Macroeconomic Variables and Indian Stock Market Return: A study

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Abstract

India ranks sixth largest economy in the world by gross domestic product (GDP). In 2018 India's economy became the world's fastest growing major economy surpassing China. The stock market is mirror of the economy. There are so many macroeconomic variables like inflation, interest rates, GDP, FII investment; prices of crude oil, exchange rate of currency etc. can affect the return of the stock market. The aim of the research work is to measure the year wise change in FII investment in equity, year wise change in Brent crude oil price, year wise change in the INR-USD exchange rate and year wise change in the return of market (NIFTY) and find out relation between change in macroeconomic variables and the return of the Indian stock market for a period of ten years from year 2009- year 2018. Collected secondary data are analysed by statistical measures like mean, median, standard deviation, skewness, kurtosis, correlation matrix, multiple correlation and regression. It was found that Change in FII investment in equity and NIFTY return and Change in INR-USD exchange rate and Change in Crude oil price are positively related. And Change in Crude oil price is negatively related with Change in FII investment in equity and NIFTY return.

Keywords: Exchange rate, Gross domestic product, Inflation, Standard deviation, Skewness.

Introduction

India is a developing country. Indian economy is a mixed economy where public sector and private sector operates side by side. India ranks sixth largest economy in the world by gross domestic product (GDP). In 2018 India's economy became the world's fastest growing major economy surpassing China. The long term growth prospective of the economy is very positive due to its young population, corresponding low dependency ratio, vigorous saving and investment rates and growing assimilation with the global economy. Indian stock market has become the most wanted investment destination for investors of all over the world especially for the investors of the developed economy. As the stock market is mirror of the economy so return of stock market is correlated with various economic, social and political factors of India and the world. There are so many macroeconomic variables like inflation, interest rates, GDP, FII investment; prices of crude oil, exchange rate of currency etc. can affect the return of the stock market. These factors can be discussed in the following way:

Inflation is the rate at which the general price level of goods and services is increasing and consequently the purchasing power of home currency is decreasing. Deflation is the opposite of inflation. Both inflation and deflation are not desirable for healthy economy. The central bank of country takes monetary measures to curb inflation and deflation.

Interest rate is generally fixed by the central bank of the country. Interest rates are lending and deposit rates. There are repo rate and reverse repo rate which are determined by the central bank. Repo rate is rate at which the central bank borrows money to the other banks and reverse repo rate is the rate at which the other banks borrow money to central bank.

Gross domestic product is the measurement in money of the market value of all the goods and services finally produced in a year or during a period of three months. GDP is considered as the most powerful indicator of growth and development of the economy of a country. Agriculture and its allied services, industry and services are three main contributors to the GDP of India. Indian economy grew at 8.2% year on year in the second half of 2018.

Foreign Institutional Investors of a country are institutions and hedge funds of outside the country where they are investing. Generally FII are long term investors and in India they have played vital role in the development of the stock market over a decade.

Bench mark crude or marker crude is a crude oil that serves as a reference price for buyers and sellers of crude oil. There are three benchmarks for crude oil viz, west texas intermediate (WTI), Brent crude and Dubai crude.

Exchange rate is the price of one country's currency in terms of other country's currency. Domestic currency and foreign currency are the two factors for determining the exchange rates. Exchange rate of currency is a vital thing for exporters and importers of a country.

Literature Review:

Bilson et al.,(2001) tested whether local macroeconomic variables (money, goods prices and real activity) have explanatory power over stock return of 20 exchanges of emerging markets for the period 1985-1997. The results indicated that the exchange rate variable was clearly the most influential macroeconomic variables.

Mohammad and George (2008) examined the role of macroeconomic variables on the movement of prices of stocks of Ghana Stock exchange. They used databank stock index to show stock market and inward foreign direct investment, Treasury bill rate (measuring interest rate), consumer price index (measuring inflation), the currency exchange rate as macroeconomic variables. They studied short and long term relation between macroeconomic variables and stock market.

Gazi and Hisham (2010) observed the relationship between trade surplus, foreign exchange reserves, money supply, oil prices and the return of Jordian stock market. They found a negative relationship between crude oil and stock market return.

Kuwornu and Nautwi (2011) examined the relationship between Consumer price index (inflation rate), Exchange rate and Treasury bill rate and return of Ghana stock market. They have used monthly data for a period from January 1992 to December 2008. As conclusion they found that consumer price index and market return of Ghana stock exchange are positively related while exchange rate and treasury bill had a negative impact on the stock exchange return.

Khan and Zaman (2012) found the relationship between GDP, exports, consumer price index, money supply M2, exchange rate, foreign direct investment, oil prices and the stock prices of Karachi stock exchange. Results of the study showed that GDP and exchange rate positively affect stock prices while consumer price index negatively affects stock prices. Other macroeconomic variables of considered for study are insignificant to the changes in stock prices.

Objective of the study:

The objective of the research work is to measure the year wise change in FII investment in equity, year wise change in Brent crude oil price, year wise change in the INR-USD exchange rate and year wise change in the return of market (NIFTY) and find out relation between change in macroeconomic variables and the return of the Indian stock market for a period of ten years from year 2009- year 2018.

Research Methodology:

a)Selection and collection of data: The present has used secondary data collected from nseindia.com, nsdl.com, tradingeconomics.com. Here only three macroeconomic variables viz., crude oil price, INR-USD exchange rate, FII investment in equity have been selected for the study. Monthly data on crude oil price, INR-USD exchange rate, FII investment in equity and return of NIFTY has been collected, then year wise change have been calculated and the data has been collected for ten years from year 2009 to year 2018.

Analysis of data: For analyzing the collected secondary data statistical measures like mean, median, standard deviation, skewness, kurtosis, correlation matrix, multiple correlation and regression have been used to find out relation between macroeconomic variables and the return in NIFTY for ten years.

Analysis and Interpretation:

Table 1 : Descriptive Statistics

	NIFTY return (%)	Change in FII investment in equity (%)	Change in Crude oil price (%)	Change in INR-USD exchange rate (%)
Mean	18.17	493.69	1.37	4.91
Median	12.50	1.75	-1.22	4.19
Standard deviation	28.63	1528.55	29.71	8.41
Kurtosis	3.36	9.82	-1.09	-0.595
Skewness	1.43	3.12	-0.30	-0.06
Range	106	4994.44	87	26.06
Minimum	-20	-164.44	-47	-8.36
Maximum	86	4830	40	17.7
Sum	181.69	4936.85	13.71	49.14
Count	10	10	10	10

Source: calculated

Inference: The above table showed the descriptive statistics of macroeconomic variables and change in NIFTY return for a period of ten years from 2009-2018. The mean return of Nifty was 18.17 and mean of the Change in FII investment in equity is 493.69, Change in Crude oil price was 13.7 and mean of Change in INR-USD exchange rate 4.91. The standard deviation of Change in FII investment in equity is1528.55, there was wide range of fluctuation in the FII investment from mean change (range of Change in FII investment in equity is 4994.44). The standard deviation of Change in INR-USD exchange rate is 8.41 there was narrow range of fluctuation in the Change in INR-USD exchange rate. NIFTY return and Change in FII investment in equity were platy kurtic and Change in Crude oil price, Change in INR-USD exchange rate was lepto kurtic. NIFTY return and Change in FII investment in equity were positively skewed and Change in Crude oil price, Change in INR-USD exchange rate was negatively skewed.

Table 2: Correlation matrix

	NIFTY return (%)	Change in FII investment in equity (%)	Change in Crude oil price (%)	Change in INR-USD exchange rate (%)
NIFTY return (%)	1			
Change in FII investment in equity (%)	0.198	1		
Change in Crude oil price (%)	-0.376	-0.036	1	
Change in INR-USD exchange rate (%)	-0.776	-0.060	0.446	1

Source: Calculated

Inference: Table 2 showed correlation matrix between macroeconomic variables and change in NIFTY return for a period of ten years from 2009-2018. It was found that Change in FII investment in equity and NIFTY return and Change in INR-USD exchange rate and Change in Crude oil price are positively related. An increase in FII investment in equity and Change in INR-USD exchange rate will lead to an increase in NIFTY return and Change in Crude oil price and vice versa. And Change in Crude oil price is negatively related with Change in FII investment in equity and NIFTY return. Also the Change in INR-USD exchange rate is also negatively related with Change in FII investment in equity and NIFTY return.

Table 3 : Multiple correlations and multiple regressions

Multiple correlation and multiple regression of NIFTY return on Change in FII investment in equity, Change in Crude oil price, Change in INR-USD exchange rate [Regression equation NITFY=$\hat{a}_0$+$\hat{a}_1$. FII investment in equity + $\hat{a}_{2.}$ Crude oil price + $\hat{a}_{3.}$ INR-USD Exchange rate]

	R	R_2	F	β_0		β_1		β_2		β_3	
				t	value	t	value	t	value	t	value
Nifty return	0.79	0.63	3.36	**3.45	0.01	0.61	0.57	-0.13	0.90	** -2.69	0.04
#Significant at 5% level table value(k,n-k-1)i.e.(3,6) degrees of freedom at 5% level is 4.76				* significant at 10% level ** significant at 5% level ***significant at 1% level Table value of t with (n-k-1) i.e. 6 degrees of freedom at 10%, 5%, 1% levels are 1.943, 2.447 and 3.707 respectively.							

Source: Calculated

Inference: The table 3 showed multiple correlations and multiple regression of NIFTY return on Change in FII investment in equity, Change in Crude oil price, Change in INR-USD exchange rate. Where NIFTY return is dependent variable and Change in FII investment in equity, Change in Crude oil price, Change in INR-USD exchange rate are independent variables. The multiple correlation co-efficient is 3.36 which was not statistically significant as it was less than 4.76. The co-efficient of multiple regressions between FII investment, change in crude oil price and nifty return were not statistically significant. But the co-efficient of multiple regressions between Change in INR-USD exchange rate and nifty return was negative which was statistically significant at 5% level of significance. So it can be said that increase in INR-USD exchange rate would lead to a fall or decrease in the stock market.

Conclusion:

It may be said from the above study that Change in FII investment in equity and NIFTY return and Change in INR-USD exchange rate and Change in Crude oil price are positively related. An increase in FII investment in equity and Change in INR-USD exchange rate will lead to an increase in NIFTY return and Change in Crude oil price and vice versa. And Change in Crude oil price is negatively related with Change in FII investment in equity and NIFTY return. Also the Change in INR-USD exchange rate is also negatively related with Change in FII investment in equity and NIFTY return. This means that an increase in Change in Crude oil price would lead to a decrease in Change in FII investment in equity. The co-efficient of multiple regressions between FII investment, change in crude oil price and nifty return were not statistically significant. But the co-efficient of multiple regressions between Change in INR-USD exchange rate and nifty return was negative which was statistically significant at 5% level of significance. So it can be said that increase in INR-USD exchange rate would lead to a fall or decrease in the stock market.

Limitation of the study:

The study had used secondary data and the study was based on the availability of the data. The study has the following limitations:

1) The study was limited to ten years period from 2009 to 2018. More years may be taken into consideration.
2) Three macroeconomic variables had been considered for the study. More variables may be considered.
3) Limited number of statistical methods and techniques had been applied.

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