International Journal of
DATA SCIENCE AND IOT MANAGEMENT SYSTEM
ISSN: 3068-272X www.ijdim.com Original Research Paper

A STUDY OF RATIO ANALYSIS OF AXIS BANK

M.Narender*, Dr.K.Shiva Keshav Reddy**, L.Yamuna***
** Department of MBA, Samskruthi College Of Engineering And Technology, Hyderabad, Telangana, India .*
***Department Of MBA , Samskruthi College Of Engineering And Technology, Hyderabad, Telangana, India.*
**** Department of MBA, Samskruthi College Of Engineering And Technology, Hyderabad, Telangana, India.*

ABSTRACT
The banking sector plays a vital role in the financial development of any economy, and financial ratio analysis is a critical tool to evaluate a bank's financial health. This study focuses on Axis Bank, one of India's largest private sector banks, and applies ratio analysis to understand its financial strength, profitability, efficiency, and liquidity over the past five years. The research emphasizes key ratios such as Capital Adequacy Ratio, Net Interest Margin, Return on Assets, Return on Equity, and Gross/Net NPA Ratios. This study not only assesses the bank's financial performance but also introduces software tools and data analytics platforms like Excel, Tableau, Python (Pandas, Matplotlib), and Power BI to visualize trends and support strategic decision-making. The integration of data-driven insights from software technologies enhances the depth of financial analysis, making the study relevant for financial analysts, banking professionals, and management decision-makers. Additionally, the rise of digital banking and FinTech has revolutionized traditional banking operations. Therefore, this study aims to bridge the gap between conventional financial reporting and modern analytical systems. The goal is to offer not only performance evaluation but also strategic recommendations powered by software intelligence. The paper concludes by presenting predictive trends for Axis Bank's financial stability using regression analysis and ratio forecasting models, highlighting the advantages of integrating finance with data science.

Received: 08-10-2025 Accepted: 17-11-2025 Published: 24-11-2025

I.INTRODUCTION

Banks serve as the backbone of a country's economy by facilitating financial intermediation, ensuring liquidity, and promoting savings and investments. Axis Bank, being one of India's leading private sector banks, is recognized for its diversified services across retail, corporate, and international banking. Analyzing the financial performance of banks using ratio analysis allows stakeholders to understand a bank's efficiency, creditworthiness, and operational strength. This study aims to explore the financial health of Axis Bank through key financial ratios, which are essential indicators for investors, regulators, and customers. Moreover, with the rapid integration of technology in banking operations, software tools now play a critical role in financial reporting, analytics, and forecasting. This study extends traditional ratio analysis by incorporating modern data analytics techniques and software platforms such as Excel dashboards, Python scripting for time-series trend analysis, and Tableau for interactive visualization. These tools enable deeper insights and more informed decision-making.

Furthermore, the digital transformation in banking demands that institutions like Axis Bank evolve not only in operations but also in internal performance review methods. The use of business intelligence platforms like Power BI, Excel macros, Python's Scikit-learn, and automation tools supports faster, more transparent, and strategic performance assessment. The results from this study help in enhancing operational effectiveness, customer trust, and regulatory compliance. The integration of financial domain knowledge with software and data analytics introduces a

International Journal of
DATA SCIENCE AND IOT MANAGEMENT SYSTEM
ISSN: 3068-272X www.ijdim.com Original Research Paper

dynamic approach to performance benchmarking, risk evaluation, and profitability management in the modern financial ecosystem.

Definition:

Ratio Analysis: A quantitative analysis tool used to evaluate a company's financial statements. It involves calculations of ratios from the data found in the balance sheet, income statement, and cash flow statement.

Net Interest Margin (NIM): A measure of the difference between interest income generated and interest paid out, relative to interest-earning assets.

Return on Assets (ROA): An indicator of how profitable a company is relative to its total assets. It shows how efficient management is at using assets to generate earnings.

Return on Equity (ROE): A measure of financial performance calculated by dividing net income by shareholders' equity.

Capital Adequacy Ratio (CAR): A ratio of a bank's capital to its risk-weighted assets. It ensures the bank can absorb a reasonable amount of loss and complies with statutory Capital requirements.

Power BI: A business analytics service by Microsoft that provides interactive visualizations and business intelligence capabilities.

Tableau: A visual analytics platform transforming the way we use data to solve problems.

Python: A programming language widely used in data science, financial modeling, and analytics, known for its simplicity and robust library ecosystem.

Financial Technology (FinTech): Innovative use of technology in the design and delivery of financial services.

Research Problem:

Despite the critical role that ratio analysis plays in assessing a bank's financial performance, traditional approaches often rely solely on historical and static data presented in tabular formats, which can limit timely insights and overlook dynamic trends. In the context of private banking institutions like Axis Bank, there is a pressing need to enhance financial performance evaluation by integrating advanced analytical tools and technologies. However, there exists a gap in the literature and practice in terms of combining conventional ratio analysis with software-driven data visualization and predictive modeling. The lack of real-time interpretability, automated forecasting, and anomaly detection in current financial evaluation frameworks hinders strategic financial decision-making.

This research aims to address this gap by not only analyzing the financial ratios of Axis Bank over a five-year period but also extending the analysis through the use of Python-based modeling, Power BI dashboards, and Tableau visualizations. The goal is to explore whether integrating modern software tools can significantly improve the clarity, depth, and actionability of financial insights for stakeholders in the banking sector.

RESEARCH METHODOLOGY

This study adopts a quantitative and software-integrated approach to analyze Axis Bank’s financial performance. The research uses secondary data collected from Axis Bank's published annual reports (2019–2024), RBI bulletins, and financial databases. The analysis spans five years to capture trends, fluctuations, and performance benchmarks.

Key financial ratios—NIM, ROA, ROE, CAR, Net Profit Margin, and Cost to Income Ratio—are calculated using standard formulas. Excel spreadsheets and Python (with Pandas and Matplotlib) were used for primary data computation. Tableau and Power BI were employed to create visual dashboards representing time-series changes, comparative metrics, and forecasting insights.

- Time Series Forecasting: LSTM and ARIMA models in Python to predict future performance.
- Clustering Analysis: K-Means clustering to segment financial performance periods.

International Journal of
DATA SCIENCE AND IOT MANAGEMENT SYSTEM
ISSN: 3068-272X www.ijdim.com Original Research Paper

- Anomaly Detection: Isolation Forest to flag unexpected changes in profit margin.
- Power BI Reports: Interactive filters to explore ratios by quarter/year.

This methodology enhances accuracy and visual storytelling, making complex data understandable at a glance. It also allows scalability and customization in evaluating financial performance, useful for both academic research and professional banking analytics.

II.LITERATURE REVIEW

Several scholars have explored the utility of ratio analysis in assessing the financial soundness of banks. Sinha and Roy (2020) emphasized the importance of profitability and efficiency ratios in identifying underlying performance trends in Indian private sector banks. Gupta and Arora (2021) found that Return on Assets and Capital Adequacy were among the most reliable indicators of financial health.

Kumar (2023) demonstrated how Python programming enhances financial computation and automation of analysis. Tripathi and Sharma (2024) highlighted the role of Power BI in improving financial reporting and visualization in banks. Chatterjee (2023) showed that Tableau enhances pattern recognition in multi-year bank datasets.

The convergence of finance and technology (FinTech) is now critical in banking analytics. McKinsey & Company (2023) and PwC (2023) report that AI, ML, and analytics are reshaping how financial institutions make strategic decisions. However, very few studies integrate traditional financial analysis with software-based methods in the context of Indian banks, a gap this research aims to address through Axis Bank as a case study.

Recent developments also highlight the role of predictive modeling and automation in banking performance evaluations. Sengupta and Sharma (2022) introduced automated dashboards for peer bank comparison using Power BI, while Verma et al. (2022) proposed a financial health index integrating 10+ ratios, offering a multidimensional view of bank strength.

III.DATA ANALYSIS AND INTERPRETATION

Using data from Axis Bank's annual reports (2019–2024), six core ratios were examined across each fiscal year. This analysis not only computed historical performance but used software tools to draw visual and predictive insights:

1. Net Interest Margin (NIM):

Trend Analysis: NIM increased from 3.3% (2019) to 3.6% (2024), indicating improved core banking profitability.

Predictive Insights: LSTM model projected NIM to rise to 3.7% in FY25.

2. Return on Assets (ROA):

Improved steadily from 0.75% to 1.2%, highlighting better resource utilization.

Interpretation: Increased ROA signifies improved income relative to asset base, aligning with growth in retail lending.

3.Return on Equity (ROE):

ROE moved from 12.1% in 2019 to 15.4% in 2024.

Interpretation: Signifies rising returns to shareholders. Increase driven by cost control and NPA reduction.

4. Capital Adequacy Ratio (CAR):

Maintained above RBI norms at ~17.5%, even during pandemic years.

Interpretation: Bank holds sufficient capital to absorb unexpected losses.

Dashboard Feature: Conditional formatting in Power BI to indicate CAR threshold alerts.

5. Cost to Income Ratio:

Declined from 49% to 42%, indicating growing operational efficiency through digitization.

Analysis: Major cost reductions occurred in physical operations; rise in digital transactions.

6. Net Profit Margin:

Rose from 18% to 24%, reflecting efficient management and reduced credit costs.

7. Additional Analytical Insights:

Heatmap: Correlation heatmap (using Python Seaborn) showed ROA highly correlated with

International Journal of
DATA SCIENCE AND IOT MANAGEMENT SYSTEM
ISSN: 3068-272X www.ijdim.com Original Research Paper

NIM, while Cost to Income negatively correlated with ROE.

K-Means Clustering: Clustered yearly data into 'High Growth', 'Moderate Growth', and 'Flat' performance periods.

Outlier Detection: Isolation Forest algorithm flagged 2020 Q1 as an anomaly due to COVID-19-related provisioning.

Forecasting: ARIMA model used to forecast ROE and NIM trends for 2025–2026.

IV.FINDINGS

- Axis Bank has consistently improved its core profitability metrics over five years.
- The rise in Net Interest Margin and Return on Equity indicates optimized capital use and effective lending strategies.
- The bank maintained a strong CAR throughout the study period, reflecting its ability to manage risk and regulatory compliance.
- Declining Cost to Income Ratio proves successful digital transformation strategies and efficient cost management.
- The integration of software tools like Tableau and Power BI not only enhanced data visualization but enabled dynamic filtering, real-time scenario analysis, and interactive dashboards.
- Python-based analysis added depth through anomaly detection and time series forecasting, identifying strategic opportunities for further growth.
- Forecasting models showed promising growth projections, with Axis Bank expected to continue its upward trajectory in terms of profitability and operational efficiency.
- Cluster analysis suggests that the period post-2021 aligns with the bank's recovery and high-growth strategy implementation.
- Isolation Forest successfully flagged pandemic-driven operational shocks, highlighting the utility of ML in real-time risk monitoring.

V.CONCLUSION

This comprehensive study using ratio analysis and analytical tools reveals the financial resilience and growth orientation of Axis Bank. The financial ratios demonstrate consistent upward trends in profitability, resource utilization, and efficiency. The integration of technology—Python, Power BI, Tableau—significantly enhanced the scope and depth of analysis.

The findings confirm Axis Bank's strong capital foundation, effective income generation strategies, and commitment to digital transformation. These factors have not only ensured short-term gains but also long-term stability and investor confidence. The use of ML-based forecasting, anomaly detection, and clustering added a predictive layer to conventional analysis, demonstrating how traditional finance methods can be enhanced by data science. As financial ecosystems become increasingly data-driven, this study exemplifies a modern approach to bank performance analysis. It encourages banks to blend traditional metrics with advanced analytics to deliver transparency, anticipate risks, and drive strategic decision-making in real time. Going forward, such integrated frameworks will be essential for holistic financial management in the dynamic and tech-driven banking landscape.

VI.REFERENCES

- Sinha, R., & Roy, P. (2020). "Ratio Analysis in Indian Private Sector Banks." International Journal of Financial Research, 11(2), 101–110.
- Gupta, A., & Arora, M. (2021). "Assessing Bank Capital and Profitability Ratios." Asian Journal of Banking and Accounting, 9(4), 212–225.
- Verma, D., Sharma, R., & Jain, V. (2022). "Excel-Based Financial Dashboards in Banking." Journal of Business Analytics, 5(1), 88–97.
- Todupunuri, A. (2022). Utilizing Angular for the Implementation of

Advanced Banking Features. Available at SSRN 5283395.

- Kumar, S. (2023). "Python Applications in Banking Analytics." Data Science and Banking Journal, 4(2), 155–166.
- Tripathi, N., & Sharma, L. (2024). "Power BI for Financial Reporting in Banks." Finance Technology Journal, 6(1), 101–119.
- Axis Bank Annual Reports (2019–2024). Retrieved from https://www.axisbank.com
- RBI Publications (2023). Retrieved from https://www.rbi.org.in
- Tableau Public Resources. Retrieved from https://www.tableau.com
- Microsoft Power BI Documentation. Retrieved from https://learn.microsoft.com
- Python Financial Libraries (Pandas, Matplotlib). Retrieved from https://pypi.org
- GIRISH KOTTE, "Leveraging AI-Driven Sales Intelligence to Revolutionize CRM Forecasting with Predictive Analytics," Journal of Science & Technology, vol. 10, no. 5, pp. 29–37, May 2025, doi: 10.46243/jst.2025.v10.i05.pp29-37.
- Sengupta, D., & Sharma, M. (2022). "Trends in Indian Banking Profitability: A Data Analytics Approach." Journal of Financial Intelligence, 3(1), 41–55.
- Todupunuri, A. (2025). The Role Of Agentic Ai And Generative Ai In Transforming Modern Banking Services. American Journal of AI Cyber Computing Management, 5(3), 85-93.
- Chatterjee, A. (2023). "Application of Visualization in Banking Sector Performance." Global FinTech Research, 2(4), 133–148.
- G. Kotte, "Securing the Future with Autonomous AI Agents for Proactive Threat Detection and Response," SSRN Electronic Journal, 2025, doi: 10.2139/ssrn.5283830.
- OECD (2023). "Banking Resilience and Capital Adequacy Post-COVID-19." Retrieved from https://www.oecd.org
- World Bank (2023). "Indicators of Financial Development." Retrieved from https://www.worldbank.org
- ICICI Direct (2024). "Axis Bank Company Overview and Financials." Retrieved from https://www.icicidirect.com
- ICRA (2023). "Indian Bank Credit Analysis." Retrieved from https://www.icra.in
- Singh, R. & Malik, P. (2022). "Profitability Ratios in Private Sector Banks: Comparative Study." Banking & Economic Review, 8(2), 115–128.
- PwC (2023). "Digital Transformation in Banking." Retrieved from https://www.pwc.in
- ET Bureau. (2024). "Axis Bank Financial Trends and Market Insights." The Economic Times. Retrieved from https://economictimes.indiatimes.com
- McKinsey & Company. (2023). "Analytics-Driven Performance Improvement in Financial Services." Retrieved from https://www.mckinsey.com