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# ABSTRACT

India's economy is expanding quickly on a global scale, and during the course of the next ten years, it is anticipated that India will rank among the top 3 economies on the planet. In contrast to a downturn in Indian corporate earnings brought on by excess capacity and banks' incapacity to extend credit, the stock market, specifically the Bombay Stock Exchange, has done well. The purpose of the current study is to examine any relationships, if any, between the BSE Sensex index and macroeconomic indicators such as the Foreign direct investment, Real gross domestic product, Inflation rate and Interest Rate in India from the the time period between 1991and 2021. The investigation aims to establish link between the variables based on the tests of Johansen Cointegration, Granger Causality, and Vector error-correction mechanism, and to find the strength of the relationship among the parameters that are independent and the dependent parameter. The analysis using the Vector Error Correction Model (VECM) supports the existence of a long-run causal relationship between the macroeconomic variables of the Index of Foreign direct Investment, inflation, interest rates, Real gross domestic product and BSE Sensex.



**Keywords:** Sensex, FDI, Interest rate, Inflation rate, Augmented dickey fuller, Johansen Cointegration, Granger Causality, and the Vector Error Correction Model

# CHAPTER I

## INTRODUCTION

Indian Economy has experienced rapid growth and is expected to rank among the top three economies in the world over the next decade. The stock market's strong performance has positively impacted the country's financial and economic systems. Several macroeconomic indicators, such as the Foreign direct investment (FDI), Gross Domestic Product (GDP), inflation rates, interest rates, gold prices, exchange rates, and money supply, are known to affect the stock market's performance. Liberalization and privatization policies in 1991 allowed Foreign direct Investment (FDI) to invest in debt and equity markets. The Indian government's economic initiatives, such as the goods and services tax and demonetization, have improved investor confidence in the stock markets. Corporates are optimistic about the Indian economy, with SEBI lowering the rules for registered international portfolio investments in the country and allowing investments in infrastructure development trusts and property investment trusts.

India's stock market is one of the most advanced capital markets globally, with the Bombay Stock Exchange (BSE) and the National Stock Exchange (NSE) being the two primary stock exchanges. The BSE is Asia's first stock exchange, established in 1875, listing over 5000 companies. The BSE Sensex, the market's respected equity benchmark index, reflects the Indian economy's strength. The NSE launched India's first stock market index in 1992, officially recognized as an exchange of stock in 1993.Volatility, which indicates risk, should be kept to a minimum in all stock markets. The stock market's volatility is influenced by various macroeconomic factors, such as inflation rates, interest rates, the FDI and GDP. The Reserve Bank of India's policy aims to keep inflation at or below 4%. Interest rate changes are influenced by inflation targeting. The Bombay Stock Exchange Sensex is affected by several macroeconomic factors. The study showed that macroeconomic factors significantly impact the Indian stock market. The examination revealed a causal relationship between the stock market and the currency rate.

### INDIAN ECONOMY:

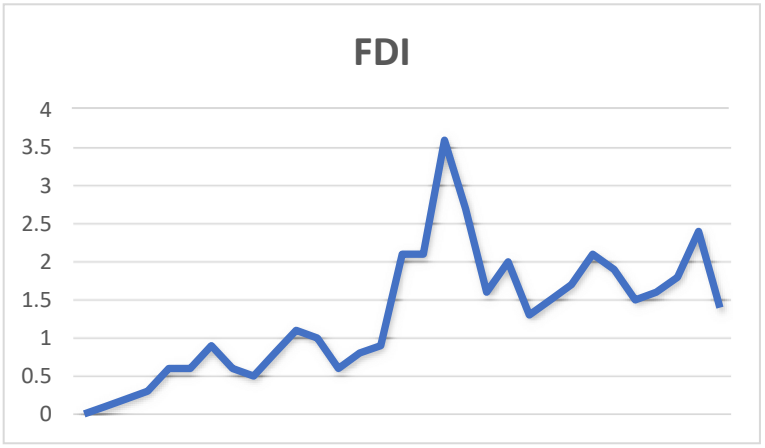
The Indian economy is the sixth-largest in the world by nominal GDP and the third-largest by purchasing power parity. India has a diverse economy, with agriculture, manufacturing, and services as the major sectors.In recent years, India has undergone significant economic reforms, including the introduction of the Goods and Services Tax (GST) and the implementation of the Insolvency and Bankruptcy Code (IBC). These reforms have improved the ease of doing business in the country and attracted foreign investment.

India's GDP was severely impacted by the COVID-19 pandemic, with a contraction of 7.7% in the fiscal year 2020-21. However, the country has shown signs of recovery, with the economy growing by 8.4% in the second quarter of fiscal year 2021-22. The government has also announced various stimulus packages to revive the economy and support businesses and individuals affected by the pandemic. Agriculture continues to be a significant sector in the Indian economy, with around half of the population employed in the sector. India is one of the largest producers of food and has a significant export market for agricultural products. The manufacturing sector has also seen significant growth, with a focus on industries such as textiles, automotive, and pharmaceuticals. The services sector, including IT services, telecommunications, and financial services, is a significant contributor to the Indian economy, accounting for around 55% of GDP. India has become a hub for IT services, with a highly skilled workforce and a large number of tech startups. However, India also faces challenges such as rising inflation, a widening current account deficit, and a growing unemployment rate. The government has announced various initiatives to address these challenges, including structural reforms and investments in infrastructure development.

Inflation rate in India accelerated to a 4-month high of 5.52% in March 2022, driven by rising food and fuel prices. India's GDP growth for Q3 of FY 2021-22 was 7.5%, which is lower than the 8.4% growth in the previous quarter. Foreign direct Investment, according to a report by the United Nations Conference on Trade and Development (UNCTAD), India has become the world's fifth-largest recipient of foreign direct investment (FDI) in 2021.Interest rate: The real interest rate in India has been affected by high inflation and the RBI's decision to keep nominal interest rates unchanged. The actual interest rate has been impacted by India's high inflation rate. The inflation rate in March 2022 was 5.52%, which is higher than the Reserve Bank of India's (RBI) target range of 2-6%.

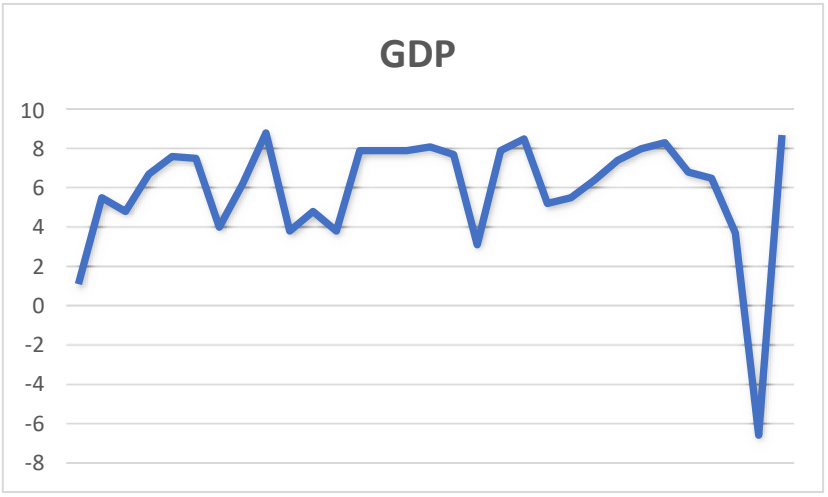
**FDI:**

Foreign Direct Investment (FDI) refers to the investment made by a company or individual in one country in a business or enterprise located in another country. FDI is an important driver of economic growth, as it brings in new capital, technology, and expertise, and creates jobs. The benefit is it can bring several benefits to the host country, including new capital, technology, and expertise, job creation, increased competitiveness, and access to new markets. Countries may use various strategies to attract FDI, such as offering tax incentives, reducing bureaucratic barriers, improving infrastructure, and providing a stable legal and regulatory environment.




**GDP:**

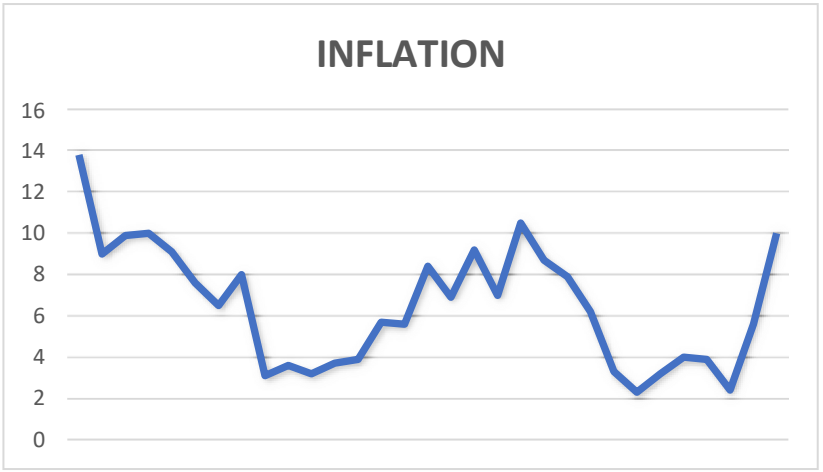
Gross Domestic Product (GDP) is a measure of the total value of goods and services produced within a country's borders over a specific period of time, typically a year. It is one of the most widely used indicators of a country's economic performance. India's economy faces several challenges, including high inflation, a large informal sector, infrastructure deficits, and income inequality.The Indian government has announced several measures to support economic growth, including infrastructure investments, tax reforms, and policy initiatives aimed at attracting foreign investment.




**INFLATION RATE:**

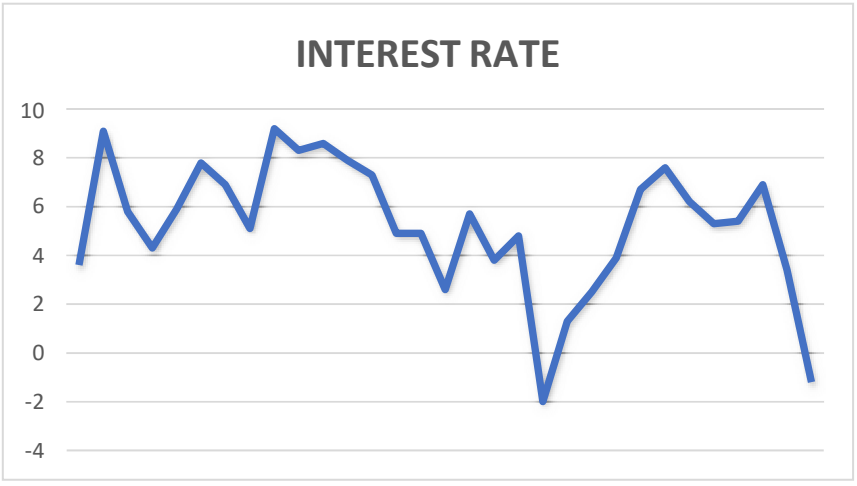
Inflation refers to the rate at which the general level of prices for goods and services is rising in an economy. Inflation can have a significant impact on the economy and on individuals. High inflation rates can negatively impact the economy by reducing the purchasing power of individuals and businesses, leading to lower economic growth, and increasing the cost of

borrowing. Central banks such as the Reserve Bank of India (RBI) use various measures to control inflation, such as adjusting interest rates, regulating the money supply, and implementing fiscal policies such as taxation and government spending.




**INTEREST RATE:**

The real interest rate is the nominal interest rate adjusted for inflation. It represents the true cost of borrowing money or the true return on an investment after accounting for the impact of inflation. The real interest rate is calculated by subtracting the inflation rate from the nominal interest rate. The real interest rate is an important indicator of the true cost of borrowing money or the true return on an investment. It helps investors and borrowers make informed decisions based on the actual impact of inflation.



## 1.1 ABOUT THE STUDY

An organised exchange where shares of stock are traded is referred to generally as the "stock market." Both rational and irrational investor behaviour affect the overall course of the stock market. to research the stock market volatility brought on by changes in macroeconomic variables including India's GDP, FDI, inflation rate, and interest rates. Therefore, a study will be conducted to determine the nature and strength of the relationship between the variables under consideration as well as the effects of inflation, GDP, FDI, and interest rates on stock market returns. Understanding the stock market, macroeconomic indicators, and how they affect the stock market are the main goals of the study.

## 1.2 PROBLEM STATEMENT

The behavior of investors, whether rational or irrational, can have a significant impact on the movement of the stock market. This is because various macro-economic factors, such as profits, business growth, P/E ratios, and dividend announcements, are specific to individual companies and can affect their returns. However, macroeconomic factors such as inflation rates, GDP, FDI, and interest rates also play a crucial role in determining the overall returns in the stock market. The purpose of this study is to explore and evaluate the relationship between these variables and their impact on stock market returns.

## 1.3 SCOPE AND SIGNIFICANCE OF THE STUDY

The project's focus is limited to investigating the correlation and magnitude of the association between the returns of the BSE Sensex and key macroeconomic factors such as interest rates, inflation rates, foreign direct investment (FDI), and gross domestic product (GDP).

## 1.4 LIMITATIONS OF THE STUDY

• The study is focused on examining the effect of FDI, GDP, inflation rate, and interest rate on stock market returns in India.

• Only data from 1991 to 2021 will be used for the analysis of stock market returns and macroeconomic variables.

• The study will be conducted on the BSE Sensex, a leading stock market indicator, and macroeconomic factors will be used. Time constraints are also considered while conducting the study.

# CHAPTER II

## INDUSTRY PROFILE

A public marketplace where businesses may raise money by distributing and selling shares of their stock to investors is the stock market, sometimes referred to as the equity market. Investors receive shares in return for which they might possibly partake in the company's future gains and expansion. The NATIONAL STOCK EXCHANGE(NSE) and the BOMBAY STOCK EXCHANGE(BSE) are two of the most well-known stock exchanges in the India. There are many stock exchanges across the world. These exchanges give businesses a platform to issue and sell shares to investors as well as a marketplace for investors to purchase and sell shares of publicly listed businesses. The stock market is separated into numerous sectors, which classify businesses according to their sector of the economy or industry. The most notable industries are In Technology: Firms that manufacture hardware, software, and other products and services related to technology are included in this sector. In Healthcare the Firms are involved in the manufacture and delivery of medical goods and services. In Financial Services: Businesses that offer financial products and services fall under this industry category. Examples include banks, insurance providers, and investment houses like JPMorgan Chase, Berkshire Hathaway, and Goldman Sachs. Consumer Goods: This industry comprises businesses like Coca-Cola, Procter & Gamble, and Nestle that manufacture and market consumer goods including food and drinks, personal care items, and home furnishings. Energy: corporations in this sector produce and distribute energy. Examples include oil and gas corporations, utilities, and companies that specialise in renewable energy, like ExxonMobil, Chevron, and NextEra Energy. Individual stock purchases, mutual fund or exchange-traded fund investments, as well as trading on market swings via options and futures contracts, are all ways that investors can get involved in the stock market. Fundamental and technical analysis are additional tools that investors may use to assess possible investments and come to wise judgements. The stock market is essential to the functioning of the global economy because it gives businesses a way to raise capital to support development and expansion and investors a way to profit from their investments. As a gauge of the state of the economy and market mood, it is also keenly studied by economists, decision-makers, and investors.

# CHAPTER III

## REVIEW OF LITERATURE

### 3.1 RESEARCH QUESTIONS

1. Is there any positive relationship between stock returns and macroeconomic indicators?
2. Whether the macro-economic variables influences the stock prices or not?
3. Whether there is any Long-run or Short-run relationship in macro economic variables with the stock market returns?
4. Suggestions that could be offered to policy makers and market participants based on this study.

### 3.2 LITERATURE REVIEW

**PAPER 1:**

**Gupta-Bhattacharya, N.,Aganyd, V.,& Sachdeva, J.K.(2014).Impact of Economic and Demographic factors on Stock markets investments in India**

This paper investigates how macroeconomic variables affect stock market investing. The secondary study, which spans the years 1993 to 2010, measures the most important macroeconomic variables affecting the returns, liquidity, and volume on the stock market. Between April 2011 and November 2011, 475 households from the five largest cities in India—Mumbai, Delhi, Kolkata, Chennai, and Bengaluru—were questioned using a structured questionnaire. According to the time series study's findings, GDP growth rate has a favourable impact on Sensex returns while GDP inflation has a negative impact on stock trading volume and liquidity. The results of the initial poll indicate that interest rates have a detrimental effect on stock market investments. Household stock market investments are positively impacted by an increase in savings at home, higher household income, and a shift in investment behaviour towards risky items from non-risky instruments.

**PAPER 2:**

**D. V. Lokeswar Reddy(2012). Impact of GDP and Inflation of stck market returns in India:**

Different factors, including sociocultural, political, and economic factors, can influence how the market reacts. External or internal events can have a positive or negative impact on the stock

values of listed firms. In this study, we focused on the effects of Real Gross Domestic Product (RGDP), Interest Rate (INT), and Inflation Rate (INF) on the stock prices of listed businesses between 1997 and 2009. We used the Stock Market Value Index as a representation of stock prices, and through regression analysis, we found that these factors explained 95.6% of the variation in stock prices.Lower interest rates and inflation rates had a positive impact on stock values, while higher RGDP had a beneficial effect as well. Therefore, it is important for the government to implement policies that would promote lower inflation and improve citizens' standards of living. To encourage more stock purchases and trades, interest rates should be kept at a modest level.

**PAPER 3:**

**Reddy, Y. V., Ingalhalli, V. B., & Sahay, H. (2019). The Impact of Macroeconomic Announcements on Financial Market Volatility in India:**

In recent years, not only have stock markets become more significant as an investment alternative but also commodity and foreign exchange markets. Furthermore, it has long been believed that macroeconomic news is a significant factor in how much securities cost. This is particularly true for emerging countries, whose socioeconomic and political foundations are burdened by the constraints imposed by macroeconomic dependency. Financial economic literature has extensively explored the effects of announcements on stock market prices (returns), the exchange rate (returns) as well as the volatility of financial marketplaces. In order to analyse the effect of planned macroeconomic variable announcements on market volatility, which would be widely known to investors in advance, the study uses GARCH models. The findings show that of the six planned macroeconomic variables taken into account for the study, GDP announcement lowers the stock market and the exchange rate volatility. An announcement of inflation has the opposite effect on the volatility of the foreign exchange market: it makes it more volatile. Additionally, when the fiscal deficit is announced, both the commodity market and the foreign exchange market become more volatile. Therefore, it is advised that investors maintain a careful eye on these important announcements in order to benefit from price fluctuations (returns) in each market that will affect the returns of their portfolio.

**PAPER 4:**

**Abdullah, D. A. & Hayworth, S. C. (1983). Macro econometrics of stock price fluctuations:**

The aim of this research is to explore the dynamic relationship between the stock exchange and selected macroeconomic factors in India between 1991 and 2008. The study revealed that the

long-term behaviour of the stock market had a positive correlation with output and exchange rates, but a negative correlation with both short- and long-term interest rates, inflation, and money supply.Based on the results of the causality and intervention analysis, it was found that the stock exchange had an impact on economic activity, particularly industrial activity. The study also predicted that the market would be more susceptible to its own shocks during the anticipated period.

**PAPER 5:**

**Adrangi, B., Chatrath, A., & Sanvicente, A. Z. (2002). Inflation, output, and stock prices:**

In the stock markets of industrialised economies, there is a perplexingly inverse connection between return on investment and inflation rates, according to economic and financial research. The present research looks into this connection for Brazil. We demonstrate that even once inflation is stripped of the effects of real economic activity, there is still a negative correlation between unexpected inflation and real stock returns. The long-term equilibrium between the value of stocks, overall prices, and real economic activity is confirmed by the Juselius and Johansen cointegration tests. Additionally, the long-term equilibrium between stock prices and overall prices and real economic activity is also evident.

**PAPER 6:**

**Investor concerns on rising interest rates. (2013). Global investors*:***

The article discusses institutional investors' worries on the consequences of the quantitative easing programme and the low rates of interest in multiple numerous emerging markets in 2013. Investors are worried about how the policy would affect inflation, pensions, and GDP growth, based on an analysis by investment adviser Allianz Global Investors. The study also revealed investor expectations for returns from stocks. Financial economic literature has extensively explored the effects of announcements on stock market prices (returns), the exchange rate (returns), and commodities markets (returns), as well as the volatility of financial marketplaces. In order to analyse the effect of planned macroeconomic variable announcements on market volatility, which would be widely known to investors in advance

**PAPER 7:**

**Muinde Patrick mumo.,(2017),The determinants of stock returns in the emerging market of Kenya: an empirical evidence:**

This research examines the risk factors that impact stock returns in the emerging market of Kenya. The objectives of the study were to evaluate the reliability of the Capital Asset Pricing Model

(CAPM) in capital markets and explore various variables that influence stock returns in Kenya. The research examines macroeconomic variables such as inflation, exchange rates, money supply, and short-term interest rates, as well as the extra market premium. Time series data from April 1996 to December 2016 were collected and analyzed using CAPM, a multiple-factor approach, and Fama and MacBeth's two-step method (1973). The results suggest that market price is the primary factor affecting stock returns variability in Kenya and that the CAPM model is still applicable and valid for the Kenyan market, despite recent evidence of its failure in advanced economies.

**PAPER 8:**

**Robert D. Gay, Jr.,(2008), the effects of macroeconomic variables on stock market returns for four emerging economies, Brazil, Russia, India and China:**

The relationship between macroeconomic indicators and share prices is well-documented in the USA and other major economies. However, there is limited research on the connection between share prices and economic growth in emerging economies. This study utilized the Box-Jenkins ARIMA model to examine the time series relationship between the stock price indexes of the BRIC countries (Brazil, Russia, India, and China) and macroeconomic factors such as exchange rates and oil prices.The study did not find any noticeable correlation between the stock price indexes of the BRIC countries and the exchange rate or the price of oil. However, this lack of correlation may be due to the influence of other domestic and global macroeconomic factors on the return on investment. Thus, further research is necessary. Furthermore, there was no discernible relationship between recent and historical stock market returns, indicating that the markets in the BRIC countries are only partially efficient.

**PAPER 9:**

**LENA SHIBLEE., (2009), The Impact of Inflation, GDP, Unemployment, and Money Supply on Stock Prices:**

This analysis aims to understand the sensitivity of stocks to changes in economic indicators such as inflation, GDP, unemployment, and money supply. The study estimates the impact of these factors on stock prices, taking into account the duration and the ability of companies to adjust prices in response to inflation. The data used in this research was collected from the Federal Reserve website for the period 1994-2007, focusing on GDP, inflation, money supply, and the consumer price index. The Federal Reserve pays close attention to GDP, unemployment, and inflation as key economic indicators. The analysis uses the New York Exchange as an example and utilizes statistics from various sources including business magazines and the US Federal

Reserve Bank. The data collected will be analyzed using the SPSS software to identify trends and patterns.

**PAPER 10:**

**Abdullah Algarini, (2020), Impact of GDP, Foreign direct investment, inflation rate and interest rate and interest rate on stock market values in Saudi Arabia:**

The aim of this study is to identify the short- and long-term linkages between the stock market value (MV) and macroeconomic indicators (GDP, FDI, inflation rate (INF), and interest rate (IR)) using yearly time series data for the years 1993-2018. The study will use time series analysis for all variables from 1993-2018. The variables included are market value of shares (MV), real GDP (GDP), inflation rate (IF), interest rate (IR), and foreign direct investment (FDI). Multiple regression analysis will be used for data analysis. Data will be collected from the Bank of Indonesia, the Central Bureau of Statistics, and the Indonesia Stock Exchange. Results indicate that GDP is the only factor significantly affecting the plantation sector's stock price index. The World Bank and International Monetary Fund (IMF) are the main sources of data for this study.

**PAPER 11:**

**Attahir Babaji Abubakar., (2016) Economic Growth Impact of Indian Stock Market: An Econometric Investigation:**

This study examines the impact of the Indian stock market on the country's economy. The ADF Unit Root test reveals that all variables are integrated to order 1, indicating that they became stationary after the initial difference was taken. The objective of the research is to analyze the short- and long-term consequences of the stock market's growth on India's economic expansion. Time-series analysis was conducted for all variables from 1982 to 2013. The Indian Economy's Handbook of Statistics, 2014, and Data were utilized as data sources for the variables. The data was collected and processed and is presented in annual series. The linkages among the variables, VECM technique was utilized. After testing the data and discovering that the variables were stationary after only taking their initial difference, the Johansen Cointegration test was utilized to determine whether the variables had a long-term connection.

**PAPER 12:**

**Indra Ria Safitri & Suresh Kumar (2014)., The Impact of Interest Rates, Inflation, Exchange Rates and GDP on Stock Price Index of Plantation Sector: Empirical Analysis on Bei In The Year Of 2008–2012:**

The plantation industry has played a significant role in aiding the development of the Indonesian

economy, and it presents an attractive investment opportunity for interested parties. To better understand the impact of various economic indicators on the Plantation sector's trading prices index at the Indonesia Stock Exchange (IDX) between 2008-2012, a quantitative analysis was conducted. The aim was to determine the effects of GDP, interest rate, inflation rate, and Rupiah to Dollar exchange rate on the industry's stock prices.Multiple regression analysis was utilized as the data analysis method, with statistics obtained from reliable sources like the Bank of Indonesia, the Central Bureau of Statistics, and the Indonesia Stock Exchange. The findings revealed that the GDP was the only significant factor that had a notable impact on the plantation sector's stock price index, while interest rates, inflation rates, and Rupiah to Dollar exchange rates had minimal bearing on the industry's stock prices.Therefore, potential investors looking to invest in the plantation industry should pay close attention to Indonesia's GDP situation to determine if it is the right time to invest.

**PAPER 13:**

**Caner Demir (2019)., Macroeconomic Determinants of Stock Market Fluctuations: The Case of BIST-100:**

The main objective of this research is to analyze the BIST-100 (Borsa Istanbul-100) index of the Turkish Stock Exchange and investigate the impact of several macroeconomic variables on it. The stock market has been a vital component of the global economy for centuries, particularly during the 20th century. As stock prices are heavily influenced by macroeconomic factors at both domestic and international levels, economists, investors, and policy-makers strive to predict stock price movements and fluctuations.This study specifically focuses on selected macroeconomic factors' effects.The objective is to analyze the impact of these factors on the stock market index during this period. The results of the ARDL Bounds Test conducted on the quarterly data reveal that interest rates and crude oil prices negatively affect the stock market index, while growth in the inverse value of the local currency, portfolio investments, and foreign direct investments have a positive impact.The findings imply that the Istanbul Stock Exchange Market would benefit from a stronger native currency, increased inflows of foreign investment, and lower prices for energy and investment. In conclusion, this research highlights the importance of carefully monitoring macroeconomic variables to make informed investment decisions and prevent economic crises.

**PAPER 14:**

**Kotlebova, J., Arendas, P., & Chovancova, B. (2020) Government expenditures in the support of technological innovations and impact on stock market and real economy: the empirical evidence from the US and Germany:**

The ongoing process of industrialization, known as "Industry 4.0," is the driving force behind the recent changes in global equity markets. This phase of industrialization is expected to accelerate the innovation process and increase the production of customized products. In the past decade, financial markets have responded to the impending technological transformation, leading to changes in the composition of major stock indices. The technology industry has gained more prominence as a result.Apart from innovation, macroeconomic factors also have a significant impact on stock market performance. Some of the selected macroeconomic factors that influence the stock market's performance include the GDP, inflation, interest rates, and currency rates. Multiple regression modeling was employed to determine the impact of these factors on the stock market's value. The results revealed that both the GDP and inflation contribute to the increase in the stock market's value, although the impact of inflation is minimal.It is worth noting that innovations have far-reaching effects on economic entities beyond just the specialized technological sector. Therefore, the impact of Industry 4.0 should not be limited to only the technology industry but should be considered in a broader economic context.

**PAPER 15:**

**Satria Aji Setiawan, (2020) Does Macroeconomic Condition Matter for Stock Market? Evidence of Indonesia Stock Market Performance for 21 Years:**

A rise in the BSE Sensex would also help India attract more foreign direct investment since foreign institutional investors will see a larger return on their investments there, which will help the Indian economy. This study utilized the Box-Jenkins ARIMA model to examine the time series relationship between the stock price indexes of the BRIC countries (Brazil, Russia, India, and China) and macroeconomic factors such as exchange rates and oil prices.The investment in additional capacity as well as the return on equity for corporations have been poor. Top-line statistics have been low. Markets are anticipatory, and for investors in Indian stocks, the most crucial concerns will be how changes in global portfolio flows and advancements in corporate financials will affect each other. Finally, through supportive policy decisions, regulatory authorities, economists, and decision-makers can undoubtedly contribute to the effective operation and movement of the Indian stock market.

**PAPER 16:**

**Keshav Garg, Rosy Kalra (2018) Impact of macroeconomic factors on Indian stock market**

A rise in the BSE Sensex would also help India attract more foreign direct investment since foreign institutional investors will see a larger return on their investments there, which will help the Indian economy. The investment in additional capacity as well as the return on equity for

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**PAPER 17:**

**Kiran Kumar Kotha1 , Bhawna Sahu (2016) Macroeconomic Factors and the Indian Stock Market: Exploring Long and Short Run Relationships**

The rapid expansion of the Indian economy over the past two decades has prompted questions about the fundamental relationship between stock prices and key macroeconomic indicators. This essay examines the short- and long-term correlations between select macroeconomic indicators and stock market performance in India. The analysis focuses on the period between July 2001 and July 2015, during which several key changes to the Indian stock market were implemented, such as the introduction of rolling settlement, the banning of the Badla system, and the introduction of stock derivatives. The results of the analysis suggest the existence of a long-term relationship between the BSE Sensex and several macroeconomic variables, including the exchange rate, the wholesale cost index, T-bill rates, and M3.

**PAPER 18:**

**Pooja Misra (2018) An Investigation of the Macroeconomic Factors Affecting the Indian stock market.**

India's economy has witnessed rapid growth in recent years, and it is projected to become one of the top three economies globally in the next decade. Despite a slowdown in the revenue of Indian corporations due to surplus capacity and difficulties in bank lending, the Bombay Stock Exchange has performed well. This study aims to determine if there is any correlation between the BSE Sensex and macroeconomic indicators such as the Index of Industrial Output (IIP), inflation, interest rates, gold prices, exchange rates, foreign institutional investment (FII), and money supply from April 1999 to March 2017. The study also aims to evaluate the strength of the relationship between independent variables and the dependent variable, BSE Sensex, in the short and long run using the Johansen Cointegration test, Granger Causality test, and Vector Error Correction mechanism. Using the Vector Error Correction Model (VECM), the analysis confirms a long-term causal relationship between the macroeconomic variables of IIP, inflation, interest rates, gold prices, exchange rate, FII, money supply, and BSE Sensex. It also demonstrates a short-term causal relationship between money supply, inflation, and BSE Sensex. Notably, the study findings

indicate that fluctuations in money supply, currency rate, FII, and gold prices are influenced by changes in BSE Sensex.

**PAPER 19:**

**Hasan Mohammed El-Nader1 & Ahmad Diab Alraimony1 (2012) The Impact of Macroeconomic Factors on Amman Stock Market Returns:**

This study's goal is to determine how macroeconomic issues affect the Amman Stock Market. Returns using monthly data between 1991 and 2010 are called (ASE) Returns. Six macroeconomic factors are used in this study:Real exchange rates, consumer price index (CPI), the real GDP (RGDP), and real money supply (RMS2)rate (E1), a dummy variable (DUM), and the weighted average interest rates on loans and advances (WAIR). The data are subjected to the unit root and normality tests. OLS, ARCH, and GARCH models are also used. Due to significant heterogeneity and a sign of plurality, the OLS calculations are ineffective and inconclusive. The study employed ARCH/GARCH estimating techniques to determine this. It does not appear that a GARCH (1, 1) extension is required. But the ARCH (1) performed well**.**

**PAPER 20:**

**Nordin, N., Nordin, S., & Ismail, R. (2014), The Impact of Commodity Prices, Interest Rate and Exchange Rate on Stock Market Performance: An Empirical Analysis From Malaysia.**

This essay investigates the effects of interest rates, currency rates, and commodity prices (palm oil, oil, and gold prices) on the performance of the Malaysian stock market. The study's findings, which used the limits test approach, revealed cointegrating correlations between variables. Results specifically showed a strong impact of palm oil price on stock market index. However, neither the oil price nor the price of gold showed any discernible influence. Both the interest rate and the exchange rate had a noticeable impact, which is consistent with earlier empirical investigations. This study has substantial policy implications, one of which is that while enacting applicable laws, the government should consider the influence of commodity prices in addition to macroeconomic factors because they could have a detrimental impact on Malaysian stock market.

## 3.3 RESEARCH GAP

Based on the review of literature, we know that there exists a link or connection between the macro-economic indicators and the movement of stock market returns.

- To identify the strengths that create an impact in the rise of gross domestic product, inflation and stock market returns.
- To identify the unit root test, cointegration test, Causality test between the variables and to analyze the various factors that helps to know the factors that cause an impact in stock market returns.

# CHAPTER IV

# OBJECTIVES OF THE STUDY

- The present study explores the relationship between stock market (i.e.) Sensex returns with respect to macroeconomic indicators such as GDP, Inflation rate, Interest rate and FDI from the period of 1991-2021(30years).
- This research also seeks to find the strength of the relation between dependent variables, i.e. stock market returns with respect to the chosen variables.

# CHAPTER V
# RESEARCH METHODOLOGY

## 5.1 RESEARCH DESIGN

The research carried out will be descriptive and quantitative approach analyzing and predicting with available statistical data. Descriptive method research is used in this paper because this type of research is used to identify the areas of further research and its help in planning the resource allocation.

## 5.2 METHOD OF DATA COLLECTION

- The research will gather data on inflation, GDP, stock market returns, and interest rates from reliable sources such as the Ministry of Finance, the Economic Survey of India, BSE India, and RBI websites.
- Additionally, relevant books will be consulted to provide conceptual definitions and in-depth knowledge on the subject matter.
- The latest information on the variables under study will be collected from various sources including journals, magazines, and newspapers

## 5.3 RESEARCH HYPOTHESIS:

H01: GDP does not have an impact on Sensex
Ha1: GDP has an impact on Sensex.

H02: Inflation does not have an impact on Sensex.
Ha2: Inflation has an impact on Sensex.

H03: Interest Rates does not have an impact on Sensex.
Ha3: Interest Rates does have an impact on Sensex.

H04: FDI does not have an impact on BSE Sensex.
Ha4: FDI does have an impact on Sensex.

## 5.4 PERIOD OF STUDY

The study was carried out from the month of September 2022 to May 2023.

## 5.5 STATISTICAL TOOLS USED FOR THE STUDY

The tools used are EViews software which is a statistical tool used to statistical analysis and econometric analysis like time series analysis etc. and Excel.

# CHAPTER VI

# ANALYSIS AND INTERPRETATION:

## 6.1 AUGMENTED DICKEY FULLER TEST:

The Augmented Dickey-Fuller (ADF) test is a statistical test used to determine whether a time series has a unit root, which implies non-stationarity and trend in the data. The ADF test is an extension of the Dickey-Fuller (DF) test that takes into account the possibility of serial correlation and trend in the data, and is widely used in econometrics and financial analysis to test for the presence of unit roots and cointegration in time series data.

| **VARIABLES** | **AT LEVEL** | **AT FIRST DIFFERENCE** |
|---|---|---|
| | **CONSTANT & TREND** | **CONSTANT & TREND** |
| **SENSEX** | -2.936 | -3.616 |
| | [1.000] | [0.00] |
| **GDP** | -2.936 | 0 |
| | [0.0206] | 0 |
| **INFLATION RATE** | -2.99 | -3.574 |
| | [0.17] | [0.00] |
| **INTEREST RATE** | -2.963 | -3.574 |
| | [0.1186] | [0.00] |
| **FOREIGN DIRECT INVESTMENT** | -2.963 | -3.563 |
| | [0.1962] | [0.00] |

**TABLE NO 6.1.1: AUGMENTED DICKEY FULLER TEST RESULTS**

On analyzing the Augmented Dickey-Fuller test, the optimal lag length is based on Akaike method criterion with default of 4 lags. In the level data it was observed that GDP variable was stationary and rest of the independent variables such as inflation rate, interest rate, Foreign direct investment was not stationary. Subsequently, the data was set to the First Difference and tested for augmented dickey fuller test, then the variables were made to be stationary or having no unit root. Hence, The first difference of the series for each and every variables other than GDP was computed.

## 5.2 PHILIPS PEARSON MODEL:

The Phillips-Perron test is a statistical test used to test for unit roots in time series data. It is similar to the Augmented Dickey-Fuller (ADF) test, but it allows for more flexibility in the trend specification of the data. The test involves regressing the time series on its lagged values and a trend term, and then examining the significance of the coefficient on the lagged values. If the coefficient is significantly different from zero, it indicates the presence of a unit root and suggests that the time series is non-stationary. On the other hand, if the coefficient is not significantly different from zero, it indicates the absence of a unit root and suggests that the time series is stationary.

| **VARIABLES** | **AT LEVEL** | **AT FIRST DIFFERENCE** |
|---|---|---|
| | **CONSTANT & TREND** | **CONSTANT & TREND** |
| **SENSEX** | -2.936 | -3.574 |
| | [1.000] | [0.00] |
| **GDP** | -2.936 | 0 |
| | [0.045] | 0 |
| **INFLATION RATE** | -2.963 | -3.574 |
| | [0.17] | [0.00] |
| **INTEREST RATE** | -2.963 | -3.574 |
| | [0.1186] | [0.00] |
| **FOREIGN DIRECT INVESTMENT** | -2.963 | -3.563 |
| | [0.207] | [0.00] |

**TABLE NO 6.1.2: PHILIPS PERRON MODEL TEST RESULTS**

After conducting the Philips Pearson test, we can observe that at the trend level except GDP the all the variables are at non stationary level and then in the first difference all became stationary. The first difference of the series for each and every variables other than GDP was computed.

## 6.3 JOHANSSEN COINTEGRATION TEST:

The Johansen cointegration test is based on the idea that if two or more time series are cointegrated, there exists a vector that can explain the long-term relationship between them. The test involves estimating a vector error correction model (VECM) for the time series and then using the trace test or maximum eigenvalue test to determine the number of cointegrating relationships. The trace test checks the null hypothesis that there are k or fewer cointegrating relationships against the alternative hypothesis The Johansen cointegration test is widely used in econometrics and financial analysis. It can be used to test for long-term relationships between macroeconomic variables, such as GDP, inflation, and interest rates, or between financial variables, such as stock prices, exchange rates, and commodity prices.

Date: 05/01/23 Time: 00:22
Sample (adjusted): 1994 2021
Included observations: 28 after adjustments
Trend assumption: Linear deterministic trend
Series: SENSEX PERCENT_FDI INTEREST_RATE INFLATION_RATE GDP
Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

| Hypothesized No. of CE(s) | Eigenvalue | Trace Statistic | 0.05 Critical Value | Prob.** |
|---|---|---|---|---|
| None * | 0.793802 | 111.3116 | 69.81889 | 0.0000 |
| At most 1 * | 0.688007 | 67.10188 | 47.85613 | 0.0003 |
| At most 2 * | 0.531708 | 34.48819 | 29.79707 | 0.0134 |
| At most 3 | 0.249988 | 13.24564 | 15.49471 | 0.1061 |
| At most 4 * | 0.169222 | 5.191002 | 3.841465 | 0.0227 |

Trace test indicates 3 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

| Hypothesized No. of CE(s) | Eigenvalue | Max-Eigen Statistic | 0.05 Critical Value | Prob.** |
|---|---|---|---|---|
| None * | 0.793802 | 44.20977 | 33.87687 | 0.0021 |
| At most 1 * | 0.688007 | 32.61368 | 27.58434 | 0.0103 |
| At most 2 * | 0.531708 | 21.24255 | 21.13162 | 0.0482 |
| At most 3 | 0.249988 | 8.054643 | 14.26460 | 0.3732 |
| At most 4 * | 0.169222 | 5.191002 | 3.841465 | 0.0227 |

Max-eigenvalue test indicates 3 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

**RESULTS OF JOHANSSEN COINTEGRATION TEST**

By observing the above results we could infer that there are three probability values which is less than 0.5 and from this we can understand that there is there are three cointegration equation occurs after conducting the test, or the variables are associated over the long run, at the 0.05 level, according to trace statistic and the maximum eigenvalue test.

## 6.4 VECTOR ERROR CORRECTION MODEL:

A Vector Error Correction Model (VECM) is a statistical model used to analyze the long-term relationships among a set of time series variables. It is commonly used in econometrics and finance to study the interactions between economic variables. A VECM is a type of vector autoregression (VAR) model that includes an additional term to account for any deviation from long-term equilibrium relationships between the variables. The VECM assumes that there exists a long-term relationship, or cointegration, among the variables, and that any short-term deviations from this relationship will be corrected in the long run. The VECM includes a lagged error correction term, which captures the extent to which the system is out of equilibrium in the previous period. This term adjusts the short-run dynamics of the model, allowing it to capture both the short-term dynamics and long-term equilibrium relationships between the variables.

The VECM is estimated using maximum likelihood estimation or Bayesian methods, and can be used to estimate the parameters of the model, including the coefficients of the lagged variables and the error correction term. The model can also be used for forecasting and impulse response analysis. The VECM is a powerful tool for analyzing the long-term relationships among a set of time series variables. It is widely used in macroeconomic and financial analysis, including forecasting, policy analysis, and risk management

Dependent Variable: D(SENSEX)
Method: Least Squares (Gauss-Newton / Marquardt steps)
Date: 04/29/23 Time: 11:07
Sample (adjusted): 1994 2021
Included observations: 28 after adjustments
D(SENSEX) = C(1)*( SENSEX(-1) + 7907.49488776*GDP(-1) +
19737.6038661*INFLATION_RATE(-1) + 36180.5939506
*INTEREST_RATE(-1) + 72247.7465306*PERCENT_F
492785.058427 ) + C(2)*D(SENSEX(-1)) + C(3)*D(S
C(4)*D(GDP(-1)) + C(5)*D(GDP(-2)) + C(6)*D(INFL
-1)) + C(7)*D(INFLATION_RATE(-2)) + C(8)*D(IN
-1)) + C(9)*D(INTEREST_RATE(-2)) + C(10)*D
+ C(11)*D(PERCENT_FDI(-2)) + C(12)

| | Coefficient | Std. E |
|---|---|---|
| C(1) | -0.025749 | 0 |
| C(2) | 0.055376 | |
| C(3) | -0.056810 | |
| C(4) | -349.0757 | |
| C(5) | -478.35 | |
| C(6) | 158.6 | |
| C(7) | 16 | |
| C(8) | 5 | |
| C(9) | | |
| C(10) | | |
| C(11) | | |
| C(12) | | |

R-squared
Adjusted R-s
S.E. of regr
Sum squ
Log lik
F-sta
Pro

**RESULTS OF VECM**

It was determined from the results of the ADF and Johansen Cointegration test that the variables that were independent (GDP, inflation rate, interest rate and FDI) and the dependent variable, or Sensex data, had a long-term relationship. Consequently, it is advised to create the Vector Error Correction model. The VECM demonstrated that the model's R square is strong (31%), Prob (F statistic) is zero, and Durbin Watson statistics was 1.57. The model was shown to have no serial correlation and no autocorrelation.

## 6.5 BREUSCH GODFREY SERIAL CORREALTION LM TEST:

The Breusch-Godfrey Serial Correlation LM Test, also known as the Breusch-Godfrey test or the LM test, is a statistical test used to determine whether a regression model suffers from serial correlation, also called autocorrelation, in the residuals.Serial correlation occurs when the errors in a regression model are correlated with one another over time, violating the assumption of independent and identically distributed errors. This can lead to biased coefficient estimates and incorrect inferences about the significance of the variables in the model.The Breusch-Godfrey test is used to test for the presence of serial correlation in the residuals of a regression model. The test involves estimating the residuals of the model and then testing whether they exhibit serial correlation using a Lagrange multiplier (LM) test. The test statistic is computed as the product of the number of observations and the coefficient of determination (R-squared) of a regression of the residuals on their lagged values.

The null hypothesis of the test is that there is no serial correlation in the residuals, while the alternative hypothesis is that there is serial correlation. The test is commonly used in econometrics to test for serial correlation in time series data, such as financial returns or macroeconomic variables. If the test indicates the presence of serial correlation in the residuals, appropriate remedial measures can be taken, such as transforming the data or using a different regression model that accounts for the serial correlation.

Breusch-Godfrey Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 2 lags

| | | | |
|---|---|---|---|
| F-statistic | 1.789984 | Prob. F(2,24) | 0.1885 |
| Obs*R-squared | 4.023899 | Prob. Chi-Square(2) | 0.1337 |

**RESULTS OF BREUSCH GODFREY SERIAL CORRELATION TEST**

Based on the Breusch Godfrey Serial Correlation LM test, the serial correlation was examined. The findings demonstrate the robustness of the VECM created and the existence of a long-term link between the independent and dependent parameters

## 6.6 WALD TEST:

The Wald test is a statistical test used to test the joint significance of a set of coefficients in a regression model. It is important to note that the Wald test assumes that the errors in the regression model are normally distributed, and the sample size is large enough to ensure the validity of the chi-squared distribution of the test statistic. The null hypothesis of the Wald test is that the coefficients of the selected variables are equal to zero. The test statistic is calculated as the difference between the log-likelihoods of the full model and the reduced model, multiplied by -2. The test statistic follows a chi-squared distribution with degrees of freedom equal to the number of coefficients being tested. The p-value of the test is the probability of observing a test statistic as extreme as the one calculated from the data, assuming that the null hypothesis is true

**GDP:**

Wald Test:
Equation: Untitled

| Test Statistic | Value |
|---|---|
| t-statistic | -0 |
| F-statistic | |
| Chi-squa | |

From the above results, we could infer that the probability value is greater than the 0.05, here there is no short run causality between GDP and Sensex

**INFLATION RATE:**

| Test Statistic | Value | df | Probability |
|---|---|---|---|
| t-statistic | -2.537129 | 26 | 0.0175 |
| F-statistic | 6.437024 | (1, 26) | 0.0175 |
| Chi-square | 6.437024 | 1 | 0.0112 |

From the above results, we could infer that the probability value is less than the 0.05, here there is short run causality between inflation and Sensex

**INTEREST RATE:**

From the above results, we could infer that the probability value is less than the 0.05, here there is short run causality between interest rate and Sensex

**FDI:**

Wald Test:
Equation: Untitled

| Test Statistic | Value | df | Probability |
|---|---|---|---|
| t-statistic | 2.764502 | 26 | 0.0103 |
| F-statistic | 7.642472 | (1, 26) | 0.0103 |
| Chi-square | 7.642472 | 1 | 0.0057 |

From the above results, we could infer that the probability value is less than the 0.05, here there is short run causality between FDI and Sensex

## 6.7 GRANGER CAUSALITY TEST:

The Granger causality test is a statistical test used to determine whether one time series is useful in predicting another time series. The test is based on the idea that if a time series X Granger-causes another time series Y, then past values of X should be useful in predicting future values of Y, even after controlling for the effect of past values of Y. The test is conducted by estimating two regression models: one that uses past values of both X and Y to predict the current value of Y, and another that uses only past values of Y to make the same prediction. The difference between the two models is then tested using an F-test to determine whether the inclusion of past values of X improves the prediction of Y. The Granger causality test is widely used in economics, finance, and other fields to test causal relationships between time series. However, it should be noted that Granger causality does not necessarily imply causality in a

broader sense, and additional analysis may be needed to establish a causal relationship. Additionally, the test assumes that the time series are stationary, linear, and have no autocorrelation or omitted variables. If these assumptions are not met, the results of the Granger causality test may not be reliable.

Pairwise Granger Causality Tests
Date: 04/28/23 Time: 01:27
Sample: 1991 2021
Lags: 4

| Null Hypothesis: | | |
|---|---|---|
| PERCENT_FDI does not SENSEX does | | |
| INTEREST_RATE does not Granger Cause SENS SENSEX does | | |

Pairwise Granger Causality Tests
Date: 04/28/23 Time: 01:34
Sample: 1991 2021
Lags: 5

| Null Hypothesis: | | |
|---|---|---|
| PERCENT_FDI does not SENSEX does | | |
| GDP does not Granger Cause SENSEX SENSEX does | | |

**RESULTS OF GRANGER CAUSALITY TEST**

Following the Granger causality test, it was discovered that changes in the FDI rate have an effect on or change the Sensex with a 4lag time. Sensex influences the interest rate, not the interest rate impacts the Sensex. The Sensex does not alter in response to inflation rates and vice versa. Changes in the FDI rate and GDP do have an influence on the Sensex in 5 lags.

## 6.8. NORMALITY TEST:

A normality test is a statistical test used to determine whether a given data set follows a normal or Gaussian distribution. The normal distribution is a bell-shaped probability distribution that is widely used in statistical analysis because many natural phenomena tend to follow it. There are several normality tests available, but one of the most commonly used tests is the Shapiro-Wilk test. This test calculates a test statistic based on the difference between the observed distribution and the expected normal distribution, and compares it to a critical value. If the test statistic is less than the critical value, then the null hypothesis is accepted, and the data is considered to be normally distributed.

If the test statistic is greater than the critical value, then the null hypothesis is rejected, and the data is considered to be non-normally distributed in the Jarque-Bera test. These tests use different statistical methods to determine normality, but they all rely on comparing the observed distribution to the expected normal distribution. Normality tests are important in statistical analysis because many statistical tests, such as t-tests and ANOVA, assume that the data is normally distributed. If the data is not normally distributed, the results of these tests may be inaccurate or misleading. Therefore, it is important to perform a normality test before conducting any statistical analysis to ensure that the assumptions of the tests are met.

| **STATISTICS** | **VALUES** |
|---|---|
| MEAN | -4.5e-12 |
| MEDIAN | -4.11.8 |
| MAXIMUM | 20780.76 |
| MINIMUM | -18277.36 |
| STANDARD DEVIATION | 8930.743 |
| SKEWNSS | 0.403660 |
| KURTOSIS | 2.576641 |

| | |
|---|---|
| JARQUE BERA | 1.073371 |
| P VALUE | 0.584683 |

**TABLE NO 6.1.3: NORMALITY TEST RESULTS**

After observing the above results, Jarque-Bera test statistic is 1.073371, and the p-value is 0.584683, which indicates that there is insufficient evidence to reject the null hypothesis that the data is normally distributed. We could accept the null hypothesis, and this data are normally distributed.

# CHAPTER VII

# FINDINGS AND SUGGESTIONS:

## 7.1 FINDINGS:

The data analysis began by conducting the Augmented Dickey-Fuller test, which revealed that the GDP variable was stationary in level data, but the other independent variables, such as inflation rate, interest rate, and Foreign Direct Investment, were not stationary. To make the variables stationary, the data was set to the first difference and tested again using the Augmented Dickey-Fuller test, which confirmed that all variables were stationary at this level.

The Johansen Cointegration test was then conducted, showing that the variables had a long-run connection at a 5% level, and there were three cointegrating equations. The Vector Error Correction Model was performed, indicating a strong R-squared value of 31%, a Prob (F statistic) of zero, and a Durbin Watson statistic of 1.57. The model had no serial correlation and no autocorrelation, as confirmed by the Breusch Godfrey Serial Correlation LM test.
Then we performed. The wald test which concluded that the GDP O value is above 0.05% which tells that there is no short run causality in the dependent variable sensex. The other independent variable like interest rate, inflation rate and FDI has the short run causality as the probability value of these variable are below the 0.05 value. The normality test was performed to know whether the data are distributed equally or not and the probability value for , Jarque-Bera test statistic is 1.073371, and the p-value is 0.584683, which indicates that there is insufficient evidence to reject the null hypothesis that the data is normally distributed. We could accept the null hypothesis, and this data are normally distributed.

Finally, the Granger causality test was conducted, which revealed that changes in the FDI rate had an effect on the Sensex with a 4lag time. The Sensex influenced the interest rate, but the interest rate did not impact the Sensex. Neither the Sensex nor inflation rates affected each other. Changes in the FDI rate and GDP did have an impact on the Sensex in 5 lags. These findings can be useful for understanding the dynamics of the Indian economy and making informed policy decisions.

## 7.2 SUGGESTIONS:

An investor who actively invests in the stock market should take macro-economic factors like GDP, interest rates, exchange rates and inflation into consideration. GDP is is the most important variable which tells us about a country's economy. These are the vital factors that will show the long-term trend of the stocks and the economy of a country. Finding implies that, in a country when the real GDP will raise it will help stock prices to increase and boost up the investor's confidence, with the growing economy. GDP is the most crucial economic indicator which tells us about the health of our economy. It can help companies and investors decide on what strategies they should adopt as also indicate to the policy makers, the effectiveness of the steps and decisions they have undertaken. Higher economic activity implies higher expected profitability, which causes stock prices to rise. Further, in a country when the crude oil prices will raise it will lead stock prices to decrease. But up to some extent that the negative impact of oil prices can be mitigated, only if the uses of alternative energy resources are facilitated. Additionally, it is also suggested that the stock market returns may provide an effective hedge against inflation in India. India is one of the promising and rising economy according to the BRIC reports as a result of this many foreign investors gets attracted to FII in India and they will be ready to invest in India to receive benefit to take or earn profit on the return on investment and the difference in the currency rate.

# CHAPTER VIII
# CONCLUSION

India's Bombay Stock Exchange (BSE) is widely known for its reliability and sophistication as a capital market. The BSE is the largest stock exchange in India in terms of listed companies and market capitalization, with almost all corporations listed there. The benchmark equity index for the Indian stock market is the BSE Sensex, which is a reflection of the Indian economy's strength, according to some experts. Patel (2012) examined the effects of various factors on the BSE S&P CNX Nifty, such as exchange rate, inflation, IIP, broad money supply, gold prices, silver prices, and oil prices.The study found that the initial data for the GDP variable was stationary, while the independent variables like inflation rate, interest rate, and foreign direct investment were not stationary. However, after the first difference, all the variables became stationary, indicating that they have no unit root. The Johansen Cointegration test revealed that the variables have a long-run connection at a 5% level, with three cointegrating equations. The Vector Error Correction Model had a strong R square value of 31%, Prob (F statistic) was zero, and Durbin Watson statistics was 1.57, indicating no serial correlation and no autocorrelation. The wald test which concluded that the GDP O value is above 0.05% which tells that there is no short run causality in the dependent variable sensex. The other independent variable like interest rate, inflation rate and FDI has the short run causality as the probability value of these variable are below the 0.05 value. The normality test was performed to know whether the data are distributed equally or not and the probability value for , Jarque-Bera test statistic is 1.073371, and the p-value is 0.584683, which indicates that there is insufficient evidence to reject the null hypothesis that the data is normally distributed. We could accept the null hypothesis, and this data are normally distributed.The Granger causality test indicated that changes in the FDI rate have an effect on the Sensex with a 4 lag time.

The Sensex influences the interest rate, but the interest rate does not impact the Sensex. Changes in the FDI rate and GDP do have an influence on the Sensex in 5 lags. In conclusion, the analysis suggests that changes in FDI rate and GDP have a significant impact on the Sensex, but interest rate and inflation rate do not appear to have a significant effect. These findings can be useful in making informed policy decisions and understanding the dynamics of the Indian economy. Policymakers should focus on increasing corporate earnings and creating a positive atmosphere on the stock markets, which would benefit the IIP. To help

industrial growth, the government should make the necessary decisions, and policies should be put in place to boost investor confidence in corporations and businesses during slowdowns. A rise in the BSE Sensex would also help India attract more foreign direct investment, which would benefit the economy. By making supportive policy decisions, regulatory authorities, economists, and decision-makers can contribute to the effective operation and movement of the Indian stock market.

## CHAPTER XI

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