

A Study on Risk Adjusted Performance Analysis of Bank Using Camel Model

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Abstract- This study evaluates the financial performance and relative soundness of ten selected Indian banks using an adapted CAMEL framework over a five-year period. The analysis focuses on capital adequacy, asset quality, management efficiency, earnings strength and liquidity to identify differences in the financial position of private- and public-sector banks. The findings reveal that Kotak Mahindra Bank achieved the highest composite CAMEL score, indicating the most balanced overall performance, while Axis Bank and IDBI Bank also recorded strong positions due to superior asset quality, deposit utilisation, capital adequacy and reserves. Union Bank of India ranked lowest over the study period, mainly because of weaker asset-quality indicators in the initial years, although several public-sector banks showed significant improvement in NPAs and capital strength. Private-sector banks generally recorded lower NPAs, stronger management-efficiency scores and higher reserves relative to assets, while SBI showed the strongest position under the investment-based liquidity measure. The Friedman test confirmed that differences in bank rankings were statistically significant. The study concludes that banks should strengthen capital buffers, improve credit appraisal and recovery systems, enhance digitalisation and risk management, diversify loan portfolios and use data analytics to support sustainable financial performance.

Keywords: camel analysis, banking performance, capital adequacy, asset quality, management efficiency, earnings strength, liquidity, non-performing assets, public-sector banks, private-sector banks, risk management, financial performance, credit risk, bank soundness, indian banking sector.

I. INTRODUCTION

India's banking system brings together institutions that collect deposits, extend credit, process payments and support the wider economy. By mobilising household savings and directing funds towards individuals, businesses and public bodies, banks connect surplus funds with productive uses. The Reserve Bank of India

(RBI) regulates and supervises this system so that banking operations remain orderly, stable and dependable. The Banking Regulation Act, 1949 provides the principal legal framework for banking companies and co-operative banks in India. It gives the RBI authority over licensing, governance, business operations, capital standards and inspection. These powers are intended to safeguard depositors and preserve confidence in the banking system. Private-sector banks are mainly owned by individuals, institutional investors and corporate shareholders rather than by the government. They operate under RBI regulation and offer services ranging from deposits and retail loans to business banking, payments and wealth management. public-sector bank is one in which the government owns at least 51 per cent of the equity. Although these banks are expected to remain commercially viable, they also carry a broader developmental role through financial inclusion, priority-sector lending and public service. Financial performance analysis examines how well banks use their resources, meet obligations and generate sustainable returns. Measures of profitability, solvency, asset quality and operating efficiency help regulators monitor stability, assist depositors in judging safety and support investors in making informed decisions. The same evidence also guides monetary and financial-sector policy.

II. REVIEW OF LITERATURE

1. R. Sateesh and P. Mohan Reddy (2026): CAMELS research mainly emphasizes asset quality and earnings, leading to the proposed CAMELS-DT framework incorporating digital capability and technology risk governance.
2. Latha Sreeram et al. (2026): The study confirmed that CAMEL effectively combines financial

- indicators to compare the stability and performance of public- and private-sector banks.
3. Rajib Sarkar (2026): The study found that AI improves credit-risk prediction but requires better data quality, transparency, explainability and regulatory oversight.
 4. Ayii Peter Alier (2026): The study found that foreign banks in South Sudan were generally healthy, although earnings, liquidity and market-risk sensitivity required improvement.
 5. Danijel Petrovic (2026): The study found that stronger risk management improves institutional efficiency, particularly through capital adequacy, management efficiency and solvency.
 6. Monica Lyras Ayunda and Edy Suryadi (2026): The study found that NIM improved profitability, while BOPO and LDR negatively affected ROA, highlighting the importance of cost and liquidity management.
 7. Anand K. (2026): The study proposed an expanded CAMELS framework incorporating resource utilisation and social performance to provide a broader assessment of bank performance.
 8. Shiv Ji Verma and Anjali Shukla (2026): The study found that higher NPAs and liquidity pressure reduced ROA and ROE, emphasizing stronger credit-risk and liquidity management.
 9. Muhammad Bako and Mu'azu Yunusa Riruwai (2026): The study found that capital adequacy, earnings, liquidity, market-risk sensitivity and financial inclusion significantly influenced bank performance.
 10. Zubaida Shukri Hussein Al-Mziri et al. (2026): The study found that greater interest-rate sensitivity weakened asset quality, highlighting the need for effective interest-rate risk management.
 11. Anjali Shukla (2026): The study found that higher NPAs and liquidity stress negatively affected private-bank profitability, emphasizing stronger credit monitoring and risk management.
 12. Roopa K. et al. (2026): The study found that private banks generally outperformed public banks in profitability, asset quality and technology, while public banks led in outreach and financial inclusion.
 13. Mostafa Sargolzaei et al. (2026): The study found that increased liquidity creation reduced capital adequacy, emphasizing the need to balance lending growth with sufficient capital buffers.
 14. Sarvjot Dhunna (2026): The study found that higher NPAs reduced ROA and ROE, while stronger capital adequacy supported the financial recovery of Indian public-sector banks.
 15. Rafiqoh et al. (2026): The study found that LDR significantly affected the share prices of Indonesian state-owned banks, whereas ROA and CAR had no significant impact.

III. RESEARCH METHODOLOGY

Nature of the Study: The research is descriptive as well as analytical. It first traces the movement of selected indicators over five years and then converts those observations into CAMEL ratios, peer-based component scores, composite scores and ranks.

Objectives:

1. To assess the capital, asset quality, management, earnings and liquidity position of each bank
2. To compare all ten banks over the same five-year period; to identify the relatively strong and weak areas of every bank; and
3. To test whether the differences in composite CAMEL performance are statistically significant.

Sources and Nature of Data: Secondary data were taken from Money control.com website and banks websites. The data relating to share capital, reserves and surplus, deposits, borrowings, liabilities and provisions, total assets, loans and advances, investments, other assets, CAR, GNPA and NNPA.

Sample Design: The sample includes ten banks. Indian Bank, Union Bank of India, Bank of Maharashtra, Bank of India and State Bank of India represent the public sector. Axis Bank, Bandhan Bank, IDBI Bank, Kotak Mahindra Bank and RBL Bank represent the private sector.

Period of the Study: The workbook columns contain March-end observations from 2022 to 2026. They are presented in the report as FY 2021-22, 2022-23, 2023-24, 2024-25 and 2025-26.

Statistical Tools & Tests

The study uses Camel model and bar charts. The Friedman test is applied for hypothesis testing, while

Kendall's W is reported to show the strength of the ranking agreement.

Hypotheses for the Statistical Test

Null hypothesis (H_0): The annual composite CAMEL ranks of the ten banks do not differ significantly.

Alternative hypothesis (H_1): The annual composite CAMEL rank of at least one bank differs significantly from the others.

Rationale for the Friedman Test: Every bank is observed in each of the same five years, so the data form matched blocks rather than independent groups. The number of time blocks is small and the composite measure is rank-based. The Friedman test is therefore more appropriate than an independent-samples ANOVA because it compares repeated rankings without requiring normality.

Comparative Score Construction

For every financial year, each bank is compared with the other nine banks on every CAMEL component. Higher values receive better scores for benefit indicators such as CAR, credit-deposit ratio, reserves to assets and investments to assets. For GNPA and NNPA, which are cost indicators, lower values receive better scores. Where two observations are equal, an average rank is assigned.

Benefit indicator score = $[(\text{Rank} - 1) \div (N - 1)] \times 100$

Cost indicator score = $[(\text{Reverse rank} - 1) \div (N - 1)] \times 100$

Asset Quality score = $(\text{GNPA comparative score} + \text{NNPA comparative score}) \div 2$

Composite CAMEL score = $(\text{C score} + \text{A score} + \text{M score} + \text{E score} + \text{L score}) \div 5$

The sample contains ten banks ($N = 10$). Each score therefore lies between 0 and 100 and represents a bank's position relative to the other banks in that particular year. The score is not an absolute regulatory grade. All five components are given equal weight because the study does not specify a different weighting scheme.

Interpretation Basis:

Score range	Relative reading	Important qualification
80–100	Very strong within the sample	This is a peer comparison, not an RBI grade.
60–79.99	Strong	Review the underlying ratio and its risk-return trade-off.
40–59.99	Moderate or mixed position	The bank may be strong in some components and weak in others.
20–39.99	Relatively weak	The score is below the midpoint of this sample.
0–19.99	Very weak within the sample	A low peer score does not necessarily mean regulatory non-compliance.

Detailed Bank-wise Analysis and Interpretation

The bank-wise tables report the annual CAMEL ratios together with the composite peer score. Each figure presents the average component scores for the five-year period. The raw ratios should be considered alongside the comparative score, since a high credit-deposit ratio or a large investment share may involve both benefits and risks.

Indian Bank

Table 1. CAMEL ratios and composite scores — Indian Bank

Financial year	CAR (%)	GNPA (%)	NNPA (%)	Credit-deposit (%)	Reserves / assets (%)	Investments / assets (%)	Composite CAMEL score
2021-22	16.00	8.00	2.27	65.57	6.48	26.18	34.44
2022-23	16.00	5.95	0.90	72.34	6.77	26.41	36.67
2023-24	16.00	3.95	0.43	74.84	7.40	27.05	44.44
2024-25	17.00	3.09	0.19	77.48	8.00	26.04	46.67
2025-26	17.00	1.98	0.15	79.13	7.94	24.98	43.33
Average	16.40	4.59	0.79	73.87	7.32	26.13	41.11

(source: Calculated values)

Interpretation: Indian Bank's most visible improvement was in asset quality. GNPA fell from 8.00% in FY 2021-22 to 1.98% in FY 2025-26, while NNPA declined from 2.27% to 0.15%. CAR moved up from 16.00% to 17.00%. Over the same period, the

credit-deposit ratio rose by 13.56 percentage points to 79.13%, indicating greater use of deposits for advances

Axis Bank

Table 2. CAMEL ratios and composite scores — Axis Bank

Financial year	CAR (%)	GNPA (%)	NNPA (%)	Credit-deposit (%)	Reserves / assets (%)	Investments / assets (%)	Composite CAMEL score
2021-22	18.00	2.82	0.73	88.33	9.83	22.97	62.22
2022-23	17.00	2.02	0.39	91.81	9.58	21.43	56.67
2023-24	16.00	1.43	0.31	93.65	10.24	21.89	57.78
2024-25	17.00	1.33	0.35	92.34	11.19	23.94	58.89
2025-26	16.00	1.24	0.39	96.15	10.94	22.94	55.56
Average	16.80	1.77	0.43	92.46	10.36	22.63	58.22

(source: calculated values)

Union Bank of India

Table 3. CAMEL ratios and composite scores — Union Bank of India.

Financial year	CAR (%)	GNPA (%)	NNPA (%)	Credit-deposit (%)	Reserves / assets (%)	Investments / assets (%)	Composite CAMEL score
2021-22	14.00	11.00	3.68	64.13	5.35	29.47	21.11
2022-23	16.00	7.53	1.70	68.22	5.58	26.68	23.33
2023-24	16.00	4.76	1.03	71.38	6.41	24.53	25.56
2024-25	18.00	3.60	0.63	72.91	7.02	23.95	31.11
2025-26	18.00	2.82	0.48	80.72	7.93	21.65	31.11
Average	16.40	5.94	1.50	71.47	6.46	25.26	26.44

(Source: calculated values)

Interpretation: Union Bank of India improved sharply across most indicators. CAR rose from 14.00% to 18.00%, GNPA dropped from 11.00% to 2.82%, and NNPA fell from 3.68% to 0.48%. The credit-deposit ratio increased by 16.58 percentage points to 80.72%. Reserves to assets advanced from 5.35% to 7.93%,

while investments to assets declined from 29.47% to 21.65%.

Bank of Maharashtra

Table 4. CAMEL ratios and composite scores — Bank of Maharashtra

Financial year	CAR (%)	GNPA (%)	NNPA (%)	Credit-deposit (%)	Reserves / assets (%)	Investments / assets (%)	Composite CAMEL score
2021-22	16.00	4.00	0.97	64.85	3.18	29.79	40.56
2022-23	18.00	2.00	0.25	73.15	3.38	25.78	52.22

2023-24	17.00	1.88	0.20	73.96	4.16	22.28	42.22
2024-25	20.00	1.74	0.18	76.87	5.69	22.26	41.11
2025-26	18.00	1.45	0.13	82.19	5.97	23.76	49.44
Average	17.80	2.21	0.35	74.20	4.48	24.77	45.11

(Source: Calculated values)

The bank's five-year composite average was 45.11, which placed it fifth. Asset quality was its strongest comparative dimension at 84.44. The earnings-strength proxy received the lowest score, 0.00, because reserves represented a smaller share of assets than in the peer banks. Even so, the underlying

reserves ratio increased steadily, so the relative score should not be read as an absolute decline.

Bank of India

Table 5. CAMEL ratios and composite scores — Bank of India

Financial year	CAR (%)	GNPA (%)	NNPA (%)	Credit-deposit (%)	Reserves / assets (%)	Investments / assets (%)	Composite CAMEL score
2021-22	17.00	10.00	2.34	67.15	7.05	24.26	38.89
2022-23	16.00	7.31	1.66	72.70	6.82	25.58	30.00
2023-24	16.00	4.98	1.22	76.51	7.14	25.38	35.56
2024-25	17.00	3.27	0.82	79.72	7.21	25.37	38.89
2025-26	18.00	1.98	0.56	82.13	7.24	23.66	37.22
Average	16.80	5.51	1.32	75.64	7.09	24.85	36.11

(Source: Calculated values)

Interpretation: Bank of India made considerable progress in reducing stressed assets. GNPA moved down from 10.00% to 1.98% and NNPA from 2.34% to 0.56%. CAR improved from 17.00% to 18.00%, and the credit-deposit ratio rose by 14.99 percentage points to 82.13%. Reserves to assets changed only slightly,

from 7.05% to 7.24%, while investments to assets eased from 24.26% to 23.66%.

State Bank of India

Table 6. CAMEL ratios and composite scores — State Bank of India

Financial year	CAR (%)	GNPA (%)	NNPA (%)	Credit-deposit (%)	Reserves / assets (%)	Investments / assets (%)	Composite CAMEL score
2021-22	13.00	3.97	1.02	68.36	5.68	33.14	50.00
2022-23	14.00	2.78	0.67	73.13	6.01	32.13	46.67
2023-24	14.00	2.24	0.57	76.20	6.15	31.34	37.78
2024-25	14.00	1.82	0.47	78.14	6.65	30.16	38.89
2025-26	15.00	1.49	0.39	82.38	7.15	28.35	45.56
Average	14.00	2.46	0.62	75.64	6.33	31.02	43.78

(Source: Calculated values)

Interpretation: State Bank of India showed steady improvement in capital and asset quality. CAR rose from 13.00% to 15.00%, GNPA declined from 3.97%

to 1.49%, and NNPA fell from 1.02% to 0.39%. The credit-deposit ratio increased by 14.02 percentage points to 82.38%. Reserves to assets moved from

5.68% to 7.15%, while investments to assets fell from 33.14% to 28.35%. SBI recorded a five-year composite average of 43.78 and ranked sixth. Its strongest relative feature was liquidity, with a

component score of 91.11, reflecting the large investment share in its asset mix.

Bandhan Bank

Table 7. CAMEL ratios and composite scores — Bandhan Bank

Financial year	CAR (%)	GNPA (%)	NNPA (%)	Credit-deposit %	Reserves assets (%) /	Investments assets (%) /	CAMEL score
2021-22	20.00	6.46	1.66	97.55	11.36	20.94	63.33
2022-23	19.00	4.87	1.17	96.93	11.54	20.78	57.78
2023-24	18.00	3.84	1.11	89.60	11.22	16.47	54.44
2024-25	18.00	4.71	1.28	87.29	11.88	21.26	43.33
2025-26	18.00	3.27	0.97	90.24	11.20	18.32	45.56
Average	18.60	4.63	1.24	92.32	11.44	19.55	52.89

(Source: Calculated values)

Interpretation: Bandhan Bank's capital and investment ratios weakened, while its asset quality improved. CAR declined from 20.00% to 18.00%, GNPA fell from 6.46% to 3.27%, and NNPA reduced from 1.66% to 0.97%. The credit-deposit ratio came down from 97.55% to 90.24%, a fall of 7.32 percentage points.

Reserves to assets stayed broadly stable, moving from 11.36% to 11.20%, whereas investments to assets declined from 20.94% to 18.32%.

IDBI Bank

Table 8. CAMEL ratios and composite scores — IDBI Bank

Financial year	CAR (%)	GNPA (%)	NNPA (%)	Credit-deposit (%)	Reserves assets (%) /	Investments assets (%) /	Composite CAMEL score
2021-22	19.00	19.00	1.27	62.60	10.52	27.61	45.56
2022-23	20.00	6.38	0.92	63.66	10.73	30.29	53.33
2023-24	22.00	4.53	0.34	67.99	11.07	31.77	62.78
2024-25	25.00	2.98	0.15	70.46	12.32	28.68	67.78
2025-26	26.00	2.32	0.15	73.14	12.37	27.48	63.89
Average	22.40	7.04	0.57	67.57	11.40	29.17	58.67

(Source: Calculated values)

Interpretation: IDBI Bank registered the largest capital improvement in the sample. CAR increased from 19.00% to 26.00%, while GNPA fell sharply from 19.00% to 2.32% and NNPA from 1.27% to 0.15%. The credit-deposit ratio rose by 10.53 percentage

points to 73.14%. Reserves to assets increased from 10.52% to 12.37%, and investments to assets remained broadly stable at around 27.5%.

Kotak Mahindra Bank

Table 9. CAMEL ratios and composite scores — Kotak Mahindra Bank

Financial year	CAR (%)	GNPA (%)	NNPA (%)	Credit-deposit (%)	Reserves / assets (%)	Investments / assets (%)	Composite CAMEL score
2021-22	22.00	2.34	0.64	98.19	17.50	30.11	97.78
2022-23	21.00	1.80	0.40	99.40	17.85	31.48	95.56
2023-24	20.00	1.39	0.34	96.65	16.79	32.10	95.00
2024-25	22.00	1.40	0.30	98.27	17.78	32.31	92.22
2025-26	22.00	1.20	0.25	99.79	17.95	28.97	94.44
Average	21.40	1.63	0.39	98.46	17.57	30.99	95.00

(Source: Calculated values)

Interpretation: Kotak Mahindra Bank maintained a consistently strong profile. CAR was 22.00% in both the first and last years, while GNPA improved from 2.34% to 1.20% and NNPA from 0.64% to 0.25%. The credit-deposit ratio increased slightly from 98.19% to 99.79%. Reserves to assets rose from 17.50% to

17.95%, and investments to assets moved from 30.11% to 28.97%.

RBL Bank

Table 10. CAMEL ratios and composite scores — RBL Bank

Financial year	CAR (%)	GNPA (%)	NNPA (%)	Credit-deposit (%)	Reserves / assets (%)	Investments / assets (%)	Composite CAMEL score
2021-22	16.00	4.00	1.34	75.95	11.24	20.84	46.11
2022-23	16.00	3.37	1.10	82.69	11.16	24.81	47.78
2023-24	16.00	2.65	0.74	81.17	10.28	21.29	44.44
2024-25	15.00	2.60	0.29	83.49	10.15	21.87	41.11
2025-26	14.00	1.45	0.39	82.20	8.81	17.74	33.89
Average	15.40	2.81	0.77	81.10	10.33	21.31	42.67

(Source: Calculated values)

Interpretation: RBL Bank improved its NPA ratios but weakened in capital, reserves and investments. CAR declined from 16.00% to 14.00%, GNPA fell from 4.00% to 1.45%, and NNPA from 1.34% to 0.39%. The credit-deposit ratio increased by 6.26 percentage points to 82.20%. Reserves to assets reduced from

11.24% to 8.81%, while investments to assets fell from 20.84% to 17.74%.

Consolidated Comparative Analysis

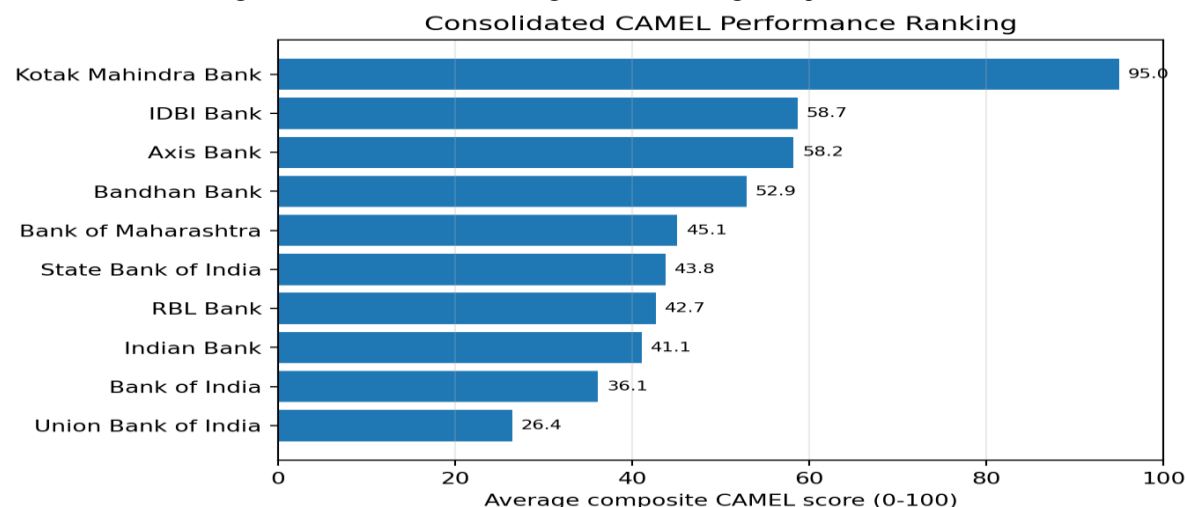
Table 11. Consolidated five-year average CAMEL ratios, scores and ranks

Ran k	Bank	Avg CAR	Avg GNPA	Avg NNPA	Avg CDR	Avg reserves / assets	Avg investments / assets	Avg CAMEL score
1	Kotak Mahindra Bank	21.40	1.63	0.39	98.46	17.57	30.99	95.00
2	IDBI Bank	22.40	7.04	0.57	67.57	11.40	29.17	58.67
3	Axis Bank	16.80	1.77	0.43	92.46	10.36	22.63	58.22
4	Bandhan Bank	18.60	4.63	1.24	92.32	11.44	19.55	52.89

5	Bank of Maharashtra	17.80	2.21	0.35	74.20	4.48	24.77	45.11
6	State Bank of India	14.00	2.46	0.62	75.64	6.33	31.02	43.78
7	RBL Bank	15.40	2.81	0.77	81.10	10.33	21.31	42.67
8	Indian Bank	16.40	4.59	0.79	73.87	7.32	26.13	41.11
9	Bank of India	16.80	5.51	1.32	75.64	7.09	24.85	36.11
10	Union Bank of India	16.40	5.94	1.50	71.47	6.46	25.26	26.44

(Source: Calculated values)

Figure 11. Consolidated ranking based on average composite CAMEL score



IV. CONSOLIDATED INTERPRETATION

Kotak Mahindra Bank achieved the highest average composite score, 95.00, and led most of the peer-based dimensions. IDBI Bank and Axis Bank followed, although their strengths were different. IDBI's position was driven mainly by capital adequacy, reserves and investments, while Axis benefited from better asset quality and stronger deposit deployment. Union Bank of India and Bank of India occupied lower five-year positions because their early NPA levels were high, even though both improved considerably by FY 2025-26. Taken together, the five private-sector banks recorded an average composite score of 61.49, compared with 38.51 for the five public-sector banks.

S L No	Bank	Friedman Mean Rank	Interpretation
1	Kotak Mahindra Bank	10.00	Highest and most consistent

2	Axis Bank	8.00	Strong
3	IDBI Bank	7.80	Strong
4	Bandhan Bank	7.30	Above the sample midpoint
5	Bank of Maharashtra	5.20	Middle position
6	State Bank of India	4.50	Middle position
7	RBL Bank	4.50	Middle position
8	Indian Bank	4.30	Below the sample midpoint
9	Bank of India	2.40	Lower relative position
10	Union Bank of India	1.00	Lowest relative position

This is a descriptive difference within the chosen sample, not a conclusion about the entire banking sector. Kotak Mahindra Bank's exceptionally high score and the early stress in some public-sector banks have a strong influence on the gap.

The most consistent trend across the ten banks was the decline in gross and net NPA ratios. Credit-deposit ratios generally moved upward, suggesting that a larger portion of deposits was channeled into advances. In several banks, the investment-to-assets ratio moved downward at the same time, indicating a gradual change in the composition of assets away from investments and towards lending or other assets.

Statistical Test: Friedman Test

The Friedman test uses the annual composite CAMEL scores for the same ten banks over five matched financial years. A higher mean rank represents stronger and more consistent relative performance across the study period.

Table 13. Friedman test statistics

Number of matched years (N)	5
Number of banks	10
Friedman chi-square	37.411
Degrees of freedom	9
Asymptotic significance (p-value)	0.000022
Kendall's W	0.831

Decision: The computed p-value of 0.000022 is below the 5% level of significance. The null hypothesis is therefore rejected. The test confirms a statistically significant difference in composite CAMEL performance among the ten banks over the five matched years, $\chi^2(9) = 37.411$, $p < 0.001$. Kendall's W is 0.831, indicating strong and consistent separation in the rankings. This result shows that the observed differences are unlikely to be due to chance alone. It does not, however, identify which individual pairs of banks differ significantly.

V. FINDINGS

1. Kotak Mahindra Bank obtained the highest composite CAMEL score in the selected sample and showed the most balanced overall position.

2. Axis Bank performed strongly because of its low NPA ratios and high level of deposit deployment.
3. IDBI Bank's high ranking was supported by a marked rise in capital adequacy and a comparatively strong reserves position.
4. Union Bank of India occupied the lowest five-year rank, largely because of weak asset-quality indicators in the opening years.
5. Most banks reported capital adequacy ratios above the applicable minimum requirement throughout the period.
6. Gross and net NPA ratios declined in the majority of banks, pointing to a broad improvement in credit quality.
7. On average, the selected private-sector banks carried lower NPA ratios than several of the public-sector banks.
8. Bank of Maharashtra recorded one of the clearest improvements in asset quality.
9. State Bank of India held the strongest position under the investment-based liquidity proxy.
10. Credit-deposit ratios increased for most banks, showing a greater use of deposits for lending.
11. The private-sector group generally achieved stronger peer scores for management efficiency.
12. Reserves as a proportion of assets, used as the earnings-strength proxy, were generally higher among the private-sector banks.

VI. SUGGESTIONS

1. Banks should maintain capital buffers comfortably above the regulatory minimum so that they can absorb future shocks.
2. Public-sector banks should continue reducing NPAs through closer account monitoring, timely restructuring where justified and stronger recovery action.
3. Credit appraisal should be strengthened before sanctioning a loan, with greater attention to borrower cash flows and sector-specific risk.
4. Further investment in digital processes can reduce transaction costs and improve the speed and quality of service.
5. Risk-management systems should bring credit, market, liquidity, cyber and operational risks into a coordinated framework.

6. Regular staff development is needed in credit analysis, compliance, technology and customer service.
7. Loan portfolios should be diversified across borrowers, industries and regions to reduce concentration risk.
8. Liquidity indicators should be reviewed continuously, particularly where credit-deposit ratios are high or investment buffers are declining.
9. Artificial intelligence and data analytics may be used to support credit assessment, early-warning systems and fraud detection, subject to proper validation and oversight.
10. Public-sector banks can improve profitability by controlling avoidable costs and making better use of their branch and digital networks.

VII. CONCLUSION

The adapted CAMEL analysis reveals clear differences in the financial structure and relative performance of the ten selected banks. Kotak Mahindra Bank emerged as the leading institution, while Axis Bank and IDBI Bank also recorded strong composite positions for different reasons. Public-sector banks generally began with greater asset-quality pressure, but several of them made substantial progress in reducing NPAs and improving capital adequacy. The Friedman test confirms that the repeated ranking differences are statistically significant rather than incidental. These conclusions must nevertheless be read within the study's limits, particularly the use of balance-sheet proxies for management efficiency, earnings strength and liquidity.

BIBLIOGRAPHY

- [1] Sateesh, R., & Mohan Reddy, P. (2026). *A systematic review of the CAMELS framework in Indian banking: Towards a CAMELS-DT model*. Journal of Banking and Financial Studies.
- [2] Sreeram, L. (2026). *Performance assessment of selected public and private sector banks using the CAMEL model*. International Journal of Finance and Banking.
- [3] Sarkar, R. (2026). *AI-driven credit risk assessment in commercial banking: A systematic review*. Journal of Financial Technology.
- [4] Alier, A. P. (2026). *Financial performance evaluation of foreign banks in South Sudan using the CAMELS framework*. African Journal of Banking and Finance.
- [5] Petrovic, D. (2026). *Risk management and efficiency of banks and insurance companies*. Journal of Risk Management.
- [6] Ayunda, M. L., & Suryadi, E. (2026). *Determinants of bank profitability using the CAMEL framework with firm size as a moderating variable*. International Journal of Economics and Finance.
- [7] Anand, K. (2026). *An enhanced CAMELS framework for evaluating banking performance*. Journal of Banking Research.
- [8] Verma, S. J., & Shukla, A. (2026). *Credit risk, liquidity risk and financial performance of Indian private banks*. Indian Journal of Finance.
- [9] Bako, M., & Riruwai, M. Y. (2026). *CAMELS indicators, financial inclusion and bank performance in Nigeria*. International Journal of Banking Studies.
- [10] Hussein Al-Mziri, Z. S. (2026). *Interest rate sensitivity and asset quality in GCC commercial banks*. Middle East Journal of Finance.
- [11] Shukla, A. (2026). *Impact of credit and liquidity risks on financial performance of Indian private banks*. Journal of Financial Management.