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AN EMPIRICAL STUDY ON THE IMPACT OF MACROECONOMIC VARIABLES ON PRICE FLUCTUATIONS AT INDIAN STOCK MARKET

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ABSTRACT:

Stock markets are essential for the economic growth of the nation. The financial stability and economic health of a country can be identified by the performance of its stock market. This study paper focuses an empirical study on the impact of macroeconomic variables on price fluctuations at Indian stock marketby analyzing the monthly data from April 2022 to March 2023. The study has been taken five macroeconomic variables i.e. Inflation, Exchange Rate, Consumer Price Index (CPI), Index of Industrial Production (IIP) and Foreign Direct Investment (FDI) which are used as independent variables where as BSE Sensex and NSE Nifty 50 Indices which are used as dependent variables. The data collected have been analyzed by using SPSS version 26. Statistical tools correlation, regression and ANOVA is used to find out the relationship between selected macroeconomic variables and Indian stock market. The result of correlation reveals that there is a positive impact of macroeconomic variables namely exchange rate, consumer price index and index of industrial production can be observed on both BSE Sensex and NSE Nifty50 indices, whereas inflation and foreign direct investment has negative impact on both BSE Sensex and NSE Nifty 50 indices.

Keywords: Stock Exchange, SEBI, Macroeconomic variables, BSE Sensex, NSE Nifty 50 indices.

I.INTRODUCTION

Indian capital market has under gone tremendous changes since 1991, when the government has adopted liberalization, Privatization and globalization polices. The capital markets are exists to mobilize the resource to organizational funds requirements it exists first as commodity the stock and derivatives markets are concern. The effective functioning of the capital markets builds a healthy corporate sector growth there by economic development. Stock markets are essential for the economic growth of the nation. The stock market helps in liquidity and marketability of the company securities and investor`s confidence in the investments into the corporate sector. The market not only provides the trading mechanism but also mitigates the risk and builds healthy portfolios of the investors to maximize the return. The main objective of the study is to analyze the relationship between selected macroeconomic variables and Indian stock market. The study consider five macroeconomic variables as Inflation, Exchange Rate, Consumer Price Index (CPI), Index of Industrial Production (IIP) and Foreign Direct Investment (FDI) and Bombay stock Exchanges indices in the form of SENSEX and NSE Nifty 50 indices.

SECURITIES AND EXCHANGE BOARD OF INDIA (SEBI)

Securities and Exchange Board of India (SEBI) was first established in 12 April 1988 as a non-statutory body for regulating the securities market. It was made as an autonomous body by the Government of India on 12 may1992 and given statutory powers in 1992 with SEBI Act 1992 being passed by the India parliament. SEBI has headquarters at the business district of Bandrakurla complex in Mumbai, and has northern, Eastern, Southern and western Regional offices in New Delhi, Kolkata, Chennai and Ahmadabad respectively. Securities and Exchange Board of India (SEBI) is an apex body that maintain and regulates Indian capital markets.

STOCK EXCHANGE

In India, stock exchanges originated in the latter half of the 19^{th} century. In India, the first organized stock exchange was set up in Bombay in 1875 by the native share and stock broker`s association stock exchange came to be established in various centre such as Madras, Delhi, Nagpur, Kanpur, Hyderabad and Bangalore. At present, there are about 24 recognized stock exchanges in the country, with 21 of them being regional in nature. The three newly setup exchanges – Over the Counter Exchange of India (OTCEI), National Stock Exchange of India (NSE), and Inter – Connected Stock Exchange of India (ICSE) were permitted since their inception to have nation-wide trading.

INDIAN STOCK MARKET Indian stock market has two major stock exchanges namely Bombay stock Exchange (BSE) and National stock Exchange (NSE), The Bombay stock Exchange is the first and largest security market in India. It was established in the year 1875. The National stock Exchange of India (NSE) is the leading stock Exchange in India. It was established in the year 1992. BSE Limited, also known as the Bombay stock Exchange. BSE is an Indian stock Exchange which is located on Dalal Street in Mumbai. It is an oldest stock exchange in Asia and also the tenth oldest in the world. Sensex is an index of the stock in BSE (Bombay Stock Exchange) Sensex has a list of 30 stocks BSE decides the Sensex. The criteria for picking a stock to be listed on Sensex are volume of the trade of that stock and total volume of the stock in BSE. The BSE is one of the world`s largest stock exchanges by capitalization with a market cap of US $3.8 trillion as of June 2023. NSE`S flagship index, the NIFTY 50, a 50 stock index is used extensively by investors in India and around the world as a barometer of the India capital market. The NIFTY 50 index was launched in 1996 by NSE. NSE is under the ownership of various financial institutions such as banks and insurance companies. The NSE is one of the Leading stock exchanges in India by capitalization with a market cap US $3.27 trillion as of Jan 2023.

OBJECTIVES OF THE STUDY

1. To study the price level changes of BSE SENSEX and NSE nifty fifty indices during the study period.
2. To analyze the relationship between selected macroeconomic variables and Indian stock market.
3. To find out the impact of selected macroeconomic variables on price level changes of both BSE and NSE stock indices.

RESEARCH METHODOLOGY

Collection of Data:

The study deal with monthly data for the duration of financial year from April 2022 to March 2023, Macroeconomic variables such as Inflation, Exchange Rate, Consumer Price Index (CPI), Index of Industrial Production (IIP) and Foreign Direct Investment (FDI) have been taken as independent variables where as BSE Sensex and NSE Nifty Fifty Indices has been taken as dependent variables. The study is based on secondary data which have been collected various websites of Bombay stock exchange (BSE), National Stock Exchange (NSE) and Reserve Bank of India (RBI) official website Database on Indian Economy (DBIE), Journals, Articles and Books etc,

HYPOTHESIS

Null Hypothesis (H_0): There is no significant relationship between selected macroeconomic variables and Indian stock market.

Alternative Hypothesis (H_1): There is significant relationship between selected macroeconomic variables and Indian stock market.

II.REVIEW OF LITERATURE

Iftaqar Ahmad and Dr. Jyotsna Sinha (2016) investigated the relationship between macro-economic variables and stock market performance with reference to BSE- Sensex. The study has been taken two macroeconomic variables i.e. Gross Domestic Product and Exchange Rate and BSE Sensex as dependent variable. The study used correlation, Regression and ANOVA model to find out the level of dependency of BSE Sensex performance on macroeconomic variables. The result of their study finding show that GDP is the significant predictor and Exchange Rate is not the significant predictor of BSE Sensex.

Rajesh Makol and Satwik Mittal (2021) revealed that a study of relationship among stock market and macroeconomic factors. The study objective is to analyze the relationship of identifies macroeconomic factors with the Indian stock market. In literature review, they reviewed fifteen literatures related to the study. The study selected four macroeconomic factors i.e. money supply, inflation , exchange rate and gold prices as independent variables and BSE Sensex and CNX Nifty as dependent variables. The result of their study revealed that money supply, inflation and exchange rate have a positively related where as gold pieces are negatively related with stock market.

D.Kinslin and V.P Velmurugan (2018) deliberated the relationship between macroeconomic factors and stock market performances in Indian stock market. The study six macroeconomic factors have been taken as independent variables and BSE Sensex and NSE-Nifty stock index as dependent variables. The study period covers twenty one year from the year 1995-1996 to 2014-2015.The result shows that there is a positive relationship between Indian stock market and macroeconomic factors except interest rate show a negative relation.

Dr.M.Jegadeeshwaran and Navitha.P (2022) examines the impact of macroeconomic variables on Nifty private Bank Index and Nifty PSU index by using data for a period of 10 years from 2012 to 2021 is collected and analyzed using correlation and multiple regressions. The results of the study show that inflation rate is negatively correlated with both Nifty Private Bank Index and Nifty PSU Index; Exchange rate is positively correlated with Nifty Private Bank Index and negatively correlated with Nifty PSU Index; Interest rate is negatively correlated with Nifty Private Bank Index and positively correlated with Nifty PSU Index.

Komal.J Chavda (2019) studies the impact of macroeconomic variables on stock market volatility with reference to Inflation rate and BSE 100 index during the year 2018. The objective of the study is to analyze the relationship between macroeconomic factors on stock market performance. In Literature review, they reviewed six Literatures related to this study. The study have been taken one macroeconomic factor i.e. inflation rate independent variable and BSE 100 indices as dependent variable. The study is based on secondary data during the year 2018 from Jan 2018 to Dec 2018. The study used statistical tools such as correlation and regression analysis. The result shows that there is correlation of inflation rate and BSE 100 return is – 0.0097%, it means there is negative relation between them, and it shows the adverse impact of inflation rate on BSE 100 return.

Piyali Roy Chowdhury and Anuradh.A (2018) entitled “Impact of Exchange rate fluctuation on stock market volatility – A study to predict the economic scenario in India”. The study selected one macroeconomic variable, exchange rate, is studied with Indian stock market (BSE Index). The main focus of the researcher is to find out the impact of exchange rate fluctuation on stock market volatility to predict the economic scenario in India. The study found significant relationship with BSE Index and exchange rate.

Priyanka Aggarwal and Najia Saqib (2017)investigate the impact of macroeconomic variables of India and USA on Indian stock market. The objective of the study is to investigate the impact of changes in selected macroeconomic variables on Indian stock market (Nifty 50 indices). The data used in this study from 2001 to 2016. The study has been used to estimate the relationship, multivariate regression model computed on standard ordinary linear square method. The result shows that exchange rate, USA GDP, S and P, USA interest rate, gold price, WPI, fiscal deficit and IIP highly affect the stock prices.**Dr. L.K. Tripathi, Arpan Parashar and Swati Jaiswal (2014)** examined the long term relationship between selected external macroeconomic variables and different sectoral indices at National Stock Exchange (NSE). The study five macroeconomic variables such as Exchange Rate (USD), Crude Oil prices, Foreign Institutional Investments, Current Account Balance and Foreign Exchange Reserves have been used to magnify the impact of external macroeconomic variables on different sectors of Indian economy represented by sectoral Indices at National Stock Exchange (NSE) i.e. CNX Auto, CNX Bank, CNX Energy, CNX FMCG and CNX IT using monthly data from April 2005 to March 2013. The results of their study finding show that all macroeconomic variables have significant relationship with sectoral indices in India.

III.DATA ANALYSIS AND INTERPRETATION

Table 1 - Descriptive statistics

	N	Minimum	Maximum	Mean	Std. Deviation
BSE SENSEX	12	53676.94	61864.24	58374.1996	2632.80037
NSE Nifty 50 indices	12	15939.39	18387.16	17339.2188	791.21032
INFLATION	12	5.70	7.80	6.6583	.65569
Exchange Rate	12	76.42	82.79	80.5942	2.11469
Consumer Price Index	12	170.10	177.20	174.7333	2.31412
Index of Industrial Production	12	129.50	151.70	138.4833	6.70764
Foreign Direct Investment	12	-1007.85	5325.85	2207.6958	1853.71231
Valid N (list wise)	12				

Table 1 showed descriptive statistics of monthly data for financial year April 2022 to March 2023.

- BSE Sensex average price is 58374.1996, minimum price is 53676.94, maximum price is 61864.24 and standard deviation is 2632.80037.
- NSE Nifty 50 indices minimum price is 15939.39, maximum price 18387.16, mean is 17339.2188 and standard deviation is 791.21032.
- The inflation lowest and highest percentages are 5.70 and 7.80 respectively. The mean value of inflation is 6.6583 and standard deviation is 0.65569.
- The exchange rate minimum is 76.42 and maximum is 82.79. The average exchange rate is 80.5942 and standard deviation is 2.11469.
- The consumer price index minimum, maximum, mean and standard deviation are 170.10, 177.20, 174.7333 and 2.31412 respectively.
- The index of industrial production lowest value is 129.50 and highest value is 151.70. The mean value of IIP (Index of industrial production) is 138.4833 and standard deviation is 6.70764.
- FDI (foreign direct investment) shows minimum amount negative value is -1007.85 and maximum amount positive value is 5325.85. The mean value of FDI is 2207.6959 and standard deviation is 1853.71231.

Table 2 –Correlations

		BSE SENSEX	NSE Nifty 50 indices	Inflation	Exchange Rate	CPI	IIP	FDI
BSE SENSEX	Pearson Correlation	1	.988**	-.504	.641*	.636*	.277	-.642*
	Sig.(2-tailed)		.000	.095	.025	.026	.384	.025
	N	12	12	12	12	12	12	12
NSE Nifty 50 Indices	Pearson Correlation	.988**	1	-.416	.604*	.585*	.231	-.609*
	Sig.(2-tailed)	.000		.178	.038	.046	.470	.035
	N	12	12	12	12	12	12	12

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table-2revealed that there is correlation exists between dependent variables and independent variables. Dependent variables are BSE Sensex and NSE Nifty 50 indices. Independent variables are inflation, exchange rate, consumer price index, index of industrial production and foreign direct investment.

- It is found that there is consumer price index and exchange rates have a high positive relationship with Indian stock market.
- The index of industrial production has a Low positive relationship with Indian stock market.

- The foreign direct investment has a high negative relationship with Indian stock market. The inflation has a moderate negative relationship with Indian stock market.
- The result clearly revealed that there is a positive relationship between exchange rate, CPI and IIP with Indian stock market except inflation and foreign direct investment as they show negative relationship.

REGRESSION ANALYSIS BETWEEN SELECTED MACROECONOMIC VARIABLES AND BSE SENSEX

Table 3 - Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.701[a]	.491	.066	2543.92503

a. Predictors: (Constant), Foreign Direct Investment, Index of Industrial Production, Exchange Rate, INFLATION, Consumer Price Index

Above table presented model summary that the value of the coefficient of determination i.e. R square is 0.491 which means 49.1% variation in the stock price of BSE Sensex is explained by predicting independent variables.

Table 4 – ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	37418688.088	5	7483737.618	1.156	.425[b]
	Residual	38829327.393	6	6471554.566		
	Total	76248015.482	11			

a. Dependent Variable: BSE SENSEX
b. Predictors: (Constant), Foreign Direct Investment, Index of Industrial Production, Exchange Rate, INFLATION, Consumer Price Index.

The table-4 presented the results of ANOVA that the residual value is 38829327.39 and mean square value is 7483737.618. The overall model is significance value is 0.425 is more than 0.05 at 5% significant level and indicates the null hypothesis rejected, whereas alternative hypothesis accepted and concluded that there is a significant relationship between selected macroeconomic variables and BSE Sensex.

Table 5 - Regression Coefficients

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	78298.444	176455.974		.444	.673
	Inflation	282.284	2289.931	.070	.123	.906
	Exchange Rate	826.441	1473.352	.664	.561	.595
	Consumer Price Index	-559.648	1570.965	-.492	-.356	.734
	Index of Industrial Production	80.313	182.470	.205	.440	.675
	Foreign Direct Investment	-.790	.857	-.556	-.922	.392

a. Dependent Variable: BSE SENSEX

Regression Coefficients table-5 shows that the value of price volatility in BSE Sensex is 78298.444 (Constant) when other independent variables to be taken as Zero. Therefore, the formula for regression equation,

$P_{BSE} = 78298.444 + 282.284\ I + 826.441\ ExR - 559.648\ CPI + 80.313\ IIP - 0.790\ FDI$

Where, Dependent variable = Price volatility of BSE Sensex

Independent variables = Inflation (I), Exchange Rate (ExR), Consumer price index (CPI),Index of industrial Production (IIP) and Foreign Direct Investment (FDI).

Macroeconomic variables on stock price volatility on BSE Sensex arise due to inflation exchange rate and index of industrial production can lead to increase in BSE Sensex by 282.284, 826.441 and 80.313 respectively. The result shows that a positive impact of macroeconomic variables on BSE Sensex stock price whereas consumer price index and foreign direct investment can lead to decrease in BSE Sensex by – 559.648 and – 0.790 respectively. The results show that there is a negative impact of macroeconomic variables on BSE Sensex stock price.

REGRESSION ANALYSIS BETWEEN SELECTED MACROECONOMIC VARIABLES AND NSE NIFTY 50 INDICES

Table 6 - Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.680[a]	.463	.015	785.29489

a. Predictors: (Constant), Foreign Direct Investment, Index of Industrial Production, Exchange Rate, INFLATION, Consumer Price Index

Table-6 shows that there is value of the coefficient of determination i.e. R square is 0.463 which means 46.3% variation in the stock price of NSE Nifty 50 indices is explained by predicting independent variables.

Table 7 – ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3186023.125	5	637204.625	1.033	.475[b]
	Residual	3700128.376	6	616688.063		
	Total	6886151.501	11			

a. Dependent Variable: NSE Nifty 50 indices

b. Predictors: (Constant), Foreign Direct Investment, Index of Industrial Production, Exchange Rate, INFLATION, Consumer Price Index

Table-7 shows that the residual value is 3700128.376 and mean square value is 637204.625. The overall model is significance value is 0.475 is more than 0.05 at 5% significant level and indicates the null hypothesis rejected, whereas alternative hypothesis accepted there is variables and NSE Nifty 50 indices.

Table 8 - Regression Coefficients

Model		Unstandardized Coefficients B	Std. Error	Standardized Coefficients Beta	t	Sig.
1	(Constant)	30035.803	54470.935		.551	.601
	Inflation	287.162	706.888	.238	.406	.699
	Exchange Rate	346.676	454.815	.927	.762	.475
	Consumer Price Index	-265.621	484.948	-.777	-.548	.604
	Index of Industrial Production	32.294	56.328	.274	.573	.587
	Foreign Direct Investment	-.275	.264	-.645	-1.042	.338

a. Dependent Variable: NSE Nifty 50 indices

Table-8 explicit the results & multiple regression shows that the value of price volatility in NSE Nifty 50 indices is 30035.803 (Constant) when other independent variables to be taken as Zero. Therefore, the formula for regression equation,

P_{NSE} = 30035.803 + 287.162 I + 346.676 ExR - 265.621 CPI + 32.294 IIP - 0.275 FDI.

Where, Dependent variable = Price volatility of NSE Nifty 50 indices

Independent variables = Inflation (I), Exchange Rate (ExR), Consumer price index (CPI),Index of industrial Production (IIP) and Foreign Direct Investment (FDI).

Macroeconomic variables on stock price volatility on NSE Nifty 50 indices arise due to inflation exchange rate and index of industrial production can lead to increase in NSE Nifty 50 indices by 287.162, 346.676 and 32.294 respectively. The result shows that a positive impact of macroeconomic variables on NSE Nifty 50 stock price whereas consumer price index and foreign direct investment can lead to decrease in NSE Nifty 50 indices by –265.621 and – 0.275 respectively. The results show that there is a negative impact of macroeconomic variables on NSE Nifty 50 stock price.

IV.FINDINGS OF THE STUDY

- Average price of BSE Sensex is 58374.1996 and NSE Nifty 50 index is 17339.2188 found in the financial year 2022 – 2023.
- The results of standard deviation (SD) showed BSE Sensex is 2632.80037 and NSE Nifty 50 indices are 791.21032.
- The correlation results shows that three macroeconomic variables namely Exchange rate, consumer price index (CPI) and index of industrial production (IIP) have positive correlation in both Indian stock market and two macroeconomic variables namely inflation and foreign direct investment have negative correlation in both Indian stock market.
- The overall model is significance value is more than 0.05 at 5% significant level and find out the null hypothesis rejected, whereas alternative hypothesis accepted.
- It is found that there is significant relationship between selected macroeconomic variables and Indian stock market.

V.CONCLUSION

The study paper focuses an empirical study on the impact of macroeconomic variables on price fluctuations at Indian stock market by analyzing the monthly average data from April 2022 to March 2023. The capital markets return refers to the facilities and institutional arrangements through which long term funds both debt and equity are raised and invested. It consists of a series of channels through which savings of the community are made available for industrial and commercial enterprises and for the public in general. It directs these savings into their most productive use leading to the growth and development of the economy. The result reveals that there is a positive impact of macroeconomic variables namely exchange rate, consumer price index and index of industrial production can be observed on both BSE Sensex and NSE Nifty50 indices, whereas inflation and foreign direct investment has negative impact on both BSE Sensex and NSE Nifty 50 indices. The study found there is significance value is more than 0.05 at 5% significant level, so we null hypothesis rejected, whereas alternative hypothesis accepted. It means that there is significant relationship between selected macroeconomic variables and Indian stock market. The study has useful to policymakers, regulators, and investment community to choose more economic variables and varies stock indices for the study.

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