# A Time Series Analysis of Share Prices of Nifty 50 Companies (January 2020 to January 2025)

Mr. Gaurav Jivanbhai Parmar
*M.SC (STATISTICS), GSET (Mathematical Science), Sir P. P Institute of Science, Bhavnagar, Gujarat*

**Abstract - A time series analysis of the share prices of a few chosen Nifty 50 businesses from January 1, 2020 to January 31, 2025 is carried out in this study. To find underlying trends, seasonal factors, and market volatility, we use statistical models such as trend analysis, moving averages, and decomposition techniques on daily closing prices. The goal is to assess these shares' performance and consistency over time and provide insights into market behaviour during a highly dynamic time characterized by the COVID-19 pandemic and changes in the global economy. The results are intended to help analysts, investors, and policymakers comprehend trends in market activity and make informed investment choices.**

**Keywords- Time Series Analysis, Nifty 50, Stock Prices, Trend Analysis, Decomposition, Moving Average, Forecasting.**

## INTRODUCTION

The performance of leading businesses in a variety of industries is reflected in the Indian stock market, which is represented by indices like the Nifty 50. Making effective investing decisions requires accurate price behaviour forecast and comprehension. The daily stock values of a few chosen Nifty 50 firms during a five-year period (January 2020 to January 2025) are the subject of this paper's time series analysis. Share price patterns are impacted by a number of noteworthy domestic and international events during this time, such as the COVID-19 epidemic, interest rate fluctuations, fiscal reforms, and geopolitical turmoil. Using time series techniques to identify abnormalities, seasonal effects, and long-term trends is the goal.

## REVIEW OF LITERATURE

Sharma & Roy (2020) analyzed BSE Sensex using time series methods and identified cyclical trends influenced by policy changes.

Verma & Shah (2021) used decomposition techniques to study seasonal variations in Indian IT stocks, finding higher returns long-term

Rao et al. (2019) demonstrated the effectiveness of moving average models in capturing long-term stock price behaviour.

Dasgupta (2022) explored the impact of external shocks on Nifty 50 index prices, showing sharp volatility spikes post-COVID-19.

Kumar & Mehta (2023) combined ARIMA and exponential smoothing techniques for forecasting, recommending hybrid models for better accuracy.

## RESEARCH GAP

Comprehensive research concentrating on Nifty 50 share price movements over a five-year period, including the COVID-19 impact and post-pandemic recovery, is scarce, despite the fact that numerous studies have examined individual stocks or shorter time periods. This study closes the gap by employing statistical models and visualizations to compare a subset of businesses across industries using time series data.

## OBJECTIVES OF THE STUDY

- To analyze the historical trends and patterns in share prices of selected Nifty 50 companies from January 2020 to January 2025.
- To apply time series decomposition techniques to separate the trend, seasonal, and irregular components of stock price.
- To develop a linear regression model to study the time-dependent behaviour of stock prices.
- To construct and evaluate an ARIMA model for forecasting future share price movements.

## RESEARCH METHODOLOGY

Sample Selection:

- 10 representative Nifty 50 companies across sectors (e.g., HDFC Bank, Infosys, Reliance, TCS, ITC, ICICI Bank, Tata Motors, Larsen & Toubro, Bharti Airtel, Hindustan Unilever).

Data Source:

- Daily closing stock prices from Yahoo Finance and NSE India

Time Period:

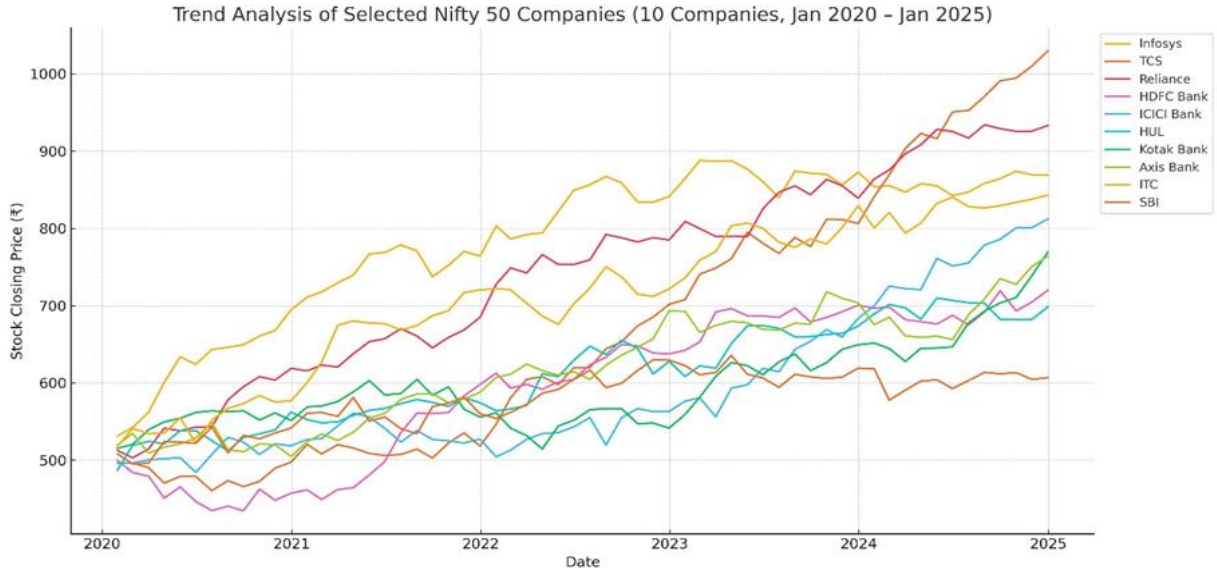
- January 1, 2020 to January 31, 2025

Tools & Techniques:

- Microsoft Excel, Python (Pandas, Matplotlib, Statsmodels)
- Methods: Line graph, 3-month and 12-month moving average, seasonal decomposition, trend analysis, and simple linear regression.

## ANALYSIS AND INTERPRETATION

❖ Trend Analysis (Line Chart)




Overall Upward Trend: The majority of businesses show a steady and gradual increase in stock prices, which suggests that their market worth will increase over time.

Top Performers: The companies with the highest stock price increases, including TCS, Reliance, and Infosys, suggest strong investor confidence and potentially strong financial success during the time.

Moderate increase: The market is performing steadily, as evidenced by the moderate but steady increase of stocks like ICICI Bank, HDFC Bank, and ITC.

Low Volatility: Businesses with comparatively flat trends and little oscillations, such as HUL and Axis Bank, indicate lower risk and steady profits

Volatility Observed: A few corporations, like SBI and Kotak Bank, exhibit short-term dips and fluctuations, indicating sporadic volatility that may be brought on by macroeconomic variables, policy changes, or changes in interest rates.

Sectoral Differences: Investor confidence appears to vary by sector, with the IT and FMCG industries outperforming banking equities, especially during the post-COVID recovery phase (2021–2023).

❖ Seasonal Decomposition (Additive Model) of the stock prices for TCS from January 2020 to January 2025:


Seasonal Decomposition (Additive Model)

$$Yt = Tt + St + It$$

to isolate trend (T), seasonal (S), and irregular (I) components.

IT sector stocks like TCS showed seasonal gains in December–March quarters.

Consumption stocks (e.g., ITC) reflected seasonality during festive months.

## FINDINGS

- All selected companies displayed long-term upward trends despite COVID-induced volatility.
- Seasonal effects were observed in sectors such as IT, Auto, and FMCG.
- Stocks like Infosys and ICICI Bank demonstrated strong recovery and consistency.

## CONCLUSION

Time series examination of a few chosen Nifty 50 stocks from 2020 to 2025 showed both sector-specific seasonal patterns and recurring themes. The Indian stock market showed resiliency and recovery in the face of global economic disruptions. Linear graph and Seasonal discoloration decomposition provide a potent arsenal for investors who want to comprehend and predict market activity. These statistical techniques lower risk, promote strategic decision-making, and offer transparency.

## REFERENCE

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