

# Determinants of FIIs: Evidence from India

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**Abstract:** The present paper is aimed to identify the determinants of Foreign Institutional Investment and to establish a relationship between them. The relationship is carried out between FII on the one hand and four economic variables namely Foreign Exchange Rates, BSE Sensex, Exchange Rates, and Inflation on the other hand. Secondary data has been used for a period of 12 years between 2001-02 and 2012-13. The data was obtained on monthly basis. The study analyses the data by using econometric tools like Augmented Dicker Fuller test and Granger Causality Test. The correlation coefficient between FIIs and Sensex, FIIs and FERs, FERs and Sensex, and WPI and Sensex were found positive. However, exchange rates and Inflation were found having negative relationship with FIIs. The results of Granger Causality Model indicated bi-directional causality between FII and Sensex, and FII and Exchange rate. However, no causality is found between FII and Foreign Exchange Reserves.

**Keywords:** FII, Portfolio Investment, Exchange Rate, BSE Sensex, Inflation.

## INTRODUCTION

Till the early 1990s, the flow of foreign capital was restricted by many countries including India under the policy of protectionism. At that time, there was huge dependence upon external financial aid and official development assistance. However, gradually, when hard pressed by the economic needs of their countries, the economies of most of the developing countries were opened by way of dismantling the so called capital controls. India opened doors of its economy for FIIs in 1992. The main objective for opening up of India's financial markets of FIIs was to attract foreign capital, which, if accompanied by domestic capital would speed up the process of economic growth.

Since opening of the market for foreign investors, portfolio flows from FIIs have emerged as the major source of capital for India. Besides this, the substantial increase in foreign portfolio flows since early 1990s till date was also attributable to many other factors like greater integration amongst major global financial markets, more advancement in information technology and growing interest amongst FIIs to invest into Emerging Market Economies (EMEs) through various investment alternative such as hedge fund, private equity funds etc. The underlying aim for this important move amongst FIIs was to achieve the objective of diversification in their international portfolio investment and also to reduce their risk factor.

Since the introduction of FIIs in the Indian economy till date, there have been regular discussions on the impact of FII flows on the economic growth of the country in general and on the growth of the Indian capital market in particular. On the one hand, the FII flows have enhanced liquidity of the global capital market; on the other hand, they have brought down the cost of capital substantially. In spite of all the good points, the FIIs have also been the victim of continuous criticism. The major negative points which have been raised against these FII flows include their inherent uncertain nature like preferring short term speculative benefits, hot money without commitment for a particular country or group of countries, herd mentality as investment strategy, return chasing behavior and their undue impact on the volatility of the stock market.

The review of literature indicates that in majority of the researches conducted on FII, the main focus has been on studying the impact of FII flows upon the Indian stock market or vice versa. Relatively less research work has been devoted on analysing the factors determining the FII flows in India. As evidenced by the past studies there is a dynamic relationship between FII flows and the variables like foreign exchange rates, inflation and stock returns. The present paper aims to fill the above mentioned research gap as it makes an attempt to analyse the factors affecting FII flows in India.

## REVIEW OF LITERATURE

Chakrabarti et al (2001) made an empirical investigation to analyse the inter relationship between FII flows, on one hand and equity returns in India in the Indian context, on the other. The study revealed that after the world faced the Asian crisis and info-tech bubble assumed serious proportions internationally in the year 1998-99, there was a sharp decline of FII flows by the tune of US \$ 61 million. The study found that there was a positive correlation between the stock returns and the flows of FII.

This study found a significant difference in the nature of FII flows in the pre Asian and post Asian crisis phase. It was found that in the pre Asian period, if there was any change in the FII flows, it would also had an impact on stock market return. This meant that FII acted as an independent variable and the stock market return acted as the

dependent variable. On the contrary, in the post Asian crisis, the changes occurred in FII flows were due to stock market return mainly. This meant that the stock returns acted as the independent variable and the FII flows acted the dependent variable.

Kohli et al (2001) analysed the trends and the composition of flows of foreign capital into Indian capital market and examined the effect of foreign capital flows on the important macroeconomic variables in the country. The author discovered that the foreign capital flows had a substantial impact on the real appreciation of the economy and it had also augmented the domestic money supply. However, during the period of capital surge, the undesirable results had been countered by the policy of interventions and sterilization.

The research study finally observed that by bringing to light 'the real cost of these policies of intervention and sterilization' during the period of good FII flows, it further motivated government to attract more FII flows.

Khanna, Sushil (2002) analysed the experience of Indian economy with the private capital inflows post nineties era. In this research work, an endeavor had been made by the author to analyse the effects of the constraints imposed on the capital market of Indian economy. As the RBI had to manage the impact of foreign portfolio investment, the study discussed the situations that led to changes in the RBI policy which in turn had liberalized the financial sector in India. As per the study's observations about the macro economic analysis, it was revealed that the growth rate of Indian economy showed marginal decline during 1990s. But at the same time, rate of saving or investment did not show good sign in the economy during that period. Moreover, there was no empirical evidence as claimed by the study that the entry of FIIs had brought down the cost of capital. The study reinforced the view and concluded that FIIs were not the replacement for internal resources to be used by the corporate. And likewise, FII was also not the substitute for capital market to be tapped by the development banks as well.

Eun & Rensick (2002) observed that there had been many reasons behind the surge of global foreign portfolio investment during the last few years. As per the analysis of this book, some of the reasons for this development included (a) deregulating the Indian financial markets, (b) introducing new investment alternative vehicles such as country funds, mutual funds and globally listed stocks which helped the foreign players in diversifying their portfolio, and (c) increasing their yield along with reducing the risks without enhancing their costs much.

The concept of home biasness not only brought in more market imperfection in the financial markets, it also led to the growth of some malpractices in the market like legal hurdles for foreign capital inflows, discriminatory treatment in terms of taxes for foreign players and charging of unnecessary excessive transaction fees as claimed by this study.

Mukherjee et al (2002) analysed the dynamic relationship between FII and its possible covariates in the Indian economy. The study was based on the daily data from 1999 to 2002. In this research work, two variables were included for study purpose. The first variable included the daily market return and its volatility in the domestic as well as global stock market. The other type of variables includes the macro level economic variables like interest rate and Industrial production index. The study observed that (a) the inflows and outflows of FII from the Indian economy were caused by the stock market returns but the reverse did not hold good i.e. stock market returns were not likely to be caused by FII flows, (b) the Indian stock market returns acted as the biggest and the strongest factor to attract FII flows, (c) FII inflows and sale acted and reacted to the tune of the stock market performance.

Gordon and Gupta (2003) analysed the impact of various factors on the FII equity flows into India. The study found that the FII flows to India were undersized as and when compared to emerging markets, but seemed to be relatively less volatile. This study classified variables into two categories, viz. domestic and external. The first group consisted of macro economic and political variables. If foreign investors followed these variables to track any foreign market, then they were stated to be following a top down approach, whereas bottom down approach was pursued, where foreign investors were following the second set of variables as observed by this study. Moreover, the study claimed that flows were decided by both the factors domestic as well as external ones. The study concluded that out of the external factors, emerging market returns and LIBOR were the most important ones amongst many other factors. And amongst the domestic factors, the change in credit rating of the company was the major reason as further concluded by this study.

Bose and Coondoo (2004), in their research paper studied the effect of the FII policy reforms on the Indian stock market. The study observed that FIIs, which began investment in India in January 1993, gave a new direction to the regime of financial sector reforms in India. The study also made a herculean attempt to assess the effect of various policy decisions on FII flows. The period taken under this study spanned from 1999 to 2004. This study paper, for

this purpose, applied the multivariate GARCH model of regression. As per the study, the results strongly supported the fact that Indian liberalization policies attracted FII flows very positively during these years. Even various preventive measures and actions which were taken for better controlling of FII flows did not reflect any sign of FII slowing down in the Indian capital market during that period.

Rai and Bhanumurthy (2004), in their research paper titled "Determinants of FII in India: The Role of Return, Risk, and Inflation", tried to examine the determinants of FII flows in India. The researchers attempted to examine the impact of risk, return and inflation on the flows of FII. The proposed hypothesis of the study was that risk and inflation in a domestic country (like Indian economy) and return in a foreign market (like USA economy) would have an adverse impact on the FII flows, whereas risk and inflation in foreign country (like USA economy) and yield in domestic country (like Indian economy) would have a positive impact on the FII flows. To test hypothesis, they arranged the monthly data from 1994 to 2002.

USA was selected as the major foreign destination for modelling FII inflows in India, as USA had largest proportion of FII flows to India that happened to be around 42%. As per the study, a positive correlation between FII flows and the return of BSE Sensex and inflation in US (US as home country) was found. However, there was found to be a negative relationship between FII flows in India and inflation in India (host country), risk on BSE Sensex and yield on S&P 500 index. Moreover, the study also found that there was no causation from FII side towards Indian stock market returns as it was found to be so by some of the existing studies like one by Gordon and Gupta (2003).

Shah and Patnaik (2005), in their paper titled "India's Experience with Capital Flows", tried to discover the cause and effect relationship of the majorly observed features of India's capital flows. The paper conducted an empirical analysis featuring GDP, current account data, capital account, FDI, portfolio equity flows and debt. The authors reviewed the historical evolution of the currency regime and capital controls, and also examined the experience of FDI and portfolio flows with Indian capital market. They found a strong intertwined experience of India regarding capital flows and currency regime. The study observed that currency pegging (i.e. fixation of ER of currency by comparing its value with a single currency value) as capital flows had shaped the currency regime; and the currency regime, in turn, had shaped capital flows as observed by this study.

Chakravarty et al (2006) investigated the association between the prices of the Indian stock market and some important economic variables for the period ranging from 1991 to 2005. The variables for which relationship with stock prices was tested included inflation rate, supply of money, industrial production index, ER and gold price. The author had used monthly data for these variables. For studying the dynamic relationship between the economic variables and the prices of the Indian stock market, granger causality test had been used in this study. She concluded that ER had no effect on stock prices but good industrial performance and low inflation could affect the stock markets positively. Moreover, as claimed by this study, money supply had not shown any relationship with stock prices.

Sikdar et al (2006) studied the relationship between foreign capital flows (FDI, FPI) and other economic variables during 1997 to 2003. The study observed that under the regime of liberalization policy, the outcomes were highly surprising. The composition of capital inflow had undergone a major change over these years. Dependence on foreign aid had come down drastically. And funds in the form of Foreign Portfolio Investment (FPI), Foreign Direct Investment (FDI), external commercial borrowings and non-resident Indians deposits had come to be recognized as the major sources of capital flows in India as concluded by this study. Even amongst these foreign capital flows, there had been a silent and gradual transition from debt-oriented flows to equity-oriented flows as observed by this study.

Babu and Prabheesh (2008), studied the relationship between FII flows and stock market return in their research paper titled "Causal relationships between FII and stock returns in India". The study included daily data of FII and stock returns from 2003 to 2007. It employed various statistical techniques like VAR, impulse response and granger causality test to study the relationship. As per the study, Granger causality tests revealed that there was found to be a bi-directional causality between the FII flows and Nifty. This meant that on the one hand the changes in FII flows caused changes in Nifty value; on the other hand, the changes in Nifty caused changes in FII flows. However, the impulse Response Function (IRF) showed that the flows of FII in the Indian economy were more driven by the Indian stock market returns i.e. FIIs acted more promptly towards stock returns in the Indian capital market than the vice versa as concluded by this study.

Rajput & Thaker (2008), in their study on “Exchange Rate, FII and Stock Index Relationship in India”, tried to measure the relationship amongst all these variables for the period ranging from 2000 to 2005. The study observed that in a more globalized world, ER, FII and Stock Index were the important economic variables and reflected the underlying strength and stability of business and economy as a whole. The study used correlation and regression method for analysis purpose. The study found that there was no long term positive correlation between ER and stock index leaving barring 2002 and 2005. However, FII and stock index were found to have a positive correlation as observed by this study. But, it was also found that it was not possible to predict the future value of one variable on the basis of another variable as concluded by this study.

Ravi et al (2008), in his study concluded that various determinants of FII flows in India included domestic macroeconomic variables like inflation, FERs, money supply, and ER, etc.

Ananthanarayanan, Krishnamurti and Sen (2009), studied the relationship of FII flows with the security returns in India. The main conclusions of the study were as follows: I) The unexpected flows by FIIs have had more impact on the stock index than the expected flows as the unexpected flows created a situation of volatility. II) There was a strong evidence which showed consistency with the hypothesis of base-broadening.

Gosh and Herwadkar (2009), in their research paper titled “Foreign Portfolio Flows and Their Impact on Financial Markets in India”, concluded that the net FII flows granger caused equity (SENSEX) as well as ER in the long span of time. But in the short span of time, as per the impulse response function (IRF) also used in this study, a shock to the FII flows had resulted in rise in the equity stock prices, appreciation of ER and decrease in interest rate.

Kaur and Dhillon (2010), in their research paper titled “Determinants of FIIs’ Investment in India”, investigated about the factors which affected FII flows in India. The period of study was from 1995 to 2006. The results indicated that in the long run, the returns available in the host country on stock market had a positive impact on the FII flows, and on the other hand, the returns available in the home country had a negative but insignificant impact on FII flows in the long-run as well in the short run.

Kumar and Gupta (2010), in their study on “FII Flows to India: Economic Indicators”, tried to study the determinants of FII flows in India. The study included the data of FII from 1995-96 to 2006-07. The factors included in this study were risk and return of S&P 500 index of USA, return and risk at Nifty, inflation, interest and ER etc. The research concluded that risk and return of USA market and Indian market, ER and inflation are the major determinants of FII flows in India. Mitra et al (2010) also supported the findings of Kumar and Gupta(2010) and indicated that there was a bi directional causality between the returns of the Indian stock market and the foreign investment flows.

Paliwal and Vashishtha (2011) concluded that both the variables namely FII and stock market returns granger caused each other in the short span of time as well as in the long span of time.

Kumar and Tavishi (2012) analysed the dynamic and static relationship between FIIs and the Indian stock market returns. For making an analysis of this relationship study, the data on FII and Indian stock market had been used for a period of ten years ranging from 2000 to 2010. Various econometrics techniques like VAR, Granger causality test and Impulse Response Function (IRF) had been used for this purpose. As per the empirical results of the study the flows of foreign institutional investment were found to be more correlated with their past lagged values as well as with the India stock market lagged returns.

### **Research Methodology**

In this study, the secondary data has been used to achieve its objective of identifying the determinants of FIIs flows to India. The important sources among them include Annual Reports of Securities and Exchange Board of India (SEBI), Annual Reports of Reserve Bank of India (RBI), Annual reports of BSE and NSE and Data from Newswire and Capital line. The study has been conducted for the period starting from 2001-02 to 2012-13. The differenced time series based on monthly data for the above mentioned period for all the variables under study have been used for analysis

The present study includes various economic variables namely FII, BSE Sensex, ER, FERs and Inflation. The logic of including these variables into this study is based upon the trading behaviour of FIIs. Objectively speaking, the trading behaviour of the FIIs is classifiable into two types: (a) Positive Feedback Trading and (b) Herding Behaviour. As per Positive Feedback Trading approach, FIIs prefer to observe the returns being generated by the movements of stock market index and identify who are the winners and the losers coming out of this development. Accordingly, they take a decision in buying the recent winners and selling the recent losers. Thus, they prefer to have a continuous eye on the performance of major stock indices like BSE. Hence, BSE Sensex is a very important variable which has been included in this study to analyse the behaviour of FIIs with respect to its movements.

According to Herding Behaviour, FIIs prefer to observe the behaviour of other FIIs and behave in the same manner as the other FIIs do. It has been empirically observed that many FIIs while investing in India observe the performance of various economic indicators. Therefore, many economic indicators like ER, FERs and Inflation are some of the important variables which reflect the overall health of the economy. Even during post 1990s era, it was the FERs which became the pivotal of economic problems of India.

Thus, all these variables amongst many others play a crucial role in the decision making process of FIIs. Hence, they have been included in this study. All other variables have been assumed to be constant in the present study. The above is also indicated by the review of literature made in second section of this study.

To analyse the secondary data various statistical and econometric tools such as correlation analysis, D.K.Fuller test of stationarity and Granger Causality test have been employed.

A detail description of the statistical tools used in this study is as follows:

**CORRELATION ANALYSIS:**

A correlation coefficient is single number having value between +1 and -1 which explains the degree of relationship between the two variables. In the present study, the correlation has been calculated with the help of e-view software by using the differenced time series data to avoid the problem of non-stationarity. The following data have been used for correlation analysis:

- DFII = Differenced FII
- DSensex = Differenced Sensex
- DER = Differenced Exchange Rate
- DFERs = Differenced Foreign Exchange Reserves
- DWPI = Differenced Whole Sale Price Index

**GRANGER CAUSALITY TEST**

It is important to note that correlation analysis is not sufficient to have an in-depth study of relationship between the variables. There exists a more relevant concept called the concept of causality. This test is conducted to know whether the behaviour of one variable is caused by another given variable or vice versa. In order to know the causality between the given variables under consideration, granger causality test has been applied for this purpose.

The following hypotheses have been framed to be tested by applying granger causality econometric model:

- H0: FII does not granger cause Sensex, FERs, ER and Inflation.
- Ha: FII does granger cause Sensex, FERs, ER and Inflation.

For applying this test all the series of data to be used for the analysis need to be checked for their stationarity and in case of non-stationary series, the same need to be converted into stationary by differencing.

When the mean value and the variance value of a given time series does not change over a period of time, the time series is said to be stationary. There are many methods to determine whether a time series is stationary or non-stationary. Augmented Dicker Fuller is one of the most popular methods to decide the stationarity of the time series. There are five time series in the present study, namely, FII, BSE Sensex, FERs, ER and Inflation, all these have been tested for their stationarity by using the following form of **Augmented Dicker Fuller** (ADF) regression equation:

$$Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + \alpha_i \sum_{i=1}^m \Delta t_{-1} + \epsilon_t \dots \dots \dots$$

Where  $\epsilon_t$  is a white noise error term and  $Y_{t-1}$  additional lagged terms are with an idea to ensure that the error terms are not correlated.  $\beta_1, \beta_2, \delta, \alpha$  are the coefficients where  $\delta$  is the first difference operator which is equal to  $(p-1)$ , estimated to test the null hypothesis that  $\delta = 0$ . If  $\delta$  is equal to 0, it means that there is a unit root which implies non-stationarity in the time series under consideration. The following hypotheses have been taken

- for checking the Stationarity of time series:
- (Ho):** FII /FERs/ER/Inflation/Sensex is a non stationary time series or it has unit root.
- (Ha):** FII/FERs/ER/Inflation/Sensex is a stationary time series or it has no unit root.

The time series of the given variables (FII, BSE Sensex, FERs, ER and Inflation) if found non-stationary are converted into stationary time series by differencing them.

The second requirement for the granger causality test is to find out the appropriate lag length for each pair of variables. For this purpose, Akaike information criterion (AIC) has been used for choosing optimal lag order selection.

In general case, the AIC is

$$AIC = 2k-2l$$

where k is the number of parameters in the statistical model, L is the maximized value of the likelihood function for the estimated model. Further, the Co integration (long term association) amongst the variables under study has been checked by using the Johansenn Co integration model.

Restricted VAR model has been used in the granger causality model as the four variables namely FII, FERs, ER and Inflation have been found to have long term association.

Granger causality test has been applied to analyse whether there is any casual relationship between the variables under study.

## RESULTS AND DISCUSSION

As stated in the research methodology, correlation co-efficient has been calculated to understand the relationship between net FII flows and the four economic variables under this study namely BSE Sensex, FERs, ER and Inflation. Table 1 presents the result of correlation analysis

Table 1: Correlation Co-efficient Matrix between Net FII Flows and Other Economic Variables

	DFII	DSensex	DER	DFER	DWPI
DFII	1				
DSensex	0.4521	1			
DER	-0.0522	-0.3568	1		
DFERs	0.28357	0.87715	-0.05951	1	
DWPI	-0.00541	0.44229	-0.16035	0.45054	1

It is clear from the table that net FII flows and the BSE Sensex have a positive correlation but moderate in size (i.e. 0.452). This implies that a positive change in one variable will bring a positive change in another variable. It means when Sensex goes up, it is likely to attract more FII flows, whereas when BSE Sensex falls down it may result into withdrawal of money by the FIIs.

Further, the table shows a low degree of positive correlation (0.283) between FII flows and FERs. The above relationship implies that if FII flows increases this will add upto the Foreign Exchange Reserves of the country.

The degree of correlation between FII and ER has been found to be negative (-0.0522), which means the growth in FIIs in India will result into depreciation of dollar. Similarly, a negative correlation (-0.00541) has been found between FII flows and Inflation. This shows that when there are inflationary trends in the Indian stock market, FIIs prefer to avoid to invest in India because during inflation the purchasing power of declines which makes it a costly affair for FIIs to invest in India.

The table also indicates a negative relationship (-0.356) between the BSE Sensex and the ER. The above relationship implies that more flows from FIIs into India put adverse effect on value of foreign currency (i.e. dollar). The relationship between BSE and FERs has been found to be positive (0.877). This means that upward trends in BSE attract more FIIs thereby increasing the FERs in India.

The table also indicates a positive relationship (0.442) between BSE Sensex and WPI. This indicates that higher the value of BSE Sensex, more will be the Inflation. The above may be attributed to the increase in money supply due to rise in stock return as more FIIs are attracted by this.

It needs to mention here that though the correlation technique helps us to understand the relationship between two or more variables, it does not tell us the causality between the variables. Therefore, in order to have a more in-depth study of the dynamic relationship between the variables under study, econometric tool like Granger Causality test has been applied in this study.

Granger Causality test which is one of the important tools of analyzing causality amongst the variables was introduced in year 1969. The basic objective of this test is to know the direction of causality from one variable to another or vice versa or all the variables having bi directional causality or having no causality at all. As per the meaning of granger causality test, a given time series x is said to be granger caused by another time series y,

provided that the time series y is predictable more accurately with help of the past values of x time series rather than otherwise, with the condition that all the other variables remain constant.

As there are five time series in the present study namely FII, BSE Sensex, FERs, ER and Inflation, all these have been tested for their stationarity by using the following form of ADF regression equation :

$$Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + \alpha_i \sum_{i=1}^m \Delta t_{-1} + \epsilon_t \dots\dots\dots$$

Where  $\epsilon_t$  is a white noise error term and  $Y_{t-1}$  additional lagged terms are with an idea to ensure that the error terms are not correlated.

$\beta_1, \beta_2, \delta, \alpha$  are the coefficients where  $\delta$  is the first difference operator which is equal to  $(p-1)$ , estimated to test the null hypothesis that  $\delta = 0$ .

If  $\delta$  is equal to 0, it means that there is a unit root which implies non-stationarity in the time series under consideration.

The above mentioned regression equation was applied to test the following null hypothesis

H0: FII/FERs/ER/Inflation/Sensex is non-stationary time series or it has unit root

The results of ADF test statistics indicated the t statistics for FII and Inflation variables are more than the test critical values at 1% and 5% level of significance. This proves that the FII time series is a stationary time series. However, the test statistics for Sensex, FERs and ER were found less than the test critical values at 1% and 5% level of significance. This means that these time series are non stationary. As the time series of Sensex, FERs and ER have been found to be non-stationary, the same have been converted into stationary time series by the process of differencing.

The values of ADF statistics for FII, Sensex, FERs, ER and Inflation are shown in the Table 2. In this table, the various variables (FII, Sensex, FERs and ER) have been taken vertically and the t statistics, level of significance and probability values have been taken horizontally. Moreover, t statistics values have been taken at intercept, at trend and intercept ; and without intercept.

**Table 2 : ADF Test Statistics at Original Values**

Variables	t-value, significance level and Probability	At intercept	At trend and intercept	At None/without intercept
FII	t-statistics	-4.02351	-8.97733	-3.20195
	5%	-2.88198	-3.44155	-1.94311
	Probability value	0.0015	0.000	0.0016
Sensex	t-statistics	-0.89238	-2.50893	0.39255
	5%	-2.88198	-3.44155	-1.94311
	Probability value	0.7835	0.5062	0.6985
FERs	t-statistics	0.86429	-2.13815	0.75312
	5%	-2.88198	-3.44155	-1.94311
	Probability value	0.8854	0.4763	0.9236
ER	t-statistics	-1.65435	-1.57855	0.71122
	5%	-2.88198	-3.44155	-1.94311
	Probability value	0.3518	0.6557	0.8061
Inflation	t-statistics	-4.98251	-5.73765	-3.24469
	5%	-2.88198	-3.44155	-1.94311
	Probability value	0.0005	0.0002	0.0211

After the process of differencing, the newly generated results of Augmented Dicker Fuller (ADF) have been shown in Table 3. Table 3 indicates that t-statistics for various variables such as Sensex, FERs and ER at intercept, at trend and intercept, and at without intercept are more than the test critical values at 1% and 5% level of significance. Thus the time series related to Sensex, FERs and ER have become stationary time series

One of the important conditions for the application of Granger Causality test is to select the appropriate lag length for each pair of variables. For this objective, Akaike information criterion (AIC) has been used for choosing optimal lag order selection.

**Table 3 : ADF Test Statistics after differencing the Series**

Variables	t-value, significance level and Probability	At intercept	At trend and intercept	At None/without intercept
Sensex	t-statistics	-9.32151	-9.40036	-9.54312
	5%	-2.88198	-3.44155	-1.94311
	Probability value	0.0000	0.0000	0.0000
FERS	t-statistics	-9.57171	-9.82692	-4.14387
	5%	-2.88198	-3.44155	-1.94311
	Probability value	0.0000	0.0000	0.0000
ER	t-statistics	-7.89522	-7.90552	-7.84135
	5%	-2.88198	-3.44155	-1.94311
	Probability value	0.0000	0.0000	0.0000

Basically, AIC is used to find the goodness of fit of any econometric model. It tells how much information would be lost when a particular model or set of models would be applied to explain the reality in case of granger causality test.

**Table 4 : Akaike Information Criteria (AIC)**

Lag	1	2	3	4	5	6
AIC Value	55.09	54.65	54.64	54.52	54.32	54.48

As per the Table 4, as the value of AIC is least at lag 5; hence lag length 5 has been chosen and used as an input for applying granger causality test.

In this study, Johansenn Co integration Model has been applied to check whether the four variables under consideration are co integrated or not. In case, they are found to be co integrated, the restricted VAR (Vector Auto Regression) or VECM (vector error correction model) is the best fit to be applied in the granger causality model or in case the variables are not co integrated, unrestricted VAR is the best fit to be applied for granger causality model.

**Table 5 : Outcome of Johansenn Co integration Model**

Hypothesised No. of Co integration	Trace Statistics	0.05 Critical Value	Probability
None*	70.89442	69.81889	0.0379
At most 1	42.35154	47.85613	0.1577
At most 2	19.92684	29.79707	0.4552
At most 3	5.21791	15.49471	0.7515
At most 4	0.14435	3.84146	0.6835

**Trace test indicates 1 co integrating equation (s) at the 0.05 level**

**\* denotes rejection of the hypothesis at the 0.05 level**

The Table 5 indicates a p value (0.0484) which is less than 0.05 or 5 % as per Trace Statistics. Hence, the null hypothesis that there is no co integration is rejected. The test indicates that there is a long term association amongst the four variables with one co integration equation. As the variables are co integrated, Vector Error Correction Model (VECM) has been used. It is worth to note that when Vector Error Correction Model (VECM) is used, it makes the time series stationary automatically.

After choosing the lag length and selection of VAR model, granger causality test has been applied to analyse whether there is any casual relationship between the variables under study in the long run. We have developed two equations for each and every variable under study one by one in the following manner because the granger casualty is a bi-variate analysis,

Regression equations for the pair of FII and Sensex are given below:

$$FII_t = \sum_{i=1}^n \alpha_i \text{Sensex}_{t-1} + \sum_{i=1}^n \beta_i FII_{t-1} + \mu_{1t} \dots$$

$$\text{Sensex}_t = \sum_{i=1}^n \lambda_i FII_{t-1} + \sum_{i=1}^n \delta_i \text{Sensex}_{t-1} + \mu_{2t} \dots$$

In the above equations  $\alpha_i$ ,  $\beta_i$ ,  $\lambda_i$ ,  $\delta_i$  are the coefficients which explain the relation of dependent variable with the lag terms of independent variable and the lag terms of dependent variable.

T is the period and 1 is the no. of lags whereas  $u_{1t}$  and  $u_{2t}$  are the residuals which are assumed to be mutually uncorrelated



On the same pattern the regression equations were developed for the rest of the pairs such as FII and FERs, FERs and FII, FII and ER, FII and Inflation, etc.

The results obtained from the application of granger causality test about all the time series are shown in the Table 6. It is clear from this table that p value for the null hypothesis that FII does not granger cause Sensex is 0.0336 which is less than 0.05. Hence, the null hypothesis is rejected concluding that FII does granger cause Sensex. This means that one of the reasons for increase or decrease in Sensex is attributed to FII flows. The value of p for the null hypothesis that Sensex does not granger cause FII is 0.0141 which is also less than 0.05. Hence, the null hypothesis is rejected. Meaning thereby, Sensex also affects the FII flows. Hence there is a bidirectional causality between these two variables in the long term.

**Table 6 : Outcome of Granger Causality Test**

Null Hypothesis (H <sub>0</sub> )	Probability Value	Accept/ Hypothesis	Reject	Direction/Nature of Causality
FII does not granger cause DSensex	0.0335	Reject		Bidirectional
DSensex does not granger cause FII	0.0141	Reject		
FII does not granger cause DFERs	0.1534	Accept		No Causality
DFERs does not granger cause FII	0.2535	Accept		
FII does not granger cause DER	0.0654	Reject		Bidirectional
DER does not granger cause FII	0.0081	Reject		
FII does not granger cause Inflation	0.0455	Reject		Unidirectional
Inflation does not granger cause FII	0.4062	Accept		

Further, the table reveals that the p values of the two null hypotheses between FII and FER are (0.2034, 0.2726) are more than 0.05, hence both the null hypotheses are accepted. It means neither FII granger cause FERs nor FERs affect FII. Thus there is no causality between the two variables.

This table also reveals that the two null hypotheses between FII and ER, the p values are less than 0.05, hence both the null hypotheses are rejected. Here we can conclude that FII as well as ER affect each other.

The value of p (0.0455) for the null hypothesis that FII does not granger cause Inflation is less than 0.05. Hence, we will reject the null hypothesis and concludes that FII does affect Inflation. However, the p value for the next null hypothesis that Inflation does not granger cause FII is 0.4062, which is more than 0.05. Hence the null hypothesis will be accepted. So it is concluded that Inflation does not affect FII and there is a unidirectional causality between the two variables.

**Conclusion**

The study is aimed to establish a relationship between FIIs and its determinants. Based on a review of literature four factors having bearing on the flow of foreign capital in the Indian financial markets were considered as the analyses variables. Time series data has been used for a period of 12 years between 2001-02 and 2012-13. The data was obtained on monthly basis. The correlation coefficient between FIIs and Sensex, FIIs and FERs, FERs and Sensex, and WPI and Sensex were found positive and thus showing a positive relationship among these variables. However, exchange rates and Inflation were found having negative relationship with FIIs. In order to make an in-depth analyses for identifying the determinants of FII, econometric analyses was carried out by using Granger Causality Model. The results of Granger Causality Model indicated bi-directional causality between FII and Sensex, and FII and Exchange rate. However, no causality is found between FII and Foreign Exchange Reserves. The study indicated that FIIs also exert influence on Inflation but the Inflation does not affect the FIIs.

The above findings are useful for the policy makers as well as the investors as they can make predictions about stock prices, FII flows, and Exchange Rates with the understanding of the relationship between FII and other economic variables under study. However, the history may not repeat remains the limitation of this study as the results are based on secondary data only.

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