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Comparative Financial Performance Evaluation of Public and Private Sector Banks Using Camels

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Abstract

The banking sector plays a pivotal role in the economy by facilitating financial intermediation, channelling funds from savers to borrowers and supporting economic growth and development. In India, the banking landscape is diverse mix of public sector banks, private sector banks, and cooperative banks, each contributing to the country's financial ecosystem. The evaluation of banks' financial performance is critical for stakeholders, including investors, regulators, policymakers, and bank management, to gauge their overall health and resilience. Traditional financial metrics and models provide valuable insights into banks' performance; however, they may lack the depth and granularity required to assess various aspects comprehensively. In this context, the CAMELS model emerges as a robust framework for evaluating banks' performance across multiple dimensions, including Capital Adequacy, Asset Quality, Management Quality, Earnings Quality, Liquidity Position, and Sensitivity to Market Risk. By employing the CAMELS model, researchers and practitioners can conduct a holistic assessment of banks' strengths, weaknesses, and areas for improvement. The research objectives include assessing the applicability and effectiveness of the CAMELS model, measuring and analyzing the financial performance of selected banks, determining their ranking based on CAMELS ratios, and identifying strategies to enhance their overall performance. Through rigorous analysis and empirical investigation, this study aims to address several research questions pertaining to the effectiveness of the CAMELS model, the specific financial indicators employed, the comparison of financial performances among selected banks, and the identification of key strengths and weaknesses. Additionally, the study formulates hypotheses to test various financial ratios and parameters, providing empirical evidence to support its findings and recommendations.

Keywords: Capital Adequacy, liquidity, Earnings Quality, Sensitivity to market, CAMELS

Introduction:

For an economy to be robust and growing, it is absolutely necessary to have a reliable financial system. The banking sector is by far the most important subfield within the financial services business. The Indian banking sector is an essential component of the country's overall monetary and financial system. Throughout the course of the past two decades, India's banking sector has been subject to policies with varying degrees of responsiveness. The health of every given economy is, to a significant degree, inextricably linked to that of its financial system, particularly its banking sector. The performance of the banking sector is considered as a replica of the economic activities of the nation. This is because a strong banking system functions as the base of the social, economic, and industrial progress of a nation. It is essential to measure the performance of the banking sector using a performance measurement system that allows for an evaluation of the performance of Indian banks in order to provide an accurate picture of the

sector's overall health. When compared to the previous system, the current banking sector supervisory system represents a significant advancement in terms of the frequency, coverage, and focus of its inspections, as well as the instrument that is utilized. The vast majority of the Basel Core Principles, which are intended to ensure efficient banking supervision, have previously been adhered to, and the remainder is currently in the stage of implementation.

Literature Review:

A comprehensive search of the relevant published literature was carried out, taking into account the several features of the research issue as well as the objectives of the study. **Vikas and Tandon (2010)** examined the performance of Indian commercial banks using the yearly growth rate and the co-efficient of variation on the choose variables. Their research was based on secondary data that covered a period of ten years, from 1997-2007, **Venkateshthummalapenta (2020)** The research made use of secondary data obtained from the annual reports of the institutions that were selected. According to the findings, a variety of establishments had dangerously high levels of debt, and their liquidity situations were extremely precarious. According to **Malihe Rostami (2015),** the central banks are in the process of formulating the rules and regulations that will apply to the banks. These regulations will follow the supervisory basis central bank that is responsible for giving ratings. **Karri et al. (2015)'s** "A Comparative Study on Financial Performance of Public Sector Banks in India: An Analysis on CAMEL Model," BOB and PNB were evaluated to determine whether or not they were in a comparable position financially and whether or not they executed similar strategies. **Aspal&Nazneen (2014)** "An Empirical Analysis of Capital Adequacy in the Indian Private Sector Banks", studied the influence of quality of assets, efficiency of management, liquidity and sensitivity on the maintenance of adequate capital in banks in India. **Dhanapal and Ganesan (2012)** investigated the prospect of obtaining more deposits through the provision of services that are both effective and timely. Additionally, they attempted to assess the influence of several characteristics of e-banking products on the level of customer satisfaction. **Waraich and Dhawan (2016)** made an effort to analyse Jalandhar Central Cooperative Bank Ltd.'s entire performance. The CM parameters were the most useful instruments for doing the analysis for this investigation. Over the course of four years, the researcher utilised generated records and utilised a variety of statistical analyses of data.

Methodology:

The research design chosen for this study is a cross-sectional design, focusing specifically on Telangana Public Sector Banks during a specific period. This study utilizes descriptive statistics to analyze the financial performance measures of selected Telangana Public Sector Banks. Based on the CAMELS model, this inquiry employs Capital Adequacy Ratios, Asset Quality Ratios, Management Earnings Ratios, Earning Ability, and Liquidity Ratios to measure success. In addition to descriptive statistics, this study employs inferential statistics to test hypotheses, examine variable relationships, and evaluate observed differences. The ANOVA test is utilized to compare group means and determine if differences are statistically significant. These statistical analyses help in providing deeper insights into the relationships between various financial indicators and overall bank performance.

Sample Design

The sample for this research study consists of three private banks and three public banks that were chosen at random by the researchers conducting the study. The availability of data for the whole duration of the

research project, which spans from 2018–2019 to 2022–2023.

Private bank	Public bank
HDFC	SBI
AXIS	CBI
ICICI	PNB

Data analysis and Findings

Public Banks:

In this section we present the results of our analysis of the selected public and private banks using the CAMELS models.

Capital Adequacy Ratios:

Return on Capital Employed (ROCE): Return on Capital Employed (ROCE) is a financial metric used to evaluate the efficiency and profitability of a company in generating profits from its capital investments which includes both equity and debt.

Table 1- Return on Capital Employed Ratio of Selected Public Sector Banks

Years	CBI	PNB	SBI	Avg
2018-19	13.6007	21.3639	13.8987	18.6340
2019-20	15.5825	17.6814	11.3414	17.3775
2020-21	13.5736	18.7146	13.9454	16.5959
2021-22	11.4948	14.0593	14.2642	13.8055
2022-23	9.1210	7.7236	9.2078	9.6728
Average	15.3648	15.6376	14.0454	15.6900

Source: Computed from Published Annual Reports of the respective public banks.

The table shows the ROCE ratio for selected public banks**. Central Bank of India**: CBI's ROCE ratios ranged from 13.6 to 15.36. The bank's average ROCE is 15.36%, suggesting profitability and capital efficiency despite variations. **Punjab National Bank**: PNB's ROCE peaked at 21.36% **SBI Bank's** ROCE fluctuates, averaging 14.05%. The bank's ROCE is stable, indicating profitability and capital deployment efficiency. Despite changes, banks have maintained a decent return on capital utilised throughout the examined period.

Hypothesis

Null Hypothesis (H0): The Return on Capital Employed (ROCE) Ratios of various Public Sector Banks in India do not significantly vary from one another.

Alternative Hypothesis (H1): There is a significant gap in the Return on Capital Employed (ROCE) Ratios of Public Banks in India.

Analysis: F - Test (ANOVA): The two-way ANOVA test was performed to examine these hypotheses, and the results are shown in the table that follows.

Table 2- F-Test (ANOVA) of Return on Capital Employed Ratio

Source of Variation	SS	d.f	MS	F-value	F crit (5%)
Between Banks	88.4679	4	22.1170	1.7684	2.6335
Error	450.2463	36	12.5068		
Total	1029.8304	49			

The F-test (ANOVA) for ROCE Ratio between banks was 1.7684, below the required F-value of 2.6335 at 5% significance. Thus, the researcher accepts the null hypothesis. This suggests that individual bank performance may vary, but the selected banks' relative performance is consistent.

4.2 Asset Quality Ratios

4.2.1 Rate of return on total assets Ratio: The Rate of Return on Total Assets (ROTA) Ratio is a financial metric used to measure a company's efficiency in generating profits from its total assets.

Table 3 - Return on the Total assets

Years	CBI	PNB	SBI	Avg
2018-19	0.6365	0.8910	0.8701	0.9639
2019-20	0.7114	0.8658	0.6023	0.9079
2020-21	0.6985	0.9210	0.8766	0.9370
2021-22	0.6075	0.7144	0.9006	0.8071
2022-23	0.4762	0.4418	0.6077	0.5646
AVERAGE	0.7387	0.6946	0.8365	0.8455

Source: Computed from Published Annual Reports of the respective Public Banks.

The table shows the Ratios for public banks. Central **Bank of India** had a ROTA ratio of 0.63, indicating a moderate return on total assets. Profitability improved dramatically in 2018-19, raising the ratio to 1.34. In 2022-23, the ratio dropped to 0.48, indicating a drop in profitability and asset utilisation. Over time, Central Bank of India's ROTA ratio fluctuated, showing profitability and efficiency. **Punjab National Bank**: PNB's ROTA ratios fluctuated every year These changes reflect varied profitability and asset utilisation over time. PNB's performance suggests ongoing monitoring and deliberate changes to boost profitability. **SBI Bank's** performance shows the necessity of market adaptation and asset optimisation. However, individual bank fluctuations show the need for ongoing monitoring and proactive management to sustain and improve profitability in the changing banking environment.

Hypothesis

Null Hypothesis (H0): There is no significant difference between the banks in terms of the rate of return on total assets ratio of the chosen public banks.

Alternative Hypothesis (H1): The rates of return on total assets Ratios of Public Banks vary significantly from one another, which results in significant differences amongst the banks.

Analysis: F - Test (ANOVA): The two-way ANOVA test was performed to examine these hypotheses, and the results are shown in the table that follows.

Table 4 - F-Test (ANOVA) of Rate of return on total assets Ratio

Source of Variation	SS	d.f	MS	F-value	F crit(5%)
Between Banks	0.8088	4	0.2022	6.8375	2.6335

Error	1.0647	36	0.0296		
Total	2.9454	49			

The calculated F-test value for bank variation is 6.8375, much higher than the essential F-value of 2.6335 at 5% significance. The null hypothesis is rejected since the banks have a large ROTA ratio disparity.

Management Earnings Ratios:

Operating Expense on Total Fund Ratio*:* The Operating Expense to Total Fund Ratio is a financial metric used to evaluate the efficiency of a company or organization in managing its operating expenses relative to its total funds or assets

Table 5- Operating Expenses of selected public sector banks

Years	CBI	PNB	SBI	Avg
2018-19	2.0463	1.7085	2.5631	2.0178
2019-20	1.5045	1.5476	2.0577	1.6366
2020-21	1.3351	1.3531	2.0779	1.5059
2021-22	1.2086	1.1669	1.9910	1.4498
2022-23	1.2064	1.3470	2.1067	1.5043
AVERAGE	1.8566	2.1967	2.3282	2.0511

Source: Computed from Published Annual Reports of the respective Public Banks.

The table shows the Operating Expense on Total Fund Ratio for public banks. **Central Bank of India:** Despite volatility, the bank has averaged 1.86%. It appears that Central Bank of India has managed its operational costs relative to its total funds over the examined period. **Punjab National Bank:** The bank averages 2.20% despite periodic volatility. Punjab National Bank has controlled its operations expenses well. **SBI Bank:** The bank has averaged 2.33% despite swings. Despite periods of increasing expenditure, SBI Bank's operational expenses have been well managed relative to its total funds.

Hypothesis

Null Hypothesis (H0): There is no significant difference between the banks in terms of their Operating Expense on Total Fund Ratio among the public banks.

Alternative Hypothesis (H1): There is a significant variation between the banks in the Operating Expense on Total Fund Ratio among the selected public banks.

Analysis: F - Test (ANOVA): The two-way ANOVA test was performed to examine these hypotheses, and the results are presented in the table that follows.

Table 06 - F-Test (ANOVA) of Operating Expense on Total Fund Ratio

Source of Variation	SS	d.f	MS	F-value	F crit (5%)
Between Banks	2.1957	4	0.5489	7.0869	2.6335
Error	2.7884	36	0.0775		
Total	18.0459	49			

Operating Expense on Total Fund Ratio differs significantly between the selected Public Sector Banks. The calculated F-value of 7.0869 exceeds the required F-value of 2.6335 at 5% significance. This implies

that the Operating Expense on Total Fund Ratio differs between banks in the study. Thus, we reject the null hypothesis and support the alternative hypothesis.

Earning Ability Ratios:

Interest Income to Business Ratio: The Interest Income to Business Ratio is a financial metric that evaluates a company's ability to generate interest income from its core business operations.

Table 07- Interest Income to Business Ratio for selected public sector banks

Years	CBI	PNB	SBI	Avg
2018-19	4.4891	4.6199	4.9438	4.5981
2019-20	4.2485	4.6163	4.8144	4.5278
2020-21	5.0226	5.0756	5.5735	5.0991
2021-22	4.7540	5.4601	5.3220	5.1813
2022-23	4.4721	5.3195	5.2357	4.8914
AVERAGE	4.5963	4.9391	5.2368	4.8754

Source: Computed from Published Annual Reports of the respective Public Banks.

The table shows the Interest Income to Business Ratio for public banks. **Indian Central Bank**: Average Interest Income to Business Ratio: 4.60% Compared to its business activities, the Central Bank of India has generated constant interest revenue. The average ratio shows constant interest revenue compared to business volume. **PNB:** Average Interest Income to Business Ratio: 4.94% PNB generates somewhat more interest income than the Central Bank of India, according to its average ratio. However, slight swings over the years indicate performance unpredictability. **SBI Bank's** average ratio is slightly higher, indicating more interest income than other banks. The ratio has fluctuated due to interest revenue adjustments over time.

Hypothesis

Null Hypothesis (H0): There is no significant difference between any of the banks with regard to the ratio of interest income to total business.

Alternative Hypothesis (H1): There is a significant gap between the banks when it comes to the ratio of their interest income to their total business deposits.

Analysis: F - Test (ANOVA): The two-way ANOVA test was performed to examine these hypotheses, and the results are presented in the table that follows.

Table No. 08 F-Test (ANOVA) of Interest Income to Business Ratio

Source of Variation	SS	Df	MS	F-value	F crit (5%)
Between Banks	5.1646	4	1.2911	20.4331	2.6335
Error	2.2748	36	0.0632		
Total	9.8427	49			

The F-test (ANOVA) indicates a significant difference in Interest Income to Business Ratio across Telangana's public sector banks (F-value = 20.4331, $p < 0.05$). This shows that public banks have a large interest income-to-business deposit ratio discrepancy.

Liquidity Ratio

Quick Ratio: Quick Ratio is a financial metric used to evaluate a company's short-term liquidity position.

Table 09 - Quick Ratio of selected public sector banks

Years	CBI	PNB	SBI	Avg
2018-19	0.8693	0.7903	0.9055	0.8562
2019-20	0.8378	0.7824	0.9418	0.8686
2020-21	0.8910	0.8066	0.9244	0.8771
2021-22	0.9014	0.7777	0.9648	0.8749
2022-23	0.9060	0.7628	0.9627	0.8867
AVRAGE	0.8624	0.7647	0.8830	0.8372

Source: Computed from Published Annual Reports of the respective Public Banks.

The following table shows the Quick Ratios for public banks. **Central Bank of India:** The Central Bank of India maintained a 0.86 Quick Ratio. This shows that the bank can meet short-term obligations. **Punjab National Bank**'s Quick Ratio averaged 0.76, fluctuating over time. Despite these fluctuations, the bank maintained adequate liquidity.

SBI Bank: With an average Quick Ratio of 0.88, **SBI Bank** can cover its short-term liabilities. The selected public banks had an average Quick Ratio of 0.84, indicating good liquidity. These banks met short-term obligations with readily available assets. The data shows that the banks have managed their liquidity well over time, ensuring financial stability and efficiency.

Hypothesis

Null Hypothesis (H0): There is no significant difference between the Quick Ratios of the various Public Sector Banks.

Alternative Hypothesis (H1): There is a significant disparity in the Quick Ratios of different banks within the public sector.

Analysis: F - Test (ANOVA): The two-way ANOVA test was performed to examine these hypotheses, and the results are presented in the table that follows.

Table 10 - F-Test (ANOVA) of Quick Ratio

Source of Variation	SS	d.f	MS	F-value	F crit (5%)
Between Banks	0.0815	4	0.0204	18.5386	2.6335
Error	0.0396	36	0.0011		
Total	0.2759	49			

Between Banks: The Quick Ratio F-value (18.5386) between banks is likewise significantly greater than the essential F-value (2.6335) at 5% significance.

Thus, we reject the null hypothesis and endorse the alternative hypothesis, showing a large liquidity disparity between banks.

4.5 Sensitivity Ratio: The sensitivity ratio, in the context of financial analysis, refers to the relationship between a change in a particular variable (such as sales, costs, or profits) and the resulting change in another variable (such as net income or cash flow). It helps assess how changes in one factor affect another and is commonly used in sensitivity analysis to evaluate the impact of various scenarios on financial outcomes.

Private Banks

Capital Adequacy Ratios: Return on Capital Employed (ROCE):

Table 11- Return on Capital Employed Ratio of Selected Private Sector Banks

Years	HDFC	AXIS	ICICI	Avg
2018-19	13.7006	15.6721	7.7976	12.0853
2019-20	15.4709	17.8353	9.3507	13.3545
2020-21	17.2670	18.5992	10.7031	14.3261
2021-22	18.5736	15.6441	12.4808	14.8647
2022-23	19.5001	16.2679	13.3999	14.1406
AVERAGE	17.4689	16.3553	10.9562	12.9087

HDFC Bank: HDFC Bank consistently demonstrates superior capital utilization, with an average ROCE of 17.47% over the period. This indicates efficient allocation of capital to generate profits, positioning HDFC Bank as a leader among its peers. **Axis Bank:** Axis Bank follows closely with an average ROCE of 16.36%, indicating robust capital management. Although slightly below HDFC Bank, Axis Bank's performance reflects effective utilization of capital resources. **ICICI Bank**: ICICI Bank demonstrates resilience with an average ROCE of 10.96%. Despite facing challenges in certain years, ICICI Bank maintains a respectable level of capital efficiency, contributing to its overall financial stability.

Hypothesis

Null Hypothesis (H0): The return on capital employed ratios of various private sector banks in do not significantly differ from one another.

Alternative Hypothesis (H1): There is a significant disparity in the return on capital employed ratios of several private sector banks.

Analysis

F - Test (ANOVA): The two-way ANOVA test was performed to examine these hypotheses, and the results are presented in the table that follows.

Table No. 12 F-Test (ANOVA) of Return on Capital Employed Ratio

Source of Variation	SS	d.f	MS	F-value	F crit (5%)
Between Banks	589.43	4	147.3586	11.7380	2.6335
Error	451.94	36	12.5540		
Total	1142.37	49			

The estimated F-test value for the variation between banks of Return on Capital Employed Ratio is 11.7380, which is higher than the critical F-value (Fcrit) of 2.6335 at the 5% significance level. Thus, the researcher decides to reject the null hypothesis and accept the alternative hypothesis.

Asset Quality Ratios

Rate of return on total assets Ratio

Table 13- Return on the Total assets

Years	HDFC	AXIS	ICICI	Avg
2018-19	1.3255	1.3920	1.1076	1.2082
2019-20	1.4157	1.3961	1.2681	1.3011

2020-21	1.5291	1.4852	1.3650	1.4006
2021-22	1.6802	1.5209	1.5510	1.4991
2022-23	1.7247	1.6224	1.6498	1.5603
Average	1.4787	1.2356	1.2081	1.1737

HDFC Bank: HDFC Bank consistently demonstrates strong profitability performance, with an average ratio of 1.48%. This indicates the bank's effective utilization of its assets to generate profits. The consistent performance underscores HDFC Bank's robust financial management and operational efficiency. **Axis Bank:** Axis Bank maintains a favourable average ratio of 1.24%, indicating good profitability relative to its asset base. While slightly lower than HDFC Bank, Axis Bank's performance is commendable, reflecting sound financial strategies and effective resource allocation. **ICICI Bank** ICICI Bank also maintains competitive profitability performance, with an average ratio of 1.19%. Despite facing challenges in certain years, ICICI Bank demonstrates resilience and effective asset utilization to generate profits. The bank's consistent performance underscores its strong position in the market.

Hypotheses

Null Hypothesis (H0): The Rate of return on total assets Ratios of various Private Sector Banks do not significantly differ from one another.

Alternative Hypothesis (H1): The rates of return on total assets Ratio of selected private sector banks are significantly different from one another.

Analysis

F-Test (ANOVA): The two-way ANOVA test was conducted to analyze the hypotheses. The results are as follows:

Table No. 14 F-Test (ANOVA) of Rate of return on total assets Ratio

Source of Variation	**SS**	**d.f.**	**MS**	**F Value**	**F crit (5%)**
Between Banks	4.3019	4	1.0755	24.7239	2.6335
Error	1.5660	36	0.0435		
Total	8.7296	49			

The computed F-value for the variation between banks is 24.7239, with a critical value (F crit) of 2.6335 at the 5% significance level. Similar to the variation between years, the computed F-value (24.7239) surpasses the critical value (2.6335), leading to the rejection of the null hypothesis.

Management Earnings Ratios: Operating Expense on Total Fund Ratio

Table 15- Operating Expenses of selected public sector banks

Years	HDFC	AXIS	ICICI	Avg
2018-19	3.8165	2.9033	2.9382	3.4226
2019-20	2.8801	2.0381	1.6957	2.5276
2020-21	2.8588	2.1687	1.7213	2.4261
2021-22	3.0744	2.0973	1.7859	2.4229

2022-23	2.6745	2.1385	1.8412	2.4495
AVRAGE	3.2596	2.2034	2.3634	2.9074

HDFC Bank: HDFC Bank maintained an average Operating Expenses on Total Fund Ratio of 3.26% over the analyzed period. This indicates that the bank manages its operating expenses efficiently relative to its total funds. However, it's worth noting that there was some fluctuation in the ratio over the years, ranging from 2.6745% to 4.5410%. **Axis Bank:** Axis Bank demonstrated good cost management with an average ratio of 2.20% over the period. This suggests efficient regulation of operational expenditures in comparison to its total funds. Similar to HDFC Bank, Axis Bank also experienced fluctuations in the ratio, ranging from 1.5930% to 2.9033%. **ICICI Bank:** ICICI Bank displayed a competitive average ratio of 2.36%, indicating conservative expense management practices relative to its total funds. The bank maintained a consistent approach, with the ratio ranging from 1.6957% to 3.2171% over the analyzed years.

Hypothesis

Null Hypothesis (H0): There is no significant difference between any of the banks in the operating expense to total fund ratio of the private sector banks.

Alternative Hypothesis (H1): There is a significant gap when comparing the Operating Expense to Total Fund Ratio of several Private Sector Banks.

Analysis

F - Test (ANOVA): The two-way ANOVA test was performed to examine these hypotheses, and the results are presented in the table that follows.

Table No. 16 F-Test (ANOVA) of Operating Expense on Total Fund Ratio

Source of Variation	SS	d.f.	MS	F-value	F crit (5%)
Between Banks	16.4699	4	4.1175	31.6159	2.6335
Error	4.6884	36	0.1302		
Total	30.9553	49			

The computed F-value for the variation in the Operating Expense on Total Fund Ratio between banks was 31.6159, which substantially surpasses the critical F-value of 2.6335 at a significance level of 5%. This implies a notable discrepancy in the Operating Expense on Total Fund Ratio among the selected banks. Consequently, the alternative hypothesis is favoured,

Earning Ability Ratios:

Interest Income to Business Ratio:

Table 17- Interest Income to Business Ratio for selected public sector banks

Years	HDFC	AXIS	ICICI	Avg
2018-19	5.5153	4.7378	5.0321	5.8566
2019-20	5.4069	4.5696	5.0079	5.6024
2020-21	6.1716	5.6416	6.0341	6.4794

2021-22	6.5423	6.0462	6.6500	6.8395
2022-23	6.1365	5.9962	6.7560	6.6594
AVRAGE	5.8590	5.0656	5.4518	5.9430

HDFC Bank: HDFC Bank consistently maintained a competitive Interest Income to Business Ratio throughout the years, with an average ratio of 5.86%. This indicates effective utilization of business activities to generate interest income, showcasing the bank's efficiency in managing its business portfolio. Axis Bank: Axis Bank demonstrated a strong performance with an average Interest Income to Business Ratio of 5.07%. Similar to HDFC Bank, Axis Bank exhibited consistent performance in effectively generating interest income from its business activities. ICICI Bank: ICICI Bank demonstrated an average Interest Income to Business Ratio of 6.10%, reflecting a robust performance in generating interest income from business activities. The bank exhibited efficient strategies in managing its business operations to maximize returns and optimize revenue.

Hypothesis Bank

Null Hypothesis (H0): There is no significant difference between any of the selected banks in the Interest Income to Business Ratio.

Alternative Hypothesis (H1): There is a significant gap in the Interest Income to Business Ratio among the selected private sector banks.

Analysis

F - Test (ANOVA): The two-way ANOVA test was performed to examine these hypotheses, and the results are

Table No. 18 F-Test (ANOVA) of Interest Income to Business Ratio

Source of Variation	SS	d.f	MS	F-value	F crit(5%)
Between Banks	27.1060	4	6.7765	23.9178	2.6335
Error	10.1997	36	0.2833		
Total	63.8581	49			

The computed F-value for the variation in the Interest Income to Business Ratio between banks was 23.9178, which substantially surpasses the critical F-value of 2.6335 at a significance level of 5%. This implies a notable discrepancy in Interest Income to Business Ratio among the selected banks. Consequently, the alternative hypothesis is favoured,

Liquidity Ratio

Quick Ratio:

Table 19 - Quick Ratio of selected public sector banks

Years	HDFC	AXIS	ICICI	Avg
2018-19	0.9305	0.8461	1.0894	0.9329
2019-20	0.9092	0.8657	1.1102	0.9674
2020-21	0.8770	0.8346	1.1349	0.9673
2021-22	0.9013	0.8606	1.1335	0.9509

2022-23	0.9326	0.9194	1.1456	1.0014
AVRAGE	0.8542	0.8023	1.0874	0.9330

HDFC Bank consistently maintained a reasonably good Temporary Solvency Ratio, averaging at 0.85. This indicates a solid capacity to fulfil short-term liabilities without facing significant hurdles. Similarly, **Axis Bank** showcased a strong performance with an average ratio of 0.80, reflecting commendable short-term solvency. **ICICI** also have strong avg of 1.08 reflects moderate quick ratio. Overall, the average Ratio for the selected banks over the specified period stands at 0.93, aligning with the global average for the same timeframe. This underscores the importance of stakeholders, including investors and analysts, having access to such information to assess the short-term solvency of banks and their capability to meet immediate financial commitments.

Hypothesis

Null Hypothesis (H0): There is no discernible variation, on a significant scale, between the Quick Ratios of the various Private Sector Banks.

Alternative Hypothesis (H1): There is a significant gap to be seen between the Quick Ratios of several Private Sector Banks.

Analysis

F-Test (ANOVA: The two-way ANOVA test was performed to examine these hypotheses, and the results are

Table No. 20 F-Test (ANOVA) of Quick Ratio

Source of Variation	SS	d.f.	MS	F-value	F crit(5%)
Between Banks	0.6726	4	0.1681	51.0298	2.6335
Error	0.1186	36	0.0033		
Total	0.8733	49			

The computed F-value for the variation between banks was 51.0298, significantly higher than the critical F-value of 2.6335 at the 5% significance level. Therefore, the researcher rejected the null hypothesis and concluded that there is a significant difference in the Quick Ratio between the selected banks.

Summary of Findings

By examining key financial metrics within each component of the CAMELS framework, we gained a comprehensive understanding of the selected banks' performance drivers and risk exposures. This holistic assessment approach allowed us to identify patterns, trends, and outliers in the data, facilitating informed decision- making and strategic planning for stakeholders, regulators, and bank management teams.

Capital Adequacy

- Capital adequacy ratios varied significantly among the selected banks, indicating differences in their capital positions.
- Some banks displayed robust capital strength, while others showed signs of vulnerability, suggesting varying levels of financial resilience.

- Public sector banks generally exhibited stronger capital adequacy ratios compared to private sector banks, highlighting bigger stage of resilience within the public banking sector
- The findings underscore the importance of robust capitalization in navigating financial challenges and ensuring long-term sustainability.
- The observed divergence in capital adequacy ratios reflects differing strategies and risk profiles adopted by different banks

Asset Quality:

- Significant variations were observed in asset quality metrics, particularly non- performing asset (NPA) ratios, among the banks studied.
- The differences in NPA ratios reflected disparities in credit risk management practices across the banks.
- Some banks demonstrated effective asset quality management practices, resulting in lower NPA ratios.
- In contrast, other banks struggled with higher levels of non-performing assets, indicating potential risks to their financial stability.
- Addressing these asset quality concerns is crucial for banks to mitigate credit risk and maintain the overall health of their balance sheets.
- The findings highlight the importance of implementing robust asset quality management frameworks to ensure financial stability and minimize credit risk exposure

Management Efficiency:

- Efficiency ratios were analyzed to assess operational effectiveness and cost management strategies across the banks.
- Public Sector Banks generally demonstrated higher efficiency ratios compared to Private Sector Banks.
- The higher efficiency ratios observed in public sector Banks suggested more efficient utilization of resources and operational effectiveness.
- The findings underscored the significance of effective management practices in optimizing operational performance and minimizing costs.
- Effective cost management strategies contribute to overall organizational efficiency and competitiveness in the banking sector.
- The results highlight the importance for banks to focus on enhancing operational efficiency to maintain competitiveness in the market

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