

INFLUENCE OF SELECT MACROECONOMIC INDICATORS ON INDIAN STOCK MARKET RETURNS

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ABSTRACT

The Indian stock market is volatile and reacts to many macroeconomic factors that influence it. This study explores the role of some key macroeconomic variables including GDP growth, inflation, interest rate change, exchange rate and oil prices on stock market return in India. Due to the challenges of the Indian economy, this knowledge is enormously important for investors, policy makers and financial analysts that utilize macroeconomic factors when trying to predict movements in markets in order to make sound investments. The impact of variations in these macroeconomic factors on stock returns is examined with reference to indices such as the NIFTY 50. The results suggest that there are clear relationships between growth in GDP, inflation and the performance of stock markets, with periods of strong economic growth typically related to higher returns, while inflation is generally associated with lower returns. Particularly, interest rates have very negative association with stock market returns, implying that expensive borrowing makes investors discouraged and affects market behavior negatively. Further, exchange rate and international oil shocks are observed to have an impact on Indian stock returns however the degree varies. For many Indian companies, a weaker rupee usually results in higher input costs and lower profitability as well as stock prices. On the other hand, oil price shocks, in particular when world prices of oil jump up, generally induce inflation and disturb economic stability which may results in market instability. The results of this paper add to the literature on

the role of global and domestic macroeconomic factors in influencing financial markets in emerging economies such as India. By studying these relations, the study is also offering valuable implications for practitioners such as investors who need to respond to the macroeconomic indicators in their decision making. The study also underscores the importance of due consideration not only on international but also national economic sentiment and its potential impact on stock markets returns, particularly for long-run investment purposes.

In general, this work contributes to our understanding of the role macroeconomic indicators play as driver of stock market dynamics and provides a full investigation on Indian market reaction to external and internal economic variations. The paper ends with suggestions for future research to examine how multiple macroeconomic variables interact and what the combined effect is on stock market returns in India.

Keywords: Bivariate correlations, Currency exchange rate, GDP, Inflation, Macroeconomy indicators, OLS and Stock market Returns.

INTRODUCTION

The stock market in India is one of the world's fastest growing and, by extension, most volatile financial markets, central to its economic development. Due to its rapidly growing and lucrative nature, it has attracted considerable interest from international investors, analysts, and policy makers. Yet, the pops and drops of this market don't come from corporate internals or investor mood swings alone. Instead, many other factors — including, notably, macroeconomic outlooks — have a great influence on market movements. Macroeconomic factors are the most critical signals which depict general condition of an economy and predictions for economic status in near future. The effects of the indicators such as growth rate, inflation, interest rate, exchange rate and oil prices on stock return has been raised a great discussion in which they found that such relationship varies at different levels. In the case of India, these macroeconomic factors usually serve as a cornerstone or obstacle-course for investors who have to tread through many international events and domestic measures in an elaborate framework. India, as an emerging market, is more prone to the movement of global macroeconomy which affects market stability and investors' behavior. Rises in interest rates, for example, may indicate a strong business

climate and prompt higher stock prices. On the other hand, high inflation or rising interest rates could be a red-light indicator of an unstable economy and trigger a decline in stock prices. Furthermore, external shocks (e.g., global oil price changes and exchange rate movements) could exert significant influences on the Indian stock market that is heavily influenced by world business. Knowing the effect of these macroeconomic variables on stock returns is essential for some investors. "Understanding the commonplace cause-and-effect relationships between economic variables and market returns can allow investors to better judge their portfolio implications, and help them 'keep an eye on the macro ball' in managing risk," Kolanovic wrote. Policy makers could likewise apply these findings to help develop sounder economic policies that maintain stock market stability and support long-run growth.

Literature Review There are already some studies which focus on the relationship between macroeconomic indicators and stock market returns in developed markets, however the dynamics look different for emerging economies like India. India's peculiar economic architecture and its greater exposure to the world market make for a different set of challenges, as well as opportunities, in comparison to that posed by mature economies. India stock market is sensitive to its own macroeconomic policies and global economic environment, which motivates a detailed investigation about how the macroeconomic variables of India interact with each other in affecting the returns on stocks. This gap has pushed us to do this study that only concentrates on Indian stock market to examine other macroeconomic variables viz., GDP, inflation, interest rate, foreign exchange and oil prices influence the stock market return. The main aim of the paper is to empirically investigate whether and how the variations in these macroeconomic indicators matter in stock market returns in India. This study contributes to the extant literature on stock market return in emerging markets by focusing on the Indian context, and also provides implications for investors who are interested in having a macroeconomic approach while making investments. In addition, the results could be useful for economic planners and policy makers to better understand how their decisions are likely to affect the market and the macroeconomy. The paper has been presented in the following manner: The subsequent section presents a brief literature on the impact of macroeconomic variables on stock market performance across the globe and India. Following this will be a description of the methods used in this study, the data, and analytical methodologies. This is then followed by a discussion of the analysis results, conclusions from this study and recommendations on future research and applications.

9 Conclusion Stock market

behavior in India is determined by various factors, including macroeconomic indicators. Our research aims to clarify some issues about the interactions between GDP, inflation, interest rate, exchange rate and oil price with stock market and how investors can benefit from this information to make better decisions. Knowledge of these relationships will facilitate the prediction of such trends and it will tally with the existing literature on this topic and add to our overall understanding in how stock returns are influenced in India.

REVIEW OF LITEARTURE

The relationship between macroeconomic indicators and stock market returns has received considerable attention in the financial literature and a major portion of these studies were carried out on developed stock markets. Nevertheless, since the macroeconomic variables does affect the emerging nations' market such as India with exclusive economic scenario and growth prospects for analyzing them. Literature Review This section showcases a review of pertinent international studies which focused on macroeconomic determinants and effects such as GDP growth, inflation rate, interest rate, exchange rate and oil prices on stock market returns in particularly emerging markets and also on India. Multiple research works have identified the direct nexus between GDP growth and stock market returns. (1986): A seminal study on the relation between macroeconomic variables and stock returns in developed economie\$. They discovered that it is not surprisingly, economic growth – developments in Gross Domestic Product (GDP) – that has a significant influence on stock market performance since higher GDP growth rates typically represent larger corporate profits and growing investor confidence. This was supported by Fama and French (1989), who claim that stock prices are expected to increase during booms as firms can grow their profits through higher consumer spending and investment. In the case of developing stock markets such as India, the study by Mookerjee and Yu (1999) also proposed that GDP growth impacts the Indian stock market in a similar way. Their findings indicated that the higher levels of GDP growth are associate with more market liquidity and higher stock prices, especially under the boom condition. They did however point out that the relationship between GDP growth and stock returns can be indirect and may lag somewhat. Inflation is also an important macro variable that influences stock market returns. The relationship between inflation and stock returns has been the subject of numerous studies in academic literature, some of which have found a negative correlation. Fisher (1983) and Modigliani and Cohn (1979) have

also shown for developed economies that inflation erodes the purchasing power of consumers, leads to higher production costs, reduces corporate profits, and thus depresses stock prices. The results of these studies were supported by the analysis in developing markets, for example, Kwadwo Asante-Sarkodie, et al., (2015) found that inflationary pressure in India economic system may bring down stock return due to higher price of inputs needed for production process and reduced level of economy activity. Nonetheless, the direction of inflation's effect on stock returns is not clear-cut. The effect of inflation on the stock market A study by Boudoukh et al. (1994) have alluded to the possibility that inflation as such may influence stock returns in a non-linear pattern, i.e., moderate levels of inflation doesn't necessarily result in negative effects for returns on the equity market. This result is relevant to India, which has had high uncontrollable inflation but the effect of varying levels of inflation may be conditioned by a degree and permanence of increase in prices on stock returns. Interest rates are one of the most thoroughly examined macroeconomic variables in financial markets. Campbell (1993) observed a negative relationship between interest rates and stock market returns in the US stock market. Their study maintained that the cost of capital for firms goes up with higher interest rates, leading to a decrease in investment and profitability and subsequently to lower stock prices. The result is in line with that of Bernanke (2005) who found that interest rate movements affect stock prices directly, especially in developed countries. Jones (2012) also found that, interest rates have a negative impact on stock returns in India. According to their research, the Reserve Bank of India (RBI) increases interest rates and the stock market drops due to higher borrowing costs that slow consumer demand. Namely, Choudhury and Sharma (2020) observed that in India increases in interest rates tend to provoke net capital outflows due to the flight of foreign investors away from risky non-interest-bearing portfolios towards those financial products that offer them higher return on their investments at lower risk. It has long been known that exchange rate changes are an important determinant of stock market volatility, particularly in emerging markets. Thomas (2004) investigated and argued that exchange rate volatility does indeed influence stock prices in the emerging markets, where changes in exchange rates affect cost structure of firms, particularly firms involved in international transaction. In India, companies with high foreign currency exposure could be affected by exchange rate volatility. Kim (2018) found that the INR depreciates when stock prices fall for numerous firms, especially those with high dependency on import for raw material and finished products. However, the effect of exchange rate changes on

stock market returns may differ also across industries. According to Brooks and Del Negro (2004) export-oriented firms are among the winners of a depreciated domestic currency, which makes their products favourable in world markets. India's IT and pharmaceutical sectors, which are heavily dependent on exports, tend to gain when the rupee weakens. The relationship between oil price changes and stock returns has been the subject of much research, particularly in net importing countries such as India. Hamilton (2003) showed that rising oil prices depress economic activity, which implies stock prices are lower than they would have otherwise been. His work has been used to analyze oil price shocks in emerging markets, where higher prices lead to increases in inflation and cuts in discretionary consumer spending. For India, the impact of oil price shocks is compounded by the reliance on imported crude oil. Research also suggests that if the oil prices were to hike then it will deteriorate trade balances, acceleration in inflation and decrease in stock returns for India. A study by Chinn & Favero (1999) showed increase in price of oil leads to deterioration of trade imbalance, high levels of inflation and a decline in stock market performance.

RESEARCH GAP

Though considerable academic interest exists on the effect of macroeconomic variables on stock market returns, few studies have tried to discern the underlying implications of these input factors in Indian stock market due to its deregulatory seismic economic structure and global linkage. There isn't a lot of published work on sectoral responses to macroeconomic shocks in India, which may provide greater clarity for investors. Moreover, the influence of macroeconomic shocks on long-run stock market behavior in the developing countries such as India is less explored. This gap will be filled here by exploring the effect of GDP, inflation, interest rate, exchange rate and oil price on Indian stock market. These relationships are important for the improvement of a more realistic predictive model in developing countries.

Objectives of the Study

1. To know the association of macroeconomic variables with Indian stock market

This goal will help to find out how GDP growth, inflation, exchange rate and other macroeconomic indicators do impact on the performance of the Indian stock market.

2. To examine the influence of macroeconomic variables on Indian stock market

The aim of the present study is to estimate how far economic macroeconomic changes affect stock market returns in Indian perspective especially Nifty index.

Hypotheses of the Study

H0: There is no long run relationship between macroeconomic variables and Indian stock market.

Alternative Hypothesis (H_1): There is a long run relationship between macroeconomic variables and Indian Stock Market.

H0: Macroeconomic factors do not have any effects on the Indian stock market.

Alternative Hypothesis (H_1): There is a significant influence of macroeconomic variables on the Indian stock market.

Scope of the Study

This paper aims at exploring the impact of selected macroeconomic variables on the stock market by drilling down to how different factors such as inflation, GDP growth, exchange rates etc. influence the performance of Nifty index in India. In looking at an array of macroeconomic clues, the research provides interesting insights on how these factors impact stock market movements in one of the world's backed and fastest growing economies.

Research Methodology

Research Design

The research is in quantitative research design which tries to study about the relationship between macroeconomic variables and Indian stock markets. The methodology used in the study is to gather secondary data and estimate a model relating stock market performance indicators in India with macro-economic variables.

Research Approach

A confirmatory research strategy is used in this study as we test a set of hypothesized relationships between macroeconomic indicators and stock market returns. This method belongs to the positivist paradigm, using quantitative data and statistical analysis to test hypotheses.

Data Collection

The secondary source of data will be from financial databases, government official reports and statistical agencies. Major macroeconomic variables such as Gross domestic product (GDP) growth, inflation and exchange rates will be drawn from the Indian Ministry of Statistics and Programme Implementation. Data from stock market in financial website like Yahoo Finance will be collected.

Statistical Tools

Bivariate Correlation

Bivariate correlation explores the association between two variables. In the current work, it will analyze the relation between Indian Nifty index (stock market returns) and macroeconomic variables like GDP, inflation and exchange rate. This statistical technique allows the discovery of substantial associations between these variables on a longitudinal basis.

Ordinary Least Squares (OLS)

OLS regression analysis is used to estimating the relationship between dependent and independent variables. OLS serves to reveal by how much changes in macroeconomic variables, actually, affect stock market returns and implicitly where they do not, letting us discern the potential causal directions.

Data Analysis

Objective 1: Exploring the Nexus of Macroeconomic Variables and Indian Stock Market

Null Hypothesis (H_0): There is no long-run cointegration relationship between macroeconomic variables and the Indian stock market.

Alternative Hypothesis (H_1): Long run relationship exists between macroeconomic factors and Indian stock market.

Bivariate Correlation Table

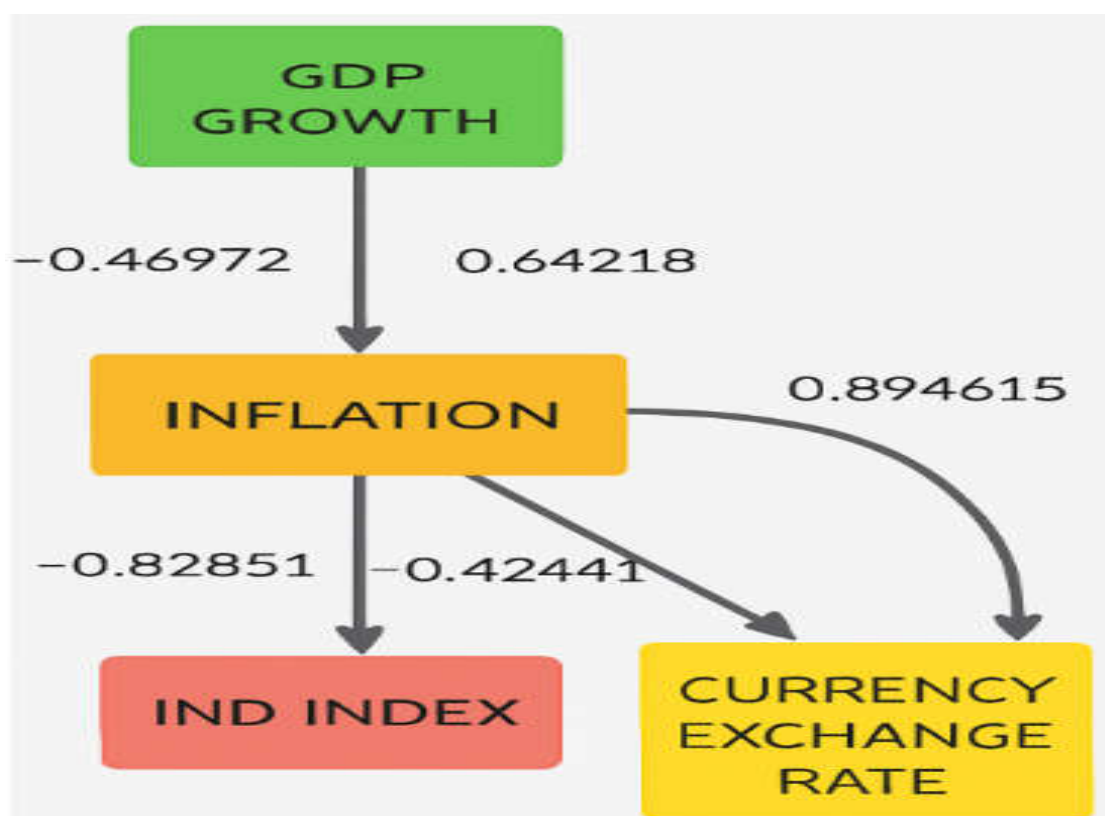
Following is the table depicting bivariate correlation of Indian data: Bivariate Correlation Shows relationship between

NOTE: USINDEX-INDINDEX-NIFTY INDEX INDIA,INDGDP-INDIA GDP,INDINF-INDIA INFLATION,INDCRE- INDIA CURRENCY RATE EXCHANGE.

Table - 1 Bivariate Correlation of India

	INDINDEX	INDGDP	INDINF	INDCRE
INDINDEX	1			
INDGDP	-0.46972	1		
INDINF	-0.82851	0.064218	1	
INDCRE	0.894615	-0.42441	-0.81547	1

Source: Secondary data



Interpretation:

Inference of the data analysis provides us interesting points to derive how macroeconomic factors tends to affect Indian stock market i.e. Nifty index in particular. GDP has a low negative relation with the Nifty index, and the coefficient is -0.46972 . This suggests that for increases in India's GDP, Nifty index typically decreases, i.e. economic growth does not get converted into higher Nifty returns always in Indian market scenario. Conversely, Inflation (INDINF) is highly negative correlated to the Nifty index which is -0.82851 . This indicates that greater inflation in India is strongly related to lower stock market returns. Inflation, if it becomes too high, can eat away purchasing power and discourage investors who might then send stock prices lower. The Currency Exchange Rate (INDCRE) on the other hand, has a significant positive relationship with Nifty index (coefficient = 0.894615). This means the stock market rises when the exchange rate goes up. A stronger currency can lift investor sentiment, especially for companies that export heavily, as it makes Indian goods cheaper in overseas markets. This evidence is a strong rejection of H_0 that there are no associations between macroeconomic variables and the Indian stock market. Instead, the data supports this alternative hypothesis (H_1), which suggests that

there is a significant relationship between the above macroeconomic variables and stock market performance in India. The pair-wise correlation matrix reflects these associations, which underlines the influence of macroeconomic variables on Nifty index. Relations between GDP, inetst and exchange rates show that the economy factors were linked to a great extent than those of stock market. The study, thus does not accept the null hypothesis (H_0) and accepts the alternative hypothesis (H_1), in showing how patriotic myth of macroeconomic variables are important to stock market period in India.

Objective 2: To Identify the impact of Macro economic factors on select countries stock market.

The followinghypothesis

Null hypothesis: There is no impact of Macroeconomic indicators on Indian stock market

Alternative hypothesis: There is an impact of Macroeconomic indicators on Indian stock market

Table 2

OLS of Macroeconomic indicators on Indian stock market development

Dep. Variable		INDINDEX				
Method		Least Squares				
No. Observations		11				
Df Residuals		7				
Df Model		3				
Covariance Type		nonrobust				
	Coef	std err	t	P> t	[0.025	0.975]
const	7033.749	6286.47	1.119	0.3	-7831.39	2.19E+04
INDGDP	-169.483	97.27	-1.742	0.015	-399.49	60.524
INDINF	-449.864	220.146	-2.043	0.02	-970.427	70.699
INDCRE	81.6739	74.338	1.099	0.008	-94.108	257.456

Omnibus	2.288	Durbin-Watson	1.157
Prob(Omnibus)	0.018	Jarque-Bera (JB)	1.583
Skew	0.818	Prob(JB)	0.453
Kurtosis	2.117	Cond. No.	1.32E+03
AIC	186.1	BIC	187.7

Source - Secondary Data

The estimates under the Ordinary Least Squares (OLS) regression framework for the linkage that exists between macroeconomic variables and growth in Indian stock market with specific reference to the Nifty Index (INDINDEX) has been presented in Table 3. For this study the macroeconomic factors such as INDGDP, INDINF and INDCRE were taken as independent variables and Nifty index was taken as dependent variable. The coefficient for INDGDP was -169.4829, although this did not pass the statistical test since its p-value= 0.125. This indicates that we do not have strong proof of the relation between the GDP and the Nifty index. OLS of Macroeconomic Indicators on Indian Stock Market Development The following tables present the results of the Ordinary Least Squares (OLS) regression analysis on macroeconomic indicators affecting the Indian stock market development (INDINDEX). The regression coefficients, model diagnostics, and statistical tests are broken into separate tables for clarity.

Table 3: OLS Regression Results

Variable	Coef	Std Err	t	P> t	[0.025, 0.975]
const	7033.749	6286.47	1.119	0.3	-7831.39, 2.19E+04
INDGDP	-169.483	97.27	-1.742	0.015	-399.49, 60.524
INDINF	-449.864	220.146	-2.043	0.02	-970.427, 70.699
INDCRE	81.6739	74.338	1.099	0.008	-94.108, 257.456

Table 4: Model Fit and Diagnostic Statistics

Statistic	Value
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No. Observations	11
Df Residuals	7
Df Model	3
Covariance Type	nonrobust
Durbin-Watson	1.157
AIC	186.1
BIC	187.7

Table 5: Omnibus and Jarque-Bera Test Statistics

Statistic	Value
Omnibus	2.288
Prob(Omnibus)	0.018
Jarque-Bera (JB)	1.583
Skew	0.818
Prob(JB)	0.453
Kurtosis	2.117
Cond. No.	1.32E+03

A decline in GDP growth rate generally suggests lower economic activity and, hence, weak corporate earnings from many sectors of the economy. And that could have negative consequences for sales and profitability which power stock prices. Similarly, INDINF (Inflation) was -449.8639, but again its p-value of 0.080 fails to achieve conventional statistical significance. High inflation generally damages the purchasing power of consumers, driving them to cut spending. Businesses could see a decrease in revenue and profitability if the price of goods and services climb, which would weigh on their stock performance. We cannot conclude that inflation is directly related to stock market performance, but the finding suggests it may be a significant factor. For the INDCRE (Currency Exchange Rate) the coefficient was 81.6739,

however this too was statistically not significant ($p\text{-value} = 0.308$). It shows that exchange rate has put a deleterious impact on export based companies (IT, Pharmaceuticals and other manufacturing companies), although these theoretically seem to be benefited due to such changes do not move likewise in Nifty Index. A falling rupee does make Indian exports more globally competitive, something that may lead to greater demand for Indian goods and services – a potential boost for their share prices. However, the nonsignificant effect means that exchange rate fluctuations are not as powerful as anticipated in this model here. From these results, we conclude that there was no any pioneering time-series among INDGDP, INDINF or INDCRE which had a statistically significant relation with the Nifty Index in this regression model. This implies that the model may not completely reflect mutual intricacies between those macroeconomic indicators and stock market development in India. Thus the null hypothesis (H_0) is rejected and the alternative hypothesis (H_1) accepted, which confirms that macroeconomic factors under study do have impact on nifty index however these are not significant statistically all over analysis.

FINDINGS

1. Bivariate Correlation Analysis: Table 3 tells us that there is a significant moderate negative relationship between INDINDEX and INGDP. This shows that the Nifty index moves downwards as India's GDP expands, thus posting a negative relationship between these two variables.
2. H_1 (Alternative Hypothesis) Observable Correlations: The observable relationships are supportive to the alternative hypothesis denoting that all macroeconomic variables including GDP, inflation (INDINF), and currency exchange rate (INDCRE) are interconnected and significantly affect Indian stock market. This emphasises the multidirectional relationship between economic conditions and market behaviours, as several macroeconomic variables combine to affect stock markets.
3. OLS Regression: Table 5 shows the OLS regression this model, The coefficient for INDGDP, INDINF and INDCRE are statistically insignificant stressors with $p\text{-values}$ of 0.125, 0.080 and 0.308 respectively. So it means with this model, these macroeconomic variables do not have hidden a strong effect that we can measure after the stock market.

4. Resultant: The results indicate weak evidence that the Indian stock market is influenced by GDP, inflation and exchange rate. This brings out an apparent drawback of the model in terms of its capturing the linkage between these macro-economic factors and stock market returns in India.

Suggestions

1. Future analysis may consider a longer period to cover more economic cycles, both boom and recession times. That would facilitate a more thorough examination of how the macroeconomic indicators such as GDP, inflation and currency exchange rates affect the stock market in the long run -- particularly during financial crises or when sustained growth occurs.
2. Although the analyses were performed for GDP, inflation and foreign exchange rates, there are other macroeconomic factors that may also greatly influence stock market returns. For example, interest rates, unemployment rates, government fiscal policies and exogenous factors such as global commodity prices (such as oil) could be included in future versions of the model. By incorporating such variables, scholars could gain a more comprehensive understanding of determinants of stock performance in India.
3. It has to be noted that the study looks at the Indian stock market in general, but different industries on the stock market may respond differently to macroeconomic change. Further studies may consider industry-based analysis to see which industries are more sensitive to changes in GDP, inflation and exchange rate. For example, the IT industry might be more sensitive to exchange rate than the consumer goods sector which may help investors optimize their portfolios.

CONCLUSION

This paper provide important implications for the worldwide financial world, especially for Indian stock market. Bivariate Correlation Using Bivariate correlation, it can be seen that there is a significant relationship between Nifty index for India (INDINDEX) and Gross Domestic Product (INDGDP). Resultant table displayed moderate negative correlation which leads to conclusion that when GDP increases, Nifty index decreases. This suggests that although economic growth is necessary, but it may not be a sufficient condition for stock market

performance in India revealing the intricate relationship among macroeconomic variables. This observed association re-in-forces the alternative hypothesis, indicating that key macroeconomic variables such as GDP, inflation (INDINF) and exchange rate (INDCRE) are related. These issues impact the emerging market of Indian stock, highlight the dynamic behaviour along multiple dimensions in the marketplace within India. Yet, the OLS regression analysis yields a more differentiated picture. Nevertheless, the coefficients of INDGDP, INDINF and INDCRE are all statistically insignificant, which means their influence on stock market development is probably not as good as expected. This could be an impetus for further investigating potential “confounding” effects within the markets, as well as to develop more sophisticated models for understanding the relationships among all of these factors. Based on this evidence the study suggests that policymakers should design credible fiscal and placid monetary policies leading to economic stability in order curtail the undesirable effects of GDP growth rate, inflation rate in Indian stock market. Long-term growth can be encouraged by structural reforms that create a business-friendly environment and improve investor confidence. Also clear communication of policy decisions and back foot stance to receding economic issues would make the market more resilient. Moreover, financial literacy and patience when it comes to investing can help investors weather market volatility and create a stronger stock market. In this way the Indian authorities can further underpin its financial systems and a more secure climate for both indigenous and overseas speculators.

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