, thereby accounting for about 63.6 per cent of the variation in NIM, which is statistically explained jointly by GNPA and OER. An adjusted R² of 0.532 suggests that about 53.2 per cent of the variance is still accounted for, even when the number of predictors is taken into consideration. The F-value is 6.117 and the p-value is 0.029 so the regression model as a whole is statistically significant at the 5 per cent level. The Durbin-Watson statistic of 2.685 is not indicative of a serious residual-correlation problem, but sample size is limited. Overall, the model indicates that asset quality and operational efficiency together offer some explanatory power for bank profitability; however, the individual coefficients must be used to identify which individual variable contributes significantly to explaining bank profitability.

Table 6: Regression Coefficients for the Effect of Asset Quality and Operational Efficiency on Bank Profitability

Predictor	Coefficient (B)	Std. Error	t-value	p-value	Decision
Constant	0.598	1.804	0.332	0.750	Not significant
Gross NPA Ratio (%)	-0.165	0.057	-2.885	0.023	Significant
Operating Expense Ratio (%)	0.129	0.070	1.837	0.109	Not significant

Table 6 indicates the respective impacts of asset quality and operational efficiency on bank profitability. The Gross NPA Ratio is negatively correlated with B = -0.165, t = -2.885, p = 0.023, and it has significant negative influence. For every percentage point increase in the GNPA ratio, the NIM in the observed sample is estimated to decrease by 0.165 percentage point, holding the Operating Expense Ratio constant. This offers empirical proof of a relationship between poor asset quality and lower profitability. The Operating

Expense Ratio, on the other hand, has a positive coefficient of 0.129, although the impact is not statistically significant ($t = 1.837$, $p = 0.109$). Thus, the study does not provide sufficient statistical evidence of the independent contribution of this operational-efficiency proxy to the explanation of NIM, when considering the control of GNPA. The constant is also not significant statistically ($p = 0.750$).

The estimated regression equation is: **$NIM = 0.598 - 0.165 (GNPA) + 0.129 (Operating Expense Ratio)$**

Based on the results of regression analysis, asset quality is the statistically significant variable that affects NIM in the model. Based on the regression result, it can be seen that asset quality or Gross NPA is a variable that affects NIM in the model. Banks that have higher GNPA ratios tend to have lower interest-margin profitability. The below listed coefficients are, however, only statistical associations within the period of the analysis, and should not be interpreted as being causal effects.

Combined, these facts suggest that the private sector banks have significantly better profitability in terms of NIM, and descriptively have better asset quality, while a significant improvement in the public sector banks in terms of reduction in their GNPA ratio and a slightly lower average Operating Expense Ratio. The t-test shows that the difference in NIM between the two ownership groups is statistically significant; differences in GNPA and operating expense ratios within the five-year sample are not statistically significant. Most important, correlation and regression analyses confirm the strong negative correlation between Gross NPA and profitability, which clearly shows that effective management of NPA is closely related with good banking performance. The results accordingly revealed the asset quality as an important finding related to the financial performance of Indian banks in the study period.

VIII. Conclusion

The present study has compared financial performance of public and private sector banks in India with specific reference to profitability, asset quality and operational efficiency during the study period. The results show that the PS bank recorded lower profitability as compared to the PS banks as their Net Interest Margin (NIM) was consistently below that of the PS banks. The average gross NPA ratio was also lower for private banks, which thus had a relatively good asset quality. Public Sector Banks, on the other hand, showed significant improvement in their asset quality by showing a significant decrease in GNPA ratio during the study period. The average Operating Expense Ratio was also slightly high for public sector banks, which indicates relatively high operating expenses in comparison to total income on this metric.

The difference in NIM between public sector banks and the private sector banks is also statistically significant while difference in GNPA and difference in OER are not statistically significant at the 5 per cent level in the inferential analysis. It is found that the relationship between the two variables, namely GNPA and NIM is negative and statistically significant, which suggests that the asset quality deteriorates with

respect to the profitability. The regression model is also statistically significant and accounts for a significant amount of the observed variation in NIM. Among them, the coefficient of NPA is significant and negative, thus indicating that the presence of high levels of NPA is linked with low interest-margin profitability. Overall, the study concludes that asset quality is an important factor associated with banking profitability and private sector banks have a better profitability position in the period under study. The results also reveal the efforts made by PSBs to manage stressed assets and improve the financial health of the banks.

IX. Scope for Further Research

Further study can be done in the future with the following: A longer time period and individual bank-level data for more public and private sector banks. As additional performance indicators, such as Return on Assets, Return on Equity, Net NPA, Capital Adequacy Ratio, Cost to Income ratio, Credit Growth and Bank size can be added to make a more holistic assessment of financial performance. The impacts of digitalisation, governance, ownership and structure, capital adequacy and macroeconomic conditions on the profitability and asset quality of banks can also be explored in future studies. A larger bank-year data set allows the use of panel data regression, fixed-effects and random-effects models, dynamic panel models and efficiency models like Data Envelopment Analysis (DEA) to produce more sound results. Comparative research can also be related to public, private, foreign and small finance banks or research can be conducted for the difference in banking performance between pre-pandemic, pandemic and post-pandemic era.

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