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INDIAN STOCK MARKET DYNAMICS AND THE ROLE OF MACROECONOMIC VARIABLES

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Abstract

This research investigated the impact of various economic indicators on stock prices in the National Stock Exchange. The study considered macroeconomic variables such as Industrial Production, Gold Price, Money Supply, Trade Deficit, Foreign Institutional Investment, Exchange Rate, Crude Oil Price, Wholesale Price Index and 91-day Treasury Bills as a proxy for Interest Rates. The research looked at data over ten years, from January 1, 2012, to December 31, 2022. Information was gathered from various places, like yearly bank reports and the dbie.rbi.org.in database for India's economy. The results showed that certain big-picture economic things didn't have a huge effect on how well the stock market did. Changes in a few things like the NSE, India's Foreign Trade, Money Supply, and Wholesale Price Index did affect how well the Production Index did. So, the study ended up agreeing with the idea that these economic factors don't really cause big changes in India's stock market. As a result, the study concluded that the null hypothesis, stating that "macroeconomic factors and the NSE do not have any kind of causal connection," was accepted.

Keywords: *Correlation, Economy, Granger Causality Test, India, Macroeconomics, NSE, Stock Market.*

JEL CLASSIFICATION: C32, C51, E44, G12, G14, O16

1. INTRODUCTION:

Stock markets play a big role in every country's economy. They provide a lot of choices for investors who want to grow their money. They also give companies a way to offer different kinds of investments. In India, the stock market has grown quite a bit, especially after they changed things in 1991 and made the Securities & Exchange Board of India (SEBI). Today, two very important Indian stock markets, the National Stock Exchange (NSE) and the Bombay Stock Exchange (BSE), are known all around the world.

The changes in 1991 caused a big shake-up in India's financial markets. Because of this, over time, it became more and more important in both India and other countries. This helped India's economy grow. The reforms have led to a greater degree of economic liberalization, globalization, and international integration. As a result, there has been more involvement of big companies from different countries in India. International investment has also been simpler as a result of the integration. Foreign investment is a significant component in the economic restructuring of developing countries like India (Froot, O'Connel, and Seasholes, 2001). Due to India's economy's deregulation and liberalization, foreign investors may benefit from diversifying their holdings. In addition to acquiring equities, they might also disperse their financial resources over other geographical areas to diversify their portfolio (Bilson, Brailsford, and Hooper, 2001). Their contribution substantially raises the nation's foreign exchange reserves, which can be utilized to counteract current account losses and reduce foreign exchange risk.

Increased global market connectivity has led to an increase in risk. In various ways, risk moves from the global market to the domestic market, and this could really change how the local stock market works. Big things happening worldwide, like how the economy is doing, political situations, and other factors, can play a role in this (Naik and Padhi, 2012). The expansion and progress of the stock market are significantly influenced by the state of the economy as a whole. Macroeconomic indicators can be used to forecast stock market returns in financial economics (Mukhopadhyay & Sarkar, 2003). Without these items, the economy would not be able to run. They have a major impact on the stock market.

A controlled exchange, often known as a stock market, is a broad term for a place where equity shares are traded. Both sane and odd investor behavior affect the majority of stock market activity. Macroeconomic factors like GDP and FIIs will also have an impact on the overall stock market performance. The expansion of a nation's economy serves as a broad indicator of economic productivity and is used to gauge development. Economic activity is frequently represented by the Gross Domestic Product (GDP). Foreign Institutional Investors (FIIs) were given access to the first listed shares traded on the Indian stock market in September 1992. According to the RBI Currency & Finance Report (2003-04), the Indian economy has been progressively advancing toward integration with the global system since 1991. The legislation governing FII investment has undergone significant change since then. India was able to attract substantial foreign investment, particularly from Western countries.

2. LITERATURE REVIEW:

Between June 1998 and June 2008, researchers examined the particular long-term link between monetary factors and stock prices. Stock prices and inflation were found to be negatively correlated (Tariq Javeed, 2019).

A research showed the impact of macroeconomic conditions on Ghanaian stock prices. It demonstrated that stock prices and macroeconomic variables cointegrated (George Twenebah, 2018).

The relationship between Pakistan's stock market growth and its GDP growth was investigated. The data set includes annual time series that run from 1971 to 2006. The results of the study show a long-term relationship between Pakistan's economy and stock market development (Ahmed, 2018).

An analysis of the causal relationship between the share price index and industrial output was done for India using a multivariate vector error correction model. The results of the study demonstrated that the Indian stock market is industry and demand-driven (Agerawalla, 2008).

The Karachi Stock Exchange's index stock price and a number of macroeconomic variables were evaluated for their long-term link. The outcome proved that stock prices are directly correlated with the health of the economy. Granger used macroeconomic issues in his explanation of stock price fluctuations (Shaheen, 2014).

The researcher checked if there's a clear connection between rising prices and how well the stock market does in Brazil, which is an important growing market. What they found supports the idea that when prices go up, stock returns tend to go down (Sanvicente, 2002).

A study was done to determine how macroeconomic issues affect the Indian stock market. The analysis discovered a significant relationship between government policies, exchange rates and stock market performance (Wadhwa, 2019).

A study was conducted to determine how macroeconomic factors impacted the price of Indian stocks. The study examined the long and short-term correlations between stock cost and several macroeconomic limits for the Indian economy using annual data from 1979 to 2014. According to the study, stock prices climbed in reaction to economic expansion, inflation, and currency rates but decreased in response to rising crude oil prices (Joshi, 2017).

A study was conducted to look at how macroeconomic issues influence the movement of stock prices. This study reveals that stock returns behave differently based on the company and the sector. Macroeconomic factor variations have a significantly greater and potent impact on stock returns at the industry level compared to the firm level (Bhaskar, 2002).

Researchers conducted a study to understand how the stock market's performance is connected to things like the exchange rate between the dollar and rupee, rising prices (inflation), oil prices, the amount of money in circulation (money supply), and the cost of borrowing money (interest rate). They looked at data for each month from July 1997 to June 2011. The study's findings showed that it's not just these big economic factors

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affecting how the stock market moves, but the stock market itself can also cause changes in some of these big economic factors (Tripathi & Seth, 2014).

3. OBJECTIVES:

1.) To investigate how macroeconomic factors affect the NSE.
2.) To examine the causal connection between macroeconomic factors and the NSE.

4. HYPOTHESIS:

H_0: Macroeconomic factors do not have a substantial effect on the NSE.
H_1: Macroeconomic factors and the NSE do not have any kind of causal connection.

5. RESEARCH METHODOLOGY:

The study's objective has been attained by using macroeconomic variables like the Money Supply (M3), Industrial Production (IIP), 91-day Treasury Bills as a proxy for Interest Rates (IR), Exchange Rate (ER), Gold Price (GP), Wholesale Price Index (WPI), Trade Deficit (TD), Crude Oil Price (CP), and Foreign Institutional Investment (FII). NSE Sensex has been utilized as a substitute for the Indian stock market.

5.1. DATA SOURCE:
The information needed for the study was gathered from various secondary sources.

5.2. DURATION:
The research looked at data over ten years, from January 1, 2012, to December 31, 2022.

5.3. SAMPLE SELECTION:
Based on the data at hand, the study seeks to cover macroeconomic aspects that influence stock market movement. The macroeconomic factors, on the other hand, were chosen based on data made available over the course of the ten-year study period. The study includes a wide range of macroeconomic variables.

5.4 TOOLS USED:
The tools that were used were descriptive statistics, correlation analysis and Granger's causality test. SPSS 28.0 was used to analyze the data that was collected.

6. FINDINGS:

Variables	NSE	IIP	WPI	M3	IR	TD	FII	ER	CP	GP
Mean	-0.992	-0.445	-1.0238	-0.9917	-0.9983	-0.9989	1.445	-3.2238	0.1984	-1.891
Median	-0.9924	-0.4788	-0.9773	-0.993	-0.9982	-0.9972	0.3251	-1.9873	0.3984	-1.793
Minimum	-1.0812	-48.5621	-1.741	-0.9999	-1.0178	-1.1444	-32.552	-2.941	-1.2177	-1.899
Maximum	-0.9077	25.8895	-0.5856	-0.9654	-0.9849	-0.8802	2.4453	-1.3856	-0.4842	-1.965
Std. Dev.	0.0385	7.2791	0.2413	0.007	0.0069	0.0575	6.2493	1.5613	0.2069	-0.107
Probability	0.5866	0	0.0026	0	0.1376	0.1969	0.1299	0.1781	0.1376	0

Descriptive Statistics (Exhibit I)

The information in the table above indicates that the things chosen for the probability analysis were distributed normally and had some level of importance in statistics. On average, the NSE had a value of -0.9920, the Production Index had an average of -0.9989, Foreign Institutional Investors had an average of -0.4450, India Foreign Trade had an average of -1.023, the Money Supply had an average of -0.9917, and the Wholesale Price Index had an average of -0.9986.

The chosen factors were all shown to have low standard deviations. Over the course of the whole study period, the results showed a strong link between risk and returns. Given the higher level of risk involved, taking macroeconomic concerns into account was especially important for those that directly affected stock returns. This indicates that the study only partially accepts the null hypothesis that "selected macroeconomic variables and the Indian stock market are not normally distributed."

Variables	NSE	IIP	WPI	M3	IR	TD	FII	ER	CP	GP
NSE	1									
IIP	0.268	1								
WPI	0.670**	0.082	1							
M3	0.707**	0.139	0.984**	1						
IR	0.122	0.063	0.547**	0.497**	1					
TD	-0.213	-0.292	0.106	0.078	0.036	1				
FII	0.378*	0.340*	0.333*	0.29	0.095	0.241	1			
ER	0.561**	0.076	0.962**	0.944**	0.558**	0.041	0.219	1		
CP	0.021	0.182	-0.017	-0.053	0.409**	-0.114	0.201	-0.091	1	
GP	-0.194	-0.064	0.409**	0.347*	0.335*	0.642**	0.385*	0.392*	-0.051	1

Correlation Analysis (Exhibit II)

The table above shows that the relationship between the index, TD, and GP does exist, despite the correlation's modest negative strength. IIP and foreign investments are strongly correlated in a positive way. Price level and inflation rate are strongly positively correlated with the money supply, interest rate, foreign institutional investors, exchange rate, and gold price. The short-term interest rate, the exchange rate, and the price of gold all have a significant impact on the money supply. The short-term interest rate is strongly positively correlated with the exchange rate, oil prices, and gold prices. There is a positive correlation between gold and the trade imbalance. The connection between the price of gold, FII, and the exchange rate is very favorable.

Null Hypotheses	Observations	F-Statistic	Prob.
CP does not Granger Cause NSE	52	1.9373	0.1304
NSE does not Granger Cause CP		0.7249	0.5402
ER does not Granger Cause NSE	52	1.0791	0.3629
NSE does not Granger Cause ER		2.6825	0.0525
FII does not Granger Cause NSE	52	0.5435	0.654
NSE does not Granger Cause FII		0.8293	0.4817
GP does not Granger Cause NSE	52	0.8281	0.4824
NSE does not Granger Cause GP		2.1685	0.0984
IIP does not Granger Cause NSE	52	1.0285	0.3847
NSE does not Granger Cause IIP		0.4438	0.7223
IR does not Granger Cause NSE	52	1.1644	0.3288
NSE does not Granger Cause IR		0.0102	0.9986
M3 does not Granger Cause NSE	52	0.6389	0.5923
NSE does not Granger Cause M3		0.7907	0.5027
TD does not Granger Cause NSE	52	0.5569	0.645
NSE does not Granger Cause TD		0.8221	0.4856
WPI does not Granger Cause NSE	52	0.691	0.5603
NSE does not Granger Cause WPI		0.2986	0.8263

Granger Causality Tests (Exhibit III)

The information in the table above clearly shows that the chosen macroeconomic factors have a kind of connection with the National Stock Exchange (NSE). When looking at the numbers, they found that the NSE significantly affected the Production Index and the India Foreign Trade index by around 10% each. It was seen that changes in how India trades with other countries had a big effect of around 5% on both of these things.

There were some other one-way connections found too. For example, changes in the amount of money in the economy (Money Supply) and the Production Index were linked in one direction. Also, changes in the price of goods (Wholesale Price Index) had an effect on India's Foreign Trade, Money Supply, and Production Index.

The chosen macroeconomic factors didn't have a very strong effect on how well the NSE did. But they did affect the Production Index. Therefore, the study accepts the null hypothesis that "macroeconomic factors and the NSE do not have any kind of causal connection."

7. LIMITATIONS:

1.) The research covered a span of ten years, which might not capture all potential market dynamics, including short-term fluctuations and crisis periods that could influence the observed relationships differently.

2.) The research did not dive deeply into the potential variations in the impact of macroeconomic indicators across different sectors of the stock market. Different sectors might respond differently to the same macroeconomic changes.

3.) External factors such as global economic conditions and trends were not extensively explored. These factors can significantly influence the domestic stock market but were not explicitly considered.

4.) The research focused specifically on the National Stock Exchange of India and might not be directly applicable to other stock markets or countries with different economic structures and conditions.

8. FURTHER SCOPE:

Researchers could dive into specific parts of the stock market to see how certain indicators affect them. This might help understand why different areas react in different ways to economic changes. They can also look at data from a longer period to see if the connections between economic indicators and stock prices stay the same or change over time. Researchers can also dig deeper into how the world economy, trade, and global events impact India's stock market which may give a wider picture.

9. CONCLUSION:

The Indian stock market is connected to macroeconomic factors throughout the research phase. According to the empirical data, macroeconomic factors have a big impact on the Indian stock market. The results of the study show a favorable correlation between the S&P CNX Nifty and the IIP, WPI, M3, FII, and exchange rate. The index and TD and GP do have a relationship, although a little inverse correlation. The relationship between IIP and foreign investment is strongly positive. Inflation is positively correlated with the money supply, interest rate, foreign institutional investors, currency rate, and gold price.

The correlation analysis revealed a low positive correlation of 0.2147 between the Wholesale Price Index and India Foreign Trade at a 5% significant level, indicating a direct or parallel relationship. India Foreign Trade grows or changes positively in response to increases in the Wholesale Price Index, and vice versa. This result demonstrates that there was not a strong correlation between all macroeconomic variables and the BSE Sensex. Thus, macroeconomic factors had no bearing on the Indian stock market during the research period.

10. DISCLOSURE STATEMENT:

The authors certify that they have no affiliations with or involvement in any organization or entity with any financial or non-financial interest in the subject matter or materials discussed in this manuscript.

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