# Causal Relationship between Foreign Institutional Investments, Exchange Rate and Stock Market Index i.e. Sensex in India: an Empirical Analysis

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**Abstract**

Since the global crisis (2008) emerged in the world economy, the inflows of foreign investors increased in developing countries and India was not the exception in terms of huge investment by foreign investors. India's capital market recognized as an emerging market in the world and growing fast since the economic liberalization and globalization in 1991. Since 1993, when liberalization policies came in to effect and Indian market opened for foreign investment, the FIIs become the driving force for the overall development of economy as well as pose threat in the development. This paper attempts to analyze the impact of currency fluctuations on the investment by the foreign investment investors, for analyzing the impact and causal relationship, Augmented Dickey-Fuller test and Granger Causality test has been applied, and for analyzing FIIs role in the development of Indian capital market linear regression model has been used. After applying the Granger Causality test, we found that FII granger causes Exchange rate. As far as causality relationship is concerned, a unidirectional causality or one-way causality is found from FII towards exchange rate. As far as the causal relationship between the FIIs and SENSEX, FII are only responsible for up to 45.4%. This means that whatever changes have happened in the SENSEX for period under study the FI investments are responsible up to 45.4%. This implies that there are many other macro-economic factors which have indirectly affected the SENSEX in India.

**Keywords:** FIIs, SENSEX, INRUSD, BSE, Volatility, GDP, RBI, FDI

## 1. Introduction

Since the global crisis (2008) emerged in the world economy, the inflows of foreign investors increased in developing countries and India was not the exception in terms of huge investment by foreign investors.

India's capital market recognized as an emerging market in the world and growing fast since the economic liberalization and globalization in 1991. Capital markets becomes the catalyst of modern economy and provides the great source of raising finances for Indian companies that ultimately leads to financial and economic development of the whole economy in the country.

The major role played by the stock market of India due to its regulating body SEBI, time to time improvements in the regulations attracts huge investment by foreign investor. A well regulated stock market is essential or pre requisite for huge investment by foreign investors. The importance of stock market is also evident from the below statement.

"An organize and well regulated stock market provides liquidity to shares, ensures safety and fair dealing and buying of securities and helps in monitoring firms in process of collection and use of funds by them" (Agrawal, 2000)

After the liberalization of economic policies (1991), the Indian economy was well suited for the foreign investors. Indian economy market has become the favorite destination for foreign inflows due to fast pace changes due to globalization. After the liberalization, new policies came to effect, which ultimately opens the door for foreign investment. Foreign investment implies to the any investments contributed by the residents of a country in the financial assets and production process of another country.

"The foreign investment is necessary for all developing nation as well as developed nation but it may differ from country to country. The developing economies are in a most need of these foreign investments for boosting up the entire development of the nation in productivity of the labour, machinery etc. The foreign investment or foreign capital helps to build up the foreign exchange reserves needed to meet trade deficit or we can say that foreign investment provides a channel through which developing countries gain access to foreign capital which is needed most for the development of the nations in the area of industry, telecom, agriculture, IT etc. The foreign investment also affects on the recipient country like it affects on its factor productivity as well as affects on balance of payments" (Agarwal, 2015).

In India, the foreign investors invest through two channels: foreign direct investment and foreign institutional investment. Foreign direct investment directly related with production activities and the period of investment is long or medium term whereas, FIIs investment period is generally for shorter period and used for short term investment. FIIs invest in capital markets such as money markets, stock markets and foreign exchange markets. FIIs were the part of foreign inflows that also attracted to well regulate Indian stock market. Foreign Institutional Investors means an institution that tends to make an investment in India capital markets, established or incorporated outside India.

In 1990-91, the government of India, analyzed the economic condition of the country and concluded that a major change is required for rapid economic growth of the country. For that, government allowed the liberalization policy and doors were opened for foreign companies to invest in India in large numbers. The government also revamped its industrial policy as well as foreign policy to attract foreign exchanges.

As the need grows for the foreign exchanges, the Government permitted foreign portfolio investment in Indian capital market on the recommendation of Narsimhan Committee Report on Financial System.

From September 14, 1992 with some regulations, Foreign Institutional Investors were allowed to invest in all the securities including shares, debentures and warrants of listed companies traded on the primary and secondary markets. Dr. Manmohan Singh as a finance minister announced the proposal in the budget of 1992-93, that FIIs are allowed to invest through pension funds and other different route in Indian Capital market. Currently, entities eligible to invest under the FII route are as follows:

As FII: Overseas pension funds, mutual funds, investment trust, asset management company, nominee company, bank, institutional portfolio manager, university funds, endowments, foundations, charitable trusts, charitable societies, a trustee or power of attorney holder incorporated or established outside India proposing to make proprietary investments or with no single investor holding more than 10 per cent of the shares or units of the fund.

Sub-accounts: The sub account is generally the underlying fund on whose behalf the FII invests. The following entities are eligible to be registered as sub-accounts, viz. partnership firms, private company, public company, pension fund, investment trust, and individuals.

FIIs registered with SEBI fall under the two categories:

a) Regular FIIs- those who are required to invest not less than 70 % of their investment in equity-related instruments and 30 % in non-equity instruments.
b) 100 % debt-fund FIIs- those who are permitted to invest only in debt instruments.
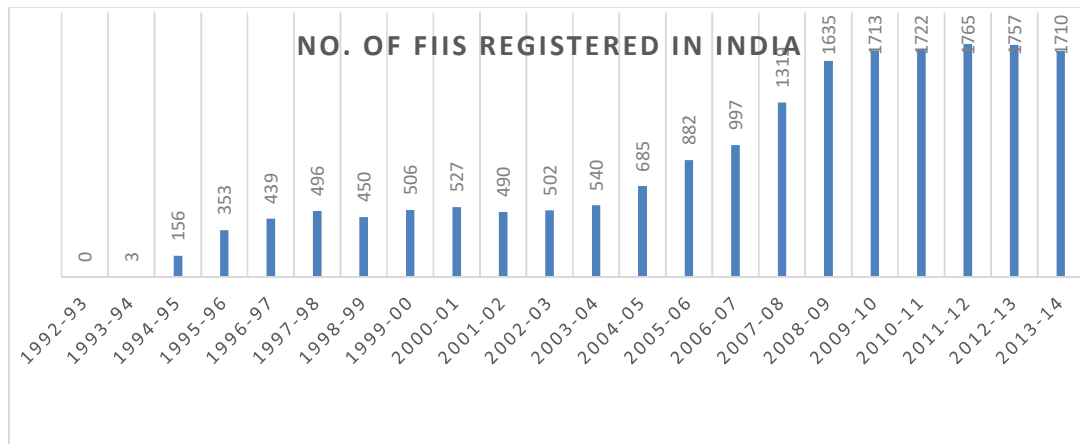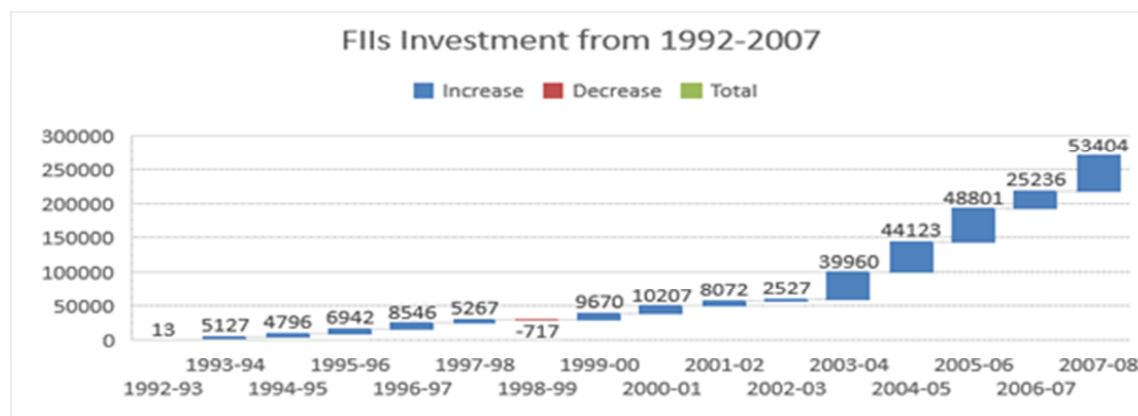
Figure 1. FIIs registered in India



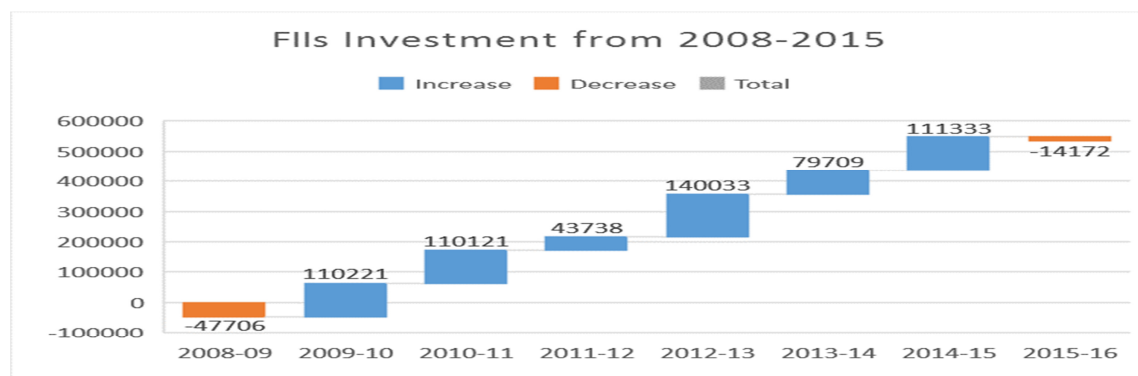Figure 2. FIIs investments in India from 1992-2007



Figure 3. FIIs Investments in India from 2008-2015

Foreign institutional investors were allowed to invest in all listed securities (debt and equity) traded in Indian capital market since liberalization policy came in the effect in 1992 and since then there has been continuous development to build the Indian economy more liberal with the world economy. Foreign capital inflows have its advantages as well as drawbacks (pros and cons) towards the development of recipient economy. FIIs also termed as bad weather friend due to its behavior of investment in any economy. The investment made by the foreign institutional investors attracted by favorable environment of the country like well-regulated stock market, government policies, exchange rate, macroeconomic aggregates etc. FIIs investment also pose severe threat to

the domestic economy as well as well financial economy of recipient country due to its behavior of outflows which results in rise of inflation, volatility in exchange rate as well as the stock markets.

In this paper, an attempt has been made to analyze the determinants of FIIs in India. Several researches on FIIs suggested that, these inflows largely determined by the performance of stock market and macroeconomics aggregates of the host country. Thus, in this paper, an effort has been made to analyses these determinants that are as follows:

FIIs are allowed to enter into recipient country (India) only through stock exchanges. FIIs invested in two forms i.e. equity and debt. FIIs have the major impact on the rise or fall of Sensex and in this present paper the effort has been made to analyses the relation between FIIs investment and Sensex. The several research evidences show that when there is positive investment by FIIs the Sensex increase and vice-versa. BSE-SENSEX has been selected for this study to analyze the relationship between FIIs investment inflows and volatility in BSE SENSEX.

The other determinant in this study is exchange rate (dollar price). This macroeconomic variable represents the nominal rate of exchange of the Indian Rupee against one unit of foreign currency. For foreign currency we choose US Dollars, because it has remained to be most dominating foreign currency used for trading and investment in the India.

In this paper, we used rupee dollar (INRUSD) to represent the movements in forex currency market, while for equity market, yearly average data for BSE Sensex has been used. The yearly data on net FIIS data has been collected from the SEBI website from 1993-2015.

For FIIs investment, we have selected the net investment in equity as well as debt in the Indian economy in this research paper.

1.1 Review of literature

A review of literature related to studies in the field of foreign investment especially Foreign Institutional Investors has been made studied here in order to discern the distinctiveness of the present study. The Researcher has consulted several journals, newspapers magazines, annual report of SEBI and Ministry of Finance, RBI, and dissertations and the work of the different researchers in area of foreign investment.

Alam and Alam (2014) analyses the performance of foreign institutional investments in the Indian stock market. After observing the movement of FIIs movement and the impact of the trading of Foreign Institutional Investors on the performance of Indian capital market and by examining the empirical relation between stock market return and FII flows, it is found that the FII net inflows are correlated with the Sensex and explains the movements in the Indian capital market.

Batra Amit (2003) attempted to develop an understanding of the dynamics of the trading behavior of FIIs and returns in the Indian equity market. Daily and monthly data have been analyzed to explore the trading behavior of FIIs and the impact of their trading biases upon stock market stability. The author found that there is strong evidence that FIIs have been positive feedback investors and trend chasers at the aggregate level on a daily basis. However, there is no evidence of positive feedback trading on a monthly basis.

Bhattacharya Basabi and Mukherjee Jaydeep (2008), investigated the nature of the causal relationship between stock returns, net foreign institutional investment (FII) and exchange rate in India implying that the inter linkages between stock price and exchange rate is prominent not due to the presence of foreign institutional investors alone, but attributed to other factors as well. It suggests the policy implication that the authorities can focus on domestic economic policies to stabilize the stock market.

Bohra and Dutt (2011) aims at understanding the behavioral pattern of FII by identifying the Decade trend analysis of FII investment in India, and attempts to present the correlation between FII turnover and turnover of different individual groups of shares in BSE sensex. The author found a positive correlation between stock market and investment of FII's in a relation that sensex follows the investment behavior of FII's, but there is some exception seen in year 2005 and 2008. It also shows that positive or negative movement of FII's leads to a major change/shift in the sentiments of domestic or related investors in market and suggests the policy implication that the authorities can focus on domestic economic policies to stabilize the stock market.

Bose Suchismita and Coondoo Dipankor (2004) examine the impact of FII policy reforms on FII portfolio flows to the Indian stock markets. Given the volatile nature of capital flows to emerging markets seen in the early 1990s, FIIs investment in India, which began in Jan 1993, called for special regulatory attention. The results of this study help to evaluate the impact of Liberalization as well as strengthening of policy framework for FII

flows in the Post-Asian crisis period and finds that the Liberalization policies that expanded the membership of FII categories and their scope of investments in the Indian market. On the whole author, finds that these policies mostly render FII investment more sensitive to domestic market returns and raise the inertia of FII flows.

Chakrabarti Rajesh (2006) focuses upon the contribution of foreign investment in Indian equity market as well as share in GDP of the country. The Author also tries to show the relationship between FII flows and return in the Indian market with the help of cumulative FII investment and the sensex from Jan 1993 to June 2006 and finds that FII equity investment and the stock market performance in India have been closely interlinked. It is also observed that the FII flows are believed to have a positive impact on the country's development, so much so that encouraging FII flows government constitute an expert group (2002, which reported in 2004) to suggest ways to accomplish this goal. Lastly the Author concludes that, FII flows should be viewed not in isolation but as a part of an integrated policy package for all capital receipts keeping in mind their role in the overall macroeconomic structure.

David carpenter Partner Mayer, Brown, Rowe and Maw LLP (2005) examined the regulatory framework established by Indian Government for three separate investment avenues: foreign direct investment; investment by foreign institutional investors; and investment by foreign venture capital investors. According to them though these investment alternatives have created ample avenues for foreign investment in India, yet they still remain subject to many conditions and restrictions which continue to hamper foreign investment in India.

Khan Masood Ahmad, Shahid Ashraf and Shahid Ahmed (2005) examined the relationship between foreign institutional investments and stock market returning India during 2002-04 and found the results that FIIs have been attracted to India as an important investment destination. FIIs investment in certain Indian companies shows majority shareholding while as a percentage of the floating stock it is also substantial. The flow of FIIs funds seems to be attracted by the Indian equity return.

Mishra P.K., Das K.B., and Pradhan B.B., (2009) assessed the performance of the Indian capital market by empirically studying the impact of net equity investment by FIIs on stock returns. This study provides the evidence of positive correlation between FII net flows into India and stock market return and also observed that the movements in the Indian capital market are fairly explained by the FII net inflows.

Mohan T. T. Ram (2005) observed that FII investment is viewed as compensating in some way for the relatively low level of foreign direct investment (FDI) and as a welcome sign of international interest in the Indian economy and observed that in India, volatility in portfolio inflows has been modest compared to other emerging markets and the real problem caused by variations in FII inflow from year to year is not stock market volatility but difficulties involved in management of money supply and exchange rate.

Singh Bhupinder (2005) examined the effects of significant macro-economic variables, inflation and exchange rate on the inflows of Foreign Institutional Investment in India and tried to develop a theoretical framework to analyze the inter-relation between Foreign Institutional Investment, inflation and exchange rate. The study suggested that the strength of the financial system of the country is gauged by the quality of foreign capital inflows. The financial system should be strong to ward off any adverse impact arising from the volatility of capital flows. It must be equipped with adequate support measures like forex reserves, comfortable balance of payments position to negate the impact of volatile capital flows. It is only then that the adverse impact of contemporary global development like oil prices hike can be minimized.

1.2 Objectives of the Study

The main objective of this study is

- To find out or investigate the causal relationship between foreign institutional investors (FIIs) and Indian stock market (SENSEX)
- To investigate the relationship between foreign institutional investors (FIIs) and macroeconomics aggregate i.e. exchange rate (INRUSD)

1.3 Scope of the Study

This research paper covers the period of 1993-2015 i.e. 22 years. This paper has been focused on the FIIs net investment in India (both equity and debt) and their effect on SENSEX as well as their influence on fluctuations of exchange rate (INRUSD).

1.4 Need of the Study

This paper attempts to analyze the impact of currency fluctuations on the investment by the foreign investment investors and the role played by the FIIs in the development of Indian capital market. Since 1993, when liberalization policies came in to effect and Indian market opened for foreign investment, the FIIs become the

driving force for the overall development of economy as well as pose threat in the development.

## 2. Data Methodology and Model specification

The study covers the period from 1992-93 to 2015-16 (Appendix 1). The relevant data used in the study are taken from the official website of Securities exchange board of India and Hand book of statistics on the Indian Economy, RBI, 2015. The variables included in the study are FIIs investment as a measure to find out the causal relationship with exchange rate (INRUSD) and sensex. The other variables used in the study are SENSEX as a measure of volatility of Indian capital market and exchange rate as a measure of volatility for macro-economic variables. Augmented Dickey-Fuller test has been used to find out the data is stationary or not for the exchange rate and Granger causality test applied on FIIs investment and exchange rate to find out the causal relationship between these two. For finding out the relationship between FIIs and sensex, linear regression model has been used in this study.

Regression equation looking at relationship between BSE Sensex and FII flows is:

$$SR_t = \alpha + \beta \, NFII_t + \varepsilon_t$$

Where $t$ $SR$ is the Sensex based yearly averages at time $t$; $NFII$ is the net investment flow by FIIs at time $t$; $\alpha$ and $\beta$ are constants; $\varepsilon_t$ is the white noise;

## Augmented Dickey Fuller (ADF) Unit Root test:

ADF Unit Root Test was developed by Dickey and Fuller in the year 1981. ADF unit root test could be used to detect the data whether associate with unit root problem and determine whether the time series data should be first or second difference.

Graphical method or hypothesis testing can be used to detect the stationary. There are two types of model that used to conduct unit root test which are model constant with trend and without trend.

Model constant with trend:

$$\Delta Y_t = \mu + \beta t + \delta Y_{t-1} + \sum_{i=1}^{k} \alpha_i \, \Delta Y_{t-i} + \varepsilon_i$$

Model constant without trend:

$$\Delta Y_t = \mu + \delta Y_{t-1} + \sum_{i=1}^{k} \alpha_i \, \Delta Y_{t-i} + \varepsilon_i$$

H0: Yt is non stationary (Yt has unit root), $\delta = 0$

H1: Yt is stationary (Yt has no unit root), $\delta < 0$

$\alpha = 0.10$

The test statistic value can be computed by the following formula:

$$\text{Test statistic} = \frac{\hat{\delta} - \delta}{SE(\hat{\delta})}$$

The decision rule is that rejects H0 when probability value is less than 10% significance level, otherwise, do not reject H0.

Reject H0 shows that the model is stationary while do not reject H0 shows that the model is non stationary.

Null Hypothesis: XSEN has a unit root

Exogenous: Constant

Lag Length: 2 (Automatic - based on SIC, maxlag=5)

|  | t-Statistic | Prob.* |
|---|---|---|
| Augmented Dickey-Fuller test statistic | 1.187732 | 0.9968 |
| Test critical values: 1% level | -3.788030 | |
| 5% level | -3.012363 | |
| 10% level | -2.646119 | |

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(XSEN)

Method: Least Squares

Date: 11/13/16   Time: 17:49

Sample (adjusted): 4 24

Included observations: 21 after adjustments

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| XSEN(-1) | 0.149838 | 0.126155 | 1.187732 | 0.2513 |
| D(XSEN(-1)) | -0.750998 | 0.267116 | -2.811506 | 0.0120 |
| D(XSEN(-2)) | -0.478682 | 0.249138 | -1.921352 | 0.0716 |
| C | 776.9602 | 1368.464 | 0.567761 | 0.5776 |

| | | | |
|---|---|---|---|
| R-squared | 0.333580 | Mean dependent var | 1056.697 |
| Adjusted R-squared | 0.215977 | S.D. dependent var | 4056.968 |
| S.E. of regression | 3592.246 | Akaike info criterion | 19.38059 |
| Sum squared resid | 2.19E+08 | Schwarz criterion | 19.57954 |
| Log likelihood | -199.4962 | Hannan-Quinn criter. | 19.42376 |
| F-statistic | 2.836481 | Durbin-Watson stat | 2.073625 |
| Prob(F-statistic) | 0.069070 | | |

Pair wise Granger Causality Tests

Sample: 1 24

Lags: 2

| Null Hypothesis: | Obs | F-Statistic | Prob. |
|---|---|---|---|
| EXCHANGE_RATE does not Granger Cause FII_INVESTMENT | 22 | 2.16142 | 0.1458 |
| FII_INVESTMENT does not Granger Cause EXCHANGE_RATE | | 4.04553 | 0.0366 |

it is observed from the above table that FII causes macroeconomic variables like exchange rate as presented in table that the F-statistic is 4.04553 and the p-value is 0.0366, that is less than critical value i.e. 0.05 which

implies that the null hypothesis is rejected i.e. it proves that FII granger causes Exchange rate. As far as causality relationship is concerned, a unidirectional causality or one-way causality is found from FII towards exchange rate.

In running the regression analysis, Sensex yearly averages have been taken as the dependent variable and the net investment flow by FIIs are considered as the independent variable. To test the causal relationship between net FII investment and Sensex, multiple linear regression model fitted with the econometric technique of ordinary least square (OLS) has been done. Regression equation looking at relationship between BSE Sensex and FII flows is:

***SRt =α +β NFIIt +ε t***

Where *t SR* is the Sensex based yearly averages at time *t; NFII* is the net investment flow by FIIs at time *t;* α and β are constants; **ε** *t* is the white noise;

Thus by applying linear regressions on net FII investment and SENSEX value the following summary table has emerged.

**Model Summary**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | .673[a] | .454 | .429 | 6283.2237990 |

a. Predictors: (Constant), FII INVESTMENT

**ANOVA[a]**

| Model | | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 720855874.253 | 1 | 720855874.253 | 18.259 | .000[b] |
| | Residual | 868535828.792 | 22 | 39478901.309 | | |
| | Total | 1589391703.045 | 23 | | | |

a. Dependent Variable: SENSEX

b. Predictors: (Constant), FII INVESTMENT

**Coefficients[a]**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 6930.613 | 1528.572 | | 4.534 | .000 |
| | FII INVESTMENT | .077 | .018 | .673 | 4.273 | .000 |

a. Dependent Variable: SENSEX

It can be observed from the above table that all explanatory variables, taken together establish a relationship nearly 45.4 percent ($R^2$ = 0.454) of the total variables in the capital market of India in each year. This means that whatever changes have happened in the SENSEX for period under study the FI investments are responsible up to 45.4%. This implies that there are many other macro-economic factors which have indirectly affected the SENSEX in India. Therefore, it may be inferred that according to the model made on the basis of linear regression, FII investment have somewhat affected the SENSEX value but not totally from the coefficients of the model as shown above.

### 3. Conclusion:

For exploring the causal relationship between FIIs, sensex and macroeconomic variables exchange rate, this study has been carried out. To examine the relationship, this paper employed the regression and Granger Causality test. Regression analysis applied on Sensex and FII to determine the how FIIs are contributing in the development of stock market and result shows that FII are only responsible for up to 45.4%. This means that whatever changes have happened in the SENSEX for period under study the FI investments are responsible up to

45.4%. This implies that there are many other macro-economic factors which have indirectly affected the SENSEX in India. But the FII have the causal relationship with exchange rate. The granger causality test applied for examine the relationship between these two and result shows that FII granger cause exchange rate and also responsible for the volatility in exchange rate.

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