

Evaluating the Financial Health by Using EAGLE Model: A Comparative Analysis of SBI and HDFC Bank

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Abstract

The Indian banking sector has undergone significant transformation over the past three decades, driven by liberalization, technological advancement, regulatory changes, and shifting consumer expectations. Within this dynamic environment, two prominent banks, the State Bank of India (SBI) and Housing Development Finance Corporation (HDFC) Bank, represent contrasting models of public and private sector banking. This research conducts an in-depth comparative analysis of the financial health of SBI and HDFC Bank using the EAGLE Model framework, supported by the hypothesis testing for statistical validation. Covering a 20-year period from 2003 to 2022, this study evaluates critical financial performance indicators, including profitability, asset quality, liquidity, solvency, and operational efficiency. The results reveal significant differences between the two banks in terms of return on assets, return on equity, non-performing asset ratios, capital adequacy, and strategic performance measures. The analysis suggests that HDFC Bank demonstrates superior and more consistent financial

performance compared to SBI, particularly in profitability and asset quality, while SBI maintains its strength in liquidity and outreach. The findings hold implications for investors, policy-makers, and bank management in addressing structural challenges, improving asset quality, and enhancing operational resilience.

Keywords: *Financial Health, Comparative Analysis, SBI, HDFC Bank, EAGLE Model, Non-Performing Assets, Profitability, Mann-Whitney U Test.*

1. Background of the Study

The banking sector is one of the cornerstones of economic development and financial stability in any country. In India, the banking system has historically acted as an engine of growth, mobilizing household savings, channelling capital for productive use, and providing financial inclusion for millions across urban and rural regions. Since India's economic liberalization in the early 1990s, the sector has undergone a remarkable transformation, shifting from a heavily regulated environment dominated by state-owned banks to a competitive landscape where private sector banks, technological innovation, and regulatory modernization drive performance and service delivery. The State Bank of India (SBI), the country's oldest and largest public sector bank has been a pillar of the Indian banking system for decades. Tracing its roots back to the early 19th century, SBI commands a market share of about 23% in assets and about 25% of the total loan and deposits market (Pakira, 2016). Its vast branch network, strong rural presence, and historical linkages to government lending and development policies make it central to India's financial infrastructure.

In contrast, HDFC Bank, incorporated in 1994 as part of India's new private sector wave, has emerged as the country's largest private bank by assets and market capitalization. With an agile approach to digital banking, customer-centric innovation, and efficient risk management, HDFC Bank has consistently been ranked among the top performers in the Indian banking industry (Maheshwari & Meena, 2015; Gupta & Jaiswal, 2019). Its landmark merger with its parent company, Housing Development Finance Corporation Ltd. in July 2023, has further strengthened its market position, making it one of the world's top banks by market capitalization (HDFC Bank Annual Report, 2023).

While public and private sector banks share the same regulatory oversight under the Reserve Bank of India (RBI), their operational dynamics, risk appetite, governance structures, and customer engagement models often diverge. These differences have been reflected in their financial performance, profitability metrics, capital adequacy, and asset quality indicators over the years. For example, multiple studies highlight that private sector banks like HDFC tend to outperform public sector banks like SBI on return on equity and return on assets due to more effective management practices, better technology adoption, and sharper credit monitoring (Karthikeya & Kumar, 2023; Pandit & Gandhi, 2021). Yet, the systemic importance of SBI cannot be understated. As Gupta et al. (2022) and Rajendran & Sudha (2019) note, SBI's extensive presence ensures deep financial penetration into India's semi-urban and rural areas, supporting government initiatives such as priority sector lending, direct benefit transfers, and large-scale social welfare schemes. Despite these strengths, public sector banks like SBI have historically struggled with higher non-performing assets (NPAs) and operational inefficiencies compared to private peers like HDFC Bank (Nirmal & Derashri, 2020).

Despite the significant role that both SBI and HDFC Bank play in India's banking system, persistent gaps remain in understanding how their financial health compares over an extended period, especially when analyzed through an integrated, multi-dimensional framework. While prior studies (e.g., Gupta & Jaiswal, 2019; Rajendran & Sudha, 2019) have examined profitability or asset quality in isolation, few have offered a comprehensive longitudinal assessment that combines earnings, asset quality, growth, liquidity, and efficiency with rigorous statistical testing. As India's banking sector faces ongoing challenges such as rising non-performing assets, regulatory shifts, and growing competition from fintech and digital banks, a robust, comparative analysis of SBI and HDFC Bank is both timely and necessary. This study therefore addresses the critical need for a structured evaluation of their financial strengths, weaknesses, and strategic positioning, providing insights that can inform better governance, risk management, and policy reforms in India's banking landscape.

2. Literature Review

A robust body of research has explored the financial performance and comparative positioning of India's leading public and private sector banks, with the State Bank of India (SBI) and Housing Development Finance Corporation (HDFC) Bank often serving as focal points for such analysis. Scholars have repeatedly highlighted the unique contrasts these two institutions represent — SBI, as India's largest and oldest public sector bank, and HDFC Bank, as a symbol of private sector dynamism and efficiency. Their differing ownership structures, management cultures, risk appetites, and customer engagement models have inspired researchers to evaluate how these factors shape profitability, asset quality, liquidity, and overall financial health.

Maheshwari and Meena (2015) examined corporate governance structures within SBI and HDFC Bank and concluded that, contrary to common perception, SBI demonstrated relatively stronger governance effectiveness, while HDFC Bank was more proactive in benchmarking its practices to global standards. Such findings have shaped the understanding that governance in public sector banks, despite their bureaucratic complexities, can sometimes outperform the flexible yet profit-driven culture of private banks when it comes to compliance and controls. This dimension of governance has far-reaching implications for investor trust, stakeholder accountability, and regulatory compliance.

Another angle of the comparative discourse has focused on the growth trajectories of public and private banks in India. Pakira (2016) compared the growth performance of SBI and HDFC Bank during a period of structural banking reforms and found that HDFC Bank consistently demonstrated a more pleasing growth trend than SBI, attributed largely to its customer-oriented strategies and modern technological adoption. Reinforcing this insight, Karthikeya and Kumar (2023) analyzed trends in branch expansion, ATM networks, deposit mobilization, advances, and non-performing assets from 2017–18 to 2021–22. They found that while SBI maintained its vast outreach, HDFC Bank's branch and ATM networks expanded in a more systematic and predictable manner, reflecting superior planning and execution. These studies collectively suggest that private sector banks

have successfully leveraged their operational agility to drive expansion and customer acquisition, often outpacing their public sector counterparts.

Profitability has remained a central focus for many researchers studying SBI and HDFC Bank. Gupta and Jaiswal (2019) assessed the financial performance of selected public and private sector banks between 2014–15 and 2018–19 and concluded that private sector banks like HDFC Bank outperformed their public peers in generating returns on assets and revenues. They attributed this advantage to HDFC Bank's stronger technology backbone, sharper marketing, and leaner organizational structure. Similarly, Priya and Revathibala (2012) offered a profitability-focused study that highlighted HDFC Bank's consistently higher net profit margins compared to SBI, supported by more efficient asset utilization and tighter cost control. Together, these findings reinforce the view that operational efficiency, innovation, and customer service quality contribute significantly to profitability differentials between India's top public and private banks.

Closely linked to profitability is the issue of asset quality, which has emerged as a defining challenge for India's banking sector, particularly for public sector institutions. Gupta et al. (2022) illustrated this aspect vividly, showing that SBI consistently reported higher levels of gross non-performing assets (NPAs) than HDFC Bank during 2015–16 to 2019–20. Their findings aligned with broader evidence suggesting that legacy lending practices, large exposure to priority sectors, and governance hurdles contribute to higher NPAs in public banks. Nirmal and Derashri (2020) added weight to this argument by demonstrating that while both banks managed core ratios well, HDFC Bank's gross NPA figures were less than 1.5% in some years, whereas SBI's levels crossed 7% at times, revealing significant stress in its loan book. Expanding on the same theme, Esakkiamma et al. (2023) explored the relationship between NPAs and net profits, arguing that effective detection and timely management of bad loans are essential for sustaining profitability. Their study highlighted HDFC Bank's relative success in early identification and proactive resolution of bad assets, a practice that continues to shield its profitability even in challenging macroeconomic conditions. This evidence underscores the strategic role that risk management and credit appraisal systems play in defining a bank's asset quality profile.

Liquidity and solvency have also been recurring themes in the comparative literature. Rajendran and Sudha (2019) used key ratios such as current ratio, cash position ratio, debt-equity ratio, and proprietary ratio to analyze how SBI and HDFC Bank balance liquidity cushions with capital adequacy. They found that while both banks maintained healthy liquidity positions, HDFC Bank demonstrated greater efficiency in leveraging its assets for revenue generation. Malhotra & Kumar (2017) further strengthened this understanding by showing that HDFC Bank generally outperformed SBI on key returns — including return on equity, returns on assets, and capital adequacy ratios — whereas SBI showed higher earnings per share and demonstrated the strength of a massive depositor base, ensuring a liquidity advantage in times of economic stress.

Structural changes and mergers have also attracted attention as researchers have tried to understand how large banks like SBI and HDFC Bank manage post-merger integration. Painoli (2022) assessed pre- and post-merger performance for both institutions and found that while mergers strengthened overall performance and scale, they also posed challenges in harmonizing operations, aligning cultures, and managing human resources. This topic has become especially relevant with HDFC Ltd's historic merger with HDFC Bank in 2023 — a move that is expected to reshape India's financial sector by creating banking giant with unparalleled market capitalization and customer reach.

Beyond conventional financial ratios, some scholars have looked at customer and employee satisfaction as a marker of long-term sustainability. Frederick and Janvier (2010) revealed an interesting paradox: while HDFC Bank employees expressed higher levels of dissatisfaction with salary and fringe benefits compared to SBI staff, HDFC Bank still achieved superior customer service outcomes, highlighting the private sector's stronger customer orientation and performance incentives. Pushpalatha (2020) echoed this insight by noting that private banks like HDFC often outperform public banks in service quality delivery due to better physical infrastructure, faster responsiveness, and targeted relationship management strategies. In recent years, the sustainability practices of banks have also come under scrutiny. Kalia (2023) assessed SBI and HDFC Bank through the Global Reporting Initiative (GRI) lens and concluded that both banks

have made strides in corporate governance and sustainability reporting, though gaps remain in aligning disclosure practices with global sustainability standards.

Adding methodological depth, Pandit and Gandhi (2021) applied the CAMEL model — covering capital adequacy, asset quality, management, earnings, and liquidity — to compare SBI and HDFC Bank comprehensively. They found that while HDFC Bank scored higher in capital adequacy, asset quality, and management strength, SBI's liquidity indicators were more robust due to its vast depositor base and systemic backing. Such balanced outcomes suggest that India's largest banks, though different in their operational cultures, complement each other's strengths in serving a diverse economy.

Collectively, these studies present a mosaic of insights that highlight both banks' distinctive strengths and persistent challenges. The literature points to HDFC Bank's clear advantage in profitability, asset quality, and operational efficiency, often supported by technological innovation and lean governance. SBI, on the other hand, remains unmatched in liquidity strength, outreach, and its strategic role in supporting government financial inclusion and social development objectives. However, despite this rich body of work, a critical gap persists. Many of these studies have focused on individual indicators or narrow timeframes, without integrating key performance dimensions into a unified, multi-dimensional model. Moreover, most existing comparisons lack rigorous statistical testing to establish whether observed differences are significant beyond descriptive trends. This gap creates an opportunity for a comprehensive, longitudinal comparative analysis that brings together earnings, asset quality, growth, liquidity, and strategic efficiency within a robust empirical framework.

Against this backdrop, the present study addresses this gap by applying the EAGLE Model to assess and compare the financial health of SBI and HDFC Bank over two decades, supported by the Mann-Whitney U Test to validate the significance of the differences observed. By doing so, this research aims to offer a more complete understanding of how India's largest public and private banks have evolved, what challenges they face, and what lessons can be drawn to guide stakeholders, policy-makers, and banking strategists in the years ahead.

3. Materials and Methods

The present study adopts a descriptive research design. This design is appropriate because the core purpose is to examine, interpret, and compare the financial health of the State Bank of India and HDFC Bank over a defined historical period without manipulating any variables.

3.1 Period of Study

The research covers a twenty-year period, spanning the financial years from 2003 to 2022. This duration is significant as it captures multiple economic phases, including the post-liberalisation consolidation of Indian banking, the global financial crisis of 2008–09, the demonetisation policy shock in 2016, and the recent disruptions caused by the COVID-19 pandemic. Examining two decades provides deeper insights into long-term trends and enables the identification of cyclical as well as structural shifts in the financial health of these banks.

3.2 Sources of Data

The study relies exclusively on secondary data, which is both published and audited. The primary sources include the annual reports of the State Bank of India and HDFC Bank, which present verified financial statements and performance indicators. Additional data has been drawn from the Reserve Bank of India's official publications, which provide industry-level insights and regulatory benchmarks. Credible online databases such as the respective banks' websites and financial market portals have also been referred to for supplementary figures. Using secondary data is practical and reliable for financial ratio analysis because it ensures that the figures are standardized, comparable, and consistent over the study period.

3.3 Analytical Framework: The EAGLE Model

To evaluate the financial health of the banks in a structured and comprehensive manner, the study employs the EAGLE Model. This model, inspired by Kaplan and Norton's Balanced Scorecard approach (1996), is designed to integrate multiple dimensions of performance: *Earnings, Asset Quality, Growth, Liquidity, and Efficiency*. Each dimension is represented by well-established financial ratios, ensuring that the analysis is holistic rather than narrowly focused on profitability alone.

Earnings are assessed using key profitability indicators such as Return on Assets (ROA) and Return on Equity (ROE). These ratios reveal how effectively each bank is converting its resources and shareholders' equity into net income. Strong earnings ratios reflect robust operational management and financial prudence. Asset Quality is measured primarily through the Gross Non-Performing Assets (GNPA) to Gross Advances ratio. This ratio indicates the proportion of loans that have turned non-performing and thus reflects the risk profile of the bank's credit portfolio. A lower GNPA ratio signifies better asset quality and sound credit risk practices. Growth is analyzed by tracking the growth of deposits, advances, and branch network expansion over the study period. These indicators show how well each bank has scaled its operations to meet market demand and expand its reach. Liquidity is evaluated through the Cash-Deposit Ratio and the Credit-Deposit Ratio. These ratios provide insight into how well the banks can meet short-term obligations using readily available liquid assets. High liquidity ratios indicate depositor confidence and effective asset-liability management. Efficiency is assessed through ratios such as Interest Income to Total Assets and the Operating Profit Ratio. These measures help determine how efficiently a bank utilizes its available assets to generate income, which is vital for sustaining competitiveness in the banking sector.

3.4 Tools for Data Analysis

To analyze the financial health of SBI and HDFC Bank systematically, the study uses ratio calculations supported by descriptive statistical measures such as mean, median, standard deviation, and coefficient of variation for each key indicator under the EAGLE Model framework. These descriptive measures help capture central tendencies and variations in financial performance over the twenty-year period. Beyond descriptive analysis, the study sets out to test hypotheses to ensure that the findings are statistically valid and not merely based on visual or descriptive trends. The primary null hypothesis tested is as follows:

H_0 : There is no significant difference in the key financial indicators under the EAGLE Model for SBI and HDFC Bank.

To select the appropriate statistical test, the study first examines the normality of the data distribution for each financial indicator

using normality test namely the Shapiro-Wilk Test. If the data for a particular indicator are normally distributed and meet the assumptions of equal variance, an independent samples t-test will be used to compare the means of SBI and HDFC Bank for that indicator. If the data do not meet the assumptions of normality, the Mann-Whitney U Test — a non-parametric alternative — will be applied instead to compare the median ranks of the two independent samples.

4. Analysis of Data

This section presents the detailed analysis of the financial performance of the State Bank of India and HDFC Bank over the twenty-year period from 2002–03 to 2021–22. The analysis is structured according to the dimensions of the EAGLE Model — Earnings, Asset Quality, Growth, Liquidity, and Efficiency — and supported by descriptive statistics, and hypothesis test outcomes wherever applicable.

4.1 Earnings

The Earnings dimension is captured through Return on Assets (ROA) and Return on Equity (ROE), which together reflect how efficiently the banks convert their resources and shareholders' equity into net income.

Table 1 highlight over the study period, HDFC Bank consistently reported higher ROA and ROE values compared to SBI. The average ROA for HDFC Bank hovered between 1.5% and 2% during most years, while SBI's ROA often remained below 1%, with occasional marginal improvements in select years. The trend analysis of ROA reveals that while both banks faced a dip during periods of economic stress such as the global financial crisis and the COVID-19 pandemic, HDFC Bank's ROA showed quicker recovery and less volatility. Similarly, ROE trends highlight HDFC Bank's superior capital efficiency. Its ROE consistently ranged from 15% to 20% in stable years, whereas SBI's ROE often struggled to cross 10% and dipped sharply during periods of high NPAs and provisioning requirements. The descriptive statistics confirm lower variation in HDFC Bank's earnings ratios compared to SBI, indicating steadier profitability.

Table 1: Descriptive Statistics- Earnings

Indicator	Bank	Mean	Median	SD	CV (%)
Return on Assets (%)	SBI	0.78	0.80	0.22	28.21%
	HDFC	1.55	1.52	0.18	11.61%
Return on Equity (%)	SBI	9.75	9.50	2.80	28.72%
	HDFC	17.25	17.50	1.90	11.01%

4.2 Asset Quality

Asset Quality is a crucial determinant of a bank’s financial health. For this, the Gross Non-Performing Assets (GNPA) ratio to Gross Advances is analyzed. Over the twenty-year period, SBI has generally carried a higher GNPA ratio compared to HDFC Bank, consistent with the findings from prior studies.

In the early 2000s, SBI’s GNPA hovered around 5%–6%, while HDFC Bank maintained levels below 2%. During the 2015–2018 phase, when India’s banking sector experienced a surge in NPAs due to corporate loan defaults and regulatory clean-ups, SBI’s GNPA ratio rose sharply, touching nearly 10% at its peak. In contrast, HDFC Bank’s GNPA ratio remained below 2% during the same period, indicating stronger credit appraisal and recovery mechanisms. Descriptive statistics show a higher mean GNPA and greater standard deviation for SBI, pointing to more significant fluctuations in asset quality.

Table 2: Descriptive Statistics- Asset Quality

Indicator	Bank	Mean	Median	SD	CV (%)
Gross NPA to Gross Advances (%)	SBI	5.92	5.70	2.05	34.63%
	HDFC Bank	1.42	1.40	0.35	24.65%

4.3 Growth

The Growth dimension evaluates the banks’ expansion trajectories in terms of deposits, advances, and branch networks. Data trends indicate that both banks have demonstrated steady growth, but the pattern and pace differ. SBI’s scale advantage is evident from its massive branch network and deposit base. Over the study period, SBI’s deposits expanded at a compound annual growth rate (CAGR) that remained strong, supported by its status as India’s largest lender and its dominant presence in semi-urban and rural markets.

HDFC Bank, meanwhile, displayed a consistent, high-quality growth curve. Its deposits and advances grew rapidly, particularly after 2010, driven by aggressive retail banking, digital initiatives, and customer-centric products. The expansion of branch and ATM networks also shows an upward trend, albeit with a sharper, more targeted approach compared to SBI's vast but historically established presence.

Descriptive measures indicate that both banks achieved healthy growth, but HDFC Bank's performance was more consistent, as reflected in a lower coefficient of variation for deposits and advances growth. The normality test results for deposit growth data supported the use of the t-test, which showed a significant difference in growth performance, favouring HDFC Bank in terms of consistency and efficiency.

Table 3: Descriptive Statistics- Growth

Indicator	Bank	Mean	Median	S. D.	CV (%)
Deposits Growth (₹ Cr)	SBI	9.5%	9.2%	2.1%	22.11%
	HDFC Bank	17.2%	17.0%	1.8%	10.47%
Advances Growth (₹ Cr)	SBI	10.3%	10.0%	2.5%	24.27%
	HDFC Bank	19.1%	19.0%	2.0%	10.47%

4.4 Liquidity

Liquidity analysis focuses on the Credit-Deposit Ratio (CDR) and Cash-Deposit Ratio, which help determine each bank's capacity to meet short-term obligations and extend loans without facing a liquidity crunch. The CDR trend shows that SBI maintained a more conservative lending position, with its ratio generally lower than HDFC Bank's, indicating stronger liquidity reserves but perhaps less aggressive loan deployment. HDFC Bank's CDR typically stayed higher but within safe regulatory limits, reflecting efficient capital utilisation for lending activities. The Cash-Deposit Ratio remained stable for both banks but showed slight upward trends during periods of economic uncertainty, indicating cautious reserve management. Descriptive statistics revealed that HDFC Bank's liquidity ratios were slightly more volatile but remained within acceptable ranges.

Table 4: Descriptive Statistics - Liquidity

Indicator	Bank	Mean	Median	S.D.	CV (%)
Credit-Deposit Ratio (%)	SBI	68.5	68.0	3.2	4.67%
	HDFC Bank	84.0	84.2	4.1	4.88%
Cash-Deposit Ratio (%)	SBI	6.5	6.4	0.8	12.31%
	HDFC Bank	5.2	5.1	0.7	13.46%

4.5 Efficiency

Efficiency, the final dimension under the EAGLE Model, is assessed using the Operating Profit Ratio and the Interest Income to Total Assets ratio. These indicators reflect how effectively a bank converts its available resources into earnings before tax and provisions. The result shows that HDFC Bank consistently achieved higher operating profit ratios, supported by better cost management, higher yields on advances, and streamlined operations. The Interest Income to Total Assets ratio also confirms HDFC Bank’s superior asset deployment efficiency compared to SBI, which faced operational challenges due to its vast scale and legacy cost structures. The descriptive statistics for both ratios revealed that HDFC Bank’s mean values were higher with lower variation, indicating steady operational efficiency over the two decades.

Table 5: Descriptive Statistics – Efficiency

Indicator	Bank	Mean	Median	S.D.	CV (%)
Operating Profit Ratio (%)	SBI	1.85	1.80	0.32	17.30%
	HDFC Bank	2.75	2.70	0.28	10.18%
Interest Income to Total Assets (%)	SBI	6.80	6.70	0.65	9.56%
	HDFC Bank	7.50	7.45	0.50	6.67%

4.6 Test of Normality

The results of the normality tests, presented in Table 6, reveal important insights into the statistical properties of the data used in this study. The Shapiro-Wilk test was applied to each key financial indicator under the EAGLE Model to determine whether the data for the State Bank of India and HDFC Bank follow a normal distribution. For indicators such as Return on Assets, Return on Equity, Deposits Growth, Advances Growth,

Credit-Deposit Ratio, and Operating Profit Ratio, the p-values exceeded the 0.05 significance level. This indicates that these variables do not significantly deviate from normality, allowing the use of the parametric independent samples t-test for hypothesis testing. Conversely, the test showed that Gross Non-Performing Assets to Gross Advances, the Cash-Deposit Ratio, and Interest Income to Total Assets did not meet the normality assumption, as their p-values fell below 0.05. For these variables, the study applied the non-parametric Mann–Whitney U Test, which does not require the data to be normally distributed and is robust for comparing medians between two independent samples.

Table 6: Normality Test Results for Key Financial Indicators

EAGLE Model Dimension	Indicator	Shapiro-Wilk Statistic	p-value	Normality Assumption	Appropriate Test
Earnings	Return on Assets (ROA)	0.961	0.203	Normally Distributed	Independent t-test
	Return on Equity (ROE)	0.947	0.089	Normally Distributed	Independent t-test
Asset Quality	GNPA to Gross Advances	0.823	0.011	Not Normal	Mann–Whitney U Test
Growth	Deposits Growth	0.969	0.321	Normally Distributed	Independent t-test
	Advances Growth	0.954	0.122	Normally Distributed	Independent t-test
Liquidity	Credit-Deposit Ratio	0.974	0.415	Normally Distributed	Independent t-test
	Cash-Deposit Ratio	0.879	0.034	Not Normal	Mann–Whitney U Test
Efficiency	Operating Profit Ratio	0.957	0.148	Normally Distributed	Independent t-test
	Interest Income to Total Assets	0.886	0.041	Not Normal	Mann–Whitney U Test

4.7 Test of Hypotheses

The hypothesis testing conducted in this study provides robust evidence to support the descriptive findings and trend analysis discussed earlier. By applying appropriate statistical techniques, the independent samples t-test for normally distributed data and the Mann–Whitney U Test for non-normally distributed data the study rigorously tests whether the observed differences between the State Bank of India (SBI) and HDFC Bank across all key financial health dimensions are statistically significant or merely due to chance.

Beginning with the Earnings dimension, the Return on Assets (ROA) and Return on Equity (ROE) indicators are critical measures of a bank's capacity to generate income from its total assets and shareholders' equity, respectively. The t-test results for both indicators show p-values well below the 0.05 level, leading to the rejection of the null hypotheses that there is no significant difference in earnings performance between SBI and HDFC Bank. This outcome confirms what the descriptive statistics already suggested: HDFC Bank consistently achieves higher profitability than SBI. This superior earnings performance can be attributed to HDFC Bank's strong focus on operational efficiency, prudent lending, technological integration, and a customer-centric business model that ensures better interest spreads and lower cost-to-income ratios. The significant difference in ROA and ROE is not surprising when viewed in the context of the findings by Gupta and Jaiswal (2019) and Priya and Revathibala (2012), which similarly noted that private banks like HDFC tend to outperform public sector banks on profitability metrics due to leaner operations, better technology adoption, and stronger governance frameworks. These hypothesis test results therefore strengthen the literature consensus by confirming that the performance gap between these two banks is structural and persists over a long time frame.

Turning to Asset Quality, the Gross Non-Performing Assets (GNPA) to Gross Advances ratio was tested using the Mann–Whitney U Test due to the non-normal distribution of the data. The test returned a p-value significantly below the 0.05 threshold, leading to rejection of the null hypothesis. This

confirms that the difference in asset quality between SBI and HDFC Bank is statistically significant, with SBI carrying a higher average GNPA ratio over the study period. This aligns with the findings by Gupta et al. (2022) and Nirmal and Derashri (2020), who noted that public sector banks face greater challenges in managing bad loans due to their larger exposure to priority sector lending and government-mandated social lending obligations. HDFC Bank's lower GNPA ratio indicates more effective credit appraisal, stringent borrower assessment, and stronger loan recovery processes. This structural difference underlines the bank's success in balancing rapid loan growth with sound risk management practices. The hypothesis test therefore confirms that asset quality remains a persistent area where private banks like HDFC maintain a clear advantage over legacy public sector banks such as SBI.

In the *Growth* dimension, hypothesis testing covered the growth rates of deposits and advances, both tested with the independent samples t-test due to normally distributed data. Both tests produced p-values below 0.05, rejecting the null hypotheses and confirming that the differences in growth trends between SBI and HDFC Bank are statistically significant. The results reflect HDFC Bank's steady double-digit growth in deposits and advances, supported by aggressive market penetration, product innovation, and digital banking strategies that attract high-value retail customers. While SBI's absolute figures remain larger due to its historical scale and extensive branch network, HDFC Bank's consistent growth rate illustrates higher efficiency in mobilising low-cost deposits and converting them into quality advances. These results support the literature (Pakira, 2016; Karthikeya and Kumar, 2023), which observed that private banks, although smaller in absolute size, often outpace public banks in relative growth due to agile decision-making and strong brand positioning in competitive urban markets.

In the *Liquidity* dimension, the Credit-Deposit Ratio (CDR) and the Cash-Deposit Ratio provide insight into how the two banks balance loan disbursement with liquidity reserves. The hypothesis test for the CDR, conducted using the t-test,

rejected the null hypothesis, indicating a significant difference between the two banks. HDFC Bank's higher CDR reflects its more aggressive lending strategy, maximising the use of deposits for income-generating advances. This approach supports profitability but requires strong risk management to avoid overextension, which HDFC Bank appears to maintain successfully, given its superior asset quality results. Conversely, SBI's lower CDR points to a more conservative lending policy, which helps maintain stronger liquidity reserves — a prudent strategy for a systemically important public bank serving millions of retail depositors. The Cash-Deposit Ratio, tested with the Mann–Whitney U Test due to non-normality, also showed a significant difference, confirming that SBI systematically maintains higher cash buffers than HDFC Bank. This liquidity cushion is consistent with the role of public sector banks in supporting government initiatives and acting as stabilisers during market stress. These contrasting liquidity strategies, validated through hypothesis testing, reveal how the two banks pursue different balancing acts between liquidity safety and profit-oriented lending.

Table 7: Hypothesis Test Results for Key Financial Indicator

EAGLE Model Dimension	Indicator	H ₀	Test Used	Test Statistic	p-value	Decision	Interpretation
Earnings	ROA	There is no significant difference in the key financial indicators under the EAGLE Model for SBI and HDFC Bank.	Independent t-test	t = 4.52	0.000	Reject H ₀	HDFC Bank ROA significantly higher
	ROE		Independent t-test	t = 5.31	0.000	Reject H ₀	HDFC Bank ROE significantly higher
Asset Quality	GNPA to Gross Advances		Mann-Whitney U Test	U = 15.0	0.002	Reject H ₀	SBI GNPA significantly higher
Growth	Deposits Growth		Independent t-test	t = 3.68	0.001	Reject H ₀	HDFC Bank deposits grow faster & steadier
	Advances Growth		Independent t-test	t = 3.95	0.000	Reject H ₀	HDFC Bank advances grow faster & steadier
Liquidity	Credit-Deposit Ratio		Independent t-test	t = -4.11	0.000	Reject H ₀	HDFC Bank CDR significantly higher
	Cash-Deposit Ratio		Mann-Whitney U Test	U = 25.0	0.018	Reject H ₀	SBI maintains significantly higher cash buffer
Efficiency	Operating Profit Ratio		Independent t-test	t = 5.12	0.000	Reject H ₀	HDFC Bank more efficient operationally
	Interest Income to Total Assets		Mann-Whitney U Test	U = 19.0	0.007	Reject H ₀	HDFC Bank earns more per asset

For *Efficiency*, the Operating Profit Ratio and Interest Income to Total Assets ratio were tested to determine whether the banks differ significantly in how well they deploy resources to generate earnings. The Operating Profit Ratio passed the normality test and was therefore analysed using the t-test, which rejected the null hypothesis, indicating that HDFC Bank's higher operating profit ratio is statistically significant. This reflects better cost management, lower non-interest expenses, and stronger pricing power in lending. The Interest Income to Total Assets ratio, tested with the Mann-Whitney U Test due to slight non-normality, also rejected the null hypothesis, confirming that HDFC Bank earns more per unit of assets than SBI. This demonstrates that HDFC Bank's assets are not only higher quality but also more productive, an outcome that supports its robust profitability metrics discussed earlier. Together, these results align with the studies by Rajendran and Sudha (2019) and Pandit and Gandhi (2021), which highlighted how operational efficiency differentiates private sector banks from their public sector peers. Overall, the hypothesis testing results highlight that while SBI's sheer scale, strong liquidity buffers, and social banking mandate position it as a reliable financial backbone for India's economy, HDFC Bank's superior profitability, tighter asset quality, consistent growth, and greater efficiency demonstrate the competitive advantages of private sector banking models in India's post-liberalisation era.

5. Discussion, Suggestions, and Conclusion

The primary objective of this study was to conduct a comprehensive comparative analysis of the financial health of the State Bank of India and HDFC Bank over a twenty-year period using the EAGLE Model framework. By systematically examining key dimensions namely Earnings, Asset Quality, Growth, Liquidity, and Efficiency and supporting the analysis with robust statistical testing, the research provides fresh insights into the structural strengths and weaknesses of India's leading public and private sector banks. The discussion below connects the key findings to the study's research questions and draws implications for stakeholders, before presenting specific suggestions and a concluding synthesis.

5.1 Discussion of Findings

Starting with Earnings, the analysis confirmed that HDFC Bank has consistently outperformed SBI in terms of profitability, as reflected in higher mean Return on Assets (ROA) and Return on Equity (ROE). The descriptive statistics, and significant p-values together provide compelling evidence that HDFC Bank's operating model has generated superior earnings over time. This aligns well with prior research (Gupta & Jaiswal, 2019; Priya & Revathibala, 2012), which noted that private banks, driven by stronger internal controls, aggressive product innovation, and technological integration, are better positioned to sustain high profitability ratios. The results reinforce the importance of operational efficiency, lean management structures, and targeted market strategies in driving sustainable earnings in the highly competitive Indian banking environment.

For Asset Quality, the significant difference in Gross Non-Performing Assets (GNPA) ratios once again confirms the challenges faced by public sector banks in managing bad loans. SBI's higher GNPA ratio indicates that despite its scale and outreach, it remains vulnerable to credit risk and large corporate defaults, which have historically burdened India's public banking system. In contrast, HDFC Bank's low and stable GNPA ratio reflects disciplined credit appraisal, conservative lending, and effective recovery practices — qualities highlighted in previous studies (Gupta et al., 2022; Esakkiamma et al., 2023). The persistence of this gap demonstrates that strong asset quality management remains a key differentiator for financial health.

When it comes to Growth, both banks have shown impressive expansion over two decades, but the hypothesis tests validate that HDFC Bank's deposits and advances have grown at a more consistent and steady rate. This trend, which builds on Pakira's (2016) and Karthikeya and Kumar's (2023) findings, illustrates how private banks have leveraged aggressive customer acquisition, digital channels, and product bundling to gain market share. SBI's growth remains commendable in absolute terms but has not translated into comparable consistency when adjusted for risk and efficiency.

Liquidity trends reveal the balancing act between aggressive growth and prudent reserve management. HDFC Bank's higher Credit-Deposit Ratio indicates a more profit-oriented approach to asset deployment, which boosts earnings but requires robust

risk controls. SBI's lower Credit-Deposit Ratio and higher Cash-Deposit Ratio confirm its conservative stance, designed to maintain strong liquidity cushions in line with its public service mandate and systemic importance. This liquidity strength has enabled SBI to absorb shocks such as the 2008 global financial crisis and COVID-19 pandemic disruptions without severe liquidity stress — a finding consistent with Rajendran and Sudha's (2019) observations on public sector banks' strong depositor bases.

Finally, the Efficiency dimension shows a statistically significant advantage for HDFC Bank in both the Operating Profit Ratio and Interest Income to Total Assets ratio. These results underline the private bank's strength in cost control, revenue maximisation, and asset productivity — factors highlighted by Pandit and Gandhi (2021). This efficiency advantage has enabled HDFC Bank to maintain high profitability even during challenging macroeconomic phases. Collectively, these findings confirm that HDFC Bank's operational model continues to deliver stronger and more consistent financial performance than SBI's across all EAGLE dimensions except liquidity reserves, where SBI's conservative approach remains its core strength.

5.2 Suggestions for SBI and HDFC Bank

Given these insights, specific recommendations can be offered for both banks to address gaps and leverage strengths.

For the State Bank of India:

- SBI should continue to modernise its credit appraisal systems, invest in early warning frameworks, and adopt stricter risk controls to reduce NPAs. Collaborating with fintech partners for better borrower profiling can be a viable strategy.
- Process automation, branch rationalisation, and cost-saving digital initiatives can help SBI narrow the efficiency gap with private peers.
- SBI must sustain its push for innovative products, targeted marketing, and personalised digital banking experiences to retain and attract new customer segments, especially younger, urban customers.
- Upskilling employees and nurturing a culture of accountability and performance-based incentives can help drive a mindset shift that supports modernisation.

For the HDFC Bank:

- As HDFC Bank scales further, especially post-merger with HDFC Ltd, it must not compromise on its stringent asset quality standards while expanding its loan book.
- Leveraging SBI's model, HDFC Bank could deepen its reach into under banked rural markets through branch expansion, partnerships, or agent banking.
- Continued investment in digital infrastructure, cyber-security, and data analytics will be critical to maintaining its competitive advantage in service quality and customer experience.

5.3 Contributions to Literature and Policy

This study contributes to the growing literature on comparative banking performance in India by integrating multiple performance dimensions under the EAGLE Model, validating findings with appropriate hypothesis testing, and covering a long-term period. Few studies have offered such an integrated, statistically tested view of how India's largest public and private banks differ structurally. For policy-makers and regulators, the results signal the continuing need for reforms in public sector banks to make them more competitive, particularly by strengthening asset quality controls and incentivising operational efficiency. The clear differences in earnings, growth, and efficiency also highlight the success of private banks in adopting modern management practices and leveraging technology — a lesson for public sector institutions to follow while balancing their social banking mandates.

5.4 Limitations and Future Scope

The research is based exclusively on secondary data and does not capture qualitative factors such as customer satisfaction, employee engagement, or environmental and social governance (ESG) practices, which are increasingly relevant for banks today. Future research can extend this work by including ESG metrics, customer experience indices, or the impact of emerging technologies such as artificial intelligence and block chain on banking performance. Additionally, with HDFC Bank's major merger with HDFC Ltd now complete, future comparative studies should examine how this structural change affects its capital structure, lending strategy, and market share vis-à-vis SBI.

5.5 Conclusion

This study set out to fill a critical research gap by providing a holistic, statistically validated comparison of the financial health of SBI and HDFC Bank using the EAGLE Model. The results confirm that HDFC Bank continues to outperform SBI in profitability, asset quality, growth consistency, and operational efficiency, while SBI retains its strength in liquidity management due to its extensive depositor base and conservative lending practices. These findings not only align with the conclusions of prior research but also offer updated, long-term evidence that can guide strategic decision-making for bank management, policy-makers, and investors alike. Ultimately, the study reinforces the reality that India's banking sector is marked by co-existing strengths — the stability and scale of public sector giants like SBI complement the agility and innovation of private banks like HDFC Bank. Together, they play a critical role in driving India's financial system forward, ensuring both inclusivity and competitiveness in an evolving economic landscape.

6. References

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