An Empirical Study on Analysing the Relationship between Macro Economic Indicators (FII, IIP, Exchange Rate) and Indian Stock Market (NIFTY 50)

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Abstract – The present global business era each country is trying to spectator binary number economic growth which is forcing them to adopt swift innovation and rivalry across the globe. In this context Foreign direct investment (FDI) and Foreign Institutional Investment (FII) acting as indicator for the economic growth. FDI and FII has become an important measure for the economic development in India as well as other countries. The purpose of this research is to find out the relationship between stock market trend and the macroeconomic variables i.e. FDI and FII using Multi-Regression techniques, where Nifty was considered as the diplomat for the Indian Stock market index. Ten years of data was taken in the study from Jan 2009 – Jan 2019. The findings specify FDI and FII are moving in a trend with coordination with Nifty and the macroeconomic variables determine the stock market trend.

Keywords: FII, IIP, Nifty, Exchange Rate, Macroeconomic Factors

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INTRODUCTION

Now a day, the readings of stock market are presumed to be the most important factor which indicates the economic condition of the stock market. Through the performance of stock market we can analyse the economic condition of the countries all over the world. The fluctuations in the stock prices are a matter of concern for all the emerging economies. The data analysts have done lot of research work to study the volatility of the stock prices. It was also agreed by the researchers, the academia and the researchers, that the macroeconomic indicator plays a very vital role in fluctuations of the stock market returns. The earliest study by Fama and Schwert (1977) also says that the macro economic variables play a vital role in influencing the volatility of the stock market. At present, the stock market indices like SENSEX and NIFTY are grabbing more attention of all the investors and data analysts. The policy makers have to keep an eye on these fluctuations which will help them to decide the next move of the stocks. Not only the researchers but the companies also have to watch closely these fluctuations in order to evaluate their own stocks. The stock market of India has become the world's popular hub for foreign investors

to invest, but the major question arises whether the stock markets are performing really well.

In India the major two markets are BSE and NSE. They are the largest and actively traded markets. It can also be said that these two stock exchanges is considered to be the barometer of our Indian economy, which in turn grabs the attention of investors, the government, foreign investors and public. After liberalisation and globalisation of the economy since 2001, the performance of stock market indices was observed to be showing a booming trend which took the Indian economy to the new heights. Nevertheless due to the major financial crisis in the year 2008, the stock market performance was rapidly declined and slowly recovered in the following years. Many researchers like Warther (1995) in his study '*price pressure hypothesis*' analysed that the upsurge in share price associated with foreign investment flow is caused by short-term liquidity (i.e. excess demand) and forecasts that this fluctuations in share prices is subsequently overturned. As a result, this study ponder the question as to "whether the foreign investment outflows were the major cause to such decline in the stock market?"

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In the year 2007 and 2008 the western countries faced a financial crisis, which cautioned their investors resulting in the stoppage of investment flow from western countries. In that time developed economies, suffered from the then crisis which spread to other parts of the globe. The contagion affect was also seen in India on 21/01/2008, when Sensex crashed1744 points. Sensex actually lost almost 2000 points in that single intraday. The clear reason behind the crash was believed to be the weaker global economy and heavy selling by the FIIs. The global economy crisis resulted due to the subprime crisis happened in USA in 2007, due to which, many USA banks and financial institutions collapsed. But India's financial institutions were standing at a pretty good health and witnessed a robustgrowth. If India was not affected so deeply by the crisis then why the stock markets like BSE and NSE performed so badly during those periods? Many studies (Tripathy, N. and Badani, K.N., 2009) have shown that FIIs had played a bigger role in influencing the Indian stock market performance. It can be justified that India as an emerging economy always require capital and hence there is need for foreign capital.

Foreign capital mostly helps to boost the exchange reserve, productivity, infrastructure development and much needed to meet the trade deficits. Foreign capital comes in two ways like Foreign Direct Investment (FDI) and Foreign Institutional Investment (FII). Foreign direct investment involves establishing direct production houses and foreign institutional investment involves a short term investment mostly in the financial markets. India, a capital scarce country liberalised its economy to foreign institutional investors in September 1992 to attract foreign investments. The event symbolized a landmark experience for India and which gave an edge to Indian financial service industry. Since then mutual funds, pension funds, investment trusts, asset management companies, institutional portfolio managers, registered university funds, endowment funds, foundations and charitable funds were permitted to invest directly in Indian stock market. Nevertheless, all these policy corrections helped India to boost its economy, but foreign fund inflow was still considerably low.

Till now the researchers witness that the whole Indian market gets panicked when FIIs withdraw for whatever reason; may be for a business motive of making short term gain or for a genuine cause like scarcity of fund because of a crisis elsewhere. If we look at some bigfalls in Indian stock market, majority was followed by FII withdrawals. So it will be better for India not to depend solely upon the foreign fund rather encourage domestic investment. At the same time there are some other factors which really affect the stock market performance such as declaration of IIP figures and the fluctuations in foreign currency exchange rate (INR/USD). Many theories and researchers suggested that a change in the

exchange would also affect the firm's foreign operation and its overall profits, which in return will affect the firm's stock price.

Aggarwal (1981) found a significant positive correlation between US dollar and US stock price, while Soenen and Agarwal (1989) found mixed results among industrial countries. Morley and Pentecost (2000) investigated the nature of relationship between stock prices and spot exchange rates for G7 countries and argued that the lack of strong relationship between exchange rate and stock prices may be due to the exchange controls that were in effect in the 1980s. The purpose of present study is to understand the degree of impact of FII on the stockmarket. Whether FII is the only route cause behind the highs & lows in NIFTY? Can India consider some other factors like Index of Industrial Production and exchange rate to control the stock indices?

REVIEW OF LITERATURE:

There exist enough studies with respect to impact of FIIs on the stock market index as well as macro Economic indicators and its influence on the stock market indices. Some studies also found that the macroeconomic variables alone cannot predict the stock returns over the time.

Pearce and Roley (1985) in their study, found that the stock prices were significantly influenced by the announcements in the monetary policy. While Jain (1988) found from his study that stock price changes happened significantly with the money supply and consumer price index.

Chen et al. (1986) tested whether a set of macroeconomic variable can explain the changes in equity returns, where it is found that variable like Industrial production, changes in risk premium, twists in the yield curve and measures of unanticipated inflation explain the stock returns significantly.

Mukherjee and Naka (1995) applied Vector error correction approach to model the relationship between the macroeconomic variables and Japanese stock returns. They found the co-integration relations among stock prices and six macro economic variables like inflation rate, exchange rate, call money rate, money supply, real economic activity and long term government bond rate.

Tsoukalas (2003) investigated the relationship between the various macroeconomic factors with the stock price of Cyprus by applying Vector Auto Regressive model. There it was found that equity market in Cyprus was sensitive to variations in the exchange rate and industrial production.

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Pethe and Karnik (2000) in their study, attempted to know about how the stock market indices were affected by macroeconomic variables in India. In their study, they run a causality tests in an error correction framework on non-cointegrated variables. The study found a weak causality running from IIP to share price index (Sensex and Nifty). They hold the view that the state of economy affects stock prices.

Bhattacharya and Mukherjee (2002), in their study used Granger causality test to examine the causal relationships between Sensex and five macroeconomic variables such as Inflation, IIP, Interest rate, National income, Money supply for the period from 1992-93 to 2000-01. From their study they found that IIP affects the fluctuations in Sensex and there exists a bi-directional causality between Rate of inflation and Sensex.

Manjri, Yamini and Kowadia (2004) found from their study that foreign currency exchange rate (INR/USD) also plays very crucial role in bringing investments to Indian capital market and it was observed that BSE sensitive index (Sensex) is really sensitive to the exchange rate.

Sharma and Singh (2007) examined the significance of variables like foreign exchange reserves, claims on private sector, wholesale price index, and call money rate, index of industrial production, exchange rate and broad money on Sensex. They used monthly data horizon from April 1986 to March 2005. In their study, they used multiple regression analysis. From this study they found variables like IIP, Foreign exchange reserve, claims on private sector, exchange rate and money supply have a considerable influence on the stock market movement. Very few variables like interest rate and wholesale price index showed a very negligible influence on the stock market.

Besides, there exists enough evidence that Index of industrial production (IIP) of India is having significant relation with the stock market indices (Padhan, 2007) and this can be an eye opener for policy makers and regulators to understand the balancing act for developing economic activity and at the same time controlling the foreign institutional investment into the Indian stock market.

Another study conducted by Kanakaraj, A. et al. (2008) has studied the trend of stock prices and various macro economic variables for the time horizon from the year 1997 to 2007. Here in their study, they have tried to answer that the boom in stock market for the period from 2003 to 2007 can be explained in the terms of macroeconomic fundamentals.

Nidheesh (2008) has studied the impact of foreign institutional investment in India and its impact on BSE and NSE and addressed various issues. In his research he has observed that there exists an influence of FII on the improvement of the trade practices of stock market since liberalization, but at the same time this advantage turns into negative in terms of the destabilization of the market, because of the trading pattern of FIIs in India.

Raj Kumar and Gupta (2010) also found from the empirical investigation that FIIs are affecting the market for their own interest and returns at the Indian stock market and the risk at the international market are the two major driving factors for the inflow of FII into India.

Singh, D. (2011) attempted to explore the causal relationship between stock market indices and three macro economic variables of Indian economy such as Index of Industrial Product (IIP), Wholesale Price Index (WPI) and Exchange rate. In his study he found that Indian stock market is approaching towards informational efficiency, at least with respect to two macroeconomic variables such as exchange rate and Inflation.

It was rightly studied by Gupta (2011), where the boom in capital market could be possible only because of the FIIs, but nevertheless some most panic moments of capital market history is also because of sudden withdrawal by these categories of investors.

Dieci, R., et al., (2013) established a financial model which helps the investors in designing proper strategies in determining their order size. This model considered from the view point of both domestic as well as foreign investors requirements, as they are dependent on foreign exchange market for their trading. The financial model has involved natural nonlinearity at its state on the basis of the connections in between the stock market of two countries and the foreign exchange market which will help the speculators of both the countries in implementing their technical fundamental trading strategies.

Afshan, S.,et al., (2018) utilized the wavelets approach in order to establish a strong relationship in between foreign exchange rate and stock market index. For the analysis purpose the weekly data were collected from 1999 to 2016 in relation to USD/ PKR, YEN/PKR, EUR/ PKR, PKR/ GBP and CNY/PKR as exchange rate and SP as stock price index. For the stationary of the data set, unit root test was implemented on the log series of the dataset. The study has revealed that there was presence of bidirectional causality in the long run.

The present study is unique in the sense that it is an analysis from a longer term prospective i.e. Jan 2009 to Jan 2019 and at the same time an empirical investigation of the degree of influence of each variable on the dependent variable. FII inflow is certainly a good indication for any stock market of any nation but country like India needs to have

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preparation for the other side of the coin i.e. how to ensure stability in stock market in the phase of FII outflow. Whether any other factor that can bring stability in the market?

OBJECTIVES OF THE STUDY:

In this research study the major objective is to examine the correlation and causal relationship, if any between the stock market and FII along with other macroeconomic variables in India for a period of 10 years, which is from Jan 2009- Jan 2019. The other objective is to know the influence of FIIs on the movement of Nifty returns along with testing the influence of IIP and exchange rate from a long run point of view. The attempt has been made to explore the degree of influence of each variable on stock price index.

HYPOTHESES OF THE STUDY;

H_01: There is no significant impact of net inflow of FII on the monthly average of Nifty 50

H_02: There is no significant impact of monthly IIP index on the monthly average of Nifty 50

H_03: There is no significant impact of monthly Exchange rate USD/INR on the monthly average of Nifty 50

RESEARCH METHODOLOGY:

This paper uses monthly average data of NIFTY 50 for the period from Jan 2009 to Jan 2019 for India. Here we have considered Index of Industrial Production (IIP) Exchange rate (INR/USD) as other macro economic factors along with net flow of Foreign Institutional Investors for this study. Further, we have considered these two factors of IIP and Exchange rate out of many other macroeconomic variables because IIP reflects the growth of India's industrial activity and exchange rate depicts the health of Indian economy. This analysis is made on the basis of secondary data. The data for the macro economic variables were taken from the handbook of statistics on Indian economy and the data for NIFTY 50 were extracted from the website of investing India. To justify the objective of the study different methods are being adopted. First, a trend analysis is being made to get a pictorial view of the entire scenario including the movement of the Nifty 50 and macroeconomic variables. Next we have used correlation analysis to find out the relationship between the upward state and downward state of stock market with FII. Then correlation technique has been used between NIFTY 50 and FII along with the other macro economic variables. The OLS Model is applied to understand the significance of macroeconomic variables on explaining the stock market index. We have used GRETL software to analyze the study.

$$NIFTY = f \text{ (FII, Exchange rate, IIP)}$$

Here IIP, Exchange rate and FII are taken as independent variables and NIFTY is taken as dependent variable. Here the dependent variable i.e. NIFTY is regressed using the other independent variables. The outcome of the regression model would be the variance of the dependent variable as a result from the impact of independent variables. Also the regression model is used to predict the performance of the dependent variable.

EMPIRICAL ANALYSIS:

In the present study it was observed that the correlation coefficient for the bearish phase of capital market is very strong in comparison to that of bullish phase. Here in **Table 1** we have taken the top 10 upward movements of NIFTY in the last 10 years and the corresponding net FII flow into India. In Table 2 we have taken the top 10 downward movements of NIFTY in the last 10 years and the corresponding FII net flow into India. From Table-1 & 2, it is clearly visible that during the declining state of the market, the dependency of the market index is more (= 0.08) than that of the upward state of the stock market (= 0.16), which otherwise confirms that the market index is having all support from other factors too during an upward trend. Hence it is mostly the selling by FIIs which plays the crucial role for the fall in Indian stock market.

Table No. 1

Date	NIFTY top upward Movements	FII
Sep-18	11750.80	-21035
Feb-19	11680.50	-12,359.71
Aug-18	11358.81	5146
Jan-19	11356.50	-9,620.56
Feb-18	11043.55	-11674
Oct-19	11025.15	127.67
Mar-19	10930.45	-10,249.17
May-19	10876.75	-2,228.53
Sep-19	10863.50	-1,103.37

Source: Author's Compilation

Table No. 2

Date	NIFTY top Downward Movements	FII
Mar-09	2763.60	-5890.2
Feb-09	2871.35	-3124.2
Jan-09	2962.30	-3442.8
Apr-09	3022.85	8998.2
May-09	3477.70	17405.6
Jul-09	4291.30	13181.8
Jun-09	4449.40	4898.1
Aug-09	4632.80	4523.4
Jan-12	4639.20	26328.7

Source: Author's Compilation

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It is clearly visible that whenever there is a huge fall in the NIFTY, the FII withdrawn also significantly high. It signifies that FII withdrawn from the market should be checked and policy decision should be taken in such a way that even if FII is withdrawn, there should not be that much impact on the NIFTY. Hence its means that India should look forward to improve other macroeconomic factors like IIP and Exchange rate.

CORRELATION ANALYSIS:

From the above analysis, it was seen that the top 10 falls in the monthly average of NIFTY is having a high degree of correlation with FII than that of 10 peaks (Table 1 & 2). So to save our stock market from sudden falls, here we have tested the significance level of all the independent variables with the dependent variable by using the correlation analysis. Here independent variables are Net flow of FII into India, IIP and Exchange rate (INR/USD) and Dependent variable is NIFTY.

Correlation Analysis

Table No.3

	Coefficient	Std. Error	t-ratio	p-value
USD/INR	0.0385093	0.00274440	14.03	<0.0001***
IIP	0.00331405	0.000964378	3.436	0.0008***
FII	2.19282e-06	1.04753e-06	2.093	0.0383**

Regression Analysis

Table No.4

Mean dependent var	8.845858	S.D. dependent var	0.330491
Sum squared residual	4.153710	S.E. of regression	0.181565
R-squared	0.705201	Adjusted R-squared	0.698182
F(3, 126)	100.4699	P-value(F)	2.89e-33
Log-likelihood	39.36761	Akaike criterion	−70.73523
Schwarz criterion	−59.26509	Hannan-Quinn	−66.07453
Rho	0.871985	Durbin-Watson	0.202797

From the **Table 3 and 4** we can derive that IIP has a strong positive correlation with the dependent variable i.e. NIFTY. Whereas FII is not having so strong positive correlation with NIFTY as compared to IIP. This indicates that IIP has a greater impact on the fluctuations in the stock market. As expected exchange rate is having a strong inverse correlation with the NIFTY. Further here it can be concluded that NIFTY depended on IIP and Exchange rate in the long run than on the FII. So FII brings short term volatility in the NIFTY, whereas IIP and Exchange

rate can be a long term key factor for the NIFTY stability.

From the model summary table, it was found that R square is 0.7052. This indicates that NIFTY is highly sensitive to all the independent variables. In other words it can be said 70.52% in NIFTY variation happened due to the independent variables. From the coefficient table, it is found that IIP and Exchange rate is significant at 1% significance level, whereas FII is significant at 10% level of significance. That means all these variable are significant, therefore the null hypothesizes are being rejected. Further the t-values indicate that IIP and Exchange rate (INR/USD) affects more to the variability of NIFTY than FII net flow.

From the collinearity statistics column we can find Tolerance and VIF values. Here the VIF for all the independent variables are below 5 and Tolerance value for all the variables is above 0.2. In other words it can be said that there does not exist any multi collinearity.

From the above table here we have constructed an Ordinary Least Square equation for predicting the performance of the dependent variable. The model is expressed as below.

$$Y = \alpha + b1x1 + b2x2 + b3x3 + \mu$$

Where Y = NIFTY, x1 = FII, x2 = IIP, x3 = Exchange rate.

The negative coefficient of exchange rate between INR and USD suggests that more the rupee depreciates the higher is the declining trend observed in the NIFTY. Saying otherwise our efforts should be made to appreciate the Rupee against the USD. This can happen only when the balance of payment will be in favor of India or the exports will be more than import. Secondly the IIP figures alone can play the role of a sound variable with the help of which the NIFTY figure can be enhanced. Better IIP figures can boost the investor's sentiment; in return the investment will flow from both domestic and foreign.

CONCLUSION:

The whole study justifies that IIP and Exchange rate (INR/USD) can be a better alternate for the policy makers to boost the stock market. If we will watch the existing scenario then still the developed economies like Europe and USA are under huge debt crisis, so it is a matter of certain prediction that foreign institutional investors will withdraw money from the Indian capital market in near future and again as per the empirical investigation made the NSE index will go down and down further. Again the other side of the story is that INR is continuously depreciating and touching to very low

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point. Both of these factors will hit hard to the NIFTY, without having any doubt. So it is high time to shift the dependency on FII to the other factors like IIP and change rate (INR/USD). The resulted output of the regression through GRETL indicating that the alternative ways to keep our stock market index bullish is by increasing industrial production, boosting the consumer confidence and keeping our balance of payment intact. Current need of the hour is to modify the monetary policies and other economic policies to bring lots of hope for the domestic investors who put their hard earned money into the capital market.

This paper has contributed to the existing studies in examining or raising new issues with respect to the macro-economic factors affecting NIFTY. Further study can be done by taking the other micro and non-economic factors available. This can be tested by observing their impact on the fluctuations of the NIFTY.

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