Macroeconomic Factors (Other Than The FIIs) Affecting The Sensex : An Empirical Analysis

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ABSTRACT

This paper attempts to investigate the impact of various macroeconomic factors upon the movement of the stock market index, i.e. the BSE Sensex. The researchers opined that since liberalization, the FIIs have played a bigger role in the movement of the Indian stock market, but whether the FIIs are responsible for both the upward and the downward state of the Sensex remained to be seen. To get an answer to the posed question, the researchers made a correlation analysis between the top ten rises and the top ten falls of the Sensex with the corresponding net flow of FIIs to know exactly the dependency of the Sensex upon the FIIs. The results showed that FIIs have a higher correlation with the Sensex at the time of its downward spiral rather than upward growth. So here the question arises, can India stabilize the Sensex at the time of FII withdrawal by promoting any other factor? Thus, the researchers tested the impact of other macroeconomic factors along with FIIs affecting the Sensex for the last 10 years from March 2001 to April 2011. Correlation and multiple-regression models were used for this study and the results depict that IIP and Exchange Rate (INR/USD) have a higher influence (than FIIs) on the stock markets. The findings suggest that by improving the IIP figures and by controlling the Exchange Rate, the Sensex can be stabilized at the time of heavy selling by the FIIs in the Indian stock market.

Keywords: Sensex, FII, IIP, Exchange Rate

INTRODUCTION

In today's world stock market, figures are presumed to be the lifeline of any economy. Stock market performance has become a crucial element for all the emerging economies around the globe. A lot of research has been carried out on how the movements of the stock prices occur and what are the factors influencing the movement. The relationship between the macroeconomic factors and the stock market movements has dominated the academia and the practical world. Early studies made by Fama and Schwert (1977) affirmed that macroeconomic variables play a major role in influencing the stock returns. Stock market indicators like the Sensex and the Nifty are becoming the most popular figures for all and are being watched by the media, the classrooms and the desktops in the offices and residences. Policymakers too look at the figures to plan out their next move. The corporate world also keep an eye on the minute to minute movement of these indicators for their own valuation.

The Indian stock market has become the world's hottest destination for investors, but the question that needs to be answered is whether (in the real sense) the Indian stock markets have performed really well over the years ?

In India, stock markets like the Bombay Stock Exchange and the National Stock Exchange are the largest and the most actively traded. The Sensex and the Nifty are often termed as the barometer of the Indian economy due to which the government, public and retail investors are taking an active interest in these indices. If we see the performance of Sensex, from 2001, it witnessed a booming trend and took the economy to a new high. However, due to the sub-prime crisis, the stock markets crashed in the year 2008. Researchers like Warther (1995) in his 'Price Pressure Hypothesis' suggested that the increase in share prices associated with foreign investment flow is caused by temporary liquidity (i.e. excess demand) and predicted that this change in share prices is subsequently reversed. In the year 2007 and 2008, the western countries faced a financial meltdown, the FIIs cautioned themselves and the investment flows from the western countries stopped. In 2008, big economies suffered heavily and the crisis spread to other parts of the globe. The contagion affect was also seen in India, and on January 21, 2008, the Sensex crashed 1744 points. Almost on that day, the Sensex actually lost 2000 points intraday. The clear reason behind the crash was believed to be the weaker global economy and heavy selling by the FIIs. The global economic meltdown happened due to the sub- prime crisis in

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USA in 2007. Due to the sub-prime crisis, many US banks and financial institutions collapsed. However, India's financial institutions stood tall and witnessed a robust growth. Now, the question that arises is - If India was not affected so deeply by the crisis, then why did the stock markets like the BSE and the NSE perform so badly during the crisis period ?

Many studies like the one by Tripathy and Badani (2009) have proven that FIIs had played a bigger role in influencing the Indian stock market performance. It can be justified that India as an emerging country always requires capital, and has always felt the need for foreign capital as it helps to boost the exchange reserve, productivity, infrastructure development and provides the much needed capital to meet the trade deficits. Foreign capital comes into the country in two ways - 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, opened her doors to Foreign Institutional Investors (FIIs) in September 1992 to attract foreign investments. The event symbolized a landmark experience for India, which gave an edge to the Indian financial services industry. Since then, mutual funds, pension funds, investment trusts, asset-management companies, institutionalized portfolio managers, registered university funds, endowment funds, foundations and charitable funds were permitted to invest directly in the Indian stock market. No doubt, all these policy corrections helped India to boost her economy, but foreign fund inflow has its own illnesses. Earlier research studies have proven that the whole market panics when FIIs exit the market for whatever reasons; may be due to a business motive of making short-term gains or for a genuine cause like scarcity of funds because of a crisis elsewhere. If we look at some big falls in the Indian stock market, a majority followed due to FIIs' withdrawals. Hence, it will be better for India not to depend solely upon foreign capital only, rather, the policies should encourage domestic investment in the capital markets of India. 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 rate would also affect a firm's foreign operations and its overall profits. In return, it will affect the firm's stock prices. Aggarwal (1981) found a significant positive correlation between the US dollar and the US stock prices; 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 the present study is to understand the degree of impact of FIIs on the Indian stock market. The study also ascertains whether the FIIs are the only route cause behind the highs & lows in the Sensex. Furthermore, the study also examines whether the Indian stock markets consider some other factors like the Index of Industrial Production (IIP) and Exchange Rate to control the stock indices.

REVIEW OF LITERATURE

There exist enough studies with respect to the impact of FIIs on the stock market index as well as macroeconomic indicators and their influence on the stock market indices. Some studies also found that the macroeconomic variables alone cannot predict the stock returns over time. Pearce and Roley (1985) in their study found that the stock prices were significantly influenced by the announcement in the monetary policy. Jain (1988) found from his study that stock price changes happened significantly with the money supply and the consumer price index.

Chen et al. (1986) tested whether a set of macroeconomic variables can explain the changes in equity returns, where it was found that variables like industrial production, changes in risk premium, twists in the yield curve and measures of unanticipated inflation explained the stock returns significantly. Mukherjee and Naka (1995) applied Vector error correction approach to model the relationship between the macroeconomic variables and the Japanese stock returns. They found co-integration relations among stock prices and six macroeconomic variables like inflation rate, exchange rate, call money rate, money supply, real economic activity and long-term government bond rate.

A lot of research has been done on emerging markets, for e.g.,Ibrahim (1999) made a study on the Malaysian stock market and found that the market was informationally efficient in the short run, but not in the long run. Tsoukalas (2003) investigated the relationship between various macroeconomic factors with the stock prices of Cyprus by applying the Vector Auto Regressive model. It was found that the equity market in Cyprus was sensitive to variations in the exchange rate and industrial production. Pethe and Karnik (2000) in their study attempted to analyze how the

stock market indices are affected by macroeconomic variables in India. In their study, they ran 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 held the view that the state of the economy affects stock prices.

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

Manjri, Yamini and Kowadia (2004) found from their study that foreign-currency exchange rate (INR/USD) also plays a very crucial role in bringing investments to the Indian capital market, and it was observed that the BSE sensitive index (Sensex) was really sensitive to the exchange rate. Sharma and Singh (2007) examined the significance of the variables like Foreign Exchange Reserves, Claims on the Private Sector, Wholesale Price Index, Call Money Rate, Index Of Industrial Production, Exchange Rate and Broad Money on the Sensex. They used the monthly data horizon from April 1986 to March 2005. In their study, they used multiple regression analysis. From their study, they found that variables like IIP, Foreign Exchange Reserve, Claims on the Private Sector, Exchange Rate and Money Supply had 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 has a significant relation with the stock market indices (Padhan, 2007), and this can be an eye-opener for policymakers and regulators to understand the balancing act for developing economic activity and at the same time, controlling foreign institutional investment into the Indian stock market.

Another study conducted by Kanakaraj et al. (2008) examined the trend of the stock prices and the various macroeconomic variables for the time horizon from the year 1997 to 2007. In their study, they said that the boom in stock market for the period from 2003 to 2007 can be explained in terms of macroeconomic fundamentals.

Nidheesh (2008) studied the impact of foreign institutional investment in India and its impact on the BSE and NSE and also addressed various issues. In his research, he observed that the FIIs have been significant in bringing about an the improvement in the trade practices of the stock market since liberalization, but at the same time, this advantage turns into a disadvantage in terms of destabilization of the market because of the trading pattern of FIIs in India.

Rajkumar and Gupta (2010) also found from their empirical study that FIIs affect the Indian market for their own interest and returns and the risk in international markets are the two major driving factors for the inflow of FIIs into India.

Singh (2011) attempted to explore the causal relationship between stock market indices and three macroeconomic variables of the Indian economy - Index of Industrial Product (IIP), Wholesale Price Index (WPI) and Exchange Rate. In his study, the researcher found that Indian stock market was approaching towards informational efficiency at least with respect to two macroeconomic variables such as Exchange Rate and Inflation. Gupta (2011) rightly observed that whereas the boom in the capital markets could only be possible because of the FIIs, nevertheless, the crash of the capital markets is also attributed to the sudden withdrawal by this category of investors.

The present study is unique in the sense that it is an analysis from a longer perspective, i.e. from April 2001 to March 2011 and at the same time, the study carries out an empirical investigation of the degree of influence of each variable on the dependent variable, which none of the earlier studies had considered. The researchers chose this period because this is the period when the stock price indices attained the highest growth and decline and the researchers wished to explore the exact reason for this fluctuation. Secondly, investor sentiment greatly dampens due to a declining trend in the stock market. Though FII inflows is certainly a good indication for any stock market of any nation, but a country like India needs to prepare itself for the other side of the coin i.e. how to ensure stability in the stock market in the phase of FIIs outflow. The present paper explores whether any other macroeconomic factor (apart from FIIs) can bring about stability in the Indian stock markets.

OBJECTIVE 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 the FIIs along with other macroeconomic variables in India for a period of 10 years. Specifically, the researchers' objective was to analyze the influence of FIIs on the movement of the stock market along with testing the

influence of IIP and Exchange Rate from a long run point of view. The study also aims to explore the degree of influence of each variable on the stock price index and then aims to rank the dependency of the above three factors on the movement of the Sensex and finally suggests certain measures to bring stability in the market condition, especially during the period of decline in the stock markets created due to the sudden withdrawal by FIIs.

HYPOTHESES OF THE STUDY

- **$H0_1$: There is no significant impact of net inflow of FIIs on the monthly average of the Sensex.**
- **$H0_2$: There is no significant impact of monthly IIP index on the monthly average of the Sensex.**
- **$H0_3$: There is no significant impact of monthly Exchange rate on the monthly average of the Sensex.**

RESEARCH METHODOLOGY AND DATA SOURCE

This paper uses monthly average data for the period from March 2001 to March 2011 for India. For the present study, the researchers have considered Index of Industrial Production (IIP) and Exchange Rate (INR/USD) as other macroeconomic factors along with net flow of Foreign Institutional Investors (FIIs) for this study. The researchers considered two factors IIP and Exchange Rate out of many other macroeconomic variables because IIP reflects the growth of India's industrial activity and the Exchange Rate depicts the health of the Indian economy. This analysis was made on the basis of secondary data. The data for the macroeconomic variables were taken from the Handbook of Statistics on Indian Economy, and the data for the Sensex were obtained from the Bombay Stock Exchange (BSE) website.

To justify the objective of their study, the researchers adopted different methods. First, a trend analysis was made to get a pictorial view of the entire scenario, including the movement of the Sensex, Nifty and the macroeconomic variables. (Refer to Figures 1- 4). Next, the researchers used the correlation analysis to find out the relationship between the upward state and the downward state of the stock market with FIIs. Then, the correlation technique had been used between the Sensex and the FIIs along with other macroeconomic variables. The researchers made a multiple linear regression model to understand the significance of macroeconomic variables on explaining the stock market index.

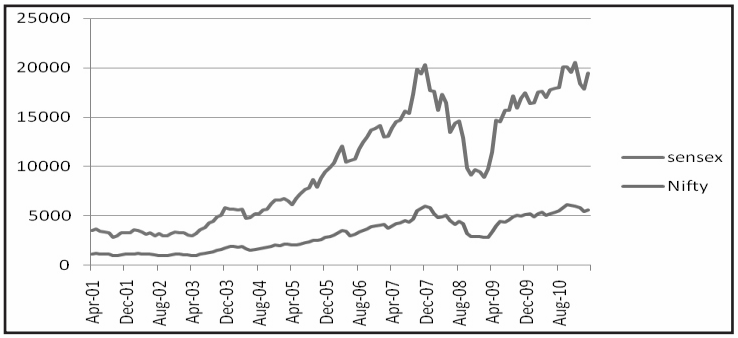
$$\text{Sensex} = f(\text{FIIs, Exchange Rate, IIP})$$

IIP, Exchange Rate and FIIs were taken as the independent variables and the Sensex was taken as the dependent variable. The dependent variable, i.e. the Sensex was used to regress the other independent variables, and the outcome of the regression model was the variance of the dependent variable as a result of the impact of the independent variables. Furthermore, the regression model was used to predict the performance of the dependent variable.

TREND ANALYSIS

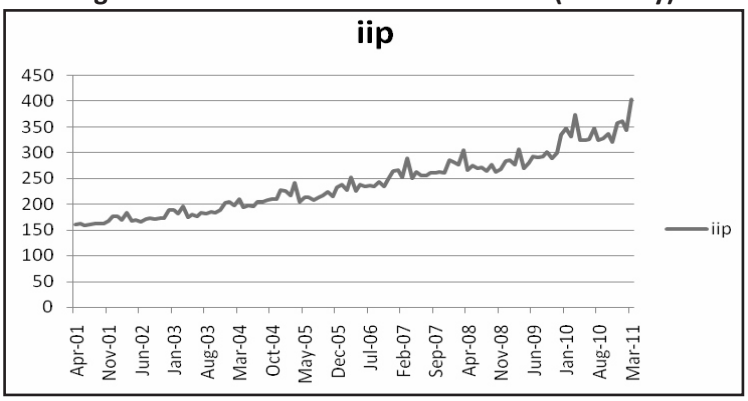
The Indian stock markets have performed phenomenally in the last decade. If we ponder on the performance of the Sensex and the Nifty since liberalization, then we find that the Sensex was below 1000 points and the Nifty was below 400 points in 1990. However, in 2001, the Sensex was at 3500 points and the Nifty was at 1100 points. So in that decade, the Sensex and the Nifty grew very slowly, but when we look at the figure of both the Sensex and the Nifty towards the end of the year 2007, then we can see that the Sensex was at around 21000 points and the Nifty was at around 6000 points. Since 2001, both the Sensex and the Nifty showed an increasing trend until the end of the year 2007. After that period, the Sensex and the Nifty slowly declined. The entire 2008 and up to March 2009, the Sensex and the Nifty witnessed a declining trend. The Sensex fell and reached at around 9000 points and the Nifty reached at around 2800 points. So, the Sensex fell from 21000 monthly average points to 9000 points, and the Nifty fell from 6000 monthly average points to 2800 points. Here, we can say that almost both the stock market indices moved in the same trend. Let's observe the movement of the macroeconomic factors between these periods. If we look at the IIP figures since 2001, then we can witness an increasing trend. The IIP data is not that volatile as compared to the Sensex, but even a very minimal change can lead to a lot of swings in the market. The IIP monthly average figure was at around 160 points in March 2001, whereas it had crossed 400 points in March 2011. This means that industry production as well as consumer spending increased with time. However, if we closely look at the figures in the year 2008 and the beginning of 2009, then we can find that these figures showed a slight downward trend. This means that during this

Figure 1: Sensex And Nifty



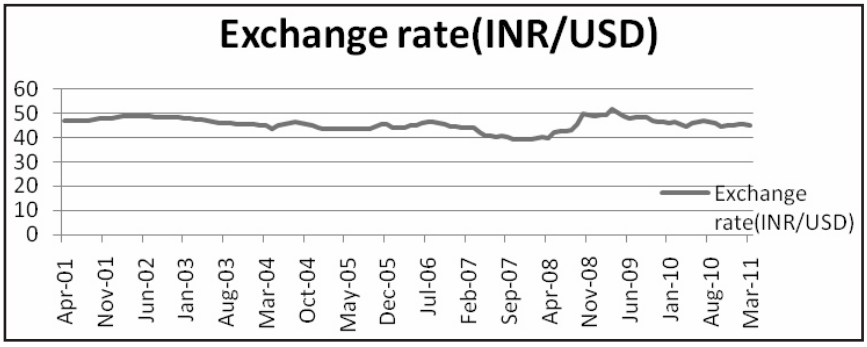
Source :Handbook of Statistics on Indian Economy

Figure 2: Index of Industrial Production (Monthly)



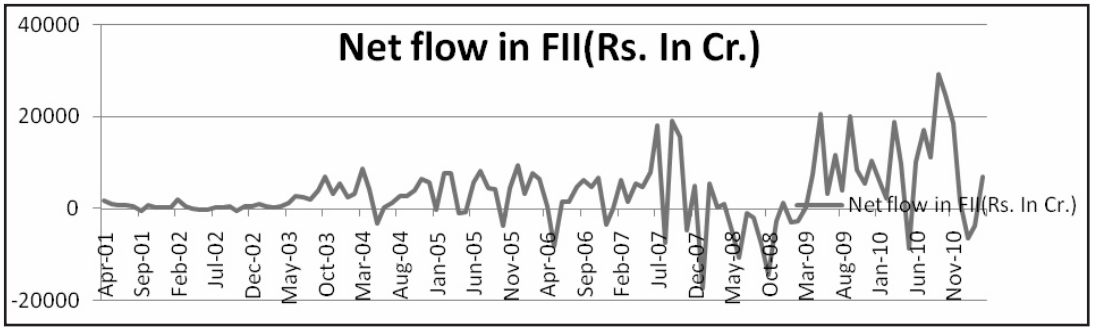
Source:Handbook of Statistics on Indian Economy

Figure 3: Exchange Rate (INR/USD) (Monthly Average)



Source: Handbook of Statistics on Indian Economy

Figure 4: Foreign Institutional Investors (Monthly)



Source:Handbook of Statistics on Indian Economy

period, both the consumer spending and industrial production were affected, which also impacted the investors in the market as low confidence leads to a decline in the stock indices.

If we see the figures of the exchange rate, then it can be seen that the rupee appreciated from ₹ 45.36 in October 2006 to ₹ 39.36 in January 2008. It was the period when the Indian stock market was on a Bull Run. Logically, when the rupee appreciates, it shows improvement in the Indian economy and vice- versa. Here, we can say from the figures that increase in the exchange rate had a negative effect on the Sensex and vice- versa.

If we notice the figures of the net flow of foreign institutional investors, the monthly average net flow of FIIs was only ₹ 1770 crore in April 2001 and around ₹ 7000 crore in March 2011. If we compare these two figures, then we can find that there was an almost 300% growth. Here, we can say that foreign investors showed confidence in the Indian stock market. This can be rightly judged from the figures. At the same time, we can see that a lot of FII outflow happened in the year 2008, which may be the root cause for the Sensex to crash by 50 percent.

EMPIRICAL ANALYSIS

It was observed that the correlation coefficient for the bearish phase of the capital markets was very strong in comparison to that of the bullish phase. The Table 1 shows the top 10 upward movements of the Sensex in the last 10

Table 1: Top 10 Upward Changes In Monthly Averages of Sensex Vs Net Flow of FIIs

Date	10 Upward Monthly Changes In Sensex	Monthly Netflow of FII (₹ crores)
Sep-07	1972.5	18948.5
Oct-07	2546.89	15577.6
Apr-08	1642.87	979
Apr-09	1694.75	7384.2
May-09	3222	20606.9
Jul-09	1176.47	11625.3
Sep-09	1460.2	19939.5
Mar-10	1098.22	18833.6
Sep-10	2098	29195.8
Mar-11	1621.82	6966.7
	ρ = .322	

Source: Authors' Research

Table 2: Top 10 Downward Changes In Monthly Averages of Sensex Vs. Net Flow of FIIs

Date	10 Downward Monthly Changes In Sensex	Monthly Netflow of FII (₹ crores)
May-06	-1643.95	-8247.2
Feb-07	-1152.83	6065
Jan-08	-2638.28	-17326.3
Mar-08	-1934.28	124.4
Jun-08	-2953.97	-10577.7
Sep-08	-1704.1	-7937
Oct-08	-3072.37	-14248.6
Oct-09	-1230.56	8304.1
Jan-10	-1106.85	5902.4
Jan-11	-2181.33	-6330.2
	ρ = .856	

Source: Authors' Research

years and the corresponding net FII inflows into India. The Table 2 depicts the top 10 downward movements of the Sensex in the last 10 years and the corresponding net FII inflows into India. From the Tables 1 & 2, it is clearly visible that during the declining state of the market, the dependency of the market index is more ($\rho = 0.85$) than during the upward state of the stock market ($\rho = 0.32$), which otherwise confirms that the market index had all support from other factors too during an upward trend, but it is mostly the selling by FIIs which played a major role in the crash of the Indian stock markets.

It is clearly visible that whenever there is a huge fall in the Sensex, the FIIs exit the market. It signifies that the FII withdrawal from the market should be checked, and policy decisions should be taken in such a way that even if FII withdrawal happens, then it should not cause a deep impact on the Sensex. It means that India should look forward to improve other macroeconomic factors like IIP and Exchange Rate.

CORRELATION ANALYSIS

From the above analysis, it can be seen that the top 10 falls (rather than the top 10 peaks!) in the monthly average of the Sensex had a high degree of correlation with the FIIs (Tables 1 & 2). To ascertain other macroeconomic factors that can stabilize the markets even if FIIs exit the market, the researchers tested the significance level of all independent variables with the dependent variable by using the correlation analysis. The independent variables are Net flow of FIIs into India, IIP and Exchange Rate (INR/USD) and the Dependent variable is the Sensex.

Table 3: Correlation Matrix

	SENSEX	FII	IIP	Exchange Rate(INR/USD)
SENSEX	1			
FII	.323 (**)	1		
IIP	.911 (**)	.280(**)	1	
Exchange Rate(INR/USD)	-.467 (**)	-.058	-.225(*)	1
Source: Authors' Research				
* Correlation is significant at the 0.05 level (2-tailed).				
** Correlation is significant at the 0.01 level (2-tailed)				

It can be inferred from the Table 3 that IIP has a strong positive correlation with the dependent variable i.e. the Sensex. Whereas, the FIIs did not have a strong positive correlation with the Sensex as compared to the IIP. This indicates that the IIP has a greater impact on the fluctuations in the stock market. As expected, the Exchange Rate also has a strong

Table 4: Model Summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
.952(a)	.907	.905	1773.72089
Source: Authors' Research by using SPSS			

Table 5: Coefficients

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
(Constant)	18011.342	3172.423		5.677	.000		
FII	.061	.024	.075	2.555	.012	.922	1.085
IIP	82.668	3.017	.827	27.400	.000	.878	1.139
Exchange rate(INR/USD)	-614.725	64.455	-.277	-9.537	.000	.949	1.053
Source: Authors' Research							

inverse correlation with the Sensex. Further, it can be concluded that rather than the FIIs, the Sensex depends more upon the IIP and the Exchange rate in the long run. Hence, FIIs bring in short term volatility in the Sensex, whereas IIP and Exchange Rate can be the long term key factors for the stability of the Indian stock markets.

REGRESSION ANALYSIS

The researchers ran a regression analysis on the independent variables - FII, Exchange Rate and IIP. The Tables 4 & 5 present the results of the regression analysis.

From the model summary (Table 4), it can be observed that the R square is 0.907. This indicates that the Sensex is highly sensitive to all the independent variables. In other words, it can be said that 90.7% variations in the Sensex happened due to the independent variables.

From the Coefficients Table (Table 5), it can be inferred that the IIP and the Exchange Rate are significant at 1% significance level, whereas FII is significant at 10% level of significance. That means all these variable are significant, therefore, the null hypotheses are rejected. Further, the t-values indicate that IIP and Exchange Rate (INR/USD) had a greater effect on the Sensex than FII net flow. From the collinearity statistics column, we can infer the Tolerance and VIF values. The VIF for all the independent variables is below 5 and the Tolerance value for all the variables is above 0.2. In other words, it can be said that multicollinearity does not exist.

From the Table 5 , the researchers 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 = Sensex,

x1 = FII,

x2 = IIP,

x3 = Exchange rate.

If we will put the value of the beta coefficient in the above equation, then we can get the following model :

Model… Sensex = 18011.342 + (.061) (FII) + (82.668) (IIP) + (-614.725) (Exchange Rate)

The negative coefficient of the Exchange Rate between INR and USD suggests that the more the Rupee depreciates, the higher is the declining trend in the Sensex. Saying otherwise, the policymakers' efforts should be 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 the imports. Secondly, the IIP figures alone can play the role of a sound variable with the help of which the Sensex points can be enhanced. Better IIP figures can boost the investor sentiment; in return, the investment will flow from both fronts - domestic and foreign.

CONCLUSION & RECOMMENDATIONS

The whole study justifies that IIP (Index of Industrial Production) and Exchange Rate (INR/USD) can be a better alternative for the policymakers to boost the stock market. If we look at the current scenario, then still, the big economies like Europe and USA are reeling under a huge debt crisis, so it is a matter of certain prediction that Foreign Institutional Investors (FIIs) will withdraw money from the Indian capital market in the near future, and again, as per the empirical investigation conducted in the present paper, the BSE index will go down and down further. Furthermore, the other side of the story is that the INR is continuously depreciating to a new low. Both these factors will hit the Sensex hard.

So, it is high time to shift the dependency from FIIs to the other factors like IIP and Exchange Rate (INR/USD). 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. The current need of the hour is to modify the monetary policies and other economic policies to bring a lot of hope for the domestic investors who put their hard-earned money into the capital markets. This paper has contributed to the existing studies in examining or raising new issues with respect to the macroeconomic factors affecting the Sensex. Further studies can be done by taking other micro and non-economic factors available and can test their impact on the fluctuations of the Sensex.

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