Behaviour of Foreign Institutional Investors in India: An Empirical Study

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INTRODUCTION

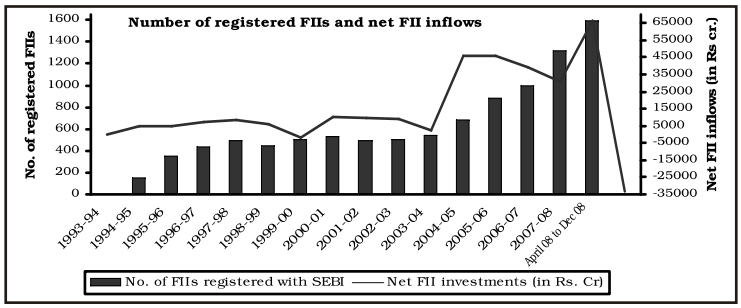
The world has increasingly become one big global market. This is reflected in the tremendous amount of flexibility available to corporations in deciding on the types of securities that they can issue to fund their investments; locations where they can issue their securities; and also, type and location of their own investments. An important attribute of this global financial architecture is the rise of Foreign Institutional Investors (FIIs) as major players in the financial markets. The period beginning March 2003 till before the sub-prime crisis began to unfold in August-September 2007, India, as other emerging economies, has witnessed a renewed romance of FIIs with emerging markets.

There is an unending and inconclusive debate on the role of FIIs in the local equity markets. One view is that foreign investment–both portfolio and direct varieties–can supplement domestic savings and augment domestic investment without increasing the foreign debt of the country. It is argued that capital inflows into the equity market lead to higher stock prices, lower cost of equity capital and encourages investment by Indian firms. Foreign investors act as catalysts kindling domestic reforms aimed at improving the market design of the securities markets, and help strengthen corporate governance.

On the flip side, arguments are that FII investments in any country are notoriously volatile. A large outflow of funds due to FII activities can leave behind a crisis situation in the domestic economy, which threatens to spill over to the rest of the world. This was what happened in the East Asian Crisis of 1997. Before the crisis period, the East Asian economies attracted a large proportion of the total capital inflows to the developing countries. However, this situation changed around 1997-98 when capital flows reversed, and capital started flowing out of these economies. The crisis which started in Thailand spread across Asia with falling asset prices, capital flight and consequent financial instability. The popular view that emerged in analysis of the crisis was that foreign investors destabilize emerging capital markets and in this case, were partly responsible for the collapse of currencies and stock markets. There is a large amount of literature dwelling on the issue of "herding behaviour"[1] and "positive feedback trading"[2] by FIIs in emerging economies empirically testing if this kind of behaviour is attributable to FIIs and if so, is it destabilizing. We shall review this literature, in detail, later in the paper.

INDIAN CONTEXT

India's tryst with FIIs began in 1992, when as part of the series of reforms to liberalize the Indian economy; FIIs were first allowed to invest in all securities in both primary and secondary markets, and schemes floated by mutual funds, within certain limits. Over the years, with gain in experience, the regulatory regime for FIIs has been liberalized along the lines of expansion of categories of eligible FIIs; enhanced limits of investments; expansion of eligible instruments for investments and easier and quicker registration process for trading in Indian markets. The figure below shows the trend in FII investments in India since inception. FII investments in India were above



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[1] Tendency to invest in the same stocks at the same time.
[2] Act of buying stocks after their price increase and selling after a price decline.

USD 9 bn over each of the financial years 2003-04, 2004-05 and 2005 06. They crossed USD 16 bn in 2007-08 before the global financial crisis took its toll, and FII investments in the country turned to negative USD 8.3 bn over April-December 2008.

Table 1: FII Stock market indicators

Indicators	*2006-07*	2007-08
Market capitalisation of FII holdings on NSE (Rs cr)	542161	712118
FII turnover on Capital Markets segment of NSE (Rs cr.)	686297	1270521
Market capitalisation of FII holdings on NSE as % of total market capitalisation of NSE	16.10%	14.66%
Market capitalisation of FII holdings on NSE as % of GDP	13.14%	15.08%
FII turnover as % of total turnover on NSE	17.64%	17.89%
Percentage share of FIIs in total number of non-promoter shares on NSE	10.78%	10.62%
Source: NSE publications		

Table-1 above gives an assessment of FII activity on the National Stock Exchange of India (NSE) (on which almost 80% of FII activity can be seen) in comparison with total market activity on the exchange. As can be seen, FIIs contribute to only 18% of the total turnover on the exchange. The market capitalization of their holdings on the NSE is 15% of the total market capitalization of the exchange and 15% of the GDP. Also, the percentage of FIIs in total number of non-promoter shares on the NSE is only 11%.

Table 2: Share of India in global portfolio equity inflows to developing countries

(in $ billion)

	Category	*2000*	*2002*	*2004*	*2006*	*2007e*
A	Portfolio equity inflows into all developing countries	13.5	5.5	40.4	104.8	145.1
Aa	The share of BRIC countries	12.5	7.8	22.2	66.2	110.0
i	China	6.9	2.2	10.9	42.9	35.0
ii	India	2.3	1.0	9.0	9.5	34.0
iii	Brazil	3.1	2.0	2.1	7.7	26.2
iv	Russia	0.2	2.6	0.2	6.1	14.8
B	% share of India in total portfolio equity flows to developing countries (India as % of "A")	17.0	18.2	22.3	9.1	23.4
C	% share of India in total portfolio equity flows to BRIC countries (India as % of "Aa")	18.4	12.8	40.5	14.4	30.9
Source: World Bank, Global Development Finance Report, June 2008 **e=estimate**						

Table-2 presents the position of India in global portfolio equity inflows into developing countries. As seen, India's share stood at 23.4% in 2007, a marked increase from 9.1% in 2006. Within the BRIC nations, India's share in portfolio inflows increased dramatically from USD 9.5 bn in 2006 to USD 34 bn in 2007, with its share in total portfolio equity flows to BRIC nations, rising to 31%.

RECENT CONCERNS ON FII INVESTMENTS

With the advent of FIIs in Indian markets, the advocates of freer markets hold that the Indian stock exchanges were forced to improve the quality of their trading and settlement procedures, and information environment in accordance with the best practices of the world. However, on the negative side, the same concerns engulfing other emerging markets that of FII investments being "hot money" and destabilizing the economy loom large on Indian policy makers as well. It is these concerns which have made the process of evolution of regulatory regime for FIIs a piecemeal and cautious one.

There have been a number of episodes when the stock markets have witnessed large falls. On such occasions, the activity of the FIIs is closely watched to understand, whether, there is a causal relation between FII activity and market movements. Of these, the incidences of May 2004 and May 2006 stand out. In the month of May 2004, following uncertainties on the constitution and policies of the new Government that was to take charge at the Centre, the benchmark Sensex and Nifty indices saw huge volatility, especially on 17th May, 2004. The returns on Sensex fell by 14.77% and that on Nifty by 16% in this month. Since the beginning of May, 2004, there was a trend of FIIs being net sellers in the Indian markets-after remaining net buyers for the whole of 2003-04 and in the month of April, 2004. FIIs sold a net of Rs 3247 cr during the month of May, 2004. While the FIIs turned net sellers in this month, the domestic mutual funds were net buyers of Rs 1005 cr. equity.

May 2006 also saw unprecedented fall in market indices following Fed rate hike, declining metal prices and weak Asian markets. Also, there were rumours of possible tax on business income of FIIs from trading in securities. The month saw a 15% decline in Sensex and Nifty. FIIs were net sellers of equity worth Rs. 7354 cr. On the other hand, domestic mutual funds net bought Rs. 7894 cr. equity during the month.

Both these episodes point towards FIIs possibly destabilizing the markets and being the first ones to withdraw their investments in case of any negative news about the host economy. However, from another point of view, we can refute this common notion by saying that like any other investor, FIIs are also in the market to make profits and take their investment decisions keeping in view all the attendant risks of investments. Thus, it may perhaps be unfair to put the blame solely on FIIs for episodes such as those mentioned above.

WHAT THIS PAPER PROPOSES TO DO?

Having put the current scenario in perspective, this paper looks at the dynamics of foreign institutional investments in the country to see the pattern of their investments and possible cause and effect relationship with returns on the domestic markets. While we look at this pattern of FII flows over the period 2003-2008; more specifically, we look at the year 2008 which saw a huge decline in share prices in the country as also witnessed in stock markets all over the world. The world environment has impacted India hugely and all theories of decoupling of financial markets have been disproved. What has been the role of foreign institutional investors in transmitting global sentiments to India is an interesting question to attempt to answer.

To be able to answer this question, we empirically examine the trading patterns of institutional investors, focusing in particular on the prevalence of positive-feedback trading among FIIs and on the effect of these flows on level of returns in the domestic markets. More specifically, we:

(i) test the causal relation between FII investments and returns on the equity segment of Indian markets;
(ii) test whether FIIs have led to a broadening of investor base;
(iii) test if the price-pressure hypothesis holds for India;
(iv) test whether FIIs indulge in positive feedback trading

The paper, after this Introduction section is organized as follows: Section 2 reviews the literature on this topic. Section 3 presents the data and methodology we employ in the study and the final section 4 lists out the results of our tests and analyses the same.

LITERATURE REVIEW

As mentioned in the introduction, following the East Asian crisis, one finds sprawling literature examining the possible causal effect of foreign investments on stock markets of emerging economies and looking at various aspects of their investment patterns.

Clark and Berko (1997) test the "base-broadening" hypothesis that foreign inflows cause emerging equity prices to rise-using data from Mexico over the period January 1989 to March 1996. They find a positive contemporaneous relation between equity flows and stock returns. Further, they show that there is no evidence that foreign investors are positive feedback traders. *Stulz et al (1999)* examine the impact of foreign investors on stock returns in Korea from November 30, 1996 to the end of 1997 using trade data. They find strong evidence of positive feedback trading and herding by foreign investors before the period of Korea's economic crisis, during the last three months of 1997. The evidence of herding becomes weaker during the crisis period and positive feedback trading by foreign investors disappears. They find no evidence that trades by foreign investors had a destabilizing effect on Korea's stock market over the sample period. *Kim and Wei (2002)* also examine the activity of foreign investors in Korea over the period of December 1996 to June 1998. They find that foreign investors show strong tendencies for herding using the measure for herding as developed by Lakonishok et al (1992). *Froot et al (2001)* explore the behaviour of daily, international portfolio flows into and out of 46 countries from 1994 through 1998. They find that flows are strongly influenced by past returns, so that investor trend-following is apparent. They further find the sensitivity of local stock prices to foreign inflows to be positive and determine that transitory inflows impact future returns negatively. *Griffin et al (2002)* use a theoretical model and empirical analysis with data for nine countries (including India, Korea, Indonesia, Thailand etc., over the period 1996-2001, to show that foreign investors find past stock prices more informative in predicting future domestic returns as compared to domestic investors. They find that foreign investors invest more following high returns in a market and that they react quickly, often within one calendar day.

Some of the empirical studies done on data from Indian markets are:

Chakrabarti (2001) reported bi-directional Granger-causality between net FII inflows and returns on the BSE for the period 1993-1999, with monthly data. However, with daily data for the period January 1999 to December, 1999, the paper finds causality running from returns to FII flows. He also looks at other determinants of FII flows into the country and finds that this collection of domestic and international variables likely to affect FII flows (such as return on MSCI world index, change in Indian short term interest rate, return on exchange rate etc.) fail to diminish the importance of contemporaneous returns in explaining FII flows. *Batra (2003),* tests for herding and

positive feedback hypothesis for FIIs for the period January 1994 to December 2002, with monthly data and January 2000 to December 2002 with daily data. She finds that there is strong evidence of FIIs chasing trends and adopting positive feedback trading strategies at the aggregate level on a daily basis. However, there is no evidence of positive feedback trading on a monthly basis. The results of the analysis also indicate that foreign investors have a tendency to herd together in their trading activity in India. However, the trading behaviour and biases of the FIIs do not appear to have a destabilizing impact on the equity market. Gordan and Gupta (2003) analyze the data from March 1993 to December 2001 to look at the determinants of FII flows into the country. They find that other than the external factors, one of the important primary domestic determinants of FII flows is lagged stock returns. However, they find negative relationship between portfolio flows and the domestic stock market, which they explain by portfolio rebalancing. In general, they find that domestic macro factors are significant in determining FII flows which suggests that foreigners do not follow a pure bottom-up approach to investing in India and that their interest in some Indian stocks is not impervious of macro events in India. *Ananthanarayanan et al (2005)* look at nature of FII flows over the period January 1993 to June 2003. They break up the total FII flows into expected and non-expected components and find that unexpected flows have a greater impact than expected flows on stock indices. They also find strong evidence consistent with the base-broadening hypothesis and do not detect any evidence regarding momentum or contrarian strategies being employed by foreign institutional investors. Finally, they do not find any substantiation to the claim that foreigners' destabilize the market. *Babu and Prabheesh (2008),* using Granger Causality test on daily data from January 2003 to February 2007 find the existence of bidirectional causality between FII flows and stock returns. Further analysis through impulse response function indicates that FII flows are more stock return driven. They also find support for information revelation hypothesis and momentum trading hypothesis.

DATA AND METHODOLOGY

The purpose of this study is to update the previous studies on FII investment dynamics in the country capturing the latest trends till December 2008. Particular emphasis is on getting an insight into the FII activity following the period when the sub-prime crisis in the US started to spread to other parts of the world by second half of 2007. An important event was the Northern Rock, a big British mortgage lender, turning to the Bank of England for an emergency loan as it was not able to raise financing in the tight credit markets, in September, 2007. There were problems brewing in Merrill Lynch and Citigroup by November, 2007. These events had started having its effect on global capital movements. Thus, we use daily net FII flows data and stock returns of the benchmark National Stock Exchange of India Index (Nifty-50) from 1st January 2003 to 31st December 2008 and divide the period into two, viz. sub-period 1- January 2003 to October 2007 and sub-period 2- November 2007 to December 2008. We start our analysis from the year 2003 as this is the year which marked an uptrend in the stock market returns[3] and in FII inflows into the country for the next few years till the recent slowdown in 2008 due to the sub-prime crisis.

Some of the earlier studies on FII activity in the country look for a causal relationship between FII flows and returns on the benchmark index of the Bombay Stock Exchange, the Sensex. Though, the break up of the FII activity in the country on the NSE and BSE[4] is not available in the public domain, what is known is that over 80% of the trading activity of FIIs is on NSE. Thus, in this study, we look at the relation between FII flows and returns on the Nifty index. Computed using the market capitalization weighted method, the Nifty index includes 50 stocks from across 23 different sectors of the economy.

The net FII inflow data has been taken from the website of Securities and Exchange Board of India (SEBI), Nifty values from NSE and daily market capitalization on NSE has been taken from Bloomberg.

In our sample, we find an increasing trend in the net FII flows (excess of purchases over sales) and market growth. Considering that we are concerned with looking at short-term changes in pattern of FII investments and its impact on stock market returns, it is important to control for these long-term effects. The total market capitalization on the NSE has been growing at over 55% per annum in the period of study barring 2008, which was an exceptional year with the sub-prime crisis unfolding and affecting the activity on the stock markets in India as all around the world. Thus, in line with the existing literature, we normalize net FII flows by the trailing 90-day moving average of the NSE market capitalization (Goetzmann and Massa, 2003).

We calculate the returns on the Nifty using the closing price index given by the following equation:

$$R_t = [\ Log\ (P_t) - Log\ (P_{t-1})] \quad \text{..... (1)}$$

[3] Barring the year 2004, where returns over the year were just around 6%.

[4] NSE and BSE are the two premier exchanges of the country accounting for over 99% of the market activity.

Where, R_t is the return from the market index at time t, P_t and P_{t-1} are closing values of market index at time t and t-1 respectively.

Table 3: Preliminary tests on the data series		
	Return Series	**FII Flows**
Minimum	-0.1305	-0.0227
Maximum	0.0797	0.0573
Mean	0.0007	0.0015
Std. Dev.	0.0179	0.0045
Skewness	-0.8201	2.0162
Kurtosis	9.0208	24.6544
Jarque-Bera (Probability Values)	2412.677 (0.000)	30121.03 (0.000)
ADF Test (1% Critical Value)	-17.496 (-3.44)	-10.798 (-3.44)
Durbin Watson Statistic	2.003	2.012

Table-3 shows the basic statistics and the main preliminary tests conducted to study the characteristics of the returns series and the scaled net FII flow series. The Nifty series was checked for stationarity using the Augmented Dickey Fuller (ADF) Test and it clearly showed non-stationarity. However, the series of return on Nifty, calculated as mentioned in equation (1) above, was found to be stationary.

The ADF test confirmed that the scaled FII flows are stationary at levels. The Durbin Watson test is insignificant for both return series and scaled FII flows confirming the absence of first order serial correlation. Therefore, both the series, being stationary, are used further in the study.

GRANGER CAUSALITY AND VECTOR AUTOREGRESSIVE (VAR) MODEL

We run the Granger Causality test to study the direction of causality between FII flows and stock returns in India as proposed by Granger (1969) and popularized by Sims (1972). Using the F-tests, we examine whether lagged information on returns provides any significant information on FII flows in presence of its own lagged values and vice versa. The regression to test Granger causality (GC) can be represented as follows:

$$R_t = \alpha + \sum_{i=1}^{m} \beta_i R_{t-i} + \sum_{i=1}^{m} \lambda_i FII_{t-i} + \varepsilon_{Rt}$$

$$FII_t = \mu + \sum_{i=1}^{m} \delta_i R_{t-i} + \sum_{i=1}^{m} \phi_i FII_{t-i} + \varepsilon_{FIIt} \quad \text{.....(2)}$$

Where, R_t is the return on the Nifty index at time t and FII_t are scaled FII flows at time t.

Null Hypothesis H_0:λ_i=0 tests if FII_t do not Granger cause R_t. and δ_i=0 tests if R_t do not Granger cause FII_t.

GC test talks about a linear prediction between returns and FII flows indicating whether one variable precedes the other or not and hence, the word causality is somewhat of a misnomer here. Therefore, we establish the channel of causality using the above GC results and further test the relationship between FII flows and NSE returns using the Vector Autoregressive Model. The bivariate VAR model used in this study contains two variables- FII flows and stock returns- each of whose current values depend on different combinations of previous k values of both variables and error terms. The unrestricted VAR model allows for dynamic interaction between the variables, explaining the effect based on its own lag as well the lags of the other variable.

The unrestricted VAR used in this study can be expressed by the following equation:

$$\begin{bmatrix} R_t \\ FII_t \end{bmatrix} = \begin{bmatrix} \alpha \\ \mu \end{bmatrix} + \begin{pmatrix} \beta_{11}(L) & \beta_{12}(L) \\ \beta_{21}(L) & \beta_{22}(L) \end{pmatrix} \begin{bmatrix} R_{t-1} \\ FII_{t-1} \end{bmatrix} + \begin{bmatrix} \varepsilon_{Rt} \\ \varepsilon_{FIIt} \end{bmatrix} \quad \text{.....(3)}$$

Where (L) is the distributed Lag Operator.

β_{12} shows the impact of the FII flows on returns and, β_{21} shows the impact of the returns on the FII flows.

We have chosen the appropriate order of the model based on the SIC (Schwartz Information Criterion) and AIC (Akaike information Criterion). We have confirmed stationarity of the variables included in GC and VAR by the ADF test. We further analyze the VAR using the impulse response function where a unit shock is applied to the error for each variable from each equation separately, and thereafter the effects upon the unrestricted VAR system as stated above are observed. (Brooks, 2002)

BASE-BROADENING HYPOTHESIS

Merton (1987) provides an intuitive model for illustrating the theory behind base-broadening hypothesis, which suggests that the expansion of investor base to include foreign investors leads to increased diversification,

reduced risk, lowering of the required risk premium and thus there is a permanent increase in the equity share price through risk pooling. Clark and Berko (1997) explain this model and use it on data from Mexico. They conjecture the following testable hypothesis based on Merton's model:

$$R_{it} = \beta_0 + \beta_1 \left[\frac{FII_t}{MC_{i,t-1}} \right] \quad \text{.....(4)}$$

Where, R_{it} is the return from market "i" (NSE in this case) at time t, FII_t is the net FII flow at time t, $MC_{i,t-1}$ is the NSE market capitalization for the previous period.

Null Hypothesis is H_0: $\beta_1=0$ and alternative hypothesis is H_1: $\beta_1>0$

If base broadening hypothesis holds in the Indian market, then we expect to reject the null hypothesis.
We further use the methodology applied by Clark and Berko (1997), based on what was done by Warther (1995), that of breaking down the FII net flows (as scaled by market capitalization) into expected and unexpected components. The rationale behind doing this is that β_1 in the above regression is likely to underestimate the impact of foreign inflows on the domestic market returns. This is so because according to efficient market hypothesis, the relevant information available at the start of the period should already be reflected in the price of assets at the start of the period. Hence, if foreign demand is expected to ultimately push prices to a higher equilibrium level, but foreigners only invest gradually, prices should rise ahead of the actual inflows. Further, if investors are unsure of the magnitude of new foreign demand for domestic stocks, the arrival of new information that causes investors to raise their estimate of total foreign inflows should push prices to a higher level. Thus, returns should be actually regressed on the expectational revisions in inflows. But since these revisions are not directly observable, we assume that investors forecast the future evolution of the investor base by studying the realized flows. (Clark and Berko, 1997)
Thus, the above equation is revised as under:

$$R_{it} = \beta_0 + \beta_1 E_t \left[\frac{FII_t}{MC_{i,t-1}} \right] + \beta_2 U_t \left[\frac{FII_t}{MC_{i,t-1}} \right] \quad \text{.....(5)}$$

Where $E_t \left[\frac{FII_t}{MC_{i,t-1}} \right]$ are expected FII flows at time t, $U_t \left[\frac{FII_t}{MC_{i,t-1}} \right]$ is the unexpected FII flows

at time t= actual scaled flow minus expected flow.
Null hypothesis is H_0: $\beta_1, \beta_2 = 0$ and alternative hypothesis is H_1: $\beta_1 >= 0$ and $\beta_2>0$
If the base broadening hypothesis holds, β_1 should be insignificant as the market is not expected to react to the expected flows and β_2 should be positively significant.

PRICE PRESSURE HYPOTHESIS

An alternative theory to the above mentioned base-broadening hypothesis is the price pressure hypothesis put forward by Warther (1995). This hypothesis suggests that the rise in prices associated with increase in FII inflows are due to temporary illiquidity and thus, these inflow induced price increases would subsequently be reversed. The regression equation to test this hypothesis is:

$$R_{it} = \beta_0 + \beta_1 U_t \left[\frac{FII_t}{MC_{i,t-1}} \right] + \beta_2 U_{t-1} \left[\frac{FII_{t-1}}{MC_{i,t-2}} \right] + \beta_3 U_{t-2} \left[\frac{FII_{t-2}}{MC_{i,t-3}} \right] \quad \text{.....(6)}$$

Null hypothesis is H_0: $\beta_2, \beta_3 = 0$ and alternative hypothesis is H_1: $\beta_2, \beta_3<0$.
If price-pressure hypothesis is true, we would expect the lagged unexpected inflows to have significant negative coefficients, i.e the increase in returns due to contemporaneous FII flows would be short lived and returns would come back to earlier levels.

POSITIVE FEEDBACK HYPOTHESIS

Positive feedback trading is a trading strategy wherein investors base their portfolio decisions on expectations, which are in turn based on past returns. In other words, investors who take a buy decision when the markets are in an upswing and a sell decision when they are on a downward trend, thus accentuating the rise or fall, are said to be feedback or momentum traders. In the context of FIIs, this hypothesis, if tested positive, would imply that FIIs invest in a market which is already showing increasing returns.

To test this hypothesis, we again use the methodology adopted by Clark and Berko (1997) on the line of that done by Warther (1995), and regress unexpected scaled net FII inflows on lagged returns to see whether lagged returns have any significant explanatory power to explain these unexpected inflows. Thus, we have the following equation:

$$U_t\left[\frac{FII_t}{MC_{i,t-1}}\right] = \beta_0 + \beta_1 R_{it} + \beta_2 R_{i,t-1} + \beta_3 R_{i,t-2} \quad \text{.....(7)}$$

Where, $U_t\left[\frac{FII_t}{MC_{i,t-1}}\right]$ is the unexpected FII flows at time t= actual scaled flow minus

Null hypothesis is H_0: $\beta_2, \beta_3 = 0$ and alternative hypothesis is H_1: $\beta_2, \beta_3 > 0$ or $\beta_2, \beta_3 < 0$

If positive feedback holds, then these two coefficients would be significantly positive.

RESULTS AND ANALYSIS

a. Granger causality test

Table below presents the results of Granger causality test:

Table 4: Pairwise Granger Causality Tests

	Lags 1	Lags 2	Lags 3	Lags 4	Lags 5
Null Hypothesis: (Full Period)					
RETURNS does not Granger Cause FII FLOWS	33.0682	17.7294	14.1341	11.2638	9.4657
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
FII FLOWS does not Granger Cause RETURNS	7.9085	6.4961	4.1263	3.2548	2.8849
	(0.0050)	(0.0016)	(0.0063)	(0.0114)	(0.0134)
Null Hypothesis (Sub-period 1)					
RETURNS does not Granger Cause FII FLOWS	23.2660	12.1291	9.6864	7.6225	6.3553
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
FII FLOWS does not Granger Cause RETURNS	5.3935	6.4012	3.7599	2.6642	2.1811
	(0.0204)	(0.0017)	(0.0105)	(0.0312)	(0.0540)
Null Hypothesis (Sub-period 2)					
RETURNS does not Granger Cause FII FLOWS	21.8218	13.4658	11.5901	8.6851	6.8769
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
FII FLOWS does not Granger Cause RETURNS	0.5495	1.6291	1.0991	1.2962	1.0796
	(0.4591)	(0.1980)	(0.3499)	(0.2718)	(0.3719)

-Figures in the brackets are p-values

We find a bi-directional relationship between scaled FII flows and returns on the Nifty over the full period 2003-2008 upto 5 lags. Therefore, we reject the null hypothesis of 'FII flows do no Granger Cause Stock returns' and also 'Stock returns do not Granger Cause FII flows'. This gives us a clear indication that FII flows in India are both- a cause and an effect to returns on the Nifty. This is also what Babu and Prabheesh (2008) find with daily data over the period January 2003-February 2007.

We notice this bidirectional relationship exists during the sub-period 1. However, during sub-period 2, we see a unidirectional relationship where, movements in the stock returns are seen to be Granger causing FII investments and not the other way round. Thus, during the period November 2007-December 2008, FII inflows are not seen to be causing or determining returns on the Nifty. This result contradicts the popular belief that stock market slowdown in 2008 was driven by FIIs pulling out their investments from the country. There could be many other factors driving the fall in returns in the markets during this period, which can be deciphered only with using the traditional modelling framework, which is beyond the scope of this paper.

However, one needs to be cautious in interpreting the GC results which is a model-free approach of detecting causality between two variables and assumes that the information relevant to the prediction of the respective variables, FII flows and Nifty returns in our case, is contained solely in the time series data of these variables. But, there could be many other factors driving these variables. However, as Chakrabarti (2001) points out, since in the financial markets, information flows drive both returns and investment flows, implications about causality between these two variables can also be highly model-specific and in such cases, an agnostic test like Granger causality may be of some use in detecting the direction of causality.

b. Vector Autoregression

The bivariate VAR model for the full period 2003-2008 and the sub-periods shows the following results (Table 5): FII flows are predicted by the previous days stock returns with lag 1 and lag 3 being positively significant. This is also true for the two sub-periods with lag 1 and lag 3 of returns positively significant in explaining FII flows during sub-period 1 and lags 1-3 significant in explaining FII flows in period 2. Thus, past returns influence FII

investment positively, indicating evidence of positive-feedback strategy being adopted by FIIs. This hypothesis is further tested in point "e" below.

FII flows are highly related to their own past flows for the entire period as well as in the two sub-periods. This is an indication of FIIs building in on their buy or sell positions over a couple of days. Looking at the return series, for the full period, only lag 1 of FII flows is significant in explaining returns. In sub-period 1, lag 1 and 2 of FII flows significantly explain returns. In period 2, again only lag 1 of FII flows is positively significant. Thus, past FII flows are positively related to returns.

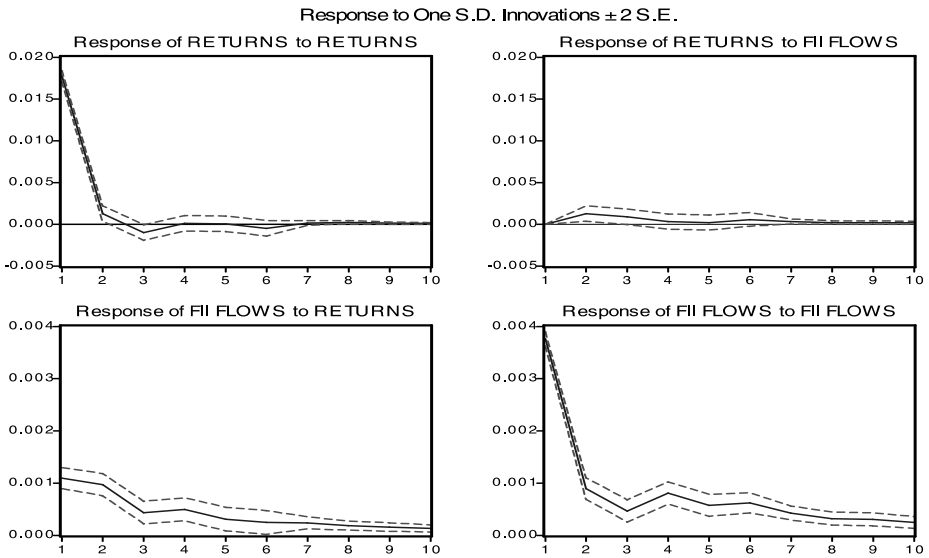
Table 5: Estimation for Vector Autoregressive Model

	VAR (Full Period)		VAR (Sub-Period 1)		VAR (Sub-Period 2)	
	FII FLOWS	**RETURNS**	**FII FLOWS**	**RETURNS**	**FII FLOWS**	**RETURNS**
FII FLOWS						
Lag 1	0.2375(-8.76)*	0.3398(-2.77)**	0.2275(-7.57)*	0.2448(-2.31)**	0.1839(-2.69)**	1.3099(-1.76)***
Lag 2	0.0533(-1.92)***	0.1375(-1.09)	0.0677(-2.23)**	0.1852(-1.73)***	-0.1305(-1.94)***	-0.8338(-1.14)
Lag 3	0.1615(-5.91)*	0.0228(-0.18)	0.1511(-4.99)*	-0.0940(-0.88)	0.1303(-1.94)***	1.0205(-1.39)
Lag 4	0.0482(-1.75)***	-0.0248(-0.19)	0.0556(-1.89)***	-0.0674(-0.65)	0.0173(-0.28)	-0.4618(-0.69)
Lag 5	0.0816(-3.10)*	0.0814(-0.68)	-	-	-	-
RETURNS						
Lag 1	0.0399(-6.65)*	0.0506(-1.86)***	0.0455(-5.34)*	0.0505(-1.68)***	0.0326(-5.23)*	0.0170(-0.25)
Lag 2	0.0054(-0.88)	-0.0868(-3.15)*	0.0012(-0.14)	-0.1184(-3.90)*	0.0169(-2.59)**	-0.0459(-0.64)
Lag 3	0.0111(-1.82)***	-0.0027(-0.09)	0.0166(-1.93)***	0.0364(-1.19)	0.0111(-1.71)***	-0.0678(-0.95)
Lag 4	-0.0029(-0.49)	-0.0143(-0.52)	0.0031(-0.35)	0.0571(-1.87)***	-0.0051(-0.79)	-0.1221(-1.73)***
Lag 5	-0.0027(-0.45)	-0.0400(-1.46)	-	-	-	-
C	0.0006(-5.18) *	-0.0001(-0.20)	0.0009(-6.47)*	0.0009(-1.65)***	-0.0004(-2.74)**	-0.0021(-1.25)
Adj R-square	*0.226*	*0.012*	*0.182*	*0.021*	*0.220*	*0.006*
Determinant Residual Covariance		4.46E-09		3.52E-09		3.27E-09
Log Likelihood		10007.83		8218.86		1954.56
Akaike Information Criteria		-13.52		-13.75		-13.73

-Figures in the brackets are t-statistics
*, ** and *** denotes statistically significance at 1, 5 and 10% level respectively

Figure below gives the impulse response to one standard deviation innovation in daily FII flows and stock returns over the full period. The dotted red lines around the estimates of the impulse response are the 2 SD band. If this band excludes zero, then we can say that the effect is significant. A one standard deviation impulse in FII flows has a positive and significant effect on stock returns till about the end of the second day. Though it remains to be positive after this, it includes zero thus making the effect insignificant. In other words, the response of returns to FII flows is short lived and dies very quickly. A one standard deviation impulse in stock returns innovation has a positive and clearly significant effect on FII flows which lasts up unto the tenth day. Babu and Prabeesh (2008) observed similar results and attributed it to the 'return chasing behaviour by the FIIs.'

We conclude that a shock in stock returns produces a more lasting affect on FII investments than vice versa, confirming that the foreign institutional investments are more stock return driven.



c. Base Broadening Hypothesis

To test for base-broadening hypothesis and positive feedback hypothesis, we need to generate the expected and unexpected scaled FII flows series as explained in the methodology above. For this, we use daily data for 2001-2002 to estimate a best fit AR model for scaled FII flows. Based on the results, we use AR(3) to estimate expected net scaled FII flows[5]. Using these coefficients, we get the expected values of FII flows over 2003-08. The unexpected flows are actual values minus expected values.

Table 6: Regression Results for base-broadening Hypothesis

Dependant Variable: Returns	Entire period	Sub-period 1	Sub-period 2
Independent Variables:			
Constant	-0.0002(-0.46)	0.0001(0.23)	0.0024(1.49)
Expected FII Flows	0.4686(1.39)	0.4750(1.54)	-0.0310(-0.01)
Unexpected FII Flows	1.2482(11.24)*	0.9219(9.39)*	4.5466(8.47)*
Adj R-square	0.083	0.072	0.196
Durbin Watson Statistic	1.996	1.989	2.208
F-statistic	68.350 [0.000]	47.707 [0.000]	35.944 [0.000]

-Figures in round brackets are t-stats and those in square brackets are p-values
*, ** and *** denotes statistically significance at 1, 5 and 10% level respectively

The results of the test for this hypothesis are reported in Table-6. Observing the results for the entire period, we find the effect of unexpected flows on returns to be positively significant at the 1% level and the effect of the expected flows on the returns to be insignificant. The results remain unchanged for sub-period 1 and sub-period 2. Therefore, we reject the null hypothesis of no base broadening in the Indian market during the period 2003-2008. This significant relationship between unexpected flows and returns is consistent with the result that Ananthanarayanan et al (2005) reported for the period 1993-2003.

Any securities market is said to be able to discover prices efficiently when there are enough investors in the market holding different view on the direction of a particular stock or the market index as a whole. Inclusion of FIIs as another category of investors has brought in such diversification of view, leading to increase in efficiency of the markets and to a permanent increase in the equity share prices as evidenced by the results of base-broadening hypothesis we have reported here.

d. Price Pressure Hypothesis

The results for this hypothesis as an alternative to base broadening hypothesis fails to detect evidence of price pressure with daily data. For the full period, as well as the two sub-periods, the lagged unexpected FII flows are positive and statistically insignificant (expect for positively significant lag 2 in period 1) in explaining returns. We can possibly explain this result of returns not returning to original levels once there is unexpected FII inflows and returns rise by the fact that market participants may be trying to learn the correct magnitude of the initial rise in demand, following unexpected FII inflows in the first period. (Clark and Berko, 1997).

Table 7: Regression Results for Price Pressure Hypothesis

Dependant Variable: Returns	Entire period	Sub-period 1	Sub-period 2
Independent Variables:			
Constant	0.0002(0.46)	0.0006(1.49)	0.0021(1.28)
Unexpected FII Flows	1.244(11.21)*	0.9240(9.43)*	4.5286(8.18)*
Unexpected FII Flows(-1)	0.1815(1.62)	0.1435(1.45)	0.1243(0.22)
Unexpected FII Flows(-2)	0.1181(1.05)	0.1675(1.71)***	-0.2857(-0.51)
Unexpected FII Flows(-3)	0.0076(0.06)	-	-
Adj R-square	0.083	0.073	0.197
Durbin Watson Statistic	1.997	1.991	2.208
F statistic	34.701[0.000]	32.872[0.000]	24.279[0.000]

-Figures in round brackets are t-stats and those in square brackets are p-values
*, ** and *** denotes statistically significance at 1, 5 and 10% level respectively

Thus, we find that price rises associated with FII inflows into the country are more permanent in nature (base-broadening hypothesis accepted) and not temporary (price-pressure hypothesis rejected).

e. Positive Feedback Hypothesis

Table-8 gives the regression results of unexpected FII flows on lagged daily Nifty returns to test for positive feedback trading. We find that returns upto lag 3 are significant in explaining unexpected FII flows for the entire period data. Sub-period 1 shows significant results at lag 1 and 3 and sub-period 2 shows significant effect of returns on flows upto lag 3. Thus, our results confirm existence of positive feedback trading among FIIs, reinforcing the results we got in the VAR framework where, FII flows included both expected and unexpected

[5] AR(3) Model has been chosen by looking at the correlelogram and further, confirming the best fit model by looking for the least SIC value.

Table 8: Regression Results for Positive Feedback Hypothesis			
Dependant Variable: Unexpected FII Flows	**Entire period**	**Sub-period 1**	**Sub-period 2**
Independent Variables:			
Constant	0.0002(2.13)**	0.0004(3.52)*	-0.0008 (-6.29)*
Returns	0.0628(11.32)*	0.0738(9.33)*	0.0432(8.72)*
Returns(-1)	0.0400(7.18)*	0.0450(5.68)*	0.0293(5.91)*
Returns(-2)	0.0108(1.95)***	0.0098(1.24)	0.0084(1.70)***
Returns(-3)	0.0138(2.49)**	0.0164(2.07)**	0.0046 (0.93)
Adj R-square	0.118	0.097	0.295
Durbin Watson Statistic	1.886	1.918	2.042
F statistic	50.678[0.0000]	33.221[0.0000]	40.477[0.0000]
-Figures in round brackets are t-stats and those in square brackets are p-values *, ** and *** denotes statistically significance at 1, 5 and 10% level respectively			

components. Batra (2003) also detected positive feedback trading with daily data.

CONCLUSIONS

There is a public perception that the investments by the FIIs are driving the market. However, looking at some numbers as quoted in the paper; FIIs do not seem to be having any large share in the stock market activity in the country. They contribute to only 18% of total turnover on the National stock exchange and the market capitalization of their holdings on the exchange is 15% of the total market capitalization.

With our study, we updated the previous studies on FII investment dynamics in the country capturing the latest trends till December 2008. Particular emphasis was on getting an insight into the FII activity following the period starting in November 2007 when the sub-prime crisis was seen to be spreading throughout the world.

Over the period of our analysis, 2003-2008, we find two way Granger Causality between FII flows and stock market returns. However, during the period November 2007 to December 2008, we find that FII flows do not Granger cause returns on the Nifty. Thus, when the markets were generally in the downward trend following the global financial crisis, FIIs did not seem to be the cause for the same. Our results refute the common myth that periods of crisis are accentuated generally by FII outflows. An analysis of FII flows and stock market returns using the VAR framework shows that FII flows are predicted by the previous days stock returns and are also significantly related to their own past flows. Impact of FII inflows on returns lasts only upto one or two days beyond which it is statistically insignificant.

We then break up the FII flows into expected and unexpected components to test for dynamics of FII flows. Our results show that while expected FII flows are factored in by the markets at an early stage itself, the unexpected FII investments in the country have led to broadening of the investor base, leading to reduction in risk premium and an increase in stock market returns. Thus, our study rejects the price-pressure hypothesis which posits that increase in prices following unexpected FII inflows is short lived and prices return to their original levels.

FIIs were found to be following positive feedback strategies with unexpected FII inflows being explained by past stock market returns. However, as per popular perception, these positive trading strategies may not be destabilizing. Batra (2003) examined this aspect and found no evidence of FII activity destabilizing the Indian markets. As noted by LSV (1992): *Positive feedback is destabilizing if it leads institutions to jump on the bandwagon and buy overpriced stocks and sell under priced stocks, thereby contributing to a further divergence of prices away from fundamentals. This trading strategy is not a necessarily destabilizing one and would in fact bring prices closer to fundamentals if stocks under react to news. (LSV 1992, p 26-27).*

Observing the results we have obtained in this study, there is no stark effect of the FII investments in the Indian stock market. We observed that there were no significant changes in the way FIIs tended to behave before and during the crisis period. Therefore, the question that arises from here is that why FIIs are blamed each time the market faces a crisis period, when statistically they do not seem to be an effect during crisis. Could it be that domestic investors tend to follow FII views and herd together causing the steep falls- due to which the FII have been facing the brunt? This study throws open these interesting questions which are beyond the scope of our paper but we suggest that these questions require further investigation.

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Inferences: The complexity inherent in the formation of a multi-tiered system of financial instruments has an exponential impact on the riskiness associated with the base security.

The force exerted will be the square of the level of further securitization, i.e., for the second level, the force exerted would increase four times, for the third level, the force exerted would increase nine times, and so on.

TO CONCLUDE WITH - A WORD OF CAUTION

Financial intermediaries and experts should hence exert an immense amount of care when designing financial products as it draws risk not just inherent to the security itself but from the environment generated due to repeated securitization. Risk assessment departments which were almost defunct for the past few years or took a backseat in the euphoria of growth and incomes should function as watch dogs and at the forefront of the financial structuring of securities. These departments need to be present at the financial institution and also at the credit rating agencies.

This paper was an effort to quantify the extent of risk faced by an underlying security through repeated securitization through sophisticated sounding nomenclatures. It drew a parallel from the physical-mechanical sciences to convey to the reader the immense challenges and risks underlying such a venture.

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