Evaluating the Interplay of Macroeconomic Variables with Nifty Pharma and Nifty Metal Sector of NSE: An Empirical Study

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KANISHKA SANJAY NAIK DESSAI

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993-665-800-418

201911438

Under the Supervision of

PROF. GUNTUR ANJANA RAJU

Goa business school

Masters of commerce

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DECLARATION BY STUDENT

I hereby declare that the data presented in this Dissertation report entitled, "**Evaluating the Interplay of Macroeconomic Variables with Nifty Pharma and Nifty Metal Sector of NSE: An Empirical Study**" is based on the results of investigations carried out by me in the Discipline of Commerce at the Goa Business School, Goa University under the Supervision of Prof. Guntur Anjana Raju and the same has not been submitted elsewhere for the award of a degree or diploma by me. Further, I understand that Goa University or its authorities will not be responsible for the correctness of observations / experimental or other findings given the dissertation.

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COMPLETION CERTIFICATE

This is to certify that the dissertation report "**Evaluating the Interplay of Macroeconomic Variables with Nifty Pharma and Nifty Metal Sector of NSE: An Empirical Study**" is a bonafide work carried out by Ms. Kanishka Sanjay Naik Dessai under my supervision in partial fulfilment of the requirements for the award of the degree of Master of Commerce in the Discipline of Commerce at the Goa Business School, Goa University.

Prof. Guntur Anjana Raju

Date: 30/04/2024

Signature of Dean of the school

Date: 30/04/2024

Place: Goa University

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I hope that the present dissertation work will surely help in lots of ways to the researchers in future to develop their work processes and practices to ensure sustainability and growth of their organizations.

Kanishka Sanjay Naik Dessai

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LIST OF ABBREVIATION

ADF	Augmented Dickey-Fuller
FER	Foreign Exchange Reserves
NSE	National Stock Exchange

ABSTRACT

The study investigates the impact of macroeconomic variables on stock prices of each company in Nifty Pharma and Nifty Metal sector of National Stock Exchange (NSE) and long-term relationship between Macroeconomic variables on returns of Nifty Pharma Index and Nifty Metal Index of National Stock Exchange (NSE). Five macroeconomic variables, namely, Foreign Exchange Reserves, Export, Interest Rates, Inflation (CPI), Money Supply (M2). Monthly frequency and time period examine is 15 years ranging from January 2008 to October 2023. The tools and techniques such as Descriptive Statistics, Unit Root Test, correlation and Multiple Regression has been used to analyze the impact of macroeconomic variables on stock prices of each company of Nifty Pharma and Nifty Metal of National Stock Exchange. Johansen Co-integration Test used to know the long term cointegration between macroeconomic variables and returns of Nifty Pharma Index and Nifty Metal Index of National Stock Exchange (NSE).

Keywords: Macroeconomic variables, stock returns, stock prices, National stock exchange (NSE), sector Index.

CHAPTER 1 INTRODUCTION

1.1. Introduction to Impact of macroeconomic variable on Pharma Sector and Metal Sector

Studying the Pharmaceuticals industry because of their importance in determining society's well-being. Medicines have a direct impact on people's health and well-being; hence that is fundamentally humanitarian's field. Contributing to the progress of this sectors has the potentials to improve countless lives by giving access to life saving treatments. The pharmaceutical industry is a center of innovation and scientific discovery. By delving into this area, will able to learn about cutting-edge research, breakthrough medicines.

The pharmaceutical sector in India has been praised as the "pharmacy of the world" for producing reasonably priced generic medications that have helped millions of people worldwide in addition to Indians. This industry provides great benefits to the Indian people. Access to inexpensive drugs has considerably improved healthcare affordability and accessibility, particularly in underserved communities. Without the pharmaceutical sector, India would be faced with many difficulties. Inequalities in health would worsen if people lacked access to necessary medications which would raise rates of morbidity and mortality. Moreover, the lack of this industries will impede India's development trajectory by stifling innovation, economic growth, and research prospects.

Studying the metal industries because they are important in forming global economies and societies. India's metal industry has a long and illustrious history that dates back several centuries, and it has seen notable advancements in recent times. Gaining knowledge about this sector can help one understand career prospects, technical improvements, and economic progress. India's metal sector has made significant strides in the last few years largely to government

initiatives, technological innovation, and globalization. This entails bringing sophisticated manufacturing techniques into the process, modernizing it and placing more emphasis on environmental standards and sustainability.

The metal sector has a big impact on the economy and society in a lot of different ways. It supports the expansion of the manufacturing sector, the building of infrastructure, and the generation of jobs. Metal sector helps us understand how it supports people at all levels of society. This industry has a wide-ranging impact on people's lives, from giving opportunities for employment to skilled people to promoting livelihoods in linked sectors to encouraging technical innovation that raises living standards. Analyzing the metal business reveals potential investment prospects. With increasing demand for metals both locally and globally, investment in the sector can be profitable. Understanding industry trends, technical improvements, and government legislation is critical to making sound investing decisions.

Both industries have experienced amazing growth and innovation in recent years. India's sustained development and the welfare of its people depend on investments in these two sectors. All things considered, the Pharmaceutical and Metal sectors are extremely promising for India's future, which makes them interesting fields for research and investment with substantial advantages for the country and its citizens.

1.2.Macroeconomic variable

Economics has various fields, one of which is macroeconomics. Macroeconomics is a study of how large-scale economies behave. It encompasses all the market-related characteristics or variables, such as Gross Domestic Product (GDP), Inflation, Economic growth, Unemployment rates etc. Macroeconomics investigates each of these components and how they interact.

Microeconomics and macroeconomic factors combine to form a nation's economy. The stock market is significantly impacted by economic factors. Given the substantial impact macroeconomic factors have on the stock market, it is impossible to overlook the link between economic growth and an efficient and successful stock market. Emerging economies stock markets are probably susceptible to shifts in a variety of macroeconomic variables as well as shifts in the degree of economic activity, the political climate, and the global economy. Since the current stock prices completely reflect all pertinent information on changes in macroeconomic fundamentals, investors would not experience anomalous profits in such a market.

Global interest in the significance of macroeconomic factors on stock returns across exchanges is expanding. In fact, a large number of researchers, practitioners, and economists have examined the relationship between macroeconomic factors and stock returns. (Sharma & Wongbangpo (2009), Rahman, Sidek & Tafri (2009), Uddin & Alam, (2007), Osamuonyi & Evbayiro Osagie, (2012) Owusu-Nantwi & Kuwornu (2011) and Onasanya & Ayoola (2012)).

1.2.1. Chosen Macroeconomic variable

Trade Balance (Exports): Trade balance is often referred to as net exports (NX), or commercial balance. It describes how the monetary worth of a country's imports and exports changes over time. As a result, the net trade balance can be used to calculate the inflow and outflow of foreign currency. Exports are goods and services produced locally and sold to foreign nations in exchange for foreign currency. The oldest sort of economic transfer is export, which occurs on a broader scale with specific trade restrictions such as taxes and subsidies.

Foreign Exchange Reserve (FER): Central banks and other monetary authorities maintain foreign currency reserves in the form of deposits and bonds.

Inflation (CPI): Inflation is the rate of increase in prices over a specified period of time. Inflation is typically measured in broad terms, such as the general price increase or increase in a nation's cost of living. One way to measure inflation is with the consumer price index (CPI). Changes in the average cost of a household's purchase of a basket of goods and services are monitored by the Consumer Price Index (CPI).

Interest Rates (IR): When inflation rates rise, central banks frequently adjust interest rates to counteract the surge, affecting the value of the currency. Higher interest rates often attract more foreign money and investment, driving up exchange rate figures. Lower interest rates, on the other hand, lead to lower exchange rates.

Money Supply (M2): Money supply consists of M1, M2, and M3 monetary aggregates, among other forms. M2 is a measure of the total amount of money circulating in country. It includes coins, currency notes, and various types of deposits, such as saving accounts, time deposits etc.

1.3.National Stock Exchange

One of the biggest stock exchanges in Asia is the National Stock Exchange. Founded in 1992, it offers India’s most advanced automated screen-based electronic trading system. Funds from both domestic and foreign traders are allocated to NSE-listed companies. The Nifty 50 index lists the top 50 firms. Nifty Next 50, Nifty 100, Nifty 200, Nifty 500, Nifty Midcap 50, Nifty Midcap 100, Nifty small cap 100, Nifty midcap 150, Nifty Small cap 50, Nifty Small cap 250, and Nifty Mid small cap 400 are the other broad-based indices of the NSE. In addition, there are a number of sector indices, strategic indices, thematic indices, and fixed income indices.

Stock markets are essential to the development of a nation's industries and trade, which in turn impacts the economy. The stock market serves as the primary indicator of the nation's growth and

development. Before making an investment, investors closely monitor the performance of the stock market by looking at the composite market index. The market index gives investors access to past stock market performance, serves as a benchmark for comparing the success of various portfolios, and helps them predict future market trends.

One important gauge of the nation's expansion and development is the stock market. The number of stock exchanges and other intermediaries, the number of listed stocks, market capitalization, trading volumes, stock exchange turnover, investor population, and price indices are all indicators of how the Indian stock market has grown. The rise of the stock market provides the impetus for the emerging market economy of India to expand and become stronger. It also funds the exploration of new ideas, promotes business activities, and makes it easier to manage financial risks (Pooja Singh, 2014).

1.4. Sectors

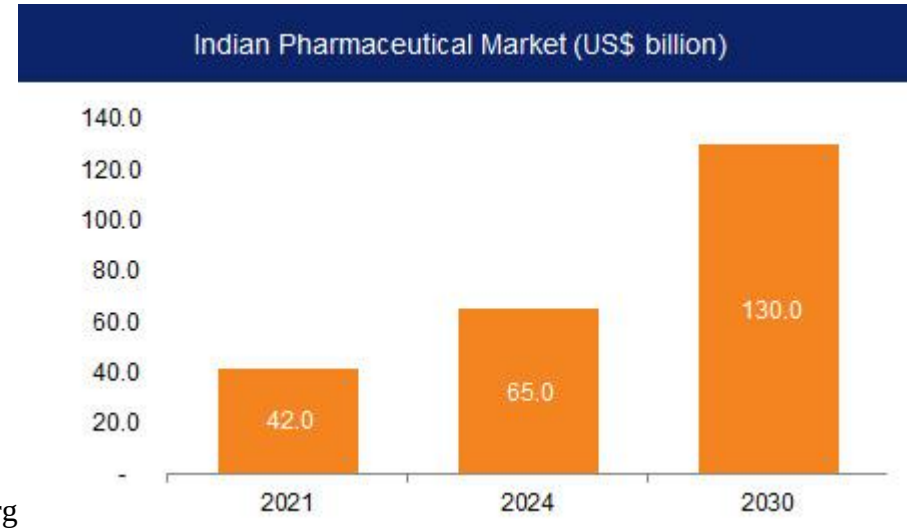
1.4.1. Pharma Sector

Pharma sector include companies which work on the creation, production, and after-sale of pharmaceuticals and other medications. The largest producer of drugs in the world is the Indian pharmaceutical sector. The Indian pharmaceutical business has grown rapidly over the past few decades; this growth can be categorized into four phases. The period preceding 1970 can be regarded as the pharma industry’s beginning. Foreign corporations controlled the Indian market at that time. The second stage runs from 1970 to 1990, when several domestic enterprises commenced operations. The third phase, which lasted from 1990 to 2010, saw Indian components begin operations abroad as a result of liberalization. The Indian pharmaceutical sector has expanded rapidly in the past several years.

The COVID-9 pandemic has accelerated investment and growth within the Indian pharmaceutical industry. We are dealing with a rapidly expanding industry, so it is critical to have a benchmarking tool that can monitor and assess the sector's performance. India has far more affordable and efficient pharmaceutical manufacturing costs and a highly skilled labor force and technological developments. India's marketing and distribution systems are also highly developed in terms of communication. The diverse industry environment serves as extra support.

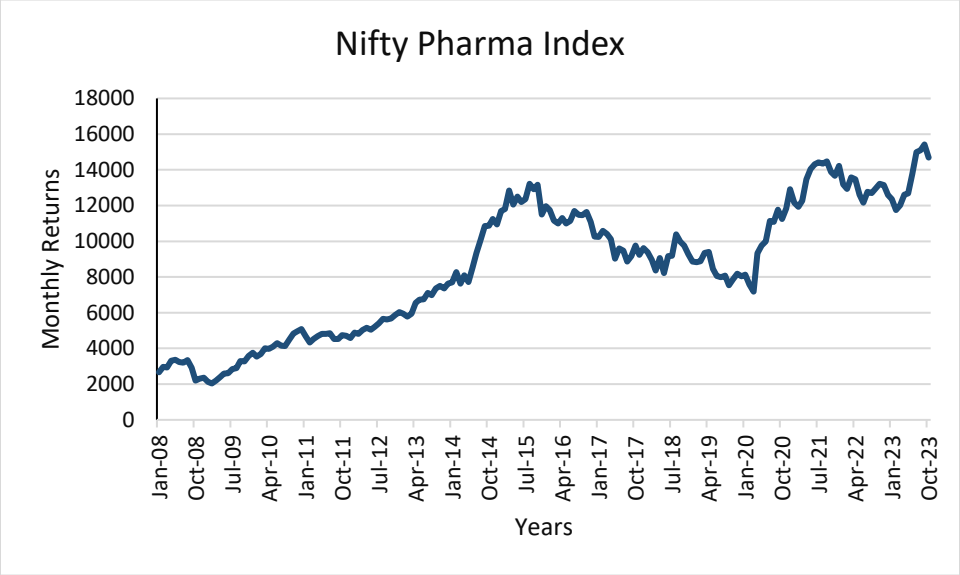
A recent significant government project called "Made in India" aims to establish India as a powerhouse for global manufacturing. To encourage domestic and international businesses, particularly those from abroad, to invest in India and establish the nation as a manufacturing powerhouse, a number of policies and regulatory frameworks are in place. The government has selected 25 industries under its most popular initiative that provide enormous potential for luring businesses to manufacture in India.

Figure 1.1: Indian Pharmaceutical market in current years



Source: ibef.org

Figure 1.2: Growth of Nifty Pharma Index between 2008 to 2023



Source: Computed by Author

1.4.2. Metal sector

India is the world's fourth-largest producer of iron ore and the world's second-largest producer of coal and crude steel. When it comes to steel and alumina production and conversion costs, India has a little advantage. Due to its advantageous position, it can take advantage of rapidly increasing Asian markets and export potential. Since minerals are valuable natural resources that are necessary raw materials for many basic industries, the expansion of the mining sector is critical to a country's overall industrial development. India's abundant reserves of both metallic and non-metallic minerals provide the basis for the growth and development of the country's mining sector. In terms of mineral fuels like coal and lignite, as well as metallic minerals like bauxite, chromite's, iron ore, and lignite, India is essentially self-sufficient.

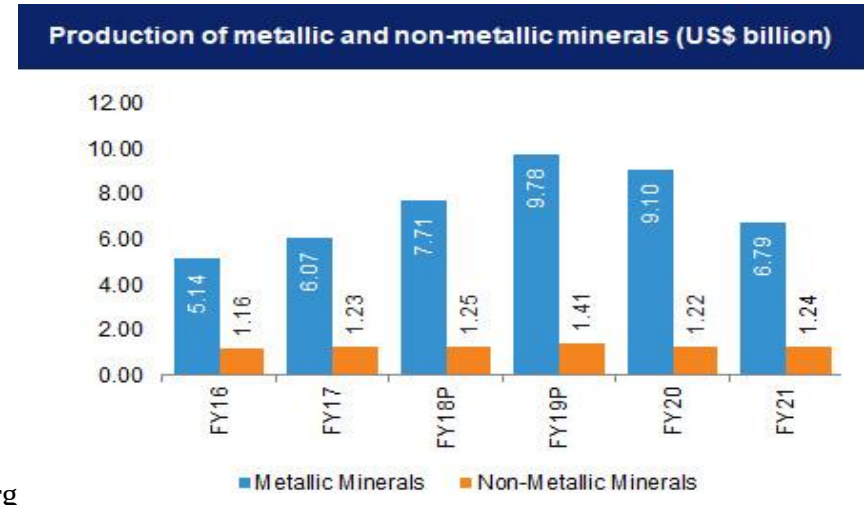
By acquiring necessary raw materials at competitive prices, the industry has the ability to have a major impact on Gross Domestic Product (GDP) growth and foreign exchange earnings. It may

also provide end-use industries like construction, infrastructure, automotive, and energy with a competitive advantage.

India will advance along the steel value chain and catch up to more developed steel-producing nations like Korea and Japan if it can become an “Aatmanirbhar” in the production of specialty steel. Through the introduction of significant legislative initiatives, the Indian government has also contributed to the growth of the country's mining and metals industry.

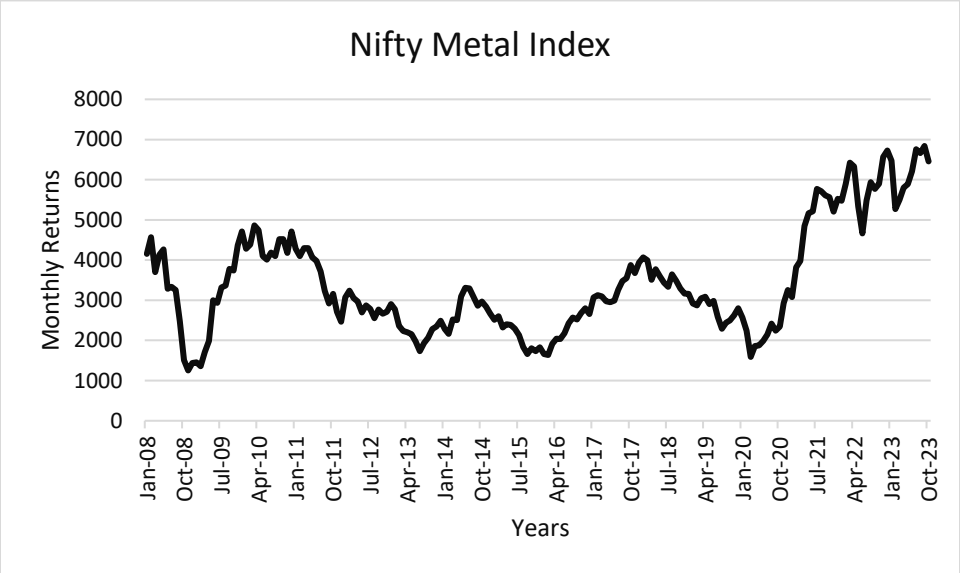
The government's approval of the National Mineral Policy in February 2019 has guaranteed enhanced openness, better regulation and enforcement, balanced social and economic growth, and sustainable mining practices. The policy increases support from the private sector and gives mining operations industry status. It also seeks to encourage private sector participation in exploration, make mergers and acquisitions of mining enterprises easier, and allow the transfer of mineral corridors established especially for metals and mining leases. In December 2022, the mining and quarrying sector's index of mineral output was recorded at 107.3, which is 9.8% higher than the level recorded in December 2021. This was primarily driven by the manufacturing of coal, fertilizers, steel, electricity, and cement. In September 2022, the mining and quarrying sector's index of mineral output was 99.5(ibrf.org).

Figure 1.3 Production of Indian Metal sector



Source: ibef.org

Figure 1.4: Growth of Nifty Metal Index between 2008 to 2023



Source: Computed by Author

1.5. Nifty Sectoral Indices

1.5.1. Nifty Pharma

The Nifty Pharma Index measures the pharmaceutical industry's performance. Twenty of the biggest pharmaceutical companies in India make up the Nifty Pharma Index, another sector index.

1.5.2. Nifty Metal

The Nifty Metal Index was developed to represent the actions and results of the Metal industry which includes mining. The maximum of 15 companies are listed on the National Stock Exchange (NSE) make up the Nifty Metal Index. Index funds, exchange-traded funds (ETFs), structured products, and fund portfolio benchmarking are just a few uses for the Nifty Metal Index.

1.6. Importance of the Study

One of the biggest and most active stock markets in the world is the Indian one. With frequent large fluctuations in stock prices and returns, it is also one of the most volatile markets. There are several reasons that can contribute to this volatility, such as macroeconomic variables. Given their critical roles in the Indian economy, research on the effects of macroeconomic variables on the stock prices of Nifty Pharma and Nifty Metal businesses is significant. The Nifty Pharma sector is one of the biggest and most significant sectors of the Indian stock market. The Nifty Metal Sector is very important in India for variety of reason. This sector includes industries like steel, copper, aluminum etc., this industry helps to manufacturing, construction, and also for export. It plays a crucial role in development of infrastructure, growth of industry and job creation. This research will support investors in making better-informed investing choices. Investors are better equipped to assess risk and investment opportunities when they have a better understanding of how

macroeconomic variables impact these companies stock values.

1.7.Scope of the Study

The scope of this study is to investigate the impact of macroeconomic variables on performance of Nifty Pharma sector and Nifty Metal sector of NSE. The study aimed at establishing the relationship between the macroeconomic variables such as Inflation (CPI), Foreign Exchange Reserves, Interest rate, Money supply (M2), and Export. The study is limited to 27 companies, 15 in the pharma sector and 12 in the Metal sector. Through econometric techniques such as unit root tests, correlation analysis, multiple regression, the Johansen cointegration test will explore the relationship between the variables and sectoral performance. Secondary sources of data were used and data collected for the period between January 2008 and October 2023, and the study only included companies that have been active at the NSE over the whole study period.

1.8. Objective of the study

1.8.1. To analyze the impact of macroeconomic variable on stock prices of each company in Nifty Pharma and Nifty Metal sector of NSE.

1.8.2. To examine the long term cointegration between macroeconomic variables and stock returns of Nifty Pharma Index and Nifty Metal Index of National Stock Exchange (NSE).

1.9. Research Questions

RQ1: To what extent do macroeconomic variable impact the stock prices of each company in Nifty Pharma and Nifty Metal sector of NSE?

RQ2: Do macroeconomic variable have a long term cointegration with stock returns of the Nifty Pharma Index and Nifty Metal Index of National Stock Exchange (NSE)?

1.10. Research Hypothesis

1.10.1. Ho: There is no statistically significant impact of macroeconomic variables on stock prices of each company in Nifty Pharma and Nifty Metal sector of NSE.

1.10.2. Ho: There is no long term cointegration between the macroeconomic variables and stock returns of Nifty Pharma Index and Nifty Metal Index of National Stock Exchange (NSE).

1.11. Chapterisation Scheme

Chapter 1: Introduction to impact of macroeconomic variables on the Pharma sector and Metal sector.

In this chapter brief introduction about the topic, macroeconomic variables used for the study, importance of the study, scope of the study, research objectives, research questions research hypothesis are mentioned.

Chapter 2: Review of Literature Review

The chapter 2 review of literature includes impact of macroeconomic variables on stock prices of each company in Nifty Pharma and Nifty Metal of National Stock Exchange and long-term cointegration between macroeconomic variable and stock returns of Nifty Pharma Index and Nifty Metal Index.

Chapter 3: Research Methodology

This chapter includes detail methods used for the study, data sources, sample size, etc.

Chapter 4: Data Analysis and Conclusion

The last chapter includes data Analysis and interpretation, conclusion drawn, findings and limitations has been made.

CHAPTER 2: LITERATURE REVIEW

2.1. INTRODUCTION

In the previous studies lots of investigation has done on impact of macroeconomic variable on sectorial Indices of National Stock Exchange (NSE). However, it is important to revisit previous studies on these NSE before digging into the present literature in this area. The literature will illustrate, summaries, preceding research related to this subject.

2.2. Impact of Macroeconomic variable on stock prices of each company in Nifty Pharma and Nifty Metal sector of National Stock Exchange (NSE).

Multiple studies have been conducted to examine the actions of various macroeconomic variables and how they affect stock prices.

Robert D. Gay, Jr. (2008) used the Box-Jenkins ARIMA model to examine the time-series link between stock market index prices and the macroeconomic variables of oil price and exchange rate for Brazil, Russia, India, and China (BRIC). The absence of a noteworthy correlation between the oil price and the respective exchange rate on the stock market index prices of both BRIC countries suggests that other macroeconomic factors, both domestic and foreign, may have a greater impact on stock market returns. Furthermore, no discernible correlation was seen between historical and current stock market returns, indicating that the markets in Brazil, Russia, India, and China demonstrate a limited form of market efficiency. **Mohamed Asmy, Aris Hassama, Wisam Rohilina, and Md. Fouad (2009)** looked at the causal relationships, both short- and long-term, between the nominal effective exchange rate, inflation, and money supply three macroeconomic

variables and the Kuala Lumpur Composite Index (KLCI) in the years leading up to and following the financial crisis. The results demonstrate the cointegration of macroeconomic variables and stock prices. According to the findings, the money supply, exchange rate, and inflation all appear to have a big impact on the KLCI. **Gagan Deep Sharma, Mandeep Mahendru (2010)** carried out a paper to investigate how various macroeconomic factors affect stock prices. The analysis came to the conclusion that the stock price and independent variables aside from the foreign exchange reserve and inflation rate have a substantial relationship. **Syed Nasrin Afzal, Shahadat Shadat Hossain (2011)** Used cointegration and the Granger causality test, to examines the causal relationship between four macroeconomic variables and stock prices on the Dhaka Stock Exchange (DSE). The findings imply that there is cointegration, or a long-term link, between stock prices and the variables M1, M2, and the inflation rate. They discover evidence of short-term unidirectional causality between the stock market, exchange rate, and M1. They also discover long-term causation between M1, M2, and the stock market, as well as between the stock market and the inflation rate, via bivariate error-correction models.

MACN. Shafana (2012) According to this paper, the variables chosen for analysis, inflation and the exchange rate are more significant for the majority of the sectors. Of these two crucial variables, the inflation rate is more effective than the exchange rate at explaining the fluctuations in share prices for the majority of the sectors. **Mehran Kianvand and Ali Hasanzadeh (2012)** concluded that while gold prices, private sector housing sector investment, and the nominal effective exchange rate have a negative impact on Iran's stock market index, the money supply and GDP growth rate have a positive effect. **Muhammad Mubashir Hussain, Muhammad Aamir, Nosheen Rasool, Maleeha Fayyaz, Maryam Mumtaz (2012)** examining the causal links, both short- and long-term, between Pakistani macroeconomic variables and the KSE (Karachi Stock

Exchange) was the aim of this study. The analysis found that while X, IPI, and IR did not show any causal relationship, ER, FER, and M had a unidirectional association with stock prices, while MS and WPI had a bidirectional relationship. **Naik Pramod Kumar and Padhi Puja (2012)** analyses the relationships among five macroeconomic factors. Due to their co-integration, the research demonstrates that there is a long-run equilibrium link between macroeconomic factors and the stock market index.

Joseph Tagne Talla (2013) find out how changes in a few chosen macroeconomic variables affect the stock prices of the Stockholm Stock Exchange (OMXS30). Based on computed regression coefficients and t-statistics, it is found that inflation and currency depreciation have a significant negative effect on stock prices. Furthermore, there is a negative correlation between interest rates and changes in stock prices, even if this relationship is not significant in the model. Conversely, there is a small but positive relationship between the money supply and stock prices. No unidirectional Granger Causality is found between stock prices and any of the predictor variables under examination, with the exception of one unidirectional causal association between stock prices and inflation. **Ahmed Imran Hunjra, Muhammad Irfan Chani, Muhammad Shahzad, Muhammad Farooq, and Kamran Khan (2014)** found that there is no association between the explanatory and dependent variables in the short term. On the other hand, the results show a strong long-term correlation. **Joshi Pooja, A K Giri (2015)** has employed Ng-Perron unit root in the study to confirm the integration order of the variables. The long-term relationship is examined by cointegration using the ARDL bounds testing approach. The VECM technique is used to evaluate both short- and long-term causality, and variance decomposition is used to forecast long-term exogenous shocks to the variables. The ARDL bounds test results validate the cointegrating relationship between sectoral GDP and sectoral stock price in India. **Jawad Khan, Imran Khan**

(2018) Since all of the variables in the study are stationary at their initial difference, the optimal ARDL approach of bound testing is employed to confirm the macroeconomic factors' short- and long-term cointegration on stock prices. The findings suggest that Karachi Stock currency stock values are significantly impacted over the long run by the money supply, currency rate, and interest rate. In the near run, all of the components are insignificant, with the exception of the currency rate, which has a negative cointegration with stock prices.

Jung Wan Lee, Tantatape Brahmasrene (2018) tries to examines the short- and long-term dynamic relationships between a few selected macroeconomic variables and stock prices on the Korea Stock Exchange. Because at least three cointegrating equations exist in the model at the 0.05 level according to the results of the Johansen cointegration test, the study found that stock prices and macroeconomic parameters in Korea have a long-run equilibrium relationship. The vector error correction model (VECM) estimations show that the money supply and short-term interest rate have little effect on stock prices. **Ahmad M. Al-Kandari, Sadeq J. Abul's (2019)** results of Var Error Correction Model (VECM) and the Johansen cointegration test indicate a long-run, unidirectional connection between the Kuwaiti Stock Exchange Index and the macroeconomic variables mentioned above. This analysis also confirmed the short-term association between oil prices and Kuwaiti stock values. **Abdullahi Ibrahim Bello (2020)** used an autoregressive distributed lag model to examine the effects of the research variables in the short- and long-term. The study concludes that the price of equities in the banking business is influenced by the foreign exchange reserve, interest rate, and inflation rate. According to the research, reducing the monetary policy rate is required to reduce borrowing costs and enhance the liquidity of the stock market. **Lekhashree S., K. Kanniammal (2021)** carried out a study to forecast and assess the sectoral indices of the NSE and the stock prices of chosen companies. The Nifty Pharmaceutical is showing

a minimal impact from the macroeconomic forces. Since there is no fluctuation between Nifty Pharmaceutical and a subset of the pharmaceutical sectoral indices, this test encourages investors to consider alternative strategies for generating profit by observing the effects of macroeconomic factors. Given that many macroeconomic indicators do not exhibit a causal relationship with Nifty Pharmaceutical, they provide insight into the short-term relationship between the variables.

2.3. Long term cointegration between macroeconomic variables and stock returns Nifty Pharma Index and Nifty Metal Index of National Stock Exchange (NSE).

Numerous research efforts have been made to investigate the relation between macroeconomic indicator and stock returns.

Tarika Singh, Seema Mehta, M. S. Varsha (2010) look into the relationship between index returns and important macroeconomic variables for Taiwan. The examination is done on stock portfolios rather than individual companies. A portfolio is constructed using the following four factors: market capitalization, price-to-book ratio (PBR), yield, and price/earnings ratio (P/E ratio). An empirical investigation revealed that while the money supply, inflation rate, and exchange rate had a negative association with returns for big and medium-sized company portfolios, GDP and exchange rates appeared to have an overall impact on portfolio returns. **Owusu-Nantwi, Victor, John K. M. Kuwornu (2011)** has concluded that within the framework of the Box-Jenkins time series technique, the ordinary least squares estimation (OLS) model was used in this paper to establish the relationship between macroeconomic variables and stock market returns. The findings demonstrate a substantial correlation between stock market returns and the consumer price index, or inflation. On the other hand, it appears that stock returns are not considerably impacted by the price of crude oil, the US dollars' worth, or the rate of valuation of Treasury bills.

Tobias Olweny, Kennedy Omondi (2011) examine how the volatility of stock returns at the Nairobi Securities currency was impacted by changes in interest rates, inflation rates, and foreign currency rates. The primary finding of the study are that, although symmetric, stock returns are leptokurtic and not normally distributed. The results demonstrated that the interest rate, inflation rate, and foreign exchange rate all had an impact on the volatility of stock returns. **Ihsan Ilahi, Mehboob Ali, Raja Ahmed Jamil, and (2012)** investigate the relationship between Pakistani stock market returns and macroeconomic variables such as the interest rate, inflation rate, and currency rate. A Multiple Linear Regression was used to examine the data. The investigation showed that there was a tenuous correlation between macroeconomic variables and stock market performance. **Sadia Saeed (2012)** looked at how macroeconomic factors affected the returns of several industries listed on the Karachi Stock Exchange. The study's findings are useful in figuring out how different element returns behave in reaction to shifts in macroeconomic forces such as the money supply, industrial production, oil prices, exchange rates, and short-term interest rates. Furthermore, the study's findings are useful in developing financial and economic policies because they consider the performance of different stock market sectors.

Zhu (2012) results show that the stock return of the energy sector in the Shanghai stock market is influenced by the exchange rate, exports, foreign reserves, and unemployment rate. **Isma Zaighum (2014)** looks at how a predetermined set of macroeconomic factors affects the stock returns of companies in nine non-financial industries that are listed on the Karachi Stock Exchange. Panel analysis with pooled ordinary least squares (OLS) reveals that the market returns and industrial production index show a positive link, whereas the consumer price index, money supply, and risk-free rate show a negative relationship with the stock returns of all the analyzed sectors' firms. **Pooja Singh (2014)** carried out study with the intention of analyzing how macroeconomic

factors affect the Indian stock market. Multivariate stepwise regression and Pearson's correlation are used to analyze how macroeconomic indicators affect stock market performance. The dynamic causal relationship between the variables is tested using Granger's causality test. The empirical findings demonstrate that macroeconomic factors have a major impact on Indian stocks.

Safdar Abbas, Safdar Hussain Tahir, Shahid Raza (2014) showed a noteworthy finding about the correlation between macroeconomic factors and returns on the Karachi Stock Exchange (KSE-100). Descriptive statistics demonstrated that the KSE-100 index offered the highest return with the lowest standard deviation. Correlation analysis revealed a negative correlation between stock returns and each of the independent variables: GDP, gold prices, inflation, exchange rates, and T-bills. There was a positive correlation between the GDP, T-bill, inflation, exchange rate, and gold prices, all of which are independent factors. The exchange rate and stock return had an insignificantly positive association, according to the regression results. The GDP and stock return have a negligible negative relationship, whereas a positive, insignificant relationship exists for gold prices. There is a notable inverse relationship between inflation and stock market returns. Additionally, the stock market and T-Bill have a negligible negative association. **Wycliffe Nduga Ouma and Peter Muriu (2014)** investigate how the money supply (M2), interest rates (91 T-bill rates), exchange rates, and inflation (CPI) affect stock returns in Kenya, which are measured by the NSE 20-share index. The study came to the conclusion that inflation, money supply, and currency rates all had an impact on Kenya's stock market performance. It has been discovered that inflation and the money supply have a major influence on NSE returns. However, it has been discovered that exchange rates negatively affect stock returns, whereas interest rates have no bearing on the NSE's long-term results.

Kaunyangi Eliud Laichena, Tabitha Nasieku Obwogi (2015) examine interest rate data showed that rising interest rates had a detrimental effect on stock returns in the stock market of East Africa. The study also discovered a significant positive correlation between the East African stock market's stock returns and the rate of inflation. It was found that there was a substantial inverse association between exchange rates and sock returns. Consequently, a rise in exchange rates, signifying a strengthening of the US dollar, resulted in a decline in stock returns within the East African stock market. Ultimately, the research revealed a statistically significant positive correlation between GDP and stock returns in the East African stock market. **Lakshmi Kalyanaraman (2015)** has used a time series analysis to investigate the relationship between sectoral returns and specific macroeconomic variables. This analysis demonstrates that several of the industries listed on the Saudi stock market have a long-term association with the selected macroeconomic variables. Sectoral returns are unaffected by the Industrial Production Index (IPI). Using the cointegration technique, the study determines that there is at least one cointegration vector between the sector indices and the selected macroeconomic variables. The long-run and short-run causation relationships between the macroeconomic variables and sectoral stock indices are examined using the error correction model and the Wald test. The findings indicate that there is variation in the impact of macroeconomic variables on the returns of different industries.

Simon Kamau Gatuhi (2015) examine the impact of interest rates, inflation, money supply, and exchange rates on Kenya's stock market performance, as well as whether or not changes in the country's macroeconomic factors have varied effects on the country's various sectors, The results demonstrated that the relationship between the macroeconomic factors of exchange rate, interest rate, inflation, money supply, and the performance of the NSE stock market was moderated by the kind of sector characteristics. **Kszénia Putyinceva, Hauke Steffen (2016)** findings indicate that

at least one of the sectors is significantly impacted by earnings per capita, the consumer price index, private consumption, the unemployment rate, the producer price index, the price of oil, the gross domestic product, and the exchange rate of the eight sector models. Earnings per capita is significant. **Bambang Sutrisno (2017)** findings show that, with the exception of basic industry, banking, transportation, infrastructure, utilities, and miscellaneous industry, interest rates have a considerable negative impact on all sectors of the economy. Not all industries are significantly impacted by the rate of inflation. Conversely, the exchange rate exhibits a notable adverse effect on all industries to a lesser extent. The government's policy may be affected by this study. Given that these three macroeconomic variables have a notable impact on sectoral indices at the same time, the Indonesian government ought to take this relationship into account in order to establish a more stable stock market. Because the currency rate has a major negative impact on all sectors, investors should take it into account while developing their investment strategy. **Khalid Ul Islam Habib (2017)** carried out research, and the study tested whether the macroeconomic variables could account for a significant portion of the difference in the returns on Islamic stocks using regression using ordinary least squares. Furthermore, the research has shown that the single factor that adversely and statistically significantly affects the performance of the Islamic stock market is currency rates. **Nurasyikin Jamaludin, Shahnaz Ismail, Syamimi Ab Manaf (2017)** by using panel least squares regression techniques, the findings demonstrate that the inflation rate and ER have a considerable impact on stock market performance. MS is determined to be negligible. This paper's findings also indicate that inflation has a bigger impact and is inversely correlated with stock market returns.

V.N. Sailaja, Chandini Mandal (2018) found that all macroeconomic variables have a significant relationship with sectoral indices in India, including BSE Auto, BSE Bank, BSE Energy, and BSE

IT. Additionally, it was discovered that various macroeconomic factors had a preference for affecting sectoral indices. But out of all the macroeconomic factors, foreign institutional investment (FII) is the only one that has the biggest impact on India's sectoral indexes. **Naveen R.S., N. Sivakumar (2020)** made effective investment selections, one must comprehend the nature of the influence macroeconomic forces have on certain sectoral indexes. While some factors, such as the price of crude oil, exchange rates, and national income, have a widespread effect on several industries, each sector is also impacted by specific elements that are exclusive to it. To make wise investing decisions, one must be aware of these particular factors. **Debasis Mohanty, Jakki Samir Khan, Shakti Ranjan Mohapatra (2021)** examined relationship between macroeconomic factors and stock market returns in this study. Six macroeconomic factors the manufacturing to GDP ratio, the debt to GDP ratio, the US dollar return, the inflation rate, and the GDP growth rate—are taken into consideration using annual data. These variables are employed as independent variables. The dependent variable in this case is the Sensex return. The link between the dependent and explanatory variables is examined using the auto-regressive distributed lag (ARDL) model. The bound test verifies the existence of a long-term relationship between the variables. The CUSUM and Serial Correlation LM tests support the fit of the developed model. **Rhoda Alexander and Husam Aldin Al-Malkawi (2022)** employs the autoregressive distributed lag (ARDL) co-integration methodology and conducts appropriate diagnostic assessments. Long-term major negative predictors of the Nifty auto index were found to be the exchange rate and IIP. Over an extended period of time, a noteworthy positive correlation was observed between the index and both the price of crude and interest rates. Additionally, IIP demonstrated a substantial positive relationship with the car index in the short term, whereas the initial lag of the oil price exhibited a large negative association.

CHAPTER 3 RESEARCH METHODOLOGY

3.1. Introduction

The whole methodology is mentioned in this section, along with problem of the study, sample size, period of the study, variables, sources of data collection, the econometrics and statistical techniques to analyze the objectives of the study.

3.2. Problem of the Study

This research paper aims to solve the complex relationship between macroeconomic factors and how they affect the Nifty Pharma and Nifty Metal sectorial indices. The study's objective is to examine the macroeconomic variables such as foreign exchange trade (export), M2, foreign exchange reserve, inflation (CPI), and interest rates that have a significant impact on these industries. It also aims to comprehend the precise impacts of these macroeconomic variables on the financial performance of businesses operating in these industries. The research examines the degree to which changes in macroeconomic circumstances impact stock price movement, assessing the sensitivity, volatility, and trends of stock prices in certain industries. A major component of this research is figuring out how macroeconomic variables relate to stock returns and evaluating how exposed investors are to risk from fluctuations in the economy.

3.3. Research Gap

There is a lack of comprehensive research that systematically analyzes and compares the sensitivity of these two sectors (Nifty Pharma sector and Nifty Metal sector) to macroeconomic fluctuations. While in the prior studies have looked at the impact of macroeconomic variables on broader stock market indexes there is a scarcity of extensive research on Nifty Pharma sector and Nifty Metal sector. These sectors have unique characteristics and sensitivity to macroeconomic

influences, necessitating more detailed research to fully grasp their dynamics. As a result, this work fills a research gap by looking into how macroeconomic variables affect individual's companies within these sectors. Although there is some literature on the cointegration of several stock market indices including Nifty Pharma and Nifty Metal index the long term cointegration of these two sectors has gotten less attention. While previous studies have looked at the impact of macroeconomic factors on specific sector or indices there is frequently a lack of agreement or opposing conclusion due to methodological variations, limitations in data or sample selection biases. This research study intends to help resolve these discrepancies by adopting robust empirical methodologies and rich database tailored to the Nifty Pharma and Nifty Metal sector, by doing this this study improves the dependability and durability of the findings filling a major research gap in the literature and giving more trustworthy insights to investors.

3.4. Period of the Study

The period of the study is Monthly data for 15 years ranging from 1st January 2008 to 31st October 2023.

3.5. Sample size

For the first objective the study has employ closing price of 15 companies from Pharma sector and closing price of 12 companies. And for the second objective the study has used returns of Nifty Pharma Index and Nifty Metal Index. For both objective Monthly data has used ranging from 1st January 2008 to 31st October 2023

Table 3.5.1. list of company in Nifty Pharma and Nifty Metal sector of National Stock Exchange (NSE)

NIFTY Pharma	NIFTY Metal
Aurobindo Pharma Ltd.	Adani Enterprises Ltd.
Biocon Ltd.	Hindalco Industries Ltd.
Cipla Ltd.	Hindustan Zinc Ltd.
Divi'S Laboratories Ltd.	J S W Steel Ltd.
Dr. Reddy'S Laboratories Ltd.	Jindal Stainless Ltd.
Glenmark Pharmaceuticals Ltd.	Jindal Steel & Power Ltd.
Granules India Ltd.	National Aluminum Co. Ltd.
Ipca Laboratories Ltd.	Ratnamani Metals & Tubes Ltd.
J B Chemicals & Pharmaceuticals Ltd.	Steel Authority of India Ltd.
Lupin Ltd.	Tata Steel Ltd.
Natco Pharma Ltd.	Vedanta Ltd.
Sanofi India Ltd.	Welspun Corp Ltd.
Sun Pharmaceutical Inds. Ltd.	
Torrent Pharmaceuticals Ltd.	
Zydus Lifesciences Ltd.	

3.6. Sources of data

Table 3.6.1. list of variables and sources

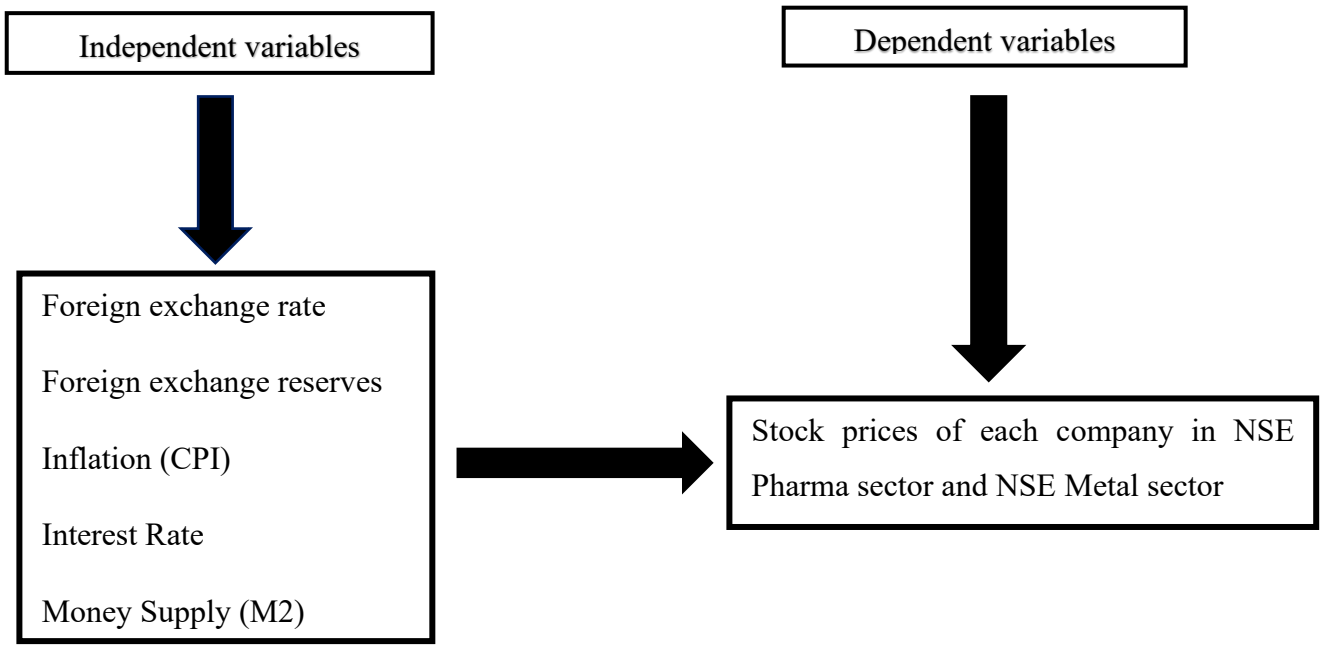
<table>
<tr><th>Variables/ Sectoral indices</th><th>Frequency</th><th>Sources</th><th>Period of the study</th></tr>
<tr><td colspan="3">Variables</td><td rowspan="8">1st January 2008 to 31st October 2023.</td></tr>
<tr><td>Foreign exchange rate</td><td>Monthly</td><td rowspan="3">Economic and Political Weekly Research Foundation (EPWRF)</td></tr>
<tr><td>Foreign exchange reserves</td><td>Monthly</td></tr>
<tr><td>Money Supply (M2)</td><td>Monthly</td></tr>
<tr><td>Interest Rate</td><td>Monthly</td><td>Reserve Bank of India (RBI) Database</td></tr>
<tr><td>Inflation (CPI)</td><td>Monthly</td><td>Organisation for Economic Cooperation and Development (OECD)</td></tr>
<tr><td colspan="3">Sectoral Indices</td></tr>
<tr><td>Companies in Nifty Pharma sector</td><td>Monthly</td><td>Centre for Monitoring Indian Economy (CMIE PROWESS IQ)</td></tr>
</table>

Companies in Nifty Metal sector	Monthly		
Nifty Pharma Index returns	Monthly		
Nifty Metal Index returns	Monthly		

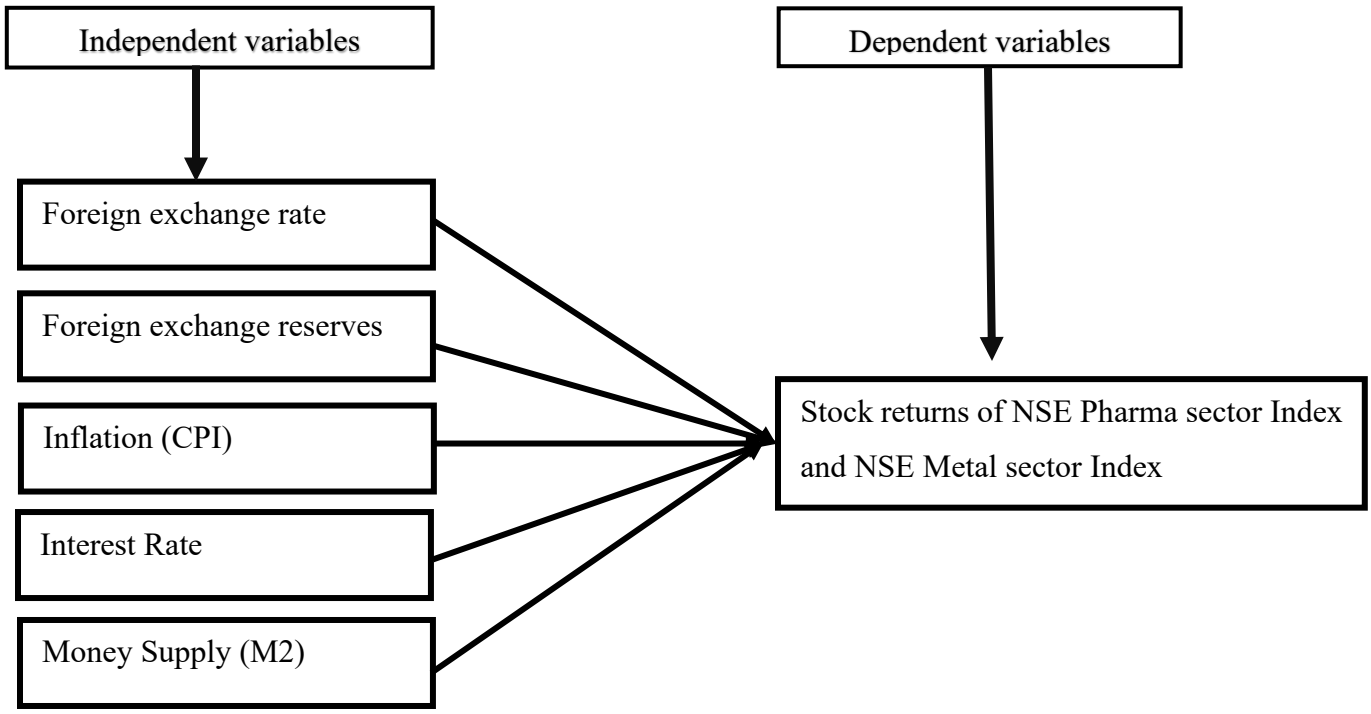
3.7. Data description

All the data analysis were carried out in E-views. And all the data of both sector companies closing prices, both sector closing index returns and macroeconomic variables were computed as simple returns by using formula as = today's price/yesterday's price-1. The following is the equations for regression analysis. Stock prices of Nifty Pharma company = β0 + β1 Export + β2 Foreign Exchange Rate + β3 Inflation (CPI) + β4 Interest Rates + β5 M2 + ε

3.7.1. Figure 1: framework of objective 1



3.7.2. Figure 2: Framework for objective 2



3.8. Tools and techniques

Descriptive statistics: various summary statistics for the series is display in descriptive statistics. The type, feature and attributes of the variables that the descriptive statistics describe offer rapid comprehension and interpretation of the study's data collection. Some common measurements, such as the measure of central tendency (mean), maximum, minimum, measures of dispersion like standard deviation (variance), kurtosis, Jarque- Bera test have been employed for quantitative description.

Unit Root Test: To know whether the time series variable is stationary or non- stationary and whether it exabits a unit root test.

Correlation Analysis: It is used to measure the strength of linear relationship between two variables, and it shows level of change in one variable due to change in another variable.

Multiple Regression: Multiple regression is a statistical technique that is used to know the relationship between two or more independent and dependent variables.

Equation for Multiple Regression:

$Y=\beta 0 +\beta 1X1+\beta 2X2 +...+\beta nXn +\epsilon$

Where: Y is the dependent variable (stock price of each company in the Nifty Pharma and Metal sector).

X1, X2..., Xn are the independent variables (macroeconomic variables).

$\beta 0, \beta 1, \beta 2 ..., \beta n$ are the coefficients representing the relationship between the independent and dependent variables.

ϵ represents the error term.

Johansen Cointegration Test: It is use to test long term relationship between several non-stationary time series data.

Equation for Johansen Cointegration test:

$Yt=\alpha+\beta 1X1t+\beta 2X2t+\ldots+\beta nXnt+\epsilon t$

Where: Yt represents the vector of stock returns for the Nifty pharma or Nifty Metal Index.

X1t, X2t…, Xnt denote the macroeconomic variables.

α is the intercept term

$\beta 1, \beta 2\ldots, \beta n$ are the coefficients of the macroeconomic variables., ϵt represents the error term.

CHAPTER 4 ANALYSIS AND INTERTATION

4.1 Analysis on Objective 1

4.1.1. Descriptive Statistics

various summary statistics for the series is display in descriptive statistics. The type, feature and attributes of the variables that the descriptive statistics describe offer rapid comprehension and interpretation of the study's data collection. Some common measurements, such as the measure of central tendency (mean), maximum, minimum, measures of dispersion like standard deviation (variance), kurtosis, Jarque- Bera test have been employed for quantitative description.

Table 1: Descriptive statistics of Nifty Pharma Sector companies

Particular	Mean	Maximum	Minimum	Standard deviation	Skewness	Kurtosis	Jarque-Bera
Aurobindo Pharma Ltd.	0.019373	0.779995	-0.856836	0.162437	-0.378839	10.45189	444.1625 (0.0000)
Biocon Ltd.	0.005197	0.406880	-0.651030	0.128643	-1.387419	9.912335	439.2175 (0.0000)
Cipla Ltd.	0.011957	0.394348	-0.225016	0.076244	0.592585	5.629337	65.85117 (0.0000)
Divi'S Laboratories Ltd.	0.009781	0.347717	-0.528383	0.106967	-1.477443	9.358828	389.2312 (0.0000)
Dr. Reddy's Laboratories Ltd.	0.013959	0.261331	-0.277277	0.082974	0.021671	4.439506	16.41962 (0.0002)
Glenmark Pharmaceuticals Ltd.	0.008321	0.637357	-0.536474	0.116938	0.163411	9.855504	372.9126 (0.0000)
Granules India Ltd.	0.020433	0.385429	-0.888722	0.145508	-0.950055	10.40650	462.8609 (0.0000)

Ipca Laboratories Ltd.	0.010902	0.413682	-0.754211	0.116338	-1.801056	14.20262	1096.252 (0.0000)
J B Chemicals & Pharmaceuticals Ltd.	0.021354	0.283090	-0.464656	0.109736	-0.531496	5.022247	41.32051 (0.0000)
Lupin Ltd.	0.011283	0.416603	-0.810219	0.105605	-2.174595	21.63898	2900.090 (0.0000)
Natco Pharma Ltd.	0.019971	0.535010	-0.793458	0.139124	-0.486329	9.312262	322.9265 (0.0000)
Sanofi India Ltd.	0.012280	0.243861	-0.223340	0.069843	0.343213	4.215317	15.42308 (0.0004)
Sun Pharmaceutical Inds. Ltd.	0.007458	0.318337	-0.787896	0.104330	-2.623779	21.16251	2829.526 (0.0000)
Torrent Pharmaceuticals Ltd.	0.016872	0.246173	-0.478322	0.093639	-1.359012	9.670235	410.7142 (0.0000)
Zydus Lifesciences Ltd.	0.011259	0.295418	-0.800736	0.104837	-2.462418	21.24816	2828.224 (0.0000)

Source: Computed Values by Author using E-views 12

Note: refer p-value in ()

In the table 1 shows the mean is average of 190 observations. J B Chemicals & Pharmaceuticals Ltd. Company Has highest average value that is 0.021354 among all the companies of the Nifty pharma sector, while the Biocon Ltd. Company has the lowest mean value that is 0.005197 according to the mean values of all the variables. The Aurobindo Pharma Ltd. Has the maximum value (0.779995), while Granules India Ltd. Company displays the minimum value (-0.88872). The standard deviation is used to quantify the variety in closing prices. It has been noted that Sanofi India Ltd. has the least amount of closing volatility compared to Aurobindo Pharma Ltd., Granules

India Ltd., Natco Pharma Ltd. A measure of the data distribution's asymmetry is called skewness. The data is skewed to the right, with a longer tail on the right side of the distribution, when there is a positive skew. A negative skew signifies a leftward skewed distribution of the data, with a longer tail on the left side. The data is symmetrical when the skewness is zero. The Lupin Ltd has higher skewness value that indicates a more positively skew compared to Dr. Reddy's Laboratories Ltd. even though most of the companies have a positive skew, Biocon Ltd has a negative skew. All the companies have value greater than 3 indicates a leptokurtic distribution. The tails of a leptokurtic distribution are fatter than those of a normal distribution. The results of the Jarque-Bera test show whether or not the time series is normally distributed. The null hypothesis is rejected indicating that the series normally distributed.

Table 2: Descriptive statistics of Nifty Metal Sector companies

Particular	Mean	Maximum	Minimum	Standard deviation	Skewness	Kurtosis	Jarque-Bera
Adani Enterprises Ltd.	0.026456	0.727353	-0.871372	0.196898	0.116691	6.484283	96.54133 (0.0000)
Hindalco Industries Ltd.	0.012925	0.574884	-0.386145	0.135972	0.609989	5.030688	44.42865 (0.0000)
Hindustan Zinc Ltd.	0.005991	0.399566	-0.891136	0.114845	-2.321856	22.12697	3066.956 (0.0000)
J S W Steel Ltd.	0.012721	0.615036	-0.878249	0.152657	-0.548395	10.48682	453.2719 (0.0000)
Jindal Stainless Ltd.	0.019941	0.687627	-0.649588	0.179677	0.328977	5.386031	48.49788 (0.0000)
Jindal Steel & Power Ltd.	0.004778	0.568125	-0.850277	0.174300	-0.964788	7.841265	215.0255 (0.0000)
National Aluminum Co. Ltd.	0.003031	0.679791	-0.774767	0.137081	-0.630136	11.58001	595.3722 (0.0000)
Ratnamani Metals & Tubes Ltd.	0.016588	0.608667	-0.798687	0.144687	-0.400413	11.88115	629.5031 (0.0000)

Steel Authority of India Ltd.	0.003878	0.581502	-0.351617	0.148207	0.986550	5.298673	72.65143 (0.0000)
Tata Steel Ltd.	0.004983	0.702436	-0.875901	0.153242	-0.452602	10.34230	433.2695 (0.0000)
Vedanta Ltd.	0.006117	0.513083	-0.953005	0.160500	-0.676003	9.770980	377.4199 (0.0000)
Welspun Corp Ltd.	0.016394	0.679920	-0.666218	0.179316	0.208347	5.287807	42.81093 (0.0000)

Source: Computed Values by Author using E-views 12, Note: refer p-value in ()

In the table 2. Adani Enterprises Ltd. Company Has highest average value that is 0.026456 among all the companies of the Nifty Metal sector, while the National Aluminum Co. Ltd. Company has the lowest mean value that is 0.003031 according to the mean values of all the variables Adani Enterprises Ltd. has the maximum value (0.727353), while Vedanta Ltd. Company displays the minimum value (-0.953005). It has been seen that Hindustan Zinc Ltd. has the least amount of closing volatility compared Adani Enterprises Ltd., Jindal Stainless Ltd. and Welspun Corp Ltd. All the companies have value greater than 3 indicates a leptokurtic distribution. The tails of a leptokurtic distribution are fatter than those of a normal distribution. And the results of -Bera test shows whether the time series are normally distributed. A measure of the data distribution's asymmetry is called skewness. All the companies have value greater than 3 indicates a leptokurtic distribution. The tails of a leptokurtic distribution are fatter than those of a normal distribution. the results of the Jarque-Bera test show whether or not the time series is normally distributed. We reject the null hypothesis and concluded that the series is normally distributed.

Table 3: Descriptive statistics of Macroeconomic Variables

Particular	Mean	Maximum	Minimum	Standard deviation	Skewness	Kurtosis	Jarque-Bera
Export	0.015608	0.826019	-0.505892	0.123360	1.205922	13.00764	838.9274 (0.0000)
Foreign Exchange Reserves	0.008208	0.081176	-0.079663	0.022057	-0.427214	5.022749	38.17069 (0.0000)
Inflation (CPI)	0.010320	0.636364	-0.500000	0.153477	0.687787	5.227796	54.27099 (0.0000)
Interest Rate	0.001787	0.350515	-0.353271	0.067653	0.070264	12.48037	711.6864 (0.0000)
M2	0.009592	0.183629	-0.224352	0.029993	-1.192725	27.05317	4625.275 (0.0000)

Source: Computed Values by Author using E-views 12

Note: refer p-value in ()

Export has highest mean value that is 0.015608 and interest rate has lowest mean value that is 0.001787 among all the five macroeconomic variables. Export also displays maximum value that is 0.826019 and minimum value is -0.505892. standard deviation is a measure of dispersion it shows how much data the data is varies from the mean. Standard deviation of export is 0.123360 which refers that export values tends to deviate from average that is 0.015608 by 0.123360 0n average. The skewness of export is 1.205922 which shows that distribution is positively skewed. Kurtosis measures of the tails of the distribution of the data. All the variables have value greater than 3 indicates a leptokurtic distribution. The tails of a leptokurtic distribution are fatter than those of a normal distribution. For the Jarque- Bera test we reject the Null hypothesis that the data is normally distributed.

4.1.2. Unit Root Test

A time series variable can be statistically tested to see if it is stationary or has a trend using unit root testing. The most popular Augmented Dickey-Fuller (ADF) test is used to analyze the chosen variables in order to ascertain if they are stationary at first difference or at level.

Table 4: Unit Root test of Nifty Pharma sector companies

Null Hypothesis: Nifty Pharma sector series have Unit Root test						
		Test Critical values				
Nifty Pharma Sector Companies	t-statistics	1% level	5% level	10% levels	Prob.*	Decision
Aurobindo Pharma Ltd.	-12.67214	-3.465014	-2.876677	-2.574917	0.0000	Reject
Biocon Ltd.	-12.58966	-3.465014	-2.876677	-2.574917	0.0000	Reject
Cipla Ltd.	-13.95136	-3.465014	-2.876677	-2.574917	0.0000	Reject
Divi'S Laboratories Ltd.	-14.28779	-3.465014	-2.876677	-2.574917	0.0000	Reject
Dr. Reddy'S Laboratories Ltd.	-15.25275	-3.465014	-2.876677	-2.574917	0.0000	Reject
Glenmark Pharmaceuticals Ltd.	-13.77926	-3.465014	-2.876677	-2.574917	0.0000	Reject
Granules India Ltd.	-12.22456	-3.465014	-2.876677	-2.574917	0.0000	Reject
Ipca Laboratories Ltd.	-12.69291	-3.465014	-2.876677	-2.574917	0.0000	Reject
J B Chemicals & Pharmaceuticals Ltd.	-14.42542	-3.465014	-2.876677	-2.574917	0.0000	Reject
Lupin Ltd.	-13.89347	-3.465014	-2.876677	-2.574917	0.0000	Reject
Natco Pharma Ltd.	-13.49474	-3.465014	-2.876677	-2.574917	0.0000	Reject
Sanofi India Ltd.	-17.71055	-3.465014	-2.876677	-2.574917	0.0000	Reject

Sun Pharmaceutical Inds. Ltd.	-14.64183	-3.465014	-2.876677	-2.574917	0.0000	Reject
Torrent Pharmaceuticals Ltd.	-12.96533	-3.465014	-2.876677	-2.574917	0.0000	Reject
Zydus Lifesciences Ltd.	-13.13490	-3.465014	-2.876677	-2.574917	0.0000	Reject

Source: Computed Values by Author using E-views 12

Note: refer p-value

Table 5: Unit Root test of Nifty Metal sector companies

Null Hypothesis: Nifty Metal sector series have Unit Root test						
		Test Critical values				
Nifty Metal Sector Companies	t-statistics	1% level	5% level	10% levels	Prob.*	Decision
Adani Enterprises Ltd.	-11.51749	-3.465014	-2.876677	-2.574917	0.0000	Reject
Hindalco Industries Ltd.	-14.27904	-3.465014	-2.876677	-2.574917	0.0000	Reject
Hindustan Zinc Ltd.	-13.98249	-3.465014	-2.876677	-2.574917	0.0000	Reject
J S W Steel Ltd.	-11.43652	-3.465014	-2.876677	-2.574917	0.0000	Reject
Jindal Stainless Ltd.	-13.41737	-3.465014	-2.876677	-2.574917	0.0000	Reject
Jindal Steel & Power Ltd.	-13.41737	-3.465014	-2.876677	-2.574917	0.0000	Reject
National Aluminum Co. Ltd.	-14.85396	-3.465014	-2.876677	-2.574917	0.0000	Reject
Ratnamani Metals & Tubes Ltd.	-11.43513	-3.465014	-2.876677	-2.574917	0.0000	Reject
Steel Authority of India Ltd.	-14.03091	-3.465014	-2.876677	-2.574917	0.0000	Reject
Tata Steel Ltd.	-12.19354	-3.465014	-2.876677	-2.574917	0.0000	Reject
Vedanta Ltd.	-12.38768	-3.465014	-2.876677	-2.574917	0.0000	Reject

Welspun Corp Ltd.	-13.15119	-3.465014	-2.876677	-2.574917	0.0000	Reject

Source: Computed Values by Author using E-views 12

Note: refer p-value

Table 6: Unit Root test of Macroeconomic variables

Null Hypothesis: Macroeconomic variables series have Unit Root test						
		Test Critical values				
Macroeconomic variables	t-statistics	1% level	5% level	10% levels	Prob.*	Decision
Export	-15.08195	-3.465202	-2.876759	-2.574962	0.0000	Reject
Foreign Exchange Reserves	-12.82005	-3.465014	-2.876677	-2.574917	0.0000	Reject
Inflation (CPI)	-10.96953	-3.465202	-2.876759	-2.574962	0.0000	Reject
Interest Rate	-5.780972	-3.465392	-2.876843	-2.575006	0.0000	Reject
M2	-7.167788	-3.466176	-2.877186	-2.575189	0.0000	Reject

Source: Computed Values by Author using E-views 12

Note: refer p-value

In table no. 4,5 and 6 that is the Nifty Pharma, Nifty Metal and Macroeconomic variable for unit root test has been tested. All the above series has unit root test. The results of this study indicate that, at the 1%, 5%, and 10% significance levels, the T statistics values for every variable are greater than the critical values. The unit root hypothesis in the data is rejected and the alternative hypothesis is accepted since the P-values are 0.000 in every case, indicating that the series is stationary at level.

4.1.3. Correlation Analysis

Table 7: Correlation analysis of macroeconomic variables with Nifty Pharma sector companies

	Export	Foreign Exchange Reserves	Inflation (CPI)	Interest Rate	M2
Aurobindo Pharma Ltd.	0.0002057	-0.058274	-0.019935	-0.137732	0.032913
Biocon Ltd.	0.069258	0.018259	0.042637	-0.094065	-0.005786
Cipla Ltd.	-0.070746	0.000579	0.021967	-0.040123	-0.016053
Divi'S Laboratories Ltd.	-0.048381	0.088516	-0.042787	-0.057169	-0.009847
Dr. Reddy'S Laboratories Ltd.	0.020426	0.015745	-0.142075	-0.025609	0.017915
Glenmark Pharmaceuticals Ltd.	-0.064113	0.021320	0.045199	-0.113197	-0.086922
Granules India Ltd.	-0.099959	-0.107536	0.029026	-0.152962	-0.039810
Ipca Laboratories Ltd.	-0.032620	-0.023085	0.036818	-0.123922	0.051614
J B Chemicals & Pharmaceuticals Ltd.	0.071314	-0.163854	-0.018292	-0.039665	0.041496
Lupin Ltd.	-0.074589	-0.029149	0.024651	0.026501	-0.066232
Natco Pharma Ltd.	-0.003161	-0.049473	-0.053977	-0.126088	-0.066462
Sanofi India Ltd.	0.097558	-0.138214	-0.045551	-0.108799	0.006295
Sun Pharmaceutical Inds. Ltd.	-0.108029	-0.032915	0.093000	-0.101076	0.095365
Torrent Pharmaceuticals Ltd.	0.039658	-0.012033	0.042302	-0.99628	0.110364
Zydus Lifesciences Ltd.	-0.003937	0.04841	-0.012600	0.044499	0.038466

Source: Computed Values by Author using E-views 12

The above table shows correlation between five Macroeconomic variable (Independent variable) and of 15 Nifty Pharma companies Stock prices (Dependent variable). A correlation coefficient close to 1 indicates a strong positive correlation, while a coefficient close to -1 indicates a strong negative correlation. A coefficient close to 0 indicates no correlation. There is a weak positive correlation between Export and stock prices of Pharma sector companies that is Aurobindo Pharma Ltd., Biocon Ltd., Dr. Reddy'S Laboratories Ltd., J B Chemicals & Pharmaceuticals Ltd., Sanofi India Ltd., Torrent Pharmaceuticals Ltd., that means rise in export tends to increase in stock price of Nifty Pharma sector companies. The correlation between foreign exchange reserve and stock prices of mostly companies in Nifty Pharma is negative. It shows that increase in foreign exchange rate tends to decline in stock prices of Nifty Pharma companies. It shows a weak negative

correlation between interest rate and most of the companies of Nifty pharma. This indicates that increase in Interest rates tends to decrease in stock values of Nifty Pharma. There is also a weak positive correlation between M2 and stock prices for most companies in Nifty Pharma that sows rise in money supply (M2) tends to rise in stock prices of Nifty Pharma companies.

Table 8: Correlation analysis of macroeconomic variables with Nifty Metal sector companies

	Export	Foreign Exchange Reserves	Inflation (CPI)	Interest Rate	M2
Adani Enterprises Ltd.	-0.004711	-0.192930	0.095680	-0.142994	-0.045293
Hindalco Industries Ltd.	-0.005330	-0.097653	-0.004276	-0.100907	-0.054712
Hindustan Zinc Ltd.	-0.158008	-0.058798	0.010059	-0.117873	-0.098029
J S W Steel Ltd.	0.033857	-0.146917	0.049609	-0.110963	-0.077124
Jindal Stainless Ltd.	0.031680	-0.040766	0.033587	-0.152313	0.050542
Jindal Steel & Power Ltd.	0.088821	-0.137000	0.150929	-0.123901	0.008824
National Aluminum Co. Ltd.	-0.110870	-0.000580	-0.020864	-0.141597	-0.011691
Ratnamani Metals & Tubes Ltd.	0.083570	-0.059956	0.033808	0.041999	0.011800
Steel Authority of India Ltd.	-0.055483	-0.157626	-0.019194	-0.119272	-0.020517
Tata Steel Ltd.	0.054861	0.023176	0.031155	-0.141513	-0.004386
Vedanta Ltd.	0.049084	-0.050518	0.027812	-0.140006	-0.016313
Welspun Corp Ltd.	0.016333	-0.128455	-0.007574	-0.065039	-0.051275

Source: Computed Values by Author using E-views 12

The above table shows correlation between five Macroeconomic variable (Independent variable) and of 12 Nifty Metal companies Stock prices (Dependent variable). A correlation coefficient close to 1 indicates a strong positive correlation, while a coefficient close to -1 indicates a strong negative correlation. A coefficient close to 0 indicates no correlation. There is a weak positive correlation between Export and stock prices of Metal sector companies that is J S W Steel Ltd., Jindal Stainless Ltd., Jindal Steel & Power Ltd., Ratnamani Metals & Tubes Ltd., Tata Steel Ltd., Vedanta Ltd., Welspun Corp Ltd. It suggests that an increase in exports usually causes the stock value of Nifty Metal companies to rise as well. The correlation between foreign exchange reserve and stock prices

of mostly companies in Nifty Metal is negative expect Tata Steel Ltd. t shows that the stock prices of companies in Nifty Metal typically decline in accordance with an increase in the foreign exchange rate. The stock prices of Nifty Metal companies and Inflation (CPI) are both positively and negatively correlated. Strong correlation is not found in any of data. There is a weak negative correlation between interest rate and most of the companies of Nifty Metal except Ratnamani Metals & Tubes Ltd. This indicates that the stock prices of Nifty Metal companies typically decline in response to an increase in interest rates. There is also a weak positive correlation between M2 and stock prices for most companies in Nifty Metal.

4.1.4. Multiple Regression

Multiple regression is a statistical technique that is used to know the relationship between two or more independent and dependent variables. The use of multiple regression is to find the linear relationship between independent and dependent variables. The coefficient for a variable show's direction and relationship between the independent and dependent variables. A positive coefficient means there is a positive relationship between the independent and dependent variable while negative coefficient means there is a negative relationship. The Prob* shows p-value for each independent variable. Th p- value is less than 0.05 shows that the relationship is statistically significant. R- squared shows how well the regression model fits in the data. R- squared of 1 means the model fits the data perfectly while R-squared of 0 means the model does not fit the data. The Durbin-Watson statistics shows presence of Autocorrelation in the residuals of regression model.

Table 9: Multiple Regression of Macroeconomic variable with Nifty Pharma Sector companies

Dependent variables	Independent variables	Coefficient	Prob*	R-squared	Durbin Watson stat
Aurobindo Pharma Ltd.	Export	0.020232	0.8441	0.023776	1.812412
	Foreign Exchange Reserves	-0.345897	0.5222		
	Inflation (CPI)	-0.024213	0.7551		
	Interest Rate	-0.335622	0.0628		
	M2	0.218289	0.6004		
Biocon Ltd.	Export	0.108147	0.1862	0.020560	1.813113
	Foreign Exchange Reserves	0.170126	0.6914		
	Inflation (CPI)	0.035994	0.5590		
	Interest Rate	-0.218563	0.1261		
	M2	-0.149873	0.6502		
Cipla Ltd.	Export	-0.041150	0.3988	0.006195	1.998341
	Foreign Exchange Reserves	-0.000150	0.9995		
	Inflation (CPI)	0.010791	0.7691		
	Interest Rate	-0.029996	0.7243		
	M2	0.009509	0.9616		
Divi'S Laboratories Ltd.	Export	-0.031015	0.6486	0.015385	2.0000597
	Foreign Exchange Reserves	0.456807	0.2021		
	Inflation (CPI)	-0.033357	0.5160		
	Interest Rate	-0.092031	0.4387		
	M2	0.021433	0.9380		
Dr. Reddy's Laboratories Ltd.	Export	0.014068	0.7890	0.022917	2.046337
	Foreign Exchange Reserves	0.092957	0.7364		
	Inflation (CPI)	-0.078922	0.0478		
	Interest Rate	-0.042640	0.6422		
	M2	0.072571	0.7332		
Glenmark Pharmaceuticals Ltd.	Export	-0.016665	0.8220	0.023104	1.936060
	Foreign Exchange Reserves	0.156901	0.6868		
	Inflation (CPI)	0.038346	0.4929		
	Interest Rate	-0.184262	0.1553		
	M2	-0.314154	0.2957		
Granules India Ltd.	Export	-0.086640	0.3439	0.039240	1.700191
	Foreign Exchange Reserves	-0.661516	0.1693		
	Inflation (CPI)	0.031802	0.6448		
	Interest Rate	-0.277764	0.0830		

	M2	-0.047063	0.8988		
Ipca Laboratories Ltd.	Export	-0.026877	0.7158	0.020762	1.840048
	Foreign Exchange Reserves	-0.092597	0.8112		
	Inflation (CPI)	0.023268	0.6761		
	Interest Rate	-0.207104	0.1091		
	M2	0.253401	0.3969		
J B Chemicals & Pharmaceuticals Ltd.	Export	0.059586	0.3892	0.034041	2.018704
	Foreign Exchange Reserves	-0.791282	0.0303		
	Inflation (CPI)	-0.010510	0.8403		
	Interest Rate	-0.069061	0.5672		
	M2	0.109799	0.6949		
Lupin Ltd.	Export	-0.060006	0.3731	0.011543	1.985762
	Foreign Exchange Reserves	-0.165245	0.6402		
	Inflation (CPI)	0.021665	0.6697		
	Interest Rate	0.073084	0.5340		
	M2	-0.174970	0.5211		
Natco Pharma Ltd.	Export	0.047712	0.5882	0.024711	1.878291
	Foreign Exchange Reserves	-0.214793	0.6424		
	Inflation (CPI)	-0.043377	0.5141		
	Interest Rate	-0.264012	0.0871		
	M2	-0.306316	0.3908		
Sanofi India Ltd.	Export	0.070677	0.1076	0.044368	2.390134
	Foreign Exchange Reserves	-0.389284	0.0916		
	Inflation (CPI)	-0.018370	0.5781		
	Interest Rate	-0.127747	0.0957		
	M2	-0.038434	0.8283		
Sun Pharmaceutical Inds. Ltd.	Export	-0.113451	0.0840	0.044124	2.102698
	Foreign Exchange Reserves	-0.178728	0.6028		
	Inflation (CPI)	0.056025	0.2589		
	Interest Rate	-0.120662	0.2911		
	M2	0.467437	0.0787		
Torrent Pharmaceuticals Ltd.	Export	0.022821	0.7002	0.025345	1.879322
	Foreign Exchange Reserves	-0.029875	0.9235		
	Inflation (CPI)	0.019437	0.6638		
	Interest Rate	-0.154074	0.1375		
	M2	0.328990	0.1714		
Zydus Lifesciences Ltd.	Export	-0.021012	0.7538	0.006049	1.867088

	Foreign Exchange Reserves	0.208462	0.5537		
	Inflation (CPI)	-0.012288	0.8079		
	Interest Rate	0.066951	0.5671		
	M2	0.152431	0.5743		

Source: Computed Values by Author using E-views 12

The above table 9 shows the results of Multiple regression of stock prices of Nifty Pharma company and five macroeconomic variable that are Export, foreign exchange reserves, Inflation (CPI) and Money Supply (M2). The relationship between Dr. Reddy's Laboratories Ltd. and Inflation (CPI) is negative as coefficient shows negative. The p-value between Dr. Reddy's Laboratories Ltd. and Inflation (CPI) is 0.0478 which is less than 0.05 so it is statistically significant. The J B Chemicals & Pharmaceuticals Ltd. and foreign exchange reserves shows negative relationship as coefficient is negative. The p-value of J B Chemicals & Pharmaceuticals Ltd. and foreign exchange reserves is 0.0303 which is less than 0.05 which shows it is statistically significant.

Table 10: Multiple Regression of Macroeconomic variable with Nifty Metal Sector companies

Dependent variables	Independent variables	Coefficient	Prob*	R-squared	Durbin Watson stat
Adani Enterprises Ltd.	Export	0.051340	0.6738	0.066783	1.634759
	Foreign Exchange Reserves	-1.650605	0.0106		
	Inflation (CPI)	0.137491	0.1362		
	Interest Rate	-0.380388	0.0751		
	M2	-0.335872	0.4966		
Hindalco Industries Ltd.	Export	0.031676	0.7134	0.021142	2.062247
	Foreign Exchange Reserves	-0.540855	0.2332		
	Inflation (CPI)	0.003193	0.9609		
	Interest Rate	-0.193667	0.1992		
	M2	-0.250161	0.4740		
Hindustan Zinc Ltd.	Export	-0.117035	0.1062	0.038558	1.895017

	Foreign Exchange Reserves	-0.282783	0.4580		
	Inflation (CPI)	0.012953	0.8120		
	Interest Rate	-0.143431	0.2557		
	M2	-0.209668	0.4734		
J S W Steel Ltd.	Export	0.101255	0.2903	0.045565	1.593576
	Foreign Exchange Reserves	-0.940765	0.0622		
	Inflation (CPI)	0.062672	0.3853		
	Interest Rate	-0.248857	0.1370		
	M2	-0.492375	0.2044		
Jindal Stainless Ltd.	Export	0.073928	0.5147	0.030747	1.956376
	Foreign Exchange Reserves	-0.237467	0.6901		
	Inflation (CPI)	0.034171	0.6896		
	Interest Rate	-0.432067	0.0301		
	M2	0.259673	0.5718		
Jindal Steel & Power Ltd.	Export	0.171406	0.1131	0.068724	1.717074
	Foreign Exchange Reserves	-1.021609	0.0724		
	Inflation (CPI)	0.178915	0.0289		
	Interest Rate	-0.347772	0.0658		
	M2	-0.174521	0.6894		
National Aluminum Co. Ltd.	Export	-0.103371	0.2336	0.028222	2.130990
	Foreign Exchange Reserves	0.045598	0.9202		
	Inflation (CPI)	-0.021645	0.7405		
	Interest Rate	-0.253451	0.0949		
	M2	0.119140	0.7341		
Ratnamani Metals & Tubes Ltd.	Export	0.094036	0.3082	0.012832	1.617039
	Foreign Exchange Reserves	-0.404642	0.4035		
	Inflation (CPI)	0.035712	0.6076		
	Interest Rate	0.068305	0.6711		
	M2	-0.077049	0.8364		
Steel Authority of India Ltd.	Export	-0.048048	0.6062	0.037953	2.020106
	Foreign Exchange Reserves	-1.009247	0.0403		
	Inflation (CPI)	-0.013093	0.8523		
	Interest Rate	-0.218003	0.1812		
	M2	0.017124	0.9638		
Tata Steel Ltd.	Export	0.120548	0.2137	0.030230	1.869838
	Foreign Exchange Reserves	0.264329	0.6029		
	Inflation (CPI)	0.029965	0.6814		

	Interest Rate	-0.367630	0.0305		
	M2	-0.141482	0.7176		
Vedanta Ltd.	Export	0.117047	0.2491	0.029106	1.897220
	Foreign Exchange Reserves	-0.264565	0.6193		
	Inflation (CPI)	0.032243	0.6734		
	Interest Rate	-0.362791	0.0415		
	M2	-0.192087	0.6399		
Welspun Corp Ltd.	Export	0.062337	0.5834	0.023084	1.934710
	Foreign Exchange Reserves	-0.982966	0.1007		
	Inflation (CPI)	0.002576	0.9760		
	Interest Rate	-0.160678	0.4182		
	M2	-0.341178	0.4585		

Source: Computed Values by Author using E-views 12

The above table 10 shows the results of multiple regression analysis of stock prices of company in Metal sector and macroeconomic variables. The relationship between Adani Enterprises Ltd. and Foreign exchange reserves is negative as coefficient shows negative. The p- value between Adani Enterprises Ltd. and Foreign exchange reserves is 0.0106 which is less than 0.05 which means it is statistically significant. M2 also has negative relationship between Adani Enterprises Ltd. and Foreign exchange reserves but it is not statistically significant as p- value is not less than 0.05. Jindal Stainless Ltd. and Interest rate have negative relationship as coefficient is negative. The p-value between Jindal Stainless Ltd. and Interest rate is 0.0301 which is less than 0.05 which means it is statistically significant. Jindal Steel & Power Ltd. And Inflation (CPI) have positive relationship as coefficient is positive. The p-value between Jindal Steel & Power Ltd. And Inflation (CPI) is 0.0289 which is less than 0.05 that shows it is statistically significant.

Steel Authority of India ltd. And Foreign exchange reserves have negative relationship as coefficient is negative. The p-value shows relationship between Steel Authority of India ltd. And Foreign exchange reserves is statistically significant as p-value is 0.0403 which is less than 0.05. The relationship between Tata Steel Ltd. and Interest rates shows negative relationship as

coefficient is negative. The p-value between Tata Steel Ltd. and Interest rates is 0.0305 which is less than 0.05 which shows it is statistically significant. Vedanta Ltd. and Interest rates have negative coefficient which shows there is negative relation between them. And the p-value for Vedanta Ltd. and interest rates is 0.0415 which is less than 0.05 that means it is statistically significant. Based on values of Durbin-Watson statistics of Nifty Metal sector the values are lies between 1 and 2 so there is no autocorrelation.

4.2 Analysis on Objective 2

4.2.1. Unit Root Test

Table 11: unit root test of returns of Nifty Pharma Index and Nifty Metal Index

Null Hypothesis: Returns of Nifty Pharma Index and Nifty Metal Index series have Unit Root test						
		Test Critical values				
Returns of Nifty Metal Index and Nifty Metal Index	t-statistics	1% level	5% level	10% levels	Prob.*	Decision
Nifty Pharma Index	-14.29695	-3.465014	-2.876677	-2.574917	0.0000	Reject
Nifty Metal Index	-12.23627	-3.465014	-2.876677	-2.574917	0.0000	Reject

Source: Computed Values by Author using E-views 12

Note: refer p-value

The unit root is tested for Nifty Pharma Index and Nifty Metal Index. All the above series has unit root test. The results of this study indicate that, at the 1%, 5%, and 10% significance levels, the T statistics values for every variable are greater than the critical values. The unit root hypothesis in the data is rejected and the alternative hypothesis is accepted since the P-values are 0.000 in every case, indicating that the series is stationary at level.

4.2.2. Johansen Cointegration Test

Table 12: Johansen Cointegration of Nifty Pharma Index

Null Hypothesis	Eigen Values	Trace Statistics	Critical value 5% (p- value)	Max-Eigen Statistics	Critical value 5% (p-value)
None*	0.326063	272.1833	95.75366 (0.0000)	73.00444	40.07757 (0.0000)
Atmost 1*	0.305825	199.1788	69.81889 (0.0000)	67.53067	33.87687 (0.0000)
Atmost 2*	0.221844	131.6482	47.85613 (0.0000)	46.40317	27.58434 (0.0001)
Atmost 3*	0.196305	85.24499	29.79707 (0.0000)	40.42913	21.13162 (0.0000)
Atmost 4*	0.121109	44.81587	15.49471 (0.0000)	23.88246	14.26460 (0.0011)
Atmost 5*	0.106986	20.93340	3.841465 (0.0000)	20.93340	3.841465 (0.0000)

Source: Computed Values by Author using E-views 12

Note: refer p-value in ()

H0: There is no long-term relationship between Nifty Pharma index and the macroeconomic variables.

The results of Johansen's Cointegration test shows in above table 12, trace value as well as Max-eigen statistics were used for analysis. In this case no cointegration are rejected as value of trace statistics is greater than critical value in all cases of cointegrating equations. Max Eigen statistics value is greater than critical values in all cases of cointegrating equation so the no cointegration are rejected. In the all-cases p value is less than 0.05 which shows there exists a long-term relationship between Macroeconomic variable and Nifty Pharma Index.

Table 13: Johansen Cointegration of Nifty Metal Index

Null Hypothesis	Eigen Values	Trace Statistics	Critical value 5% (p- value)	Max-Eigen Statistics	Critical value 5% (p-value)
None*	0.340711	274.9539	95.75366 (0.0000)	77.06987	40.07757 (0.0000)
Atmost 1*	0.302438	197.8841	69.81889 (0.0000)	66.63026	33.87687 (0.0000)
Atmost 2*	0.239024	131.2538	47.85613 (0.0000)	50.53338	27.58434 (0.0000)
Atmost 3*	0.170396	80.72042	29.79707 (0.0000)	34.55923	21.13162 (0.0004)
Atmost 4*	0.125689	46.16119	15.49471 (0.0000)	24.84903	14.26460 (0.0008)
Atmost 5*	0.108813	21.31216	3.841465 (0.0000)	21.31216	3.841465 (0.0000)

Source: Computed Values by Author using E-views 12

Note: refer p-value in ()

H0: There is no long-term relationship between Nifty Metal index and the macroeconomic variables.

The results of Johansen's Cointegration test shows in above table 13, trace value as well as Max-eigen statistics were used for analysis. In this case no cointegration are rejected as value of trace statistics is greater than critical value in all cases of cointegrating equations. Max Eigen statistics value is greater than critical values in all cases of cointegrating equation so the no cointegration are rejected. In the all-cases p value is less than 0.05 which shows there exists a long-term relationship between Macroeconomic variable and Nifty Metal Index.

4.3. FINDINGS

Through this study it is found that for Nifty Pharma sector Sanofi India Ltd. has the least amount of closing volatility compared to Aurobindo Pharma Ltd., Granules India Ltd., Natco Pharma Ltd. whereas, for Nifty Metal sector Hindustan Zinc Ltd. has the least amount of closing volatility

compared Adani Enterprises Ltd., Jindal Stainless Ltd. and Welspun Corp Ltd. and for Macroeconomic variables Export shares highest standard deviation. In unit root test ADF test has been used and results found for Nifty Pharma and Nifty Metal sector that all the series has unit root test and therefore unit root Null hypothesis are rejected and alternative hypothesis are accepted as p-value is less than 0.05 that indicates series are stationary at level. Through Correlation analysis it is observed that most of the companies of Nifty Pharma and Nifty Metal sector have negative and weak positive relation between stock prices and macroeconomic variables. Multiple Regression results has concluded that only two macroeconomic variables have impact on Nifty Pharma sector company that is Inflation has significant impact on Dr. Reddy's Laboratories Ltd. and Foreign exchange reserves have impact on J B Chemicals & Pharmaceuticals Ltd. but in case of Nifty Metal sector a greater number of companies got impacted by macroeconomic variables.

The study also examined long- term cointegration between macroeconomic variable and stock returns of Nifty Pharma Index and Nifty Metal Index, for this purpose firstly unit root has been tested, data found stationary at level and null hypothesis are rejected as p-value found less than0.05. Johansens cointegration results revealed that in the all-cases p value is less than 0.05 which shows there exists a long-term relationship between Macroeconomic variable and Nifty Pharma Index and Nifty Metal Index.

4.4. CONCLUSIONS

This study examined impact of five macroeconomic variable namely Export, Interest rates. Inflation (CPI), Foreign Exchange Reserves and Money Supply (M2) on stock prices of each company in Nifty Pharma and Nifty Metal Sector of National Stock Exchange (NSE). For the purpose of study 15 years monthly data ranging from 1 January 2008 to 31 October 2023 has been taken from Centre for Monitoring Indian Economy (CMIE PROWESS IQ) database. For this analysis Descriptive Statistics, Unit root test, Correlation Analysis and Multiple Regression.

Finally, the analysis concluded using Multiple regression that there is an impact of macroeconomic variable on stock prices of some companies of Nifty Pharma and Nifty Metal sector. By using Johansen Cointegration test it has been seen that there is a long-term relationship between Macroeconomic variable and stock returns of Nifty Pharma Index and Nifty Metal Index. Through present study it has been seen that macroeconomic variable will continue to impact on stock prices.

4.5. LIMITATIONS

This study is limited to only two sectors of National Stock Exchange (NSE) that is Nifty Pharma and Nifty Metal, under Nifty Pharma there are 20 companies out of which only 15 companies are taken and 5 companies such as Abbott India Ltd., Alkem Laboratories Ltd., Gland Pharma Ltd., Laurus Labs Ltd., Mankind Pharma Ltd. are not included, where as in Nifty Metal only 12 companies are included and 3 companies are excluded they are A P L Apollo Tubes Ltd., Hindustan Copper Ltd., N M D C Ltd., companies are excluded from both the sector due to unavailability of data during the period of 1 January 2008 to 31 October 2023, only five macroeconomic variables has been taken for the study that are Export, Inflation (CPI), Foreign Exchange Reserves, Interest rates, Money Supply (M2), period of the study is also limited to 15 years ranging from 1 January 2008 to 31 October 2023 based on availability of data.

4.6. FURTHER RESEARCH SCOPE AND SUGGESTIONS

The suggestion for further studies is to extend the study over longer time period to capture diverse economic conditions and sectoral responses, focus on a greater number of sectors, and more numbers or different variables. Compare the impact of macroeconomic variables across different companies within each sector to identify variations in responsiveness.

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