IMPACT OF SELECTED MACRO-ECONOMIC INDICATORS ON SENSEX

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Abstract: *The study was aimed to analyze the impact of macroeconomic variables on the performance of stock market over the period of time from 2008 to 2013. Performance of stock market has significant relationship with macroeconomic variables like Interest Rate, Inflation Exchange Rate etc. The Indian equity market has undergone many changes over the past few years. The market has been boosted up after the financial sector reform, which opened the door for the FII inflow. Large fluctuations have been observed in stock market in the during the last few years. To understand the reasons of these fluctuations, it was necessary to understand the relationship between selected macroeconomic variables with stock market. The purpose of the study is to know the relationship of SENSEX with Exchange rate, Inflation and FII in India and understand its behaviour. The coefficient results of Pearson correlation & regression analysis provide a strong positive significant relationship between SENSEX and FII and strong negative relationship between SENSEX and Exchange rate.*

***Keywords:** SENSEX, Exchange rate, Inflation, FII, WPI, Stock market, BSE.*

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INTRODUCTION

There are many macroeconomic factors which affect stock market i.e. GDP, inflation, exchange rate etc. Changes in these factors lead to fluctuations in stock market. In the recent past (2008 to 2013) there has been an increase in volatility in the stock markets because of recession in 2007-08 and increased participation from FIIs (Foreign Institutional Investors) because India has become an attractive investment country for FII. The performance of stock market depends upon many factors. Researchers have found that stock price is affected by the economic factors, industrial factors and company factors. These factors attribute to changes in stock market in the following proportion-Economy-wide factors: 30-35%, Industry factors:15-20%, Company factors:30-35 % and others factors:15-20%. To understand the stock market changes, it is necessary to understand the relationship between these factors with stock market. Besides the macroeconomic variables stock market performance also depends upon Government policies, central bank policies, and regulatory body policies (SEBI).

Globalization has also affected the stock market because now foreign investors' involvement in Indian stock market has been increased. The change in the government policies and steps taken by SEBI (Securities and Exchange Board of India) has encouraged both existing & new market players causing higher volatility in SENSEX. When RBI changes monetary policy in terms of CRR, Repo rate, Reverse Repo Rate and interest rate, it causes fluctuations in stock market. During the polling phases in elections there is sharp and sudden increase in market volatility. During the budget also there is high fluctuation in the stock market because of changing government policies. Budget affects the every individual in terms of their savings and investment pattern. Budget also affects the profitability of corporate sectors due to changes in tax pattern. This reflects in the share prices of the companies. The volatility in the market gives an opportunity to the traders to speculate and make a quick buck in the market. At the same time, it increases the risk of all market participants. This increased volatility can hit the retail investors the hardest because they do not possess the high risk bearing capacity unlike other market participants. Therefore it is very important to understand the factors that cause movement in stock market. It has been seen over the years that investors who are not well aware of the market trends tend to lose their money.

Studies show that market trends have strong relationship with macroeconomic factors like inflation, exchange rate and inflow and outflow of FII. FII plays a significant role in shaping market sentiments. FII purchase lead to an increase in the SENSEX and also cause inflow of dollars and rupee to appreciate. On the other hand, FII sale depress the SENSEX and also cause the rupee to depreciate. FII affects both market sentiments and also exchange rate movements. In India FII plays an important role in defining the movement of stock market which is largely affected by exchange rate. The exchange rate is affected by domestic inflation and also the international demand for the home as well as other currencies.

Another major reason of volatility in the stock market is value of currency. A depreciating currency causes a decline in stock prices because of expectations of inflation and an appreciating currency causes increase in stock prices. The impact of change in exchange rate will be determined by the relative dominance of import and export sectors of the economy, as a depreciating home currency will increase export earnings whereas, decrease importers' profit. It affects the stock prices and thus in turns the SENSEX.

INFLATION AND ITS IMPACT ON STOCK MARKET

Besides this faith in government's ability to protect the value of currency, monetary and fiscal policy, budgetary deficits etc also affect the inflation. A persistent increase in the level of consumer prices or a persistent decline in the purchasing power of money leads to inflation. Inflation represents an imbalance between the flow of incomes to people and the spending power available with them on the one hand and the availability of goods and services on the other.

Inflation hit the different sectors of the economy in different manners. The sectors which come under the purview of price control are affected by inflation badly and the sectors which don't come under the purview of price control may get benefited. Inflation affects the corporate sector in terms of their profitability which affects the share prices of the company and thus the stock market. However inflation can be controlled by the mutual effort of government, RBI and corporate sector. Government can curb the inflation by changing fiscal policy. RBI can curb the inflation with the help of changes in monetary policies. Inflation can be controlled by proper formulation of economic plans and determined implementation of the plans. Fiscal & monetary action constitutes important elements of the anti inflationary strategy.

FISCAL POLICY AND INFLATION

Govt. can control inflation by control over expenditure & maximizing tax income and rise in the interest rates. Ceiling should be put on purchase of Govt securities by the RBI and the commercial banks so lending power of bank reduce & the extension of advances to Govt by the Reserve Bank so that Govt can use the fund in productive investment .

MONETARY POLICY

RBI uses the monetary policy to control the money supply in the economy. For this purpose RBI change the monetary policy in terms of CRR, SLR, Repo and Reverse repo rate. Besides this selective credit control and open market operations are also the instrument of credit control which is used by RBI to curb the inflation.

FOREIGN INSTITUTIONAL INVESTORS (FII) AND ITS IMPACT ON STOCK MARKET

Foreign institutional investors play a significant role in the Indian stock market. Inflow and outflow of funds by FII decides the movement of SENSEX to a large extent. Foreign investment comes in India in two forms- foreign direct investment and foreign Institutional Investment. The former represent investment for setting up new projects and hence is long term in nature, the latter is in the form of purchase of securities in the capital market.

Participation of FII has made the market more innovative and competitive enabling the issuers of securities and intermediaries to grow. Portfolio flows often referred as "hot money"-are notoriously volatile compared to other types of capital inflows. When foreign investors invest in Indian equity market, it causes a sudden increase in SENSEX but as Investor pull back their money from market, it leads to sudden downfall in the SENSEX and the economy has to face the disastrous consequences. The International capital flows and capital controls have emerged as an important policy issues in the Indian context.

EXCHANGE RATE AND SENSEX

The exchange rate is the price of a country's currency in terms of another country's currency. There are some terms which are necessary to understand the fluctuation of exchange rate like-appreciation, depreciation, devaluation and revaluation. **Appreciation** of a currency is the increase in its value in terms of another foreign currency while **depreciation** of a currency is the decrease in its value in terms of another country's

currency. If a country lowers the value of its currency in terms of another foreign currency, it is called **devaluation** while If a country raises the value of its currency in terms of foreign currency, it is called **Revaluation**. Exchange rate of a currency is affected by the demand of that currency, inflation level and interest rate in that country.

INFLATION AND EXCHANGE RATE

Now we will see how relatively higher rate of inflation in a country affect the exchange rate of its currency. Suppose there is higher rate of inflation in India as compared to America then the US goods will become relatively cheaper and Indians goods expensive. This leads to Indian to import goods from US. This will raise the demand of US dollar because we can purchase US goods in dollars. At the same time higher price level of Indian goods will leads to American people to reduce the import of Indian goods .This will decrease the demand of Indian rupee because Indian rupee is needed to purchase Indian goods. Thus as a result of higher rate of inflation in India, the US dollar will appreciate and the Indian rupee will depreciate.

Balance of Payment and Exchange Rate

Ideally the exchange rate between two currencies should be determined by the balance between exports and imports of the two countries. Capital flows and currency flow through both FII and FDI tend to affect the exchange rate. That is, the exchange rate is function of both current account movement in the balance of payment as well as capital account movements. Moreover, the moment foreign currency itself becomes a commodity beyond just being a medium of exchange; arbitrageurs enter the market and tend to affect the rates. Beyond the spot market, future market and option market develop which in turn also affect the exchange rate.

Interest Rate and Exchange Rate

Another important factor influencing the exchange rate is the interest rate in a country relative to interest rate of other countries with which it trades its goods. For example a relatively higher interest rate in India as compared to US would lead to the depreciation of dollar and appreciation of rupee.

LITERATURE REVIEW

A significant number of literatures examined the relationship of stock market with many macroeconomic variables. Fama and Schwert (1977) had done research to study the

relationship between stock market and inflation. They analyzed the relationship between stock market and inflation over the period of time from 1953 to 1971. In their research, they found that the common stock returns are negatively related to inflation. Dornbusch and Fischer (1980) had done research to study the relationship between exchange rate and stock market. They suggested that changes in exchange rates affect the competitiveness of a firm as fluctuations in exchange rate affects the value of the earnings and cost of its funds as many companies borrow in foreign currencies to fund their operations and hence its stock price.

Gultekin (1983) analyzed the relationship between inflation and stock market. For the study they had taken the inflation and stock market data of 26 countries and investigate the relation between common stock & inflation in 26 countries for the postwar period. The study found that there is a consistent lack of positive relation between stock returns and inflation in most of the countries. Ajayi and Mougoue (1996), analysed the relationship between exchange rate and stock market. They used daily data for eight countries, showed significant interactions between foreign exchange and stock markets, another research paper was also published by Abdulla and Murinde (1997) ,they analysed that a country's monthly exchange rates tends to lead its stock prices. Pan et. al. (1999) used daily market data to study the causal relationship between stock prices and exchange rates. The study found that the level of causal relationship between exchange rate and stock market is not very strong but the causal relationship has been stronger after the Asian crisis.

Mansor (2000) carried out research to analyzed the relationship between Foreign Institutional Investment and Indian Equity Market. In their study, they used the daily flows of FII during Jan 1999 - May 2002. They found the significant relationship between FII and stock market. Verma (2002) has investigated the impact of FII on Capital Market to find the relation between FII and Stock indices. For this he has taken seven indices into consideration, out of them five are Consumer Durables, Capital Goods, Fast Moving Consumer Goods, Health Care, Information Technology and the other two are SENSEX and Nifty. He observed these indices during January 1993 to September 2001.To find out the results he used least square method. Finally, after completing his study he concluded that except IT sector on all other indices the impact is very low during January 1993 to September 2001 as the correlation is negative in Consumer durable, Capital Goods, Fast

Moving Consumer Goods, Health Care, SENSEX and Nifty. Jacob and Richardson (na) analyzed the relationship between inflation and stock market. In their research they took the help of regression to estimate the relationship. For establishing relation, they regressed one year stock returns on one year inflation & five year stock returns on five year inflation. The results showed that the regression coefficient of five year stock returns on the contemporaneous five year inflation rate is significantly positive, $\beta_5 = 0.52$, with a standard error of 0.17. On the other hand, they found that the estimate of $\beta_1 = 0.07$ close to zero, indicating that the stocks seems to compensate for inflation in the long run. Many researcher have considered various macroeconomic variables to test their effect on studied the effect on SENSEX and provided new theories.

The present study is aimed to consider FII, Inflation rate and Exchange rate to test their effect on SENSEX during the period of five years (2008- 2013). Study is also aimed find out the level of dependency of SENSEX performance on selected economic variables (Exchange rate, Inflation and FII).

METHODOLOGY

The purpose of this research is to find out the relationship between SENSEX and selected macroeconomic variables i.e. exchange rate, inflation and FII with reference to India. Here we will see the impact of Inflation, exchange rate and FII on SENSEX for a period of 5 years from 2008-09 to 2012-13. This section of the report discusses the variables included in the study and applied statistical techniques in investigating the relationship between SENSEX and variables. The secondary data used in this study is acquired from the various websites. The study used Regression analysis as statistical tool as in the study data is of time series in nature and both types of variable are considered in the study i.e. independent variable (Inflation, Exchange rate and FII) dependent variable (SENSEX).

Inflation

In present study wholesale price index is taken for the measurement of inflation. This is the index that is used to measure the change in the average price level of goods traded in wholesale market.

Exchange rate

An exchange is the value of one currency in terms of another. The impact of change in exchange rate will be determined by the relative dominance of import and export sectors of

the economy as a depreciating home currency will increase export earnings whereas decrease importers' profit. It affects their stock prices and thus in turns the SENSEX.

FII

Foreign invest comes in India in two forms- foreign direct investment and foreign Institutional Investment. The former represent investment for setting up new projects and hence is long term in nature, the latter is in the form of purchase of outstanding securities in the capital market. Foreign Institutional Investors (FIIs) have a significant impact on the Indian stock market.

SENSEX

SENSEX is barometer of Indian economy. The BSE SENSEX is the older and more widely followed index. The primary index of BSE is BSE SENSEX comprising 30 stocks. This index is calculated on the basis of market capitalization and contains the heavily traded shares from key sectors (Seth, 2012).

Multiple Correlation Regression Analysis

Regression is the determination of a statistical relationship between two or more variables. When there are two or more than two independent variables, the analysis concerning relationship is known as multiple correlations and the equation describing such relationship as the multiple regression equation. Multiple regressions are a statistical method used to examine the relationship between one dependent variable Y and one or more independent variables X_i. The regression parameters or coefficients b_i in the regression equation (www.medcalc.org)

Regression model was used to derive the relationship and formula to compute the relationship is given by

$$Y = \alpha + \beta_1 X1 + \beta_2 X2 + \beta_3 X3$$

Where,

Y=dependent variable

α= intercept.

β1 =slope of inflation

β2 =slope of exchange rate

β3 =slope of FII.

X1= inflation

X2= Exchange rate

X3=FII

DATA ANALYSIS AND INTERPRETATION

Table 1 shows correlation coefficients for the variables in the study (SENSEX, Inflation, Exchange rate and FII). As the results indicates that there is negative correlation between SENSEX and Inflation rate (-0.317). On the other side FII is strongly correlated with SENSEX but the correlation between inflation and SENSEX is not strong as like FII.

Table 1: Correlations					
		SENSEX	Exchange rate	Inflation	FII
Pearson Correlation	SENSEX	1	-0.317	0.096	0.773
	Exchange rate	-0.317	1	-0.223	-0.332
	Inflation	0.096	-0.223	1	-0.119
	FII	0.773	-0.332	-0.119	1
Sig. (1-tailed)	SENSEX	.	0.005	0.223	0
	Exchange rate	0.005	.	0.037	0.003
	Inflation	0.223	0.037	.	0.172
	FII	0	0.003	0.172	.
N	SENSEX	65	65	65	65
	Exchange rate	65	65	65	65
	Inflation	65	65	65	65
	FII	65	65	65	65

As the analysis indicates, SENSEX is significantly positively correlated with FII with the correlation coefficient as 0.773. This means that with the increase in this variable SENSEX increases and with the decrease in this variable SENSEX decreases. SENSEX is negatively correlated with exchange rate with the correlation coefficient of -0.317.This means that with the increase in exchange rate SENSEX decreases and with the decrease in exchange rate SENSEX increases. Inflation is positively correlated with SENSEX. But the correlation is not as significant as the error term is not in the standard range of .01 to.05.

This relation are more precisely observed in the output of regression analysis where we found that when regressed all the independent variables with the dependent variable then the coefficient of determination i.e. R^2 (0.634) shows that there is a very low variability in

the SENSEX due to the independent variables. Output which I got is different than the earlier findings. Earlier study shows that there is great degree of association between performance of SENSEX and the economic variables. But in the research work carried a slightly different result came which shows that the degree of association is quite low as the value of R^2 (coefficient of determination) is 0 .634 which is low which shows the interdependence between dependent and independent variable is low. On the basis of study it reflects that only 63.4% of relationship can be established between these three variables and SENSEX and the rest is driven by some other factor.

But when we regress only those variables with SENSEX which have a significant correlation with SENSEX then the variability in SENSEX due to this independent variable is 59.8% which is good. So this variable will become the part of our regression equation and hence the model is given by:

SENSEX= 6058.414 + 0.150 FII+ e

Relationship between exchange rate and SENSEX

We can see in the graph that there is negative relationship between exchange rate and SENSEX. When exchange rate increases, SENSEX go down and when exchange rate decreases, SENSEX go up. It is also identified by the correlation coefficient between SENSEX and exchange rate which is - 0.317. It indicates that SENSEX is negatively correlated with exchange rate.

Relationship between FII and SENSEX

We can see in the graph that there is positive relationship between FII and SENSEX. When the inflow of FII increases, SENSEX go up and when there is outflow of FII, SENSEX go down. It is also identified by the correlation coefficient between SENSEX and FII which is 0.773. It indicates that SENSEX is positively correlated with FII.

Relationship between inflation and SENSEX

We can see in the graph that there is negative relationship between Inflation and SENSEX. When inflation increases, SENSEX go down and when inflation decreases SENSEX go up.

CONCLUSION

This research shows that FII have positive correlation with SENSEX and there is a significant relationship between SENSEX and FII. The analysis of the data set shows that the SENSEX is positively related to FII and negatively related to exchange rate. This means that with the

increase in FII, SENSEX will go up and decrease in FII SENSEX will go down. The models thus estimated reflect the relationship of these variables with SENSEX and hence can guide the investors to understand the trends of SENSEX according to fluctuation in these variables. This analysis has been constrained by size and nature of the data, which could have well affected the results. The data was taken on monthly basis. The data on daily basis can give more positive results (may be). Further studies will aim at increasing the sample size for still better and consistent estimates.

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