

Prediction of Financial Ratios Based on BSE Top 10 Companies: An Excel and VBA-Based Approach

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Abstract

This study explores the predictive potential of key financial ratios for the top 10 companies listed on the Bombay Stock Exchange (BSE) using historical financial data (FY 2022–2024). Utilizing Excel and VBA for automation, key ratios—such as P/E, P/B, ROE, EPS, Current Ratio, and Debt-to-Equity—are computed, analysed, and forecasted using regression models. The study demonstrates that financial ratios serve as effective tools for evaluating corporate performance, guiding investment decisions, and supporting strategic financial planning. Despite certain limitations, the model proves useful for short-term forecasting and provides a replicable framework for further research and practical application.

1. Introduction

Financial ratio analysis is an essential technique for assessing a firm's performance, risk, and valuation. This study aims to forecast financial ratios of BSE's top 10 companies using an Excel-based model integrated with VBA macros to enhance efficiency, accuracy, and accessibility.

India's capital markets, characterized by sectoral diversity and emerging market volatility, offer a complex but promising environment for ratio-based analysis. Traditional methods are time-consuming and error-prone, especially across multi-company datasets. Hence, automation is proposed to streamline the process.

Research Questions:

- How effective are financial ratios in assessing BSE companies?
- Can Excel and VBA enhance forecasting efficiency?
- What patterns can be observed across sectors?

2. Literature Review

Past studies such as Lev and Thiagarajan (1993) and Bhargava & Malhotra (2005) establish the predictive strength of ratios like ROE and D/E. Gupta and Jain (2017) applied time-series models to forecast liquidity and solvency ratios. More recently, Kumar et al. (2020) and Desai & Shah (2022) used machine learning and deep learning models, enhancing predictive accuracy by incorporating sentiment and macroeconomic variables. While much research is focused on developed markets or stock prices, few studies explore predictive modelling of financial ratios in India's emerging context using Excel automation.

3. Methodology

3.1 Design:

A quantitative and predictive design using secondary data from FY 2022–2024 for top 10 BSE companies.

3.2 Data Sources:

Money control, Yahoo Finance, BSE India, company annual reports.

3.3 Sample:

Top 10 companies by market capitalization:

Reliance, HDFC Bank, Infosys, ICICI Bank, TCS, LIC, SBI, Bharti Airtel, HUL, ITC.

3.4 Tools Used:

- Excel + VBA: for automation, calculations, and dashboards.
- Linear regression: for forecasting key ratios.
- Visualization: line graphs, scatter plots, and comparative tables.

3.5 Ratios Analysed:

- **Liquidity:** Current Ratio, Quick Ratio
- **Solvency:** Debt-to-Equity, Interest Coverage
- **Profitability:** ROE, ROA, Net Profit Margin
- **Valuation:** P/E, P/B, EPS

4. Results and Discussion

4.1 Results

According to the financial ratio analysis of the top 10 BSE-listed firms (Reliance, HDFC Bank, Infosys, ICICI Bank, TCS, LIC, SBI, Bharti Airtel, HUL, and ITC), the following conclusion was drawn:

a. **Profitability Analysis** Infosys and HUL registered consistent high Return on Equity (ROE) (more than 25%) and EPS growth for FY 2022–2024. These firms demonstrated strong shareholder returns and low volatility and hence are favourable for long-term investors.

TCS also reflected stable Net Profit Margin and operating efficiency.

b. Leverage and Solvency

LIC and Bharti Airtel recorded the highest Debt-to-Equity ratios (>2.0), reflecting greater financial leverage.

Even then, both of them had moderate Interest Coverage Ratios, reflecting that debt levels were still manageable.

c. Liquidity Trends

Current Ratios were highest in HUL, Infosys, and TCS, reflecting high short-term solvency.

LIC recorded low Current Ratio (<1), reflecting possible liquidity pressure in the short term.

d. Valuation Metrics

P/E Ratios were at their maximum for HUL and Infosys, showing confidence of the market and future growth expectations.

LIC and ITC looked undervalued on low P/E and P/B ratios, presenting potential contrarian bets.

2. **Predictive Modelling Findings** Linear regression models were used with Excel to predict major ratios such as EPS, ROE, and P/E.

Except for a few instances, forecasted values were very close to actual values, especially for Infosys and Reliance, validating the predictability of financial ratios in the short run based on historical data.

Simplicity in the model, however, prevented it from making forecasts in non-linear settings or macroeconomic shocks.

3. Graphical Insights Trendlines (e.g., Infosys ROE) displayed uniform upward slopes, reflecting long-term profitability.

Scatter plots indicated a negative correlation between Debt-to-Equity and financial health, grouping LIC and Airtel in high-risk buckets.

Actual vs. Forecast graphs confirmed regression validity, particularly for EPS trends of successful companies.

4.2 Summary of Key Trends:

- **Infosys & HUL:** High ROE, low D/E, excellent liquidity—ideal investment profiles.
- **LIC & Airtel:** Higher leverage, moderate profitability—capital-intensive sectors.
- **P/E & EPS Forecasting:** Regression analysis confirms predictability in short-term financial movements.

4.3 Visual Analysis:

- **Trendlines:** ROE and EPS show consistent growth for Infosys and TCS.
- **Scatter Plots:** LIC and Airtel cluster in high-risk (high D/E) zones.
- **Forecast Charts:** Predicted EPS and P/E align closely with actual figures.

4.4 Implications:

- Investors can screen stocks using automated dashboards.
- Analysts can reduce manual workload and improve efficiency.
- Academics gain a scalable, low-cost teaching model for ratio forecasting.

5. Limitations

- **Model Simplicity:** Linear regression may miss non-linear market behaviours.
- **Excludes Macroeconomics:** Inflation, policy shifts, and investor sentiment not included.
- **Short Timeframe:** Only three years of data; not ideal for long-term forecasting.
- **Secondary Data Dependence:** Public data may have inconsistencies.
- **No Sentiment or ESG Metrics:** Study does not include behavioural or sustainability indicators.

6. Conclusion and Recommendations

6.1 Conclusion

The study affirms that financial ratios, when analysed through automated tools like Excel and VBA, offer reliable, scalable insights for performance evaluation and investment decisions. Infosys, HUL, and TCS emerged as top performers, while LIC and Airtel presented higher financial risk. Regression analysis confirmed short-term forecasting viability.

6.2 Recommendations

- **For Investors:** Focus on multi-ratio analysis and automated tracking.
- **For Corporates:** Use ratio trends for internal benchmarking and restructuring.

- **For Educators:** Promote Excel-based financial modelling projects.
- **For Policymakers:** Encourage standard ratio disclosures and financial literacy.

7. Future Research

- Expand to include real-time API data, ESG metrics, and behavioural finance indicators.
- Test machine learning and deep learning models for improved accuracy.
- Develop sector-specific models (banking vs. IT vs. telecom).
- Explore macroeconomic influences on financial ratios.

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