An Empirical Evidence of Dynamic Interaction Between Institutional Fund Flows and Stock Market Returns in India

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Abstract

This study examined the relationship between institutional investment flow and stock returns using daily data over the period of January 1, 2002 to July 31, 2012. The analysis was conducted using two and three factors vector autoregression (VAR) frameworks, in which we considered investment flow of two sets of institutional investors, that is, foreign institutional investors (FIIs) and domestic institutional investors (DIIs) proxied by mutual funds, separately as well as jointly, to form the endogenous part in VAR. The analysis for each institutional investor group revealed that FIIs flow did not have any significant impact on market returns, but the DIIs investment flow did have a significant impact. We also found that the fund flow from both the investor groups was significantly affected by their own lags and lagged stock returns, implying that they followed their own past strategy as well as the recent market behaviour, albeit their trading strategy differed. Considering these two institutional investor groups jointly, we found that the net flow of FIIs and DIIs significantly influenced the Indian stock market even after controlling for market fundamentals. Furthermore, we found a feedback relationship between the institutional investment flow and stock market returns. Overall, it was found that the institutional investment collectively impacted the stock market returns.

Keywords: **institutional investment, mutual fund flows, foreign institutional investment, stock returns**

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The decision of opening up the Indian equity market to international investors encourages larger participation of foreign institutional investors (FIIs) into the Indian capital market. FIIs and domestic institutional investors (DIIs) such as Indian mutual funds constitute a major chunk of investment from the international and domestic investors. During the last decade, the total assets under their management amounted to around 20% of the total market capitalization. These two sets of institutional investors have become an integral part of the Indian capital market (Mukherjee & Roy, 2011). The net investment of FIIs rose sharply from ₹ 9933.40 crores in the year 2000-01 to ₹ 93725.50 crores in the year 2011-12; and the net investment of mutual funds rose significantly to ₹ 333462.9 crores in 2011-12 from ₹ 2256.51 crores in 2000-01 (SEBI, n.d.). However, the trading behavior of FIIs and DIIs in India is quite different. In this study, we investigate the interrelationship of these two sets of institutional investors; and whether their activities indeed affect the overall stock market in India. It is expected that the analysis will provide an insight of the investment strategies of these two sets of institutional investors who are highly regulated by prudent financial investors, and their impact upon the stock market behavior.

The literature provides three prominent hypotheses in order to explain this relationship. First, the feedback trading hypothesis (Davidson & Dutia, 1989; DeLong, Shleifer, Summers, & Waldmann,1990) that postulates a

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positive relationship between institutional investment and lagged stock returns (also known as the positive feedback trading or momentum trading). Second, the price pressure hypothesis (Harris & Gurel, 1986; Shleifer, 1986) that presumes the stock returns to be positively related with contemporaneous fund flows but negatively related with lagged fund flows. Third, the information revelation hypothesis (Lee, Shleifer, & Thaler, 1991) which states that institutions make the use of available information, thereby timing their trade better.

Most of the previous empirical studies - that have documented that the institutional investment flows are highly correlated with stock returns - have largely focused on mutual fund flows of developed countries. For example, Warther (1995), Grinblatt, Titman, and Wermers (1995), Wermers (1999), Nofsinger and Sias (1999), and Bennett, Sias, and Starks (2003) documented that institutional fund flows are positively related with contemporaneous returns. Boyer and Zheng (2009) documented similar findings for mutual funds and foreign investors. Edelen and Warner (2001) found that flows are positively related with contemporaneous and lagged market returns. On the other hand, Gompers and Metrick (2001) found that the lagged returns are negatively related to institutional flows once they are controlled for market capitalization. Yan and Zhang (2009) showed that this relationship is driven by short-term institutions, and documented that trading of these institutions forecasts future stock returns. Rakowski and Wang (2009) concluded that fund investors follow the contrarian strategy. Oh and Parwada (2007) documented similar findings for the Korean mutual fund industry. Their analysis revealed that fund flows are positively related to stock purchases and sales, but negatively associated with net flows. Fortune (1998) and Alexakis, Niarchos, Patra, and Poshakwale (2005) documented a positive contemporaneous relationship as well as a bi-directional relationship between market returns and fund flows. Overall, these studies provide a mixed result regarding the interaction of stock market returns and institutional investment flows.

In the Indian context, Mukherjee, Bose, and Coondoo (2002) found that stock returns had a significant impact on FIIs flows, but changes in FIIs flows did not have a significant impact on stock returns. Thenmozhi and Kumar (2009) analyzed the interaction between mutual fund flows and stock returns, and documented a positive concurrent relationship between market returns and fund flows. Sehgal and Tripathi (2009) compared the investment behaviour of mutual funds and FIIs, and found that stock market returns caused both FII flows and mutual fund flows. Their study concluded that domestic institutional investors reacted late to market movement as compared to FIIs. Mukherjee and Roy (2011) documented that mutual funds influenced the decision of FIIs when they invested in equity, whereas, FIIs' decision was opposite to mutual funds. Moreover, their findings indicated a one-way causation from returns to FII investment, and a bi-directional causality between mutual fund flows and market returns. On the contrary, Thiripalraju and Acharya (2011) found a bi-directional causality between FIIs investment and stock market returns, and a one-way causation between returns and mutual fund flows, that is, market returns cause mutual fund flow. Furthermore, this study also found that while mutual fund investment was negatively related to lagged market returns, a positive relationship was evident between FIIs' investment and lagged returns.

Bose (2012) took the mutual fund flows and FIIs fund flows simultaneously and examined their impact on stock market returns for the post financial-crisis period over 2008 to 2012. She concluded that stock returns were determined by their own past values and lagged FIIs investment, but not by mutual funds. Majumder and Nag (2013) considered the after crisis period data and found that FII flows had no significant effects on stock price volatility. Past studies have also attempted to compare the role of mutual funds and foreign institutional investors (Bose, 2012; Yadav & Yadav, 2012).

Our approach differs from the previous studies based on Indian data in the following three folds and extends the growing empirical literature. While most of the previous studies have considered the analysis either between FIIs and returns/volatility (Chakrabarti, 2002; Majumder & Nag, 2013 ; Mukherjee et al., 2002; Thenmozhi & Kumar, 2009; Thiripalraju & Acharya, 2011, among others) or between mutual funds and stock returns/volatility (Sehgal & Tripathi, 2009; Thenmozhi & Kumar, 2009; Thiripalraju & Acharya, 2011 among others), the present study goes one step forward and analyses the relationship by considering the two sets of institutional investors individually as well as jointly within the same framework as attempted by Bose (2012). Unlike Bose (2012), who considered the after crisis period only, we took a longer period spanning from 2002 to 2012 and controlled the

crisis period with a dummy variable. Furthermore, as suggested by Cha and Lee (2001), we compared our analysis by considering a set of market fundamental variables and a financial crisis dummy as an exogenous factor in the system.

Data and Methods

Data Sources : Daily closing price data of BSE Sensex and market capitalization were obtained from PROWESS database of CMIE. The closing prices were then converted as :

$$r_t = \ln\left(\frac{P_t}{P_{t-1}}\right)$$

where, r_t is the compounded return at time *t,* and P_t and P_{t-1} are the daily stock index at the two successive days *t* and *t-1* respectively. Daily data on the institutional equity investment flow (purchase, sales, and net) of FIIs and mutual funds were obtained from the Securities and Exchange Board of India (SEBI). Following Warther (1995), Goetzmann and Massa (2003) and Oh and Parwada (2007), we normalized all the flow variables by a rolling 90-day moving average of the BSE Sensex market capitalization in order to control for the market and fund growth. Thus, for example, *STDPUR= PURCHASE/ROLLMCAP*, where *STDPUR* is the standardized flows, *PURCHASE* is the raw inflows before standardization, and *ROLLMCAP* are the rolling moving average of the market capitalization in the past 90 trading days.

Similarly, *STDSALES = SALES/ROLLMCAP* and *STDNET = NET/ROLLMCAP* were calculated for both FIIs and mutual fund flows. We used three types of market fundamental variables namely, dividend yield, exchange rate (INR vs. US$), and the short term interest rate proxied by call money lending rate to further analyze whether institutional equity investments affected market returns in the presence of these fundamentals. Daily data on exchange rate and call money rate were obtained from Reserve Bank of India (RBI), and the dividend yields were obtained from Bombay Stock Exchange (BSE). Following Oh and Parwada (2007), we considered a 5 days moving average on the data of all the three fundamental variables. The sample period for final analysis ranges from January 1, 2002 to July 31, 2012. We also introduced a dummy variable in order to control the impact of financial crisis by considering a value of 1 from January 8, 2008 to March 9, 2009 (the bear market period in India due to the U.S. subprime crisis) and 0 otherwise.

Methodology : In order to analyze the dynamic relationship between institutional (FIIs and MFs) investment flows and stock market returns, this study used a vector autoregression (VAR) approach. The basic *p* -lag VAR model in its general form, may be defined as :

$$Y_t = c + \Phi_1 Y_{t-1} + \Phi_2 Y_{t-2} + \ldots\ldots\ldots\ldots + \Phi_p Y_{t-p} + \varepsilon_t, \qquad t = 1,2,3\ldots\ldots\ldots T \qquad (1)$$

where $Y_t = (y_{1t}, y_{2t} \ldots\ldots\ldots\ldots y_{nt})'$ is a vector of $(n \times 1)$ time series variables, *c* is a *k*-vector of intercepts, Φ_i are $(n \times n)$ coefficient matrices with all eigenvalues of Φ having moduli less than 1 to satisfy the stationary property of time series, and ε_t is an $(n \times 1)$ i.i.d zero mean white noise error vector process with time invariant covariance matrices $\sum$. With the stochastic exogenous variables and seasonal dummy variable or linear time trend, the general form of VAR*(p)* model can be defined as :

$$Y_t = c + \Phi_1 Y_{t-1} + \Phi_2 Y_{t-2} + \ldots\ldots\ldots\ldots + \Phi_p Y_{t-p} + D_t + \psi X_t + \varepsilon_t, \qquad t = 1,2,3\ldots\ldots\ldots T \qquad (2)$$

where,

D_t represents $(l \times 1)$ matrics of deterministic components or dummy variables, X_t represents $(m \times 1)$ matrices of exogenous variables, and the φ and ψ are the parameters matrices. The selection of VAR lag length is based on the lag selection criteria. We used the Schwarz Bayesian Criterion (SBC).

Empirical Analysis and Results

Summary Statistics : The descriptive statistics of our variables of interest are presented in the Table 1, which indicates that all the data series have, at large, deviated from their respective mean values as observed from their respective standard deviations. It is observed that the average net flows of FIIs are greater than that of mutual funds. Secondly, the average inflows are greater than the total outflows for both groups of institutional investors. The values of skewness and kurtosis are away from the standard values of 0 and 3, respectively, indicating a lack of symmetric distributions. The high value of Jarque-Bera test statistics confirms the non-normality of the variables considered. In order to employ the VAR, the time series must satisfy the stationary property. We confirm the stationarity using three types of unit root tests such as Augmented Dickey Fuller (ADF), Phillips-Perron (PP), and

Table 1. Descriptive Statistics

	Rt	*FIIPUR*	*FIISALES*	*FIINI*	*MFPUR*	*MFSALES*	*MFNI*	*DIV*	*EXRT*	*INTR*
Mean	0.0641	0.00012	0.00010	1.44E-05	3.17E-05	3.12E-05	5.03E-07	1.5553	45.956	5.8943
Median	0.1204	0.00011	9.76E-05	9.51E-06	2.77E-05	2.86E-05	-3.30E-08	1.4656	45.7692	5.7528
Max	15.989	0.00082	0.00049	0.00056	0.000119	0.000205	8.53E-05	2.5688	56.7086	15.446
Min	-11.809	1.58E-06	3.09E-07	-0.00028	3.29E-07	5.98E-08	-0.000113	0.8056	39.2828	0.1916
Std. Dev.	1.6277	6.52E-05	5.41E-05	4.65E-05	1.70E-05	1.47E-05	1.47E-05	0.4273	3.1699	1.8831
Skewness	-0.0709	2.07312	1.73961	2.1131	1.4139	1.6507	0.3297	0.4234	0.3955	0.6508
Kurtosis	10.670	13.0533	8.7378	22.634	5.8903	11.935	7.0468	2.0396	4.0593	5.0074
Jarque-Bera	6382.753	12826.51	4883.699	43750.88	1773.427	9841.878	1823.438	177.8291	189.591	620.844
Prob.	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Obs	2603	2603	2603	2603	2603	2603	2603	2603	2603	2603

Note: Rt=log Returns; FIIPUR=FIIs Purchase, FIISALES=FIIs Sales, FIINI=FIIs Net Investment, MFPUR=Mutual Funds Purchase, MFSALES=Mutual Funds Sales, MFNI=Mutual Funds Net investment (All are standardized); DIV=Dividend Yields, EXRT=Exchange Rates, INTR=Interest Rates.

Table 2. Results of Unit Root Tests

Variables	ADF	PP	KPSS	Order of Integration
RT	-36.703*	-47.374*	0.189	I(0)
FIINI	-13.012*	-48.078*	0.793	I(0)
FIIPUR	-9.659*	-47.868*	0.703	I(0)
FIISALES	-7.079*	-41.783*	1.144	I(0)
MFNI	-13.628*	-43.629*	0.467	I(0)
MFPUR	-6.834*	-43.268*	1.014	I(0)
FIISALES	-7.979*	-43.917*	0.904	I(0)
DIV	-2.272	-2.071	3.331*	I(1)
D(DIV)	-8.849*	-4.555*	0.112	
EXRT	-1.103	-0.700	0.868*	I(1)
D(EXRT)	-8.312*	-5.753*	0.329	
INTR	-3.493*	-3.862*	0.697	I(0)
D(INTR)	-15.745*	-7.377*	0.033	

Note: *indicates statistical significance at the 1% level.

the Kwiatkowski-Phillips-Schmidt-Shin (KPSS) tests. The results are reported in the Table 2. The Table 2 indicates that except dividend yield and exchange rate, all the variables are individually integrated in order *I*(0). In first difference, the dividend yield and exchange rate are found to be stationary.

↳ **Vector Autoregression Results and Causality Test :** In the first stage, we examined the relationship between fund flows and stock market returns for FIIs and mutual funds investment (purchase, sales, and net) flows individually. The equations are expressed in a VAR framework as follows :

$$R_t = \alpha_1 + \sum_{i=1}^{p} \beta_{1,i} R_{t-i} + \sum_{i=1}^{p} \gamma_{1,i} Flow_{t-i} + \varepsilon_t^R \qquad (3)$$

$$\text{Flow}_t = \alpha_2 + \sum_{i=1}^{p} \gamma_{2,i} \text{Flow}_{t-i} + \sum_{i=1}^{p} \beta_{2,i} R_{t-i} \qquad (4)$$

where,

R_t represents the stock market returns at time *t*, $Flow_t$ represents the fund flows (purchase, sales, and net) of institutional investors.

The results of the bi-variate VAR models for the investment flows of FIIs and mutual funds are presented in the Table 3. The first part (column 2nd to 7th) of the Table 3 shows the results for FIIs and the second part (column 8th to 13th) shows the results for mutual funds. It can be observed that none of the flow variables (purchase, sales, and net) of FIIs have a significant impact on market returns. This finding is consistent with the findings of Mukherjee et al. (2002). However, stock market returns are significantly influenced by their lagged value. The R2 values, however, are very less (about 1%), implying that the capacity of FIIs investment flows to explain the market returns is only marginal. On the other hand, the second part of the Table 3 shows that returns are significantly influenced by the lagged purchase and sales of mutual funds. The net investments do show a significant impact on market returns at second lags. Moreover, for both FIIs and mutual funds, all the flow variables are significantly and positively influenced by their own lags. Furthermore, the past activity of the institutional fund flows tends to be followed by other institutional investors as well.

From the Table 3, it is also evident that lagged returns positively influence FIIs inflows (purchase) and net investments, but negatively influence the outflows (sales). On the contrary, the returns are negatively associated with mutual fund inflows (purchase) and net investment, but are positively associated with mutual fund outflows (sales). The stock market also responds to the investment activities of mutual fund investors as the flow variables (purchase, sales, and net) significantly and positively affect the market returns. These results signify that mutual funds, as a group, sell more and purchase less when the market rises ; whereas, foreign institutional investors buy stocks when the market rises and sell more when the markets are down. Thus, for FIIs, positive feedback trading is indicated (as the coefficients attached to lagged returns are positively related to FII net investments). On the other hand, negative feedback trading or contrarian strategy is indicated for mutual funds equity investment (as the lagged index return is negative and significantly related to mutual fund net investment). This result is consistent with the findings of Oh and Parwada (2007) for the Korean mutual fund industry and Thenmozhi and Kumar (2009) for India.

Next, we take both FIIs net investment and mutual funds net investment simultaneously. Considering the fund flows from FIIs mutual funds to be interdependent and forming the endogenous part of the VAR system, the equations become :

$$R_t = a_1 + \sum_{i=1}^{p} \phi_{1i} R_{t-i} + \sum_{i=1}^{p} \varphi_{1i} FIINI_{t-i} + \sum_{i=1}^{p} \gamma_{1i} MFNI_{t-i} + \varepsilon_t^R \qquad (5)$$

$$FIINI_t = a_2 + \sum_{i=1}^{p} \varphi_{2i} FIINI_{t-i} + \sum_{i=1}^{p} \phi_{2i} R_{t-i} + \sum_{i=1}^{p} \gamma_{2i} MFNI_{t-i} + \varepsilon_t^{fiiini} \qquad (6)$$

Table 3. Vector Autoregression Analysis of Flows and Returns (FII &MF)

	FII						MF					
	Purchase		Sales		Net		Purchase		Sales		Net	
	Return	Flow	Return	Flow	Return	Flow	Return	Flow	Return	Flow	Return	Flow
Intercept	-0.025	2.74E-05	0.086	2.12E-05	0.031	6.00E-06	-0.083	6.19E-06	-0.078	7.10E-06	0.059	4.29E-07
	[-0.298]	[10.062]	[0.976]	[9.652]	[0.890]	[7.147]	[-1.01]	[9.346]	[-0.847]	[11.073]	[1.870]	[1.624]
R_{t-1}	0.074	4.15E-06	0.075	-3.52E-06	0.072	7.87E-06	0.064	-4.31E-07	0.079	8.89E-07	0.074	-1.18E-06
	[3.793]	**[6.674]**	**[3.838]**	**[-7.188]**	**[3.666]**	**[16.679]**	**[3.241]**	**[-2.705]**	**[4.019]**	**[6.544]**	**[3.716]**	**[-7.107]**
R_{t-2}	-0.057	2.73E-06	-0.056	-1.41E-06	-0.068	5.50E-06	-0.060	-8.63E-08	-0.066	6.55E-07	-0.064	-6.88E-07
	[-2.903]	**[4.351]**	**[-2.849]**	**[-2.837]**	**[-3.312]**	**[11.065]**	**[-3.018]**	**[-0.540]**	**[-3.325]**	**[4.764]**	**[-3.180]**	**[-4.111]**
R_{t-3}	-0.016	4.07E-07	-0.009	8.07E-07	-0.029	9.70E-07	-0.012	-1.50E-07	-0.011	5.02E-07	0.0001	-6.39E-07
	[-0.831]	[0.646]	[-0.456]	[1.622]	[-1.411]	[1.911]	[-0.623]	[-0.937]	[-0.576]	**[3.631]**	[0.006]	**[-3.810]**
R_{t-4}	-0.003	2.32E-07	-0.001	-5.43E-08	-0.015	5.91E-07	0.0006	-1.61E-07	-0.009	3.66E-07		
	[-0.160]	[0.369]	[-0.095]	[-0.109]	[-0.745]	[1.168]	[0.032]	[-1.007]	[-0.457]	**[2.650]**		
R_{t-5}	-0.024	-1.18E-07	-0.030	7.89E-07			-0.020	1.91E-09	-0.030	4.07E-07		
	[-1.236]	[-0.188]	[-1.517]	[1.593]			[-1.054]	[0.012]	[-1.533]	**[2.952]**		
$Flow_{t-1}$	392.835	0.289	-377.921	0.370	1430.441	0.173	6356.508	0.384	7727.708	0.31427	813.589	0.283
	[0.635]	**[14.842]**	[-0.483]	**[19.004]**	[1.7596]	**[8.872]**	**[2.592]**	**[19.529]**	**[2.739]**	**[16.130]**	[0.3403]	**[14.319]**
$Flow_{t-2}$	1052.73	0.128	831.771	0.122	1324.774	0.106	2933.697	0.121	-4437.12	0.169	6292.174	0.121
	[1.655]	**[6.404]**	[1.001]	**[5.918]**	[1.623]	**[5.457]**	[1.120]	**[5.753]**	[-1.499]	**[8.287]**	**[2.549]**	**[5.924]**
$Flow_{t-3}$	-681.994	0.088	-872.279	0.080	-176.365	0.128	1222.412	0.100	4988.510	0.086	-2412.54	0.097
	[-1.067]	**[4.383]**	[-1.046]	**[3.886]**	-0.220	**[6.702]**	0.465	**[4.782]**	[1.672]	**[4.187]**	[-1.013]	**[4.924]**
$Flow_{t-4}$	-415.573	0.146	-722.883	0.110	-221.309	0.106	-1066.39	0.074	-3360.75	0.064		
	[-0.654]	**[7.320]**	[-0.871]	**[5.337]**	[-0.290]	**[5.799]**	[-0.407]	**[3.534]**	[-1.138]	**[3.151]**		
$Flow_{t-5}$	379.09	0.119	933.376	0.122			-4801.84	0.125	-318.901	0.131		
	[0.620]	**[6.183]**	[1.204]	**[6.353]**			[-1.955]	**[6.380]**	[-0.114]	**[6.793]**		
R^2	0.011	0.382	0.010	0.441	0.011	0.299	0.015	0.419	0.013	0.422	0.011	0.165

Notes: *t*-values are in brackets. Statistically significant *t*-values are shown in bold fonts.

$$MFNI_t = a_3 + \sum_{i=1}^{p} \gamma_{3i} MFNI_{t-i} \sum_{i=1}^{p} \varphi_{3i} FIINI_{t-i} + \sum_{i=1}^{p} \phi_{3i} R_{t-i} + \varepsilon_t^{mfni} \quad (7)$$

where,

R_t, $FIINI_t$, and $MFNI_t$ are the stock market returns, FIIs net investments, and mutual funds net investments at time t respectively ; a_1, a_2, a_3 are the intercepts; ϕ, φ, γ are the parameters to be estimated, and ε_t^R, ε_t^{fiini}, ε_t^{mfni}, are the white noise error tems, p denotes the lag lengths. In equation (5) FIIs' net investment flows Granger cause stock market returns if either φ_{1i} are jointly significant by testing the null hypothesis of H_0: $\varphi_{11}=\varphi_{12}= \ldots..= \varphi_{1p} = 0$. Similarly, mutual funds net investment flows Granger cause stock market returns if either γ_{1i} are jointly significant. The Granger causality for equations (6) and (7) are tested in a similar fashion.

As an improvement, we extend our analysis by controlling three fundamental variables namely dividend yield, exchange rate, and interest rate those act as exogenous variables in the VAR system as suggested by Cha and Lee (2001). It is argued that these variables more or less reflect the short run variation of the Indian economy. By including these variables, we try to see whether the Indian equity market and the institutional investors incorporate

such information. In the part of the exogenous variable, a dummy variable is also added to represent and control for the effect of the global financial crisis. The VAR model by incorporating these factors is expressed as follows :

$$R_t = \omega_1 + \sum_{i=1}^{p} \theta_{1i} R_{t-i} + \sum_{i=1}^{p} \vartheta_{1i} FIINI_{t-i} + \sum_{i=1}^{p} \rho_{1i} MFNI_{t-i} + \delta_1 \text{Dummy} + \varsigma_1 dDIV_t + \tau_1 dEXRT_t + \upsilon_1 INTR_t + \varepsilon_t^R \quad (8)$$

$$FIINI_t = \omega_2 + \sum_{i=1}^{p} \vartheta_{2i} FIINI_{t-i} + \sum_{i=1}^{p} \theta_{2i} R_{t-i} + \sum_{i=1}^{p} \rho_{2i} MFNI_{t-i} + \delta_2 \text{Dummy} + \varsigma_2 dDIV_t + \tau_2 dEXRT_t + \upsilon_2 INTR_t + \varepsilon_t^{fiini} \quad (9)$$

Table 4. VAR Results of Returns and Fund Flows (FII and MF Taken Together)

Panel A: VAR Analysis of FIIs and Mutual Funds Net Investment Flows and BSE Sensex Returns						
	Dependent variable = *Rt*		**Dependent variable = *FIINI***		**Dependent variable = *MFNI***	
Indvar	**Coeff**	***t*-stat**	**Coeff**	***t*-stat**	**Coeff**	***t*-stat**
Intercept	0.0185	[0.530]	7.04E-06	**[8.361]**	8.46E-07	**[2.920]**
R_{t-1}	0.0685	**[3.429]**	8.39E-06	**[17.426]**	-1.12E-06	**[-6.788]**
R_{t-2}	-0.0809	**[-3.811]**	5.18E-06	**[10.140]**	-6.11E-07	**[-3.473]**
R_{t-3}	-0.0249	[-1.150]	5.42E-07	[1.039]	-5.22E-07	**[-2.904]**
$FIINI_{t-1}$	1759.979	**[2.178]**	0.1810	**[9.310]**	-0.0067	[-1.001]
$FIINI_{t-2}$	1406.544	[1.755]	0.1212	**[6.288]**	-0.0034	[-0.518]
$FIINI_{t-3}$	-199.335	[-0.263]	0.1564	**[8.598]**	-0.0188	**[-3.013]**
$MFNI_{t-1}$	1604.078	[0.667]	-0.3437	**[-5.943]**	0.2762	**[13.882]**
$MFNI_{t-2}$	7373.791	**[2.962]**	0.0188	[0.315]	0.1127	**[5.469]**
$MFNI_{t-3}$	-1585.46	[-0.656]	0.0710	[1.221]	0.0854	**[4.273]**
R^2	0.015		0.300		0.170	
Panel B: VAR analysis of FIIs and mutual funds net investment flows and BSE Sensex Returns in presence of fundamentals and dummy as exogenous variable						
Intercept	0.2458	**[2.184]**	1.74E-05	**[6.460]**	2.39E-06	**[2.563]**
R_{t-1}	0.0636	**[3.183]**	8.27E-06	**[17.230]**	-1.15E-06	**[-6.914]**
R_{t-2}	-0.0837	**[-3.945]**	5.15E-06	**[10.116]**	-6.22E-07	**[-3.530]**
R_{t-3}	-0.0265	[-1.223]	5.64E-07	[1.084]	-5.25E-07	**[-2.918]**
$FIINI_{t-1}$	1419.252	[1.746]	0.1675	**[8.588]**	-0.0087	[-1.291]
$FIINI_{t-2}$	1064.503	[1.320]	0.1081	**[5.590]**	-0.0054	[-0.812]
$FIINI_{t-3}$	-599.22	[-0.785]	0.1415	**[7.727]**	-0.0211	**[-3.340]**
$MFNI_{t-1}$	1314.224	[0.547]	-0.3547	**[-6.160]**	0.2746	**[13.793]**
$MFNI_{t-2}$	7097.611	**[2.855]**	0.0080	[0.134]	0.1111	**[5.387]**
$MFNI_{t-3}$	-1696.49	[-0.703]	0.0657	[1.136]	0.0847	**[4.232]**
Dummy	-0.3376	**[-3.064]**	-7.59E-06	**[-2.869]**	-1.43E-06	[-1.568]
dDIV	-1.2842	[-0.402]	-1.50E-05	[-0.196]	-6.93E-06	[-0.261]
dEXRT	0.6012	[1.330]	-1.07E-05	[-0.988]	1.26E-06	[0.337]
INTR	-0.0301	[-1.695]	-1.52E-06	**[-3.573]**	-2.22E-07	[-1.506]
R^2	0.021		0.308		0.171	

Note: *t*- statistics are reported in brackets, the selection of maximum lags is based on Schwarz Bayesian Information Criteria.

$$MFNI_t = \omega_3 + \sum_{i=1}^{p} \rho_{3i} MFNI_{t-i} + \sum_{i=1}^{p} \vartheta_{3i} FIINI_{t-i} + \sum_{i=1}^{p} \theta_{3i} R_{t-i} + \delta_3 \text{Dummy} + \varsigma_3 dDIV_t + \tau_3 EXRT_t + \upsilon_3 INTR_t + \varepsilon_t^{fiini} \quad (10)$$

In this specification, *dDIV*, and *dRXRT* are the first difference of the variable dividend yield and exchange rate respectively, and *INTR* represents the interest rate.

The results are reported in the Table 4. From Panel A of Table 4, it is evident that both mutual fund flows and FII fund flows significantly affect the Indian stock market. Both the institutional fund flows (with lags) are found to be significantly and positively influencing the stock market returns. This result somewhat deviates from the findings of Bose (2012), where she documented that mutual fund flows are insignificant in determining stock returns (see. Bose, 2012 Table 3 Panel C)[1]. Considering FII net investment as the dependent variable, we can see that all the three variables (with lags) such as stock returns, *FIINI*, and *MFNI* are significantly determining the net investment of foreign institutional investors. While the market returns (with lag) and the *FIINIs* own lags are positive, *MFNI* is negatively associated with *FIINI*. Finally, when *MFNI* is the dependent variable, it is evident that stock returns as well as *FIINI* up to three lags are significantly and negatively affecting mutual fund net investment flows.

Hence, it is clear from the Table 4 that while the BSE returns (with lags) have a positive influence on FII flows, a negative impact is observed in determining mutual fund investment flows during the study period. Similar kind of results were found after controlling for market fundamentals. With market fundamentals and the dummy variable, the BSE returns are positively influenced by mutual fund flows and the lagged stock returns, but not by the FII investment flows. The coefficient of the dummy variable that controls for the U.S. subprime crisis is negative and significant, implying that the stock market was adversely affected due to the U.S. crisis. The three fundamental variables, however, do not turn out to be significant in determining market returns. Similar to the Panel A of Table 4, the Panel B also shows that mutual fund flows are negatively associated with BSE returns and FII flows. The *FIINI*, however, is positively influenced by BSE returns, but is negatively influenced by mutual fund flows. Furthermore, the FII net investments are also sensitive towards the change of interest rate as the interest rate is significant and negatively related to *FIINI.*

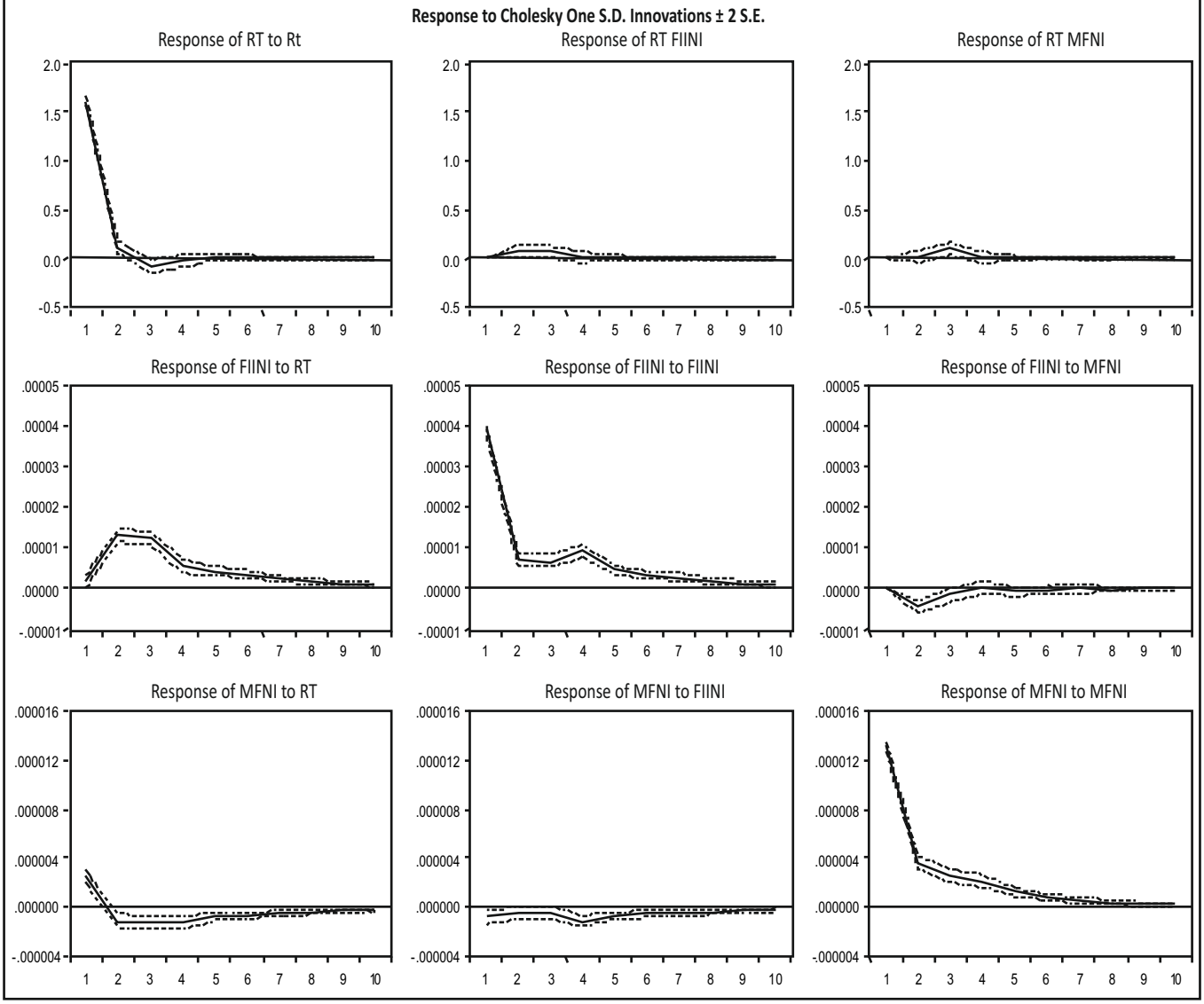
The results from the causality tests are reported in the Table 5. The Panel A of Table 5 represents a three-factor

Table 5. Granger Causality Test of Stock Returns and Institutional Investment

Panel A: VAR Granger Causality/Block Exogeneity Wald Tests without Fundamentals				**B: VAR Granger Causality/Block Exogeneity Wald Tests in the presence of Fundamentals**			
Dependent variable: *Rt*							
Excluded	**Chi-sq**	***df***	**Prob.**	**Excluded**	**Chi-sq**	***df***	**Prob.**
FIINI	10.6754	3	0.0136	*FIINI*	5.5485	3	0.1358
MFNI	11.3679	3	0.0099	*MFNI*	10.2460	3	0.0166
All	18.4788	6	0.0051	All	13.7770	6	0.0322
Dependent variable: *FIINI*							
Rt	433.994	3	0.0000	*Rt*	421.588	3	0.0000
MFNI	37.1402	3	0.0000	*MFNI*	40.2712	3	0.0000
All	454.568	6	0.0000	All	442.859	6	0.0000
Dependent variable: *MFNI*							
Rt	67.6648	3	0.0000	*Rt*	69.6740	3	0.0000
FIINI	15.1087	3	0.0017	*FIINI*	19.0973	3	0.0003
All	104.368	6	0.0000	All	109.174	6	0.0000

[1] However, her findings (based on 5-day moving average of daily flows) indicate that both the fund flows are significantly determining stock returns, similar to the present study.

Figure 1. Impulse Response Function



Granger causality/block exogeneity tests without controlling the market fundamentals, while Panel B represents the causality analysis with the presence of market fundamental and dummy. The Panel A indicates a bi-directional causation between institutional investment and stock market returns. These results suggest that the stock market returns may contain information about the two groups of institutional investment flows. Similarly, both mutual funds as well as FII net equity investments respond to the market information. However, while controlling the market fundamentals and the dummy variable, we were not able to reject the null hypothesis that 'FII net investment flows do not Granger cause stock return' at the usual 5% level of significance. But together, FII and mutual fund net investments flows do Granger cause stock returns. In both the cases, it is evident that market returns strongly Granger cause institutional investment flows. The results are consistent with the findings of Alexakis et al. (2005), who found a bi-directional causality between institutional investment and stock returns for Greece. While other Indian studies (Sehgal & Tripathi, 2009; Mukherjee & Roy, 2011; Thiripalraju & Acharya, 2011) documented the differences in the direction of causality for FIIs and mutual funds, the present paper finds a bi-directional causality between stock returns and net investment of both FIIs and mutual funds in the study period.

The impulse response function depicts the relationship between innovations in stock market returns and innovations in net flow. The estimated dynamic response of FII net flows and mutual fund net flows to one standard deviation shocks to stock returns are described in the Figure 1. The Figure 1 indicates that the response of Sensex returns shocks to both types of institutional investment flows is negligible or insignificant. The FIIs net investment positively responds to stock returns about up to 3 days, and it negatively responds to the mutual fund flows. The response of mutual fund net flows to stock returns is initially positive, but it turns negative in the next two days. It responds negatively to the FII net flows.

Discussion, Implications, and Directions for Future Research

The institutional investors such as FIIs and domestic mutual funds have gained a significant role in the Indian equity market. This study empirically examines the dynamic interaction of these two sets of institutional investors and the stock market behavior in a structural VAR framework using 10 years of daily data spanning from January 1, 2002 to July 31, 2012. The analysis was done by considering these two sets of institutional investors individually as well as simultaneously. The results indicate that at an aggregate level, FIIs follow a positive feedback trading strategy, whereas, mutual funds follow a negative feedback trading strategy. Precisely, the results are summarized as follows :

The individual analysis for FIIs and mutual funds reveals that:(a) while FIIs' funds flow do not significantly affect stock market returns, the fund flows of mutual funds do affect the same; (b) the investment flows from both groups are significantly associated with their own lags and lagged returns, suggesting that institutional investors follow their own past strategies as well as the recent market behavior; (c) while FIIs buy more stocks when the market rises and sell more when markets are down, mutual funds sell more and purchase less when the market rises.

Considering the fund flow of FIIs and mutual funds simultaneously, this study found that both the investor groups jointly influence the stock market returns. It was also found that the FII investment flows are determined by their past activities as well as by their past returns and past mutual fund activities. The relationship between the net flow of FIIs and mutual funds is found to be negative. This study also finds a two-way causation between institutional investment flows and stock market returns, suggesting that stock market contains information about the two sets of institutional investors considered in this study. Thus, it can be concluded that although their trading strategies are different, collectively, their investment activity can change the direction of the stock market in India.

These findings are obviously important for practical implications. While giving continuous encouragement to FIIs, there is also a great need to strengthen the domestic mutual funds, which are largely responsible for bringing in retail investments into the equity markets. However, the present study is limited to considering only one group of domestic institutional investors, that is, mutual funds. As it is obvious that the trading strategies of different institutions are different, inclusion of other domestic institutional investors such as insurance companies, hedge funds, and so forth may improve our understanding of the dynamic relationship between institutional investment and stock market behavior. Future research may incorporate these factors.

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