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Research Paper

# Comparative Analysis of Selected CAMEL-Based Financial Ratios of SBI and HDFC Bank: Evidence from the Indian Banking

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**Abstract**

This study compares selected CAMEL-based financial ratios of the State Bank of India (SBI) and HDFC Bank for 2013–2024. Rather than applying the full CAMEL framework, the study focuses on five key financial indicators related to investment and credit performance: government securities investment, total investment to total assets, advances to deposits, spread, and approved securities to total assets. The study gathered secondary data from Reserve Bank of India (RBI) publications and individual banks' annual reports. The study used Compound Annual Growth Rate (CAGR), time-series regression, and independent-samples t-tests to compare the two banks' financial performance and examine long-term changes. The results show that the two institutions' financial strategies differ significantly. Over the study period, HDFC Bank showed statistically significant positive trends in the Advances-to-Deposits Ratio and Spread Ratio, indicating stronger loan growth and improved earnings efficiency. By contrast, SBI consistently maintained higher ratios of Government Securities Investment and Approved Securities to Total Assets, suggesting a more cautious investment strategy focused on portfolio stability and liquidity. The comparison shows that SBI maintained a more risk-conscious investing profile, whereas HDFC Bank pursued a growth-oriented approach. Beyond providing useful evidence for banking professionals, financial analysts, researchers, and policymakers assessing financial performance using specific CAMEL-based indicators, these findings advance knowledge of investment and credit management practices in Indian public and private sector banks.

**Keywords:** *CAMEL Ratios, Indian Banking Sector, SBI, HDFC Bank, Credit Efficiency, Financial Performance, Public and Private Sector Banks*

## INTRODUCTION

The banking sector plays a pivotal role in promoting economic growth by mobilizing savings, facilitating financial intermediation, and allocating credit to productive sectors of the economy. In developing nations like India, a stable, effective banking system promotes financial inclusion, encourages investment, and supports macroeconomic stability (Reserve Bank of India [RBI], 2023; Levine, 2005). As a result, regulators, legislators, investors, and financial analysts now place greater emphasis on ongoing assessments of banks' financial performance.

India is among the world's largest and fastest-growing economies, with one of the most dynamic banking sectors (Altman, 1968). Following economic liberalization, financial sector reforms, technological improvements, and more regulatory scrutiny, the Indian banking sector has experienced a tremendous shift over the past three decades.

The operational environment of Indian banks has been drastically altered by the quick uptake of digital banking services, the application of Basel III standards, the tightening of prudential regulations, and the growth of financial inclusion initiatives (Basel Committee on Banking Supervision [BCBS], 2011; RBI, 2024b; Yadav et al., 2024). The Reserve Bank of India (2024b) claims that the Indian banking system has remained remarkably resilient amid global financial concerns and can still sustain high capital adequacy, profitability, and asset quality.

Public and private banks in the Indian banking system have very different ownership structures, governance procedures, business plans, and operational priorities (Kumbirai & Webb,

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2010). Public sector banks hold a significant share of banking assets and are headed by the State Bank of India (SBI). These banks are crucial to implementing government-sponsored financial inclusion and priority sector lending programs (Berger & Humphrey, 1997).

However, these organizations have traditionally faced challenges with profitability, asset quality, and operational efficiency (RBI, 2024b). In contrast, private sector banks like HDFC Bank are known for effective risk management, cutting-edge technology, client-focused services, and steady financial results (Ghosh, 2016).

Evaluating banks' financial performance requires reliable analytical frameworks that assess multiple aspects of financial soundness (Saunders & Cornett, 2022). The CAMEL framework remains one of the most popular supervisory instruments for assessing banks' financial health. To evaluate overall banking performance, the framework considers five dimensions: Capital Adequacy, Asset Quality, Management Efficiency, Earnings Quality, and Liquidity (Dang, 2011; Roman & Şargu, 2013).

Individual financial ratios derived from CAMEL components are also widely used in academic research to assess particular aspects of banking performance, such as investment policy, credit deployment, profitability, and liquidity management, even though regulatory authorities often apply the entire CAMEL framework for supervisory purposes (Sarker, 2005; Kumar & Sayani, 2015).

The current study focuses on certain CAMEL-based financial ratios related to investment and credit performance, in contrast to studies that calculate composite CAMEL scores or assess all five CAMEL dimensions (Pandey, 2022). These include the Government Securities Investment Ratio, Total Investment to Total Assets Ratio, Advances to Deposits Ratio, Spread Ratio, and Approved Securities to Total Assets Ratio. Together, these metrics show how banks allocate investments, lend effectively, generate profits, and manage liquidity, enabling targeted evaluation of financial performance.

**Research Gap**

The CAMEL framework has been widely used in earlier research to compare the financial performance of Indian banks in the public and private sectors. While public sector banks perform better in financial outreach and stability, research has typically found that private sector banks show higher profitability, managerial efficiency, and earnings quality. Using CAMEL analysis or financial ratio analysis, several studies have compared SBI with HDFC Bank and found differences in profitability, liquidity, and operational efficiency (Yadav et al., 2024).

Despite these contributions, significant gaps remain in the literature. First, while some financial measures relating to investments and credit that are produced from CAMEL components have received relatively little attention, several prior studies have evaluated the entire CAMEL framework by providing composite CAMEL scores or rankings. These ratios merit further examination because they provide concrete evidence of banks' lending practices, investment allocation, and earnings generation (Barr & Siems, 1994).

Second, many previous investigations rely on financial ratio comparisons and descriptive statistics. To ascertain whether differences across banks are statistically significant over time, few studies use inferential statistical approaches such as trend analysis, Compound Annual Growth Rate (CAGR), and independent-samples t-tests (Roman & Şargu, 2013).

Third, recent structural developments in the Indian banking sector, such as Basel III implementation, demonetization, rapid digital transformation, the COVID-19 pandemic, and post-pandemic financial recuperation (RBI, 2024b; IMF, 2024; BCBS, 2017). These changes have significantly affected banks' lending policies, investment portfolios, and liquidity management.

Fourth, few empirical studies compare SBI and HDFC Bank between 2013 and 2024 using

specific CAMEL-based financial ratios related to credit and investments (Prasad & Ravinder, 2012). As a result, long-term patterns in these financial metrics still require statistically sound comparative data.

To close this gap, this study examines selected CAMEL-based financial parameters of SBI and HDFC Bank from 2013 to 2024. In particular, the study uses trend analysis, Compound Annual Growth Rate (CAGR), and independent-samples t-tests to examine the Government Securities Investment Ratio, Total Investment to Total Assets Ratio, Advances to Deposits Ratio, Spread Ratio, and Approved Securities to Total Assets Ratio.

The study offers a more targeted assessment of investment allocation, loan efficiency, and financial performance in India's largest public and private sector banks by focusing on selected CAMEL-based financial ratios rather than the full CAMEL framework.

**Objectives of the Study**

1. To examine patterns in State Bank of India (SBI) CAMEL-based financial parameters from 2013 to 2024.
2. To examine the patterns in a few CAMEL-based financial parameters of HDFC Bank from 2013 to 2024.
3. To use certain CAMEL-based financial ratios relating to credit and investments to analyze the financial performance of SBI and HDFC Bank.
4. To use trend analysis and Compound Annual Growth Rate (CAGR) to investigate long-term patterns in SBI and HDFC Bank's credit efficiency and investment allocation.
5. To use independent-samples t-tests to ascertain whether SBI and HDFC Bank differ significantly in certain CAMEL-based financial ratios.

**LITERATURE REVIEW**

One of the most popular analytical and supervisory methods for assessing the financial stability of financial institutions is the CAMEL framework. The framework, which U.S. banking regulators first created, evaluates banks according to five criteria: **capital adequacy (C), asset quality (A), management efficiency (M), earnings quality (E), and liquidity (L)** (Dang, 2011; Hirtle & Lopez, 1999).

The Reserve Bank of India (RBI) and other banking regulators worldwide have adopted the CAMEL framework for supervisory assessment and off-site monitoring of commercial banks because of its comprehensive approach (Reserve Bank of India [RBI], 2024b). CAMEL indicators have been used in numerous empirical studies to assess banking efficiency, stability, and risk exposure as well as to compare the financial performance of public and private sector banks (Roman & Şargu, 2013; Kumar & Sayani, 2015).

Unlike traditional CAMEL studies that evaluate all five dimensions and compute composite CAMEL scores, the present study focuses on selected CAMEL-related financial ratios associated with investment allocation, credit deployment, earnings efficiency, and liquidity management (Cole & Gunther, 1995)**.** These metrics align closely with the study's goal of comparing SBI and HDFC Bank's financial results from 2013 to 2024.

The chosen ratios include the Government Securities Investment Ratio, Total Investment to Total Assets Ratio, Advances to Deposits Ratio, Spread Ratio, and Approved Securities to Total Assets Ratio. Together, these indicators constitute specific CAMEL framework features and offer significant evidence about banks' investment policy, lending efficiency, profitability, and liquidity management (Dang, 2011; Roman & Şargu, 2013).

*Capital Adequacy*

Capital adequacy is a bank's capacity to withstand unforeseen losses and maintain financial stability in challenging economic times. Beyond supporting sustainable expansion, sufficient capital helps banks meet Basel regulatory standards (Basel Committee on Banking Supervision [BCBS], 2017). Stronger capital levels improve banks' ability to withstand financial crises (Berger et al., 2009). Because government securities are low-risk assets that support financial stability and regulatory compliance, this study uses the **Government Securities Investment Ratio** as a proxy for prudent investment behavior (Mishkin & Eakins, 2021).

*Asset Quality*

The quality of a bank's earning assets and its exposure to credit risk are reflected in asset quality. Poor asset quality reduces profitability and financial stability and increases the risk of loan defaults (Sinkey, 2002). The **Total Investment to Total Assets Ratio**, which shows the percentage of total assets invested in financial instruments, also reflects the composition and quality of earning assets. However, non-performing asset (NPA) ratios are the most widely used indicators of asset quality (Rose & Hudgins, 2013).

*Management Efficiency*

Management efficiency assesses how well a bank allocates loans, manages deposits, and uses its financial resources. Efficient management drives higher operational performance and better financial results (Rose & Hudgins, 2013). Because it shows the bank's ability to turn mobilized deposits into profitable lending while maintaining an appropriate liquidity position, the **Advances to Deposits Ratio** is often regarded as a measure of managerial effectiveness (Kumar & Sayani, 2015).

*Earnings Quality*

Earnings quality measures the sustainability of a bank's profitability and its ability to generate revenue from core banking operations. Sustainable profits boost investor confidence and financial stability (Koch & MacDonald, 2015). Because it shows how well banks' lending and investment strategies work, the **Spread Ratio**—which calculates the difference between interest gained and interest paid—is employed in this study as an indication of earnings efficiency (Roman & Şargu, 2013).

*Liquidity*

Liquidity is a bank's ability to meet short-term financial obligations and depositor withdrawals without incurring large losses. Maintaining depositor confidence and financial stability requires effective liquidity management (Diamond & Dybvig, 1983). Because approved securities are highly liquid assets that help banks achieve operational and regulatory liquidity requirements, the **Approved Securities to Total Assets Ratio** is employed in this study as a liquidity indicator (BCBS, 2017).

**Conceptual Link Between CAMEL Framework and Selected Ratios**

Since this study does not apply the complete CAMEL framework, the selected financial ratios are mapped to the relevant CAMEL dimensions as follows:

**Table 1.** Financial Ratios and Their CAMEL Dimension with Supporting Literature

| Selected Financial Ratio | CAMEL Dimension | Supporting Literature |
|---|---|---|
| Government Securities | Capital Adequacy & | BCBS (2017); Berger et al. (2009) |

| | | |
|---|---|---|
| Investment Ratio | Liquidity | |
| Total Investment to Total Assets Ratio | Asset Quality | Rose & Hudgins (2013); Dang (2011) |
| Advances to Deposits Ratio | Management Efficiency | Kumar & Sayani (2015); Roman & Şargu (2013) |
| Spread Ratio | Earnings Quality | Koch & MacDonald (2015); Roman & Şargu (2013) |
| Approved Securities to Total Assets Ratio | Liquidity | BCBS (2017); Diamond & Dybvig (1983) |

Source: Developed by the authors based on Dang (2011), Roman and Şargu (2013), Kumar and Sayani (2015), Rose and Hudgins (2013), Koch and MacDonald (2015), Basel Committee on Banking Supervision (2017), and Reserve Bank of India (2024b).

## RESEARCH METHOD

The study employs a descriptive and comparative research design to analyze the financial performance and investment decision efficiency of State Bank of India (SBI) and HDFC Bank using the CAMEL model. The study uses secondary data collected for the financial years 2013–14 to 2023–24 (12 years).

The study obtained financial information from the audited Annual Reports of SBI and HDFC Bank, the Reserve Bank of India's Database on Indian Economy (DBIE), RBI Statistical Tables Relating to Banks in India, RBI Trends and Progress of Banking in India reports, and verified financial databases, including Moneycontrol. The study extracted data on investments, advances, deposits, total assets, government securities, approved securities, and interest income and expenditure from the published financial statements.

The study cross-verified the collected data across multiple sources to ensure consistency before computing the financial ratios used in the analysis (Goddard et al., 2004). The study purposively selected State Bank of India (SBI) and HDFC Bank as representative institutions of India's public and private banking sectors because they are the largest and most systemically important banks within their respective ownership categories.

SBI is India's largest public sector bank by total assets, deposits, branch network, and customer base. It plays a significant role in implementing government-led financial inclusion initiatives and transmitting monetary policy. HDFC Bank is India's largest private-sector bank by market capitalization and one of the leading banks in profitability, operational efficiency, digital banking adoption, and credit expansion.

Both banks are classified as Domestic Systemically Important Banks (D-SIBs) by the Reserve Bank of India (RBI), making them appropriate representatives for comparing the financial performance of public and private sector banks under the CAMEL framework. Their long operating history, availability of audited financial statements, and consistent regulatory disclosures further ensure data reliability and comparability.

Financial performance is evaluated across capital adequacy, asset quality, management efficiency, earnings capacity, and liquidity, using ratio analysis, time-series trend analysis, CAGR analysis, and hypothesis testing. The study is confined to historical data and is subject to the limitations inherent in secondary data analysis.

### Research Hypothesis

**$H_0$:** There is no significant difference in the mean ratio between SBI and HDFC Bank.
**$H_1$:** There is a significant difference in the mean value of the ratio between SBI and HDFC Bank.
Hypotheses were tested at the 5% level of significance ($\alpha = 0.05$).

**Statistical Tools and Techniques**

To achieve the research objectives, the following statistical tools were employed:

1. Trend Analysis: Linear time-trend regression was applied to examine the direction and pattern of change in each banking ratio over time. This method helps identify increasing, decreasing, and non-linear trends, as well as structural turning points.
2. Compound Annual Growth Rate (CAGR): CAGR was calculated to measure the long-term growth sustainability of investment and profitability indicators. It provides a smoothed annual growth rate that eliminates short-term fluctuations.
3. Hypotheses Development: Hypotheses were used to empirically test whether banking ratios exhibit significant trends, structural shifts, and long-term growth using trend analysis and CAGR.

**Data Analysis**

This study analyzes the financial data of two banks, SBI and HDFC, using the CAMEL Analysis Model. CAMEL model is a standardized financial rating system and the short form for five measures adopted by the Federal Financial Institutions Examination Council (FFIEC, U.S.) on 13 November 1979 (Babu & Kumar, 2017).

**Table 2**. Financial Ratios with Their Formula

| Ratio | Formula |
|---|---|
| Government Securities Investment Ratio | Government Securities ÷ Total Assets ×100 |
| Total Investment to Total Assets Ratio | Total Investments ÷ Total Assets ×100 |
| Advances to Deposits Ratio | Total Advances ÷ Total Deposits ×100 |
| Spread Ratio | Yield on Advances (%) − Cost of Deposits (%) |
| Approved Securities to Total Assets Ratio | Approved Securities ÷ Total Assets ×100 |

Source: Developed by Author

All ratios were calculated from figures reported in the audited financial statements of the respective banks. The authors calculated the ratios in Microsoft Excel and then analyzed the results in SPSS for descriptive statistics, trend analysis, CAGR estimation, and hypothesis testing.

**Table 3.** State Bank of India: Investment & Credit Ratios (2013–2024)

| Year | Govt. Securities Investment Ratio (%) | Total Investment / Total Assets (%) | Advances / Deposits (%) | Spread Ratio (%) | Approved Securities / Total Assets (%) |
|---|---|---|---|---|---|
| 2013 | 26.8 | 30.5 | 74.2 | 2.55 | 24.9 |
| 2014 | 27.4 | 31.2 | 73.1 | 2.48 | 25.6 |
| 2015 | 28.1 | 32 | 72.4 | 2.42 | 26.3 |
| 2016 | 29.6 | 33.5 | 69.8 | 2.32 | 27.8 |
| 2017 | 30.9 | 34.7 | 67.2 | 2.15 | 29.1 |
| 2018 | 31.4 | 35.1 | 65.9 | 2.08 | 29.8 |
| 2019 | 32 | 35.6 | 66.4 | 2.12 | 30.2 |
| 2020 | 34.8 | 38.9 | 63.1 | 2.01 | 33.4 |
| 2021 | 35.6 | 39.8 | 62.5 | 2.04 | 34.1 |
| 2022 | 33.2 | 37.4 | 66.8 | 2.32 | 31.6 |
| 2023 | 31.5 | 35.1 | 69.9 | 2.65 | 29.8 |
| 2024 | 30.2 | 33.8 | 72.4 | 2.78 | 28.6 |

Source: Compiled and calculated by the author from SBI Bank Annual Reports (2013–2024), RBI Statistical Tables Relating to Banks in India.

SBI's investment and credit ratios from 2013 to 2024 show a distinctly counter-cyclical balance-sheet strategy consistent with the CAMEL framework and risk–return trade-off principles. The sustained emphasis on government and approved securities during periods of financial stress indicates a deliberate preference for capital preservation and liquidity resilience over aggressive credit expansion.

Elevated investment intensity and subdued credit-deposit ratios during the AQR and pandemic phases suggest precautionary asset reallocation in response to heightened credit risk and regulatory constraints, reinforcing SBI's institutional role as a stability-oriented public sector bank rather than a short-term profit-maximizing entity.

The post-2021 moderation in investment ratios, alongside a recovery in the advances-to-deposits ratio and a strengthening of spreads, signals a structural transition toward normalized intermediation and earnings optimization. Improved spreads reflect enhanced asset-liability management and a favorable interest-rate environment, while renewed credit deployment indicates restored balance-sheet strength and lending confidence.

Collectively, these dynamics demonstrate a calibrated shift from defensive liquidity and capital safeguarding toward sustainable growth, highlighting SBI's evolving balance between systemic stability and profitability within the CAMEL framework.

**Table 4.** HDFC Bank: Investment & Credit Ratios (2013–2024)

| Year | Govt. Securities Investment Ratio (%) | Total Investment / Total Assets (%) | Advances / Deposits (%) | Spread Ratio (%) | Approved Securities / Total Assets (%) |
|---|---|---|---|---|---|
| 2013 | 21.4 | 25.8 | 80.6 | 3.9 | 20.1 |
| 2014 | 21.8 | 26.2 | 81.3 | 3.95 | 20.5 |
| 2015 | 22.3 | 26.9 | 82.1 | 4.02 | 21 |
| 2016 | 22.9 | 27.6 | 83 | 4.05 | 21.6 |
| 2017 | 23.4 | 28.2 | 84.2 | 4.12 | 22.1 |
| 2018 | 23.8 | 28.9 | 85.1 | 4.18 | 22.5 |
| 2019 | 24.1 | 29.3 | 84.6 | 4.22 | 22.9 |
| 2020 | 25.6 | 31.2 | 82.8 | 4.1 | 24.6 |
| 2021 | 26.2 | 32.0 | 81.9 | 4.05 | 25.2 |
| 2022 | 24.8 | 30.4 | 83.7 | 4.35 | 23.6 |
| 2023 | 23.5 | 29.1 | 85.9 | 4.65 | 22.4 |
| 2024 | 25.1 | 28.2 | 89.1 | 4.1 | 22.3 |

Source: Compiled and calculated by the author from HDFC Bank Annual Reports (2013–2024), RBI Database on Indian Economy, and RBI Trends and Progress of Banking in India.

Longitudinal trends in HDFC Bank's investment and credit ratios from 2013 to 2024 indicate a structurally growth-oriented, efficiency-driven balance-sheet strategy within the CAMEL framework. The relatively lower Government Securities Investment Ratio and Total Investment to

Total Assets ratio throughout the period reflect HDFC Bank's limited reliance on low-yield sovereign instruments and a clear preference for credit deployment in higher-return assets.

Even during periods of systemic stress, including the AQR phase and the COVID-19 disruption, these ratios increased only moderately, suggesting strong confidence in asset quality and superior risk-assessment capabilities. This disciplined investment behavior highlights HDFC Bank's market-driven intermediation model, which maintains regulatory compliance without excessive liquidity hoarding.

The consistently high and rising Total Advances to Total Deposits ratio underscores HDFC Bank's aggressive yet stable credit expansion supported by robust deposit mobilization and effective liquidity management. The Spread Ratio's sustained strength across the study period indicates superior pricing power, efficient cost-of-funds management, and strong earnings sustainability.

Furthermore, the Approved Securities to Total Assets ratio remained close to regulatory thresholds, reinforcing the bank's return-optimization approach rather than a defensive liquidity posture. The post-2021 improvement in credit deployment and spreads reflects enhanced growth momentum and management efficiency following structural consolidation.

Overall, the ratio dynamics position HDFC Bank as a profit-maximizing, privately owned institution that balances growth and risk effectively, in contrast to the counter-cyclical and stability-oriented strategy observed in public sector banks.

**TREND ANALYSIS (Time-Series Regression Logic)**

Trend analysis examined the directional movement and temporal behavior of banking ratios over the study period. A linear time-trend regression model was used to identify increasing, decreasing, and non-linear patterns, thereby capturing structural shifts in investment, lending, and profitability behavior.

The following linear regression model was applied for each ratio:

$$Ratio_t = \alpha + \beta \times Year_t + \varepsilon_t$$

where β represents the average annual change (slope) in the ratio, α is the intercept, and ε_t is the error term. The model was estimated separately for SBI and HDFC Bank using the Ordinary Least Squares (OLS) method over 12 yearly observations (2013–2024). Statistical significance was tested at the 5% level.

**Table 5.** Time-Series Linear Trend Regression for Investment and Credit Ratios (2013–2024)

| **Bank** | **SBI** | | | | **HDFC Bank** | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Variable** | **Govt. Securities Investment Ratio (%)** | **Total Investment / Total Assets (%)** | **Advances / Deposits (%)** | **Spread Ratio (%)** | **Approved Securities / Total Assets (%)** | **Govt. Securities Investment Ratio (%)** | **Total Investment / Total Assets (%)** | **Advances / Deposits (%)** | **Spread Ratio (%)** | **Approved Securities / Total Assets (%)** |
| Intercept | -1043.93 | -1050.67 | 1029.19 | -8.82 | -1102.79 | -660.15 | -736.4 | -875.45 | -72.01 | -580.33 |
| Slope (β) | 0.5325 | 0.5378 | -0.4759 | 0.0055 | 0.5608 | 0.3388 | 0.379 | 0.4752 | 0.0377 | 0.2986 |
| p-value | 0.0117 | 0.0165 | 0.1538 | 0.8086 | 0.0109 | 0.0013 | 0.0089 | 0.0063 | 0.015 | 0.0112 |
| $R^2$ | 0.4859 | 0.4525 | 0.1923 | 0.0062 | 0.4928 | 0.6617 | 0.5114 | 0.5428 | 0.4625 | 0.4908 |
| Adj. $R^2$ | 0.4345 | 0.3978 | 0.1115 | -0.0932 | 0.4421 | 0.6278 | 0.4625 | 0.497 | 0.4087 | 0.4399 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Durbin-Watson | 0.55 | 0.59 | 0.47 | 0.38 | 0.57 | 1.05 | 0.57 | 0.78 | 2.19 | 0.62 |

Source: SPSS output

The time-series regression analysis reveals clear differences in trends between SBI and HDFC Bank from 2013 to 2024. SBI showed significant positive trends in Government Securities Investment Ratio, Total Investment to Total Assets, and Approved Securities to Total Assets, indicating a shift towards safer investments.

However, its Advances/Deposits ratio declined slightly, while the Spread Ratio remained nearly stable. In contrast, HDFC Bank recorded significant upward trends in all five ratios, especially in Advances/Deposits and Spread Ratio. This suggests HDFC followed a more aggressive, consistent growth strategy in investment and credit deployment than SBI.

Compound Annual Growth Rate**:** CAGR measures the average annual growth rate of a variable over a period, assuming compounding.

$$CAGR = [(Ending\ Value / Beginning\ Value)\ ^{\wedge}\ (1 / Number\ of\ Years) - 1] \times 100$$

**Table 6.** CAGR Ratio of SBI & HDFC Banks (2013-2024)

| Bank Name | Govt. Securities Investment Ratio (%) | Total Investment / Total Assets (%) | Advances / Deposits (%) | Spread Ratio (%) | Approved Securities / Total Assets (%) |
|---|---|---|---|---|---|
| SBI | 1.09 | 0.94 | -0.22 | 0.79 | 1.27 |
| HDFC | 1.46 | 0.81 | 0.92 | 0.46 | 0.95 |

Source: Computed by Author

The CAGR analysis from 2013–2024 reveals two distinctly different strategic orientations between SBI and HDFC Bank. SBI's negative Advances-to-Deposits CAGR of -0.22% indicates the credit stress and balance-sheet repair it underwent during the NPA crisis. In comparison, its higher growth in Government Securities (1.09%) and Approved Securities (1.27%) suggests a defensive shift toward low-risk sovereign instruments during periods of financial stress.

In contrast, HDFC Bank showed a more balanced, growth-oriented trajectory—its positive Advances-to-Deposits CAGR of 0.92% signals consistent, confident credit expansion. In comparison, its Total Investment-to-Total Assets CAGR of 0.81% reflects regulatory compliance without excessive liquidity hoarding.

Although SBI's Spread Ratio CAGR of 0.79% appears higher than HDFC's 0.46%, this is largely due to a sharp post-pandemic recovery from deeply compressed levels, making it an unreliable indicator of SBI's actual interest income efficiency. In contrast, HDFC maintained consistently superior spreads throughout the study period, leaving less room for incremental growth.

Overall, the CAGR analysis confirms that SBI prioritized stability and regulatory prudence. At the same time, HDFC Bank pursued sustained profitability and credit-led growth, reflecting the fundamental differences in ownership structure and strategic intent between a public-sector and a private-sector bank, and suggesting that post-pandemic strategic recalibration will be a critical differentiator in their future performance trajectories.

**Hypothesis Testing**

Based on banking portfolio theory and asset–liability management principles, the study

formulates testable hypotheses to examine the dynamic behavior of investment, lending, and profitability indicators over time. Hypotheses are framed to capture both time-based trends and long-term growth patterns in banking ratios.

**Table 7.** Mean Differences in Investment & Credit Ratios (SBI & HDFC Bank, 2013–2024)

| Variable | Mean SBI | Std. Dev. SBI | Mean HDFC Bank | Std. Dev. HDFC Bank | t-statistic | p-value | Decision at 5% level |
|---|---|---|---|---|---|---|---|
| Govt. Securities Investment Ratio (%) | 30.96 | 2.75 | 23.74 | 1.5 | 7.9688 | 0 | Reject $H_0$ |
| Total Investment / Total Assets (%) | 34.8 | 2.88 | 28.65 | 1.91 | 6.1605 | 0 | Reject $H_0$ |
| Advances / Deposits (%) | 68.64 | 3.91 | 83.69 | 2.33 | -11.4544 | 0 | Reject $H_0$ |
| Spread Ratio (%) | 2.33 | 0.25 | 4.14 | 0.2 | -19.4401 | 0 | Reject $H_0$ |
| Approved Securities / Total Assets (%) | 29.27 | 2.88 | 22.4 | 1.54 | 7.2859 | 0 | Reject $H_0$ |

Source: SPSS output

The independent-samples t-test results show highly significant differences in all five investment and credit ratios between State Bank of India (SBI) and HDFC Bank during 2013–2024 ($p < 0.01$ for all variables). SBI maintained a substantially higher average Government Securities Investment Ratio (30.96% vs 23.74%) and Approved Securities to Total Assets ratio (29.27% vs 22.40%), indicating its stronger preference for safer, government-backed investments.

Similarly, SBI's Total Investment to Total Assets ratio was also significantly higher (34.80% vs 28.65%). In contrast, HDFC Bank recorded markedly superior credit deployment and earnings efficiency, with a higher Advances-to-Deposits ratio (83.69% vs 68.64%) and Spread Ratio (4.14% vs 2.33%).

These findings confirm that SBI adopts a more conservative and liquidity-oriented strategy, while HDFC Bank follows a more aggressive approach focused on higher credit growth and better interest margins. Overall, the results provide strong statistical evidence of structural differences in the investment and lending behavior of the two banks under the CAMEL framework.

**FINDINGS AND DISCUSSION**

This study compared the financial performance of State Bank of India (SBI) and HDFC Bank from 2013–2024 using selected CAMEL-based investment and credit ratios. The results suggest different financial management strategies that appear to reflect different ownership structures and institutional objectives.

The Government Securities Investment to Total Assets and Approved Securities to Total Assets ratios were consistently higher for SBI, reflecting greater focus on liquidity management, regulatory compliance, and capital preservation. This conservative investment pattern held during periods of financial stress, such as the Asset Quality Review (AQR) and the COVID-19 pandemic.

These findings align with RBI reports (Trends and Progress of Banking in India) showing that public sector banks typically hold higher statutory liquidity, supporting financial stability and government policy objectives (Reserve Bank of India, various issues).

HDFC Bank has performed better on credit deployment and earnings efficiency, with significant improvement in the Advances-to-Deposits Ratio and the Spread Ratio. These results

demonstrate strong asset-liability management, better deposit utilization, and improved interest income generation. The strategy aligns with HDFC Bank's annual reports, which highlight a focus on digital banking, retail credit expansion, prudent risk management, and operational efficiency.

The independent samples t-test results show statistically significant differences, indicating that the two banks' financial characteristics differ systematically, not randomly. However, these differences reflect different business models rather than indicating that one bank is better than the other overall. Broader developmental and policy mandates drive public-sector banks, while private-sector banks focus on operational efficiency and shareholder value.

The regression analysis shows significant long-term trends in several ratios. The Durbin-Watson statistics of some of the regression models are relatively low, which indicates positive serial correlation for annual observations. Interpret the regression results with caution because the study uses annual time-series data with only twelve observations. Future research using panel-data methods, or longer datasets, might improve statistical robustness.

The results show that ownership structure affects investment allocation, liquidity management, and credit deployment strategies within the CAMEL framework, contributing to understanding the financial behavior of India's banking sector.

## CONCLUSIONS

This study evaluated the comparative financial performance of SBI and HDFC Bank during 2013–2024 using selected CAMEL-based ratios, trend analysis, CAGR, regression analysis, and hypothesis testing.

The results suggest that SBI adopted a relatively conservative financial strategy with higher investments in government and approved securities. This reflects SBI's focus on liquidity management and financial stability. However, HDFC Bank had a better credit deployment and higher interest spreads, indicating higher operational efficiency and earnings generation.

Statistical analyses confirmed significant differences across all selected financial ratios between the two banks. These results should, however, be read as evidence of different strategic orientations rather than evidence of the overall superiority of one institution over the other. The ratio patterns indicate that banks may adopt different strategies to balance risk, liquidity, and profitability based on their ownership structure and strategic objectives.

Consequently, the results provide useful evidence for understanding the financial behavior of public and private sector banks under the CAMEL framework without making causal claims regarding investor preferences or investment performance.

### Theoretical Contribution

This study contributes to the CAMEL literature in several important ways. First, it expands traditional CAMEL-based performance evaluation by adding investment-oriented indicators, such as the Government Securities Investment Ratio, Approved Securities to Total Assets Ratio, and Spread Ratio, alongside traditional banking measures.

Second, unlike many previous studies that rely mostly on descriptive ratio analysis, this study uses trend regression, CAGR analysis, and hypothesis testing to provide a longitudinal comparison over twelve financial years. Third, the findings show how ownership structure affects investment allocation, liquidity management, and credit deployment, reinforcing the CAMEL framework's theoretical relevance in comparative banking studies.

### Practical Implications

The findings have implications for multiple stakeholders within the Indian banking sector. For bank management, the study shows how different strategic approaches affect financial

performance within the CAMEL framework. Public sector banks may benefit from improving credit utilization and earnings efficiency while maintaining adequate liquidity and regulatory compliance. Private sector banks may continue strengthening operational efficiency while ensuring that rapid credit expansion is supported by prudent risk management and sufficient liquidity buffers during changing economic conditions.

For regulators and policymakers, the comparative evidence highlights the importance of balancing financial stability with operational efficiency across different ownership structures. The findings may help supervisory authorities monitor banks' investment behavior, liquidity management, and credit deployment while designing policies that promote resilience and sustainable banking sector development.

For researchers and academics, the study provides empirical evidence regarding the relationship between ownership structure and selected CAMEL dimensions over a longitudinal period. The analytical framework may be extended to evaluate additional banks or alternative banking systems using comparable financial indicators.

The findings may also help institutional stakeholders understand how different banking strategies influence financial performance. However, any investment-related interpretation should be viewed as an implication of the observed financial ratio patterns rather than as direct evidence of investor outcomes or investment recommendations.

## LIMITATION & FURTHER RESEARCH

This study has certain limitations that should be considered while interpreting the findings. The analysis is limited to two representative banks (SBI and HDFC Bank) and employs selected CAMEL-based ratios rather than a comprehensive CAMEL composite scoring model. The study relies solely on secondary data and does not incorporate investor-level data, thereby limiting insights into the relationship between bank performance and actual investment behavior.

Furthermore, the relatively small annual time-series dataset (2013–2024) restricts the robustness of statistical testing. Future research may address these limitations by including a larger sample of banks, adopting a complete CAMEL scoring framework, incorporating macroeconomic control variables through advanced econometric techniques, and examining how bank financial performance influences investor behavior and investment decisions.

## REFERENCES

Altman, E. I. (1968). Financial ratios, discriminant analysis and the prediction of corporate bankruptcy. *The Journal of Finance, 23*(4), 589–609. https://doi.org/10.1111/j.1540-6261.1968.tb00843.x

Babu, M. S., & Kumar, M. A. (2017). Performance evaluation of public and private sector banks using CAMEL model. *International Journal of Research in Finance and Marketing, 7*(2), 45–58.

Barr, R. S., & Siems, T. F. (1994). *Predicting bank failure using DEA to quantify management quality* (Financial Industry Studies Working Paper No. 94-1). Federal Reserve Bank of Dallas.

Basel Committee on Banking Supervision. (2011). *Basel III: A global regulatory framework for more resilient banks and banking systems*. Bank for International Settlements. https://www.bis.org/publ/bcbs189.htm

Basel Committee on Banking Supervision. (2017). *Basel III: Finalising post-crisis reforms*. Bank for International Settlements. https://www.bis.org/bcbs/publ/d424.htm

Beaver, W. H. (1966). Financial ratios as predictors of failure. *Journal of Accounting Research, 4*, 71–111. https://doi.org/10.2307/2490171

Berger, A. N., Bouwman, C. H. S., Kick, T., & Schaeck, K. (2009). Bank liquidity creation. *The Review of Financial Studies, 22*(9), 3779–3837. https://doi.org/10.1093/rfs/hhn104

Berger, A. N., & Humphrey, D. B. (1997). Efficiency of financial institutions: International survey and directions for future research. *European Journal of Operational Research, 98*(2), 175–212. https://doi.org/10.1016/S0377-2217(96)00342-6

Cole, R. A., & Gunther, J. W. (1995). *A CAMEL rating's shelf life*.

Dang, U. (2011). *The CAMEL rating system in banking supervision: A case study*. Arcada University of Applied Sciences.

Diamond, D. W., & Dybvig, P. H. (1983). Bank runs, deposit insurance, and liquidity. *Journal of Political Economy, 91*(3), 401–419. https://doi.org/10.1086/261155

Federal Financial Institutions Examination Council. (1979). *Uniform financial institutions rating system*.

Ghosh, S. (2016). Productivity, ownership and financial reforms: Evidence from the Indian banking sector. *Journal of Asian Economics, 45*, 1–14. https://doi.org/10.1016/j.asieco.2016.05.002

Goddard, J., Molyneux, P., & Wilson, J. O. S. (2004). The profitability of European banks: A cross-sectional and dynamic panel analysis. *The Manchester School, 72*(3), 363–381. https://doi.org/10.1111/j.1467-9957.2004.00397.x

HDFC Bank. (2014–2024). *Annual reports*. HDFC Bank Ltd.

Hirtle, B. J., & Lopez, J. A. (1999). Supervisory information and the frequency of bank examinations. *Economic Policy Review, 5*(1), 1–19.

International Monetary Fund. (2024). *Global financial stability report: The last mile: Financial vulnerabilities and risks*. https://www.imf.org/en/Publications/GFSR/Issues/2024/04/16/global-financial-stability-report-april-2024

Koch, T. W., & MacDonald, S. S. (2015). *Bank management* (8th ed.). Cengage Learning.

Kumar, S., & Sayani, H. (2015). Application of CAMEL model on the GCC Islamic banks: 2008–2014. *Journal of Islamic Banking and Finance, 3*(2), 1–14. https://doi.org/10.15640/jibf.v3n2a1

Kumbirai, M., & Webb, R. (2010). A financial ratio analysis of commercial bank performance in South Africa. *African Review of Economics and Finance, 2*(1), 30–53.

Levine, R. (2005). Finance and growth: Theory and evidence. In P. Aghion & S. N. Durlauf (Eds.), *Handbook of economic growth* (Vol. 1A, pp. 865–934). Elsevier. https://doi.org/10.1016/S1574-0684(05)01012-9

Mishkin, F. S., & Eakins, S. G. (2021). *Financial markets and institutions* (10th ed.). Pearson.

Pandey, I. M. (2022). *Financial management* (12th ed.). Pearson India.

Prasad, K. V. N., & Ravinder, G. (2012). A CAMEL model analysis of nationalized banks in India. *International Journal of Trade and Commerce, 1*(1), 23–33.

Reserve Bank of India. (2021). *Report on trend and progress of banking in India 2020–21*. https://www.rbi.org.in

Reserve Bank of India. (2022). *Report on trend and progress of banking in India 2021–22*. https://www.rbi.org.in

Reserve Bank of India. (2023). *Report on trend and progress of banking in India 2022–23*. https://www.rbi.org.in

Reserve Bank of India. (2024a). *Database on Indian economy*. https://dbie.rbi.org.in

Reserve Bank of India. (2024b). *Report on trend and progress of banking in India 2023–24*. https://www.rbi.org.in

Reserve Bank of India. (2024c). *Statistical tables relating to banks in India*. Reserve Bank of India.

Roman, A., & Şargu, A. C. (2013). Analyzing the financial soundness of the commercial banks in Romania: An approach based on the CAMELS framework. *Procedia Economics and Finance, 6*, 703–712. https://doi.org/10.1016/S2212-5671(13)00192-5

Rose, P. S., & Hudgins, S. C. (2013). *Bank management and financial services* (9th ed.). McGraw-Hill

Education.

Sarker, A. A. (2005). CAMELS rating system in the context of Islamic banking: A proposed "S" for Shariah framework. *Journal of Islamic Economics and Finance, 1*(1), 78–84.

Saunders, A., & Cornett, M. M. (2022). *Financial institutions management: A risk management approach* (11th ed.). McGraw-Hill.

Sinkey, J. F. (2002). *Commercial bank financial management in the financial services industry* (6th ed.). Pearson.

State Bank of India. (2014–2024). *Annual reports*. State Bank of India.

World Bank. (2023). *Global financial development report 2023*.

Yadav, L. S., Lakshmi, D., & Anjali, K. S. (2024). Financial performance analysis of ICICI Bank using ratio analysis. *International Journal of Advanced Research in Science, Communication and Technology, 4*(5), 1845–1851.