Foreign Institutional Investors and Security Returns: Evidence from Indian Stock Exchanges

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Abstract

India liberalized its financial markets by opening its doors to foreign institutional investors in September, 1992. We study this landmark event, by examining the impact of trading of Foreign Institutional Investors on the major stock indices of India. First, we find that unexpected flows have a greater impact than expected flows on stock indices. Second, we find strong evidence consistent with the base-broadening hypothesis. Third, we do not find any evidence that foreign institutional investors employ either momentum or contrarian strategies. Fourth, our findings support the price pressure hypothesis. Finally, the claim that foreigners' destabilize the market is not substantiated.

Keywords: Foreign institutional investors, momentum and contrarian strategies, destabilization

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Abstract

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1.0 Introduction

One of the outstanding features of globalization in the financial services industry is the increased access provided to non-local investors in several major stock markets of the world. Increasingly, stock markets from emerging markets permit institutional investors to trade in their domestic markets. This opening up of capital markets in emerging market countries has been perceived as beneficial by some researchers while others are concerned about possible adverse consequences such as contagion.

Clark and Berko (1997) emphasize the beneficial effects of allowing foreigners to trade in stock markets and outline the "base-broadening" hypothesis. The perceived advantages of base-broadening arise from an increase in the investor base and the consequent reduction in risk premium due to risk sharing. Other researchers and policy makers are more concerned about the attendant risks associated with the trading activities of foreign investors.[i] They are particularly concerned about the herding behavior of foreign institutions and the potential destabilization of emerging stock markets.

In this paper, we address these issues in the context of foreign institutional investors' (FII) trading activities in a big emerging market – India. India liberalized its financial markets and allowed FIIs to participate in their domestic markets in 1992. Ostensibly, this opening up resulted in a number of positive effects. First, the stock exchanges were forced to improve the quality of their trading and settlement procedures in accordance with the best practices of the world. Second, the information environment in India improved with the advent of major international financial institutional investors in India. On the negative side we need to consider potential destabilization as a result of the trading activity of foreign institutional investors. This is especially important in an emerging country that has embarked upon reforms to open up its market.

The rest of the paper is organized as follows. The next section describes details of Foreign Institutional Investors and their trading activities in India. The third section reviews past literature and develops the hypotheses. Section 4 provides details regarding the various data sources used in the study and outlines the methodology. In section 5 we look at the empirical findings, followed by conclusions in section 6.

2.0 Foreign Institutional Investors in India

India opened her doors to foreign institutional investors in September, 1992. This event represents a landmark event since it resulted in effectively globalizing its financial services industry.[ii] Initially, pension funds, mutual finds, investment trusts, Asset Management Companies, nominee companies and incorporated/institutional portfolio managers were permitted to invest directly in the Indian stock markets. Beginning 1996-97, the group was expanded to include registered university funds, endowment, foundations, charitable trusts and charitable. Since then, FII flows which form a part of foreign portfolio investments have been steadily growing in importance in India.

Figure 1 shows that other than in the year 1998, the net flows have been positive. The nuclear tests and East Asian crisis did slow down the flows but as stated by Gordan and Gupta (2003), their effects were short lived. Figure 2 shows that as percentage of total net turnover of BSE, the share of average of FII sales and purchases increased from 2.6 percent in 1998 to 5.5 percent in 2002.[iii] The cumulative net FII investment in India as on August 2003 is approximately $17400 million. As of August 2003 net FII investment was 9 percent of the BSE market capitalization which is small compared to the size of the market. However, in the words of Banaji (2002), it is not the market capitalization that matters but what is important is the level of the free float, that is, the shares that are actually publicly available for trading. With floating stock in the Indian market being less than 25 percent, about 35 percent[iv] of the

free float available has been bagged by FIIs - despite the fact that they invest in just a few highly liquid stocks.

Figure 1

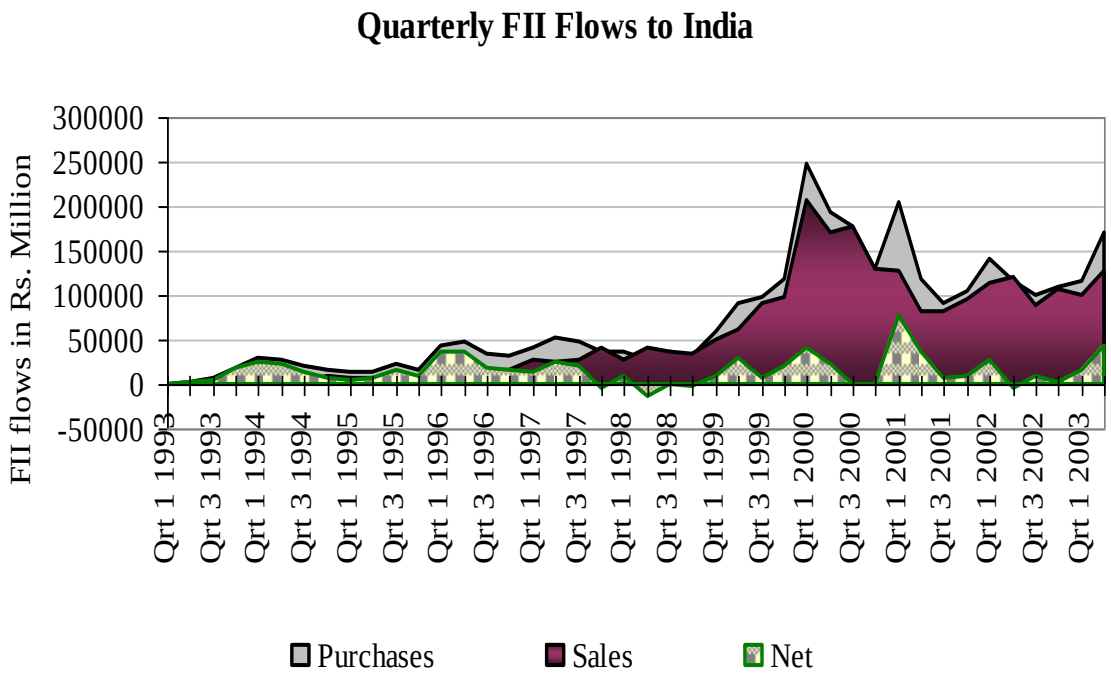
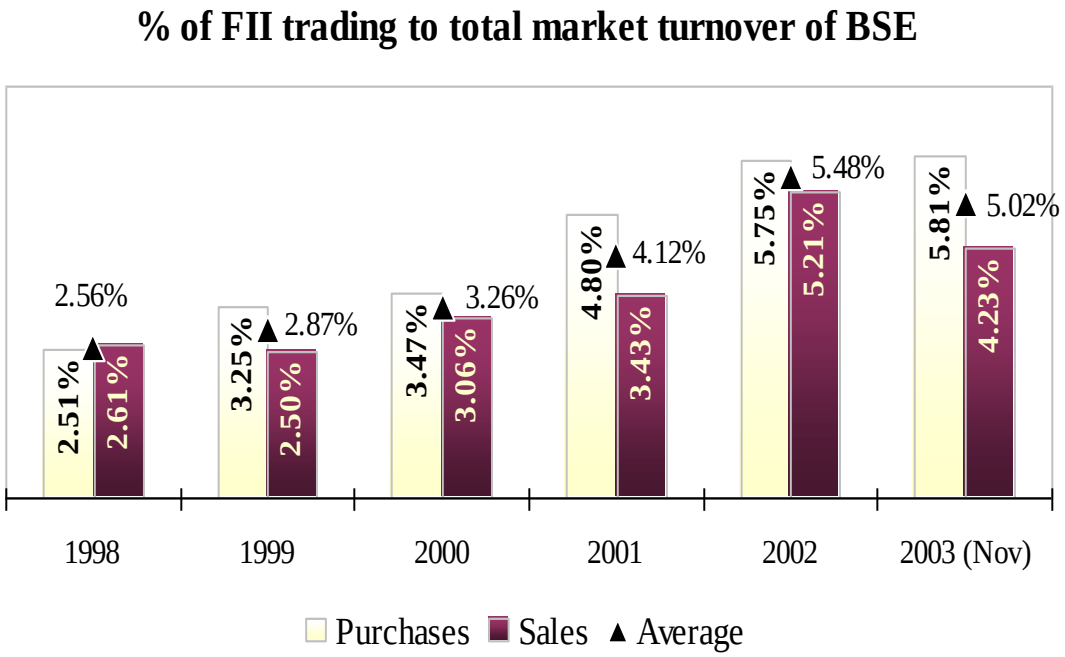


Figure 2



Source: Bombay Stock Exchange

Though India receives hardly 1 percent of the FII investments in emerging markets[v], the portfolio flows to India have been less volatile when compared with that of many other emerging markets (Gordan and Gupta, 2003). FIIs by adopting a bottom-up approach seem to invest in top-quality, high growth, large cap stocks (Gordan and Gupta, 2003). Sytse et al. (2003) provide empirical evidence that foreign institutional investors in India, invest in large, liquid companies which enable them to exit their positions quickly at relatively lower cost and also that the foreign institutional owners have a larger impact than foreign corporate owners when performance is measured using stock market valuation criterion.

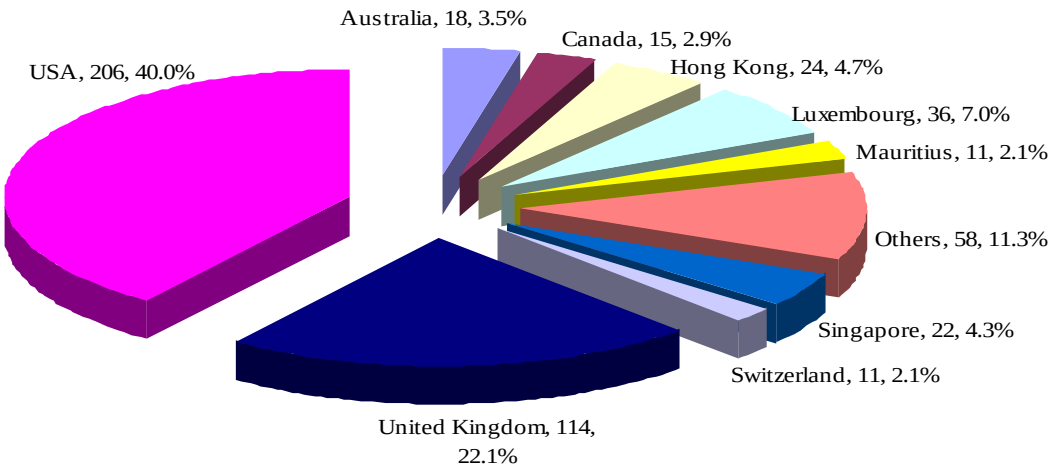
Given that India is one of the fastest growing economies in South Asia, promising a growth of over 6 percent, second only to China, it would not be a surprise to see increased FII flows to India in the future. FIIs are now looking at the economy as a whole, with the macro-economic factors also playing their role in attracting foreign investors. Factors like a strong currency, key reforms in the banking, power and telecommunications sector, increased consumer spending and stable policies are expected to play a major role in attracting FIIs to India. The Securities Exchange Board of India (SEBI) along with the Institute of Chartered Accountants of India (ICAI) jointly monitor the markets and announces the regulatory measures thus making the Indian companies more transparent and more disciplined.

According to the April 2001 report on corporate governance by CLSA Emerging Markets, India ranks fourth with a score of 55.6 percent. Banaji (2000) emphasizes that the capital market reforms like improved market transparency, automation, dematerialization and regulations on reporting and disclosure standards were initiated because of the presence of the FIIs. But FII flows can be considered both as the cause and the effect of capital market reforms. The market reforms were initiated because of the presence of FIIs and this in turn has lead to increased flows.

The Government of India gave preferential treatment to FIIs till 1999-2000 by subjecting their long term capital gains to lower tax rate of 10 percent while the domestic investors had to pay higher long-term capital gains tax. The Indo-Mauritius Double Taxation Avoidance Convention 2000 (DTAC), exempts Mauritius-based entities from paying capital gains tax in India - including tax on income arising from the sale of shares. This gives an incentive for foreign investors to invest in Indian markets taking the Mauritius route. Consequently, we now see investments coming from Mauritius while there were none before 2000.

Figure 3

Countrywise breakdown of FIIs registered in India (Nov 2003)



Source: Securities Exchange Board of India

Figure 3 gives the country wise distribution of the FIIs registered in India, with majority of them coming from USA and UK. Chakrabarti (2002) and Rao et al. (1999) point out the fact that due to existing inter-linkages, the source of the FII investment might not be the country from where the institution operates. Nevertheless, the figure gives us an idea of the country wise distribution of the FIIs in India. So as to encourage long term investments in the Indian market, Budget 2003 proposed that investors who buy stocks of listed companies from March 1, 2003 be exempt from paying tax on the gains they make on their investments,

provided they hold them for more than one year. With so much to benefit from, the FII investment in India is likely to increase in the future.

3.0 Hypotheses and Research Methodology

In this study on the inter-relationship between FII flows and domestic market returns, we first test for the existence of base-broadening hypothesis. We then test for the existence of price-pressure and feedback trading hypothesis, which can also explain the high correlation between returns and contemporaneous flows and provide evidence regarding market efficiency.

3.1 Base-broadening Hypothesis

The theory behind the base-broadening hypothesis suggests that the expansion of investor base to include foreign investors leads to increased diversification followed by reduced risk and consequently lowering the required risk premium. Thus there is a permanent increase in the equity share price through risk pooling (Merton, 1987). Warther (1995) finds evidence in favor of base-broadening hypothesis in his study on the relation between aggregate mutual fund flows in U.S and security returns. Clark and Berko (1997) also find similar relation between foreign equity purchases in Mexico and market returns. Our study concerning the FII flows and market returns begins with the test for existence of base-broadening hypothesis in India, which is an emerging market. The basic regression equation takes the following form.

$$R_{it} = \beta_0 + \beta_1 \frac{Flow_t}{MarketCap_{i,t-1}} \qquad (1)$$

where,

R_{it} =Return from market *i* at time *t*

$Flow_t$ = FII flow at time *t*

$MarketCap_{i,t-1}$ - Market capitalization of market *i* at time t-1.

H_0: $\beta_1 = 0$ and H_a: $\beta_1 > 0$. We expect to reject the null hypothesis if base-broadening hypothesis holds.

3.2 Expected and Unexpected Flows

We separate the flows into expected and unexpected flows, using time-series models to estimate expected flows and then investigate the correlation of the two components with market returns. Based on the regression results of the scaled flows on the lagged scaled flows and the Lagrange Multiplier test for first-order autocorrelation in the residuals we fit a AR(2) model for purchases, a AR(3) model for sales and a AR(1) model for net flows. Unexpected flows are computed by subtracting expected flows from actual flows. We expect to find significant positive correlation between returns and unexpected inflows. The reasoning behind this is that the expected flows should not be influencing the returns as these flows are anticipated by the market. An efficient market should not react to anticipated flows. It is the shock brought in by the surprise of the unanticipated flows to which the market should react.

Clark and Berko (1997) argue that even if base-broadening hypothesis holds, the β_1 coefficient from regression (1) is likely to underestimate the impact of foreign inflows on the host country's stock prices. Further, based on the efficient market hypothesis the price of the assets at the start of the period should reveal the available information at the start of the period. Thus, anticipated foreign demand will push the prices up. But investors would then be unsure of the magnitude of the flows and this will lead to expectational revisions about the evolution of investor base and not actual change in investor base as and when new information arrives. Therefore, the returns should be actually regressed on these expectational revisions. But such revisions are not directly observable. Estimating the expected flows and then reducing it from the actual flows is the best available alternative for expectational revision. This proposition, established by Clark and Berko (1997) is the motivation behind

separating the expected and unexpected components of flows in our analyses. Moreover, the high autocorrelation seen in the flows imply that they are highly predictable.

Warther (1995) and Remelona et al. (1997) document that unexpected shocks to mutual fund flows in U.S have a strongly positive contemporaneous effect on returns, in line with the findings of Clark and Berko (1997) who report positive significant relation between concurrent returns and foreign equity purchases in Mexico.

Given that we now have expected and unexpected flows in our analyses, the regression equation (1) takes the following form.

$$R_{it} = \beta_0 + \beta_1 E_t\left[\frac{Flow_t}{MarketCap_{i,t-1}}\right] + \beta_2 U_t\left[\frac{Flow_t}{MarketCap_{i,t-1}}\right] \qquad (2)$$

where,

R_{it} = Return from market *i* at time *t*

$U_t(Flow_t / MarketCap_{i,t-1})$ = Unexpected FII flow at time *t*, being equal to actual scaled flow minus expected flow

$E_t(Flow_t / MarketCap_{i,t-1})$ = Expected FII flow at time *t*.

H_0: $\beta_1, \beta_2 = 0$ and H_a: $\beta_1 \geq 0$, $\beta_2 > 0$.

If we are able to accurately measure the expected flows, β_1 should be equal to zero as the market is not expected to react to the expected flows. However, that may not be the case as we are adopting an estimation technique. As mentioned by Clark and Berko (1997), it is possible that estimated expected flows may include some unexpected components of flow. We expect to reject the null hypothesis in favor of significant positive relation between unexpected flows and returns.

3.3 Feedback Trader Hypothesis

To investigate the positive correlation between returns and flows further, we consider the feedback trader hypothesis and price pressure hypothesis. Investors who base their portfolio decisions on the expectations, which are in turn based on past returns, are termed as feedback or momentum traders**.** The positive feedback-trader hypothesis posits that FIIs

move money into the market in response to the increasing returns at the market, that is, the flow must lag returns. On the other hand, negative feedback trading suggests that investors buy when prices are low and sell after prices increase. We have the following regression equation to test the feedback trader hypothesis.

$$U_t\left[\frac{Flow_t}{MarketCap_{i,t-1}}\right] = \beta_0 + \beta_1 R_{it} + \beta_2 R_{i,t-1} + \beta_3 R_{i,t-2} \qquad (3)$$

where,
R_{it} = Return from market *i* at time *t*
$U_t(Flow_t / MarketCap_{i,t-1})$ = Unexpected FII flow at time *t*, being equal to actual scaled flow minus expected flow

Alternative 1 - H_0: $\beta_2, \beta_3 = 0$ and H_a: $\beta_2, \beta_3 > 0$.
Alternative 2 - H_0: $\beta_2, \beta_3 = 0$ and H_a: $\beta_2, \beta_3 < 0$.

The alternate hypothesis suggests that feedback trading could be either positive or negative. If the positive feedback trader hypothesis holds the coefficients for purchases and net flows will be significantly positive as shown in Alternative 1 and in case of negative feedback trading, we expect to see significant negative coefficients as given by Alternative 2.

3.4 Price Pressure Hypothesis

The rationale behind this hypothesis is that the shocks from increased flows generate expectations of additional future flows. This expectation is reflected by the current price increase followed by increase in expected future flows. When the expected flows do not materialize in the future, the prices fall (Froot et al., 2001). The theory of price pressure hypothesis suggests that the rise in prices is associated with increased inflows; based on this we expect to see prices return to the fundamental when the actual flows do not match the expected flows. Warther (1995) posits that the rise in prices caused by inflow surges are due to temporary illiquidity and such a theory predicts that the prices would return to fundamentals. This theory seems appropriate in the context of an emerging market like India. We test the price-pressure hypothesis using the following equation.

$$R_{it} = \beta_0 + \beta_1 U_t \left[\frac{Flow_t}{MarketCap_{i,t-1}} \right] + \beta_2 U_{t-1} \left[\frac{Flow_{t-1}}{MarketCap_{i,t-2}} \right] + \beta_3 U_{t-2} \left[\frac{Flow_{t-2}}{MarketCap_{i,t-3}} \right] \quad (4)$$

where,

R_{it} = Return from market *i* at time *t*

$U_t(Flow_t / MarketCap_{i,t-1})$ = Unexpected FII flow at time *t*, being equal to actual scaled flow minus expected flow

H_0: $\beta_2, \beta_3 = 0$ and H_a: $\beta_2, \beta_3 < 0$.

If the price pressure hypothesis holds, the coefficients of lagged unexpected flows would be negative and significant.

In contrast to the direct relation between purchases/net flows and returns, we expect sales and returns to be inversely related. Accordingly, each of the alternate hypotheses mentioned above takes the opposite sign for the relationship between sales and market returns.

4.0 Data description and source

We obtain the aggregate monthly FII flow data from the time India opened her doors to FIIs, that is, from January 1993 to June 2003 from India Infoline and Equity Master. We also have data on each of the three components of the flows, that is, the purchases, sales and the net flows (purchases less sales) with the markets returns. The Reserve Bank of India and the Securities Exchange Board of India also provide the data on FII flows. We look at the relationship between flows and market returns using both, the returns on the Bombay stock exchange (BSE) and National stock exchange (NSE). The data on market index is obtained from the respective stock exchanges. The return for market *i* for month *t* would be given by;

$$R_{it} = \log P_{it} - \log P_{i,t-1}$$

R_{it} = Return from market *i* at time *t*.

$P_{it}, P_{i,t-1}$ represent *i* market's index at the end of month *t* and *t-1*, respectively.

Established in 1875, BSE is not only the oldest stock exchange in India, but is also the oldest in Asia. It accounts for over one-third of the total trading volume in the country. The

National Stock Exchange (NSE), located in Bombay, was set up in 1993 to encourage stock exchange reform through system modernization and competition. It opened for trading in mid-1994. Since then the NSE has made major strides and is now the dominant stock exchange in the country. Most other studies on Indian market use the BSE Sensex index to compute market returns. With NSE being an equally prominent stock exchange in India, we also use the S&P CNX Nifty index to compute returns. Between the two exchanges, NSE being demutualized provides a better market quality. With lower execution cost, lower price volatility and higher liquidity compared to BSE, NSE has emerged to be superior by providing improved market quality and high standards of investor protection (Krishnamurti et al. 2003).

BSE Sensex is a basket of 30 constituent stocks representing a sample of large, liquid and representative companies. The base year of SENSEX is 1978-79 and the base value is 100. The index is widely reported in both domestic and international markets through print as well as electronic media. The Index was initially calculated based on the 'Full-market capitalization' methodology but was shifted to the 'Free-float methodology' with effect from September 1, 2003. Under the 'Full-market capitalization' methodology, the total market capitalization of a company, irrespective of who is holding the shares, is taken into consideration for computation of an index. Recognizing the limitation with this methodology, BSE now uses the Free-float market capitalization of a company for index calculation, like MSCI, FTSE, S&P and Dow Jones. Using 'Free-float methodology', generally excludes promoters' holding, government holding, strategic holding and other locked-in shares, which are not tradable in the normal course. Thus, the market capitalization of each company in a Free-float index is reduced to the extent of its Free-float available in the market.

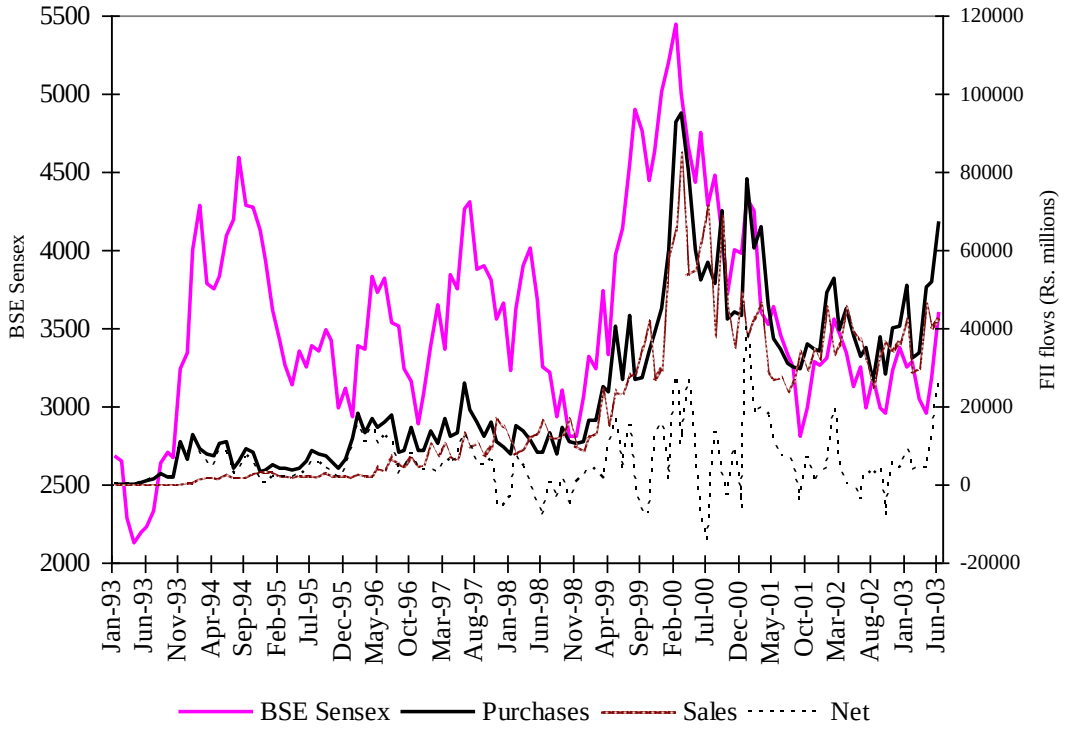
S&P CNX Nifty is a well diversified 50 stock index accounting for 23 sectors of the economy. S&P CNX Nifty is computed using market capitalization weighted method,

wherein the level of the index reflects the total market value of all the stocks in the index relative to a particular base period. The method also takes into account constituent changes in the index and importantly corporate actions such as stock splits, rights, etc without affecting the index value. The base period selected for S&P CNX Nifty index is the close of prices on November 3, 1995, which marks the completion of one year of operations of NSE's Capital Market Segment. The base value of the index has been set at 1000 and a base capital of Rs.2.06 trillion.

The stocks in these indices, both BSE Sensex and S&P CNX Nifty, are the ones in which the FIIs are most likely to invest in. Figure 4 shows the movement of BSE Sensex with FII flows starting January 1993. Figure 5 shows the same relation between S&P CNX Nifty and flows. The purchases and sales seem to be more correlated with the indices from late 90's.

Figure 4

BSE Sensex and FII Flows



We scale the flows for the month by market capitalization at the beginning of the month, that is, market capitalization as at the end of previous month. Regressions looking at relationship between BSE returns and flows have flows normalized by BSE market capitalization. For analyzing the relationship between NSE returns and flows, we scale the flows by NSE market capitalization. With the monthly BSE market capitalization data available from April 1993; we have the scaled flows starting May 1993 to June 2003 giving us scaled flow data for 122 months. The monthly market capitalization data for NSE is available from November 1994, giving the scaled flows from December 1994 to June 2003. Therefore, with the scaled flow data for 103 months the sample size becomes smaller for the analysis using NSE returns. The data on market capitalization has been taken from the respective stock exchange websites.[vi]

Figure 5

S&P CNX Nifty and FII Flows

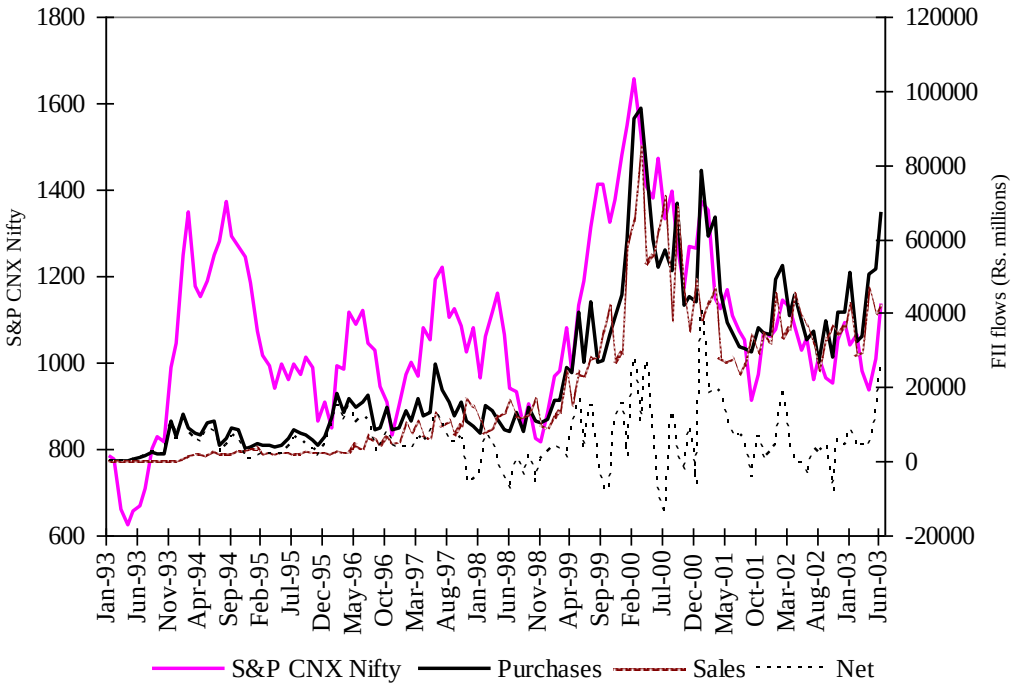
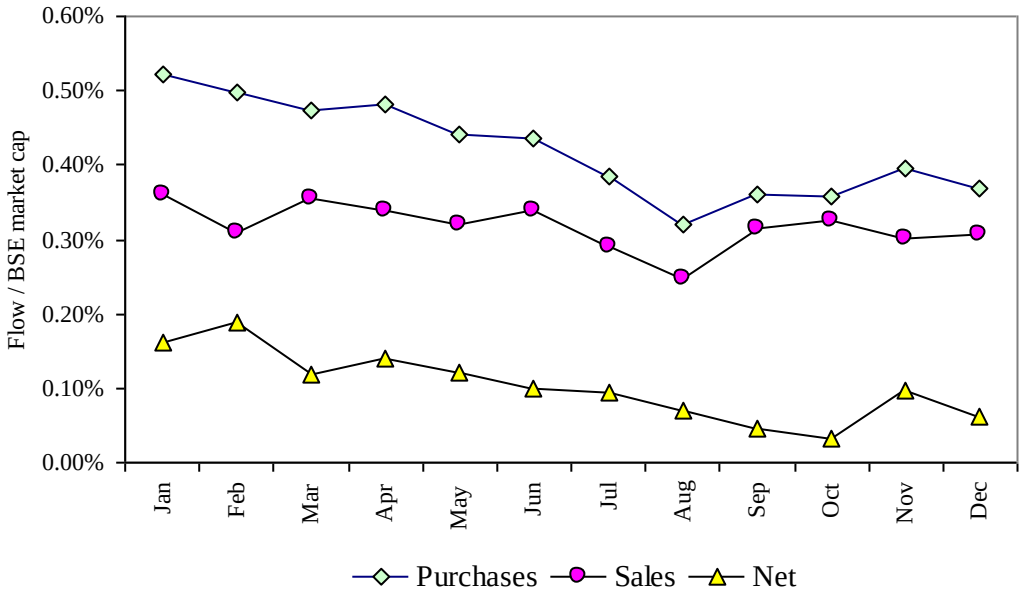


Figure 6 shows the seasonal pattern in the average monthly FII flows (scaled) to India. Consistent with Rao et al. (1999) the graph shows that the month of January witnesses the

highest inflow and the flow (especially purchases) decreases as the year progresses. The fund managers might be investing most of the funds allocated to a market, at the beginning of the year and the investment reduces subsequently with the reduction in availability of funds. Rao et al. (1999) make an interesting observation that BSE Sensex and FII investments decline in the fourth quarter and this may be because the local market players might be looking toward FIIs for leads.

Figure 6

Average monthly FII flows (May 1993- June 2003)



The summary statistics for the scaled flows are given in Table 1. The mean value of purchases is highest as it should be. The autocorrelation of the flows, especially purchases and sales is very high suggesting that the flows are persistent. The results of the normality test are reported in Table 2. The Jarque-Bera test statistic rejects the null hypothesis of normality at 1 percent level for the flows scaled by BSE market capitalization. The flows scaled by NSE market capitalization and the market return pass the test for normality. To test the stationarity of the series we perform the Augmented Dickey-Fuller (ADF) and Phillips-Perron test. The results of the same are reported in Table 3. The ADF test results show that

the scaled sales to be non-stationary series. The other flows are stationary at various levels of significance. However, the Phillips-Perron test rejects the null hypothesis of unitroot in all cases.

Table 1- Summary statistics

Summary statistics for the scaled FII flows. Flows scaled by BSE market capitalization range from May 1993 to June 2003 and flows scaled by NSE market capitalization range from December 1994 to June 2003.

Scaled flows	Obs.	Mean	Median	Std.dev	Autocorrelations		
					Lag 1	Lag 10	Lag 20
Scaled by BSE market capitalization							
Purchases	122	0.42%	0.33%	0.27%	0.83	0.63	0.42
Sales	122	0.32%	0.25%	0.26%	0.91	0.70	0.51
Net	122	0.10%	0.08%	0.13%	0.33	-0.02	0.00
Scaled by NSE market capitalization							
Purchases	103	0.47%	0.45%	0.25%	0.79	0.49	0.29
Sales	103	0.37%	0.39%	0.23%	0.87	0.61	0.37
Net	103	0.10%	0.08%	0.13%	0.35	0.00	-0.05

Table 2 - Normality Test Results

Flows scaled by BSE market capitalization range from May 1993 to June 2003 and flows scaled by NSE market capitalization range from November 1994 to June 2003.

	Obs.	Jarque-Bera	P-value
Scaled by BSE market capitalization			
Purchases	122	10.12	0.006
Sales	122	10.64	0.005
Net	122	16.36	0.000
Scaled by NSE market capitalization			
Purchases	103	5.52	0.063 [5]
Sales	103	6.06	0.048 [1]
Net	103	6.02	0.049 [1]
BSE Return	122	2.15	0.342 [5]
NSE Return	103	2.87	0.238 [5]

H_0 : Series is normally distributed

[1]and [5] denote significance at 1% and 5% levels respectively.

Table 3 - Unitroot Test Results

Flows scaled by BSE market capitalization range from May 1993 to June 2003 and flows scaled by NSE market capitalization range from November 1994 to June 2003.

	Obs.	ADF	P-value	Phillips-Perron	P-value
Scaled by BSE market capitalization					
Purchases	122	-3.33	0.0659	-5.42	0.0001
Sales	122	-2.58	0.2899	-5.84	0.0000
Net	122	-7.50	0.0000	-7.62	0.0000
Scaled by NSE market capitalization					
Purchases	103	-3.25	0.0804	-5.24	0.0002
Sales	103	-2.72	0.2309	-6.27	0.0000
Net	103	-6.54	0.0000	-6.59	0.0000
BSE Return	122	-11.40	0.0000	-11.40	0.0000
NSE Return	103	-10.60	0.0000	-10.62	0.0000

H_0 : Series has a unitroot

Having looked at the impact of the aggregate flow on the market, we extend our study by using the disaggregated flow data, to have a better understanding of the market reaction to the flows. The Bombay Stock Exchange gives the disaggregate flow data for BSE starting January 1998. We assume that the FIIs in India trade only through BSE and NSE. The other stock exchanges in India are comparatively inactive and the probability that FIIs might be trading only at these two exchanges is very high. Hence, we subtract the flow data at BSE from the aggregate flows (all India) to get the flows specific to NSE. This gives us the disaggregated flow data for 66 months. The disaggregated scaled flow data are normally distributed and stationary.[vii]

5. 0 Empirical Results

5.1 Econometric Issues

We use the Box-Jenkins diagnostics to identify the time-series properties before we estimate the expected flows. Table 4 presents the results of time-series regression of flows on lagged flows for the Bombay Stock Exchange. Panel A explains the results for scaled

Table 4 Regression of Flows on Lagged Flows - BSE

Panel A **Panel B** **Panel C**

Time-series regression of flows on lagged flows for the period June 1993 to June 2003. The flows at time t have been scaled by BSE market capitalization at time t-1 to get the scaled flows. Breusch Godfrey serial correlation Lagrange multiplier test is used to check the first-order autocorrelation in the residuals. Panel A presents regressions using purchases, Panel B using sales and Panel C using net flows. Numbers in parentheses are t-statistics.

	Regression (1)	(2)	(3)
Independent variables			
Constant	0.0006 [1]	0.0004 [10]	0.0004 [10]
	(2.67)	(1.83)	(1.79)
Purchases			
Lag1	0.8685 [1]	0.5280 [1]	0.5294 [1]
	(18.27)	(6.18)	(5.65)
Lag2		0.3994 [1]	0.4012 [1]
		(4.65)	(4.04)
Lag3			(-0.0038)
			(-0.04)
Lag4			
R^2 (adjusted)	0.73	0.77	0.77
Observations	121	120	119
LM	21.80 [1]	0.00	1.17
LM test (p-value)	(0.000)	(0.969)	(0.281)
H_0: no autocorrelation			

	Regression (1)	(2)	(3)	(4)
Independent variables				
Constant	0.0003 [10]	0.0002	0.0002	0.0002
	(2.09)	(1.64)	(1.51)	(1.51)
Sales				
Lag1	0.9175 [1]	0.5375 [1]	0.3979 [1]	0.3741 [1]
	(25.20)	(6.38)	(4.50)	(3.99)
Lag2		0.4143 [1]	0.2390 [1]	0.2200 [1]
		(4.91)	(2.57)	(2.28)
Lag3			0.3336 [1]	0.3004 [1]
			(3.73)	(3.03)
Lag4				0.0778
				(0.80)
R^2 (adjusted)	0.84	0.87	0.88	0.88
Observations	121	120	119	118
LM	24.37 [1]	14.08 [1]	0.65	0.72
LM test (p-value)	(0.000)	(0.000)	(0.422)	(0.397)
H_0: no autocorrelation				

	Regression (1)	(2)	(3)
Independent variables			
Constant	0.0007 [1]	0.0006 [1]	0.0006 [1]
	(4.82)	(3.65)	(3.60)
Net			
Lag1	0.3434 [1]	0.2807 [1]	0.2909 [1]
	(3.90)	(3.04)	(3.06)
Lag2		0.1890 [10]	0.2029 [10]
		(2.04)	(2.10)
Lag3			-0.0519
			(-0.54)
Lag4			
R^2 (adjusted)	0.11	0.13	0.12
Observations	121	120	119
LM	4.21 [10]	0.30	0.01
LM test (p-value)	(0.043)	(0.587)	(0.917)
H_0: no autocorrelation			

[1], [5] and [10] denote significance at 1%, 5% and 10% levels respectively.

purchases, Panel B for scaled sales and Panel C for scaled net flows. With respect to scaled purchases and net flows the first and second lags are statistically significant and the third lag is insignificant. We use the Lagrange Multiplier test to check for first-order autocorrelation in the residuals. The results are reported at the bottom of Table 4. For scaled purchases and net flows, regression (1) shows significantly autocorrelated residuals, while regression (2) does not. Based on the results, we use AR(2) model to estimate expected purchases and net flows. In Panel B, the first three lags are statistically significant and the fourth lag is insignificant. The result of Lagrange Multiplier test shows the residuals of regression (1) and (2) to be significantly auto correlated. Hence, we use AR(3) model to estimate expected sales. Table 5 shows the results for flows scaled by NSE market capitalization. The results are similar to what we see in the case of flows scaled by BSE market capitalization. We estimate the respective coefficients (AR(3) for sales and AR(2) for purchases and net flows), using half the sample and then estimate the expected flows for the other half, using the AR coefficients. Subtracting the expected flows from actual scaled flows gives the unexpected flows for our analyses. The expected and unexpected flow data for analyses with BSE returns range from

June 1998 to June 2003. The flow data being examined with NSE returns range from March 1999 to June 2003.

Table 5 Regression of flows on lagged flows - NSE

Panel A **Panel B** **Panel C**

Time-series regression of flows on lagged flows for the period December 1994 to June 2003. The flows at time t have been scaled by NSE market capitalization at time t-1 to get the scaled flows. Breusch-Godfrey serial correlation Lagrange multipier test is used to check the first-order autocorrelation in the residuals. Panel A presents regressions using purchases, Panel B using sales and Panel C using net flows. Numbers in parentheses are t-statistics.

	Regression (1)	(2)	(3)
Independent variables			
Constant	0.0008 [1]	0.0005 [10]	0.0006 [10]
	(2.75)	(1.74)	(1.83)
Purchases			
Lag1	0.8385 [1]	0.5276 [1]	0.5409 [1]
	(14.28)	(5.59)	(5.26)
Lag2		0.3864 [1]	0.4033 [1]
		(4.04)	(5.59)
Lag3			-0.0399
			(-0.38)
Lag4			
R^2(adjusted)	0.67	0.71	0.70
Observations	102	101	100
LM	16.54 [1]	0.12	0.03
LM test (p-value)	(0.000)	(0.727)	(0.853)
H_0: no autocorrelation			

	Regression (1)	(2)	(3)	(4)
Independent variables				
	0.0005 [1]	0.0003 [10]	0.0003	0.0003
	(2.36)	(1.68)	(1.44)	(1.45)
Sales				
Lag1	0.8827 [1]	0.5207 [1]	0.3842 [1]	0.3500 [1]
	(18.56)	(5.65)	(3.96)	(3.42)
Lag2		0.4128 [1]	0.2501 [1]	0.2238 [1]
		(4.45)	(2.47)	(2.13)
Lag3			0.3255 [1]	0.2832 [1]
			(3.30)	(2.61)
Lag4				0.1051
				(-0.97)
R^2(adjusted)	0.77	0.81	0.83	0.82
Observations	102	101	100	99
LM	20.14 [1]	11.32 [1]	1.15	0.94
LM test (p-value)	(0.000)	(0.001)	(0.287)	(0.334)
H_0: no autocorrelation				

	Regression (1)	(2)	(3)
Independent variables			
Constant	0.0006 [1]	0.0005 [1]	0.0006 [1]
	(4.12)	(3.20)	(3.23)
Net			
Lag1	0.3709 [1]	0.3087 [1]	0.3217 [1]
	(3.87)	(3.03)	(3.07)
Lag2		0.1769 [10]	0.1966 [10]
		(1.73)	(1.83)
Lag3			-0.0708
			(-0.67)
Lag4			
R^2(adjusted)	0.12	0.14	0.13
Observations	102	101	100
LM	3.03 [10]	0.44	0.00
LM test (p-value)	(0.085)	(0.508)	(0.976)
H_0: no autocorrelation			

[1,5] and [10] denote significance at 1%, 5% and 10% levels respectively.

When we examine the correlations between FII flows and market returns, we find that purchases and net flows are positively correlated with returns while sales are negatively correlated with returns. The correlation is even higher between unexpected flows and returns; 0.39 between unexpected net flows and BSE returns and 0.37 between unexpected net flows and NSE returns, while the expected flows and returns are weakly correlated; -0.02 and -0.03 respectively. The results are not reported in order to conserve space.

5.2 Disaggregate flow data

We conduct further analysis by disaggregating the flows into those occurring on the two exchanges – BSE and NSE. We adopt a similar methodology as discussed above, to identify the times-series properties and estimate the expected and unexpected flows for the disaggregate flow data. This helps us to better understand the impact and behavior of the market to the flows occurring in each exchange. With the data on market specific flow available only from January 1998, the number of observations is reduced to 66, of which we

use half the sample to estimate the expected flows. Based on the regression results of the scaled flows on the lagged scaled flows and the LM test for first-order autocorrelation in the residuals we fit the AR(2) models for purchases, AR(3) model for sales and AR(1) model for net flows. Unexpected flows are computed by subtracting expected flows from actual flows.

5.3 Relation between aggregate monthly flows and market returns

Tables 6 and 7 present the regression results with respect to monthly BSE returns and NSE returns, respectively. Panel A presents the results with respect to purchases; Panel B presents the results with respect to sales and Panel C with respect to net flows. Regression (1) looks at the relation between returns and concurrent scaled flows. Regression (1) of Table 6 shows that BSE returns are strongly correlated with contemporaneous net flows (Panel C). Net flows equalling 1 percent of market capitalization is associated with 7.2 percent rise in BSE index and 7.6 percent rise in NSE. Since the scaled flows include both the expected and unexpected component, we expect the relation between unexpected flows and returns in regression (3) to be higher than what we see in the case of regression (1).

We look at the relation between returns and lagged flows in regression (2). Table 6 shows returns to be positively related to concurrent purchases and net flows and negatively but not significantly related to concurrent sales. We find the lag 2 coefficients for scaled purchases (Panel A) and net flows (Panel C) to be negative and significant. One of the possible explanations for the negative coefficients of lagged flows is that the stock prices overreact to flows initially, and then revert in later months, that is, the existence of price pressure. However, on omitting the concurrent flows from regression (2)[viii], the lagged coefficients lose their significance, suggesting that lagged flows may be acting as instruments for expected concurrent flows thus rejecting the likelihood of price pressure (Warther (1995)). The pattern of relationship seems to be same in the case of NSE returns and lagged flows reported in Table 7. As expected the relation between returns and concurrent sales is negative

Table 6 BSE Returns and Disaggregated Monthly FII Flows

Regression results of BSE returns on monthly FII flows at BSE and regression of monthly unexpected flows on returns at BSE. The flows at time t have been scaled by BSE market capitalization at time t-1 to get the scaled flows. The scaled flow data is from the period January 1998 to June 2003. We use half the data to fit the AR model for estimating the expected flows. Unexpected flows are actual flows less expected flows. The flow and the return data used in the regression are from October 2000 to June 2003. In regressions (1), (2), (3) and (4) we regress returns on flows and in regression (5) we regress unexpected flows on BSE returns. Panel A presents regressions using purchases, Panel B using sales and Panel C using net flows. Numbers in parentheses are t-statistics.

Panel A

	BSE returns				Unexpected purchases
	(1)	(2)	(3)	(4)	(5)
Independent variables					
Constant	0.0078	0.0203	0.0275	0.0309	-0.0031
	(0.44)	(1.00)	(0.48)	(0.70)	(-18.00)**
Purchases					
Lag 0	-3.3274	-1.2221			
	(-0.59)	(-0.19)			
Lag 1		4.4225			
		(0.68)			
Lag 2		-10.8019			
		(-1.65)*			
Expected purchases					
Lag 0			-5.7700		
			(-0.79)		
Unexpected purchases					
Lag 0			-1.7354	0.5927	
			(-0.27)	(0.09)	
Lag 1				8.9039	
				(1.27)	
Lag 2				0.8124	
				(0.13)	
Market Returns					
Lag 0					-0.0020
					(-0.34)
Lag 1					0.0057
					(0.93)
Lag 2					0.0037
					(0.59)
Observations	33	31	33	31	31
R2 (adjusted)	-0.021	0.013	-0.045	-0.036	-0.040
R2	0.011	0.112	0.021	0.048	0.044

Panel B

	BSE returns				Unexpected sales
	(1)	(2)	(3)	(4)	(5)
Independent variables					
Constant	0.0449**	0.0098	0.0001	-0.0282	-0.0034
	(2.03)	(0.33)	(0.00)	(-0.43)	(-35.21)**
Sales					
Lag 0	-20.8583**	-25.2451**			
	(-2.14)	(-2.55)			
Lag 1		28.3541**			
		(2.72)			
Lag 2		-7.9723			
		(-0.79)			
Expected sales					
Lag 0			-13.7784		
			(-1.11)		
Unexpected sales					
Lag 0			-21.9709**	-14.7459*	
			(-2.25)	(-1.54)	
Lag 1				14.4274**	
				(2.05)	
Lag 2				-7.1598	
				(-0.93)	
Market Returns					
Lag 0					-0.0041
					(-1.14)
Lag 1					-0.0027
					(-0.74)
Lag 2					0.0058*
					(1.58)
Observations	33	31	33	31	31
R2 (adjusted)	0.102	0.214	0.098	0.142	0.083
R2	0.130	0.294	0.154	0.244	0.175

Panel C

	BSE returns				Unexpected net flow
	(1)	(2)	(3)	(4)	(5)
Independent variables					
Constant	-0.0041	0.0055	0.0135	0.0005	0.0001
	(-0.44)	(0.78)	(0.89)	(0.10)	(1.00)
Net flow					
Lag 0	4.8773	11.2245**			
	(0.67)	(1.40)			
Lag 1		-8.7251			
		(-1.22)			
Lag 2		-15.7739**			
		(-2.07)			
Expected net flow					
Lag 0			-42.2175		
			(-1.13)		
Unexpected net flow					
Lag 0			7.2044	11.6079*	
			(0.97)	(1.44)	
Lag 1				-7.8504	
				(-1.12)	
Lag 2				-17.8188**	
				(-2.30)	
Market Returns					
Lag 0					0.0026
					(0.57)
Lag 1					0.0021
					(0.44)
Lag 2					0.0035
					(0.72)
Observations	33	31	33	31	31
R2 (adjusted)	-0.018	0.103	0.004	0.104	-0.077
R2	0.014	0.192	0.044	0.195	0.030

** and * denote significance at 1%, 5%, 10% and 15% levels respectively.

Table 7 NSE Returns and Disaggregated Monthly FII Flows

Regression results of NSE returns on monthly FII flows at NSE and regression of monthly unexpected flows on returns at NSE. The flows at time t have been scaled by NSE market capitalization at time t-1 to get the scaled flows. The scaled flow data is from the period January 1998 to June 2003. We use half the data to fit the AR model for estimating the expected flows. Unexpected flows are actual flows less expected flows. The flow and the return data used in the regression are from October 2000 to June 2003. In regressions (1), (2), (3) and (4) we regress returns on flows and in regression (5) we regress unexpected flows on NSE returns. Panel A presents regressions using purchases, Panel B using sales and Panel C using net flows. Numbers in parentheses are t-statistics.

Panel A

	NSE returns				Unexpected purchases
	(1)	(2)	(3)	(4)	(5)
Independent variables					
Constant	-0.0115	-0.0251	-0.0503	0.0252	-0.0028 *
	(-0.64)	(-0.99)	(-0.99)	(0.97)	(-14.55)
Purchases					
Lag 0	2.4729	1.0145			
	(0.58)	(0.20)			
Lag 1		6.9846			
		(1.21)			
Lag 2		-2.1182			
		(-0.36)			
Expected purchases					
Lag 0			7.2118		
			(1.01)		
Unexpected purchases					
Lag 0			0.5235	0.9227	
			(0.11)	(0.18)	
Lag 1				7.9473 **	
				(1.63)	
Lag 2				0.2010	
				(0.04)	
Market Returns					
Lag 0					0.0054
					(0.81)
Lag 1					0.0030
					(0.45)
Lag 2					0.0167 *
					(2.43)
Observations	33	31	33	31	31
R2 (adjusted)	-0.021	-0.034	-0.032	-0.010	0.090
R2	0.011	0.069	0.033	0.091	0.181

*, ** and *** denote significance at 1%,5%, 10% and 15% levels respectively.

Panel B

	NSE returns				Unexpected sales
	(1)	(2)	(3)	(4)	(5)
Independent variables					
Constant	0.0214	-0.0595 *	-0.1559 *	0.0438	-0.0035 *
	(1.02)	(-2.28)	(-2.20)	(1.23)	(-22.76)
Sales					
Lag 0	-6.6121	-9.5968 **			
	(-1.13)	(-1.94)			
Lag 1		11.6059 *			
		(2.32)			
Lag 2		15.0976 *			
		(2.99)			
Expected sales					
Lag 0			16.3237 ***		
			(1.58)		
Unexpected sales					
Lag 0			-11.4287 **	-9.4145 ***	
			(-2.01)	(-1.75)	
Lag 1				11.0462 *	
				(2.17)	
Lag 2				11.2178 *	
				(2.13)	
Market Returns					
Lag 0					-0.0097 **
					(-1.83)
Lag 1					-0.0010
					(-0.19)
Lag 2					0.0068
					(1.23)
Observations	33	31	33	31	31
R2 (adjusted)	0.009	0.320	0.164	0.286	0.103
R2	0.040	0.388	0.216	0.358	0.192

Panel C

	NSE returns				Unexpected net flows
	(1)	(2)	(3)	(4)	(5)
Independent variables					
Constant	-0.0079 *	0.0001	0.0038	-0.0027	0.0004 *
	(-1.33)	(0.02)	(0.29)	(-0.58)	(2.25)
Net flows					
Lag 0	11.0159 *	14.8736 *			
	(2.00)	(3.06)			
Lag 1		-3.6037			
		(-0.66)			
Lag 2		-19.5506 *			
		(-3.49)			
Expected net flow					
Lag 0			-26.4570		
			(-0.70)		
Unexpected net flow					
Lag 0			12.2752 *	14.9870 *	
			(2.17)	(3.09)	
Lag 1				-1.5384	
				(-0.29)	
Lag 2				-19.8938 *	
				(-3.57)	
Market Returns					
Lag 0					0.0135 *
					(2.49)
Lag 1					-0.0018
					(-0.32)
Lag 2					0.0085 ***
					(1.51)
Observations	33	31	33	31	31
R2 (adjusted)	0.085	0.347	0.086	0.350	0.126
R2	0.114	0.412	0.143	0.415	0.213

as the prices go down with increase in sales by FIIs, but the coefficient is insignificant. Furthermore, there is no significant relationship between return and lagged sales. The positive relation between purchase and net flows with returns and the negative relation between sales and returns signals that the FIIs do not indulge in heavy purchases and sales in the same month. The direct relation between purchases and returns and the inverse relation between sales and returns, signal that FIIs in the Indian market may be herding. This is consistent with evidence provided by Batra (2003), where using both daily and monthly data, she finds that FIIs tend to herd in the Indian market and the herding measure being high for the monthly horizon.

In regression (3), we regress the returns on expected and unexpected flows. Looking at the relation between BSE return and contemporaneous unexpected flows we see that the concurrent unexpected purchases and net flows are strongly related to returns, while the coefficient of unexpected sales is not significant. The relation between returns and unexpected flows is stronger than the relation between returns and scaled flows in regression (1). Unexpected purchases and net FII flows equalling 1 percent of market capitalization is associated with 7.7 percent and 8.1 percent increase in BSE stock prices, respectively and 7 percent and 8.4 percent increase in NSE stock prices, respectively. The shocks caused by the unexpected flows have a significant impact on the returns. Clark and Berko (1997) find that unexpected purchases of Mexican stocks by foreign investors equalling 1 percent of market capitalization are associated with a 13 percent rise in Bolsa index. The significant coefficient of unexpected flows is consistent with the base-broadening hypothesis.

Regression (3) indicates the strength of relationship between returns and unexpected flows, but this does not imply causality, that is, whether returns are attracting flows or flows are pushing the prices up. In regressions (4) and (5) we test the existence of price pressure and feedback trader hypothesis, respectively. If the price pressure hypothesis holds we expect the prices to return to fundamentals when the sentiment is no longer there, thus expecting a

significant negative coefficient for the lagged flows. We find evidence of price pressure hypothesis when we examine the regression of returns on net flows in Panel C of tables 6 and 7. From this we deduce that increased net inflows by FIIs do cause the prices to increase initially but they return to normal (drop) when the inflows stop.

In regression (5), we test the feedback trader hypothesis by regressing unexpected flow on contemporaneous and lagged return. The coefficients of the lagged returns have to be significant and positive (negative) for us to accept the hypothesis of positive (negative) feedback trading. We do not see evidence in favor of positive feedback trading hypothesis in our results. Also, we find no evidence of negative feedback trading. Our results are at variance with prior research. Gordan and Gupta (2003) document significant negative relation between monthly flows and lagged returns. Batra (2003) also finds that monthly trading imbalance of FIIs for the period between March 1998 and June 2002 to be negatively related to lagged returns. We attribute the differences to the results to the differences in methodology employed. We use disaggregated flows while prior research uses aggregate flows.

Summarizing the results with respect to relation between disaggregated flows and returns, we find that monthly unexpected flows and contemporaneous returns are significantly positively related. This is consistent with the base broadening hypothesis. When we examine net unexpected flows, we detect strong evidence of price reversal, suggesting that the price increase associated with net FII inflows is not permanent and reverses when the sentiment fades out. At monthly horizon we do not find any evidence suggesting that the FIIs adopt negative feedback trading.

6.0 Conclusion

We study the impact of trading of Foreign Institutional Investors on the major stock indices of India. Our contribution to this growing literature pertaining to globalization is two

fold. First, we separate the flows into expected and unexpected and find that unexpected flows have a greater impact than expected flows. Second, we identify the specific flows of foreign institutional investors flowing into (or out of) each exchange and examine the impact on the specific stock market indices. Our principal conclusions are as follows. We find strong evidence consistent with the base-broadening hypothesis consistent with prior work. We do not find compelling confirmation regarding momentum or contrarian strategies being employed by foreign institutional investors. Our findings support the price pressure hypothesis. We do not find any substantiation to the claim that foreigners' destabilize the market.

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End Notes

[i] See for instance Choe, Kho, and Stulz (1999).
[ii] Fearing political backlash, India has been much more cautious in opening its door to other types of services.
[iii] As the FIIs can either sell or purchase from others or from other FIIs, the transactions of FIIs cannot, therefore, be strictly compared with the total net turnover of the Exchange. (Rao et al. 1999) suggested taking average of FII sales and purchases for a given period.
[iv] Morgan Stanley
[v] Stock Exchange Review, BSE, September 2003
[vi] I am thankful to Dr. Rajesh Chakrabarti for sharing with me the data from his study.
[vii] Results not reported.
[viii] Not reported in the table.