Trading behavior and Factors Influencing Foreign Institutional Investors in the Indian Stock Market
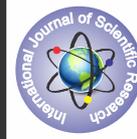
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ABSTRACT *The Foreign Institutional Investors (FIIs) have emerged as important players in the Indian equity market in the recent past. This study makes an attempt to develop an understanding of the dynamics of the trading behavior and the factors influencing FIIs and returns in the Indian equity market by analyzing daily and monthly data. The study concludes that FIIs follow positive feedback trading on a daily basis, while they follow negative feedback trading on a monthly basis. The factors that affect the foreign investor's decisions depend on a number of factors, differing for both daily and monthly data. But the main determinant remains lagged stock returns. The study concludes that FIIs inflows in India are determined by stock market characteristics, macroeconomic factors and international factors. JEL Code: G2, G23*

1. INTRODUCTION

Until the 1980s, India's development strategy was focused on self-reliance and import substitution. Current account deficits were financed largely through debt flows and official development assistance. There was a general disinclination towards foreign investment or private commercial flows. However, since the initiation of the reform process in the early 1990s, India's policy stance has changed substantially, with a focus on harnessing the growing global foreign direct investment (FDI) and portfolio flows. As per the RBI, Report on Currency & Finance (2003-04), since 1991 there has been continuous move towards the integration of the Indian economy with world economy. Since then the regulations with regard to FIIs investment has become more liberal. As a result of abolishment of barriers to capital inflows in the form of FIIs investment, India attracted huge amount of foreign capital particularly from developed countries. This paper focuses on the trading behavior of foreign institutional investors and the factors influencing their investment decisions in the Indian equity market.

A Foreign Institutional Investor (FII) is an investor or investment fund that is from or registered in a country outside of the one in which it is currently investing in. The term is used most commonly in India to refer to outside companies investing in the financial markets of India. Otherwise also called as International portfolio flows, Foreign Institutional Investment (FII) flows refer to capital flows made by individual and institutional investors across national borders with a view to creating an internationally diversified portfolio. These Institutional investors mainly include hedge funds, insurance companies, pension funds and mutual funds. International institutional investors must register with the Securities and Exchange Board of India to participate in the market.

Foreign portfolio inflows through FIIs, in India, are important from the policy perspective, especially when the country has emerged as one of the most attractive investment destinations in Asia. It may be a signal of increasing confidence in the Indian growth story, when the rest of the world was struggling to fight the recession. Bloomberg data showed that foreign institutional investors (FIIs) purchased domestic equities worth $13.7 billion in 2010 making it the only Asian market to have received more than $10 billion of investment in the year. It was 56% higher than the corresponding period of last year. In the same year, FII investment into India was over 57% higher than that of South Korean, which remains at the second slot in terms of overseas investment followed by Indonesia, Taiwan, Thailand, Philippines and Vietnam among others.

EVOLUTION OF FII POLICY IN INDIA

The gates to Foreign Institutional Investors (FIIs) were opened after the recommendation made by the Narsimhan Committee Report in 1992. FIIs were then permitted to invest in all the securities traded in Indian primary and secondary market for the first time in September, 1992. In order to invest in the Indian equity market, FIIs were required to register with the SEBI and gain an approval from the RBI under the FERA Act. The cap on FII investment initially was 5% of the paid up capital for NRIs and 24% of the paid up capital for Overseas Corporate Bodies (OCBs). In November 1996, 100% debt FIIs were permitted. The cap on the investment was increased to 30% in April, 1997 in order to increase the participation by FIIs. In April 1998, FIIs were permitted to invest in dated Government securities subject to a ceiling. In June 1998, FIIs were allowed to invest in equity derivatives and the NRI limit was increased to 10% of the paid up capital. In 2000, under FEMA Act, FIIs were permitted to take part in foreign exchange related transactions. Also, foreign firms and high net-worth individuals were permitted to invest as subaccounts of FIIs. Domestic portfolio managers were allowed to be registered as FIIs to manage the funds of sub-accounts. In March 2001, FII ceiling under special procedure was increased to 49%. In September 2001, the ceiling was raised to a sectoral cap. In December 2003, the dual approval process of SEBI and RBI was changed to a single approval process of SEBI. The objective of this was to streamline the registration process and reduce the time taken for registration. In 2011, the FIIs were allowed to invest in mutual funds.

Fig. 1 in the Appendix shows the sources of FIIs in India. US-based institutions accounted for slightly over 41%, those from the UK constitute about 20% with other Western European countries hosting another 17% of the FIIs. It is, however, instructive to bear in mind that these national affiliations do not necessarily mean that the actual investor funds come from these particular countries. Given the significant financial flows among the industrial countries, national affiliations are very rough indicators of the 'home' of the FII investments. In particular institutions operating from Luxembourg, Cayman Islands or Channel Islands, or even those based at Singapore or Hong Kong are likely to be investing funds largely on behalf of residents in other countries. Nevertheless, the regional breakdown of the FIIs does provide an idea of the relative importance of different regions of the world in the FII flows.

Fig. 2 in the Appendix shows the growth of FII Investment in India. In the year 1993, the number of FIIs registered with the SEBI was only 18. This increased to 506 in the year 2000. The cumulative investment in 1993 was a mere $4 US million which increased to $11,372 US million in 2000. The number of FIIs and the cumulative investment in 2008 was 1319 and $68,919 US million respectively. This figure was 1703 and $1,20,024 US million respectively in February, 2011. Fig. 3 shows the trend in Net FII Investment and the Sensex from January, 2000 to December, 2008. It can be seen that the Net FII follows the trend in the Sensex. The fluctuations in the Net FII after September 2007 can be attributed to the financial crisis in the USA.

Since there has been such an increase in the FII flows in India, it becomes very important that one understands the investment decisions, trading strategies and behavior of these FIIs. But there are concerns that foreign investors are chronically ill-informed about India, and this lack of sound information may generate some different kinds of trading strategies in the form of herding and positive feedback trading. Information disadvantage and diversified international portfolio investment create incentives for rational herd behavior causing stock markets in emerging economies to be volatile. FII inflows are popularly described as "hot money", because of the herding behaviour and potential for large capital outflows. Herding is where many FIIs may trade in similar directions over a period of time. A positive feedback strategy leads to buys (sells) when prices are rising (falling) and can lead to prices spiraling up (down) and overshooting the equilibrium (Lahiri, 2005). In simple words, positive feedback trading is where FIIs buy after positive returns and sell after negative returns, thus exacerbating market volatility. These kinds of behaviour can exacerbate volatility, and push prices away from fair values. In this paper, I will focus on the positive feedback trading strategy of the FIIs in the Indian equity market.

The thesis is organized as follows. In addition to Introduction and Evolution of FII policy in Section 1, a brief survey of the literature is presented in section 2. The objective of the study is presented in Section 3. The data, the data sources and the model are presented in Section 4. The Methodology and the Results are presented in two parts: one where daily data is used and the other where monthly data is used. These are presented in Sections 5 and 6 of the paper. Section 7 concludes the paper.

2. LITERATURE REVIEW

A number of studies have been conducted to examine the existence, measure the extent, in some cases gauge the damage, and help in policy-making due to the trading behavior of foreign institutional investors.

Froot et al's. (2000) study finds the sensitivity of stock prices to foreign inflows as positive. They found that FII flows were strongly influenced by past returns thus proving that there is positive feedback trading. They suggest that this positive-feedback trading may be evidence that some foreign investors use returns to extract information about future returns. They also determine that the transitory inflows impact future returns negatively. Batra (2003), in her paper attempts to investigate the existence of positive feedback trading, herding, and whether these activities have a destabilizing effect on the Indian equity market. She found strong evidence of FIIs chasing trends and adopting positive feedback trading strategies at the aggregate level on a daily basis. However there was no evidence of positive feedback trading on a monthly basis. The empirical results also indicated that foreign investors have a tendency to herd together in their trading activity in India. Despite all this, the trading behavior and biases of the FIIs did not appear to have a destabilizing impact on the equity market. Gordon and Gupta (2003), analyze the factors that affect FII flows in India. They regressed FII equity flows and FII flows/market capitalization (in percent) on some global, regional and domestic variables. Among external factors, LIBOR and emerging market stock returns turned out to be significant, while the primary domestic determinants were the lagged stock return and changes in credit ratings. In quantitative terms, both external and domestic factors were found to be about equally important. They also found that the portfolio flows to India have been less volatile when compared with that of many other emerging markets. FIIs by adopting a bottom-up approach seem to invest in top-quality, high growth, large cap stocks. Also they found that there was a significant negative relation between monthly flows and lagged returns, i.e., there was evidence of negative feedback trading on a monthly basis. A negative feedback trader exhibits a "buy low, sell high strategy" Negative feedback trading can result from profit taking as markets rise or from investment strategies that target a constant share of wealth in different assets. Richards (2004), in his paper analyses data for the aggregate daily trading of all foreign investors in six Asian

emerging equity markets: the Jakarta Stock Exchange (JSX), Korea Stock Exchange (KSE), Philippine Stock Exchange (PSE), Stock Exchange of Thailand (SET), Taiwan Stock Exchange (TWSE), and Kosdaq Stock Market. His findings were: a) the trading decisions of foreign investors in the above-mentioned equity markets are substantially influenced by recent returns in global equity markets in addition to returns in the domestic market, b) there are substantial price movements associated with the trades of foreign investors. He therefore concludes that foreign investors and conditions in mature markets have a much larger effect on emerging markets and that the combination of trading driven substantially by conditions in other markets and large price pressures from the trading of the foreigners raises the possibility that foreign trading could be destabilizing in emerging markets.

Chakrabarti (2005), in his paper indicated that FII flows and contemporaneous stock returns are strongly correlated in India. He obtained a high correlation figure for the two variables for the period of his study (1993-99). He said that investors chase returns in the immediate past, after which they aggregate their funds over the month. He says that there are a number of domestic and international variables (like exchange rate, short-term interest rate in India, returns on the MSCI world index, etc.) which are likely to affect both flows and returns yet do not diminish the significance of the feedback trading observed. Further the FIIs do not seem to be at an informational disadvantage in India compared to the local investors.

Rai and Bhanumurthy (2006) analyzed the determinants of foreign institutional investment in India using monthly data from January 1994 to November 2004. The study revealed the positive association of FII investment with return on BSE Sensex, inflation in US (home country) and negative association with inflation in India (host country), return on S&P 500 index, ex-ante risk on BSE and ex-ante risk on S&P 500 index. However, the ex-post risk neither in US nor in India affected the FII inflow to India. They also did not find any causation running from FII inflow to stock market returns. Their study concluded that stabilizing the stock market volatility and minimizing the ex-ante risk would help in attracting more FII inflows. Otherwise there would be adverse impact of non-fundamental factors of FII behavior which in turn would affect the real economy in the long-run.

Kaur and Dhillon (2010) aim at exploring the determinants of FII investment in India. They found that returns on Indian stock market have positive impact whereas US stock market returns have no significant influence on FIIs investment to India. Stock market risk has a negative influence on FIIs inflows to India while market capitalization and stock market turnover of India have a significant positive influence only in the short-run. Among macroeconomic determinants, economic growth of India has positive impact on FIIs investment both in the long-run and the short-run. But all other macroeconomic factors have a significant influence only in long-run like inflation in US has positive influence whereas inflation in India has negative influence on FIIs investment. Further, US interest rate has adverse impact on FIIs investment while liberalization policies of India exhibited significant contribution to FIIs inflows. Their study concludes that FIIs inflows in India are determined by both stock market characteristics and macroeconomic factors.

Most of the papers mentioned above corroborate with each others' findings, i.e., in general, FIIs follow positive feedback trading and the most important determinant is the lagged stock returns. Only a couple of them prove otherwise. Gordon and Gupta's finding defies the previous set of work done in this area. As this study proceeds further, it will be seen that this paper also substantiates Gordon and Gupta's findings.

The literature, as seen, mainly talks about the trading behaviour of FIIs with the main focus on one determinant: the lagged stock returns in the host country. Very few papers take the initiative to explore the impact of other factors that determine the decision-

making of foreign institutional investors. Hence, this study provides an insight into the effects that various variables bring about in the decision-making of the foreign institutional investors.

3. OBJECTIVES OF THE STUDY
The literature either focuses on the trading behaviour of FIIs or on identifying the factors that influence foreign investor's decisions. Only a handful of them talk about both. This study makes a modest attempt to explore the relation between FII and its pivotal determinants and test for positive feedback trading, for the particular case of India. Since investments in stock markets is sentiment driven, and is affected more or less by everything, the crucial task is to identify the few critical determinants. More specifically, a few important variables believed to be affecting FII are chosen and then a theoretical model is built and empirically tested. So the objective of this paper is:

• To test if FIIs follow positive feedback trading strategy while investing in the Indian equity market; and

• To identify some crucial factors that affect FII flows to India, and to test whether inclusion of these variables impacts upon the trading strategy of the foreign investors.

4. DATA AND THE MODEL
For the purpose of the study, daily and monthly data have been collected. Daily data gives more precise results and is better able to capture the lead – lag dynamics between net FIIs and equity returns. However monthly data presents further insight into the trading behavior of FIIs based on long horizon returns (Batra, 2003). The years 2004-2008 has been chosen as the time period for this study as the real growth in the foreign institutional investments in India started only in the year 2004 and FII data was not available from 2009 onwards. To ascertain the influence of both domestic and foreign factors, following variables have been considered to estimate the determinants of FII investment in India.

Domestic factors
• Sensex returns
• Exchange rate (dollar-rupee exchange rate)
• Stock return volatility
• Gross domestic product
• Index of industrial production
• (Export + Import) / GDP ratio
• Inflation

Foreign factors
• LIBOR
• Global gold price
• MSCI World index returns
• MSCI Emerging Market Index returns
• Dummy Variable for financial crisis

Net FII investment as measured by Gross Purchase of equities *less* Gross Sale of equities by the foreign investors has been taken as the dependent variable.

Sensex Returns as measured by:
$R_t = Ln(P_t) - Ln(P_{t-1})$
where R_t is the Sensex return in time period *t*,
P_t is the stock price in time period *t*,
P_{t-1} is the stock price in time period *t-1*,
Ln is natural logarithm

Sensex was a natural choice for inclusion in the study, as it is the most popular market index and widely used by market participants for benchmarking. Sensex returns is the most important variable affecting FII investment. The theory of positive feedback trading itself revolves around Net FII and stock market returns. The theory explain that FIIs follow positive feedback trading when the stock returns increase that is in such a situation, the foreign investment

flows into an economy will also increase. So, if the coefficient is positive, it would mean that there is positive feedback trading, and if it is negative, it would mean that there is negative feedback trading.

Exchange rate has been used as it is a critical factor affecting the foreign portfolio investments. Kaur and Dhillon have also regarded exchange rate as an important factor. They found that it had a negative relation with FII investment. In other words, an appreciation of the rupee is expected to reduce foreign inflows into the country as the returns on 1 USD falls to the extent of the appreciation, while depreciation would attract more investment flows. Hence it becomes imperative to include exchange rate as a determinant of FII flows. Also, based on the literature, a negative relationship is expected out of the two variables FII investment and exchange rate.

Stock return volatility again becomes a very crucial factor affecting FII investment. If the stock returns are very volatile, then FII flows would reduce. The stock return volatility for this study has been calculated as the standard deviation of the stock returns of the past 6 months. Taking a longer period volatility gives a better picture of the stability (or in some cases, the instability) of stock returns than a shorter time period (like a 1-month or 3-month volatility) volatility. Rai and Bhanumurthy have regarded stock return volatility as a representative of the risk in the market. Hence, investors are considered to be risk-averse and therefore they will withdraw their investments when domestic market risk increases. Therefore, there is a negative relation between FII investment and stock return volatility.

Gross Domestic Product Growth rate has been chosen as another determinant for FII flows as it represents the growth of an economy. If an economy has a high GDP growth rate, it means its resources are being utilized in the right avenues and this would attract FII flows considering that they are rational and would like to invest in a growing economy. Ahmed *et al.* (2005) have also used GDP growth rate as a proxy for growth prospects and have found a positive relation between FDI and FII flows and GDP growth rate for their study conducted in South Africa. A positive sign is expected from the interaction of these two variables.

Growth rate of Industrial Index of Production is also taken as a determinant of FII investment as it represents the rate at which the industrial sector in the economy is growing. A higher growth rate would attract foreign investments while a slack would discourage investments. Kaur and Dhillon have used IIP as a proxy for economic growth. Therefore FII investment holds a positive association with the growth rate of IIP.

Export plus Import to GDP ratio has been taken as an important determinant of FDI and FPI flows in South Africa by Ahmed et al. and Aron et al. (2010). The variable acts as a representative of the trade openness of the economy. Trade openness would signify better opportunities and less transaction cost in terms of less rules and regulations for cross-border flows. This acts as an encouragement for foreign portfolio managers to invest in the country.

Inflation as measured on the basis of the WPI (as India calculates inflation based on the WPI) acts as a representative of the purchasing power of the funds invested by the foreign investor. Rai and Banumurthy have combined the Purchasing Power Parity Theory and the Uncovered Interest Parity to conclude that if inflation is high in the host country, the purchasing power of the funds invested will decline hence compelling the foreign investors to withdraw their investments.

LIBOR (London Interbank Offered rate) is an important determinant of FII investment as it represents the opportunity cost of the foreign investments made by the investors. According to Gordan and Gupta, LIBOR is negatively associated with FII flows as a global monetary tightening could lead to a slowdown in FII inflows.

World gold price is another profitable avenue for the foreign investors

to invest in, especially if they are seeking long-term gains. Aron et al have also taken the real gold price to represent the opportunity cost of foreigners' investments.

Morgan Stanley Capital International World Index (MSCI WI) is an index comprising of 1500 stocks from 24 developed stock markets. It also represents an opportunity cost for the foreign investments. According to Richards, returns in mature markets might influence flows because investors extract information from global returns about prospects for emerging markets.

Morgan Stanley Capital International Emerging Market Index (MSCI EM Index) is an index comprising of 1800 stocks traded in 26 emerging stock markets. Richards notes that if portfolio rebalancing effects are important, the relevant return might not be a global mature markets return, but rather the return on a basket of emerging market equities.

The *dummy variable* for financial crisis has been included in the study as one of the determinants. Since the time period chosen for this study also includes some of the days when the financial crisis was going on, it becomes imperative to include this variable as this might have been an important criteria for the investor's decisions to invest in a country like India at the time of the crisis.

Positive feedback trading pattern can result from extrapolative expectations about prices, from stop – loss orders i.e. automatic selling when the price falls below a certain point, from forced liquidations when an investor is unable to meet her margin calls or from portfolio insurance investment strategy which calls for selling stocks when the price falls and buying it when the price rises (Batra, 2003). Therefore, in my study, I would like to test the hypothesis that net FII investment is driven by recent lagged returns in the Indian equity market. Regression model is used for testing for positive feedback trading. The independent variable here is lagged stock returns as the theory of positive feedback trading suggests that Net FII will follow lagged stock returns. Hence FII investment in time period t depends on the stock returns in the time period t-1. This model remains the same for both daily as well as monthly data where for daily data, the lagged returns would mean the previous day's returns while for monthly data it would simply mean the previous month's returns. If lagged returns turn out to be significant and if β is positive, then that means there is positive feedback trading, while on the other hand, if β is negative (but significant) then that would mean that there is negative feedback trading.

After testing for positive feedback trading, irrespective of whether it actually exists or not in the Indian stock market in the time period 2004-2008, a model is specified in which factors that determine net FII investment are included to verify whether these factors have any significant impact upon the foreign investor's investment decisions.

The model is:

$NetFII_t = \alpha + \beta\ R_{t-1} + \delta\ ER_{t-1} + \phi\ V_{t-1} + \gamma\ GDP\_Gr_{t-1} + \eta\ IIP\_Gr_{t-1} + \phi\ ExIm\_to\_GDP_{t-1} + \pi\ P_{t-1} + \lambda\ LIBOR_{t-1} + \mu\ Gold_{t-1} + \nu\ MSCI\_WI_{t-1} + \theta\ MSCI\_EM_{t-1} + \upsilon\ D_1 + U_t.$

Where $NetFII_t$ is the Net FII investment in time period t,
R_{t-1} is the stock return in time period t-1,
ER_{t-1} is the exchange rate ($/Re.) in time period t-1,
V_{t-1} is the stock return volatility in time period t-1,
GDP_Gr_{t-1} is the GDP growth rate in time period t-1,
IIP_Gr_{t-1} is the IIP growth rate in time period t-1,
$ExIm\_to\_GDP_{t-1}$ is the export plus import to GDP ratio in time period t-1,
P_{t-1} is the WPI-inflation in India in time period t-1,
$LIBOR_{t-1}$ is the LIBOR in time period t-1,
$Gold_{t-1}$ is the gold price in time period t-1,
$MSCI\_WI_{t-1}$ is the returns on the MSCI WI in time period t-1,
$MSCI\_EM_{t-1}$ is the returns on the MSCI EM index in time period t-1,
$D_1 = 1$, if there is a financial crisis,

= 0, otherwise
U_t is the error term.

5. METHODOLOGY
For both monthly and daily data, the study first checks for Stationarity, following which the regressions are run.

Stationarity Test
Before proceeding with the model, I checked for the presence of unit root in the variables using the Augmented Dickey Fuller Test. For this purpose, the software STATA was used. The lag of all the variables was taken for the test.

Test for Positive feedback trading
To test for positive feedback trading, a stepwise regression of the net investment on several lags of the stock returns was carried out. If the coefficient of the lagged stock returns was significant and positive, then foreign investors follow positive feedback trading. If the coefficient was significant and negative, then investors followed negative feedback trading.

Factors influencing foreign investor's decisions
To identify what factors influence the foreign investor's investment decisions, a step-wise regression of net foreign investment on other factors like lagged exchange rate, lagged LIBOR, lagged stock return volatility, other lagged market returns (MSCI WI, MSCI EM), lagged gold price, lagged growth rate of GDP and IIP, lagged inflation rate, lagged balance of trade to GDP ratio and the dummy variable for financial crisis. In order to identify the factors which most affect FII decisions, two models have been built.

Model 1
In this model, in addition to the factors mentioned in Section III, the lagged values of the net FII investments has also been included as a factor determining the foreign investments. If the lagged net FII are significant, it would mean that the FIIs observe the trend of their investments over time in order to make investment decisions in the current time period.

Model 2
In this model, net FII is regressed upon only those variables that were mentioned in Section III. Lagged Net FII is not one of the determinants here.

The purpose of these two models is to see if lagged net FII has any impact upon the investor's decisions or not and also to check if this variable outweighs the significance of some other variables that were believed to be important determinants for the FIIs decisions.

In the stepwise regression, the variables were divided into blocks and then included in the model. The variables were divided in the following manner:

- Block 1:
  - Lagged Net FII (for Model 1)
  - Lagged stock returns
  - Lagged stock return volatility
  - Lagged exchange rate

- Block 2:
  - Lagged IIP growth rate
  - Lagged GDP growth rate
  - Lagged export plus import to gdp ratio
  - Lagged inflation

- Block 3:
  - Lagged MSCI WI returns
  - Lagged MSCI EM returns
  - Lagged gold price
  - Lagged LIBOR
  - Dummy Variable (D)

Block 1 variables are such that these variables directly affect the net FII investment. Block 2 variables are the domestic economic factors and Block 3 consists of variables that are international in nature. In the stepwise regression, these variables are entered into the model one at a time. The variables that are not significant are excluded from the final model.

6. RESULTS
6.1 DAILY DATA
Table 1 in the Appendix shows the descriptive statistics of the daily data. Table 2 shows the results for the Stationarity Test. Augmented Dickey Fuller test was performed on the variables. The lag of all the variables was taken for the test. All the variables were stationary except for the lagged values of the exchange rate, stock return volatility and gold price. To make these variables stationary, the first difference of the lag values were taken following which the variables followed a unit root process.

After the Stationarity test, a stepwise regression of net FII on the lagged stock returns was performed. The results are given in Table 3. The stock returns were taken upto three lags. All the three lagged stock return variables are significant at 1% level of significance. The R^2 change is maximum after the second lag is entered. The third lag causes only a 1.8% change in the R^2. Also to be noted is that the coefficients of the lagged stock returns are positive. Hence, it can be concluded that FIIs follow positive feedback trading strategy while making investment decisions. So, if stock returns in the previous period had increased, then FII flows in the current period would also have risen. This corroborates with the results that Batra (2003) obtained for her study.

The next stage is a stepwise regression of the net investment on all the other factors. This stage has two models, one where lagged dependent variable is taken, and the other where the lagged dependent variable is not taken.

MODEL 1
Table 4 (ii) shows the excluded variables in the regression result for Model 1. These variables did not enter the final model as they were insignificant. The table provides the partial correlation coefficient values based on which the variables enters/does not enter the model. The variable might be significant if it were to enter the model individually, but since an entire block is regressed on the dependent variable at once, the extent of significance of some of these variables might fall. For example, the first step in this model shows that the second and third lags of the net FII, the lagged stock returns, lagged exchange rate, lagged stock return volatility, lagged Growth rate of IIP, lagged inflation rate, lagged LIBOR, lagged Gold price, lagged returns on the MSCI EM index and the dummy variable are all significant. But in the second step, only the first lag of the stock return enters the model as the partial correlation coefficient between this variable and net FII is the highest compared to the partial correlation coefficient of the other variables. In the next step, the second lag of the stock returns enters the model as its partial correlation coefficient (0.205) is higher than the partial correlation coefficient of the other variables. In the same fashion it is decided which variable enters the model and which does not. In the eighth step, none of the variables are significant hence indicating that it is the final step in the regression model.

Considering the fact that this model consists of the lagged dependent variable as an explanatory variable, there is bound to be a presence of autocorrelation in the model. The lagged dependent variables are significant and positive which means that the foreign investors observe their own past investments in order to make investment decisions in the current time period. An increase in their investment in the previous period will induce them to increase their investments in the current period. The lagged stock returns are also positive and significant. This would mean that despite inclusion of other factors in the model, the foreign investors still follow positive feedback trading strategy. This means that they buy stocks in the Indian equity market

when the Sensex rises and sell the stocks when the Sensex falls. Another variable that is significant is the growth rate of IIP and the coefficient, as expected, is positive. This means that if the industrial growth rate in India is rising then foreign inflows also increase. Inflation acts as an important determinant of FII flows. This can be attributed to the fact that though the coefficient is positive, the variable is significant. According to Rai and Bhanumurthy, the variable has a negative relation with net FII. Since it is positive, the study assumes that the home country inflation was probably higher than the inflation rate in India due to which foreign investors found it more profitable to invest in the Indian equity market. Finally, returns in the MSCI EM index is significant and bears a positive relation with the FIIs investment decisions. So a change in the returns of the MSCI EM index would induce more foreign flows into India.

The first lag of the net FII alone explains 13.2% of the changes in the net FII flows. Apart from this variable, the maximum change in the R2 is brought about by the inclusion of the first lag of the stock returns in the model. So, the first lag of the net FII and the stock return explain about 21.8% of the change in the dependent variable. The addition of the other variables also brings about a positive change in the R^2 but the extent of change keeps diminishing after every step.

MODEL 2
Table 5 (i) shows the results of a stepwise regression performed on all the variables excluding the lagged dependent variable.

Table 5 (ii) shows the excluded variables in the regression result for Model 1. The table, as explained earlier provides the partial correlation coefficients between the variable and the dependent variable. The decision to enter or exclude the variable from the model depends upon the partial correlation coefficients of that variable. Hence, stock return volatility enters the model in the second step as it has the highest partial correlation figure compared to the other variables. The lagged exchange rate then enters the model next. Continuing the process, the regression finally results in the eighth and final step where none of the variables are significant.

In Model 2, now that the lagged dependent variable is not taken, there are more number of variables which significantly determine the net FII flows. The lagged stock returns is the most significant of all the other variables. It bears a positive sign indicating that there is positive feedback trading strategy by the foreign investors on a daily basis. Next, stock return volatility is significant and is negative indicative of the fact that more volatile the stock markets are, the lesser will be the foreign investment in that stock market. In other words, the riskier it is to invest in a stock market, the lesser would be the investment, assuming that the foreign mangers are risk-averse. Exchange rate also bears a negative sign corroborating with the literature wherein it is said that an appreciation in the rupee will discourage the foreign inflows and a depreciation would encourage foreign inflows. The growth rate of IIP has a positive relation with net FII indicating the fact the foreign investors would invest in a country whose industrial sector is growing. The export plus import to GDP ratio bears a positive relationship with the dependent variable representing the fact that FIIs would invest in a country which is more open to outside trade and hence has less restrictions. Like in Model 1, host country inflation is positive here too which means that the home country inflation must be comparatively higher. The returns on the MSCI EM index have a positive sign. Here, the dummy variable representing the financial crisis in USA is also significant and bears a negative sign indicating that the financial crisis discouraged the foreign investors to invest in the Indian equity market. An interesting aspect comes into picture here. The IIP growth rate which was highly significant earlier becomes insignificant after the inclusion of the dummy variable for financial crisis in the model. This can be attributed to the fact that financial crisis slowed down the industrial growth of the economy. The lagged stock returns explain about 10.2% of the changes in the dependent variable. The maximum change in R^2 is then brought about after the inclusion of stock return volatility and IIP growth rate. After the

inclusion of these two variables, the R^2 increases to 16.4%. The addition of the other variables also brings about a positive change in the R^2 but the extent of change keeps diminishing after every step.

6.2 MONTHLY DATA

Table 6 in the Appendix shows the descriptive statistics of the monthly data. Table 7 shows the results for the Stationarity Test. Augmented Dickey Fuller test was performed on the variables. The lag of all the variables was taken for the test. All the variables were stationary except for the lagged values of the exchange rate, LIBOR and gold price. To make these variables stationary, the first difference of the lag values were taken following which the variables followed a unit root process.

Now a stepwise regression of net FII on lagged stock returns is performed to test for positive feedback trading. Table 8 presents the results of the stepwise regression. Three lags of the stock returns are taken. The result shows that the third lag of the stock return alone is significant at 5% level. The first and second lags of the stock returns are not significant. This means that the foreign investors' decision to invest depends upon the stock returns three months before the current period. Though the coefficient is positive, the R^2 is only 7.5% which makes it even more important to include some other variables in the model. Hence, based on this model alone, one cannot conclude that foreign investors follow positive feedback trading on a monthly basis.

The next stage therefore is a stepwise regression of the net investment on all the other factors. This stage as seen earlier has two models, one where lagged dependent variable is taken, and the other where the lagged dependent variable is not taken.

RESULTS: MODEL 1

Stepwise regression of net FII on other factors including the lagged dependent variable results in 3 steps. Table 9 (i) shows the variables that were excluded from the model. As explained earlier the decision to enter the variable depends on the partial correlation coefficient along with the significance value. Therefore, the second lag of stock return enters the model in the second step as the partial correlation coefficient is 29.7% which is higher than the partial correlation coefficient of all the other variables. The lag of LIBOR enters the model in the third step as its partial correlation coefficient of 29.1% is higher than the partial correlation coefficient of the other variables.

Considering the fact that this model consists of the lagged dependent variable as an explanatory variable, there is bound to be a presence of autocorrelation in the model. The first lag of the dependent variable is positive indicating the fact that foreign investors look at only the previous month's FII investment in order to make their decisions. Apart from that, second lag of the stock returns is also significant though the variable is negative. This indicates that foreign investors follow negative feedback trading while investing in the stock market. This means that they buy stocks when the Sensex falls and sell stocks when the Sensex rises. However, this variable becomes insignificant when the lagged value of LIBOR enters the model. This can be attributed to the fact that the coefficient of LIBOR is negative, and therefore if LIBOR in the previous month had increased, foreign investors would prefer to invest in the LIBOR rather than the Indian Stock market.

A look at the R^2 values reveals that on a monthly basis, the first lag of the dependent variable itself explains about 19.7% of the changes in the dependent variable. Inclusion of the second lag of the stock returns increases the R^2 to 26.8% and inclusion of LIBOR increases the R^2 to 33%.

RESULTS: MODEL 2

Stepwise regression is performed to determine the factors other than the lagged dependent variable that affect the net FII. The regression results as shown in Table 10 (i) shows the variables that were excluded from the model. The second lag of the stock returns enters the model in the second step as its partial correlation coefficient of 29.2% with the dependent variable is the highest amongst all the variables. In the next step, the lagged value of the GDP growth rate enters the model following which the lagged value of LIBOR enters the model. Thus in the end, none of the other variables are significant.

Similar to the daily data, exclusion of lagged dependent variable results in more number of variables turning out to be significant. Similar to the case in Model 1, the coefficient of the lagged stock returns is negative indicative of the fact that foreign investors follows negative feedback trading strategy while investing in the Indian equity market. This, though defies most of the literature, corroborates with Gordan and Gupta's findings for India. Their study also concluded that, on a monthly basis, FIIs follow negative feedback trading while investing in the Indian stock market. Lagged growth rate of GDP, being positive, implies that the foreign investors invest in a growing economy. But, inclusion of GDP growth rate makes the lagged stock returns significant at 10% level now. LIBOR which is negative is indicative of the fact that an increase in LIBOR would discourage investors to invest in the Indian equity market. Also, inclusion of LIBOR makes the lagged stock returns insignificant and growth rate of GDP significant at 5% level (compared to 1% earlier). Hence, on a monthly basis, factors such as lagged values of LIBOR and growth rate of GDP take precedence over lagged stock returns. Observing the R^2 values, inclusion of both the lags of the stock returns results in an R^2 value of 15.8%. The maximum change in the R^2 value is seen after the lagged growth rate of GDP is added to the model. Finally, inclusion of lagged LIBOR takes the R^2 value to 33.2%.

7. CONCLUSION

After studying the trading behaviour of foreign institutional investors in the Indian stock market and identifying the factors that play a major role in their decision-making, the study concludes that FIIs follow positive feedback trading on a daily basis, while they follow negative feedback trading on a monthly basis. This corroborates with Batra's (2003) paper. On a daily basis when the lagged Net FII is also considered, the factors that affect the FIIs decisions are lagged stock returns, lagged growth rate of IIP, lagged inflation and lagged returns on the MSCI EM index. When lagged FII is disregarded, the factors that determine the FII investment decisions are lagged stock returns, lagged stock return volatility, lagged exchange rate, lagged growth rate of IIP and import plus export to GDP ratio, lagged host country inflation, lagged returns on the MSCI EM index and the dummy variable for the financial crisis. On a monthly basis, as mentioned earlier, FIIs follow negative feedback trading strategy. This result is in line with the result that Gordon and Gupta obtained for their study. If FIIs consider their lag investments, then other factors that impact upon their decisions are the lagged stock returns and lagged LIBOR. Disregarding lagged net FII, the factors that affect the foreign investors decisions are lagged growth rate of GDP and lagged LIBOR. Lagged stock returns were significant until LIBOR was included in the model. Hence, on a monthly basis lagged LIBOR acts as the most important determinant of the FII's investment decisions. It is also observed that neither on a daily basis, nor on a monthly basis, mature market returns (MSCI WI returns) and the gold price affect the FII's investment decisions. The most relevant of all the factors are the lagged stock returns, the lagged IIP growth rate and the exchange rate, lagged net FII, lagged GDP growth rate and the lagged returns on the MSCI EM index.

Given, the short-term nature of these investments it becomes imperative that policy-makers keep a close watch on the movement of these investments. A sudden flight of the investment money out of the country might affect the stock market, and sometimes the economy itself, adversely. Hence, this study hopes to provide the policy-makers with a better insight into the factors and trading behaviour of the foreign investors. The recent trend in the investments shows that the foreign investors dominate the investments in the Indian capital market, giving them considerable

control on the movement of the stock index itself. Increasing the cap alone on their investment is not a solution. Extensive amount of regulation should be implemented to keep the foreign investor's investments in check, but the regulation should not be such that it hinders further investment on behalf of the foreign investors. Foreign investments in India, whether it is in the form of FIIs or FDI, have on an average helped India grow to its current state. They have played an integral role in India's growth and development, making them an important part of the system itself.

TABLE 1: Descriptive Statistics

	Mean	Median	Mode
net fii	114.8915	98.15	127.3
stock returns	0.041914	0.146248	#N/A
Volatility	1.633458	1.472117	#N/A
exch rate	43.92034	44.21	45.25
gdp(MP)	13.99098	14.4	14.4
msci (EM)	0.000395	0.001261	-0.0005
msci(WI)	0.000445	0.000159	1.39E-05
Inflation	6.125676	6.15	11.14
Labor	3.595763	3.640315	5.32
(X+M)/gdp	-0.00795	-0.01551	0.016083
gold in $	604.5582	608.85	420
iip_growth	0.087316	0.084	0.07

TABLE 2: Stationarity test, ADF Test Results

Variable		
	test statistic	critical value[a]
Net FII		
Sensex Returns	-23.643	-2.86
Exchange rate*	-32.41	-2.86
stock return Volatility*	-48.115	-2.86
LIBOR	-24.365	-2.86
Gold Price*	-2.9	-2.86
MSCI WI returns	-34.569	-2.86
MSCI EM returns	-60.357	-2.86
[a] significance at 5% level	-38.697	-2.86

TABLE 3: Regression of Net FII on lagged stock returns (Daily Data)

	coefficient	R^2 change
R_{t-1}	118.2673*	0.105
R_{t-2}	101.3992*	0.078
R_{t-3}	50.74213*	0.018
constant	103.9155	

*significant at 1% level of significance.

TABLE 4(i) Step Wise Regression Model 1(Daily Data)

Variable\Step	1	2	3	4	5	6	7	8
$NetFII_{t-1}$	0.363*	0.337*	0.276*	0.228*	0.202*	0.194*	0.190*	0.204*
$NetFII_{t-2}$					0.085*	0.077*	0.075*	0.089*
$NetFII_{t-3}$				0.183*	0.158*	0.149*	0.146*	0.141*
R_{t-1}		110.372*	107.792*	107.535*	108.294*	106.702*	106.303*	92.523*
R_{t-2}			71.826*	77.102*	77.481*	76.897*	76.938*	55.144*
IIP_Gr_{t-1}							2,812.837*	5,304.01*	5,117.667*
P_{t-1}							20.495**	20.136**
$MSCI\_EM_{t-1}$								4,350.303*
Constant	72.952	71.464	75.883	60.034	55.993	289.296	371.147	355.491
R^2	0.132	0.218	0.251	0.283	0.288	0.294	0.296	0.315
R^2 change	0.132	0.087	0.033	0.032	0.006	0.006	0.003	0.019

*significance at 1% level of significance

** significance at 5% level of significance

The table provides the coefficients of each of the variables.

TABLE 4(ii): Step-wise regression of Model 1(excluded variables)

	1	2	3	4	5	6	7	8
$NetFII_{t-2}$	0.120*	0.135*	0.146*	0.089*				
$NetFII_{t-3}$	0.176*	0.185*	0.205*					
R_{t-1}	0.3157*							
R_{t-2}	0.207*	0.205*						
ER_{t-1}	-0.06**	-0.055***	-0.018***	-0.016	-0.014	-0.012	-0.010	-0.006
V_{t-1}	-0.100*	-0.119*	-0.087*	-0.005**	-0.047***	-0.042	-0.039	-0.043
GDP_Gr_{t-1}	-0.005	-0.007	-0.011	-0.015	-0.016	-0.001	0.008	0.003
IIP_Gr_{t-1}	-0.133*	-0.122*	-0.123*	-0.085*	-0.088*			
$ExIm\_to\_GDP_{t-1}$	-0.003	0.001	0.003	0.005	0.005	-0.046	-0.040	-0.041
P_{t-1}	-0.06**	-0.05***	-0.05***	-0.038	-0.034	0.060**		
$LIBOR_{t-1}$	0.062**	0.055***	0.052***	0.039	0.036	0.058**	0.035	0.036
$Gold_{t-1}$	-0.097*	-0.088*	-0.088*	-0.067**	-0.062**	0.050***	0.033	0.032
$MSCI\_WI_{t-1}$	0.008	0.028	0.043	0.038	0.035	0.027	0.026	0.015
$MSCI\_EM_{t-1}$	0.282*	0.199*	0.158*	0.088*	0.086*	0.060*	0.165*	
D_1	-0.166*	-0.151*	-0.151*	-0.088*	-0.087*	-0.057**	-0.044	-0.044

*significance at 1% level of significance **significance at 5% level of significance

***significance at 10% level of significance. The table presents the partial correlation coefficients between the variable and the Net FII investment.

TABLE 5(i): Step-wise regression of Model 2

	1	2	3	4	5	6	7	8
R_{t-1}	121.194*	122.864*	120.533*	116.631*	114.917*	114.367*	96.373*	95.222*
ER_{t-1}			-281.185*	-257.652*	-253.432*	-246.212*	-198.557**	-193.381**
V_{t-1}		-3,960.588*	-3,838.76*	-3,411.584*	-3,153.267*	-3,028.860*	-2,844.424*	-2,943.883*
IIP_Gr_{t-1}				5,479.130*	7,167.068*	10,405.251*	10,342.164*	2,394.39
$ExIm\_to\_GDP_{t-1}$					3,135.766*	2,860.388*	2,885.738*	2,195.290**
P_{t-1}						28.287*	28.606*	12.528**
$MSCI\_EM_{t-1}$							5,379.734*	5,363.820*
D_1								-315.431*
Constant	109.749	116.364	116.992	564.747	677.747	774.953	766.026	280.274
R2	0.105	0.127	0.136	0.158	0.164	0.169	0.203	0.208
R2 change	0.105	0.022	0.009	0.022	0.006	0.005	0.034	0.005

*significance at 1% level of significance

**significance at 5% level of significance

***significance at 10% level of significance

The table provides the coefficients of each of the variables.

TABLE 5 (ii): Step-wise regression of Model 2 (excluded variables)

	1	2	3	4	5	6	7	8
ER_{t-1}	-0.107*	-0.101*						

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V_{t-1}	-0.156*							
GDP_Gr$_{t-1}$	-0.006	-0.017	-0.017	0.010	0.028	0.039	0.034	0.005
IIP_Gr$_{t-1}$	0.098*	0.094*	0.090*					
ExIm_to_GDP$_{t-1}$	0.003	0.005	0.004	0.087*				
P$_{t-1}$	-0.084*	-0.079*	-0.078*	0.084*	0.075*			
LIBOR$_{t-1}$	0.078*	0.078*	0.076*	0.072*	0.072*	0.065**	0.066	-0.012
Gold$_{t-1}$	0.031	0.028	0.026	0.029	0.028	0.031	0.013	0.009
MSCI_WI$_{t-1}$	0.038	0.033	0.038	0.023	0.023	0.022*	0.014	0.009
MSCI_EM$_{t-1}$	0.061*	0.067*	0.060*	0.059*	0.061*	0.068*		
D$_1$	-0.058*	-0.055*	-0.050*	-0.046*	-0.048*	-0.062*	-0.062*	

*significance at 1% level of significance
**significance at 5% level of significance
***significance at 10% level of significance the N
The table presents the partial correlation coefficients between the variable and et FII investment.

TABLE 6: Descriptive Statistics of Monthly Data

	Mean	Median	Mode
NetFII_Investment	2733.267	2449	#N/A
sensex_l_1	0.009415	0.034339	#N/A
vol_calculated	0.056783	0.056333	#N/A
GDP_growth_lagged	14.48	14.35	14.3
exchange rate_l_1	43.8203	44.1725	39.54
MSCI_WI_returns_lag	-0.00054	0.009754	#N/A
MSCI_EM_returns_lag	0.005257	0.018666	#N/A
inflation_lag	6.019153	5.39	4.71
BOT_to_GDP_lagged	-0.00833	-0.01518	0.024156
iip_growth_rate_lagged	0.0872	0.084	0.07
Labor	3.61229	3.7763	5.3201
Gold	605.3596	604.4192	#N/A

TABLE 7: ADF test for Stationarity

ADF Test Variable	test statistic	critical value[a]
Net FII	-7.414	-2.923
Sensex Returns	-5.476	-2.923
Exchange rate*	-4.252	-2.923
stock return Volatility	-4.184	-2.923
LIBOR*	-5.390	-2.923
Gold Price*	-7.464	-2.923
MSCI WI returns	-4.322	-2.923
MSCI EM returns	-5.282	-2.923

[a] significance at 5% level
* denotes that the variable was initially non-stationary. To make it stationary the first difference was taken.

TABLE 8: Regression of Net FII on lagged stock returns (Monthly Data)

	coefficient	R^2 change
R$_{t-1}$	6843.698	-
R$_{t-2}$	3341.798	-
R$_{t-3}$	21378.55**	0.075
constant	1796.85	

**significant at 5% level of significance.

TABLE 9 (i): Step-wise regression of Model 1 (Monthly Data)

	1	2	3
NetFII$_{t-1}$	0.485*	0.486*	0.388*
R$_{t-2}$		-8,218.756**	-4,772.687
LIBOR$_{t-1}$			-1,570.550**
Constant	843.622	929.152	1,044.512
R^2	0.197	0.268	0.330
R^2 change	0.197	0.071	0.062

*significance at 1% level of significance
**significance at 5% level of significance
***significance at 10% level of significance
The table provides the coefficients of each of the variables.

The table presents the partial correlation coefficients between the variable and the Net FII investment.

TABLE 10(i): Step-wise regression of Model 2 (Monthly Data)

	1	2	3	4
Rt-1	- 9,535.411**	-10,673.904**	-8,242.726**	-5,412.437
Rt-2		-8,645.114**	-6,307.097***	-2,521.353
GDP_Gr$_{t-1}$			283.680*	254.775**
LIBOR$_{t-1}$				-1,733.966**
Constant	1,513.287	1,609.058	-1,178.392	-914.763
R^2	0.079	0.158	0.257	0.332
R^2 change	0.079	0.079	0.099	0.076

*significance at 1% level of significance
**significance at 5% level of significance
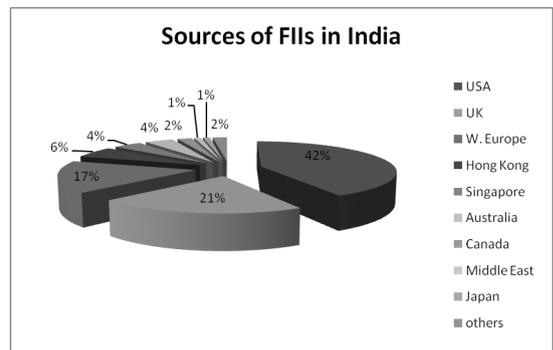***significance at 10% level of significance

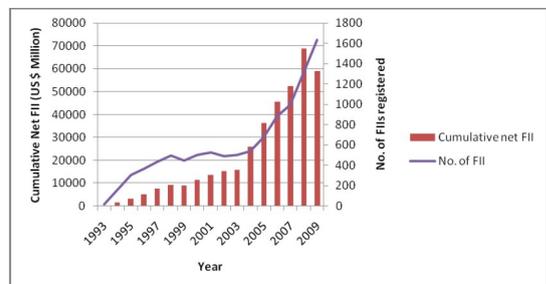Fig.1 Sources of FIIs in India
Source: SEBI
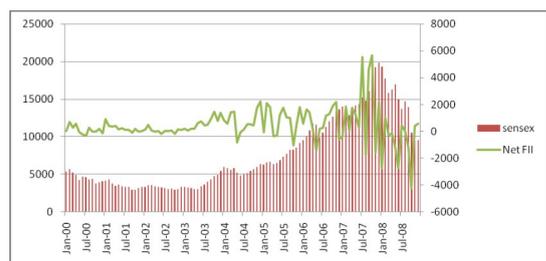

Fig. 2: Growth of FII investment in India

Fig. 3: Trend of Net FII and Sensex

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