



# Analyzing Non-Linear Trajectory of Stock price: Predictive revelations from accounting information

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**Abstract:** This study investigates the predictive capacity of financial ratios in forecasting stock price trends of firms listed on the National Stock Exchange (NSE). Financial ratios including earnings per share (EPS), return on assets (ROA), return on capital employed (ROCE), price-to-earnings ratio (PER), and price-to-book value (PBV) are analyzed alongside NSE and NYSE indices were taken for the study. Data spanning from 2014 to 2023 is collected from annual financial reports and Historical stock prices collected from NSE. Classical assumption tests, multicollinearity assessments, correlation analyses, regression modeling, and structural equation modeling (SEM) are employed. The findings highlight significant relationships between financial ratios and stock prices, with P/E Ratio were emerging as a significant predictor. The Non-Linear model exhibits a strong fit, explaining 97% of the variability in stock prices, and SEM reveals a high coefficient of determination ( $R^2 = 0.99$  which revealed 99.6% strength between Financial Ratios and Stock prices). Overall, the study underscores the importance of financial ratios in predicting stock price trends and provides valuable insights for investors, analysts, and policymakers.

**Index Terms:** NSE, Stock price, ROA, ROCE, PER, PBV, Non-Linear Model, and Structural Equation modeling (SEM)

## I. INTRODUCTION:

Stock prices and financial ratios is the central element of financial analysis and investment decision; financial ratios contain information on firm's financial health and performance, while stock prices embody the market perceptions of a firm value. The relationship between these two elements has paramount importance for the investment and forecasting of stock prices. Financial ratios are computed as the relation between financial items, where financial items are either asset inflows (profitability ratios such as return on asset, earning per share) or asset or items (liquidity ratios such as current ratio, quick ratio) or items (leverage ratios such as debt-to-equity ratio). Profitability ratios depict the relationship between the profit and investment/capital. Therefore, the higher the profit from a given investment, the higher a firm value; on the other hand, liquidity and leverage ratios assess a firm's financial position in terms of short- or long-term solvency, depending on the ratio utilized. For instance, the return on equity ratio measures the return a firm made on shareholders' equity investment, which means the higher a firm return on shareholders' equity position, the better its financial situation. Likewise, a firm with low debt-to-equity ratio may be characterized by a conservative capital structure with lower financial risk. A stock price is the perception of a company value by the market at a specific time; stock prices are influenced by a complex set of factors including company performance (eg, profit, revenues, investment ...), industry conditions, stage of the economic cycle,

investor's mood as well as geopolitical events. Stock price can be influenced by expectations of future earnings and cash flow, risk tolerance and investment objectives. Nonetheless, there are variations in the relationship between stock prices and financial ratios depending on market conditions and investors' perceptions. Still, a strong financial performance usually leads to high stock prices because investors are ready to pay more for shares in company with good fundamentals. Conversely, poor financial performance or unfavorable financial ratios might result in low stock prices as investors become less optimistic about the company's prospects. In the context of using financial ratios for predicting trends in stock prices, investor sentiment plays a crucial role in creating a delicate linkage between such metrics and the market price of equity.

Market sentiment is often stronger than the effect of these ratios whereby positive sentiments tend to raise share values irrespective of their associated indicators while negative feeling pushes them down despite favorable signals. Investors' mood which includes group dynamics and cognitive biases as well as their reaction to news items may make stocks deviate from rational expectations based on firm fundamentals. The importance of taking into account investors' attitudes when interpreting study findings cannot be overstated.

## **II. LITERATURE REVIEW**

Financial rates for each sector to prognosticate stock price, the decision maker of similar investors can calculate on the fiscal analysis presented by the fiscal rates when making fiscal and functional decisions. Arkan, T. (2016). The paper verified that profitability and debt rates are the most important business factors from the perspective of the impact on stock prices. Pražák, T., & Stavárek, D. (2018). deeply the effect of fiscal rates including Return On means (ROA), Net Profit periphery (NPM) and Debt to Equity rate (DER) on stock prices ahead and after the publication of fiscal statements. Tarmidi, D., Pramukty, R., & Akbar, T. (2020). This study showed that the issues of retrogression ways can be bettered for the vaticination of stock price trend by using a dataset in standardized ordinal data format. Siew, H.L., & Nordin, M.J. (2012, September). The results attained from this study show that the capital acceptability rate and the tip payout rate don't impact the stock price. Rane, N., G., P. (2022). This exploration shows that NPM variable has a incompletely positive relationship on the stock price, ROE has a positive relationship on the stock price. Imansyah, S., & Mustafa, M.H. (2021). The ideal of this empirical exploration is to dissect the threat- return through fiscal rates as determinants of stock price in ASEAN region. Jermisitti parsert, K., Ambarita, D.E., Mihardjo, L.W., & Ghani, E.K. (2019). The purpose of this exploration is to measure and to dissect the impact of fiscal rates to company's stock price, while using macroeconomics variable as control variable. The fiscal rates used in this exploration are price earnings rate, price to bespeak value, net profit periphery and return on equity. Setianingrum, P.H., & Prastuti, D. (2020, April). In this paper, the LSTM neural network is used to prognosticate the price of a named stock and give useful and near dependable perceptivity so that investor can have an idea of how the stock may perform in the future. Ishan, Adhikari, Bairagi., Ashish, Mark, Daniel., Anchal, Sharma. (2022). Examined the significance of fiscal rates taken from the fiscal reports or statements to read trend in stock price and set up that fiscal rates are dependable tool to prognosticate stock price while making investment decisions. Ahmed, Rahi, Abed., Ahmed, Mahdi, Hadi., Ahmed, Kadhim, Sendw. (2019).

## **III. STATEMENT OF THE PROBLEM**

The statement of the problem revolves around the challenge of accurately predicting the stock price trends of India's one of the top company (Infosys) using financial ratios based on the criteria such as listed on NSE prior to 2014, IT company, positive EBITDA, positive cashflow, active trading on NSE ; this company have been chosen using the ratios like EPS, ROA, ROCE, P/E and PBV. And mediation have been analysed using NSE and NYSE. so based on above criteria, Infosys has been chosen for the study.

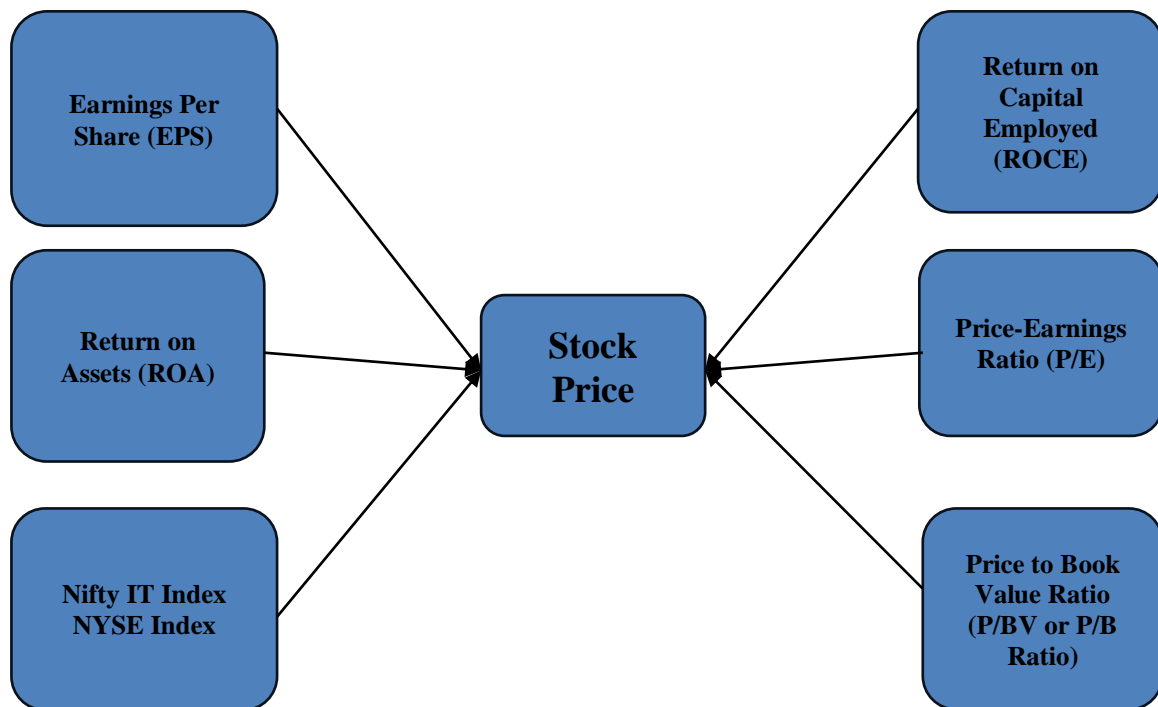
**IV. OBJECTIVES**

- To find out the partial relationship between financial ratios and movement of stock price.
- To find out the relationship between stock price and exchange index.
- To find out the simultaneous relationship between financial ratios and movement of price.

**V. RESEARCH METHODOLOGY**

This research uses a complete approach to study the ability of financial ratios to predict trends in stock prices. SPSS Normality Test is used for assessing data normality, multicollinearity evaluation, correlation examination and regression analysis with F-Test significance assessment. Furthermore, to validate the findings, Structural Equation Modelling (SEM) through SmartPLS is employed. This method guarantees that an in-depth examination of the possible links between financial indicators and share prices will be undertaken by improving the reliability and robustness of the study’s conclusions.

**VI. CONCEPTUAL FRAMEWORK**



**VII. HYPOTHESES**

Based on the above objectives, the following main hypothesis was formulated:

NULL HYPOTHESIS	ALTERNATIVE HYPOTHESIS
<b>H<sub>01</sub>:</b> There is no partial relationship between EPS and stock price.	<b>H<sub>1</sub>:</b> There is a partial relationship between EPS and stock price.
<b>H<sub>02</sub>:</b> There is no partial relationship between ROA and stock price.	<b>H<sub>2</sub>:</b> There is a partial relationship between ROA and stock price.
<b>H<sub>03</sub>:</b> There is no partial relationship between ROCE and stock price.	<b>H<sub>3</sub>:</b> There is a partial relationship between ROCE and stock price.
<b>H<sub>04</sub>:</b> There is no partial relationship between	<b>H<sub>4</sub>:</b> There is a partial relationship between PER

PER and stock price.	and stock price.
<b>H<sub>05</sub></b> : There is no partial relationship between PBV and stock price.	<b>H<sub>5</sub></b> : There is a partial relationship between PBV and stock price.
<b>H<sub>06</sub></b> : There is no simultaneous relationship between financial ratios and stock price.	<b>H<sub>6</sub></b> : There is a simultaneous relationship between financial ratios and stock price.

### VIII. DATA COLLECTION

Data source 1 -Financial Performance - Annual Financial Reports (2014-2023). The financial performance data was collected from the annual financial reports of the selected company for the years 2014 to 2023. These reports were obtained directly from the company websites, regulatory filings, or financial databases. Relevant financial statements including the Balance Sheet, Profit & Loss (P&L) Statement, and Cash Flow Statement were extracted from each annual report for the specified years. Calculation of Various financial ratios such as Return on Assets (ROA), Return on Equity (ROE), Debt to Equity Ratio, Earnings Per Share (EPS), etc., were calculated using the data extracted from the financial statements. The formulas for each ratio were applied consistently across all company and years. The calculated financial ratios were cross-verified to ensure accuracy and consistency. Any discrepancies or errors identified during the validation process were rectified by revisiting the source data.

Data Source 2: Stock Price - NSE (2014-2023). The stock price data for the National Stock Exchange (NSE) for the years 2014 to 2023 was collected from reliable financial data providers such as Bloomberg, Yahoo Finance, directly from the NSE website. Year-wise Stock Price Data-The daily closing prices of the selected company stocks were collected for each trading day from 2014 to 2023.

### IX. RESULTS AND DISCUSSION

#### 1. Classical assumption test

##### Normality Test

	Kolmogorov-Smirnov <sup>a</sup>			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
INFY_SP	.271	10	.036	.828	10	.031
INFY_EPS	.279	10	.026	.747	10	.003
INFY_ROA	.207	10	.200*	.924	10	.395
INFY_ROCE	.203	10	.200*	.949	10	.653
INFY_PER	.265	10	.044	.902	10	.232
INFY_PBV	.324	10	.004	.832	10	.035

**Source:** secondary data processed by SPSS.

**Findings :** The Stock Price ,EPS,ROA,PER,PBV has the P value less than 0.05, which means data taken for study is normally distributed as shown is Kolmogorov- Smirnov test.

Multicollinearity Test							
Model	Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.	Collinearity Statistics Tolerance	VIF
(Constant)	-639.276	622.052		1.028	0.362		
INFY_EPS	1.966	1.593	0.162	1.234	0.285	0.433	2.308
INFY_ROA	23.384	53.49	0.081	0.437	0.685	0.216	4.634
INFY_ROCE	5.864	18.579	0.072	0.316	0.768	0.142	7.045
INFY_PER	31.144	5.311	0.853	5.864	0.004	0.353	2.835
INFY_PBV	38.757	24.239	0.208	1.599	0.185	0.44	2.274
a Dependent Variable: INFY_SP							

Source: secondary data processed by SPSS.

**Findings:** In the Multicollinearity analysis for INFY\_SP, INFY\_PER (Price to Earnings Ratio) emerges as a significant predictor with a coefficient of 31.144 and a standardized coefficient of 0.853, both statistically significant. INFY\_EPS (Earnings Per Share) exhibits a moderate positive impact with a coefficient of 1.966 and a standardized coefficient of 0.162, though not statistically significant. Other variables like INFY\_ROA and INFY\_ROCE show weaker associations, with coefficients of 23.384 and 5.864, respectively, both lacking statistical significance.

## 2. Correlation

### Correlation Test

		INFY_SP	INFY_EPS	INFY_ROA	INFY_ROCE	INFY_PER	INFY_PBV
INFY_SP	Pearson Correlation	1	-.490	.477	.751*	.936**	.757*
	Sig. (2-tailed)		.151	.163	.012	.000	.011
	N	10	10	10	10	10	10

Source: secondary data processed by SPSS

**Findings:** The correlation analysis for INFY\_SP and its independent variables reveals significant relationships. INFY\_SP shows strong positive correlations with INFY\_PER (0.936\*\*) and INFY\_PBV (0.757\*), indicating highly significant associations. INFY\_SP also exhibits moderate positive correlations with INFY\_ROA (0.477) and INFY\_ROCE (0.751\*), while its correlation with INFY\_EPS is moderate and negative (-0.490), though not statistically significant.

Correlations of Indexes				
		INFY_SP	NSE_IT	NYSE
INFY_SP	Pearson Correlation	1	.837**	.837**
	Sig. (2-tailed)		0.003	0.003
	N	10	10	10

Source: secondary data processed by SPSS

**Findings:** The correlation analysis shows significant associations between INFY\_SP and other variables. INFY\_SP demonstrates strong positive correlations with NSE\_IT and NYSE (0.837\*\*), indicating highly significant relationships, while its correlation with VIX is weak (0.328) and not statistically significant.

### 3. Regression

Non-Linear Regression						
Model Summary						
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson	
1	.985	0.97	0.933	137.2358	2.146	
<b>a Predictors: (Constant), INFY_PBV, INFY_EPS, INFY_ROA, INFY_PER, INFY_ROCE</b>						
<b>b Dependent Variable: INFY_SP</b>						

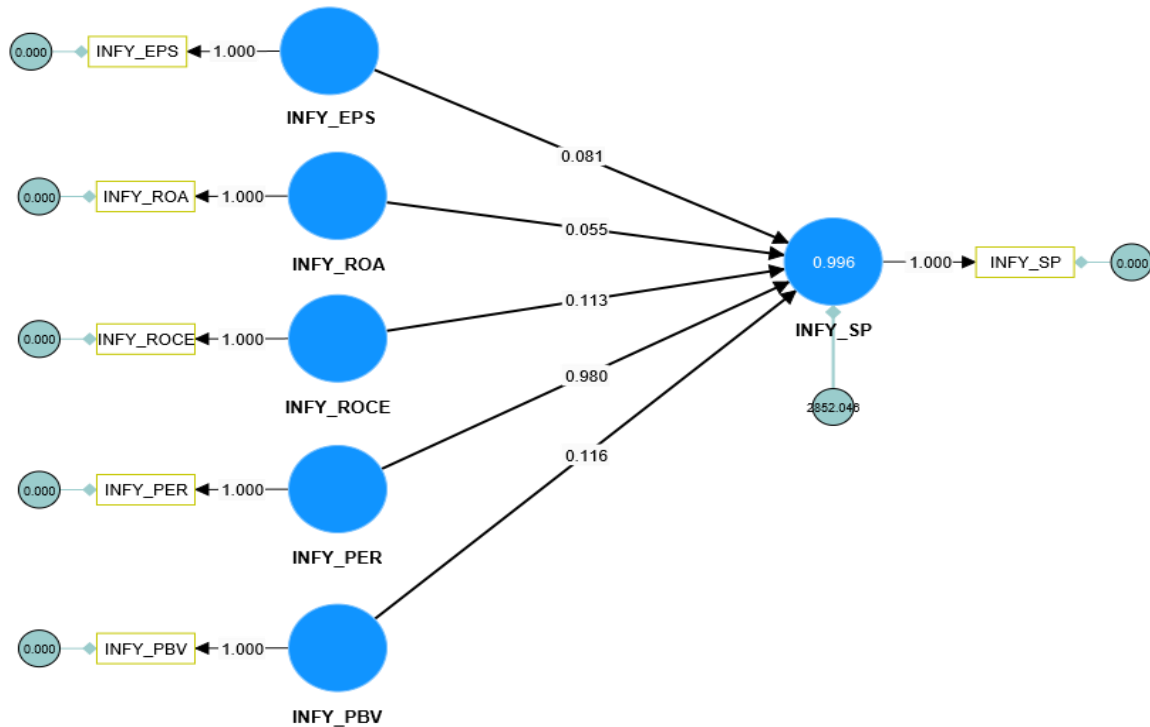
Source: secondary data processed by SPSS

#### Regression Equation:

$$\text{INFY\_SP} = -639.276 + 1.966 \times \text{INFY\_EPS} + 23.384 \times \text{INFY\_ROA} + 5.864 \times \text{INFY\_ROCE} + 31.144 \times \text{INFY\_PER} + 38.757 \times \text{INFY\_PBV}$$

**Findings:** The model summary for INFY\_SP indicates a strong fit, with an R-squared value of 0.97, implying that approximately 97% of the variability in INFY\_SP can be explained by the independent variables. The adjusted R-squared value remains high at 0.933, with a standard error of the estimate of 137.2358, indicating the model's accuracy in predicting INFY\_SP.

#### 4. SEM Model: Shows the SEM Model For Financial Ratios And Stock Price



Source: secondary data processed by SmartPLS.

#### INTERPRETATION:

R-square value of 0.996 which indicates 99.6% of the variability in the Stock price explained by the financial ratios. The path coefficient value of correlation between INFY\_SP and INFY\_EPS is 0.081, between INFY\_SP and INFY\_ROA is 0.055, between INFY\_SP and INFY\_ROCE is 0.113, between INFY\_SP and INFY\_PER is 0.980 and between INFY\_SP and INFY\_PBV is 0.116. Here the most influential path coefficient is INFY\_SP and INFY\_PER with 0.116 as its value.

#### X. CONCLUSION

In conclusion, this study elucidates the crucial role of financial ratios in predicting stock price trends of India's one of the top company (INFOSYS) listed on the NSE. The analysis reveals significant relationships between financial metrics and stock prices, particularly highlighting the predictive power of PER. By incorporating economic indicators and financial ratios, the study enhances our understanding of stock market dynamics and offers practical implications for investment decision-making. The findings underscore the importance of considering both financial fundamentals and market sentiment in forecasting stock price movements accurately. Moving forward, stakeholders can leverage these insights to make informed investment decisions, refine forecasting models, and formulate effective market strategies in navigating the dynamic landscape of financial markets. The study highlights the pivotal role of financial ratios, notably PER and PBV, in forecasting the stock price trends of Infosys. The robust correlation and regression analyses underscore the strong relationships between these financial metrics and SP, the stock price of Infosys. PER, in particular, emerges as a significant predictor, with a high coefficient and standardized coefficient, indicating its substantial influence on stock prices. The structural equation modeling further validates these findings, demonstrating the remarkable predictive capacity of financial ratios, with PER playing a crucial role in explaining the variability in Stock price. These insights offer valuable guidance for investors, analysts, and policymakers, empowering them to make informed decisions and devise effective strategies in navigating the intricacies of the financial markets.

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