

Foreign Fund Flows and Stock Returns: Evidence from India^{*}

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Abstract

We study the impact of foreign institutional investor (FII) flows on stock returns in India. We exploit stock-level daily trading data for FII purchases and FII sales during 2006-2011 to separate stocks into those experiencing abnormally high and low FII flow innovations. We find that stocks with high innovations are associated with a coincident price increase that is permanent, whereas stocks with low innovations are associated with a coincident price decline that is in part transient, reversing itself within two weeks. The differential abnormal return between high and low innovation stocks is nevertheless significant, both statistically and economically (relative to stock return volatility), largely unrelated to firm characteristics and risk loadings, and largest during period of market stress. Our findings are robust in out-of-sample tests. The results are consistent with a price “pressure” on stock returns induced by FII sales, as well as information being revealed through FII purchases and FII sales.

Keywords: Foreign Institutional Investors; Foreign Ownership; Portfolio Flows; Price Impact; Volatility.

"Over time, we have to figure out how much we want to sort of expose ourselves to those relatively short-term flows, but I am glad to say that even during the big sell-off in last July-August, long-term flows, whether debt or equity stayed with us."

- Raghuram Rajan, Governor, Reserve Bank of India (RBI), February 3, 2014.¹

"The principal risk facing India remains the inward spillover from global financial market volatility, involving a reversal of capital flows."

- IMF Country Report, February 2014.²

In today's increasingly globalized world economy, capital flows can have significant real effects, as exemplified by the above two quotes. One school of thought is that exposure to global flows can have a permanent long-term adverse impact on the economy (for instance, the quote from the IMF Report). Another school of thought is that the focus of policy makers should be on fundamentals, and while global capital may entail volatility, the effects are likely to be transient in nature (as suggested by the RBI Governor, Raghuram Rajan).

The debate about calibrating the level of capital flows thus rests on gaining a better understanding of the *precise* impact of foreign fund flows on the domestic economy. Not much empirical research has been done to gauge the magnitude as well as the longevity of the impact of capital flows on equity markets. In this study, we examine the case of an emerging market (India) to see how foreign fund flows affect the domestic equity market performance both in terms of magnitude of the immediate impact as well as the permanence of the impact. Our study helps shed light on the tradeoff between information effects and transient volatility effects that arise in the context of global capital flows.

Foreign fund flows in and out of Indian stock markets are now a sizeable portion of the market activity. Cumulative net investment flows from foreign institutional investors (FIIs) have

¹ See "Volatility may force a rethink on short-term inflows into government bonds, Shaji Vikraman, ET Bureau Feb 3, 2014, 07.02AM IST.

² IMF Country Report No. 14/57, February 2014 (Item No. 46, page 20), <http://www.imf.org/external/pubs/ft/scr/2014/cr1457.pdf>

exceeded USD 100 billion in the last decade, and FII order flow accounts for a significant portion of the daily turnover in Indian exchanges. For instance, the number of FIIs registered with the Securities and Exchange Board of India (SEBI) increased from 882 in March 2006 to 1757 in March 2013, and FIIs, on average, accounted for 20.6 percent of the total turnover traded at the National Stock Exchange of India (NSE) in 2012-13.³

While FII participation in Indian equity markets has been steadily increasing over the last decade, there is a widespread perception that foreign fund flows may be creating substantial volatility in markets, especially during times of stress, a concern that extends more generally to emerging markets given the illiquidity of their equity markets (relative to those of developed markets) for absorbing sudden inflows and outflows of foreign funds. For instance, Table 1 and Figure 1 show that during the global financial crisis (2008-09), FII inflows turned negative (net outflows of approx. USD 10 billion) consistent with the overall flight to quality. The volatility of the NIFTY, an index measuring the broad stock market performance in India, is also, as seen in Table 1 and Figure 1, much higher during this period in comparison to other years, lending casual support for the hypothesis that FII flows may have induced volatility in emerging markets.

Recent research has shed some light on the concerns of policy makers regarding the impact of net flows of foreign investors on domestic markets. In particular, studies have examined the extent of transmission of economic shocks from one region to another region of the world. Researchers have also examined whether the associated price pressure effects are permanent or temporary.⁴ Jotikasthira, Lundblad and Ramdorai (2012) find that asset fire sales in the developed world affect fund flows to emerging markets. They argue that equity markets in emerging markets are influenced by this “push” factor and that fund flows provide an additional channel of contagion.⁵ Anshuman, Chakrabarti, and Kumar (2012) find that during

³ SEBI Annual Report 2012-13 http://www.sebi.gov.in/cms/sebi_data/attachdocs/1378192045802.pdf

⁴ Coval and Stafford (2007) show that sudden increases (decreases) in fund flows causes mutual funds to significantly adjust their holdings, resulting in price pressure effects, that are transient but can take several weeks to be reversed fully.

⁵ Jotikasthira, Lundblad and Ramdorai (2013) extend this line of argument by examining the relationship between global fund flows and domestic real economic activity. They find that shocks in fund flows affect investment policy of Chinese and Indian firms.

the financial crisis period, the influence of (aggregate) foreign institutional investor (FII) flows on Indian equity markets increases during periods when the U.S. markets experience abnormal returns.⁶

Given the lack of data at the level of individual stock-level flows by foreign investors, these studies have focused on aggregate flows in and out of the emerging stock markets. While the studies to date have got around this problem by identifying foreign flows that vary over time and can be considered reasonably “exogenous” to the stock-market fundamentals of the emerging market, an alternative approach would be to examine the cross-sectional return performance of firms within an emerging stock market, affected differentially by foreign fund flows. This article adopts the latter approach by examining how stock returns differ between stocks experiencing foreign fund inflows versus foreign fund outflows. We are able to do this by accessing an exclusive dataset that provides information about FII flows at the individual stock level for most actively traded stocks in the Indian market during the period 2006-2011.

Exploiting this stock-level daily trading data for FII purchases and FII sales during 2006-2011, we separate stocks into those experiencing abnormally high and low FII flow innovations. We use a “naive” approach based simply on net FII flows into stocks, ranking stocks each week and forming high and low FII flow portfolios. In addition, we also employ a “panel regression” approach in which we run a first-pass estimation procedure for predicting FII flows at the stock level based on lagged firm characteristics, FII flows, and market-wide factors. The residuals from this estimation exercise are then used to rank stocks each week to form high and low FII flow innovation portfolios.⁷ We then study the returns of these portfolios in the pre-formation window, on the portfolio-formation day, and the post-formation window.

We find that stocks with high innovations in FII flows are associated with a coincident (portfolio-formation day) price increase that is permanent, whereas stocks with low innovations

⁶ Several other studies have examined the impact of aggregate institutional trades on asset returns, e.g., Warther (1995), Edelen and Warner (2001), Goetzmann and Massa (2003), and Teo and Woo (2004). The main conclusion from these studies is that aggregate mutual fund flows affect contemporaneous stock returns.

⁷ Hasbrouck (1988) and Bessembinder and Seguin (1993) point out that the information content of trades can only be weeded out by examining the unexpected component of trading rather than the total amount of trading.

in FII flows are associated with a coincident price decline that is in part transient, reversing itself within one week (see Figure 2). The differential cumulative abnormal return between high and low innovation stocks over a five-day period starting with the formation-day is nevertheless significant, both statistically and economically (relative to stock return volatility). Our findings are similar to the findings of Coval and Stafford (2007), Frazzini and Lamont (2008) and Lou (2012), who study the impact of mutual fund flows on asset pricing over longer horizons. They conclude that price pressure due to fund flows can cause temporary deviations of stock prices from fundamental values followed by reversals over time. The asymmetric response for the high and low innovation portfolios is similar to the findings in the empirical studies of block transactions, e.g., Holthausen (1987), Chan and Lakonishok (1993), Keim and Madhavan (1996) and Saar (2001). The prevalent explanation is that block buys are motivated by information whereas block sales are motivated by portfolio rebalancing concerns. Our findings are consistent with this explanation.

Importantly, we find that there is no pre-formation differential abnormal return between the high and low innovation portfolios (when they are formed on the basis FII flow innovations derived from the first-pass panel regression model). Furthermore, the abnormal return differential between the portfolios does not arise due to a difference in their pre-formation characteristics (such as volatility, beta or systematic risk, idiosyncratic risk, size and trading volume).

We then examine if these return differentials can be explained in the time-series by market-wide factors. To this end, we relate the differential abnormal return between high and low FII flow innovation portfolios to time-series changes in the portfolio characteristics as well as in market-wide shocks. We find that the differential abnormal return is increasing in times of aggregate fund outflows from the Indian stock market and a rise in global stock market volatility (VIX). In an alternative way of conducting this inquiry, we first do cross-section regressions in the spirit of Fama and MacBeth (1973) linking stock returns to firm characteristics and risk loadings. We then relate the difference in the residuals (obtained from the Fama-MacBeth cross-sectional regressions) of the high and low innovation portfolios to the time-

series variation in the market-wide shocks. Again, we find that the differential abnormal return is increasing in times of greater global stock market volatility.

Our results are consistent with a price “pressure” on stock returns induced by FII sales, given the partial reversal of formation-day negative returns for stocks experiencing abnormally high FII outflows. The results are, however, also consistent with information being revealed through FII purchases and FII sales, given the permanent nature of formation-day returns for stocks experiencing abnormal FII flows. In summary, we conclude that while FII outflows contribute to transient volatility for stocks experiencing the outflows, the trading by FIIs also generates new information. The first result suggests “limits to arbitrage” at work when the aggregate risk appetite of global financial firms is low (i.e., in periods associated with high VIX) so that liquidity providers (in our setting, the domestic investors in Indian stock markets who purchase stocks being sold by the FIIs) generate excess returns in such states. The second result suggests that as in developed markets (see for instance the seminal work of French and Roll (1986)), in emerging markets too, trading, and in particular, FII trading, is central to generating information. These relative effects of foreign fund flows must be balanced against each other while evaluating their desirability for emerging markets.

Despite that fact that FII flows are strongly related to firm size, our analysis reveals that the differential cumulative abnormal returns between high and low innovation stocks persist in sub-samples based on firm size, i.e., even after controlling for firm size. We find that the coincident price decline observed for low innovation small cap stocks is a permanent effect without any associated reversal, unlike the case for the low innovation mid cap and large cap stocks. This bid side effect is mainly driven by the fact that FII sales are much lower in small cap stocks as compared to larger size stocks. It is as if the market perceives FII sales in small cap stocks to be entirely information related.

We also examine the impact of FII flows during periods of market stress. First, we compare the price impact of FII flows during the crisis period and during the non-crisis period. Our findings suggest that the impact of FII flows is asymmetric on the ask and bid sides of the market. During the crisis period, excess FII sales have a greater adverse impact and during the non-crisis period, excess FII purchases have a greater impact. Second, we segregate the

sample into days associated with high VIX and days associated with low VIX relative to the median VIX level in the sample. The impact of FII flows, is in general, higher on days with high VIX as compared to days associated with low VIX. This finding suggests that there is volatility spillover from the developed markets into emerging markets.

The key results discussed above are robust. Because FII order flows exhibit strong persistence we redefine our measure of FII flow innovations in terms of weekly cumulative innovations rather than daily innovations in FII flows. We find that our basic findings sustain even under this new definition of FII flow innovations. The findings also sustain in out-of-sample data in that we find similar price behavior for portfolios with high and low innovations in FII flows as found in in-sample data.

The rest of the paper is organized as follows. Section I describes the data and methodology used in our analysis. Section II discusses the empirical results. Section III concludes.

I. Data and Methodology

Our sample period of study is from Jan 1st, 2006 to Dec 31st, 2011. The dataset contains daily purchases and sales of foreign institutional investors (FIIs), daily closing prices on the most actively traded stocks preferred by FIIs in the Indian economy. The data for our analysis comes from three sources. The first source is a proprietary data of daily stock-wise FII trading obtained from the National Stock Exchange (NSE); the second source is the Prowess database created by the Center for Monitoring Indian Economy (CMIE) for daily adjusted closing prices of NSE listed stocks, the third source is www.finance.yahoo.com for data on the S&P500 index and the VIX index of the US market.

To select the sample firms, we first consider all stocks that are part of four broad based indices: the CNX NIFTY index, the CNX JUNIOR index, the CNX MIDCAP index and the CNX SMALLCAP index as on June 28, 2013, in order to exclude stocks that are infrequently traded during the period Jan 2005 to Dec 2011. This filter results in 272 stocks and these stocks represent approximately 88% of the free float market capitalization of all stocks listed on the

NSE. We dropped 8 stocks for missing data on FII flows from NSE. We impose an additional filter that requires selected stocks to have at least 250 FII trading days across the entire sample period of 2006-2011. This filtration causes 13 stocks to be left out of the sample. Next, we truncate the sample further by imposing some restrictions on outliers. 23 stocks are dropped as they are associated with extreme outliers in beta estimates. Further, FII share of trading volume on any trading day is censored at +/- 95% and daily stock returns are censored at +/- 20%. Our final sample data consists of an unbalanced panel of 228 unique stocks with 312239 stock-day observations.

The data on the benchmark market index, the CNX NIFTY index, as well as the S&P 500 index and the CBOE VIX index are used as follows. The CNX NIFTY index is used to measure the broad market performance in the Indian economy. It is a well-diversified index consisting of 50 stocks across 22 different sectors in the economy. The S&P 500 index and the CBOE VIX index movements help capture the broad global market performance and the “risk-appetite” of the global financial sector, respectively.

I.1 Variable Definitions

Stock returns are defined by continuously compounding the return on daily closing prices, as follows,

$$RET_t = 100 * \ln \left(\frac{P_t}{P_{t-1}} \right),$$

where P_t is the closing stock price adjusted for splits and dividends, etc., on Day t . Similarly, the returns on the NIFTY index are calculated as

$$NIFTY_RET_t = 100 * \ln \left(\frac{NIFTY_t}{NIFTY_{t-1}} \right)$$

We define net FII inflows as the difference between the daily rupee value of purchases (FII_BUYS) and daily rupee value of sales (FII_SELLS) scaled by the aggregate rupee value of daily FII as well as non-FII trading volume ($RUPEE_VOLUME$).

$$FII_Net_t = \frac{FII_BUYS_t - FII_SELLS_t}{RUPEE_VOLUME_t},$$

where $RUPEE_VOLUME_t$ is the aggregate rupee trading volume on Day t , i.e., the denominator above includes non-FII trades. The variable FII_NET gives an economic measure of the daily net FII flows relative to the total daily rupee trading value.⁸

Table 2 presents a list of variables and the corresponding definitions. The discussion on these variable definitions has been presented at various places in the text, and this table provides a summary. Table 3 presents the descriptive statistics of variables related to firm characteristics, market characteristics and FII trading statistics. The average firm size is approximately 170 billion rupees and the average (daily) stock return is 0.0202%. During the same period, the average daily returns on the NIFTY index is 0.0333%, and on the S&P 500 index, 0.0014%. The mean β of the stocks is 1.00 and the mean volatility is 36.16% (annualized). The CBOE volatility index (VIX) had a mean level of nearly 24 during the sample period. FII daily average purchases (FII_BUYS) were approximately equal to FII daily average sales (FII_SELLS), resulting in a daily average net FII flow (FII_NET) close to zero.

I.2 Empirical Design

In this paper, we rely on a simple procedure to infer the information content of FII flows. We construct portfolios on the basis of net FII flows and then examine the short-run performance of these portfolios and how it is related to net FII flows. This approach allows us to isolate the impact of FII flows on asset returns.

To elaborate, first, we sort stocks on the basis of FII_NET once every week and segregate stocks into five quintiles. We then examine the return on the portfolio of stocks over a 10 day trading window around the day of portfolio formation (Day 0). The ten day window covers a pre-formation period over the (-5, -1) window and a post-formation period over the (0, 5) window. We examine the immediate impact of FII flows (returns on Day 0) and also the

⁸ We also considered an alternative definition where the net FII trading is normalized by the sum of FII purchases and FII sales, as has been employed in studies of stock order flow. However, in the context FII trading in emerging markets, there is considerable variation in FII trading due to differences in firm size. Our measure, as defined above, captures the economic significance of FII trading relative to overall trading volume in the stock. Thus we are able to control for spurious correlations driven by the size effect.

subsequent reaction of the portfolio returns over (0, 5). This allows us to determine the permanent and the transient components of the impact of FII flows on stocks returns.

The next step of our analysis is to perform time series analysis of the returns on Day 0 and the cumulative returns over the (0, 5) window to see whether these returns can be explained by differences in firm characteristics as well as time-varying market-wide shocks. In particular, we use the Fama and MacBeth (1973) procedure to control for risk factor loadings of firms to examine whether asset returns can be explained by innovations in FII flows after controlling for the returns accruing to the stocks from risk exposures.

I.3 Innovations in FII Flows

We consider two models to define the surprise or innovation in net FII flows: a “naive” model that assumes that FII_NET is perfectly correlated with innovations in FII flows, and a panel regression model of FII_NET on lagged FII_NET , lagged stock returns and other control variables; residuals from this model (FII_NET_INNOV) are used as a proxy for the “true” (unobserved) innovations in FII flows. These two characterizations allow us to check the robustness of our findings.

The panel regression model allows for firm fixed effects. The control variables are related to firm characteristics and market factors. Firm characteristics include firm size ($SIZE$) and turnover ($TOVER$). Market factors include lagged returns on NIFTY, S&P 500, volatility index (VIX) and aggregate FII flows (AGG_FFLOW), which is defined as (total FII_BUYS – total FII_SELLS) / total traded rupee value on day t for all stocks.

$$FII_NET_{i,t} = FirmFEff + \sum_{j=1}^5 \beta_j FII_NET_{t-j} + \sum_{k=1}^5 \gamma_k Ret_{t-k} + \delta_1 SIZE + \delta_2 TOVER + \Phi_i MktFactors_t + \varepsilon_{i,t}$$

The above regression serves the purpose of a first pass panel regression.⁹ The regression residuals define innovation (FII_NET_INNOV). Note that the FirmFEff refers to firm fixed effects and MktFactors refers to time-varying market related variables.

⁹ We explored alternative specifications with and without firm fixed effects and time fixed effects. These variations turned out to be quite similar and the panel regression model with firm fixed effects is fairly robust.

Table 4 shows the results of the panel regression of FII_NET on lagged FII_NET , lagged returns, firm characteristics and market factors. The R-squared value is around 19 percent. FII_NET is significantly related to first-lagged return and up to five-lagged values of FII_NET . The positive coefficients on lagged return is consistent with trend chasing or positive feedback trading by FIIs. The positive coefficient on lagged FII_NET shows persistence in order flow. Both these findings are similar to what has been reported in Anshuman, Chakrabarty and Kumar (2012) regarding aggregate FII flows. The other variables that have significant coefficients in the panel regression model are firm size ($SIZE$), turnover ($TOVER$), market stress (VIX), first difference in market stress (ΔVIX), and aggregate FII flows ($AGGR_FFLOW$). The coefficients on lagged S&P 500 returns and lagged NIFTY returns are insignificant. The residuals obtained from this panel regression (FII_NET_INNOV) are used as a proxy for surprises or innovation in FII flows.

We refer to the above model as the panel regression model of innovation in contrast to the naive model of innovation, which uses FII_NET as a direct proxy for innovations in FII flows. Innovations defined in the two models are strongly correlated. Over the sample period, the correlation between daily FII_NET and residuals from the panel regression model is a statistically significant 0.897.

II. Analysis

II.1 Hypothesis related to Fund Flows

If cross-border fund flows are an idiosyncratic phenomenon, then under market efficiency, foreign fund flows should not influence domestic asset returns. Our null hypothesis, stated below, reflects this line of reasoning.

H1. Foreign fund flows have no systematic impact on market prices of domestic assets.

The alternative hypothesis is that asset returns are influenced by fund flows. Recent studies by Coval and Stafford (2007), Frazzini and Lamont (2008) and Luo (2012) find that mutual fund flow induced price impacts exhibit a degree of reversal. It has also been well established in prior

literature that information is asymmetrically incorporated on the ask and bid sides of the market. Block purchases are associated with permanent price impact whereas block sales have been associated with transient price impact (See Holthausen (1987), Chan and Lakonishok (1993), Madhavan (1996) and Saar (2001) for studies that document this phenomenon). One explanation for this asymmetric impact is that block sales are motivated by information whereas block sales are motivated by portfolio rebalancing concerns. Given these possibilities, we propose the alternative hypothesis as follows.

H1a. Foreign flows reflect information-based trading; therefore they cause a permanent impact on market prices of domestic assets.

H1b. Foreign flows reflect portfolio rebalancing requirements; therefore domestic assets experience price pressure - a transient price impact that is reversed in the following periods.

An interesting way to identify price pressure effects (i.e., flow-induced price changes) is to examine the relationship between the magnitude of the price impact and the magnitude of fund flows. A positive relationship confirms price pressure effects, as has been demonstrated in the classic study by Scholes (1972), who studied price pressure associated with secondary distributions by firms on the New York Stock Exchange. Hypothesis H2 and H3 examine this aspect of the price pressure hypothesis.

H2. Price pressure associated with foreign flows should be positively related with the size of shock in foreign flows.

H3. The price impact of foreign flows should be positively related to firm size because foreign flows increase with firm size.

Finally, if fund flows affect asset returns, we should expect that uncertainty associated with fund flows should also affect asset returns. In particular, we would expect to see a greater price impact during days associated with high global market uncertainty. We employ two proxies for global market uncertainty, namely, high VIX days and the financial crisis period, as discussed in the hypotheses below.

H4. *The price impact of foreign fund flows should be positively related to the uncertainty in markets. (VIX).*

H5. *The price impact of foreign fund flows should be greater during the period of the recent financial crisis as compared to the other periods.*

II.2 Price Impact of Fund Flows

Hypothesis H1, H1a and H1b are examined in this section. Table 5 presents results relating the innovations in FII flows to contemporaneous and subsequent stock returns. First, as per the naive model, we rank all stocks according to daily *FII_NET* flows once every week (typically on every Monday) and sorted into five quintiles. Over the 6 year sample period, there are 315 portfolio formation days. Panel A reports the results for the naive model of FII flow innovations and Panel B reports the results for the panel regression model of FII flow innovations. The first major column presents the findings for the portfolios with the lowest innovations (Q1) in *FII_NET* and the second major column presents the findings for the portfolio with the highest innovations (Q5) in *FII_NET*. The table also shows the difference in the abnormal returns of these two portfolios (Q5-Q1). The returns examined are the cumulative abnormal returns over the (-5, -1) window, the abnormal returns on the portfolio-formation day (DAY 0) and the abnormal returns over the (0, 5) window.

As can be seen in both Panel A (naive model of FII flow innovations) and Panel B (panel regression model of FII flow innovations), the abnormal return for the low (high) innovation portfolio, Q1 (Q5), on the portfolio formation day (Day 0) is economically and statistically significant. In the case of the naive model of innovations (Panel A), the abnormal return over the (0, 1) window, *AB_RET* (0, 1), is -0.91% for the low innovation portfolio (Q1) but is 0.87% for the high innovation portfolio (Q5). These findings remain when we consider the panel regression model of FII flow innovations (Panel B). The abnormal returns are -0.98% for the low innovation portfolio (Q1) and 0.90% for the high innovation portfolio (Q5). As we can see, the low innovation portfolio (Q1) is associated with negative returns and the high innovation portfolio (Q5) is associated with positive returns, and the results are robust to the specification of FII flow innovations.

The (abnormal) return difference between the high innovation portfolio and the low innovation portfolio (Q5 - Q1) is also statistically significant, as can be seen in both Panel A and Panel B. For the naive (panel regression model) model, the differential abnormal returns between stocks with high innovation and low innovation are equal to 1.78% (1.88%). These findings indicate that foreign FII inflows are associated with price appreciation and foreign FII outflows are associated with price declines.

In contrast to the positive differential abnormal returns (between high and low innovation stocks) on the portfolio-formation day (Day 0), the differential abnormal returns in the post-formation window (0, 5) is negative.¹⁰ For the naive model (Panel A), the cumulative abnormal return in the post-formation window (0, 5) is significantly positive (0.29%) for the low innovation portfolio (Q1), and also significantly negative (-0.15%) for the high innovation portfolio (Q5). This pattern indicates reversal of prices in the post-formation window. However, when we examine the more robust specification of the panel regression model (Panel B), we can see that there is significant reversal only for the low innovation portfolio. The cumulative abnormal return in the post-formation window is a statistically significant 0.28% for the low innovation portfolio (Q1) but a marginally significant -0.08% for the high innovation portfolio (Q5). Thus the statistically significant differential cumulative abnormal returns (Q5 - Q1) of -.36% in the post-formation window (in Panel B) is largely driven by the reversal of the prices for the low innovation portfolio (Q1).

We are also assured of the significance of our findings when we examine the cumulative abnormal returns over the pre-formation window, (-5, -1). We can see that in the case of the naive model (Panel A), the cumulative abnormal returns differential is statistically significant (1.24%, t-statistic of 20.67) but in the case of the more sophisticated panel regression model of innovation (Panel B), it is statistically *insignificant* (-0.10%, t-statistic of -1.75).

These result can be more easily seen in Figure 2, which shows the cumulative abnormal returns over the (-5, 5) window. Panel A shows results for the naive model and Panel B shows

¹⁰ This result also holds for longer windows, e.g., over (0, 10) and (0, 20). However, given that FII trading innovations occur continuously, it would be difficult to make meaningful inferences for longer post-formation windows. For completeness, we have also examined the return differentials over longer windows in a later section that discusses robustness issues.

the results for the panel regression model. The results are virtually identical for the naive model and the panel regression model. Both models suggest that there is a significant return shock on the portfolio formation day (Day 0). High innovation stocks experience a significant coincident price appreciation whereas low innovation stocks experience a significant coincident price decline.¹¹ For both models of innovation, the cumulative abnormal returns in the post-formation period remain flat for the high innovation portfolio. However, for the low innovation portfolio, the cumulative abnormal returns line starts rising in the post-formation period.

These findings imply that stocks with high innovations (positive residuals) in FII flows experience a coincident abnormal return that reflects a permanent information effect. However, stocks with low innovations (negative residuals) in FII flows experience both permanent information effects and transient effects, which are reversed over the post-formation window. This finding implies that order imbalances on the buy side and the sell side are associated with asymmetric effects, thereby confirming the claims in Hypothesis H1a and H1b, while rejecting the null hypothesis, H1, of no price impact. Hypothesis H2 is also confirmed in that the price impact is positively related to the size of the innovations. The high innovation portfolio (Q5) experiences a positive abnormal return, whereas the low innovation portfolio (Q1) experiences a negative abnormal return. This finding is consistent with a flow-induced price pressure effect.

When we examine abnormal returns for the low innovation portfolio in Figure 2 (Panel B), we can see that, under the panel regression model, a significant proportion (approximately, 40%) of the abnormal returns on Day 0 are reversed in the post-formation period. Given the volatility of a typical stock is around 36.16%, a return reversal of 0.3% based on the panel regression model, suggests that the transient effect accounts for $0.3 \times \sqrt{252} / 36.16$, or nearly 13.17% percent of the annualized volatility of a typical stock.¹²

¹¹ This result holds for raw returns as well abnormal returns; all returns reported in the paper refer to abnormal returns.

¹² To obtain an idea about the magnitude of the impact of FII flow innovations on prices, we can consider the study of Hendershott and Menkveld (2013) who estimate price pressure on the NYSE. They report that a \$100,000 inventory shock causes an average price pressure of 0.28% with a half-life of 0.92 days. Price pressure causes average transitory volatility in daily stock returns of 0.49%. Price pressure effects are substantially larger with longer durations in smaller stocks.

In summary, low innovation stocks experience both a permanent information effect as well as a transient effect on the portfolio formation day; the latter effect gets reversed during the post-formation period. On the other hand, high innovation stocks experience only a permanent information effect and there is no reversal of returns during the post-formation period. As a consequence, (negative) differential abnormal returns between high and low innovation stocks during the post-formation window are largely driven by the return reversal experienced by low innovation stocks.

To examine whether the differential abnormal return between high and low innovation stocks is arising because of differences in firm characteristics, we perform additional tests, as shown in Table 5. We can see that for the naive model of innovation (Panel A), there are some differences in the firm characteristics of high innovation and low innovation portfolios. In particular, rupee volume, (pre-formation) size and beta differ significantly across the high and low innovation portfolios. However, when we inspect the panel regression model of innovation (Panel B), we can see that there are no significant differences in firm characteristics between the high innovation portfolio and the low innovation portfolio. This finding gives us some assurance that the differences in performance of high innovation and low innovation portfolios are unlikely to be driven by differences in firm characteristics.

The results are consistent with a price “pressure” on stock returns induced by FII sales, given the partial reversal of formation-day negative returns for stocks experiencing abnormally high FII outflows, i.e., the low innovation portfolio. The results are, however, also consistent with information being revealed through FII purchases and FII sales, given the permanent nature of formation-day returns for stocks experiencing abnormal FII flows. While FII outflows contribute to transient volatility for stocks experiencing outflows, trading by FIIs also generates new information.

II.3 Time Series Variation in Return Shocks

Having established that there are permanent information effects associated with innovation in FII flows, we now examine if the time series of differential abnormal returns can be explained time series variation of market-wide factors. Figure 3 shows the time series

relationship between the differential abnormal returns due to innovation and lagged *VIX* for the naive model (Panel A) and for the panel regression model (Panel B). The correlation between these variables is .4069 under the naive model and 0.3913 under the panel regression model. Both correlations are statistically significant.

We compute the cross-sectional average of the differential returns (Y_t) between high and low innovation stocks on each portfolio formation day. (Y_t) is regressed on firm characteristics (X_t), lagged market-wide factors (Z_{t-1}) and expected FII flows (predicted value of FII flows based on the panel regression model, EXP_FFLOW) as well as unexpected FII flows (innovation in FII flows, FII_NET_INNOV). The results are reported in Table 5.

$$Y_t = \alpha_0 + \beta X_t + \gamma Z_{t-1} + \delta EXP_FFLOW + \tau FII_NET_INNOV + \varepsilon_t$$

The results for both models of innovation in FII flows (the naive model and the panel regression model) are similar. For brevity, we report the results of the panel regression model in Table 6. From the first two sets of regressions (seen in the first four columns of the table), we can see that the differential return on Day 0 is positively related to the Amihud Illiquidity measure and positively related to lagged *VIX*. These findings indicate that the returns differential on the portfolio-formation day (Day 0) is greater during times of illiquidity and a rise in the global stock market volatility (*VIX*), consistent with the claim in Hypothesis H4. Aggregate FII flows (across the entire set of stocks in the sample) have a negative effect on differential returns, as can be seen in the fourth column of the table. More importantly, the intercept is statistically significant and positive, indicating that even after controlling for firm characteristics and market-wide factors, going long on a high innovation portfolio and short on a low innovation portfolio provides a positive alpha.

In the last two columns of Table 6, we include the differences in the predicted FII flows and the innovations in the FII flows (based on the panel regression model) between the high and low innovation stocks. When these FII flow measure are included, the coefficient on aggregate FII flows loses its significance. However, firm illiquidity and global market sentiment continue to remain significant factors driving differential Day 0 returns. In summary, the time

series variation in the price impact of FII flows is driven by firm specific as well as global risk perceptions.

II.4 Fama MacBeth cross-sectional regressions

We now employ the Fama-MacBeth cross-sectional regression methodology to relate the returns on the portfolio-formation day (Day 0) to cross-sectional variation in firm characteristics. In Table 7 (Panel A), we present time-series averages of the intercept and the slope coefficients from a series of cross-sectional regressions of Day 0 returns on firm characteristics. We find that none of the firm characteristics are associated with a statistically significant coefficient. This evidence suggests that difference in firm characteristics cannot explain the differential returns on Day 0. Further, since the intercept term is also insignificant, it suggests that variation in differential returns on Day 0 between high and low innovations stocks may be largely driven by market-wide macroeconomic factors rather firm specific factors.

To understand the time series influence of macroeconomic factors, we examine the time series variation in the residuals obtained from the Fama-MacBeth cross-sectional regressions. We compute the median of the residuals from these regressions for both the high innovation and the low innovation portfolios on each portfolio-formation day. The difference in the residual medians of the high innovation portfolio and the low innovation portfolio is regressed against market-wide factors across time to examine the impact of macroeconomic conditions. Panel B reports the results of this test. We find that returns on Day 0 are positively related to lagged VIX , a finding consistent with the claim in Hypothesis H4. The role of VIX is similar to that reported in time series regression model of Table 6. Again, we can conclude that the portion of Day 0 returns that is unrelated to firm characteristics is greater when there is a rise in global stock market volatility (VIX). The regression is associated with a positive and significant alpha, suggesting that a strategy of shorting the low innovation stocks and going long on high innovations stocks can yield excess returns.

II.5 Size Effect

Next, we examine the impact of firm size on how FII trading affects stock returns. We partition the sample into three sub-samples: large cap, mid cap, and small cap stocks. Table 8 shows the

differential abnormal returns between the high and low innovation portfolios. Abnormal returns on Day 0 are directly related to firm size. Large cap stocks (as in the NIFTY index) experience the highest Day 0 abnormal return differential of 2.18% between the abnormal returns on the high and low innovation portfolios. In contrast, the mid cap and small cap stocks experience abnormal return differentials of 1.79% and 1.67%, respectively. Figure 4 presents the same findings. We can see that the abnormal return on the high and low innovation portfolios is higher in the case of large cap stocks, lower for mid cap stocks and least for small cap stocks. This finding is consistent with the conjecture in Hypothesis H3.

Note that large cap stocks, on average, experience daily FII purchases of Rs 268.78 million whereas mid cap and small cap stocks experience daily FII purchases of Rs 36.95 million and Rs 12.23 million, respectively. Likewise, large cap, mid cap, and small cap stocks experience, on average, daily FII sales of Rs 282.12, 35.92, and 12.15, million respectively. These numbers suggest that total FII flows (FII Purchases plus FII sales) are directly related to firm size and that FIIs trade much less in small cap stocks than in mid cap stocks and large cap stocks. We can see that Day 0 abnormal return differentials between high and low innovation portfolios exhibit the same monotonic relation with firm size as total FII order flows.¹³

Interestingly, the price reversal observed in the post-formation period is similar in the large cap and mid cap stocks. The price reversal for large cap stocks is greater than the price reversal for the mid cap stocks. It is the low innovation portfolio (Q1) that experience a price increase (i.e., a reversal) in the post-formation window. There is no significant reversal for the high innovation portfolio (Q5). In the case of small cap stocks, there is no price reversal for both the low innovation (Q1) as well as the high innovation (Q5) portfolios.

¹³ We also examine the time series average of the difference in innovations on the high and low innovation portfolios in each of the three sub-samples. The differential innovation is 0.50, 0.57 and 0.41 for large cap, mid cap stocks and small cap stocks, respectively. These differential innovations are not monotonic in firm size. Also, FII_NET, which is a normalized measure of net FII flows, has a value of 0.00229 for large cap stocks and values of 0.019821 and 0.0091374 for mid cap and small cap stocks, respectively. Again, these measure of FII flows are non monotonic in firm size. Essentially, as compared to both these measures, total FII order flow is better correlated with Day 0 return differentials between the high and low innovation portfolios.

In the overall sample, the high innovation portfolios are associated with a permanent price impact whereas about 40% of the price impact is reversed in the case of the low innovation portfolios. This pattern is followed in the case of large cap and mid cap stocks. However, in the case of small cap stocks, FII trading causes a permanent price impact on both sides of the market.

Given the low extent of FII trading in small cap stocks, it seems that when FIIs buy and sell, their order flow is perceived by the market as informed order flow and there is no significant price reversal on both sides of the market. For large cap and mid cap stocks, the price impact of FII sales exhibits some degree of price reversal, unlike the case for FII sales in small cap stocks. In other words, the fear of transient volatility triggered by FII sales is more relevant in the bigger and more well-known stocks rather than in the smaller capitalization stocks. Thus, both permanent as well the transient price impact of FII trades affect the more important segment of the Indian stock market.

II.6 Impact of Global Market Stress

The financial crisis of 2008 provides an excellent opportunity to examine the role of capital flows in driving asset returns. Fratzscher (2011) finds that the capital outflows from emerging markets to the U.S. were largely a flight to safety effect. Thus, the financial crisis period provides a unique opportunity to examine the impact of foreign fund flows on emerging markets during times of stress. We also examine the role of VIX in explaining differential Day 0 returns. As shown in the previous section, market conditions influence the price impact of FII flows.

We explore these hypotheses more carefully in the following way. First, we split the sample into a crisis period sub-sample and a non-crisis period sub-sample. This segregation allows us to examine how the financial crisis affected the price impact of FII flows. One might conjecture that the impact of FII flows would be greater during the crisis period. Second, we divide the portfolio formation days into two groups: one associated with low VIX and the other associated with high VIX. This test is useful in estimating the impact of VIX on the price impact of FII flows.

II.6.1 Crisis Period Effect

In Indian capital markets, the crisis period is usually identified as the period from January 2008 to December 2008.¹⁴ The remainder of the sample period is classified as the non-crisis period. We examine the abnormal return differentials between portfolios with high and low innovations in FII flows in the crisis as well as the non-crisis periods. Table 9 (Panel A) shows the results. The abnormal return differential between high and low innovation portfolios is much higher during the crisis period (2.56%) than in the non-crisis period (1.74%), i.e., there is a 47 percent greater impact of FII flows during the crisis period, consistent with Hypothesis H4. This can also be more easily seen in Figure 5. Further, the price reversal experienced by the low innovation stocks in the post-formation window is also greater in the crisis period as compared to the non-crisis period. This finding suggests that there is greater transient volatility induced by unexpected FII sales during the crisis period. Overall, our analysis indicates that concerns about contagion effects during crisis times are well substantiated.

II.6.2 Volatility Index (*VIX*) Effect

Foreign fund flows are likely to be affected by uncertainty in domestic markets. To examine this effect, we identify portfolio formation days that are associated with high global market stress across all domestic markets that fund foreign flows into Indian markets. We use the *VIX* index as a measure of global market stress. The portfolio formation days are partitioned into high *VIX* days and low *VIX* days based on the median *VIX* levels. Table 9 (Panel B) shows the results. The abnormal return differential between high and low innovation portfolios is much higher during high *VIX* days than on low *VIX* days. As seen in the case of the crisis period and the non-crisis period, the abnormal differential return on Day 0 is greater on days associated with high *VIX* (2.12%) as compared to days associated with low *VIX* (1.62%), i.e. a difference of approximately 31 per cent, consistent with Hypothesis H5. As in the crisis period case, the price reversal in the post-formation window is greater on days associated with high *VIX*. Again, these findings indicate that transient volatility is also greater during times of global market stress.

¹⁴ Anshuman, Chakrabarti, and Kumar (2012) use this period to define the crisis period in India. The results hold for alternative specifications of the crisis period.

II.7 Robustness Checks

II.7.1 Cumulative Innovations Analysis

Since FII trading occurs continuously and because FII traders may strategically split their trades over several days, a *daily* measure of FII flow innovations, as we have used here, may fail to capture the true level of FII flow innovations. To account for strategic trading behavior, we accumulate daily FII flow innovations over the $(-5, 0)$ window and use this cumulative measure of innovations to form portfolios. The results based on this measure of cumulative FII flow innovations are shown in Table 10 (Panel A).

Not surprisingly, the results are qualitatively similar to earlier findings because FII order flow is known to exhibit strong persistence. However, differential abnormal returns on Day 0 is 0.81 per cent, somewhat lower than the 1.88 per cent when we use the daily measure of FII flow innovations to construct portfolios. Again, this difference is not altogether surprising, because persistence in orderflow implies that prices start moving upward (for the high innovation portfolio) or downward (for the low innovation portfolio) from Day -5 itself, thereby mitigating the effect on Day 0. We can see this by noting the values of $AB_RET(-5, -1)$, the cumulative abnormal return over the $(-5, -1)$ window, which is significantly negative (positive) for the low (high) innovation portfolio.

We also compute $AB_RET(-10, -5)$ for the window $(-10, -5)$, which is the relevant pre-formation window given that we are using a cumulative measure of FII flow innovations. We find that the low innovation portfolio has a positive and significant return, which assures us that the negative abnormal returns over the window $(-5, -1)$ and on Day 0 are not driven by pre-formation negative returns. When we consider the high innovation portfolio, the abnormal return in the pre-formation window, $(-10, -5)$ is statistically insignificant, again assuring us that the positive abnormal return over $(-5, -1)$ and $(-1, 0)$ are not due to an effect carried over from the pre-formation window.

II.7.2 Out of Sample Analysis

Our measure of FII flow innovations is based on residuals obtained from a panel regression done on in-sample data. The validity of the panel regression model may therefore be

questionable. In order to ascertain the impact of spurious effects associated with in-sample model construction, we employ the in-sample panel regression model on an out-of-sample dataset over the period January 2012 to June 2013. We find that our results are robust to using out-of-sample data. Table 10 (Panel B) shows that there are significant differences in abnormal returns for the high innovation and the low innovation portfolios. The Day 0 abnormal return for the high innovation portfolio is 0.76% and the Day 0 abnormal return for the low innovation portfolio is -0.79, implying a differential abnormal returns of 1.55%. The reversal pattern is similar, but weaker than what we found for the in-sample data. As before, only the low innovation portfolio experiences a reversal in price. The pre-formation window abnormal returns pattern reveals that the low innovation portfolio experiences a weakly significant positive return. This assures us that the Day 0 negative return is not driven by any effect carried over from the pre-formation window. In the case of the high innovation portfolio, the pre-formation window abnormal returns is statistically insignificant, again suggesting that the Day 0 abnormal returns is not due to a pre-formation window effect.

III. Conclusion

Employing a unique database that provides data on foreign institutional investor (FII) flows at the individual stock level, we are able to examine the impact of FII flow innovations on stock returns in India. We find that stocks with high innovations are associated with a coincident price increase that is permanent, whereas stocks with low innovations are associated with a coincident price decline that is in part transient, reversing itself within five days. The results are consistent with a price “pressure” on stock returns induced by FII sales, as well as information being revealed through FII purchases and FII sales. We show that while FII outflows contribute to transient volatility for stocks experiencing the outflows, trading by FIIs also generates new information. Interestingly, price pressure effects are increasing in the magnitude of innovations but are largely unrelated to firm characteristics.

Our study not only reinforces the findings in recent literature that fund flows affect stock returns but also provides insights into when this relationship is likely to arise. We are able to demonstrate that price pressure is higher in times of global market stress. These findings can

help pursue research on identifying the mechanism by which information gets transmitted across global markets and also in identifying which sectors of the economy are more likely to be affected by shocks in global fund flows.

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Figure 1

FII Annual Net Flows into Indian Equity Markets and NIFTY Volatility during 2001-2012

The chart below shows the relationship between annual FII net inflows and the annualized standard deviation of the daily returns on the CNX NIFTY index for each fiscal year over the period, 2001-2012. FII net inflows were positive in all years except 2008. The data for chart have been taken from Table 1.

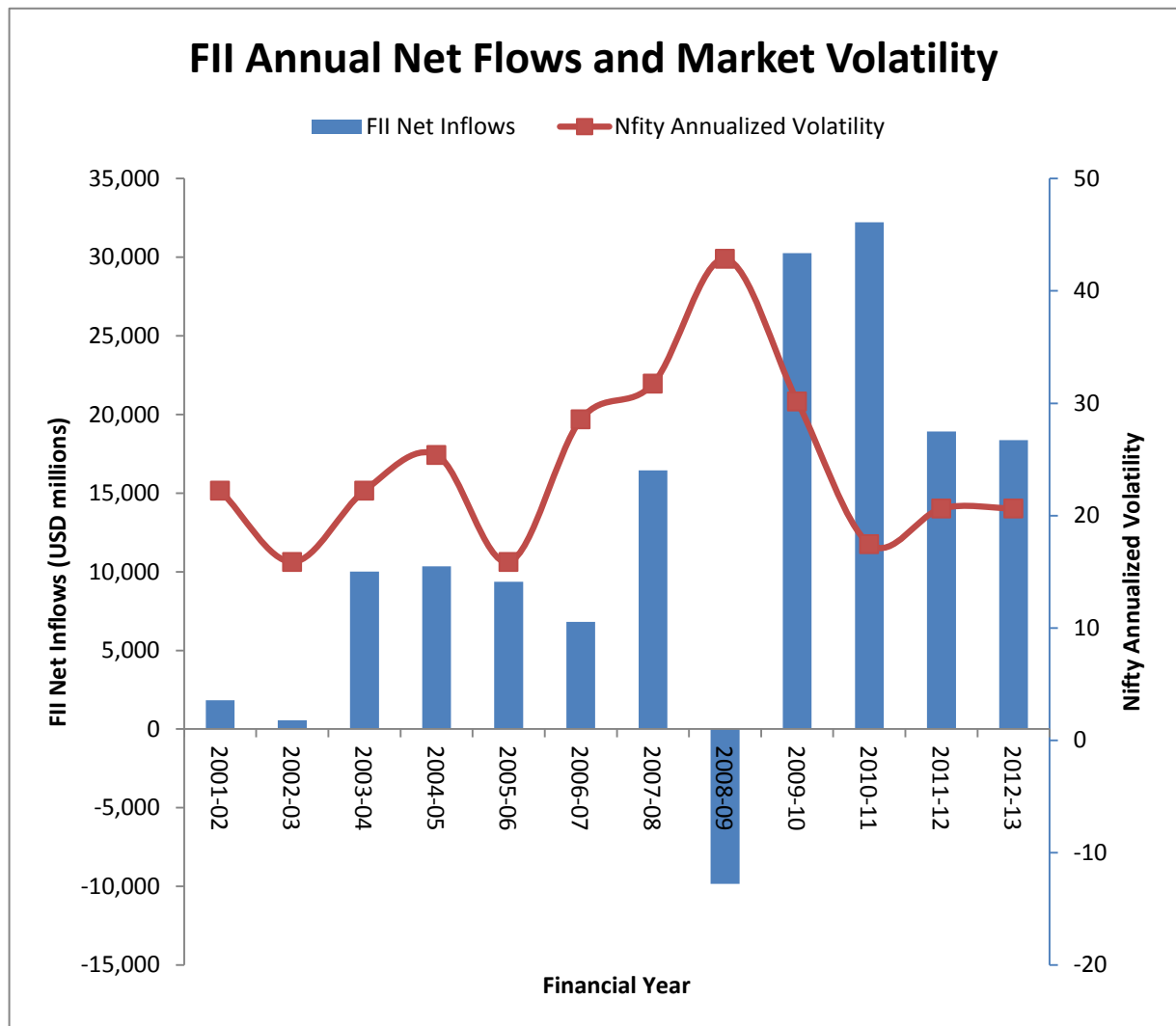


Figure 2

Cumulative abnormal returns of high innovation and low innovation portfolios in the (-5, 5) window surrounding the portfolio-formation day (Day 0)

This figure presents the behavior of cumulative daily abnormal stock returns for stocks that experience extremely high or low innovations in FII flows ($FII_NET_{i,t}$), which is defined as the difference between the FII_BUYS and FII_SELLS scaled by the total rupee value traded (across both FII and non FIIs) for the i^{th} stock on the t^{th} day. Two models are used to define shocks (innovations) in FII flows. The naive model uses FII_NET as a proxy for innovation in FII flows. The panel regression model uses the residuals obtained from a pre-defined specification to define innovations in FII flows. During the period 2006-2011, firms are ranked according to innovations in FII_NET at the beginning of every week (typically on every Monday) and sorted into five quintiles. The figures plot the cumulative difference between the abnormal returns on the highest innovation and the lowest innovation portfolios in the pre-formation window (-5, -1), the portfolio-formation day (Day 0), and in the post-formation window (0, 5). Panels A and B shows the differential abnormal returns between the high and low innovation portfolios for the naive model and the panel regression model, respectively.

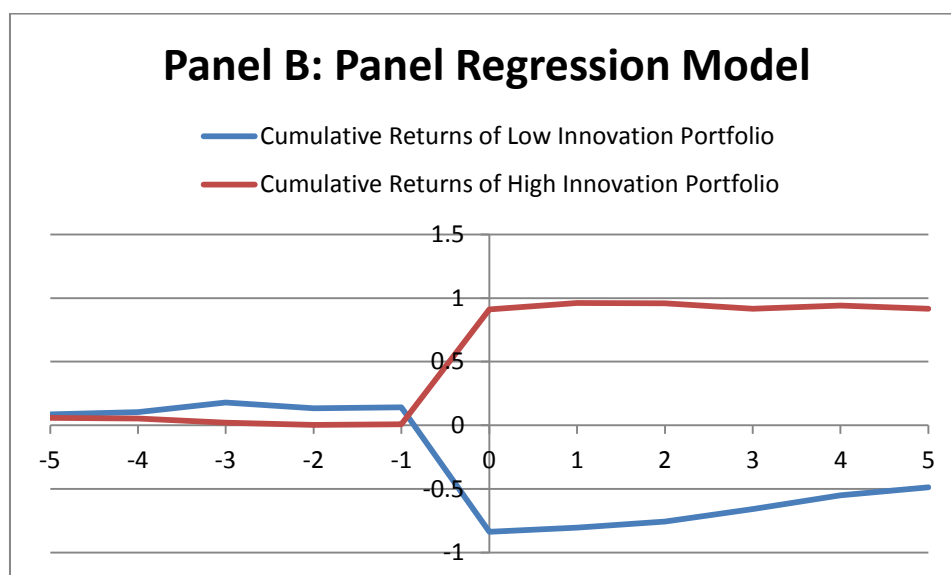
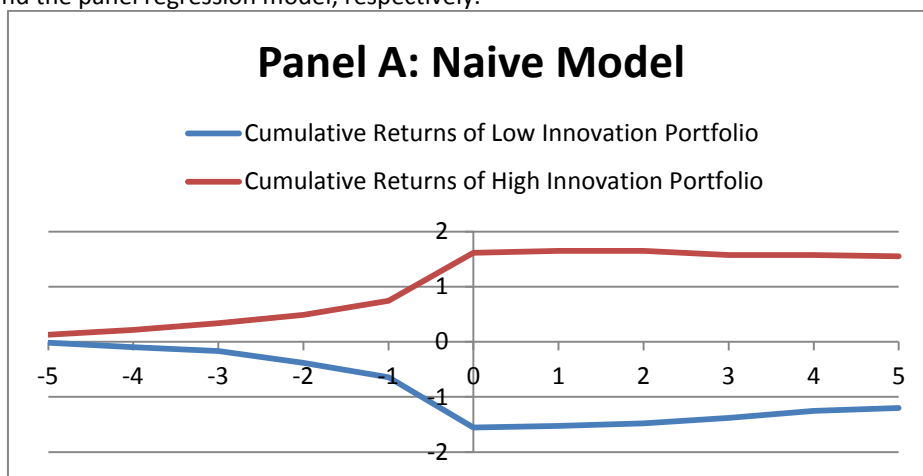


Figure 3

Time Series Variation in Abnormal Return Differential (between High Innovation and Low Innovation Portfolios) and Time Series Variation in VIX

FII flows ($FII_NET_{i,t}$) are defined as the difference between the FII_BUYS and FII_SELLS scaled by the total rupee value traded (across both FII and non FIIs) for the i^{th} stock on the t^{th} day. Two models are used to define shocks (innovations) in FII flows. The naive model uses FII_NET as a proxy for innovation in FII flows. The panel regression model uses the residuals obtained from a pre-defined specification to define innovations in FII flows. During the period 2006-2011, firms are ranked according to innovations in FII_NET at the beginning of every week (typically on every Monday) and sorted into five quintiles. The figures plot the time series relationship between the differential abnormal returns due to innovation and lagged VIX for the naive model (Panel A) and the panel regression model (Panel B).

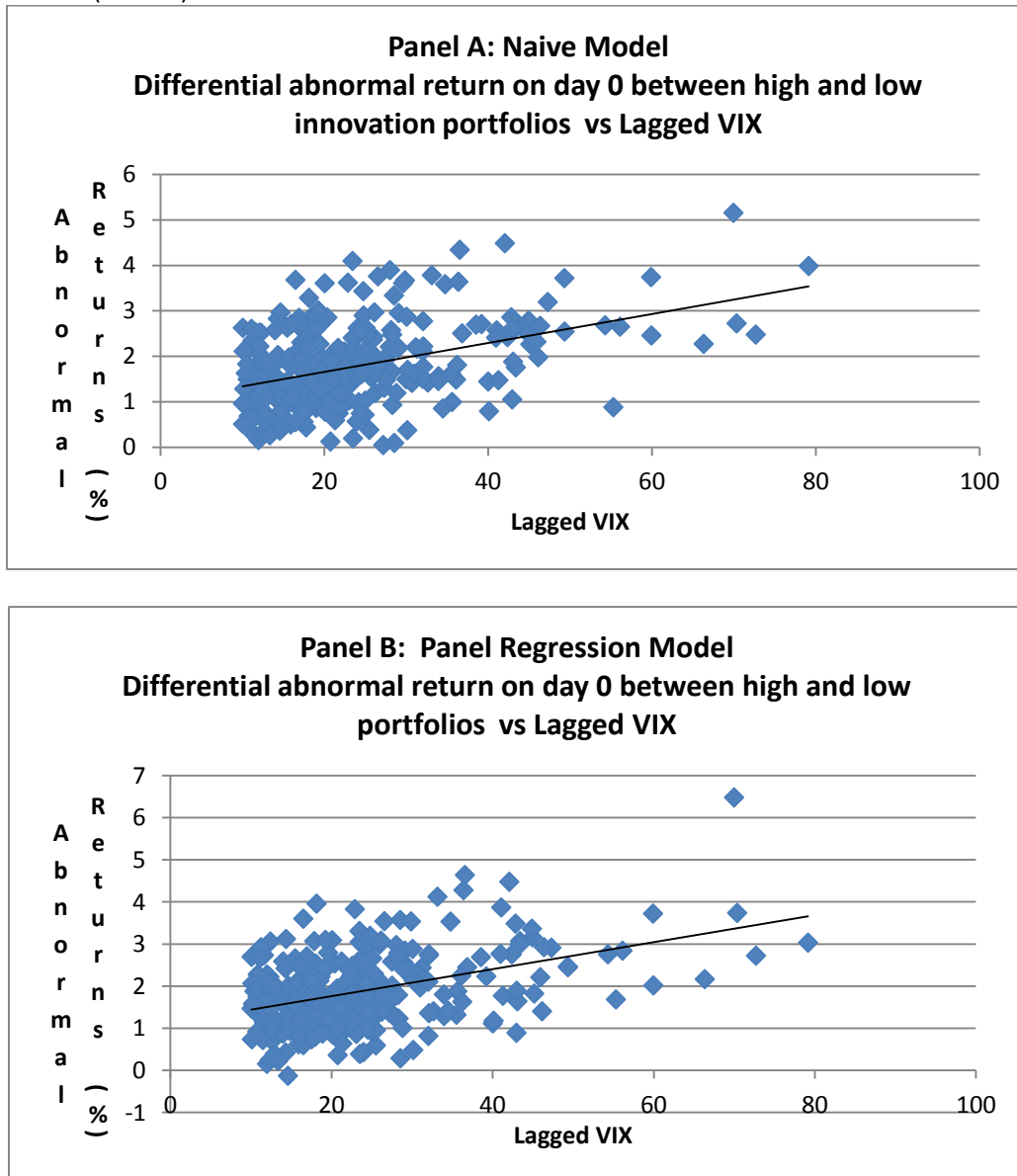
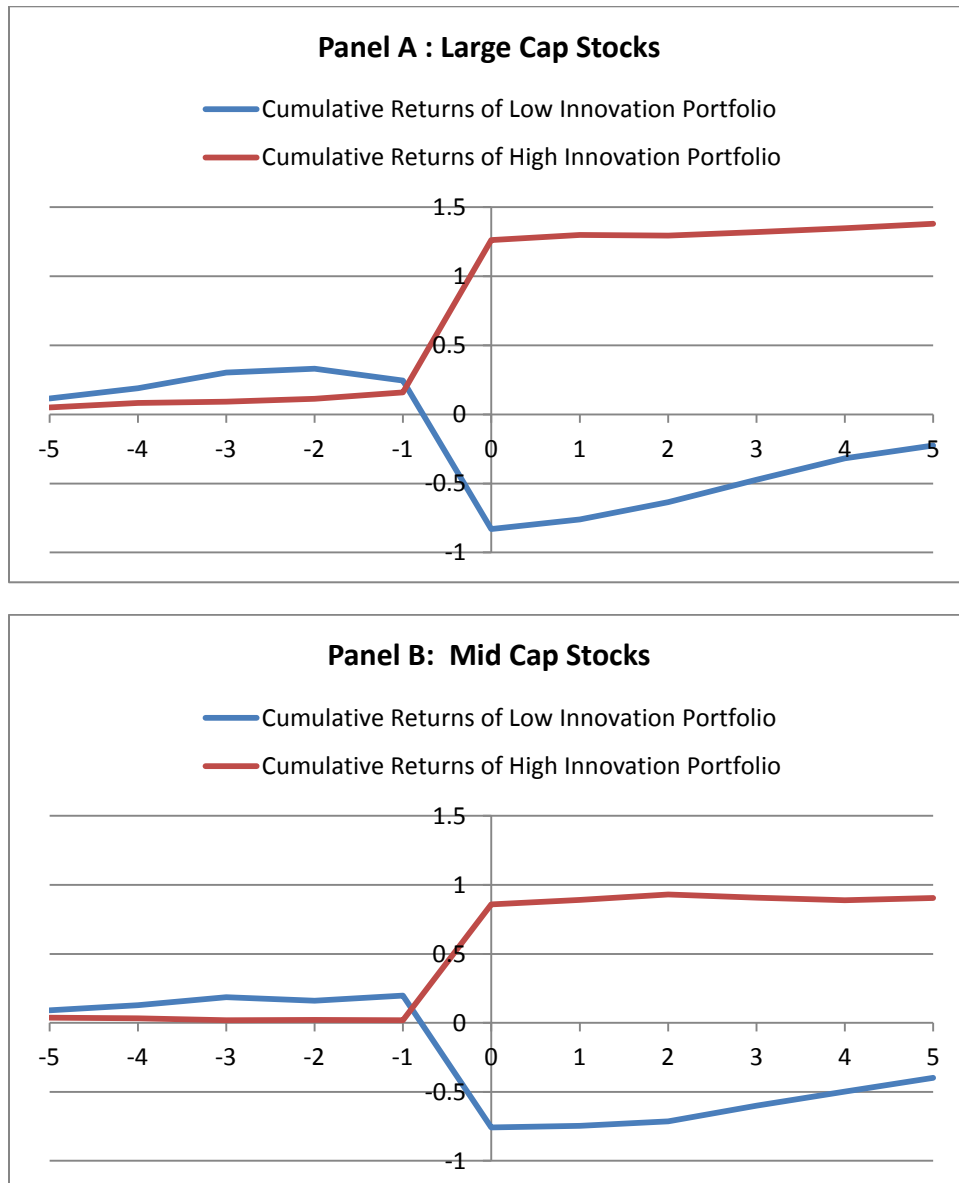


Figure 4

Cumulative Abnormal Returns around Shocks in FII Flows: Firm Size Effects

This figure presents the behavior of cumulative daily abnormal stock returns around shocks in FII flows separately for Large cap, Midcap and Small cap firms. FII flows ($FII_NET_{i,t}$) are defined as the difference between the FII_BUYS and FII_SELLS scaled by the total rupee value traded (across both FII and non FIIs) for the i^{th} stock on the t^{th} day. The panel regression model uses the residuals obtained from a pre-defined specification to define innovations in FII flows. During the period 2006-2011, firms are ranked according to innovations in FII_NET at the beginning of every week (typically on every Monday) and sorted into five quintiles. The figures plot the cumulative difference between the abnormal returns on the highest innovation and the lowest innovation portfolios in the pre-formation window (-5, -1), the portfolio-formation day (Day 0), and in the post-formation window (0, 5). Panel A shows the portfolios formed on the basis of innovations from panel regression model for large cap stocks, Panel B for mid cap stocks and Panel C for small cap stocks.



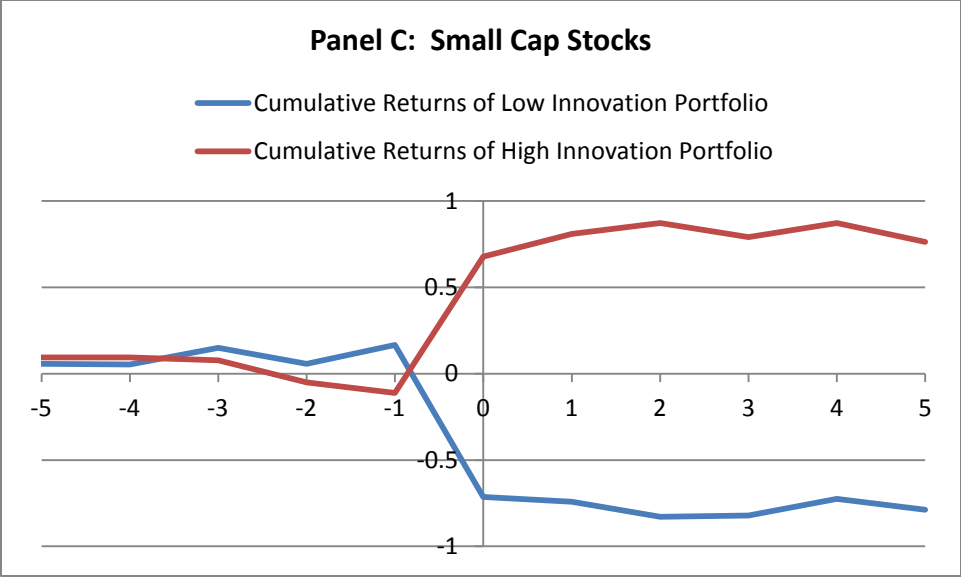


Figure 5

Cumulative Abnormal Returns around Shocks in FII flows: Effects of the Financial Crisis

This figure presents the behavior of cumulative daily abnormal stock returns around extreme shocks in FII flows (innovations) during Crisis (Jan to Dec 2008) and Non-crisis (excluding 2008: 2006-2011) periods. FII flows ($FII_NET_{i,t}$) are defined as the difference between the FII_BUYS and FII_SELLS scaled by the total rupee value traded (across both FII and non FIIs) for the i^{th} stock on the t^{th} day. The panel regression model uses the residuals obtained from a pre-defined specification to define innovations in FII flows. During the period 2006-2011, firms are ranked according to innovations in FII_NET at the beginning of every week (typically on every Monday) and sorted into five quintiles. The figures plot the cumulative difference between the abnormal returns on the highest innovation and the lowest innovation portfolios in the pre-formation window (-5, -1), the portfolio-formation day (Day 0), and in the post-formation window (0, 5). Panel A shows the portfolios formed on the basis of innovations from panel regression during Crisis period and Panel B for Non-crisis period.

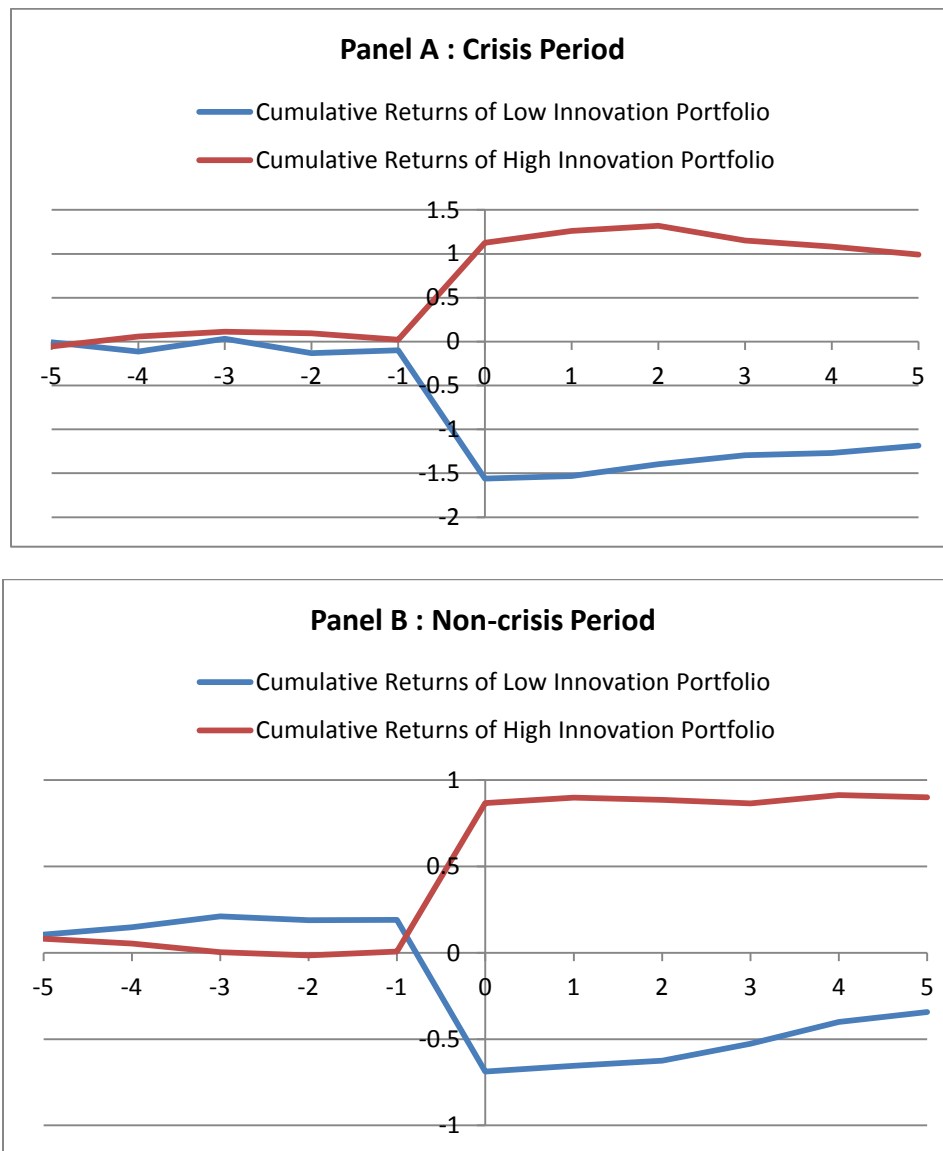


Table 1**Foreign Institutional Investor (FII) Annual Net Flows and Market Volatility**

This table shows the relationship between annual net FII flows (in USD million) and the annualized standard deviation of the daily returns on the CNX NIFTY index. Annual net FII flow is the difference between FII purchases and FII sales over a fiscal year.

Foreign Institutional Investors (FIIs) annual net flows and daily volatility in the corresponding fiscal year			
Fiscal year	Inflows from FIIs (in USD million)		CNX Nifty Volatility (%), annualized standard deviation based on daily data)
	Net	Cumulative	
2001-02	1,839	1,839	22.22
2002-03	566	2,405	15.87
2003-04	10,005	12,410	22.22
2004-05	10,352	22,762	25.39
2005-06	9,363	32,125	15.87
2006-07	6,821	38,946	28.57
2007-08	16,442	55,388	31.74
2008-09	-9,837	45,551	42.86
2009-10	30,253	75,804	30.16
2010-11	32,226	108,030	17.46
2011-12	18,923	126,953	20.63
2012-13*	18,377	145,330	20.63

Source: Based on data in the SEBI-Handbook of Statistics 2012; * until Dec 2012 only.

Table 2**Variable Definitions**

RET_{it}	Daily continuous compounded return of the i^{th} stock, $\ln(P_t/P_{t-1})$ where P_t is adjusted closing price of stock i on day t
$NIFTY_RET_t$	Daily continuous compounded return on CNX NIFTY index on day t
$S\&P500_RET_t$	Daily continuous compounded return on S&P500 Index on day t
$SIZE_{i,t}$	Market Capitalization of the stock i on day t
$RUPEE_VOLUME_{i,t}$	Total value traded for stock i on day t
$FII_BUYS_{i,t}$	Total rupee value of FII purchases for stock i on day t
$FII_SELLS_{i,t}$	Total rupee value of FII sales for stock i on day t
$FII_NET_{i,t}$	Difference between the FII_BUYS and FII_SELLS scaled by the total value traded across both FII and non-FIIs ($RUPEE_VOLUME$) for the i^{th} stock on day t
$AB_RET(t_1, t_2)$	Cumulative average abnormal returns defined as $\sum_{(t_1, t_2)} \sum_i (RET_{it} - NIFTY_RET_t)$ for all the stocks in a portfolio on day t accumulated over the interval (t_1, t_2)
$AMIHUDD_ILLIQ_{i,t}$	Ratio of absolute return over traded value on day t for stock i
$TOVER_{i,t}$	Ratio of total traded value to market capitalization
$LOCAL\ \beta_{ETA}$	Slope coefficient of the $NIFTY_RET$ in the market model regression estimated using 52 weekly returns prior to portfolio formation day, t
$GLOBAL\ \beta_{ETA}$	Slope coefficient of the $S\&P\ 500_RET$ in the market model regression estimated using 52 weekly returns prior to portfolio formation day, t
$IDIO_RISK$	Annualized standard deviation of residuals of the market model regression using 52 weekly returns prior to portfolio formation day, t
$VOLATILITY$	Annualized standard deviation of daily returns of the stock
VIX	Volatility Index value of the Chicago Board of Options Exchange (CBOE)
ΔVIX	First difference of VIX
$AGGR_FFLOW_t$	Aggregate FII Flows, defined as the difference between total FII_BUYS and total FII_SELLS scaled by the total value traded on day t for all stocks
$EXP_FFLOW_{i,t}$	Fitted value of FII_NET using firm fixed effects panel regression model
$FII_NET_INNOV_{i,t}$	Residuals from fitting a firm fixed effects panel regression model to FII_NET
$PRE\ (POST)$	Refers to the week before (after) portfolio formation day t

Table 3

Descriptive Statistics

This table presents descriptive statistics of the sample firms (228) listed on the National Stock Exchange of India (NSE) and the associated foreign institutional investor (FII) daily trading flows for the period Jan 1, 2006 to Dec 31, 2011. Panel A shows the firm characteristics. *SIZE* refers to the market capitalization of the firm, *RUPEE_VOLUME* is the daily rupee trading value of the firm, *VOLATILITY* is the annualized standard deviation of daily returns of the firm, *LOCAL_* (*GLOBAL_*) *BETA* is the slope coefficient on the NIFTY (S&P 500) index returns in the market model estimated using weekly returns, and *IDIO_RISK* is the annualized standard deviation of residuals of the market model regression using weekly returns. Panel B presents summary statistics of market wide factors: S&P 500 index returns, *VIX*, the volatility index from the Chicago Board of Options Exchange (CBOE), and the CNX NIFTY index returns. Returns are calculated as $100 \cdot \ln(P_t/P_{t-1})$ where P_t is the adjusted closing price on day t . Panel C presents summary statistics of daily FII flows (Purchases, Sales and Net) in Rs. millions. $FII_NET_{i,t}$ is the difference between the FII_BUYS and FII_SELLS scaled by the total rupee value traded across both FII and non FIIs (*RUPEE_VOLUME*) for the i^{th} stock on the t^{th} day. *AGGR_FFLOW* (aggregate FII flows) defined as (total FII_BUYS – total FII_SELLS) / total traded value on day t for all stocks. Daily stock-wise FII flow data are obtained from proprietary data provided by the National Stock Exchange. The other data are sourced from CMIE Prowess and www.finance.yahoo.com.

Variable	Mean	Median	Minimum	Maximum	Std. dev.
Panel A : Firm characteristics					
<i>RET (%) Daily Returns</i>	0.0202	-0.0397	-20.0000	20.0000	3.0382
<i>SIZE</i> (Rs. millions)	169777.89	52290.47	862.48	4681984.10	353766.20
<i>RUPEE_VOLUME</i> (Rs. millions)	412.66	145.23	4.77	6006.75	704.42
<i>AMIHUDD_ILLIQ</i>	1.66	0.06	0.00	137.60	12.76
<i>LOCAL_</i> β <i>BETA</i>	1.00	0.98	-9.61	9.63	0.48
<i>GLOBAL_</i> β <i>BETA</i>	-0.11	-0.08	-7.66	9.30	0.54
<i>VOLATILITY</i> (annualized)	47.06	47.08	22.56	72.14	9.43
<i>IDIO_RISK (%)</i>	36.16	34.13	0.00	86.18	12.42
Panel B : Market Wide Factors					
<i>NIFTY_RET (%)</i>	0.0333	0.0886	-13.0142	16.3343	1.8537
<i>S&P 500_RET (%)</i>	0.0014	0.0669	-9.4695	10.9572	1.5712
<i>VIX</i>	23.3676	21.1800	9.8900	80.8600	11.2043
ΔVIX (first difference in <i>VIX</i>)	0.0398	-0.3914	-35.0588	49.6008	7.3871
<i>AGGR_FFLOW</i>	-0.0053	-0.0020	-0.2004	0.1821	0.0439
Panel C : FII Flows					
<i>FII_BUYS</i> (Rs. millions)	81.8121	4.8677	0.0000	33788.043	272.9893
<i>FII_SELLS</i> (Rs. millions)	84.2778	3.8290	0.0000	23831.583	280.0172
<i>FII_NET</i>	0.011832	0.0000	-0.9500	0.95	0.218543

Table 4

Panel Regression Model

This table reports the results of firm fixed effects panel regression of $FII_NET_{i,t}$ on past FII_NET and past stock returns along with size and daily turnover of the firm and market wide factors. Unbalanced sample includes 228 firms and 311984 firm-day observations for the period 2006-2011.

$$FII_NET_{i,t} = FirmFEff + \sum_{j=1}^5 \beta_j FII_NET_{t-j} + \sum_{k=1}^5 \gamma_k Ret_{t-k} + \delta_1 SIZE + \delta_2 TOVER + \Phi_i MktFactors_t + \varepsilon_{i,t}$$

where $FII_NET_{i,t}$ is the difference between the FII_BUYS and FII_SELLS scaled by the total value traded (across both FII and non FIIs) for the i^{th} stock on the t^{th} day; RET_{it} is daily continuous compounded return of the i^{th} stock; $SIZE$ is log of market capitalization of the i^{th} stock on day t ; and $TOVER$ is the ratio of total traded value to market capitalization. Market wide factors include $AGGR_FFLOW$ (aggregate FII flows) defined as (total FII_BUYS – total FII_SELLS) / total traded value on day t for all stocks; level (VIX) and changes in VIX (ΔVIX); and lagged returns on S&P 500 index and NIFTY index. The table reports the coefficient estimates along with robust t-statistics. *, ** and *** indicate that the estimate value differs from zero at significance levels of 0.10, 0.05 and 0.01, respectively.

Variable	Coefficient	t-Statistic
Intercept	-0.1377	-5.1521 ***
FII_NET_{t-1}	0.2880	96.5636 ***
FII_NET_{t-2}	0.1122	41.5933 ***
FII_NET_{t-3}	0.0631	22.5920 ***
FII_NET_{t-4}	0.0438	16.3155 ***
FII_NET_{t-5}	0.0499	19.4840 ***
RET_{t-1}	0.0011	6.9012 ***
RET_{t-2}	0.0002	0.9128
RET_{t-3}	0.0001	0.3011
RET_{t-4}	-0.0004	-1.8028 *
RET_{t-5}	-0.0001	-0.4402
$AGGR_FFLOW_{t-1}$	0.1192	5.5158 ***
$SIZE$	0.0062	5.7991 ***
$TOVER$	-0.1007	-2.8580 ***
VIX_{t-1}	-0.0004	-5.8159 ***
ΔVIX_{t-1}	-0.0006	-3.6759 ***
$S\&P\ 500_RET_{t-1}$	0.0007	0.7699
$NIFTY_RET_{t-1}$	-0.0003	-0.6507
Adjusted R-square	0.19	
Durbin-Watson stat	2.00	
F-statistic	303.00 ***	
No. of observations	311984	
Number of Firms	228	

Table 5

Differential Abnormal Returns on Portfolio Formation Day (Day 0)

FII flows ($FII_NET_{i,t}$) are defined as the difference between the FII_BUYS and FII_SELLS scaled by the total value traded (across both FII and non FIIs) for the i^{th} stock on t^{th} day. During the period 2006-2011, firms are ranked according to innovations in FII_NET at the beginning of every week (typically on every Monday) and sorted into five quintiles. The mean estimate and t-statistics for the highest innovation (Q5), lowest innovation (Q1) and the difference between the highest and lowest (Q5-Q1) portfolios are reported in this table.

Panel A reports the results for portfolios formed on the basis of FII flow innovations obtained from naive model. Panel B reports the results for portfolios formed on the basis of FII flow innovations obtained from the panel regression model. The first major row reports the abnormal returns (AB_RET) – namely, excess returns over the Nifty index - in the pre-formation window (-5, -1), the portfolio-formation day (Day 0), and the post-formation window (0, 5). The second major row reports the firm characteristics of the highest (Q5), lowest (Q1) and the difference between the Q5-Q1 portfolios. $PRE_ (POST_) VOLATILITY$ is the annualized standard deviation of daily returns for 5 days before (after) the day of portfolio formation; $PRE_ (POST_) RUPEE_ VOLUME$ is the average of daily rupee trading value in Rs. millions during the 5 days before (after) the day of portfolio formation; $PRE_ (POST_) SIZE$ is the average market capitalization in Rs Millions of the firm during five days before (after) the day of portfolio formation; $PRE_LOCAL_ (GLOBAL_) \beta$ is the slope coefficient on the NIFTY (S&P 500) index in the market model regression estimated using 52 weekly returns prior to the day of portfolio formation; and $IDIO_RISK$ is the annualized standard deviation of residuals of the market model regression. The number of stocks in the sample is 228. *, ** and *** indicate that the estimate value differs from zero at significance levels of 0.10, 0.05 and 0.01, respectively.

Panel A: Naive Model of FII flow Innovations

	Q1		Q5		Q5-Q1	
	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat
Return behavior around the days of shocks in FII_NET						
$AB_RET (-5, -1) \%$	-0.68	-15.7***	0.55	13.48***	1.24	20.67***
$AB_RET (-1, 0) [Day 0 Returns] \%$	-0.91	-42.2***	0.87	38.93***	1.78	57.32***
$AB_RET (0, 5) \%$	0.29	5.68***	-0.15	-3.13***	-0.44	-6.26***
Firm characteristics						
PRE_RUPEE_VOLUME	470.74	55.22***	358.40	52.33***	-112.34	-10.28***
$POST_RUPEE_VOLUME$	485.57	54.73***	367.04	51.83***	-118.53	-10.45***
$PRE_AMIHUDD_ILLIQ$	2.03	1.17	0.24	11.56***	-1.79	-1.03
$POST_AMIHUDD_ILLIQ$	0.12	16.19***	0.38	2.02**	0.26	1.37
PRE_SIZE	215001	59.79***	180416	57.15***	-34584.20	-7.23***
$POST_SIZE$	212124	59.96***	183371	57.05***	-28752.66	-6.02***
PRE_LOCAL_BETA	0.95	218.27***	0.90	165.96***	-0.06	-8.18***
$POST_LOCAL_BETA$	0.95	234.89***	0.91	141.48***	-0.04	-5.51***
PRE_GLOBAL_BETA	-0.10	-21.41***	-0.09	-9.47***	0.00	0.37
$POST_GLOBAL_BETA$	-0.09	-20.39***	-0.11	-7.81***	-0.02	-1.36
$PRE_VOLATILITY (\%)$	2.36	165.61***	2.32	166.31***	-0.64	-2.03**
$POST_VOLATILITY (\%)$	2.41	165.89***	2.34	164.38***	-1.21	-3.73***
$PRE_IDIO_RISK (\%)$	4.78	335.99***	4.79	342.60***	0.06	0.44
$POST_IDIO_RISK (\%)$	4.77	336.01***	4.78	343.14***	0.07	0.47

Panel B: Panel Regression Model of FII Flow Innovations

	Q1		Q5		Q5-Q1	
	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat
Return behavior around the days of shocks in <i>FII_NET</i>						
<i>AB_RET</i> (-5, -1) %	-0.01	-0.13	-0.11	-2.68***	-0.10	-1.75*
<i>AB_RET</i> (-1, 0) [<i>Day 0 Returns</i>] %	-0.98	-44.8***	0.90	39.93***	1.88	59.88***
<i>AB_RET</i> (0, 5) %	0.28	5.44***	-0.08	-1.73*	-0.36	-5.13***
Firm characteristics						
<i>PRE_RUPEE_VOLUME</i>	385.36	52.84***	381.29	54.62***	-4.08	-0.40
<i>POST_RUPEE_VOLUME</i>	397.01	51.67***	389.24	54.24***	-7.77	-0.74
<i>PRE_AMIHUD_ILLIQ</i>	2.46	1.40	0.30	6.65***	-2.15	-1.23
<i>POST_AMIHUD_ILLIQ</i>	0.34	7.33***	0.25	11.30***	-0.09	-1.69*
<i>PRE_SIZE</i>	189061	58.62***	188702	57.43***	-359.03	-0.08
<i>POST_SIZE</i>	186898	58.81***	191315	57.32***	4417.39	0.96
<i>PRE_LOCAL_BETA</i>	0.92	142.43***	0.92	189.61***	0.00	-0.31
<i>POST_LOCAL_BETA</i>	0.91	225.15***	0.92	179.19***	0.01	1.30
<i>PRE_GLOBAL_BETA</i>	-0.10	-9.40***	-0.10	-11.64***	0.00	0.01
<i>POST_GLOBAL_BETA</i>	-0.11	-13.09***	-0.10	-15.63***	0.01	0.83
<i>PRE_VOLATILITY</i> (%)	2.31	163.52***	2.32	169.50***	0.01	0.52
<i>POST_VOLATILITY</i> (%)	2.39	164.46***	2.37	166.41***	-0.03	-1.43
<i>PRE_IDIO_RISK</i> (%)	4.77	344.72***	4.78	339.79***	0.09	0.66
<i>POST_IDIO_RISK</i> (%)	4.76	344.77***	4.77	340.35***	0.10	0.68

Table 6

Time Series Variation in Returns of Innovation-based Portfolios

FII flow (FII_NET_{it}) is defined as the difference between the FII_BUYS and FII_SELLS scaled by the total value traded (across both FII and non FIIs) for the i^{th} stock on t^{th} day. Firms are ranked according to innovations in FII flows at the beginning of every week (typically on every Monday) and sorted into five quintiles. Q5 refers to the high innovation portfolio and Q1 refers to the low innovation portfolio.

This table reports the results of regressions relating the difference between the abnormal returns (AB_RET) on the highest (Q5) and lowest innovation (Q1) portfolios (Y_t) to pre-formation firm specific characteristics (X_t), expected FII flows (EXP_FFLOW), unexpected FII flows (FII_NET_INNOV) and market-wide factors (Z_{t-1}),

$$Y_t = \alpha_0 + \beta X_t + \gamma Z_{t-1} + \delta EXP_FFLOW + \tau FII_NET_INNOV + \varepsilon_t.$$

The dependent variable in the first major column is the difference between abnormal returns on the highest and lowest innovation portfolio on the portfolio formation day. The vector X_t includes mean difference between highest and lowest quintile portfolio for pre-formation firm characteristics: $LOCAL_BETA$ is the slope coefficient on the CNX NIFTY (S&P 500) index returns in the market model regression estimated using 52 weekly returns prior to portfolio formation day; $IDIO_RISK$ is the standard deviation of the residuals obtained from the market model regression; $SIZE$ is the average market capitalization; $RUPEE_VOLUME$ is the daily average traded value; $VOLATILITY$ is the standard deviation of daily returns over five days prior to the day of portfolio formation day. Expected FII flows (EXP_FFLOW) and unexpected FII flows (FII_NET_INNOV) are based on the predicted values and the residual values of the panel regression model. The vector Z_t includes the market wide factors: $AGGR_FFLOW$ (aggregate FII flows) defined as (total FII_BUYS – total FII_SELLS) / total traded rupee value on day t for all stocks; VIX and changes in VIX (ΔVIX); and lagged returns on S&P 500 index and NIFTY index. The sample consists of 315 weekly observations. The number of stocks in the sample is 228. The table reports coefficient estimates and robust Newey-West t-statistics, calculated with three lags. *, ** and *** indicate that the estimate value differs from zero at significance levels of 0.10, 0.05 and 0.01, respectively.

Q5 (High) - Q1 (Low)	Day 0 Abnormal Returns, AB_RET (-1,0)					
	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat
Intercept	1.89	37.71***	1.10	10.01***	-0.55	-1.25
$AMIHUDD_ILLIQ$	0.00	2.11**	0.00	5.14***	0.00	4.54***
$\text{Log}(RUPEE_VOLUME)$	0.06	0.43	-0.07	-0.57	-0.10	-0.84
$\text{Log}(SIZE)$	-0.13	-0.87	-0.08	-0.55	-0.03	-0.19
$LOCAL_BETA$	0.00	0.01	0.01	0.02	0.22	0.94
$GLOBAL_BETA$	0.08	0.39	0.14	0.78	0.17	0.97
$VOLATILITY$	-0.11	-0.54	-0.08	-0.62	-0.04	-0.28
$IDIO_RISK$	-0.11	-0.61	-0.13	-0.87	-0.08	-0.50
$NIFTY_RET_{t-1}$	–		0.06	1.91*	0.05	1.66
$S\&P\ 500_RET_{t-1}$	–		-0.04	-0.40	-0.04	-0.48
VIX_{t-1}	–		0.03	6.95***	0.03	6.70***
ΔVIX_{t-1}	–		0.01	0.69	0.01	0.57
$AGGR_FFLOW_{t-1}$	–		-2.25	-1.92	-1.12	-0.93
EXP_FFLOW	–				1.23	0.88
FII_NET_INNOV	–				1.98	1.14
Adjusted R-square	-0.02		0.20		0.24	
F-statistic	0.30		7.44***		8.05***	

Table 7

Fama-MacBeth Cross-sectional Regressions

On each portfolio-formation day, a cross sectional regression of returns on pre-formation firm specific characteristics is performed. FII flow ($FII_NET_{i,t}$) is defined as the difference between the FII_BUYS and FII_SELLS scaled by the total value traded (across both FII and non FIIs) for the i^{th} stock on t^{th} day. $LOCAL_ (GLOBAL_) \beta ETA$ is the slope coefficient on the CNX NIFTY (S&P 500) index returns in the market model regression estimated using 52 weekly returns prior to the day of portfolio formation, $IDIO_RISK$ is the standard deviation of the residuals obtained from the market model regression; $SIZE$ is the average market capitalization; $RUPEE_VOLUME$ is the daily average traded value; $VOLATILITY$ is the standard deviation of daily returns over five days prior to the day of portfolio formation. The number of stocks in the sample is 228.

$$RET_{it} = \alpha_0 + \alpha_1 * FirmFactors + \varepsilon_{it}; i = 1 \text{ to } 228 \text{ and for every } t$$

Panel A. This panel reports time series average of the coefficient estimates and t-stats calculated using time-series standard error of the estimates for Fama MacBeth regressions performed on each portfolio formation day.

	Estimate	t-stat
Dependent Variable: Day 0 Returns, $AB_RET (-1, 0) \%$		
Intercept	0.53	1.38
$PRE_AMIHUDD_ILLIQ$	-0.03	-0.57
$\text{Log}(PRE_RUPEE_VOLUME)$	0.00	-0.10
$\text{Log}(PRE_SIZE)$	-0.02	-0.85
PRE_LOCAL_BETA	-0.05	-0.74
PRE_GLOBAL_BETA	-0.04	-0.88
$PRE_VOLATILITY$	0.00	0.28
PRE_IDIO_RISK	0.00	0.18
Average Adjusted R-sq		0.074

Panel B. Residuals from the Fama-MacBeth regression model are regressed against market wide factors: $AGGR_FFLOW$ (aggregate FII flows) defined as (total FII_BUYS – total FII_SELLS) / total traded rupee value on day t for all stocks; VIX and changes in VIX (ΔVIX); and lagged returns on S&P 500 index and NIFTY index. The panel reports results for the estimates and robust t-stats for difference in abnormal returns on Day 0 between the highest innovation (Q5) and the lowest innovation (Q1) portfolios. *, ** and *** indicate that the estimate value differs from zero at significance levels of 0.10, 0.05 and 0.01, respectively.

Q5 (High) - Q1 (Low)	Estimate	t-stat
Intercept	0.99	9.27***
$AGGR_FFLOW_{t-1}$	-1.70	-1.63
$NIFTY_RET_{t-1}$	0.05	1.62
$S\&P\ 500_RET_{t-1}$	-0.10	-1.39
VIX_{t-1}	0.03	5.56***
ΔVIX_{t-1}	0.00	0.14
Adjusted R-Square		0.19
F-statistic		15.85***

Table 8

Size Effect

This table presents the differential abnormal returns between stocks experiencing high innovation in FII flows (excess purchases) and stocks experiencing low innovations in FII flows (excess sales). FII flow ($FII_NET_{i,t}$) is defined as the difference between the FII_BUYS and FII_SELLS scaled by the total value traded (across both FII and non FIIs) for the i^{th} stock on t^{th} day. Firms are ranked according to innovations in FII flows at the beginning of every week (typically on every Monday) and sorted into five quintiles. Q5 refers to the high innovation portfolio and Q1 refers to the low innovation portfolio. Q5-Q1 refers to the differential abnormal returns between the Q5 and Q1 portfolios.

The panels below report mean value and t-statistics for the abnormal returns on the highest innovation (Q5), the lowest innovation (Q1) portfolios and their (Q5-Q1) difference in the pre-formation window (-5, -1), the portfolio-formation day (Day 0), and the post-formation window (0, 5). The first, second and third major row reports for Large cap, Mid cap and Small cap stocks, respectively. The number of stocks in the sample is 228. *, ** and *** indicate that the estimate value differs from zero at significance levels of 0.10, 0.05 and 0.01, respectively.

SIZE	Q1		Q5		Q5-Q1	
	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat
Large Cap						
$AB_RET(-5, -1) \%$	0.07	0.92	0.04	0.59	-0.03	-0.28
$AB_RET(-1, 0) [Day\ 0\ Returns] \%$	-1.07	47.83***	1.10	46.98***	2.18	37.89***
$AB_RET(0, 5) \%$	0.53	5.74***	0.02	0.26	-0.51	-3.91***
Mid Cap						
$AB_RET(-5, -1) \%$	0.04	0.64	-0.08	1.36	-0.12	-1.40
$AB_RET(-1, 0) [Day\ 0\ Returns] \%$	-0.95	69.43***	0.84	49.11***	1.79	39.95***
$AB_RET(0, 5) \%$	0.28	3.96***	-0.05	0.74	-0.33	-3.34***
Small Cap						
$AB_RET(-5, -1) \%$	0.06	0.66	-0.25	2.70***	-0.32	-2.34**
$AB_RET(-1, 0) [Day\ 0\ Returns] \%$	-0.88	23.16***	0.79	19.29***	1.67	23.82***
$AB_RET(0, 5) \%$	-0.12	1.09	0.03	0.30	0.16	0.98

Table 9

Impact of FII flows during Periods of Market Stress

This table presents the differential abnormal (excess return over NIFTY index) returns between stocks experiencing high innovation in FII flows (excess purchases) and stocks experiencing low innovations in FII flows (excess sales) during periods of global market stress. FII flow ($FII_NET_{i,t}$) is defined as the difference between the FII_BUYS and FII_SELLS scaled by the total value traded (across both FII and non FIIs) for the i^{th} stock on t^{th} day. Firms are ranked according to innovations in FII flows at the beginning of every week (typically on every Monday) and sorted into five quintiles. Q5 refers to the high innovation portfolio and Q1 refers to the low innovation portfolio. Q5-Q1 refers to the differential abnormal returns between the Q5 and Q1 portfolios.

Panel B divides the sample into days associated with high VIX and low VIX. The panels below report mean estimates and t-statistics for the abnormal returns (AB_RET) on the highest innovation (Q5), lowest innovation (Q1) and the difference between highest and lowest (Q5-Q1) portfolios in the pre-formation window (-5, -1), the portfolio-formation day (Day 0), and the post-formation window (0, 5). Panel A examines the impact of the financial crisis by considering two sub-samples for non-crisis (first major row) and the crisis period (second major row). Panel B divides the sample into days associated with High (above its median) VIX (first major row) and Low (below its median) VIX (second major row). The number of stocks in the sample is 228. *, ** and *** indicate that the estimate value differs from zero at significance levels of 0.10, 0.05 and 0.01, respectively.

Panel A : Impact of FII Flows - Financial Crisis

Non-Crisis Period	Q1		Q5		Q5-Q1	
	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat
$AB_RET (-5, -1) \%$	0.04	0.93	-0.12	2.90***	-0.16	-2.65***
$AB_RET (-1, 0) [Day 0 Returns] \%$	-0.88	85.23***	0.86	173.42***	1.74	54.98***
$AB_RET (0, 5) \%$	0.29	5.75***	-0.03	0.70	-0.32	-4.51***
Crisis Period						
$AB_RET (-5, -1) \%$	-0.23	1.70*	-0.06	0.45	0.17	0.90
$AB_RET (-1, 0) [Day 0 Returns] \%$	-1.46	31.47***	1.10	17.15***	2.56	25.52***
$AB_RET (0, 5) \%$	0.22	1.35	-0.32	2.19	-0.54	-2.47**

Panel B: Impact of FII Flows - VIX

High VIX days	Q1		Q5		Q5-Q1	
	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat
$AB_RET (-5, -1) \%$	0.03	0.50	-0.02	0.36	-0.06	-0.61
$AB_RET (-1, 0) [Day 0 Returns] \%$	-1.09	90.04***	1.03	64.85***	2.12	43.87***
$AB_RET (0, 5) \%$	0.32	4.19***	-0.13	1.82*	-0.46	-4.26***
Low VIX days						
$AB_RET (-5, -1) \%$	-0.05	0.87	-0.21	4.11***	-0.16	-2.10**
$AB_RET (-1, 0) [Day 0 Returns] \%$	-0.85	75.99***	0.76	55.16***	1.62	41.59***
$AB_RET (0, 5) \%$	0.22	3.61***	-0.03	0.47	-0.25	-2.88***

Table 10

Robustness Checks

This table presents the differential abnormal returns between stocks experiencing high innovation in FII flows (excess purchases) and stocks experiencing low innovations in FII flows (excess sales). FII flow ($FII_NET_{i,t}$) is defined as the difference between the FII_BUYS and FII_SELLS scaled by the total value traded (across both FII and non FIIs) for the i^{th} stock on t^{th} day. Firms are ranked according to innovations in FII flows at the beginning of every week (typically on every Monday) and sorted into five quintiles. Q5 refers to the high innovation portfolio and Q1 refers to the low innovation portfolio. Q5-Q1 refers to the differential abnormal returns between the Q5 and Q1 portfolios.

The panels below report mean value and t-statistics for the abnormal returns on the highest innovation (Q5), the lowest innovation (Q1) portfolios and their (Q5-Q1) difference in the pre-formation window (-5, -1), the portfolio-formation day (Day 0), and the post-formation window (0, 5). In Panel A, we re-define FII flow innovations on the basis of past cumulative innovations over the last five days. The pre-formation window relevant in this case is (-10, -5). In Panel B, we examine out-of-sample (Jan 2012- Jun 2013) behavior of the panel regression model used to define FII flow innovations. FII flow innovations in the out-of-sample period are based on the panel regression model constructed from in-sample data over the period 2006-2011. The number of stocks in the sample is 228. *, ** and *** indicate that the estimate value differs from zero at significance levels of 0.10, 0.05 and 0.01, respectively.

	Q1		Q5		Q5-Q1	
	Estimate	t-stat	Estimate	t-stat	Estimate	t-stat
Panel A: Cumulative Innovation in FII flows						
$AB_RET (-10, -5)\%$	0.37	6.29***	0.06	1.09	-0.31	-3.77***
$AB_RET (-5, -1) \%$	-1.61	160.90***	1.44	116.21***	3.04	51.07***
$AB_RET (-1, 0) [Day 0 RET]\%$	-0.40	23.61***	0.41	23.91***	0.81	25.33***
$AB_RET (0, 5) \%$	0.43	9.09***	-0.13	2.65***	-0.56	-7.99***
Panel B : Out of Sample data						
$AB_RET (-5, -1) \%$	-0.18	2.57**	0.08	1.30	0.26	2.77***
$AB_RET (-1, 0) [Day 0 Returns] \%$	-0.79	37.80***	0.76	38.61***	1.55	33.87***
$AB_RET (0, 5) \%$	0.19	2.35**	-0.02	0.22	-0.21	-1.88*