IMPACT OF MACROECONOMIC VARIABLES ON NSE AUTO INDEX AND NSE IT INDEX: AN EMPIRICAL STUDY

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i

DECLARATION BY STUDENT

I hereby declare that the data presented in this Dissertation report entitled, **"Impact of Macroeconomic Variables on NSE Auto Index and NSE IT Index: 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 be not be responsible for the correctness of observations / experimental or other findings given the dissertation.

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ii

COMPLETION CERTIFICATE

This is to certify that the dissertation report **"Impact of Macroeconomic Variables on NSE Auto Index and NSE IT Index: An Empirical Study"**, is a bonafide work carried out by Ms. Priti Laxman Velip Talpikar 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

Goa Business School ★ Goa University ★

Signature of Dean of the school

Stamp

Date: 30/04/2024

Place: Goa University

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CONTENTS

TABLES

FIGURES

ABBREVIATIONS

ADF	Augmented Dickey-Fuller
FER	Foreign Exchange Reserves
EX	Exports
IR	Interest Rate

ABSTRACT

The study analyses the impact of Macroeconomic Variables on the stock prices of companies of Nifty Auto and Nifty IT Index Sector and also examines the long-term relationship between the Macroeconomic Variables and stock return of Nifty Auto and Nifty IT Index in NSE. Using monthly data ranging from January 2008 to 31st October 2023, Descriptive Statistics, Unit Root Test, Correlation, Multiple Regression Model has been used to analyse the impact of macroeconomic variables on the stock prices of the companies of the Nifty Auto sector and Nifty IT Sector and for the second objective Johansen Cointegration test has been used to examine the long-term relationship between the macroeconomic variables and the stock returns of Nifty Auto index and Nifty IT index. Macroeconomic Variables include Exports (EX), Foreign Exchange Reserves (FER), Inflation (CPI), Interest Rate (IR) and Money Supply (M2). The result indicates that foreign exchange Reserves, Exports, M2 and interest rate have a significant impact on Nifty Auto companies and Nifty It companies. Finally, results from Johansen Cointegration test found that there exists long-term relationship between the Nifty Auto index and Nifty IT index with macroeconomic variables

Keywords: Macroeconomic variables, Stock returns, Multiple Regression, Johansen Cointegration test

CHAPTER 1: INTRODUCTION

1.1 Introduction to Impact of macroeconomic variables on Nifty Auto and Nifty IT sector

The Stock market serves as a crucial marketplace for the trade of securities issued by the governments and publicly traded corporations. Its stands as one of the most important institutions in an economy, exerting a significant impact on determining and indicating economy's performance. Consequently, the government, investors, and stakeholders in general are highly concerned about the nature and condition of the stock market. The financial system and economic fundamental's play an important role in the growth and development of nation's stock market in the global economy. The well-established financial system offers the capital inputs required for services and production while, robust economic policies and economic indicators have a positive impact on the growth of an economy and uphold individual's living standards.

Our economy was regarded as closed before to liberalization, privatization and globalization (LPG). Following the establishment of globalisation, privatization and liberalization in 1991, most nations developed open economies and strong connection to the world's trade. (Singh Sidhu,2020) The behaviour of stock markets in industrialized and emerging nations was thus predicted by the macroeconomic variables and changes in these variables had a significant impact on stock prices. Researchers and academics have long been interested in studying the connection between the macroeconomic factors and the stock market. Stock market returns are influenced by number of macroeconomic factors such as GDP, money supply, inflation, exchange rate and interest rate. (Ibrahim & Musah, 2014), (Habib & Islam, 2017), (Pervaiz et al., 2018), (Haque & Sarwar, 2012)

1.2 Macroeconomic variables

Important indicators that contribute to the expansion of an economy's overall health and performance are macroeconomic variables. Macroeconomic variables include wide range aspects of an economy output, unemployment, inflation and economic growth. To maintain economic stability, policymakers try to control important macroeconomic factors as the balance of payments, inflation, economic growth and unemployment.

Macroeconomic factors have an impact on stock prices either directly or indirectly because they have a significant impact on stock returns which demonstrates the existence of a long-term relationship between the macroeconomic variables and stock prices.

1.Exports (EX)

Exports is a process by which one nation ships produced commodities or raw materials to another for eventual sale or exchange. The gross output of the producing country increases with this kind of sale. A significant amount of the yearly income of many big businesses in developed economies comes from exports to other nations. By selling more goods and services, the strength of exporting goods promotes economic growth. According to economists, a persistent trade imbalance has a detrimental impact on a nation's economy because it encourages domestic manufacturing to relocate overseas, devalues the home currency and lowers interest rates.

2.Foreign Exchange Reserves (FER)

Maintaining reserves in multiple currencies, including the US Dollar, Euro, Pound Sterling, and Japanese Yen, permits central banks and other monetary authorities to satisfy their obligations and provide as a safety net against unforeseen economic disasters. These reserves

are essential for maintaining the value of a nation's currency and for influencing monetary policy. They act as a buffer against unanticipated crises and shocks to the economy. Additionally, they play a major role in drawing both domestic and foreign investors to the stock market and help to preserve exchange rate stability. Higher reserves are a sign of greater economic confidence, which encourages more domestic and international investors to participate in the stock market.

3.Money Supply (M2)

Compared to M1, M2 is a more comprehensive measure of the money supply since it includes "near money" in addition to all of M1's constituent parts. M1 consists of currency and bank deposits, whereas close money includes money market securities, mutual funds, savings accounts, and other time deposits. These assets are not as easily used as mediums of exchange and are seen as less liquid than those in M1. When necessary, they can be swiftly converted into cash or checking deposits.

4.Inflation (CPI)

A common tool for measuring inflation is the consumer price index. The cost-of-living increases with inflation, which forces people to transfer their resources from investments to consumption. As a result, there is less of a demand for market instruments, which lowers the number of stocks exchanged. Furthermore, economic tightening measures are implemented by monetary policy in response to inflationary pressures, raising the nominal risk-free rate. As a result, this raises the discount rate and reduces the cash flows' present value. Thus, it is widely accepted that there is an inverse relationship between inflation and stock prices.

5.Interest Rate (IR)

The cash rate is frequently used as an objective for policy development and is frequently considered to be a crucial element in the daily implementation of monetary policies. An increase in the cash rate raises the opportunity cost of holding money, which in turn causes investors to switch from stocks to assets that provide interest, which in turn causes stock values to fall. Furthermore, a number of other factors are impacted by the cash rate, including corporate profitability, the demand for products and services, the allure of financial instruments like bonds and shares, the financing strategies used by businesses, and the cost of borrowing money to purchase shares.

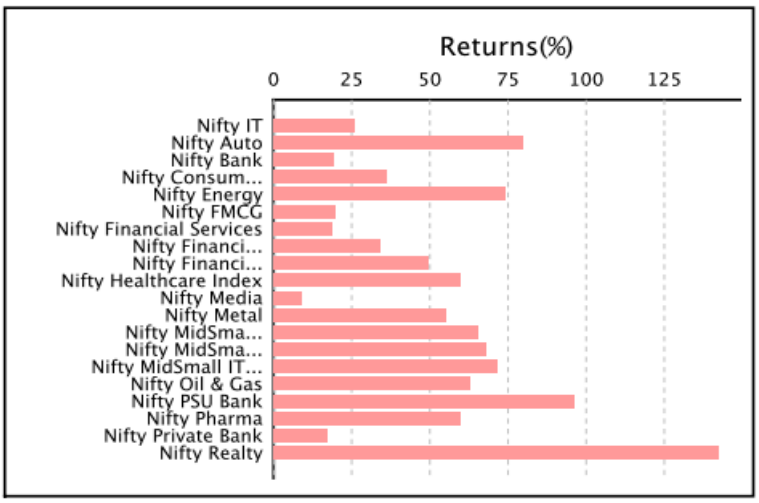
Table 1.1 Description of variables

Sr.no	Macroeconomic variables	Operational definitions	source	symbol	Literature support
1.	inflation	CPI	OECD	INF	Nasrin Afzal, Syed Shahadat Hoss (2011)
2.	Interest rate	Weighted average call money rates	RBI	IR	(Mohsina Habib, Khalid Ul Islam,2017)
3.	Foreign exchange reserves	Total Foreign exchange reserves	EPWRF India time series	FER	Kawerinder Singh Sidhu, Pradeep Sur (2020)
4.	Exports	India's Foreign trade	EPWRF India time series	EX	Jawad Khan, Imran Khan (2018)
6.	Money supply	Narrow money	EPWRF India Time series	M2	(Jung Wan LEE, Tantatape BRAHMASRENE,2020)

1.3 National Stock Exchange (NSE)

National stock exchange of India limited is one of the country's top stock exchanges in India, based in Mumbai. The NSE is the largest private wide area network and also the largest financial market in India. It was India's the first exchange to offer completely modern, fully automated electronic trading. NSE is owned by a number of financial organizations such as banks and insurance companies. It is the world's largest derivatives exchange in terms of contracts traded and the third largest in cash equities in terms of trades for the year 2022. As of January 2024, it is the 7th largest stock exchange in the world by the total market capitalisation.

FIGURE 1.1: 1 Year Performance Comparison of Sectoral Indices



Source: NSE website

As we can see from the above figure 1.1 shows the 1 Year performance comparison of sectoral indices. Nifty Realty has the highest return has compared to others followed by Nifty PSU Bank, Nifty Auto whereas Nifty Media has the lowest return.

1.4 Sectors

1.4.1 Nifty Auto sector

The nifty auto index is intended to represent the performance and behaviour of Indian auto industry which includes manufacturers of cars & motorcycles, heavy vehicles, auto ancillaries, tyres, etc. Using the free float market capitalization approach, the Nifty auto index is calculated using a base date January 1, 2024 indexed to based value of 1000. The index comprises of 15 stocks namely Apollo Tyres Ltd, Ashok Leyland Ltd, Bajaj Auto Ltd, Balkrishna Industries Ltd, Bharat Forge Ltd, Bosch Ltd, Eicher Motors Ltd, Exide Industries Ltd, Hero Moto Corp Ltd, MRF Ltd, Mahindra and Mahindra Ltd, Maruti Suzuki India Ltd, Samvardhana Motherson Intl. Ltd, TVS Motor Co. Ltd, and Tata Motors Ltd. India has appeared as one of the largest and most dynamic in the world, with particular strength in subsectors such as light passengers and commercial vehicles, two-wheelers and spare components. The nifty auto index has multiple uses including index fund launches, exchange traded funds and structured product benchmarking. In its initial years, the Nifty Auto index experienced a steady growth trajectory, reflecting the overall expansion of the Automobile industry in India. Additionally, the sector saw a gradual shift towards electric and hybrid vehicles as environmental concerns gained prominence. The emergence of new technologies, including electric and autonomous vehicles has been a focal point for the industry. It currently holds the fifth position in the Nifty 50, representing 6.63% of the index.

Table 1.2: Top Nifty Auto Companies by Weightage

Company's Name	Weight(%)
Mahindra & Mahindra Ltd.	18.26
Tata Motors Ltd.	17.35
Maruti Suzuki India Ltd.	16.51
Bajaj Auto Ltd.	10.28
Hero MotoCorp Ltd.	6.09
Eicher Motors Ltd.	5.46
TVS Motor Company Ltd.	4.97
Tata Motors Ltd DVR	3.05
Bharat Forge Ltd.	2.87
Samvardhana Motherson International Ltd.	2.76

Source: NSE website

Figure 1.2 shows the top Nifty Auto companies by weightage. Mahindra and Mahindra Ltd. has the highest weight i.e. 18.26% and Samvardhana Motherson International Ltd. has the lowest weight i.e. 2.76%**.**

1.4.2. Nifty IT Sector

Nifty IT index is a Sectoral index that shows us the performance of the top IT companies in India. The Indian economy has benefited greatly from the IT sector to establish a reliable standard for the Indian IT industry. The nifty IT index is represented by the performance of Indian IT companies. Ten companies that are listed on the NSE make up the nifty IT index namely Coforge Ltd, HCL Technologies Ltd, Infosys Ltd, L & T Technology Ltd, Ltimindtree Ltd, Mphasis Ltd, Persistent Systems Ltd, Tata Consultancy Services Ltd, Tech Mahindra Ltd, and Wipro Ltd. With a base date of January 1, 1996 and an index value of 1000, the nifty IT index is calculated using the free float market capitalization method. The index level represents the entire free float market value of all companies in the index in relation to a specific base market capitalization value. With the effect from May 28, 2004, the index's base value was

changed from 1000 to 100. The nifty IT index has multiple uses including index fund launches, exchange traded funds and structured products benchmarking fund portfolios. In the initial years of the Nifty IT sector were marked by robust growth, reflecting rise in India as a global IT hub. Indian IT companies gained prominence on the international stage, providing services to clients around the world. Additionally, technological disruptions like cloud computing and automation prompted IT companies to adapt their business models and offerings. The Nifty IT sector saw a surge in innovation which focuses on emerging technologies such as artificial intelligence, blockchain, and cybersecurity. It currently holds second position in the Nifty 50, representing 11.33% of the index.

Table 1.3: Top Nifty IT Companies by Weightage

Company's Name	Weight(%)
Infosys Ltd.	26.80
Tata Consultancy Services Ltd.	24.86
HCL Technologies Ltd.	10.34
Tech Mahindra Ltd.	9.97
Wipro Ltd.	8.52
LTIMindtree Ltd.	5.70
Persistent Systems Ltd.	5.17
Coforge Ltd.	4.24
MphasiS Ltd.	2.50
L&T Technology Services Ltd.	1.90

Source: NSE website

Figure 1.3 shows the top Nifty IT companies by weightage. Infosys ltd. has the highest weight i.e. 18.26% and L & T Technology Services Ltd. has the lowest weight i.e. 1.90%**.**

Since the macroeconomic factors have already been addressed as having an impact on a nation's whole economy, they must undoubtedly have an impact on every sector as well. However, the

question is that do they have an equivalent impact on Nifty Auto companies and Nifty IT Index companies? Of course not, as shifts in macroeconomic factors could present both opportunities and threats to different companies of the sectors. It therefore becomes interesting to learn how these factors impact the Nifty Auto companies and Nifty IT Index companies. Which sectors are most likely to be impacted by these factors changing? Besides its impact the study also aims to examine the long-term relationship between macroeconomic variables and Nifty Auto and Nifty IT sector. Because of this purpose the study selected five macroeconomic variables namely, Foreign Exchange Reserves (FER), Interest Rate (IR), Inflation (CPI), Exports (EX), Money supply (M2).

1.5 Importance of the study

Investors often seek data driven insights to make informed decisions. This study can provide them with a more nuanced understanding of how macroeconomic variables impact specific sectors, allowing them to adjust their investment strategies accordingly. Understanding the sensitivity of the Nifty Auto and Nifty IT sectors to macroeconomic shifts can be crucial for risk assessment. This knowledge can help investors and fund managers mitigate potential losses and optimise their portfolio. This research can help the policymaker has it serves as valuable resource for crafting policies that aim to stabilise these sectors in response to prevailing economic conditions. These can help companies to adapt their strategies, enhance competitiveness, and navigate market challenges more effectively. It could also serve as a research point for future researchers interested in similar topics. It will enable market participants to anticipate and respond to economic fluctuations more adaptively, potentially reducing market volatility.

1.6 Scope of the study

The scope of the study is limited to 14 companies of Nifty Auto sector and 7 companies of Nifty IT sector in NSE. The study focuses on macroeconomic variables such as Foreign Exchange Reserves (FER), Exports (EX), Interest Rate (IR), Inflation (CPI), and Money Supply (M2) and on the two specific sectors- Nifty Auto and Nifty IT. This analysis allows for a more targeted understanding of how macroeconomic variables impact stock prices of the companies of these sectors. Additionally, the research will also examine the long-term relationship between the stock returns of the Nifty Auto and Nifty IT sector with the macroeconomic variables Through the econometric techniques such as descriptive statistics, unit root test, correlation, multiple regression analysis will explore the relationship between the variables and these sectors. The period of the study is from 1st January 2008 to 31st October 2023. The findings of this study will not only offer valuable insights for investors and policymakers but also have potential implications for risk assessment and informed decision making within these sectors.

1.7 Objectives of the study

RO1. To analyse the impact of macroeconomic variables on stock prices of companies in Nifty Auto and Nifty IT sector Index of NSE.

RO2. To examine the long-term relationship between the Macroeconomic Variables and Stock Returns of the Nifty Auto and Nifty IT sector Index in NSE.

1.8 Research Questions

RQ1. To what extent do Macroeconomic Variables impact the stock prices of companies in the Nifty Auto and Nifty IT sector in NSE?

RQ2. Do macroeconomic variables have long-term relationship with Stock Returns of Nifty Auto and Nifty IT sector in NSE?

1.9 Research Hypothesis

1.9.1 H_0: There is no statistically significant impact of macroeconomic variables on stock prices of companies in Nifty Auto and Nifty IT sector in NSE.

1.9.2 H_0: There is no long-term relationship between the macroeconomic variables and stock returns of Nifty Auto and Nifty IT sector in NSE.

1.10 Chapterization Scheme

Chapter 1: Introduction to impact of macroeconomic variables on the Nifty Auto and Nifty IT sector.

This chapter includes macroeconomic used for the study, importance of the study, scope of the study, research objectives, research questions research hypothesis, in detail.

Chapter 2: Review of Literature Review

This chapter includes the detail literature review on objective 1 and on objective 2.

Chapter 3: Research methodology

This chapter includes problem of the study and methods used for the study, period of the data, data sources, sample size, etc.

Chapter 4: Analysis, conclusion, and findings

This chapter includes analysis, interpretation, conclusion, findings. It also briefs up the limitations, suggestions and highlighted the scope for future research.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

A literature review is a crucial component of every research project. It gives researchers an understanding of what has already been done in their topic, which is an essential first step in making relevant conclusions. A comprehensive understanding of the topic matter is made possible by researchers gathering up-to-date knowledge on the specific area they plan to explore through the examination of previous research.

2.2 Reviews relating to the impact of macroeconomic variables on the stock market

Many studies have analysed the impact of macroeconomic variables on the domestic as well as international stock markets. The following conclusions are typically indicated by the findings of these investigations.

T Sampath (2011), analysed the impact of macroeconomic factors on stock prices during India's post-liberalization era, including the real effective exchange rate, wholesale price index and index of industrial production. The most recent Autoregressive Distributed Lag (ARDL) approach to cointegration was used in the study. The result showed that the wholesale price index, the index of industrial production and real effective exchange rate have statistically significant long-term effects on stock prices. Mohammad Bayezid Ali (2011), investigated the impact of changes in selected microeconomic and macroeconomic variables on stock returns of Dhaka Stock Exchange. A Multivariate Regression Model computed on Standard OLS Formula has been used to investigate the impact of changes in selected microeconomic and macroeconomic variables on stock returns of Dhaka Stock Exchange. Based on regression analysis, it was found that inflation and foreign remittance have negative influence whereas

industrial production index; market P/Es and monthly percent average growth in market capitalization have positive influence on stock returns. No unidirectional causa; relation is found between stock prices and macroeconomic variables under study except one unidirectional causal relation from stock price and market P/Es.

Additionally, Joseph Tagne Talla (2013), investigated the impact of macroeconomic variables on the Stockholm stock exchange using monthly data from 1993 to 2012. Further using ordinary least square method, granger causality test and ADF unit root test and found that interest rate negatively influence the stock prices. Chetna Parmar (2013) investigated the various macroeconomic variables on Indian stock market. Macroeconomic variables liked reverse repo rate, CRR, SLR, Repo rate, inflation rate, CPI, Index of industrial production, gold rate, oil rate, exchange rate was used to find out the inter relationship between macroeconomic variables and its impact. Empirical study period was selected from January 2004 to December 2012. Moreover, Muhammad Arif Javed, Nimra Shahzad, Qandeel Sheikh, Samina Saddique, Mariam Riaz and Sania Batool (2014), examined the impact of macroeconomic variable on stock market performance in Pakistan. For the study purpose monthly data have been used. By using Pearson correlation and regression analysis technique, it was found that the Pakistan stock market index is significantly affected by the fiscal policy, monetary policy and inflation. The results revealed that the interest rate and government revenue have a significant negative relationship with the stock market index in Pakistan, whereas the inflation rate and the government expenditures have a significant positive relationship with the stock market Index in Pakistan. Muazu Ibrahim & Alhassan Musah (2014), investigates the effects of macroeconomic variables on stock market returns using recent data spanning September, 2000 to September, 2010. The study used the Johansen multivariate cointegration approach and vector error correction model (VECM). Results from both the impulse response functions and variance decomposition found that among the macroeconomic variables, shocks to inflation,

money supply and exchange rate do not only explain a significant proportion of the variance error of stock returns but their effects persist over a long period. Vanita Tripathi Ritika Seth (2014) tried to analyse the stock market performance and macroeconomic factors in India using monthly data from July 1997 to June 2011. Statistical Techniques used for study were ADF and PP unit root tests, ARCH model, Factor Analysis, Regression Model, Granger Causality and Johansen co-integration test. Impulse Response analysis was used to check the response of stock market to shocks created in the real economy. Isma Zaighum (2014), studied the impact of pre-specified set of macroeconomic factors on firm's stock returns for nine nonfinancial sectors listed in Karachi Stock Exchange. The macroeconomic factors such as consumer price index, industrial production index, market returns, risk free return and money supply were taken. The period of the study was taken from 2001 to 2011. By applying regression analysis, IPI and KSE 100 index both are positively related to stock returns whereas CPI, M2 and risk-free rate negatively related to the stock returns for almost all sectors. In explaining the stock returns most of the macroeconomic factors used in the study, are found to be statistically significant.

Likewise, Gurloveleen K and Bhatia BS (2015) examined how macroeconomic variables impact Indian stock market using monthly data from May 2000 to August 2016. Ten macroeconomic variables were used namely money supply, exchange rate, broad money, call money rate, crude oil prices, foreign exchange reserves, foreign institutional investors, gross fiscal deficit, trade balance and inflation. Econometric techniques such as augmented dickey fuller (ADF), multiple regression and granger causality were used to analyse the data. The result reveals that in the long run foreign institutional investors and exchange rate were significantly affect the stock prices. Finally, it was found that these variables had no relationship with the average closing prices of manufacturing firms in the BSE 500 index. Ahmed & Sinha (2016) using quarterly data from Jan 2012 to December 2014 in SPSS analysed

the impact of GDP on BSE Sensex. The study used descriptive statistics, Karl Pearson correlation and regression analysis to test the hypothesis, showing strong positive correlation between GDP and stock market indices. Further it was observed that there was a long-term relationship between GDP and Sensex with a negative relationship noted between exchange rate and Sensex.

Similarly, Amado Peiró (2016) analyses the impact of macroeconomic variables on the stock prices in the three largest European economies namely France, Germany and the United Kingdom. Industrial production and interest rates play an important role in influencing stock prices in these countries. Mohsina Habib, Khalid Ul Islam (2017), tries to analyse the impact of various macroeconomic variables on the performance of the Islamic stock market in India. Used Ordinary Least Square (OLS) Regression to study the impact of macroeconomic variables including inflation, industrial production, exchange rate, interest rates and money supply on the Islamic stock returns. To check whether the residuals of OLS are pure white noise Breusch-Godfray Serial Correlation Lagrange Multiplier (LM) test, the Breusch-Pagan-Godfray test and the Jarque-Berra test were used. The study found that exchange rate and interest rates have a significant impact on the Islamic stock market. Javed Pervaiz, Junaid Masih & Teng Jian-Zhou (2018), examines the impact of selected macroeconomic variables on Karachi stock market returns. The study consists of data for the period of 10 years and 5 months ranging from January 2007 till May 2017. Macroeconomic variables such as inflation, interest rate, and exchange rate has been taken as independent variables. by using regression analysis, hypotheses have been tested to find out whether there exists a significant relationship between the Stock market return and macroeconomic variables or not.

To conclude there exists positive and negative impact of macroeconomic variables on stock market returns which had been indicated in the above-mentioned studies

2.3 Reviews relating to relationship between the macroeconomic variables and stock returns

Numerous studies have examined the relationship between the stock indexes and macroeconomic variables such interest rates, money supply, exchange rates, and inflation and so. The following conclusions are typically indicated by the findings of these investigations.

Shahid Ahmed (2008) investigated the causal relationships between stock prices and the macroeconomic variables which representing real and financial sector of the Indian economy using quarterly data from March, 1995 to March, 2007. The variables such as the index of industrial production, exports, foreign direct investment, money supply, exchange rate, interest rate, NSE Nifty and BSE Sensex in India. Johansen`s approach of cointegration and Toda and Yamamoto Granger causality test were applied to examine the long-run relationships while BVAR modelling for variance decomposition and impulse response functions was applied to examine short run relationships. The study revealed the differential causal links between macroeconomic variables and stock indices in the long run. However, the revealed causal pattern was similar in both markets in the short run. Imran Ali, Kashif Ur Rehman, Ayse Kucuk Yilmaz, Muhammad Aslam Khan and Hasan Afzal (2010) examined the causal relationship between macro-economic indicators and stock market prices in Pakistan. To analyze the causal relationship between various macro-economic variables and stock exchange prices the data from June 1990 to December 2008 were used. The macro-economic indicators such as inflation, exchange rate, balances of trade and index of industrial production were used. The statistical techniques used include unit root Augmented Dickey Fuller test, Johansen's co-integration and Granger's causality test. The study found co-integration between industrial production index and stock exchange prices. However, no causal relationship was found

between macro-economic indicators and stock exchange prices in Pakistan. Gagan deep Sharma, Mandeep Mahendru (2010) analyses long term relationship between BSE and macroeconomic variables. In order to investigate the relationship among these factors multiple regression equation model was used, the period of the study from January 2008 to January 2009. The results reveal that exchange rate and gold prices highly effect the stock prices.

Similarly, Dharmendra Singh (2010) tries to explore the relation especially the causal relation between stock market index and macroeconomic variables of Indian economy. The statistical techniques like correlation, unit root stationarity tests and Granger causality test were used. Monthly data has been taken from April,1995 to March, 2009 for all the variables, like, BSE Sensex, wholesale price index, index of industrial production and exchange rate. By applying the Granger causality test the result indicated that IIP is the only variable having bilateral causal relationship with BSE Sensex whereas WPI is having unilateral causality with BSE Sensex. Nasrin Afzal and Syed Shahadat Hossain (2011) investigated the causal relationship between macroeconomic variables and Dhaka Stock Exchange (DSE) stock prices by using cointegration and Granger causality test. Found that in the short- run, unidirectional causality exists from stock market to exchange rate and Ml. By using bivariate Error-Correction models, it was found that long run causality exists from Ml, M2 to stock market and from stock market to inflation rate. Haneen Abu-Libdeh and Murad Harasheh (2011) tries to investigate the correlation and causality relationships between macroeconomic variable and stock prices in Palestine. Two methodologies were used. first, a regression analysis for ten years on quarterly data for five macroeconomic variables namely GDP, inflation, exchange rate, Libor rate and balance of trade, as the independent variables and the quarterly stock market index returns as the dependant variable. Second a Granger causality test to assess the causality relationship. The results of the regression analysis indicate a significant relationship between the macroeconomic

variables and stock prices. Moreover, the causality analysis found no causal relationships between macroeconomic variable and stock prices.

Moreover, J. K. M. Kuwornu (2012) explained the effect of macroeconomic variables on the Ghanaian stock market returns using the monthly data from Jan 1992 to Dec 2008. For analysis of data Johansen Multivariate cointegration, unit root test, VECM, were used. Finally, the study concluded that the interest rate is positively related to stock returns. Abdul Haque and Suleman Sarwar (2012), explored the relationship between macro- determinants and stock returns by examining the impact of macroeconomic variables on the returns on individual stocks. The study was conducted using a panel data set of 394 listed companies from Krachi stock exchange between 1998 and 2009. The findings showed that while inflation, interest rate, money supply and budget deficit indicate a substantial negative correlation, volatility and GDP have a large positive impact on individual stock return. The result also showed that the exchange rate had a considerable favourable impact on the equity return of the textile industry. Javed Mahmood Jasra, Rauf Azam, Muhammad Asif Khan (2012), tries to examine the relationship between stock prices and interest rate, exchange rate and consumer price index (CPI). On the basis of data availability, 4 different industries were selected for the study such as oil and gas, chemical, cement and insurance industry. The data for the selected industries and economic variables were obtained for the period of 6 years on quarterly basis. To analyse the impact of exchange rate, interest rate and consumer price index on stock returns regression analysis was used. Stock index was used as a dependent variable and the macroeconomic variables were used as independent variables. Results of the study found that the impact of interest rate on oil and gas, chemical and cement industry was insignificant, while it has significant effect on insurance industry. The exchange rate found significant negative effect on all 4 industries. Yu Hsing, Wen-Jen Hsieh (2012), by using the GARCH or ARCH models, it was discovered that the M2/GDO ratio showed a quadratic relationship with the Poland stock index, which is positively

correlated with real GDP or industrial production and the German stock market index. The index is negatively correlated with the government borrowing/GDP ratio, real interest rate, nominal effective exchange rate, expected inflation rate and government bond yield in the euro area.

Additionally, Mahfoudh Hussein, Hussein Mgammal (2012), looked into the possible relationship between exchange rates and stock prices. These variables are found to have both a short-term and long-term connection using quarterly and monthly data for the period of January 2008 to December 2009 on two Gulf countries namely the United Arab Emirates (UAE) and the Kingdom of Saudi Arabia (KSA). According to the study's short-term findings, there is no correlation between the exchange rate and the stock market price index kingdom of Saudi Arabia and a positive influence on the stock market price index for the United Arab Emirates. Furthermore, the long-term analysis discovered that the United Arab Emirates stock market price index is adversely impacted by the exchange rate. Pramod Kumar NAIK, Puja PADHI (2012) tries to investigates the relationship between the stock prices and macroeconomic variables over pried from April 1994 to June 2011. Johanson cointegration test and vector error correction model was used to test long run relationship between macroeconomic variables and stock market index. It was found that stock prices are positively related to money supply, and industrial production and negatively related to inflation. Using causality test, bidirectional causality was observed between industrial production and stock prices and unidirectional causality existed from money supply to stock prices, stock prices to inflation and stock prices to interest rate. Mohanamani & Sivagnanasith (2014) analysed the relationship between the macroeconomic variables and Indian stock market using monthly data ranging from April 2006 to July 2013. Macroeconomic variables such as call money rate, foreign institutional investment, exchange rate between Indian rupees and US dollar, industrial productivity, money supply, wholesale price index was used. Descriptive statistics, Pearson's correlation matrix,

unit root test, granger causality test have been applied to test the relationship between stock market and macroeconomic variables. The study found that the Indian stock market is positively influenced by wholesale price index, money supply and industrial productivity. The study revealed that IIP is influenced by the returns of Sensex. A long-term relationship was found between IIP and Sensex at a 10% level of significance. Further, concluded that investors should not rely on strategies based on changes in the macroeconomic variables to make profit as these variables do not precede fluctuations in the stock market instead, they follow these fluctuations. Harsh Vardhan and Pankaj Sinha (2015) examined the influence of macroeconomic variables on the movement of Indian stock market. By conducting stationarity test and using vector error correction model researcher analysed long run and short run impact of index of industrial production (IIP) on the Sensex using monthly data from January 1995 to December 2009. The study found the long-term relationship between IIP and Sensex with negative relation between exchange rate and Sensex.

Likewise, Sagarika Mishra and Harminder Singh (2015), determined whether macroeconomic fundamentals are primary driver of the Indian stock market by collecting monthly observations from 1998 to 2008, the study employed a non-parametric technique to ascertain whether any variable are non-linearly connected with stock returns and the variability of stock returns. To determine whether any of the macroeconomic variables significantly affects the stock return and its variability in a non-linear way, the study used a semi-parametric technique. According to findings, the semi parametric approach explains stock returns and volatility better than the ordinary least square technique. Muhammad Khalida Mohsin Altaf Mohammad Majid Mehmood Bagram and Haroon Hussain (2015) examined the long-term impact of macroeconomic variables on the fluctuations in the returns on the Karachi stock exchange (KSE). From January 2000 to December 2010, monthly statistics on inflation, currency rates, treasury Bills and stock returns were collected. Descriptive statistics showed that the KSE

return offers the highest return. The cointegration technique used to investigate the long-term co-movement of several series. The outcome demonstrated that variables and KSE return do not move in parallel. The correlation analysis results indicate that the variables do not significantly positively correlate whereas the T-bill and inflation as well as T-bill and X-rate negligible positive association. Mohammed Mustapha Wasseja, Elizabeth Njoroge, Samwel N. Mwenda (2015) analyse the causal relationship between macroeconomic variables and stock prices by using secondary time series annual data from 1980 to 2012. Sim's causality test to test the causality relationship while OLS (Ordinary Least Squares) was used to test significant relationship. The result found that macroeconomic variables had no significant effect on stock prices except for inflation rate; exchange rate. Also found the causality between macroeconomic variables and stock prices runs unilaterally from inflation rate and exchange rate to stock prices and from stock prices to market interest rates. Rudra P. Pradhan, Mak B. Arvin, Atanu Ghoshray (2015) examines the linkages between economic growth, oil prices, stock market, and macroeconomic indicators such as real effective exchange rate, inflation rate, and real rate of interest. To test Granger causality for the G-20 countries employed a panel vector autoregressive model. The study clearly defines the long-run and short-run relations between the economic variables. The result reveals a strong connection over long term between the economic growth, oil prices, real effective exchange rate, inflation rate, stock market depth, and real rate of interest where as in the short run these factors found a complex network of casual relationships.

Similarly, Pooja Joshi (2015). using monthly data from April 2004- July 2015 this study aim to examine how fiscal fundamental macroeconomic variables affect the performance of the stock market in India. to check the non-stationarity property of the series, Ng-Perron unit root tests were used then the Auto Regressive Distributed Lag (ARDL) bounds test and a Vector Error Correction Model (VECM) were used for testing both short and long run dynamic

relationships. To predict the exogenous shocks of the variables, variance decomposition (VDC) was used too. The study found that there exists a long-run co-integrating relationship between different macroeconomic variables and the stock prices in India. Mahmoud Ramadan Barakat, Sara H. Elgazzar & Khaled M. Hanafy (2016), examined the relationship between the stock market and macroeconomic factors in two emerging economies namely Egypt and Tunisia. The study the period was taken from January 1998 to January 2014. Results found that there is a causal relationship in Egypt between market index and consumer price index (CPI), exchange rate, money supply, and interest rate whereas there is no causal relationship with the market index in Tunisia except for CPI. Moreover, it also found that the four macroeconomic variables are co-integrated with the stock market in both countries. Debasish Sur, Amalendu Bhunia (2016), investigated the influence of macroeconomic variables on stock market indices namely sensex and nifty of India. This study is based on time series monthly data collected from various sources like Reserve Bank of India database, BSE and NSE database, investing.com and yahoo, finance database for the period starting from July 1997 to July 2015. The empirical results found that sensex and nifty reactions to shocks on crude oil prices, exchanges rates, real interest rates and whole prices indices were positive while a negative shock from Sensex and nifty to real interest was noticed.

Moreover, Muhammad Ahmad Shahid, Fareena Farheen Kamran (2016) investigate the significant macro-economic factors affecting the stock Prices of KSE-100 Index. Time series Data for Stock Prices on monthly basis for the period ranging January, 2005 to March, 2014 has been used. 30 companies from KSE-100 Index were used for analysis. Macro-economic variables include Inflation (CPI), Producer Price Index (PPI), Gold price, silver price, Exports and Imports. To check stationarity of data, Augmented Dickey Fuller test has been used. Johansen's Cointegration test and Ganger's causality tests has been used to examine the causal relationship between stock prices and selected macro-economic variables. The results found

that stock prices are cointegrated with macro-economic variables in long term. Further, macroeconomic variables Inflation, PPI, Gold price and Exports have long term causal relationship with stock prices in Pakistan. Hassan Chaharmahali Alireza Ghanbari Abdollah Vosoughi Niri (2017) examined the relationship between macroeconomic variables and stock returns of Tehran stock exchange. Variables such as GDP, liquidity, exchange rate, interest rate and stock returns ranging from 2013 to 2016. were used. The study found that only GDP has significant relationship to stock returns.

Additionally, Pervez Iqbal, Sajjad Nawaz and Zeeshan Umer (2017), investigated the short run and the long run impact of macroeconomic variables on stock exchange prices in Pakistan. To analyze the relationship, the monthly time series data ranges from January 1999 to June 2016 were used. The study found that economic fundamentals have statistically significant impact on Karachi Stock Exchange. Godfrey Marozva, CFA1 , Margaret Rutendo Magwedere (2017), investigated the relationship between the macroeconomic variables, leverage and the stock returns on the Johannesburg Stock Exchange by using ARDL bounds testing approach and Vector error correction model The study found that there is co-integrating relationship between macroeconomic variables and stock returns, moreover, there is a long run relationship between stock returns and real GDP, and also between stock returns and interest rates. Lastly, Jawad Khan, Imran Khan (2018) focuses on how these macroeconomic variables affect stock prices in Pakistan by using monthly data from May 2000 to August 2016. ARDL Bounds test was applied to check short- and long-term relationship between the variables and stock prices. In the long run, Karachi Stock exchange significantly affected by money supply, interest rate and exchange rate where as in the short run, all the variables were insignificant except exchange rate which showed negative relationship with stock prices. V.N. Sailaja, Chandini Mandal (2018) examined the relationship between selected external macroeconomic variables and indices at Bombay Stock Exchange (BSE). Macroeconomic variables such as Crude Oil prices,

Foreign Institutional Investments and Dollar value were used for the study. Monthly data for the period ranging from April 2009 to March 2015 were used. Using SPSS20, Multiple Regression equation model had been employed to examine the relationship between the variables. However, all the macroeconomic variables selectively affect different sectoral indices in India accept Foreign Institutional Investment (FII) affects all sectoral indices in India.

Likewise, Ahmad M. Al-Kandari & Sadeq J. Abul (2019), examines the dynamic relationship between the Kuwaiti Stock Exchange Index and the main macroeconomic variables. The variables such as M2, the three-month deposit interest rate, oil prices, the US Dollar vs Kuwaiti Dinar exchange rate and the inflation rate. By applying the Johansen cointegration test, together with the VECM, the study revealed that there is a long-run unidirectional relationship exists between the Kuwaiti Stock Exchange Index and the macroeconomic variables. Moreover, study also confirmed the existence of a short-run relationship between oil prices and stock prices in Kuwait. Erfan M. Bhuiyana, Murshed Chowdhury (2020), examines how macroeconomic variables influence different sectors of the stock market differently in the US and Canada. A cointegration analysis is applied to examine the relationship between industrial production, money supply, long-term interest rate, and different sector indices by using monthly data from 2000 to 2018. The study found a stable long-term relationship between the macroeconomic variables and different sector indices for the US but not for Canada. Areesha Zaheer, Nadia Kiran (2020), analyses the impact of macroeconomic variables on stock prices in Pakistan. Monthly data ranging from January 2001 to December 2016 were used for study. The macroeconomic variables such as market interest rate, consumer price index, industrial production index and nominal exchange rate were taken. Econometric techniques such as correlation matrix, unit root test, Johansen co-integration test, vector error correction model, and Granger causality test were applied. Finally, it was found no relationship exist between these variables over the both examined periods.

More studies like, Sumit Kumar Maji, Arindam Laha and Debasish Sur (2020), aimed to investigate the significant sector specific macroeconomic variables in the long and short term, using monthly data on five major manufacturing sector specific and macroeconomic variables for the period September 2005 to November 2016.Economic policy uncertainty, FPIR and price factor found to be the most significant predicators of all sectoral stock indices for the empirical data produced by applying the ARDL-UECM model. Kawerinder Singh Sidhu, Pradeep Suri (2020), tried to found out whether there is any relationship between the stock market indices and macro-economic indicators of Indian economy. Macroeconomic variables such as Forex Reserve, Foreign Direct Investments, Call Money Rate, Index of Industrial Production, Foreign Portfolio Investments, Consumer Price Index, Inflation rate, Crude oil price, Gold Price and Exchange Rate were taken. Applied various tests like Regression analysis, Augmented Dickey Fuller Test (ADF) and Granger causality test. found out that the Exchange rate, Inflation rate and Index of Industrial Production have unidirectional relationship with the SENSEX whereas the other seven factors have no relationship with the performance of SENSEX. Olowe, Rufus Ayodeji (2023), using Johansen's (1991) vector error connection model, the study investigated the dynamic equilibrium link between a set of macroeconomic factors and the Nigerian stock exchange index. The consumer price index, money supply, oil prices, treasury bill rate, and index of industrial production are among the macroeconomic factors were examined. The study found that there is a cointegrating relationship between macroeconomic variables.

To conclude there exists long term as well as short term relationship between the macroeconomic variables and stock returns which had been indicated in above mentioned studies. Prior research mostly concentrated on larger indices and included few studies broken down by sector. Nevertheless, an apparent absence of comprehensive research exists that methodically assesses and compares the Nifty Auto and Nifty IT sector companies. To fill this

gap the present aims to analyse the impact of macroeconomic variables on the stock prices of Nifty Auto and Nifty IT sector.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction

The research methodology employed for the investigation is covered in this chapter. It includes information on problem of the study, research gap, data sources, data period, sample variables and tools and techniques used for the study. "Research methodology is a way to systematically solve the research problem," according to C.R. Kothari. It may be considered a science that studies scientific research methodology. Not only must a researcher be knowledgeable about research methods and procedures, but they also must be able to distinguish between relevant and irrelevant methods and techniques.

3.2 Problem of the study

A study of stock return fluctuations and many macroeconomic aggregates and indicators has become essential in the light of recent economic changes. This is because of the stock market is the most susceptible sector in every rising economy. Through a variety of mechanisms, the stock market affects cooperate investments and economic expansion. Shifts in the regional or global political and economic landscape have an impact on share price fluctuations. Only when they are aware of the worth and changes of market indicators investors can make educated guesses, although the majority of investors are confused about the relationship between one indication to another. Determining the correlation between the macroeconomic variables and stock prices could be beneficial for researchers, investors and fundamentalists in forecasting the direction of the Indian stock market. The purpose of this research is to investigate the impact of macroeconomic variables and stock prices of companies of nifty auto and nifty IT sector in NSE and also to examine the long-term relationship between these variables and stock returns

of nifty auto and nifty IT index using monthly data ranging from 1st January 2008 to 31st October 2023. The main aim of identifying the impact of Macroeconomic indicators on the NSE Auto index and NSE IT index is that it may help the investors to make investment decisions on Nifty auto and nifty IT index and its companies.

3.3 Research Gap

Existing literature focused on broader indices with limited sector wise studies. However, there is noticeable absence of in-depth research that systematically evaluates and contrasts the Nifty Auto and Nifty IT sector companies**.** To fill this gap the present aims to analyse the impact of macroeconomic variables on the stock prices of Nifty Auto and Nifty IT sector.

3.4 Data source

Table 3.1 Collection of data from different sources

Independent variables	**Sources of data**
Foreign Exchange Reserves (FER)	EWPRF INDIA TIME SERIES
Exports (EX)	
Money Supply (M2)	
Inflation (CPI)	OECD
Interest Rate (IR)	RBI
Dependent variables	
Monthly closing stock prices data of selected Nifty Auto companies	CMIE PROWESS IQ
Monthly closing stock prices data of selected Nifty IT companies	
Monthly closing data of Nifty Auto index	
Monthly closing data of Nifty IT index	

3.5 Data Period

Monthly data ranging from 1st January 2008 to 31st October 2023 are used to arrive at desired outcomes.

3.6 Sample variable

The present uses the monthly data ranging from 1st January 2008 to 31st October 2023 for objective 1 dependent variables are the Nifty Auto and Nifty IT companies and the independent variables are macroeconomic variables namely Exports (EX), Foreign Exchange Reserves (FER), Inflation (CPI), Interest Rate (IR) and Money Supply (M2). And for the objective 2 the dependent variables are Nifty Auto Sector and Nifty IT sector and independent variables are same as mentioned in objective 1.

As mentioned below in the table 14 companies of Nifty Auto Sector and 7 companies of Nifty IT Sector are taken for the study.

Table 3.2 List of Selected Nifty Auto and Nifty IT Companies

Nifty Auto Companies	**Nifty IT Companies**
Apollo Tyres Ltd	Coforge Ltd
Balkrishna Industries Ltd	HCL Technology Ltd
Eicher Motor Ltd	Infosys Ltd
Exide Industries Ltd	Mphasis Ltd
Bharat Forge Ltd	Tata Consultancy Services Ltd
Ashok Ley Land Ltd	Tech Mahindra Ltd
Bosch Ltd	Wipro Ltd
Hero Moto Corp Ltd	
Mahindra and Mahindra Ltd	
Maruti Suzuki India Ltd	
MRF Ltd	
Sawardhan Motherson Itnl Ltd	

Tata Motor Ltd	
TVS Motor	

3.7 Tools and Techniques used for the study

The study will employ time series data to analyse the impact of macroeconomic variables on the stock prices of companies of Nifty Auto and Nifty IT index in NSE and also to examine the long-term relationship between the macroeconomic variables. and the stock returns of Nifty Auto and Nifty IT index in NSE. In order to meet the objectives, it has decided to use the following tools and techniques

a. Descriptive Statistics

Descriptive statistics is used to illustrate the nature and traits of the data series. Descriptive statistics measures the central tendency, dispersion, kurtosis, skewness etc.

b. Unit root test

After descriptive statistics, unit root test will be used to test whether the data is stationary or not.

c. Correlation Analysis

After unit root test, correlation will be 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 variables.

d. Multiple Regression

After correlation analysis, multiple regression will be used to analyse the impact of macroeconomic variables on the stock prices of companies of Nifty Auto and Nifty IT index in NSE.

e. Johansen Cointegration test

To examine the long-term relationship between the macroeconomic variables and stock returns of Nifty Auto and Nifty IT index in NSE.

CHAPTER 4: DATA ANALYSIS AND CONCLUSIONS

4.1 Analysis on objective 1

4.1.1 Descriptive Statistics

The temporal characteristics of the data set are described using descriptive statistics. Descriptive statistics give information about the nature, traits, and attributes of the variables that provide rapid comprehension and analysis of the study's data set. In order to provide a quantitative description, some common measures have been employed, including the Jarque-Bera test, kurtosis, maximum and minimum values, standard deviation (or variance), and measures of central tendency (mean).

Table 4.1 Descriptive Statistics of Nifty Auto Companies from 1st January 2008 to 31st October 2023

Nifty Auto companies	Mean	Max	Min	Standard Deviation	Skewness	Kurtosis	Jarque-Bera
Apollo Tyres Ltd	0.0184	0.4683	-0.4436	0.1260	-0.0822	4.8228	26.5204 (0.0000)
Ashok Leyland ltd	0.0157	0.5199	-0.5136	0.1371	0.1097	5.7927	62.1276 (0.0000)
Balkrishna Industries Ltd	0.0208	0.7373	-0.8293	0.1492	-0.6875	11.051	528.1372 (0.0000)
Bharat Forge Ltd	0.0135	0.4595	-0.4778	0.1229	-0.2746	6.8253	118.2329 (0.0000)
Bosch Ltd	0.0101	0.2697	-0.2859	0.0798	0.2107	4.4906	18.9968 (0.0000)
Eicher Motors ltd	0.0239	0.3892	-0.8986	0.1249	-1.9595	17.794	1854.404 (0.0000)
Exide Industries Ltd	0.0104	0.3638	-0.2306	0.0901	0.2454	4.2594	14.4461 (0.0007)

Hero Moto Corp Ltd	0.0112	0.3571	-0.2219	0.0834	0.2362	3.9246	8.535920 (0.0140)
MRF Ltd	0.0199	0.4153	-0.3443	0.1073	0.6133	5.4575	59.72625 (0.0000)
Mahindra and Mahindra Ltd	0.0092	0.3708	-0.4659	0.1087	-0.8495	7.1358	158.2734 (0.0000)
Maruti Suzuki India Ltd	0.0171	0.3232	-0.3174	0.0977	0.1100	4.1002	9.967139 (0.0068)
Samvardhana Motherson Intl Ltd	0.0083	0.4763	-0.4109	0.1346	-0.2146	4.7783	26.49681 (0.0000)
TVS Motor co Ltd	0.0259	0.4559	-0.4970	0.1360	-0.1557	4.7819	25.90613 (0.0000)
Tata Motors Ltd	0.0142	0.5129	-0.7897	0.1608	-0.2632	6.8653	120.4753 (0.0000)

(Source: Author's compilation using E-Views 12)

The table 4.1. shows the mean value, maximum, minimum, standard deviation, skewness, kurtosis, followed by Jarque Bera and p values of Nifty Auto companies. TVS motors Ltd has the highest mean value, and Samvardhana Motherson Intl Ltd has the lowest mean value. Balkrishna Ltd has the maximum value whereas Bosch Ltd has the minimum value. Tata Motors Ltd has the highest value of Standard deviation. It also explains the coefficients of skewness and kurtosis of observations. Skewness of Apollo Tyres Ltd, Balkrishna Ltd, Bharat Forge Ltd, Eicher Motors Ltd, Mahindra and Mahindra Ltd, Samvardhana Motherson Intl Ltd, TVS motos Ltd and Tata motors are negative which shows that the distributions are negatively skewed whereas rest all are positive which shows that the distributions are positively skewed. Kurtosis values of all the Nifty Auto Companies are more than which shows that the distribution of all dependent variables is leptokurtic. The Jarque-Bera normality test rejects the assumptions of normality for all the Nifty Auto companies as all the value are less than 0.05 which indicates that they are normally distributed.

Table 4.2 Descriptive Statistics of Nifty IT Companies from 1st January 2008 to 31st October 2023

Nifty IT companies	Mean	Max	Min	Standard deviation	Skewness	Kurtosis	Jarque-Bera
Coforge ltd	0.0248	0.5696	-0.4427	0.1335	0.3606	4.7535	28.464 (0.0000)
HCL Technologies Ltd	0.0136	0.2960	-0.5148	0.1081	-0.9993	7.8377	216.905 (0.0000)
Infosys Ltd	0.0052	0.3125	-0.5475	0.1044	-1.8753	11.520	686.077 (0.0000)
Mphasis Ltd	0.0159	0.5016	-0.3604	0.1082	-0.4166	5.7100	63.6428 (0.0000)
Tata Consultancy Servies Ltd	0.0106	0.3491	-0.5070	0.0912	-1.2536	11.286	593.410 (0.0000)
Tech Mahindra Ltd	0.0105	0.5456	-0.7800	0.1276	-1.0939	12.808	799.548 (0.0000)
Wipro Ltd	0.0040	0.3454	-0.5175	0.1021	-0.82662	8.3073	244.6196 (0.0000)

(Source: Author's compilation using E-Views 12)

Table shows 4.2 the mean value, maximum value, minimum value, standard deviation, skewness, kurtosis and Jarque-Bera value of Nifty IT Companies. Coforge Ltd has the highest mean value whereas Wipro Ltd has the lowest mean value. The value of standard deviation indicates that the Coforge Ltd and Tech Mahindra are relatively more volatile compared to other companies of Nifty IT Index. The kurtosis for all the aforementioned factors is more than 3 i.e. the frequency distribution assigns a higher probability to returns as well as very high positive returns. The Jarque-Bera normality test rejects the assumptions of normality for all the Nifty IT companies as all the value are less than 0.05 which indicates that they are normally distributed.

Table 4.3 Descriptive Statistics of Macroeconomic Variables from 1st January 2008 to 31st October 2023

Particulars	Mean	Max	Min	Standard deviation	Skewness	Kurtosis	Jarque-Bera
Exports	0.0156	0.8260	-0.5058	0.1233	1.2059	13.007	838.9274 (0.0000)
Foreign Exchange Reserves	0.0082	0.0874	-0.0796	0.0220	-0.4272	5.0227	38.1706 (0.0000)
Inflation Rate	0.0103	0.6363	-0.5000	0.1534	0.6877	5.2277	54.2709 (0.0000)
Interest Rate	0.0017	0.3505	-0.3532	0.0676	0.0702	12.4803	711.6864(0.0000)
M2	0.0095	0.1836	-0.2243	0.0299	-1.1927	27.053	4625.275(0.0000)

(Source: Author's compilation using E-Views 12)

Table 4.3 The mean value of exports, fer, inflation, interest rate and M2 are 0.015608, 0.008208, 0.010320, 0.001787, and 0.009592 respectively. M2 has the maximum value and foreign exchange reserves has the minimum value. The highest deviation is 0.153477 for Inflation rate and lowest deviation is 0.022057 for Foreign Exchange reserves. The value of Skewness of Foreign Exchange reserves and M2 are negative which means that the distribution is negatively shewed whereas the value of Exports, Inflation rate, and interest rate are positives which means that the distribution is positively skewed. The kurtosis for all the aforementioned factors is more than 3 i.e. the frequency distribution assigns a higher probability to returns as well as very high positive returns. The Jarque-Bera normality test rejects the assumptions of normality for all the macroeconomic variables as all the value are less than 0.05 which indicates that they are normally distributed.

4.1.2 Unit Root Test

In time series analysis, the stationarity of data series is essential for establishing the reliability of the conventional regression results and for deriving significant inferences about a trend. i.e. to determine if a time series' trend is stochastic or deterministic in nature. It displays the integration order. The most popular Augmented Dickey-Fuller (ADF) test is used to analyse the chosen variables in order to ascertain if they are stationary at level or at first difference.

Table 4.4 Unit Root Test of Nifty Auto Companies from 1st January 2008 to 31st October 2023

Null Hypothesis: Nifty Auto companies have a unit root						
Nifty Auto Companies	**t-statistics**	**Test Critical Values**			**Prob.***	**Decision**
		1% level	**5% level**	**10% level**		
Apollo Tyres Ltd	-13.0931	-3.46501	-2.87667	-2.57491	0.0000	Reject
Ashok Leyland Ltd	-13.5799	-3.46501	-2.87667	-2.57491	0.0000	Reject
Balkrishna Industries Ltd	-12.9750	-3.46501	-2.87667	-2.57491	0.0000	Reject
Bharat Forge Ltd	-13.4188	-3.46501	-2.87667	-2.57491	0.0000	Reject
Bosch Ltd	-15.5315	-3.46501	-2.87667	-2.57491	0.0000	Reject
Eicher Motors Ltd	-13.5821	-3.46501	-2.87667	-2.57491	0.0000	Reject
Exide Industries Ltd	-13.6290	-3.46501	-2.87667	-2.57491	0.0000	Reject
Hero Moto Corp Ltd	-15.5709	-3.46501	-2.87667	-2.57491	0.0000	Reject
MRF Ltd	-13.0377	-3.46501	-2.87667	-2.57491	0.0000	Reject
Mahindra and Mahindra Ltd	-11.7125	-3.46501	-2.87667	-2.57491	0.0000	Reject
Maruti Suzuki India Ltd	-13.7812	-3.46501	-2.87667	-2.57491	0.0000	Reject
Samvardhana Motherson Ltd	-13.8380	-3.46501	-2.87667	-2.57491	0.0000	Reject
TVS Motor co Ltd	-13.0400	-3.46501	-2.87667	-2.57491	0.0000	Reject
Tata Motors Ltd	-12.7124	-3.46501	-2.87667	-2.57491	0.0000	Reject

(Source: Author's compilation using E-Views 12)

The Nifty Auto companies data were evaluated for unit root test, and the null hypothesis for this test is that Nifty Auto companies series has a unit root. The findings demonstrate that, at the 1%, 5%, and 10% significance levels, the values of the T statistics for each variable are greater than the critical values. The unit root hypothesis in the data is rejected and the alternative hypothesis is supported since the P-values are 0.000 in every case, indicating that the series is stationary at level.

Table 4.5 Unit Root Test of Nifty IT Companies from 1st January 2008 to 31st October 2023

Null Hypothesis: Nifty IT companies have a unit root						
Nifty IT Companies	**t-statistics**	**Test Critical Values**			**Prob.***	**Decision**
		1% level	**5% level**	**10% level**		
Coforge Ltd	-15.0863	-3.46501	-2.87667	-2.57491	0.0000	Reject
HCL Technologies Ltd	-13.3688	-3.46501	-2.87667	-2.57491	0.0000	Reject
Infosys Ltd	-15.4215	-3.46501	-2.87667	-2.57491	0.0000	Reject
Mphasis Ltd	-13.5733	-3.46501	-2.87667	-2.57491	0.0000	Reject
Tata Consultancy Services Ltd	-18.7914	-3.46501	-2.87667	-2.57491	0.0000	Reject
Tech Mahindra Ltd	-11.1567	-3.46501	-2.87667	-2.57491	0.0000	Reject
Wipro Ltd	-13.5787	-3.46501	-2.87667	-2.57491	0.0000	Reject

(Source: Author's compilation using E-Views 12)

The Nifty IT companies data were evaluated for unit root test, and the null hypothesis for this test is that Nifty IT companies series has a unit root. The findings demonstrate that, at the 1%, 5%, and 10% significance levels, the values of the T statistics for each variable are greater than the critical values. The unit root hypothesis in the data is rejected and the alternative hypothesis is supported since the P-values are 0.000 in every case, indicating that the series is stationary at level.

Table 4.6 Unit Root Test of Macroeconomic Variables from 1st January 2008 to 31st October 2023

Null Hypothesis: macroeconomic variables have a unit root						
Macroeconomic variables	**t-statistics**	**Test Critical Values**			**Prob.***	**Decision**
		1% level	**5% level**	**10% level**		
Exports	-15.0819	-3.46520	-2.87675	-2.57496	0.0000	Reject
Foreign Exchange Reserves	-12.8200	-3.46501	-2.87667	-2.57491	0.0000	Reject
Inflation Rate	-10.9695	-3.46520	-2.87675	-2.57496	0.0000	Reject
Interest Rate	-5.78097	-3.46539	-2.87684	-2.57500	0.0000	Reject
Money Supply (M2)	-7.16778	-3.46617	-2.87718	-2.57518	0.0000	Reject

(Source: Author's compilation using E-Views 12)

The five macroeconomic variables data were evaluated for unit root test, and the null hypothesis for this test is that all five macroeconomic variables series has a unit root. The results indicate that the values of T statistics are more than the critical value at 1%, 5% and 10% significance level. The null hypothesis is rejected because the p values are 0.000 in all cases. The results identify all macroeconomic variables data are stationary at level.

4.1.3 Correlation analysis

Correlation analysis is a statistical method to show how much two or more variables move together is to use matrix analysis. The range of a correlation coefficient is -1 to +1. A positive correlation denotes the degree to which two variables rise or decrease in the same direction, whereas a negative correlation denotes the degree to which two variables move in the opposite direction, with one variable increasing as the other declines. If there is a relationship between two variables are perfectly positively linked when the coefficient is +1, perfectly negatively correlated when the coefficient is -1, and there is no relationship between the two variables when the coefficient is 0.

Table 4.7 Correlation Analysis of Nifty Auto Companies and Macroeconomic Variables from 1st January 2008 to 31st October 2023

Nifty Auto companies	Exports	Foreign exchange reserves	Inflation rate	Interest rate	M2
Apollo Tyres Ltd	0.00	-0.20	0.04	-0.07	0.03
Ashok Leyland Ltd	-0.02	-0.19	0.02	-0.06	0.03
Balkrishna Industries Ltd	0.06	-0.00	0.00	-0.11	0.01
Bharat Forge Ltd	-0.08	-0.07	-0.03	-0.06	-0.08
Bosch Ltd	0.07	-0.08	-0.00	0.03	0.00
Eicher Motors Ltd	0.06	-0.05	-0.02	-0.05	0.02
Exide Industries Ltd	0.06	-0.18	0.00	-0.01	0.04
Hero Moto Corp Ltd	-0.04	-0.02	-0.02	-0.07	-0.02
MRF Ltd	0.01	-0.14	-0.00	-0.04	0.02
Mahindra and Mahindra Ltd	-0.05	-0.09	0.09	-0.09	-0.03
Maruti Suzuki India Ltd	-0.03	-0.02	0.04	-0.07	0.01
Samvardhana Motherson Intl Ltd	-0.02	-0.12	0.08	-0.08	-0.00
TVS Motor co Ltd	0.00	-0.15	-0.02	0.02	-0.00
Tata Motors Ltd	-0.12	-0.10	0.03	-0.12	0.01

(Source: Author's compilation using E-Views 12)

The results of correlation between the macroeconomic variables and Nifty Auto companies is shown in the table 4.7. The correlation coefficient values shows that foreign exchange reserves have a weak negative correlation with all the Nifty Auto companies which implies that as Foreign Exchange Reserves increase, the stock prices of these companies tend to decrease. In case of exports the results shows that exports have a weak positive Association with Apollo Tyres Ltd, Balkrishna Industries Ltd, Bosch Ltd, Eicher Motors Ltd, Exide Industries Ltd, MRF Ltd, and TVS Motors co Ltd that means rise in exports tends to increase the stock prices of

these companies whereas exports have a weak negative association with Askoy Ley Land Ltd, Bharat Forge Ltd, Hero Moto Corp Ltd, Mahindra and Mahindra Ltd, Maruti Suzuki India Ltd, Samvardhana Motherson Itnl Ltd, and Tata Motors Ltd. This indicates that as the exports increases the stock prices tends to decrease. With respect to Inflation rate the results shows that with the increase in Inflation (CPI) the stock prices of Apollo Tyres Ltd, Ashok Ley Land Ltd, Balkrishna Industries Ltd, Exide Industries Ltd, Mahindra and Mahindra Ltd, Maruti Suzuki India Ltd, Samvardhana Motherson Intl Ltd, and Tata Motors will also move in the same direction whereas rest of the companies will move to opposite direction. There is a weak negative association between the interest rate and with all the companies except one have weak a positive association i.e. TVS Motos co Ltd. Lastly in case of M2 the results indicates that the M2 have a positive association with Apollo Tyres Ltd, Ashok Ley Land Ltd, Balkrishna Industries Ltd, Bosch Ltd, Eicher Motor Ltd, Exide Industries Ltd, MRF Ltd, and Maruti Suzuki India Ltd rest all the companies have a weak negative connection which indicates that rise in M2, the stock returns of these companies tends to decrease.

Table 4.8 Correlation Analysis of Nifty IT Companies and Macroeconomic Variables from 1st January 2008 to 31st October 2023

Nifty IT companies	Exports	Foreign exchange Reserves	Inflation rate	Interest rate	M2
Coforge Ltd	0.04	0.02	-0.03	-0.11	-0.08
HCL Technologies Ltd	-0.01	-0.04	-0.02	-0.06	-0.00
Infosys Ltd	0.11	-0.11	-0.05	-0.04	0.00
Mphasis Ltd	0.12	-0.07	0.05	-0.17	-0.11
Tata Consultancy Services Ltd	-0.05	0.04	0.41	-0.06	0.00
Tech Mahindra Ltd	0.11	-0.02	0.08	0.00	-0.09
Wipro Ltd	0.13	0.01	0.02	-0.16	-0.02

(Source: Author's compilation using E-Views)

The results of correlation between the macroeconomic variables and Nifty IT companies in show in the table 4.8 The correlation coefficient values shows that Exports have a weak negative association with HCL Technologies Ltd and Tata Consultancy Services Ltd and rest all the companies have a negative association. In case of Foreign Exchange Reserves the results shows that with increase in Foreign Exchange Reserves the stock prices of Coforge Ltd and Wipro Ltd will also move in the same direction whereas rest of companies will move to opposite direction. With respect to Inflation (CPI) the results shows that the Inflation (CPI) have a positive association with Mphasis Ltd, Tata Consultancy Services Ltd, Tech Mahindra Ltd, Wipro Ltd rest all the companies have negative association. In case of interest rate the results indicate that the interest rate has a negative association with all the companies. Lastly in case of M2 the results indicates that the M2 have a negative association with the all companies except Infosys Ltd have positive association.

4.1.4 Multiple Regression

Multiple regression is a statistical technique used for modelling a single response variable that has been measured at least at the interval scale. This method can be applied to one or multiple independent variables, including categorical ones that have been suitably coded. Its purpose is to assess the impact of changes in one variable, such as prices, on another. In the current analysis, OLS modelling is employed to examine how macroeconomic variables impact the returns of the Nifty Auto and Nifty IT companies.

Table 4.9 Multiple Regression of Nifty Auto Companies and Macroeconomic Variables from 1st January 2008 to 31st October 2023

Dependent variables	Independent variables	coefficient	prob	R-squared	Durbin-Watson stat
Apollo Tyres Ltd	C	0.026094	0.0103	0.048607	1.864125
	Exports	-0.005239	0.9470		
	Foreign Exchange Reserves	-1.145478	**0.0062***		
	Inflation	0.041355	0.4871		
	Interest Rate	-0.112417	0.4143		
	Money Supply (M2)	0.170386	0.5936		
Ashok Ley Land Ltd	C	0.024045	0.0296	0.044798	1.845979
	Exports	-0.037022	0.6666		
	Foreign Exchange Reserves	-1.2117741	**0.0075***		
	Inflation	0.026287	0.6851		
	Interest Rate	-0.096135	0.5216		
	Money Supply (M2)	0.230107	0.5085		
Balkrishna Industries Ltd	C	0.019380	0.1105	0.020787	1.915635
	Exports	0.117016	0.2175		
	Foreign Exchange Reserves	0.052876	0.9153		
	Inflation	0.005181	0.9422		
	Interest Rate	-0.286660	0.0840		
	Money Supply (M2)	-0.033323	0.9307		
Bharat Forge Ltd	C	0.020382	0.0422	0.018700	1.850800
	Exports	-0.059305	0.4478		
	Foreign Exchange Reserves	-0.382213	0.3517		
	Inflation	-0.022885	0.6976		
	Interest Rate	-0.073591	0.5892		

	Money Supply (M2)	-0.020382	0.4374		
Bosch Ltd	**C**	0.012280	0.0601	0.013169	2.090447
	Exports	0.046653	0.3594		
	Foreign Exchange Reserves	-0.298425	0.2645		
	Inflation	0.001247	0.9741		
	Interest Rate	0.034677	0.6960		
	Money Supply (M2)	-0.048436	0.8140		
Eicher motors Ltd	**C**	0.025154	0.0142	0.011759	1.886633
	Exports	0.072407	0.3637		
	Foreign Exchange Reserves	-0.283768	0.4976		
	Inflation	-0.022440	0.7088		
	Interest Rate	-0.116891	0.4007		
	Money Supply (M2)	0.048850	0.8796		
Exide Industries Ltd	**C**	0.014923	0.0406	0.037078	1.951190
	Exports	0.036043	0.5251		
	Foreign Exchange Reserves	-0.733576	**0.0145***		
	Inflation	0.007360	0.8634		
	Interest Rate	-0.017628	0.8586		
	Money Supply (M2)	0.098323	0.6685		
Hero Moto Corp Ltd	**C**	0.012687	0.0639	0.007537	2.238645
	Exports	-0.016790	0.7528		
	Foreign Exchange Reserves	-0.060999	0.8275		
	Inflation	-0.014457	0.7193		
	Interest Rate	-0.083543	0.3697		
	Money Supply (M2)	-0.034915	0.8715		
MRF Ltd	**C**	0.024589	0.0051	0.024353	1.814995
	Exports	0.011121	0.8701		
	Foreign Exchange Reserves	-0.709355	**0.0481***		

	Inflation	-0.002100	0.9673		
	Interest Rate	-0.058334	0.6231		
	Money Supply (M2)	0.113422	0.6804		
Mahindra and Mahindra Ltd	**C**	0.013797	0.1175	0.028792	1.573895
	Exports	-0.030615	0.6561		
	Foreign Exchange Reserves	-0.445553	0.2180		
	Inflation	0.072342	0.1641		
	Interest Rate	-0129086	0.2826		
	Money Supply (M2)	-0.094616	0.7339		
Samvardhana Motherson Itnl Ltd	**C**	0.014222	0.1919	0.029270	1.964281
	Exports	-0.016498	0.8462		
	Foreign Exchange Reserves	-0.774628	0.0842		
	Inflation	0.07442	0.2469		
	Interest Rate	-0.139235	0.3489		
	Money Supply (M2)	0.019496	0.9449		
TVS Motor co Ltd	**C**	0.034262	0.0021	0.026538	1.771805
	Exports	-0.011762	0.8913		
	Foreign Exchange Reserves	-0.988802	**0.0297***		
	Inflation	-0.014857	0.8189		
	Interest Rate	0.074096	0.6218		
	Money Supply (M2)	-0.002988	0.9932		
Tata Motors Ltd	**C**	0.020085	0.1211	0.039792	1.787755
	Exports	-0.157657	0.1198		
	Foreign Exchange Reserves	-0.759670	0.1533		
	Inflation	0.033891	0.6566		
	Interest Rate	-0.230789	0.1916		
	Money Supply (M2)	0.304851	0.4564		

(Source: Author's compilation using E-Views 12) ***** *indicates significance level at 5%*

Table 4.9 shows the coefficients of the constant, exports, foreign exchange reserves, inflation rate, interest rate and M2 for all the Nifty Auto companies. The multiple regression results of Apollo Tyres Ltd shows that the foreign Exchange Reserves has an significant impact on the stock returns of the Apollo Tyres Ltd. As the p value is less than 0.05 significance level. A 1% change in Foreign Exchange Reserves would lead to -1.1454% in the stock returns in this company. The results revealed that the foreign exchange reserves have an inverse impact on the stock return of this company which means as the foreign exchange reserves increases the returns tend to decrease and vice versa. R-Squared value indicates that only 4.86% of the variation in stock returns is explained by the variables considered in this study implying that remaining 95.14% of the variation in the returns is caused by the variables outside the preview of this study. The value of Durbin Watson statistics is lies between 1 and 2 i.e. 1.8641 so there does not exist a problem of autocorrelation. In case of Ashok Ley Land Ltd the results shows that only Foreign Exchange Reserves have a significant impact on the stock returns of this company. R-Squared value indicates that only 4.47% of the variation in stock returns is explained by the variables considered in this study implying that remaining 95.53% of the variation in the returns is caused by the variables outside the preview of this study. The value of Durbin Watson statistics is lies between 1 and 2 i.e. 1.8459 so there does not exist a problem of autocorrelation. In case of MRF Ltd, the results shows that the Foreign Exchange Reserves have a significant impact on the MRF Ltd.

Where as in the case of Balkrishna Industries Ltd, Bharat Forge Ltd, Bosch Ltd, Eicher Motor Ltd, Hero Moto Corp Ltd, Mahindra and Mahindra Ltd, Samvardhana Motherson Intl Ltd, and Tata Motors Ltd. the results indicates that there is no significant impact on these dependent variables as the p value for all the independent variables are more than significance level i.e. 0.05. in case of Exide Industries Ltd the result shows that the Foreign Exchange Reserves have a significant impact on the stock returns. A 1% change in Foreign Exchange Reserves would

lead to -0.7335% in the stock returns in this company. The results revealed that the foreign exchange reserves have an inverse impact on the stock return of this company which means as the foreign exchange reserves increases the returns tend to decrease and vice versa. In case TVS Motor co Ltd, the results also show the significant impact of Foreign Exchange Reserves on the stock returns of this company. The value of Durbin Watson statistics is lies between 1 and 2 i.e. 1.7718 so there does not exist a problem of autocorrelation.

Table 4.10 Multiple Regression of Nifty IT Companies and Macroeconomic Variables from 1st January 2008 to 31st October 2023

Dependent variables	Independent variables	coefficient	prob	R-squared	Durbin-Watson stat
Coforge Ltd	C	0.026088	0.0162	0.032105	2.073310
	Exports	0.111034	0.1884		
	Foreign Exchange Reserves	0.289828	0.5125		
	Inflation	-0.027673	0.6632		
	Interest Rate	-0.269300	0.0682		
	Money Supply (M2)	-0.476223	0.1636		
HCL Technologies Ltd	C	0.017715	0.0457	0.010494	1.852968
	Exports	0.009807	0.8870		
	Foreign Exchange Reserves	-0.204267	0.5730		
	Inflation	-0.010792	0.8357		
	Interest Rate	-0.096394	0.4238		
	Money Supply (M2)	-0.233686	0.4032		
Infosys Ltd	C	0.008848	0.2940	0.032853	2.185256
	Exports	0.114571	0.0832		
	Foreign Exchange Reserves	-0.466872	0.1781		
	Inflation	-0.036149	0.4672		

	Interest Rate	-0.103629	0.3678		
	Money Supply (M2)	0.100514	0.7063		
Mphasis Ltd	**C**	0.021328	0.0125	0.089487	1.887435
	Exports	0.187316	**0.0051***		
	Foreign Exchange Reserves	-0.271300	0.4357		
	Inflation	0.047404	0.3433		
	Interest Rate	-0.325688	**0.0054***		
	Money Supply (M2)	-0.624729	**0.0207***		
Tech Mahindra Ltd	**C**	0.014019	0.1720	0.041613	1.555599
	Exports	0.170699	**0.0342***		
	Foreign Exchange Reserves	-0.089284	0.8319		
	Inflation	0.079498	0.1893		
	Interest Rate	-0.036408	0.7945		
	Money Supply (M2)	-0.644923	**0.0479***		
Tata Consultancy Services Ltd	**C**	0.009025	0.2261	0.009788	2.537437
	Exports	-0.034323	0.5556		
	Foreign Exchange Reserves	0.188856	0.5369		
	Inflation	0.022213	0.6131		
	Interest Rate	-0.077803	0.4441		
	Money Supply (M2)	0.059194	0.8017		
Wipro Ltd	**C**	0.003122	0.6998	0.064686	1.998136
	Exports	0.165514	**0.0096***		
	Foreign Exchange Reserves	0.167481	0.6147		
	Inflation	0.021565	0.6519		
	Interest Rate	-0.310021	**0.0055***		
	Money Supply (M2)	-0.278528	0.2782		

(Source: Author's compilation using E-Views 12) ***** *indicates significance level at 5%*

4.10 Shows the results of multiple regression analysis, in case of Nifty IT companies. Coforge Ltd, HCL Technologies Ltd, Infosys ltd, and Tata Consultancy Services Ltd has no significant impact on the stock returns as the p values of these independent variables are more than 0.05 significance level. Where as in case of Mphasis Ltd exports and interest rate have a significant impact on the stock returns of this company**.** A 1% change in exports, interest rate would lead to 0.1873%, -0.1036% change in the returns in this company. The result revealed that exports have a positive impact on the stock returns which means as the exports increases the stock returns also tend to increase whereas the interest rate as a negative or inverse impact on the stock returns which means as interest rate increases the stock returns decreases and vice versa. In case of Tech Mahindra Ltd, exports and Money Supply have a significant impact on the stock returns. A 1% change in exports, would lead to 0.1706%, change in the returns in this company. The result revealed that exports have a positive impact on the stock returns which means as the exports increases the stock returns also tend to increase. Lastly in case of Wipro Ltd, exports and interest rate have a significant impact on the stock returns. A 1% change in exports, interest rate would lead to 0.1655%, -0.3100% change in the returns in this company. The result revealed that exports have a positive impact on the stock returns which means as the exports increases the stock returns also tend to increase whereas the interest rate as a negative or inverse impact on the stock returns which means as interest rate increases the stock returns decreases and vice versa. -Squared value indicates that only 6.46% of the variation in stock returns is explained by the variables considered in this study implying that remaining 93.54% of the variation in the returns is caused by the variables outside the preview of this study. The value of Durbin Watson statistics is lies between 1 and 2 i.e. 1.9981 so there does not exist a problem of autocorrelation.

4.2 Analysis on objective 2

4.2.1 Unit Root Test

Table 4.11 Unit Root Test of Nifty Auto Index and Nifty IT Index from 1st January 2008 to 31st October 2023

Null Hypothesis: Nifty Auto Index and Nifty IT index has a Unit Root Test						
Particulars	**t-statistics**	**Test Critical Values**			**Prob.***	**Decision**
		1% level	**5% level**	**10% level**		
Nifty Auto Index	-13.7617	-3.4650	-2.8766	-2.5749	0.0000	Reject
Nifty IT Index	-13.8196	-3.4650	-2.8766	-2.5749	0.0000	Reject

*(Source: Author's compilation using E-Views 12) * indicates significance level at 5%*

The Nifty Auto and Nifty IT index data were evaluated for unit root test, and the null hypothesis for this test is that Nifty Auto and Nifty IT index series has a unit root. The findings demonstrate that, at the 1%, 5%, and 10% significance levels, the values of the T statistics for each variable are greater than the critical values. The unit root hypothesis in the data is rejected and the alternative hypothesis is supported since the P-values are 0.000 in every case, indicating that the series is stationary at level.

4.2.2 Johansen Cointegration test

Johansen Cointegration test is used to examine the long-term relationship. If the variables are integrated of the same order, then only, we can use Johansen Cointegration test. So, in this study all the variables are stationary at level1(0) which means they are integrated of same order and we can use Johansen Cointegration test.

Table 4.12 Johansen Cointegration Test of Nifty Auto Index from 1st January 2008 to 31st October 2023

Null Hypothesis	Nifty Auto Index	Trace statistics	Critical value (5% P value)	Max-Eigen statistics	Critical value (5% P value)
None *	0.309039	265.4054	95.75366 (0.0000)	68.38930	40.07757 (0.0000)
At most 1 *	0.301148	197.0161	69.81889 (0.0000)	66.28857	33.87687 (0.0000)
At most 2 *	0.242781	130.7275	47.85613 (0.0000)	51.44889	27.58434 (0.0000)
At most 3 *	0.177238	79.27863	29.79707 (0.0000)	36.09142	21.13162 (0.0002)
At most 4 *	0.116161	43.18721	15.49471 (0.0000)	22.84392	14.26460 (0.0018)
At most 5 *	0.104133	20.34329	3.841465 (0.0000)	20.34329	3.841465 (0.0000)

*(Source: Author's compilation using E-Views 12) * indicates significance level at 5%*

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

Table 4.12 explains the Johansen Cointegration test of Macroeconomic variables and Nifty Auto index. The results show the trace values are more than the critical value which means there is a cointegration between the Nifty Auto index and macroeconomic variables and also the Max-Eigen value are also more than critical value and the p value is less than 0.05 which means there exists long term relationship between the Nifty Auto index and macroeconomic variables.

Table 4.13 Johansen Cointegration Test of Nifty IT Index from 1st January 2008 to 31st October 2023

Null Hypothesis	Nifty IT Index	Trace statistics	Critical value (5% P value)	Max-Eigen statistics	Critical value (5% P value)
None *	0.330147	269.4318	95.75366 (0.0000)	74.12890	40.07757 (0.0000)
At most 1 *	0.305798	195.3029	69.81889 (0.0000)	67.52352	33.87687 (0.0000)
At most 2 *	0.230335	127.7793	47.85613 (0.0000)	48.43297	27.58434 (0.0000)
At most 3 *	0.162142	79.34637	29.79707 (0.0000)	32.72780	21.13162 (0.0008)
At most 4 *	0.135801	46.61856	15.49471 (0.0000)	27.00113	14.26460 (0.0003)
At most 5 *	0.1006612	19.61744	3.841465 (0.0000)	19.61744	3.841465 (0.0000)

*(Source: Author's compilation using E-Views 12) * indicates significance level at 5%*

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

Table 4.12 explains the Johansen Cointegration test of Macroeconomic variables and Nifty IT index. The results show the trace values are more than the critical value which means there is a cointegration between the Nifty IT index and macroeconomic variables and also the Max-Eigen value are also more than critical value and the p value is less than 0.05 which means there exists long term relationship between the Nifty IT index and macroeconomic variables.

4.3 Findings, conclusions and suggestions

This section will include major findings of objective 1 and 2, conclusions and suggestion for future research

4.3.1 Major findings

It is observed that Tata Motors and Inflation rate has a highest standard deviation as compared to others which means they are relatively more volatile than others.

Augmented Dickey–Fuller test (ADF) test is used to understand the stationary properties of the variables. Whereas we found all the macroeconomic variables and both the sectors companies stock returns data are stationary at level and further the study used multiple regression analysis to know the impact of macroeconomic variables on the stock prices of companies of Nifty Auto and Nifty IT index.

The results of multiple regression indicates that the from the Nifty Auto companies Apollo Tyres Ltd Asok Ley Land Ltd, Exide Industries Ltd and TVS Motors co Ltd have a significant impact on foreign exchange reserves. Whereas from Nifty IT companies, Mphasis Ltd have a significant impact on foreign exchange reserves, exports, and M2. Tech Mahindra Ltd have a significant impact on exports and Wipro Ltd have a significant impact on exports and interest rate.

To examine the long-term relationship between the macroeconomic variables and the stock returns of Nifty Auto and Nifty IT index the Johansen Cointegration test has been used. The results of Johansen cointegration indicates that there exists long term relationship between the macroeconomic variables and the stock returns of Nifty Auto and Nifty IT index as trace values are more than the critical value which means there is a cointegration between the macroeconomic variables and Nifty Auto and Nifty IT index also the Max-Eigen value are also more than critical value and the p value is less than 0.05.

4.3.2 Conclusions

The present study aimed to analyse the impact of macroeconomic variables on Nifty Auto and Nifty IT sector by using monthly data from 1st January 2008 to 31st October 2023 i.e. 15 years.

Five macroeconomic variables such as Foreign Exchange Reserves (FER), Exports (EX), Inflation (CPI), Interest Rate (IR), and Money Supply (M2)

During the analysis, some companies within these sectors exhibited fluctuations in response to macroeconomic variables, others demonstrated more stable performance. This empirical evidence provides valuable insights for investors, policymakers and stakeholders emphasizing the importance of understanding the relationship between macroeconomic variables and stock prices. Diversification across multiple sectors is recommended to mitigate risk and optimize returns.

4.3.3 Limitations of the study

1. The present study is limited to 14 companies of Nifty Auto sector and 7 companies of Nifty IT sector. 1 company i.e. Bajaj Auto Ltd from Nifty Auto sector are not taken since Bajaj Auto Ltd was listed on May 2008 on NSE and 3 companies from Nifty IT sector are not taken because namely L & T Technology Services Ltd was listed on September 2016, Ltimindtree Ltd was listed on July 2016 and Persistent Systems Ltd was listed on April 2010 on NSE. The study period is from 1st January 2008- 31st October 2023 so because of this I have not taken these companies for the present study.

2. The study is restricted to only five macroeconomic variables namely Exports (EX), Foreign Exchange Reserves (FER), Inflation (CPI), Interest Rate (IR) and Money Supply (M2).

4.3.4 Suggestions

Investors can consider integrating macroeconomic analysis into their investment strategy to better anticipate how economic changes might affect stock prices. Investors should also pay

attention to these sectors i.e. Nifty Auto and Nifty IT. Where there is evidence of a long-term relationship between macroeconomic variables and stock returns. Understanding these dynamics can help investors to make more informed investment decision with these sectors.

Policymakers enhance regulatory oversight to maintain market stability and investor confidence, particularly in light of the significant impact of macroeconomic variables on stock prices. Implement measures to mitigate risks associated with economic fluctuations.

4.3.5 Scope for future study

In light of the research findings, there are a few possible directions for future investigation that include the following:

First off, all, macroeconomic indicators such as employment rate, import, political environments, and gross domestic savings may grow in magnitude and divide into several groups. These indicators are not used in analysis.

The future study can also be done by using daily, weekly data and also by using alternative techniques to analyse the impact of macroeconomic variables and the stock prices of Nifty Auto and Nifty IT Sector. Similar study can also be done by taking larger samples.

The NSE Sectoral Indices that have been chosen for this research are Nifty Auto and Nifty IT sector. Other sectors potentially be the subject of inquiry. Each sector in the Indian economy has a unique role and significance.

The second recommendation for additional research is to concentrate on a different time period. As time goes on, comparable variables provide different outcomes because macroeconomic factors are impacted by policy changes. This can help us to understand the global economic situation better in terms of significant financial developments.

An in-depth analysis of the differences between the stock markets of India and other South Asian economies can provide valuable insights into the macroeconomic conditions and stock

market performance of rising economies. Future research may revisit the final problems this study addressed, either by eliminating or examining some of the limitations or broadening the breadth of the relationship through sectoral research that is not included in this study.

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