

A Comparative Evaluation of Financial Soundness and Operational Efficiency of State Bank of India (SBI) and Bank of Baroda (BOB): An Empirical Study Using the CAMEL Model

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ABSTRACT

The Indian banking sector has been instrumental in supporting the country's economic development, even while confronting challenges such as economic instability, deteriorating asset quality, issues in corporate governance, and a decelerating economy. In response, the sector has experienced substantial reforms, regulatory changes, and policy interventions. This study focuses on the CAMEL framework—comprising Capital Adequacy, Asset Quality, Management Efficiency, Earnings, and Liquidity—which serves as an internal supervisory rating system to evaluate the overall performance of banks. The CAMEL rating approach assesses these five critical dimensions to determine a bank's financial soundness and operational efficiency. By examining selected banks from both public and private sectors, specifically Bank of Baroda, and State Bank of India, the study aims to provide a comparative understanding of their performance and generate meaningful insights. These banks are considered leading institutions in their respective sectors, making them suitable choices for this analysis.

Keywords: CAMEL Model, Capital Adequacy, Asset Quality, Management Efficiency, Earnings, Liquidity, Bank of Baroda, State Bank of India.

1. Introduction

After the nationalization of banks, the Indian banking system has witnessed significant expansion in terms of branch networks and financial instruments. Over time, the sector has experienced rapid growth and transformation. In its early stages, banking activities were largely confined to basic functions such as accepting deposits and providing loans. However, in the modern era, the banking industry has evolved into a highly complex and diversified sector.

Today, banks offer a wide range of products and services, including retail banking, investment banking, capital market services, fund mobilization, and money market operations. With the adoption of advanced technologies and innovative strategies, banks now manage a large customer base, high volumes of transactions, and multiple types of accounts efficiently. The primary objectives of banks have also expanded to include not only profit maximization and wealth creation but also enhancing customer satisfaction.

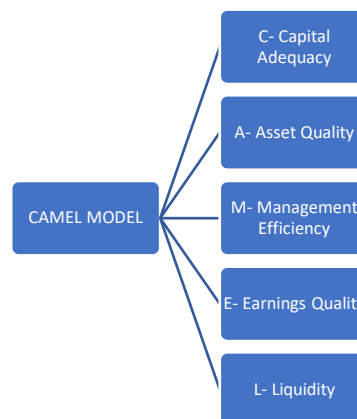
The growth of the banking sector plays a vital role in strengthening the financial system and promoting overall economic development. Banks act as the backbone of the economy by maintaining stability in

monetary demand and supply. They serve as key facilitators of economic growth by channeling funds from surplus units (depositors) to deficit units (borrowers), such as industrialists and individuals.

In addition to traditional lending activities, modern banks generate income through various services, including agency functions and foreign exchange transactions. By lending funds at higher interest rates and offering financial services across domestic and international markets, banks enhance their profitability. Evaluating the performance of the Indian banking sector is a complex task, as it involves multiple criteria when classifying banks from strong to weak performers. Financial performance is generally assessed through two approaches: external evaluations conducted by rating agencies and internal assessments carried out by the bank's own management and supervisory authorities, commonly referred to as internal ratings.

The primary purpose of these internal regulatory and supervisory rating systems is to regularly monitor the bank's performance and ensure that it remains aligned with its strategic and operational objectives. Such ratings are confidential in nature and are typically accessible only to the senior management or top-level executives within the bank (Vanlalawna, 2016).

CONCEPT OF CAMEL MODEL



The abbreviation CAMEL stands for "Capital Adequacy, Asset Quality, Management Quality, Earnings Ability, and Liquidity Management". The CAMEL model is a ratio-based internal tool used for rating, monitoring, regulation, and supervision, designed to evaluate the financial soundness of banks through both on-site and off-site surveillance methods. It was developed to ensure effective control and oversight of the financial system. CAMEL serves as a structured, systematic, and reliable framework for performance evaluation (Malihe Rostami, 2015).

This model promotes transparency, improvement, and institutional development within banks through its well-established methodology. It examines key financial indicators by incorporating both quantitative ratios and broader qualitative as well as quantitative factors. While the quantitative approach focuses on measurable financial data, the qualitative aspect considers subjective elements that influence the functioning and management of financial institutions (Uyen Dang, 2011).

Although originally introduced in the American financial system as a preventive mechanism before institutional failure, the CAMEL rating system has proven to be an effective internal assessment tool that encourages banks to undertake timely corrective measures and strengthen their overall performance.

CAMEL RATING SYSTEM

The CAMEL framework is an internal rating system used to assess the financial soundness of banks and

savings institutions. It is widely utilized by government policy bodies, central banks responsible for regulating commercial banks, and non-governmental research organizations. The system originated in 1979 when the Federal Reserve System proposed the Uniform Financial Institutions Rating System (UFIRS), which was subsequently implemented across financial institutions in the United States and later adopted globally.

The methodology gained international recognition through the acronym “CAMEL.” It was further developed with contributions from ACCION, an organization focused on promoting financial development. During the 1980s, North American banking regulators refined the CAMEL approach as a tool to evaluate both the managerial efficiency and financial stability of commercial banks (Milligan, 2002). This framework enabled regulators to systematically monitor and assess the performance and reliability of financial institutions.

2. LITERATURE REVIEW

Recent studies on the CAMEL model have extensively examined its effectiveness as a tool for evaluating the financial performance and stability of banks. A comprehensive review by Lokeshwari (2024) highlights that the CAMEL framework integrates both qualitative and quantitative indicators, making it a robust mechanism for assessing banking soundness. The study emphasizes that CAMEL not only identifies financial weaknesses but also supports regulatory monitoring and compliance within the banking sector. Several empirical studies have applied the CAMEL model to analyze the performance of individual banks. Hari Ram (2025) conducted a detailed analysis of HDFC Bank over the period 2019–2024 and found that the bank maintained strong capital adequacy and liquidity positions, although slight concerns were observed in asset quality and profitability. Similarly, Dubey et al. (2025) evaluated the performance of State Bank of India and concluded that the bank demonstrated consistent operational efficiency and financial stability, making it one of the most resilient public sector banks.

Comparative studies have also been widely conducted using the CAMEL framework. Chavda and Derashri (2025) compared public and private sector banks, revealing that private sector banks tend to outperform public sector banks in terms of profitability and managerial efficiency, while public sector banks exhibit greater stability. Supporting this view, Bansal and Singh (2024) analyzed selected commercial banks and found that capital adequacy and asset quality are key determinants of bank performance, with lower non-performing assets (NPAs) contributing significantly to better financial outcomes.

Research has also extended to emerging banking segments. Mistry et al. (2023) examined small finance banks in India and reported that although these banks are expanding rapidly, they face challenges related to asset quality and earnings consistency. This indicates that while growth opportunities exist, risk management remains a critical concern for newer banking institutions.

Further studies have explored the relationship between CAMEL components and overall bank performance. Qureshi and Siddiqui (2023) found that capital adequacy, earnings, and management efficiency positively influence profitability, whereas poor asset quality has a negative impact. Similarly, Sami et al. (2024) conducted a longitudinal study of Indian banks and concluded that the sector, overall, maintains strong capital positions and stable financial health, reflecting effective regulatory oversight.

In addition to traditional applications, recent literature has also discussed the evolution of the CAMEL model. Potharla (2025) proposed an extended version, CAMELS-C, which incorporates factors such as compliance and technological systems to address emerging risks like cyber threats and governance issues. This highlights the need to adapt the model to the changing dynamics of the modern banking environment.

Further enriching the literature, Sharma and Mehta (2024) conducted a comparative analysis of leading private sector banks in India using the CAMEL model. Their findings revealed that banks such as HDFC Bank and ICICI Bank demonstrated superior performance in terms of capital adequacy and earnings quality, largely due to efficient risk management practices and diversified income sources. However, the study also noted that rising operational costs could impact future profitability.

Kumar and Rao (2023) focused on public sector banks and highlighted that although these banks have improved significantly in capital adequacy following regulatory reforms, issues related to non-performing assets (NPAs) still persist. Their study emphasized that asset quality remains the most critical challenge affecting the overall CAMEL rating of public sector banks.

In another study, Verma et al. (2024) analyzed regional rural banks (RRBs) and found that while these banks perform well in maintaining liquidity and serving financial inclusion goals, they lag behind in profitability and management efficiency. The study suggested that technological adoption and better governance practices could enhance their CAMEL performance.

Patel and Joshi (2025) examined the impact of macroeconomic variables on CAMEL indicators and concluded that inflation, interest rates, and GDP growth significantly influence bank performance, particularly affecting earnings and asset quality. This study highlights the importance of considering external economic factors while interpreting CAMEL-based evaluations.

Lastly, Nair and Pillai (2024) explored the integration of sustainability into the CAMEL framework and proposed a modified model incorporating ESG (Environmental, Social, and Governance) parameters. Their findings suggest that banks with strong ESG practices tend to exhibit better long-term stability and lower financial risk, indicating a shift towards more holistic performance assessment models.

Overall, the literature suggests that the CAMEL model is a reliable and widely accepted framework for assessing bank performance. However, with the increasing complexity of the financial sector, there is a growing need to integrate additional dimensions such as technology risk, sustainability, and customer-centric metrics. This indicates a significant scope for further research in enhancing the applicability of the CAMEL model in the contemporary banking landscape.

RESEARCH GAP

Despite the extensive application of the CAMEL framework in evaluating banking performance, several critical gaps remain in the existing literature:

- Most studies focus on either public sector or private sector banks independently, with limited comparative analysis between leading representatives such as State Bank of India and Bank of Baroda using recent data.
- Existing research often relies on short time horizons, thereby failing to capture long-term performance trends and post-reform impacts in the Indian banking sector.
- Many studies emphasize quantitative ratio analysis but overlook the integrated interpretation of CAMEL components, particularly the interrelationship between asset quality, management efficiency, and earnings quality.
- There is insufficient focus on post-pandemic financial resilience, especially how banks have adapted in terms of capital adequacy and liquidity management after COVID-19.
- Prior research provides descriptive findings but lacks statistical validation and hypothesis testing, which is essential for drawing robust and generalizable conclusions.

Therefore, this study attempts to bridge these gaps by conducting a comparative, data-driven, and analytically rigorous evaluation of SBI and Bank of Baroda using the CAMEL model over a recent and relevant time period.

3. RESEARCH OBJECTIVES

Primary Objective

To evaluate and compare the financial performance of State Bank of India and Bank of Baroda using the CAMEL model.

Secondary Objectives

1. To analyze the Capital Adequacy position of SBI and Bank of Baroda Bank.
2. To examine the Asset Quality and risk management practices of both banks.
3. To assess Management Efficiency in terms of operational performance.
4. To evaluate the Earnings Quality and profitability of the selected banks.
5. To study the Liquidity position and short-term solvency of both banks.
6. To provide a comparative ranking based on CAMEL parameters.
7. To identify strengths, weaknesses, and areas of improvement in both banks.

RESEARCH HYPOTHESES

H₀ : There is no significant difference in the financial performance of SBI and Bank of Baroda based on CAMEL parameters.

H₁ : There is a significant difference in the financial performance of SBI and Bank of Baroda based on CAMEL parameters.

RESEARCH METHODOLOGY

Research Design

The present study adopts a descriptive and analytical research design to evaluate the financial performance of the selected banks under the CAMEL framework. The descriptive component of the research focuses on the systematic presentation of financial data related to various CAMEL parameters, including capital adequacy, asset quality, management efficiency, earnings quality, and liquidity. This helps in organizing and summarizing large volumes of financial information in a structured manner.

Data

The study is based entirely on secondary data, which forms the foundation for the analysis of financial performance. The data required for the study has been collected from various reliable and authentic sources. These include the annual reports of the State Bank of India and Bank of Baroda, which provide detailed financial statements and performance insights. Additional data has been obtained from reports and publications of the Reserve Bank of India, which offer industry-level information and regulatory perspectives.

Further, official websites and investor presentations of the respective banks have been used to supplement financial data and gain updated insights. Peer-reviewed journals, research articles, and financial databases have also been consulted to support the analysis and provide a theoretical foundation.

Study Period

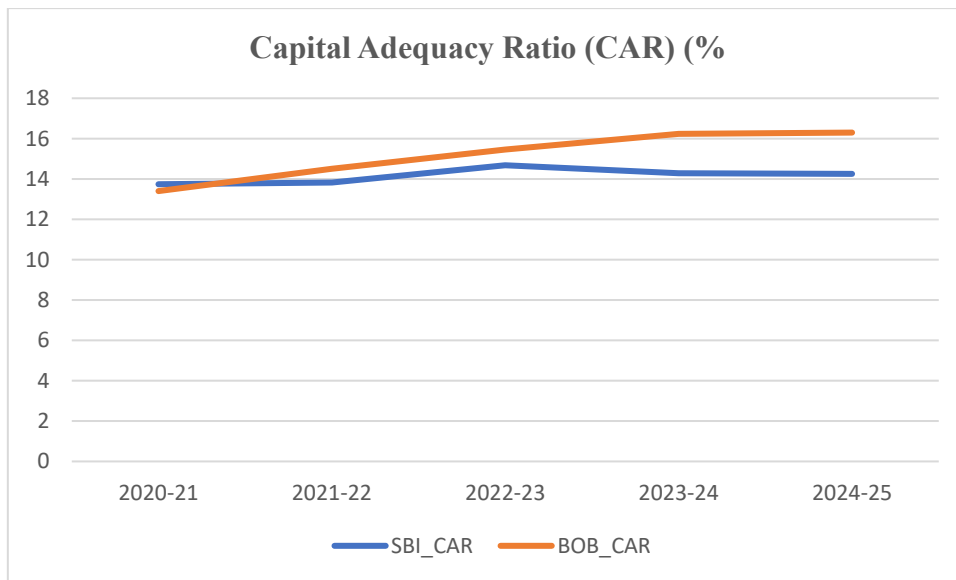
The study covers a period of **five financial years, from 2020–21 to 2024–25**. This time frame has been deliberately chosen to capture recent trends in banking performance.

The selected period is particularly significant as it includes the impact of the COVID-19 pandemic as well as the subsequent recovery phase. This allows for an analysis of how banks have responded to economic disruptions and adapted to changing financial conditions. Moreover, the period reflects the current regulatory and economic environment, thereby enhancing the relevance and applicability of the findings.

4. DATA ANALYSIS AND INTERPRETATION

Table 4.1: Capital Adequacy Ratio (CAR) (%)

Year	SBI_CAR	BOB_CAR
2020-21	13.74	13.4
2021-22	13.83	14.5
2022-23	14.68	15.46
2023-24	14.28	16.24
2024-25	14.25	16.3



Interpretation

Bank of Baroda consistently maintains a higher CAR than SBI . SBI shows stable but moderate capital strength. BOB indicates stronger capital buffer and risk absorption capacity

4.2 Gross NPA (%)

Year	SBI_GNPA	BOB_GNPA
2020-21	4.98	8.87
2021-22	3.97	7.25
2022-23	2.78	5.89
2023-24	2.24	4.53
2024-25	1.82	3.79

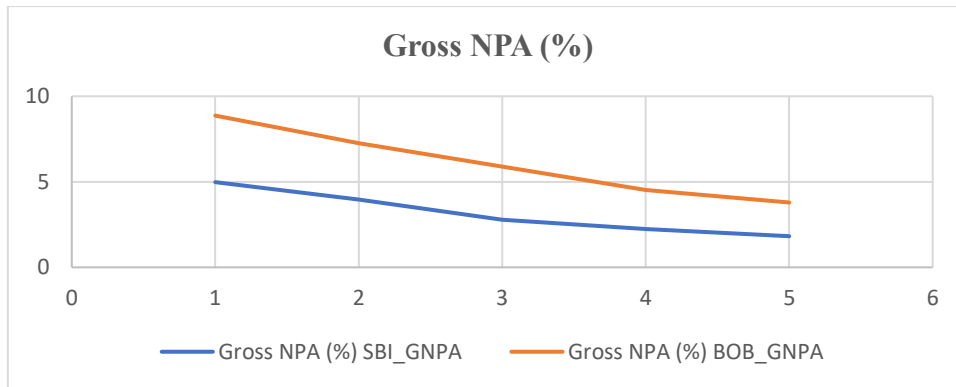
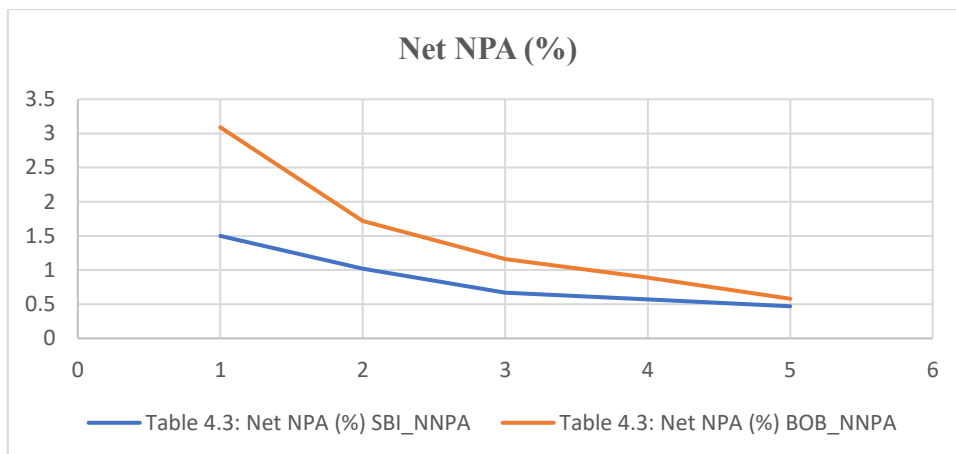


Table 4.3: Net NPA (%)

Year	SBI_NNPA	BOB_NNPA
2020-21	1.5	3.09
2021-22	1.02	1.72
2022-23	0.67	1.16
2023-24	0.57	0.89
2024-25	0.47	0.58



Interpretation

SBI has significantly lower NPAs throughout the period. Both banks show a declining trend (improvement post-COVID). SBI demonstrates better credit risk management.

4.4 Earnings Quality Analysis

Table 44: Return on Assets (ROA) (%)

Year	SBI_ROA	BOB_ROA
2020-21	0.48	0.18
2021-22	0.67	0.73
2022-23	0.96	0.92
2023-24	1.04	1.05
2024-25	1.1	1.09

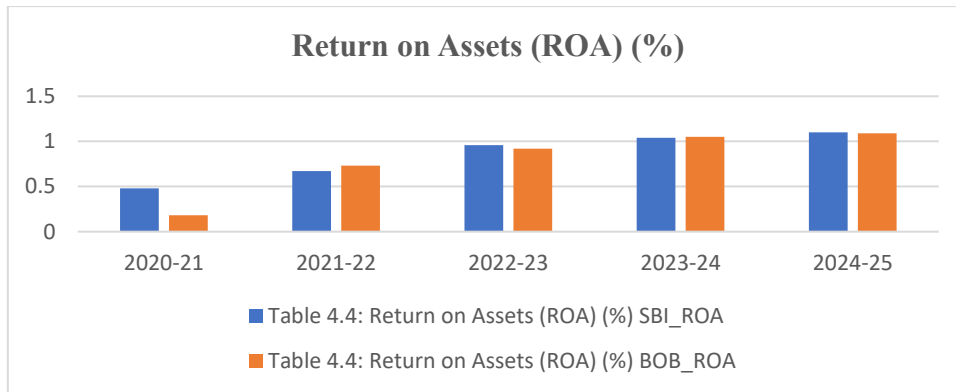
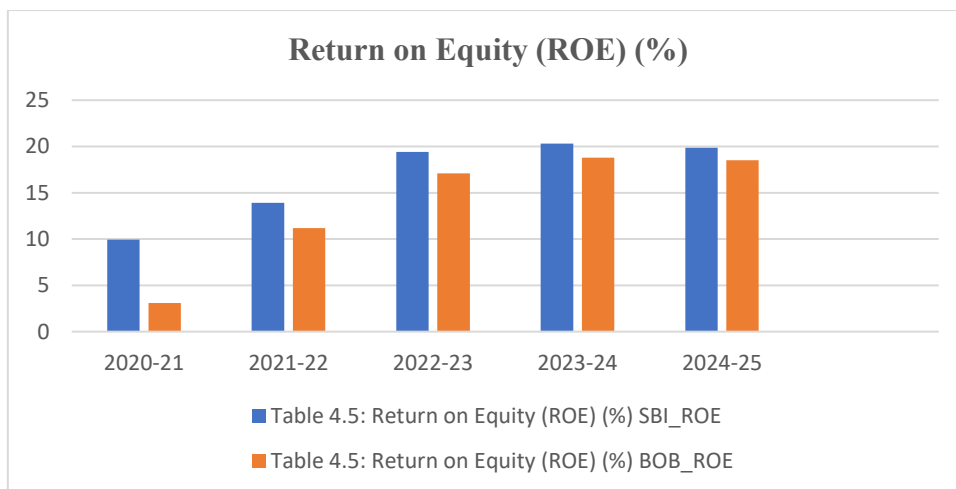


Table 4.5: Return on Equity (ROE) (%)

Year	SBI_ROE	BOB_ROE
2020-21	9.94	3.1
2021-22	13.92	11.2
2022-23	19.43	17.1
2023-24	20.32	18.8
2024-25	19.87	18.5



Interpretation

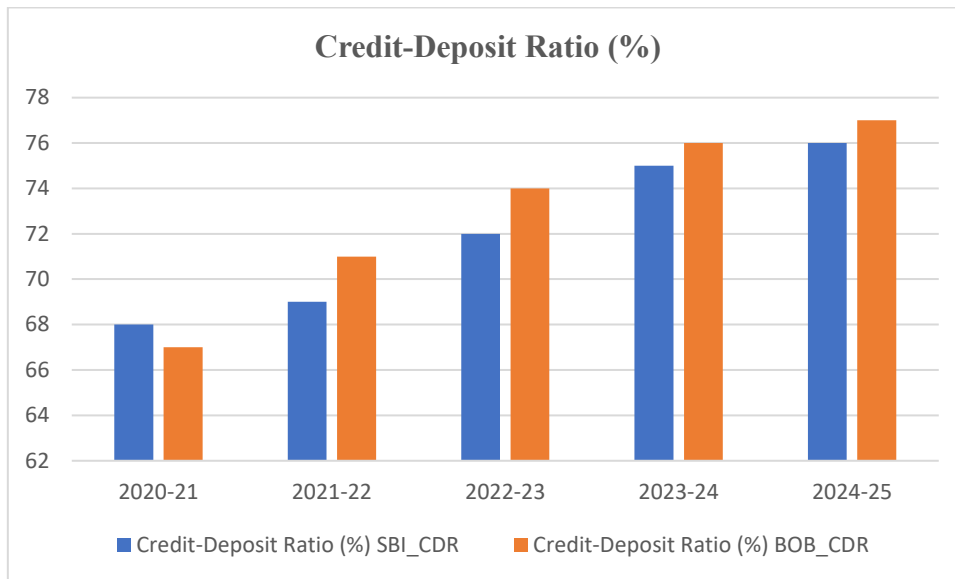
Both banks show significant improvement in profitability. SBI maintains slightly higher ROE. ROA for both banks is now above 1% (strong performance)

4.6 Liquidity Analysis (L)

Table 4.6: Credit-Deposit Ratio (%)

Year	SBI_CDR	BOB_CDR
2020-21	68	67
2021-22	69	71
2022-23	72	74
2023-24	75	76

2024-25	76	77
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Interpretation

Both banks maintain balanced liquidity positions. Bank of Baroda shows slightly higher lending activity. Ratios are within acceptable limits.

Overall CAMEL Ranking

Parameter	SBI Rank	Bank of Baroda Rank
Capital Adequacy	2	1
Asset Quality	1	2
Management Efficiency	1	2
Earnings Quality	1	2
Liquidity	2	1
Overall Rank	1	2

Interpretation

SBI ranks 1st overall, due to strong asset quality and profitability. Bank of Baroda ranks 2nd, with strength in capital and liquidity. Both banks show significant improvement post-pandemic.

5. FINDINGS

- Capital Adequacy:** The analysis of capital adequacy reveals that Bank of Baroda consistently maintained a higher Capital Adequacy Ratio (CAR) compared to State Bank of India throughout the study period. Both banks maintained CAR well above the regulatory requirements prescribed by the Reserve Bank of India, indicating a strong capital base and financial stability. However, Bank of Baroda demonstrated relatively stronger risk absorption capacity due to its higher capital buffer.
- Asset Quality:** With respect to asset quality, State Bank of India performed better by maintaining significantly lower Gross and Net Non-Performing Asset (NPA) ratios compared to Bank of Baroda. Both banks showed a consistent declining trend in NPAs over the study period, reflecting improved

recovery mechanisms and enhanced credit monitoring. Nevertheless, SBI exhibited superior asset quality and more effective credit risk management practices.

3. **Management Efficiency:** The evaluation of management efficiency indicates that State Bank of India demonstrated relatively better performance in terms of operational productivity and profitability indicators. The efficient utilization of human and financial resources contributed to improved performance over time. This suggests that SBI has a more effective management framework compared to Bank of Baroda.
4. **Earnings Quality:** The analysis of earnings quality shows that both banks experienced significant growth in profitability, particularly in the post-pandemic period. State Bank of India maintained a slightly higher Return on Equity (ROE), indicating better returns to shareholders. Additionally, the Return on Assets (ROA) of both banks crossed 1% in recent years, reflecting strong financial performance and improved operational efficiency.
5. **Liquidity Position:** In terms of liquidity, both State Bank of India and Bank of Baroda maintained a balanced Credit-Deposit Ratio, indicating sound liquidity management. However, Bank of Baroda recorded slightly higher ratios, suggesting a more aggressive lending approach. Overall, both banks maintained stable liquidity positions during the study period.
6. **Overall Performance:** Based on the overall CAMEL analysis, State Bank of India secured the first rank, while Bank of Baroda ranked second. SBI's strength lies in its superior asset quality, higher earnings, and efficient management practices. On the other hand, Bank of Baroda performed well in terms of capital adequacy and liquidity. This indicates that while both banks are financially sound, SBI demonstrates relatively stronger overall performance.

6. SUGGESTIONS

Bank of Baroda should focus on improving its asset quality by strengthening its credit appraisal processes and adopting more rigorous risk assessment techniques before sanctioning loans. Emphasis should also be placed on enhancing recovery mechanisms to further reduce non-performing assets (NPAs), which would directly contribute to improved profitability. Additionally, the bank should work towards increasing its operational efficiency by optimizing resource utilization and adopting best practices followed by leading banks in the industry.

State Bank of India should continue to maintain its strong performance in areas such as asset quality and profitability, which are key contributors to its overall leadership position. However, the bank should focus on improving its capital adequacy to ensure long-term financial stability and resilience against potential economic uncertainties. Furthermore, SBI should continue investing in digital transformation and technological advancements to enhance operational efficiency and customer experience.

Both State Bank of India and Bank of Baroda should adopt advanced risk management practices, including the use of data analytics and predictive models, to strengthen decision-making and minimize financial risks. Strengthening digital banking infrastructure is also essential to meet the growing demand for online and mobile banking services.

In addition, both banks should focus on sustainable banking practices by promoting environmentally and socially responsible investments. Enhancing customer-centric services, such as personalized banking solutions and improved service quality, will further help in building customer trust and ensuring long-term growth and competitiveness.

7. CONCLUSION

The study concludes that both State Bank of India and Bank of Baroda have demonstrated significant improvement in their financial performance during the study period, particularly in the post-pandemic phase.

However, SBI emerges as the overall better-performing bank due to its strong performance in critical areas such as asset quality, profitability, and operational efficiency. Its ability to maintain lower NPAs and generate higher returns reflects effective management practices and sound financial strategies.

On the other hand, Bank of Baroda shows strength in maintaining higher capital adequacy and a stable liquidity position, indicating financial resilience and a strong capital base.

Overall, the Indian banking sector appears to be financially sound, resilient, and improving, supported by better regulatory practices and efficient risk management.

8. LIMITATIONS OF STUDY

The study is subject to the following limitations:

- It is based entirely on secondary data, which may have inherent limitations
- The analysis is restricted to two banks only, limiting generalization
- CAMEL model focuses mainly on quantitative factors, ignoring qualitative aspects such as customer satisfaction
- External factors like economic conditions and policy changes are not deeply analyzed

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