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Statistical Analysis of Trends in Stock Market with reference to Oil, Gas and Automobile

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ABSTRACT

A Stock market is a high platform where millions of investors invest their money in a wide range of financial instruments, including shares, bonds, futures, and derivatives on every business day. Nevertheless, the Stock market is a very complex and highly volatile structure in terms of the company's growth and future returns. Therefore, before investing, every investor should have adequate background knowledge and understand stock price movements to achieve investment objectives.

Hence, in this paper, to analyze the trend in the Stock market, moving average technical indicators have been used to minimize the risk of loss in every trade, thereby maximizing the profit. In this project, several statistical tools and indicators are also used to demonstrate the same. Analysis of Stocks of top Companies within Oil & Gas and Automobile Sectors has also been taken into consideration. After all the analysis, the most important aspects are obtained that the Moving Averages, MACD and Super Trend, when combined, give a simple, executive, doable, money-making system. The objective of this paper is to study trend in stock of the above mentioned sectors with great accuracy.

Key words: *Stock Market, Moving Average, Oil & Gas Industry, Automobile Industry, Moving Average Convergence Divergence.*

1. Introduction:

The Indian Stock market is an organized financial marketplace where securities such as shares, bonds, and debentures are bought and sold. It provides a platform for investors and companies to trade securities, ensuring liquidity and efficient allocation of capital. Investors can trade only through registered stockbrokers using electronic trading systems. The Stock market plays a vital role in economic growth by mobilizing savings, facilitating investments, and supporting industrial development.

India has two major stock exchanges: the **Bombay Stock Exchange (BSE)** and the **National Stock Exchange (NSE)**, both headquartered in Mumbai. The BSE, established in **1875**, is Asia's oldest

stock exchange and is represented by the **SENSEX**, an index comprising 30 leading companies across various sectors. The NSE, established in **1992**, is India's largest stock exchange by trading volume. Its benchmark index, the **Nifty 50**, consists of 50 major companies and serves as an important indicator of the Indian capital market.

The **Securities and Exchange Board of India (SEBI)** is the regulatory authority for the Indian securities market. Established to protect investors and promote fair trading, SEBI ensures transparency in stock exchanges, regulates stockbrokers and other inter-mediatories, prevents unfair trade practices and market manipulation, safeguards the interests of small investors, and encourages the orderly development of the securities market.

The history of the Indian Stock market dates back nearly two centuries. Organized trading began in Bombay during the nineteenth century, with brokers gathering on Dalal Street. In 1875, they formed the "Native Share and Stock Brokers Association," which later became the Bombay Stock Exchange. Following the liberalization of the Indian economy, the National Stock Exchange was established in 1992 to introduce a modern, transparent, and technology-driven trading system comparable to international standards.

Stock markets perform several important economic functions. They mobilize savings from investors for productive investments, provide liquidity by enabling investors to buy and sell securities easily, facilitate efficient price discovery through market forces, and promote corporate governance by monitoring the performance of listed companies. They also support capital formation, encourage entrepreneurship, and contribute to overall economic development.

The SENSEX and Nifty 50 are the two principal Stock market indices in India. SENSEX, launched in 1986, tracks the performance of 30 financially strong and actively traded companies listed on the BSE. Nifty 50 represents 50 leading companies listed on the NSE and is widely used by investors, mutual funds, and analysts as a benchmark for measuring market performance. Both indices are calculated using the free-float market capitalization method, which considers only the shares available for public trading.

Overall, the Indian Stock market is a crucial component of the country's financial system. By providing an efficient platform for raising capital and investing savings, it supports business growth, creates investment opportunities, enhances financial stability, and contributes significantly to India's economic progress.

2. Aims and Objectives

Stock market prediction is an important area of research because it helps investors make informed investment decisions and reduce financial risks. Predicting stock prices is challenging due to the dynamic and volatile nature of financial markets, which are influenced by economic conditions,

government policies, global events, and investor sentiment. Understanding market trends enables investors to identify profitable investment opportunities and manage risk effectively.

This study focuses on the Indian Stock market, particularly the National Stock Exchange (NSE) and the Bombay Stock Exchange (BSE), during the period 2011–2017. The main objectives are to examine the trends in market performance, market. The study also analyses selected leading companies such as Maruti Suzuki and Reliance using popular technical analysis tools, including Simple Moving Average (SMA), Moving Average Convergence Divergence (MACD), Relative Strength Index (RSI), Super Trend, and Fibonacci Retracement. These tools help identify market trends and support investment decisions.

The research is based on **secondary data** collected from research journals, books, stock exchange reports, official publications, and reliable online sources. The study is organized as covering the introduction, review of literature, research methodology, data analysis and conclusions.

Earlier studies have shown the usefulness of technical analysis in understanding Stock market movements. Researchers such as Sachin Kamat reported consistent prediction accuracy using technical indicators, while Hetamsaria and Deb (2004), Vipul (2006) and Mallikarjunappa and Afsal (2008) found that derivatives trading generally reduced market volatility. Debashis (2009) has also done market study of stock in India. These findings support the use of technical indicators for analysing Stock market behaviour.

Overall, the study provides valuable insights into the performance and trends of the Indian Stock market and demonstrates how technical analysis can assist investors in making informed and profitable investment decisions.

3. Research Methodology

The present study employs several technical analysis tools to examine Stock market trends and evaluate the performance of selected stocks. These indicators help investors identify market direction, momentum, and potential buying or selling opportunities.

Moving Average (MA) is a trend-following indicator that smooths price fluctuations and identifies the overall market trend. The **Simple Moving Average (SMA)** is calculated by averaging the closing prices over a specified period. It helps determine support and resistance levels and generates trading signals.

Moving Average Convergence Divergence (MACD) is a momentum indicator developed by Gerald Appel. It measures the relationship between two Exponential Moving Averages (EMAs), usually the 12-day and 26-day EMAs, with a 9-day signal line. MACD helps identify changes in trend, momentum. Together, these technical indicators provide a reliable framework for analysing

Stock market behaviour, understanding price movements, and supporting effective investment decisions.

Methods of Data Collection

The present study is based entirely on secondary data, which were collected from reliable and published sources. The data were obtained from the official websites of the National Stock Exchange (NSE) and the Bombay Stock Exchange (BSE), along with research journals, books, financial reports and online publications. Historical data of the Nifty 50 Index and selected companies for the period 2011–2017 were used for analysis. Secondary data were chosen because they are readily available, economical, and suitable for analyzing Stock market trends. The collected data were analyzed using various technical analysis tools to achieve the study objectives.

4. Analysis of Data

In this section, the data of Nifty 50 from the past 7 years (**From Jan 2011 – to Dec 2017**) are examined using various statistical tools. The data is quantitative in nature and obtained from the official source mentioned earlier. We also compared the methods, to identify which method gives a better prediction of the future value. The result obtained in the study is analyzed and presented in this section using code and graphs. The variables under consideration are presented during the explanation of the methods.

(i) Analysis Based on Simple Moving Average

In this section, will use the Simple Moving Average Method to determine the trend and take 9 Days Moving Average and 20 Days Moving Average in the procedure. Considering the code involved in the analysis, we took SMA plot as a variable and plotted a graph using the respective code.

The following Graph shows the Simple Moving Average with 9 days moving average using the green line and 20 days moving average using the red line overlaying the candles described in the previous section.

Source: Computation based on NSE data

ChartNo.1StockPriceMovementof NIFTY50With9and20SMAs

Here in SMA Analysis, we see that when the price crosses below a moving average, it suggests that the bears are in control of the price action and that the asset will likely continue its move lower. Also, there is a cross of price above the moving average, and it suggests that the bulls are in control and that the price may continue its move higher in the coming years.

(ii) Analysis Based on Moving Average Convergence Divergence MACD

In this section, we will be using the Moving Average Convergence Divergence Method to determine the trend. MACD is an extremely popular indicator used in technical analysis. MACD can be used to identify aspects of a security's overall trend. Most notably these aspects are momentum, as well as trend direction and duration. What makes MACD so informative is that it is the combination of two different types of indicators. First, MACD employs two Moving Averages of varying lengths (which are lagging indicators) to identify trend direction and duration. Then, MAC Dtakes the difference in values between those two Moving Averages (MACD Line) and an EMA of those Moving Averages (Signal Line) and plots that difference between the two lines as a histogram which oscillates above and below a centre Zero Line. The histogram is used as a good indication of a security's momentum. The following Graph shows the Moving Average Convergence Divergence with Colored Line Graph and Histogram compared to the standard candles described in the previous section. Here the green line and red line define the trend, and the histogram shows where the trend is going, and whether to buy or sell the stock in the future.

Source: NSE data

Chart No. 2 StockPriceMovementofNIFTY50WithMACDGraph

Here we see that whenever U crosses over L in the lower direction, we trigger a Buy call and vice versa. From the data of NIFTY50 we analyzed, this model works well, and the trend we see in

the procedure has a slight latency in telling the triggered values.

(ii) Oil and Gas Sector/ Industrial Sector

Reliance Industries Limited is engaged in refining, including manufacturing of refined petroleum products and petrochemicals, including manufacturing of basic chemical fertilizers and nitrogen compounds, plastic, and synthetic rubber in primary forms. The company's segments include refining, petrochemicals, oil and gas, organized retail and others. The Refining segment includes production and marketing operations of petroleum products.

As of May 2017 **Reliance Industries** has a market cap of **$72 Billion**. This makes Reliance Industries the world's 150th most valuable company by market cap.

Source : NSE data

Chart No. 3 Stock Price Movement of Reliance Industries

(iii) Auto mobile Sector

Maruti Suzuki India Ltd (formerly Maruti Udyog Ltd) is India's largest passenger car company,accounting for over50% of the domestic car market. The company offers a full range of cars from entry-level Maruti Alto to stylish hatchback Ritz, A-star, Swift, Wagon R, Estillo, and sedans DZire, SX4, and Sports Utility vehicle Grand Vitara. The company is a subsidiary of Suzuki Motor Corporation of Japan. The Japanese car major held a 56.21% stake in Maruti

The Company, Suzuki formerly known as Maruti Udyog Limited, was incorporated as a joint venture between the Government of India and Suzuki Motor Corporation, Japan in February 1981The company Suzuki Motor Corporation owns an equity of 56.2% as of March, 2017 and **Maruti Suzuki India** has a market cap of **$30.7 Billion** and ranked around 357th among the world's publicly listed companies by market capitalization.

Source: NSE data

Chart No.4 Stock Price Movement of Maruti Suzuki

5. Conclusion

The study concludes that the Indian Stock market offers significant long-term investment opportunities despite short-term volatility. Technical indicators such as Simple Moving Average (SMA), Moving Average Convergence Divergence (MACD), are useful for identifying market trends, momentum and buy or sell signals. However, many factors are needed to combine the multiple indicators for improving prediction accuracy and investment decisions. The analysis shows that while stock prices fluctuate in the short run, long-term investments in quality stocks generate attractive returns. Therefore, technical analysis, supported by proper risk management, helps investors make informed and profitable investment decisions.

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