The Global Financial Crisis and Investor Behavior in Indian Equity Market

Prakash Tiwari* and Monika Mehrotra**

Abstract

The purpose of this research paper is to investigate the performance and relationship of different Investor group particularly Foreign Institutional Investors, Domestic Institutional Investor and Individual Investor using daily net flow in Indian equity market. We are examining the investor behavior before, during & after the financial crisis (2008). Augmented Dickey Fuller tests have employed and found that all the net inflows are stationary at their level and market return stationary at first difference. The causal relationship between all the investor group have checked through Granger Causality test and VAR in different time phase i.e. pre-crisis, during the crisis and after the crisis periods. The result reveals that the behavior of all the groups in all the phase of the crisis is not varying except domestic investor group performance. The Engle–Granger Co-integration has also proved that there is no co-integration between all different investor groups.

Keywords: FII (Foreign Institutional Investors), Domestic Investor, Financial Crisis

1. Introduction

The mayhem as started in the deregulated financial markets of US showed its impact on Indian stock market in early 2008. The crisis did not remain confined to pockets of US credit and security markets, as can be witnessed from its spread to other nations developing & developed. Nor did it remain confined, from the very beginning, to the financial sphere, thus impacting the already squeezed space of the real economy.

Since year 2006, share market went through many phases. Investors were seen getting overjoyed at 21K and crying too when it crashed.

The first impact of the global crisis on India was felt in the stock market in January 2008. This came through the reversal of inflows from Foreign Institutional Investors (FIIs) into the country which was followed by domestic institutional investors & individual investors. India had received about US$ 17.7 billion as net equity investment inflows from FIIs during 2007. This turned into a net disinvestment of US$ 13.3 billion during the period from January 2008 to February 2009. This was the direct result of the massive de-leveraging of US banks after the financial meltdown.

The sudden withdrawal of FIIs from the Indian stock market brought about a crash in the market in January 2008. Watching the FII disinvestment DII & II also lost their confidence in the Indian Equity market which resulted in down fall of Indian stock market. The benchmark stock price index, the BSE Sensex, plummeted from 20,873 on 8 January to 9093 on 28 November 2008, a 56 per cent fall over a period of 11 months. After which the domestic sentiments had an effect & DII & Individual Investors showed a downfall. The fall in Wall Street started two months before in November 2007, but the intensity of the market crash taking place after a lag in Dalal Street (India's stock exchange) had been much larger.

Capital inflows under external commercial borrowings, short-term trade credit and external borrowing by banks dropped sharply from April 2008.

After the macro-economic reforms in 1991, Indian economy has been increasingly integrated into the global economy. The financial institutions in India are exposed to the world financial market. This has significant impact on India's stock market and exchange rate. India's stock market index Sensex which touched above 21, 000 mark in the month of January, 2008 has plunged below 10, 000 during October.

* Associate Professor, Department of Management Studies, Dehradun Institute of Technology, Dehradun, India
**Assistant Professor, Department of Management Studies, Mahadevi Institute of Technology, Dehradun, India

2. Literature Review

The theories related to contemporaneous relationship between net inflows of foreign institutional investment and Market Return has been developed separately in the earlier period. However, the interpretation of this relationship and implications of the role of foreign investors in emerging markets still remains an unsettled issue. There are several competing hypotheses to explain this relationship. Based on the market segmentation theories, there are two main factors that can explain the positive relationship between share prices and foreign participation. They are: (1) Increase in investor base leads to diversification and risk sharing and thus lowering the risk premium of stocks (Merton, 1987; and Errunza and Losq, 1989), and (2) The perceived liquidity risk may reduce due to the entry of new foreign investors.

Merton (1987) provides a model for illustrating how broadening the investor base for a given stock and an extension of an emerging equity market may raise equity prices through risk pooling. In Merton's model, investors are assumed to invest only in an exogenously determined subset of the universe of equities. Besides, he characterizes the assumed barriers that prevent investors from holding fully diversified portfolios as informational, i.e., investors invest only in stocks about which they are `informed'. Thus his approach is consistent with explaining the impact of other barriers such as institutional restrictions, including limitations on short sales, taxes, transaction costs, liquidity and imperfect divisibility of securities.

Brennan and Cao (1997) model reveals the contemporaneous positive correlation between stock market returns and foreign portfolio flows and it is a function of the asymmetry of information about local markets among foreigners and domestic investors. The above theoretical arguments reveal several competing hypotheses to explain the relationship between foreign institutional investment flows and equity market returns in emerging economies and calls for earlier literature pertaining to this issue which will be helpful to identify the direction of our proposed study.

Initially, the research on international portfolio flows highlighted the phenomenon of home bias, whereby despite the advantages of international diversification, portfolios were found to be heavily skewed towards domestic securities (French and Poterba, 1991). Overtime, the degree of home bias in equity portfolios has declined and recent literature has examined the relationship between foreign equity flows and local market returns with an emphasis on detecting the trading behavior of foreign investors and making inferences on their comparative information advantage or disadvantage relative to local investors (Tesar and Werner, 1994; 1995a; 1995b; Bohn and Tesar, 1996; and Brennan and Cao, 1997). However, the low frequency of previously available database over a short period used in the earlier studies lacks the power to identify the true dynamic relationship between foreign equity investment flows and local market returns.

One possible explanation for the contemporaneous relationship between foreign portfolio flows and local market returns is the price pressure because the trading volumes of foreign investors are very high for the size of emerging markets. Clark and Berko (1997) used Warther (1995) approach to evaluate price pressure by foreign investors in Mexican stock market, but they do not find any price pressure in the Mexican market.

By contrast, Ananthanarayanan et al. (2005) had examined the impact of foreign institutional investors on stock market returns in India using monthly data series and found an evidence of validity of price pressure hypothesis.

In a behavioral context, recent studies have examined whether foreign investors are positive feedback traders or destabilize the functioning of local stock markets in developed and emerging economies. Choe et al. (1999) argues that positive feedback trading are not necessarily destabilizing for two reasons: First, investors trading on fundamentals may be sufficiently powerful in the markets to prevent prices from moving away from fundamental values. Second, positive feedback traders may be trading in response to information about fundamentals, so that their trading does not drive prices away from fundamentals. Further, they examined the impact of foreign investors on stock returns in Korea during pre and post-Asian crisis period. The analysis reveals that foreign investors in Korea seem to be positive feedback traders during the pre-crisis period and not in the post-crisis period. Perhaps, more importantly, they find that positive feedback trading need not be destabilizing the Korean stock market. By contrast, the study of Kim and Wei (2002) reveals that foreign investors in Korea did not strongly follow the positive feedback trading strategies during the pre-crisis period, but did so thereafter. Further, the study of Karolyi

(2002) of Japan finds a consistent positive feedback trading strategy during pre and post-crisis period.

Richards (2002) also finds evidence of positive feedback trading strategies in emerging Asian equity markets and that foreign flows have significant short-term impacts on emerging markets. Moreover, the study of Griffin et al. (2002) for nine emerging countries has found the evidence of positive feedback trading at daily frequency. However, Lin and Swanson (2004) find, for the eight largest emerging Asian markets, significant evidence that foreign inflows have a short-term positive impact on local market returns but only minimal evidence that foreign investors employ momentum trading.

Using daily data information, Batra (2003) finds that foreign investors tend to follow the positive feedback trading strategies with reference to India. Suresh and Prabheesh (2008) examine the dynamic interaction between FII flows and stock market returns in the Indian stock market. Using daily data from January 2003 to February 2007, Vector Autoregressive (VAR) framework and Granger causality test, they find the evidence of information revelation hypothesis and momentum trading hypothesis. By contrast, using monthly data series, Ananthanarayanan et al. (2005) do not find any evidence regarding momentum or contrarian strategies being employed by foreign institutional investors in India. But, the research studies performed in the Indian context found that the equity return has a significant and positive impact on the FII (Agarwal, 1997; Chakrabarti, 2002; Griffin et al., 2002; and Trivedi and Nair, 2003).

Secondly, the majority of the empirical studies pertaining to the impact of foreign institutional investment flows on local market returns in emerging economies are mainly based on quarterly or monthly database. However, the foreign institutional investments and stock market transactions takes place on a daily basis or even shorter time intervals and hence the use of daily database will provide more appropriate and consistent results compared to monthly or quarterly database. Thirdly, the earlier studies such as Clark and Berko (1997), Froot et al. (2001), Bekaert et al. (2002), Chakrabarti (2002), Griffin et al. (2002), Richards (2002), Gordan and Gupta (2003), Dahlquist and Robertsson (2004), Adabag and Ornelas (2005) and Ananthanarayanan et al. (2005) etc., employed the ratio of net foreign institutional investment flows to the total size of market capitalization as foreign institutional investment variable and it is not an appropriate measure of foreign institutional investment in examining the issue. This will provide misinformation. For instance, if market capitalization increases faster than foreign institutional investment (due to local investors), the constructed ratio will fall even though there is an absolute increase in foreign institutional investment over the years and vice-versa.

Rogoff K (2006) found that the volume of stock trading tends to go up in the weeks and months following an increase in the stock markets, while volume goes down after a decrease. “People attribute increases to their own great skills,” and so become even more active investors.

Alvarez and Gorg (2007), investigating the response of multinational and domestic firms to an economic downturn in Chile, do not .and multinationals to react to the economic crisis differently than domestic firms. Desai, Foley and Forbes (2008), evaluating the response of multinational and local firms to sharp currency depreciations, and sales, assets, and investment to increase significantly more for U.S.

Tong and Wei (2009) examine whether the volume and composition of capital flows affected the degree of credit crunch faced by a country’s manufacturing firms. Using data on 3,823 firms in 24 emerging countries, the authors find declines in stock prices to be, on average, more severe for firms intrinsically more dependent on external finance.

Rose and Spiegel (2009), for example, investigate the role of trade and financial linkages in explaining the differential extent of the crisis across countries. Using a large country-level cross-section dataset, they do not find international linkages to be clearly associated with incidences of the crisis.

Eaton et al. (2009) and Chor and Manova (2009), among others, examine the potential causes of the great trade collapse, a phenomenon that received particular attention in the recent crisis, and find, respectively, that manufacturing demand and credit conditions played important roles.

Bernard et al. (2009) have shown that intra firm trade fell less than unrelated-party trade during the Asian financial crisis. Multinationals that engaged in activities with stronger financial constraints also have a greater advantage over local firms.

Subbarao D (2009) said several factors have led to the current crisis: investment banks that excessively leveraged their debt, homeowners' finances stretched beyond their means and weak government regulation. The economic errors people make aren't random, and the decisions they make aren't necessarily rational. Instead, they're based on common psychological factors, biases and cognitive errors.

Based on the above background, the present paper examines the relationship between foreign institutional investment, domestic institutional investment, individual investment flows and equity market returns (BSE Sensex) in India with special reference to before, during and after the global financial crisis period. The paper presents the methodology of the study and also offers empirical results and discussion. Finally, it presents the conclusion.

3. Objectives

- To measure the performance of foreign, domestic institutional and individual investors in different time phase of financial crisis
- To investigate the causal relation between the stock return & investment made by different investors group (FII, DII and II) before, during and after the financial crisis.
- To diagnose whether different investment groups are integrated to each other or not.

4. Data and Methodology

To examining the investor behavior before, during & after this crisis of different investor group we have divided our data into three sub periods: namely, from March 2007 to Jan 2008 for before the crisis, Feb 2008 to July 2009 to for during the crisis and Aug 2009 to April 2011 for after the crisis. The data for the same has taken from the website bseindia.com.

In order to examine the relationship between stock returns and the behavior of foreign, Domestic and Individual Investor time series econometrics tools, such as unit root tests, Granger causality test and regression analysis are employed. A set of unit root tests, namely, Dickey and Fuller (DF) (1976), Augmented Dickey-Fuller (ADF) are employed to test if the data series is stationary or not. Further, to examine the causal links between stock returns and inflation during entire sample period and for the sub periods Granger (1969) causality test is employed. Multiple linear regression equation is also estimated to examine the relation between stock returns and foreign, Domestic and Individual Investor Vector auto regression (VAR) is performed to test for robustness of the results.

Unit Root Test

Augmented Dickey –Fuller (ADF) test is most frequently used test of unit root. It is based on simple logic. A non-stationary process has infinite memory as it does not show decay in a shock that takes place in the process. Every random shock carries away the process from its earlier level not to return back again unless another random shock push it towards its previous level. Therefore, it behaves like AR (1) process with $\rho = 1$. Dickey Fuller test is designed to examine if $\rho = 1$.

Let;

$$y_t = \rho y_{t-1} + \varepsilon_t$$

$$y_t - y_{t-1} = \rho y_{t-1} - y_{t-1} + \varepsilon_t$$

$$\Delta y_t = (1-\rho) y_{t-1} + \varepsilon_t$$

$$\Delta y_t = \delta y_{t-1} + \varepsilon_t$$

In ADF test we test the hypothesis if $\delta = 0$. The test procedure is similar to usual t-test but standard critical values of the t-test are not valid in this case. The modified critical values tabulated in *MacKinnon* (1991) are used for ADF test.

Granger Causality Test

Traditionally, to test for causal relationship between two variables, the standard Granger test has been employed in the relevant literature. This test states that, if past values of a variable *Y* significantly contribute to forecast the value of another variable X_{t+1}, then *Y* is said to Granger cause *X* and vice versa. The test is based on the following two regressions:

$$Y_t = \beta_0 + \sum_{k=1}^{M} \beta_k Y_{t-k} + \sum_{l=1}^{N} \alpha_l X_{t-1} + u_t$$

$$X_t = \gamma_0 + \sum_{k=1}^{M} \gamma_k X_{t-k} + \sum_{l=1}^{N} \delta_l Y_{t-1} + \vartheta_t$$

Where Y_t and X_t are the variables to be tested, u_t and J_t are mutually uncorrelated white noise errors, *t* denotes the time period, and *k* and *l* are the number of lags. The null hypothesis is $a_l = d_l = 0$ for all *l*'s versus the alternative hypothesis that a_l ¹ 0 and d_l ¹ 0 for at least some *l*'s. If the coefficient a_ls are statistically significant but d_ls are not, then *X* causes *Y*. In the reverse case, *Y* causes *X*. But if both a_l and d_l are significant then causality runs in both ways.

Recent developments in the time series analysis have suggested some improvements in the standard Granger test. The first step is to check for the stationary of the original variables and then test for co integration between them. According to Engle and Granger (1987), the test is valid if the variables are not co integrated. Second, the results of Granger causality are very sensitive to the selection of lag length. If the chosen lag length is less than the true lag length, the omission of relevant lags can cause bias. If the chosen lag length is more, the irrelevant lags in the equation cause the estimates to be inefficient. To deal with this problem, Hsiao (1981) developed a systematic autoregressive method for choosing optimal lag length for each variable in an equation.

Vector Autoregressive Models

VAR models were popularized in econometrics by Sims (1980). A VAR is a system of regression models which can be considered as a kind of hybrid between the univariate time series models and the simultaneous equation models. VARs have often been advocated as an alternative to large-scale simultaneous equation structural models. In VAR models, the term autoregressive is due to the appearance of the lagged value of the dependent variable on the right-hand side and the term vector is due to the fact that we are dealing with a vector of two or more variables. In economic phenomenon we cannot have univariate series. On the contrary, the series are interconnected therefore we have VAR models. VAR is a case of multiple time series regression and in this model; the exogenous and lag variables are predetermined. A VAR is a system of equations in which each of the components depend not only on its own past values, but also on the past values of rest of the components. The standard VAR model of two variables x and y can be presented as follows:

$$\begin{matrix} x_t \\ y_t \end{matrix} = \begin{matrix} \lambda_{10} \\ \lambda_{20} \end{matrix} + \begin{matrix} \lambda_{11}^{1} & \lambda_{12}^{1} \\ \lambda_{21}^{1} & \lambda_{22}^{1} \end{matrix} \begin{matrix} x_{t-1} \\ y_{t-1} \end{matrix} + \ldots\ldots \begin{matrix} \lambda_{11}^{p} & \lambda_{12}^{p} \\ \lambda_{21}^{p} & \lambda_{22}^{p} \end{matrix} \begin{matrix} x_{t-p} \\ y_{t-p} \end{matrix} + \begin{matrix} \varepsilon_{1t} \\ \varepsilon_{2t} \end{matrix}$$

5. Empirical Results

Our sample period comprises from March 2007 to Jan 2008 for before the crisis, Feb 2008 to July 2009 to for during the crisis and Aug 2009 to April 2011 for after the crisis. Table 1 summarizes the mean, standard deviation, minimum & maximum value of daily return and net buying/selling of each of the investors: foreign, domestic and individual investors for all the sample period. From this table it can be inferred that mean of the market return is zero for the whole period where as the average performance of domestic investor is much better than foreign and individual investors group. On the other hand Table 2 shows the descriptive statistics of different investor group in different time phase of financial crisis. The result shown in the table revealed that the performance of the individual investor is marginally better than foreign investor in before and after the crisis period. But foreign investor has gain significantly in the third (after crisis) phase of the crisis with a average net of 160.077 (Rs.cr). The performance of domestic investor is better than both groups along with market performance. Based on the result this may be sensed that due to balance hedging technique our domestic institutional investor has able to manage their funds performance in the prevailing negative sentiment around the world.

Table 1: Descriptive Statistics for All Samples

Statistics	*RETURN*	*FII*	*DII*	*II*
Mean	0.000367	-24.53417	114.3140	-33.91831
Maximum	0.159900	5475.450	3399.210	722.6600
Minimum	-0.116044	-4265.19	-1964.19	-3868
Std. Dev.	0.019987	852.4580	465.1998	255.0753

The pair wise correlation analyses are performs on different investor groups in different phase of financial crisis. Table 3 shows that foreign investor are significantly correlated with domestic and individual investor for the whole sample period which is followed in the different time phase also.

Table 2: Descriptive Statistics in Different Time Period

Before the Crisis				
Statistics	RETURN	FII	DII	II
Mean	0.001219	-148.076	201.1724	-30.24941
Maximum	0.064092	2868.59	3399.21	722.66
Minimum	-0.076957	-4265.19	-929.77	-2420.69
Std. Dev.	0.017157	1074.125	512.9368	288.6398
During the Crisis				
Mean	-0.000368	-173.2095	204.9017	-8.920192
Maximum	0.1599	4792.56	1744.68	587.58
Minimum	-0.116044	-2513.73	-1964.19	-3868
Std. Dev.	0.027824	685.3419	371.5537	252.0011
After the Crisis				
Mean	0.0005	160.0738	-3.649231	-56.86494
Maximum	0.034362	5475.45	2330.25	360.33
Minimum	-0.041515	-2813.06	-1716.85	-2574.64
Std. Dev.	0.011407	828.4255	487.1733	238.7694

Table 3: Correlation Coefficient Between Different Investor Groups in Different Time Phase

	Combined				*Before the crisis*		
	RETURN	*FII*	*DII*		*RETURN*	*FII*	*DII*
RETURN	1			RETURN	1		
FII	0.06336	1		FII	0.10694	1	
DII	-0.039	0.6389	1	DII	-0.0314	0.7372	1
II	-0.0369	-0.605	0.08135	II	-0.0953	0.7203	0.32617
During the crisis					After the crisis		
	RETURN	FII	DII		RETURN	FII	DII
RETURN	1			RETURN	1		
FII	0.06553	1		FII	0.08617	1	
DII	-0.0385	0.5525	1	DII	-0.0943	0.5937	1
II	-0.0334	0.6233	0.03077	II	-0.0035	0.5132	-0.0652

To analyze the casual relationship between different investor groups it is necessary to have the stationary in the date set Table 4 reveals that according to the ADF test results, the Market return, FII, DII and II are stationary at first difference level. The graphs shown in figure1 also support the stationary of the data set of different investor group.

The result of Granger Causality test are displayed in table 5, from where we can see that before the financial crisis at 5 percent level of significance there are unidirectional relationship between market return and different investor group and bidirectional relationship exist between foreign & domestic and domestic and individual investor groups.

During the crisis result reviled that there is a bidirectional relationship can be seen between market return & FII, market return & II and unidirectional relations are between market return & DII and FII & DII. Similarly after the financial crisis the bidirectional relationship is visible between market return & DII and FII & DII whereas market return is causing foreign investment and individual investor is causing domestic investor groups.

6. VAR Model

In the present analysis, VAR method is employed to investigate the causal link between market return and different investor group in different time period viz

Figure 1: Chart showing the stationary of data series.

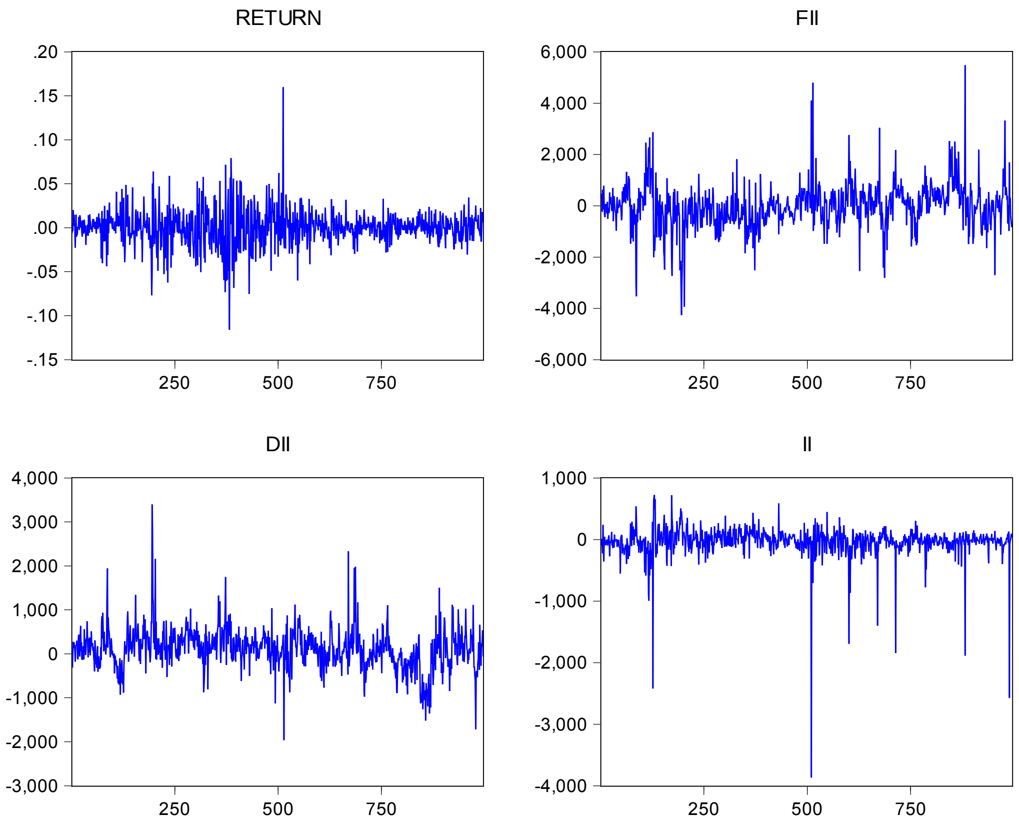

Table 4: Stationary test Through ADF

Null Hypothesis: RETURN, FII , DII and II has a unit root		
Exogenous: Constant		
Lag Length: 0 (Automatic based on SIC, MAXLAG=21)		
Augmented Dickey-Fuller test statistic		
Variable	t-Statistic	Prob.*
Stock Return	-29.29884	0.0000
FII	-9.070138	0.0000
DII	-10.53385	0.0000
II	-27.91285	0.0000
Test critical values:	1% level	-3.4367
	5% level	-2.8642
	10% level	-2.5683

before, during and after the financial crisis. VAR approach is based on two conditions: first, the series should be stationary, and second, the choice of the optimal lag length. In such cases, broadly two methods are used to arrive at the optimal lag length. Cross-equation restrictions and the information criteria. In the present model, we use the information criteria technique. The method uses six criteria: log likelihood value (log L), sequential modified LR test statistic, FPE, AIC, SIC and HQ information criteria for choosing the optimal lag length. For our analysis the optimum lag length is found to be 3 for all variables.

Table 5: Pair wise Granger Causality Tests at Lags: 2

Before the Crisis			
Null Hypothesis:	F-Statistic	Prob.	Inferences
FII does not Granger Cause RETURN	0.32032	0.7263	Accepted
RETURN does not Granger Cause FII	61.6921	2.00E-21	Rejected
DII does not Granger Cause RETURN	0.93202	0.3955	Accepted
RETURN does not Granger Cause DII	26.2677	8.00E-11	Rejected
II does not Granger Cause RETURN	0.58467	0.5583	Accepted
RETURN does not Granger Cause II	36.1335	4.00E-14	Rejected
DII does not Granger Cause FII	4.32256	0.0146	Rejected
FII does not Granger Cause DII	10.8432	3.00E-05	Rejected
II does not Granger Cause FII	1.26999	0.2831	Accepted
FII does not Granger Cause II	12.7049	6.00E-06	Rejected
DII does not Granger Cause II	8.49953	0.0003	Rejected
II does not Granger Cause DII	6.03460	0.0029	Rejected
During the Crisis			
FII does not Granger Cause RETURN	4.42214	0.0127	Rejected
RETURN does not Granger Cause FII	91.6561	7.00E-33	Rejected
DII does not Granger Cause RETURN	0.73717	0.4792	Accepted
RETURN does not Granger Cause DII	21.4081	2.00E-09	Rejected
II does not Granger Cause RETURN	13.9029	2.00E-06	Rejected
RETURN does not Granger Cause II	31.6397	2.00E-13	Rejected
DII does not Granger Cause FII	0.72509	0.485	Accepted
FII does not Granger Cause DII	7.19760	0.0009	Rejected
II does not Granger Cause FII	0.09488	0.9095	Accepted
FII does not Granger Cause II	1.50932	0.2225	Accepted
DII does not Granger Cause II	0.61079	0.5435	Accepted
II does not Granger Cause DII	1.78184	0.1698	Accepted
After the crisis			
FII does not Granger Cause RETURN	1.57968	0.2073	Accepted
RETURN does not Granger Cause FII	34.5396	1.00E-14	Rejected
DII does not Granger Cause RETURN	3.01492	0.0401	Rejected
RETURN does not Granger Cause DII	2.94912	0.0435	Rejected
II does not Granger Cause RETURN	2.04320	0.1309	Accepted
RETURN does not Granger Cause II	14.1507	1.00E-06	Rejected
DII does not Granger Cause FII	3.14140	0.0442	Rejected
FII does not Granger Cause DII	21.3210	2.00E-09	Rejected
II does not Granger Cause FII	0.81496	0.4434	Accepted
FII does not Granger Cause II	2.34447	0.0971	Accepted
DII does not Granger Cause II	1.13964	0.3209	Accepted
II does not Granger Cause DII	13.3911	2.00E-06	Rejected

Before the Financial Crisis

Table 6: VAR Model for Daily Data on Different Investment Group

	FII	*II*	*DII*	*RETURN*
FII(-1)	0.214334	-0.078152	-0.089049	6.18E-06
	(0.10403)	(0.03779)	(0.05773)	(2.8E-06)
	[2.06039]	[-2.06831]	[-1.54252]	[2.21458]
FII(-2)	0.034476	-0.004168	-0.062338	7.76E-06
	(0.10343)	(0.03757)	(0.05740)	(2.8E-06)
	[0.33334]	[-0.11095]	[-1.08605]	[2.79852]*
FII(-3)	0.141037	-0.0521	-0.109097	-4.46E-07
	(0.10063)	(0.03655)	(0.05584)	(2.7E-06)
	[1.40161]	[-1.42545]	[-1.95366]	[-0.16518]
II(-1)	-0.040252	-0.073904	0.028361	1.12E-05
	(0.26480)	(0.09618)	(0.14695)	(7.1E-06)
	[-0.15201]	[-0.76837]	[0.19300]	[1.57643]
II(-2)	0.467451	-0.156673	-0.100582	1.34E-05
	(0.26008)	(0.09447)	(0.14433)	(7.0E-06)
	[1.79733]	[-1.65845]	[-0.69688]	[1.91936]
II(-3)	-0.278125	-0.090307	0.129540	5.51E-06
	(0.25691)	(0.09332)	(0.14257)	(6.9E-06)
	[-1.08257]	[-0.96774]	[0.90858]	[0.79996]
DII(-1)	-0.488353	0.059373	0.340465	8.97E-06
	(0.15951)	(0.05794)	(0.08852)	(4.3E-06)
	[-3.06154]*	[1.02474]	[3.84611]*	[2.09682]
DII(-2)	0.168310	-0.019905	-0.042816	-2.28E-06
	(0.16654)	(0.06049)	(0.09242)	(4.5E-06)
	[1.01062]	[-0.32905]	[-0.46327]	[-0.51110]
DII(-3)	-0.173209	0.040900	-0.108676	9.22E-06
	(0.15631)	(0.05678)	(0.08674)	(4.2E-06)
	[-1.10814]	[0.72038]	[-1.25286]	[2.20005]
RETURN(-1)	29526.13	-8092.767	-9044.91	0.078160
	(2664.68)	(967.896)	(1478.78)	(0.07144)
	[11.0805]*	[-8.36120]*	[-6.11649]*	[1.09405]
RETURN(-2)	11751.57	-60.7032	-1756.075	0.004913
	(3540.81)	(1286.13)	(1964.99)	(0.09493)
	[3.31889]*	[-0.04720]	[-0.89368]	[0.05176]
RETURN(-3)	7961.624	-1109.762	123.8589	-0.195391
	(3634.35)	(1320.11)	(2016.89)	(0.09744)
	[2.19066]	[-0.84066]	[0.06141]	[-2.00529]
C	-69.21125	-61.1264	150.1901	0.001069
	(54.3621)	(19.7460)	(30.1684)	(0.00146)
	[-1.27315]	[-3.09563]*	[4.97838]*	[0.73317]

	FII	II	DII	RETURN
R-squared	0.686043	0.428147	0.574801	0.117081
Adj. R-squared	0.665896	0.391451	0.547516	0.060423
Akaike AIC	15.77441	13.74898	14.59667	-5.279044
Schwarz SC	15.98880	13.96337	14.81106	-5.064653

statistically significant at 5% level of significant

During the Financial Crisis

Table 7: VAR Model for Daily Data on Different Investment Group

	FII	II	DII	RETURN
FII(-1)	0.015708	-0.044114	-0.002509	-7.81E-07
	(0.08020)	(0.03539)	(0.04977)	(4.1E-06)
	[0.19585]	[-1.24644]	[-0.05042]	[-0.19069]
FII(-2)	0.132184	-0.003957	-0.142012	-2.73E-06
	(0.07439)	(0.03283)	(0.04616)	(3.8E-06)
	[1.77682]	[-0.12054]	[-3.07645]	[-0.72007]
FII(-3)	0.049460	0.035020	-0.065871	-1.29E-06
	(0.07307)	(0.03224)	(0.04534)	(3.7E-06)
	[0.67688]	[1.08607]	[-1.45283]	[-0.34608]
II(-1)	0.077991	-0.045284	-0.083799	-1.04E-05
	(0.16341)	(0.07211)	(0.10139)	(8.3E-06)
	[0.47727]	[-0.62801]	[-0.82647]	[-1.24323]
II(-2)	-0.124908	0.091514	-0.221595	-3.83E-05
	(0.16206)	(0.07151)	(0.10056)	(8.3E-06)
	[-0.77077]	[1.27971]	[-2.20370]	[-4.62383]*
II(-3)	0.289479	-0.055855	-0.056515	7.52E-07
	(0.16791)	(0.07410)	(0.10419)	(8.6E-06)
	[1.72398]	[-0.75382]	[-0.54242]	[0.08779]
DII(-1)	-0.093906	-0.012517	0.146037	-4.41E-07
	(0.10765)	(0.04750)	(0.06680)	(5.5E-06)
	[-0.87231]	[-0.26350]	[2.18625]	[-0.08023]
DII(-2)	-0.13534	0.029795	0.029410	-9.14E-06
	(0.10611)	(0.04682)	(0.06584)	(5.4E-06)
	[-1.27550]	[0.63634]	[0.44669]	[-1.68722]
DII(-3)	-0.097159	0.052195	-0.021561	2.95E-06
	(0.10409)	(0.04593)	(0.06459)	(5.3E-06)
	[-0.93343]	[1.13635]	[-0.33383]	[0.55455]
RETURN(-1)	10424.44	-3474.748	-1536.826	0.062927
	(1045.55)	(461.374)	(648.756)	(0.05337)
	[9.97033]*	[-7.53131]*	[-2.36888]	[1.17904]

	FII	II	DII	RETURN
RETURN(-2)	10039.73	-755.349	-3966.425	-0.085376
	(1141.75)	(503.825)	(708.448)	(0.05828)
	[8.79330]*	[-1.49923]	[-5.59875]*	[-1.46488]
RETURN(-3)	-622.9673	625.6434	-752.6683	-0.114384
	(1269.95)	(560.398)	(787.997)	(0.06483)
	[-0.49054]	[1.11643]	[-0.95517]	[-1.76448]
C	-61.27338	-26.46843	130.3577	-0.0003
	(35.5862)	(15.7033)	(22.0811)	(0.00182)
	[-1.72183]	[-1.68553]	[5.90360]*	[-0.16534]
R-squared	0.433554	0.183083	0.252132	0.102182
Adj. R-squared	0.414021	0.154913	0.226343	0.071223
Akaike AIC	15.40481	13.76864	14.45034	-4.36075
Schwarz SC	15.54486	13.90868	14.59038	-4.220708

**statistically significant at 5% level of significant*

After the Financial Crisis

Table 8: VAR Model for Daily Data on Different Investment Group

	FII	II	DII	RETURN
FII(-1)	0.300262	-0.030898	-0.102944	-5.50E-07
	(0.07001)	(0.02505)	(0.04045)	(1.2E-06)
	[4.28895]*	[-1.23338]	[-2.54491]*	[-0.45566]
FII(-2)	0.138402	-0.016413	-0.072026	1.25E-06
	(0.07128)	(0.02551)	(0.04119)	(1.2E-06)
	[1.94156]	[-0.64344]	[-1.74873]	[1.01701]
FII(-3)	0.060720	0.010585	-0.057905	2.59E-06
	(0.06864)	(0.02456)	(0.03966)	(1.2E-06)
	[0.88465]	[0.43098]	[-1.46009]	[2.18785]
II(-1)	-0.039881	-0.010378	0.069450	-4.24E-06
	(0.18325)	(0.06558)	(0.10589)	(3.2E-06)
	[-0.21762]	[-0.15825]	[0.65590]	[-1.33982]
II(-2)	0.091481	-0.004912	0.029141	6.87E-06
	(0.18308)	(0.06551)	(0.10578)	(3.2E-06)
	[0.49969]	[-0.07497]	[0.27548]	[2.17499]
II(-3)	-0.099075	0.066561	-0.044461	6.87E-06
	(0.18404)	(0.06586)	(0.10634)	(3.2E-06)
	[-0.53834]	[1.01071]	[-0.41812]	[2.16481]
DII(-1)	-0.122676	-0.036886	0.267357	-3.20E-06
	(0.10695)	(0.03827)	(0.06180)	(1.8E-06)
	[-1.14703]	[-0.96381]	[4.32644]*	[-1.73592]
DII(-2)	-0.006267	-0.000891	0.072080	2.39E-06
	(0.10792)	(0.03862)	(0.06235)	(1.9E-06)
	[-0.05807]	[-0.02307]	[1.15599]	[1.28348]

	FII	II	DII	RETURN
DII(-3)	-0.048577	0.015503	0.064280	9.31E-07
	(0.10251)	(0.03668)	(0.05923)	(1.8E-06)
	[-0.47389]	[0.42264]	[1.08527]	[0.52617]
RETURN(-1)	22817.56	-4844.1	-2941.23	0.021715
	(2813.56)	(1006.79)	(1625.68)	(0.04854)
	[8.10985]*	[-4.81142]*	[-1.80923]	[0.44734]
RETURN(-2)	4765.049	-1460.277	293.4736	0.006321
	(3015.41)	(1079.02)	(1742.31)	(0.05203)
	[1.58023]	[-1.35333]	[0.16844]	[0.12149]
RETURN(-3)	818.7566	667.9678	-1561.975	-0.046953
	(3027.91)	(1083.50)	(1749.53)	(0.05224)
	[0.27040]	[0.61649]	[-0.89280]	[-0.89875]
C	62.74150	-45.6456	40.60636	0.000574
	(34.2143)	(12.2431)	(19.7691)	(0.00059)
	[1.83378]	[-3.72827]*	[2.05403]	[0.97270]
R-squared	0.401814	0.078331	0.423622	0.051290
Adj. R-squared	0.384433	0.051552	0.406875	0.023724
Akaike AIC	15.82619	13.77083	14.72914	-6.108796
Schwarz SC	15.94992	13.89456	14.85287	-5.985069

**statistically significant at 5% level of significant*

The Engle–Granger Co-integration

Table 9: A -Unrestricted Co Integration Rank test (Maximum Eigen Value)

Hypothesized No. of CE(s)	Eigen value	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.184968	170.1774	24.27596	0.0001
At most 1 *	0.12205	83.45769	12.3209	0.0001
At most 2 *	0.064495	28.2674	4.129906	0

Trace test indicates 3 cointegrating eqn(s) at the 0.05 level
** denotes rejection of the hypothesis at the 0.05 level*
***MacKinnon-Haug-Michelis (1999) p-values*

Table 9: B- Unrestricted Co Integration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigen value	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.184968	86.71973	17.7973	0
At most 1 *	0.12205	55.19029	11.2248	0
At most 2 *	0.064495	28.2674	4.129906	0

Trace test indicates 3 cointegrating eqn(s) at the 0.05 level
** denotes rejection of the hypothesis at the 0.05 level*
***MacKinnon-Haug-Michelis (1999) p-values*

Table 6 reports the VAR results for daily data of BSE 30 as benchmark for market and foreign, domestic and individual investor group in different time phase. The lag length of three is chosen based on lag length criterion, as mentioned above. The FII and II equation shows that their coefficients are statistically insignificant in all the three lags. II are negatively related to FII at all three lags. The DII equations coefficients are significant at lag one where as FII, II and DII are coefficients are significant at lag one of market returns. The market return coefficients are significant with FII and market return at lag two. During the phase of financial crisis only market return and Individual investor return are found statistically significant at lag one and two. After the phase of financial crisis the foreign direct investor, domestic institutional investor and market return coefficient are significant at lag one.

Co-integration is a property of two or more variables moving together through time, and despite following their own individual trends will not drift too far apart since they are linked together in some sense. The results of the unit root test show that the time series of indices of share prices related to various stock exchanges under study are I (1). Therefore, co-integration will be a suitable means for correctly testing hypotheses concerning the long-term relationship among the time series under the study. It tests a set of null hypothesis that there exist no co-integrating equations among variables.

The co-integration results are presented in table 9 (A&B) ,the trace test, indicate that all the hypothesis are rejected at 5 percent level of significance at trace and maximum eigen value test. The results prove that there is no co-integration in whole sample period between the different investor groups. It is important to note that co-integration reflects only co-movements between two time series over a period of time among variable under study but does not represent the correlation among them..

9. Conclusion

From the above result, it can be concluded that the overall performance of domestic investor is much better than foreign and individual investors group. we found that the performance of the individual investor is marginally better than foreign investor in before and after the crisis period. But foreign investor has gain significantly in the third (after crisis) phase of the crisis. The performance of domestic investor group is better than both groups along with market performance which is further supported by result of correlation.

To explore relationship among the different investor group along with the market the Granger Causality test and VAR Model has applied and it is found that all three groups' performance is based on the performance of market return whereas foreign, domestic and individual investor groups are mutually related to each other before the financial crisis. During the crisis, result revealed that market return; FII and II are having both way relations. Further, after the financial crisis the bi-directional relationship is visible between market return & DII and FII & DII. The VAR results confirmed that the domestic institutional investment is significant at lags one and FII, II & DII are significant at lag one of market returns where as the market return coefficients are significant with FII and market return at lag two. During the phase of financial crisis only market return and Individual investor return are found statistically significant at lag one and two. After the phase of financial crisis all three investor group along with market return found significant at lag one. Finally the results of co-integration prove that there is no co integration between all three investor group for the whole sample period.

References

Adabag, M. C. & Ornelas, J. R. (2005). Behavior and Effects of Foreign Investors on Istanbul Stock Exchange. Proceedings of the 4th Annual Conference of the European Economics and Finance Society.

Agarwal, R. N. (1997). Foreign Portfolio Investment in Some Developing Countries: A Study of Determinants and Macroeconomic Impact. Indian Economic Review, 32(2), pp. 217 - 229.

Ananthanarayanan, S., Krishnamurti, C. & Sen, N. (2005). Foreign Institutional Investors and Security Returns: Evidence from Indian Stock Exchanges. Paper Presented for the Winter Research Conference in Finance, on 21st December, at Indian School of Business, Hyderabad, India.

Andrew, B. & Jensen, B. (2007). Firm Structure, Multinationals and Manufacturing Plant Deaths. Review of Economics and Statistics, 89(2), pp. 193 - 204.

Andrew, B. & Sjoholm, F. (2003). Foreign Owners and Plant Survival. NBER Working Paper No. 10039.

Andrew, B., Jensen, B., Redding, S. & Schott, P. (2009). The Mar- gins of US Trade. American Economic Review Papers and Proceedings, 99(2), pp. 487 - 493.

Alvarez, R. & Holger, G. (2007). Multinationals as Stabilizers? Economic Crisis and Plant Employment Growth. IZA Discussion Paper 2692.

Batra, A. (2003). The Dynamics of Foreign Portfolio Inflows and Equity Returns in India. Working Paper No. 109. New Delhi, India: ICRIER.

Bekaert, G., Harvey, C. R. & Lumsdaine, R. L. (2002). The Dynamics of Emerging Market Equity Flows. Journal of International Money and Finance, 21(3), pp. 295 - 350.

Bohn, H. & Tesar, L. (1996). US Equity Investment in Foreign Markets: Portfolio Rebalancing or Return Chasing? American Economic Review, 86(2), pp. 77 - 81.

Brennan, M. J. & Cao, H. H. (1997). International Portfolio Investment Flows. Journal of Finance, 52, pp. 1851 - 1880.

Chakrabarti, R. (2002). FII Flows to India: Nature and Causes. Money and Finance, 2(7), pp. 61 - 81.

Choe, H., Kho, B. & Stulz, R. (1999). Do Foreign Investors Destabilize Stock Markets? The Korean Experience in 1997. Journal of Financial Economics, 54(2), pp. 227 - 264.

Clark, J. & Berko, E. (1997). Foreign Investment Fluctuations and Emerging Market Stock Returns: The Case of Mexico. Working Paper No. 24, New York: Federal Reserve Bank of New York.

Dahlquist, M. & Robertsson, G. (2004). A Note on Foreigners' Trading and Price Effects Across Firms. Journal of Banking and Finance, 28, pp. 615 - 632.

Errunza, V. & Losq, E. (1989). Capital Flow Controls, International Asset Pricing, and Investors' Welfare: A Multi-Country Framework. Journal of Finance, 44, pp. 1025 - 1037.

French, K. R. & Poterba, J. M. (1991). Investor Diversification and International Equity Markets. American Economic Review, 81(2), pp. 222 - 226.

Gordan, J. & Gupta, P. (2003). Portfolio Flows into India: Do Domestic Fundamentals Matter? IMF Working Paper No. 03/20. New Delhi.

Griffin, J. M., Nardari, F. & Rene, M. S. (2002). Daily Cross Border Equity Flows: Pushed or Pulled? NBER Working Paper 9000.

Jonathan, E., Kortum, S., Neiman, B. & Romalis, J. (2009). Trade and the Global Recession. Mimeo.

Kaminsky, G. L. & Schmukler, S. L. (1999). What Triggers Market Jitters? A Chronicle of the Asian Crisis. Journal of International Money and Finance, 18, pp. 537 - 560.

Karolyi, G. A. (2002). Did the Asian Financial Crisis Scare Foreign Investors Out of Japan? Pacific Basin Finance Journal, 10, pp. 411 - 442.

Kim, W. & Wei, S. (2002). Foreign Portfolio Investors Before and During A Crisis. Journal of International Economics, 56, pp. 77 - 96.

Kumar, S. (2009). Investigating Causal Relationship Between Stock Return with Respect to Exchange Rate and FII: Evidence from India, MPRA Working Paper No. 15793. Munich Personal RePEc Archive.

Lin, A. Y. & Swanson, P. E.(2004). International Equity Flows and Developing Markets: The Asian Financial Market Crisis Revisited. Journal of International Financial Markets, Institutions & Money, 14, pp. 55 - 73.

Merton, R. C. (1987). A Simple Model of Capital Market Equilibrium with Incomplete Information. Journal of Finance, 42(3), pp. 483 - 510.

Rose, A. & Spiegel, M. (2009). The Causes and Consequences of the 2008 Crisis: International Linkages and American Exposure. Paci.c Economic Review, Forthcoming.

Rogoff, K. (2006). Will Emerging Markets Escape the Next Big Systemic Financial Crisis? Cato Journal, Spring-Summer, 26, pp. 337 - 341.

Suresh, B. M. & Prabheesh, K. P. (2008). Causal Relationships Between Foreign Institutional Investments and Stock Returns in India. International Journal of Trade and Global Markets, 1(3), pp. 259 - 265.

Subbarao, D. (2009). Impact of the Financial Crisis on India Collateral Damage and Response. Reserve Bank of India Bulletin, March.

Tesar, L. & Werner, I. (1994). International Equity Transactions and US Portfolio Choice. In J .Frankel (Ed.), The Internationalization of Equity Markets (pp. 185-220) University of Chicago Press.

Tesar, L. & Werner, I. (1995). Home Bias and High Turnover. Journal of International Money and Finance, 14, pp. 467 - 492.

Tesar, L. & Werner, I. (1995). US Equity Investment in Emerging Stock Markets. World Bank Economic Review, 9, pp. 109 - 130.

Trivedi, P. & Nair, A. (2003). Determinants of FII Investment Inflow to India. Paper Presented in 5th

Annual Conference on Money & Finance in the Indian Economy. Mumbai: Indira Gandhi Institute of Development Research (IGIDR).

Tong, H. & Shang, J. W. (2009). The Composition Matters: Capital In. Ows and Liquidity Crunch during a Global Economic Crisis. NBER Working Paper No. 15207.

Yasushi, H. & Mei, J. (2001). Living with the "Enemy": An Analysis of Foreign Investment in the Japanese Equity Market. Journal of International Money and Finance, 20, pp. 715 - 735.