

FII Flows in Indian Capital Market and Volatility

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Abstract: Foreign Institutional Net Investment (FIIN) does not have any influence on volatility for all the market indices viz. Nifty, Sensex and BSE 100 for the whole period of study i.e. 1999- 2017. Further breakup of the period into nine years exhibit the same results that the FIIN is not influencing the market volatility. The breakup of the period into six years and three years present the interesting finding that FIIN presents a positive influence on volatility of Nifty during 2005-2011 and 2011-14, FIIN has a positive influence on volatility for Sensex return during 2005-2008 and 2008-2011 and the last short period analysis of 2014-17 show that FIIN has a positive influence on volatility for Nifty. It means that the period of post economic crisis (2008-17) confirm positive influence of FII on volatility in Nifty, Sensex and BSE 100 market indices.

Keywords: Foreign Institutional Investors, Volatility, Nifty, Sensex, BSE 100, GARCH model, ARCH term, Stationarity, ADF test

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India is one of the biggest emerging markets and is currently an important destination for portfolio investment. India has received considerable amount of portfolio investment in the form of Foreign Institutional Investors (FIIs) investment in equities since 1993. Such investment constitutes non-debt creating financing instrument for the current account deficit in the external balance of payment. The basic issue is whether FII inflows are conducive for the growth of Indian capital market. The aspect of efficiency has been discussed at length and the studies came out with different results. Often, it is argued that the market becomes volatile with the inflow and outflow of FII. This paper tries to analyse the volatility of Indian capital market after the arrival of FII.

Background

Researchers and economists have conducted studies to identify the determinants of FII flows to Indian capital market (Kaur and Dhillon, 2010; Banaji, 2000; Rai and Bhanumurthy, 2003; Mehla and Goyal (2013). They argued that the growing Indian market had attracted the foreign institutional investors (FIIs) to Indian equity market during post financial reform period. Bhargava and Malhotra (2015) found that there exists a significant and positive relationship between FII and the BSE 500, S&P Nifty, S&P 500 Equity and the

BSE turnover. Dash and Singh (2008) observed that the volatility has increased marginally in the post reform period. Rajput and Chopra (2012) tested the information spill over and volatility spill-over relationship for Indian stock market for a period from 1992 to 2011. They also examined if there has been an increase in volatility persistence in the Indian stock market after the process of financial liberalization initiated in India.

Pal (2005) examined the behaviour of the FIIs in India for the period March 2004 to June 2004 and investigated how the withdrawal of foreign portfolio capital in the post-election phase has affected the price and equity holding pattern of different Sensex companies. He supports that being the most dominant non-promoter shareholder in the Sensex companies than the other investors group FIIs increase volatility in the market. It is found that Sensex were quite closely related to FIIs movement in India and also support the feedback-trading hypothesis. Karmakar (2006) measured the volatility of daily market return in the Indian stock market over the period from 1961 to 2005 by using the GARCH Model and observed that the market was tranquil and volatile. The level of the volatility was modest for the first two decades of the 1960s and 1970s. Almost from the beginning of 1980s there were indications of change in the mood of the market. Volatility touched new high from 1985 and during the year 1992, it surpassed all previous records and continued to increase till the end of the decade. Ray (2009) revealed that the flow of FII funds seemed to be attracted by the Indian equity returns.

Jacob and Nair (2012) found that foreign portfolio investment has maximum volatility when compared to other forms of capital flows. Prakash and Dharamveer (2012) argued that the major falls in stock market were after effects of withdrawal of money by FIIs. No doubt, the biggest fall in stock markets occurred in 2007 and 2008. Volatility of market was more because during this period there was an increase in registration of FIIs and the investments. Rai and Bhanumurthy (2003) argued that stabilizing stock market volatility and minimizing the ex-ante risk would help to attract more FII, an inflow of which has a positive impact on the real economy. Another study (Garg and Mitra, 2015) suggests unintentional herding among FIIs that create short term volatility. They have also found out that, FIIs herding tendency is more intense on the buy-side rather than the sell-side.

Mazumdar (2004) found in his study that FII flows have enhanced liquidity in the Indian stock market but not much evidence is there to support the hypothesis that FII flows have generated volatility in the returns. Dhingra *et al* (2016) investigated the interactions of foreign institutional investments with market returns and market volatility in India using both static and dynamic models based on daily data for a period ranging from 1st January 2004 to 30th September 2012. The study argued that foreign institutional investments destabilise the market particularly with selling activities as they significantly increase the volatility. In this background the present study made an attempt

to see the volatility in the Indian capital market on equity return with the inflow of FII.

Methodology

The period had covered for the study is 18 years from April 1999 - March 2017. The period of analysis was chosen because several changes concerning the rules for foreign institutional investor's entry had been brought about during this period. In 1997-1998 and 1998-1999, Indian capital market experienced a massive reversal in FII investment following the Asian crisis.

The market indices used as the reference point in the study are Nifty, Sensex and BSE 100. The data used in the research have been collected from various secondary sources. The data consists of month end adjusted values of market indices (Nifty, Sensex and BSE 100) and FII net investment (FIIN). Monthly data were collected from the websites of Reserve Bank of India (RBI), National Stock Exchange (NSE), Bombay Stock Exchange (BSE), Securities and Exchange Board of India (SEBI) and National Securities Depository Limited (NSDL).

The monthly market return of the indices (Nifty, Sensex and BSE 100) are computed by using the following formula

$$R_t = \frac{(P_t - P_{t-1})}{P_{t-1}} \times 100$$

Where, R_t is the index return at period t , P_t is the price index at day t , P_{t-1} is the price index at day $t - 1$.

The tools for analysis are: Dickey-Fuller Unit Root Test has been employed for testing stationarity, GARCH model has been employed for testing volatility of the market.

Framework

Tools to test volatility are GARCH Model which capture the dynamic nature of volatility and cater to the problem of volatility clustering (periods of large returns are followed by periods of small returns). They also take into account the leverage effect (volatility is higher in a falling market than in a rising market). The variance equation of GARCH (1,1) specification is;

$$\sigma_t^2 = \omega + \alpha \mu_{t-1}^2 + \beta \sigma_{t-1}^2 + \delta FIIN_t \quad (1)$$

Where σ_t^2 is the conditional variance of residual at time 't'; ω is the constant α and β are the parameters; μ_{t-1}^2 is the news about volatility from previous period which is measured as the lag squared residual derived from the mean equation and it is the ARCH term. σ_{t-1}^2 is the previous period's conditional residual variance and it is known as GARCH term, $FIIN_t$ represents FII net investment in rupees crore in equity segment of the Indian capital market. In the (1,1) term of the GARCH model, the first '1' in the parentheses denotes the

presence of first-order autoregressive GARCH term and the second '1' in the parentheses refer the first-order moving average ARCH term.

Results and Discussion

Stationarity of data has been tested by employing the ADF test and find that the data series are stationary. The FII net investment in equity was introduced into the GARCH equation in order to measure the impact of FII net investment on stock market volatility. The ARCH and GARCH model explain that the current volatility is influenced by past volatility and the coefficient of FIIN shows the influence of it on volatility if it is find significant. It is evident from the test result that the FII net investment (FIIN) is not statistically significant which indicates that the volatility of the market indices Nifty, Sensex and BSE 100 are not influenced by the FII net investment. Hence FIIN does not have any influence on the stock market volatility in respect of the market indices for the period 1999-2017.

Table 1: GARCH Model with FII – Total Period
(April 1999 – March 2017)

Panel A: Nifty Return				
<i>Variable</i>	<i>Coefficient</i>	<i>Std. Error</i>	<i>z-Statistics</i>	<i>Prob.</i>
C	0.983029	0.822988	1.194464	0.2323
RESID(-1)^2	0.127031	0.053499	2.374446	0.0176
GARCH (-1)	0.839579	0.049087	17.10394	0.0000
FIIN	0.000000	0.000000	-1.119704	0.2628
Panel B: Sensex Return				
C	1.498284	0.975109	1.536530	0.1244
RESID(-1)^2	0.087204	0.042898	2.032831	0.0421
GARCH (-1)	0.862726	0.052978	16.28467	0.0000
FIIN	-0.000109	0.000000	-1.494055	0.1352
Panel C: BSE_100 Return				
C	1.890353	1.431290	1.320734	0.1866
RESID(-1)^2	0.160541	0.069706	2.303105	0.0213
GARCH (-1)	0.787876	0.074284	10.60628	0.0000
FIIN	0.000000	0.000000	-0.975782	0.3292

Source: Computed from RBI, BSE, NSE and SEBI Handbook of Statistics

The two sub period analysis of pre and post economic crisis reveals that the GARCH results of the market returns show that GARCH and ARCH terms are significant at one per cent for Sensex. While the GARCH term is affecting the market volatility of BSE 100, the ARCH and GARCH terms are completely absent for Nifty during the first sub period of 1999- 2008 (See appendix: Table 1). This indicates that the current volatility is influenced by information of volatility in previous period (ARCH) for Sensex and past volatility (GARCH)

for Sensex and BSE 100. During the second period (2008-2017) the ARCH and GARCH terms are influencing the volatility of the market return at one per cent level of significance. FII inflow is not influencing the volatility of the market returns during the first and second period as is evident from the respective p value (See appendix: Table 2).

The results do not confirm with the findings of those who argue that FII led to higher volatility of market indices. Karmarkar, (2006) measured the volatility of daily market return in the Indian stock market over the period from 1961 to 2005. Upadhyay, (2006) argued that high degree of volatility can be attributed to the increase in investment by FII, which increases the stock prices. Beside this, even when any correction takes place and the stock price declines; there will be pull out by the FIIs in a large number. According to this study the reason of the volatility is that the FIIs manipulate the situation of boom in such a manner that they wait till the index rises up to a certain height and exits at an appropriate time. This tendency increases the volatility further. As against this, Garg and Bodla (2011) used daily data on stock market index (Sensex), FII flows and other related variable for a period of 22 years ranging from January 1986 to December 2007. The study found that the volatility of Indian stock market as well as its return has declined after opening the stock market for FIIs

The difference in the finding between present study and previous study may be due to the period selected on the one hand and a larger period on the other. One pertinent reason for the less volatility is that BSE 100 being a broad based index FII may largely be flowing into scrips which are not included in Nifty and Sensex. For more insights of impact of FII net investment on volatility in the equity segment of the Indian capital market, further breakup of the whole periods into various sub periods are tried.

Further classification of three sub period of six year each also tried to identify the influence of FII inflows on stock market volatility. In the first period analysis (See appendix: Table 3) of the GARCH model revealed that the current volatility of the BSE 100 index was influenced by the past volatility measured by the GARCH term. But FII net investment was not influencing the volatility of the market return during the period I. In the second sub period (See appendix: Table 4), the market volatility was influenced by GARCH term for Nifty and BSE 100 at one per cent level of significance. The ARCH term influenced the volatility of Sensex return during the period II but the FII net investment affecting the market return for Nifty only. During the third sub period (See appendix: Table 5) the ARCH and GARCH terms are influencing the market volatility at one per cent level of significance. It means that FII net investment is not affecting the volatility of the market return during the period II and III.

Six sub periods of three year each has been carried out to analyse the significance of FII inflow on stock market volatility. The empirical results of

period I (1999 - 2002) indicate that the recent past information and the past volatility is creating a positive and significant influence on the volatility of Sensex, the p value is significant at one per cent level.

Table 2: GARCH Model with FII – Six Sub Period
(Period I: 1999 – March 2002)

Panel A: Nifty Return				
<i>Variable</i>	<i>Coefficient</i>	<i>Std. Error</i>	<i>z-Statistics</i>	<i>Prob.</i>
C	18.55130	28.54554	0.649884	0.5158
RESID(-1)^2	-0.258675	0.211820	-1.221199	0.2220
GARCH (-1)	0.540946	1.039702	0.520289	0.6029
FIIN	-0.000184	0.006285	-0.029346	0.9766
Panel B: Sensex Return				
C	4.284922	2.164156	1.979951	0.0477
RESID(-1)^2	-0.371058	0.006566	-56.51467	0.0000
GARCH (-1)	1.224713	0.006360	192.5518	0.0000
FIIN	0.001659	0.002640	0.628422	0.5297
Panel C: BSE_100 Return				
C	16.14552	19.84120	0.813737	0.4158
RESID(-1)^2	-0.094853	0.086821	-1.092512	0.2746
GARCH (-1)	0.518901	0.663652	0.781887	0.4343
FIIN	0.012097	0.008763	1.380445	0.1674

Source: Computed from RBI, BSE, NSE and SEBI Handbook of Statistics

It is found that during the period II and III (2002- 2005 and 2005-08) coefficients of ARCH (1), GARCH (1) and FIIN were statistically not significant (See appendix: Table 6 & 7). It is made clear that the volatility of the Sensex return was highly affected by the FII net investment during the period 2005-08 as the p value is significant at one per cent level. The empirical results of the coefficient of ARCH (1) term of the market return for the period IV (2008-2011) is significant at one per cent level for Sensex and at five per cent level for Nifty and BSE 100. It indicates that the recent past information is creating significant influence on the volatility of the return of the Indian stock market. While the coefficient of GARCH (1) term is statistically significant at one per cent level for Sensex. The influence of the net investment by FIIs is statistically significant for Sensex at one per cent level and it was not significant for the other two market indices viz. Nifty and BSE 100.

The influence of the net investment by FIIs is statistically significant for Sensex at one per cent level and it was not significant for the other two market indices viz. Nifty and BSE 100. The empirical result of the coefficient of ARCH (1) term of the market returns for the period V (2011-2014), significant at one level for Nifty and Sensex returns indicate that the recent past information is creating significant impact on the volatility of the return of the Indian stock market.

Table 3: GARCH Model with FII – Six Sub Period
(Period IV: April 2008 – March 2011)

Panel A: Nifty Return				
<i>Variable</i>	<i>Coefficient</i>	<i>Std. Error</i>	<i>z-Statistics</i>	<i>Prob.</i>
C	20.97219	0.579932	36.16316	0.0000
RESID(-1)^2	1.053317	0.526359	2.001140	0.0454
GARCH (-1)	-0.179454	0.124546	-1.440860	0.1496
FIIN	-0.000464	0.000649	-0.715886	0.4741
Panel B: Sensex Return				
C	5.604671	0.035367	158.4705	0.0000
RESID(-1)^2	-0.140612	0.006755	-20.81677	0.0000
GARCH (-1)	1.071092	0.011017	97.22038	0.0000
FIIN	-0.00042	0.000000	-6.085332	0.0000
Panel C: BSE_100 Return				
C	34.92304	19.16606	1.822129	0.0684
RESID(-1)^2	0.838526	0.390900	2.145117	0.0319
GARCH (-1)	-0.146375	0.154250	-0.948948	0.3426
FIIN	-0.001095	0.001026	-1.067335	0.2858

Source: Computed from RBI, BSE, NSE and SEBI Handbook of Statistics

Table 4: GARCH Model with FII – Six Sub Period
(Period V: April 2011 – March 2014)

Panel A: Nifty Return				
<i>Variable</i>	<i>Coefficient</i>	<i>Std. Error</i>	<i>z-Statistics</i>	<i>Prob.</i>
C	0.847417	0.003015	281.0661	0.0000
RESID(-1)^2	-0.186694	0.006805	-27.43501	0.0000
GARCH (-1)	1.131609	0.004231	267.4308	0.0000
FIIN	0.000000	0.000000	-6.742913	0.0000
Panel B: Sensex Return				
C	2.106746	1.526768	1.379873	0.1676
RESID(-1)^2	-0.189772	0.087059	-2.179808	0.0293
GARCH (-1)	1.054888	0.016540	63.77983	0.0000
FIIN	-0.000100	0.000000	-1.286916	0.1981
Panel C: BSE_100 Return				
C	3.502962	0.581667	6.022278	0.0000
RESID(-1)^2	-0.167706	0.113865	-1.472843	0.1408
GARCH (-1)	0.975509	0.134349	7.260991	0.0000
FIIN	-0.000172	0.000000	-386.3955	0.0000

Source: Computed from RBI, BSE, NSE and SEBI Handbook of Statistics

In the fifth sub period it is observed that the FII net investment is influencing the market return of Nifty and BSE 100 at one per cent level of significance. The empirical result of the coefficient of ARCH (1) term of the market returns for the period V (2011-2014), is significant at one and five per

cent level for Nifty and Sensex returns indicate that the recent past information is creating significant impact on the volatility of the return of the Indian stock market. Whereas the coefficient of GARCH (1) term is statistically significant at one per cent level for all the indices and show a positive and significant impact on the stock market volatility.

Table 5: GARCH Model with FII – Six Sub Period
(Period VI: April 2014 – March 2017)

Panel A: Nifty Return				
<i>Variable</i>	<i>Coefficient</i>	<i>Std. Error</i>	<i>z-Statistics</i>	<i>Prob.</i>
C	1.165915	0.232152	5.022212	0.0000
RESID(-1)^2	-0.292087	0.042702	-6.840052	0.0000
GARCH (-1)	1.239180	0.012448	0.012448	0.0000
FIIN	-0.000112	0.000000	0.000000	0.0000
Panel B: Sensex Return				
C	5.486966	4.492389	1.221392	0.2219
RESID(-1)^2	-0.137660	0.066168	-2.080461	0.0375
GARCH (-1)	0.551696	0.559867	0.985406	0.3244
FIIN	-0.000185	0.000150	-1.229345	0.2189
Panel C: BSE_100 Return				
C	6.327333	4.472978	1.414568	0.1572
RESID(-1)^2	-0.128949	0.063400	-2.033878	0.0420
GARCH (-1)	0.552940	0.469267	1.178305	0.2387
FIIN	-0.000248	0.000175	-1.418130	0.1562

Source: Computed from RBI, BSE, NSE and SEBI Handbook of Statistics

In the final classification (Table 5) of the sub period 2014- 2017 the empirical results of the coefficient of ARCH (1) term of the market return is significant at one per cent level for Nifty and for the market indices Sensex and BSE 100 at five per cent level. It indicates that the recent past information is creating significant impact on the volatility of the return of the Indian stock market. While the coefficients of GARCH (1) terms are statistically significant at one per cent level for Nifty and show a positive and significant impact on the stock market volatility. The influence of the net investment by FIIs is statistically significant for Nifty at one per cent level during the period 2014-2017.

The existence of volatility for shorter periods is recognized by previous studies. Wadhwa (2015) study examined the influence of foreign portfolio investor trading behaviour on the stock markets of India for the period from January 2001 to December 2013. The study indicates that activities of foreign institutional investors in the Indian stock market affect the volatility in the stocks markets. As against this, Banerjee and Sarkar (2006) attempted to forecast stock return volatility in the index return of NSE using high frequency intraday data covering a period from June 2000 to January 2004 and find out that

participation of FIIs in the Indian stock market not resulting in significant increase in market volatility.

Conclusion

The main inference made in the study is that there exists volatility in the market throughout the period considered in the study. When a longer period is considered i.e. during 18 year period of 1999-2017 and nine year period of 1997-2008 and 2008-17, the volatility is not influenced by FIIN for all the market indices namely Nifty, Sensex and BSE 100. Further breakup of the period into six years makes it clear that during 2005- 2011 presents a positive influence of FIIN on volatility of Nifty. The last short period analysis of three years show that FIIN has a positive influence on volatility of Sensex return during 2005-2008 and 2008- 2011 and positive influence on Nifty and BSE 100 during 2011-14 . The last short period analysis of three years (2014- 2017) show that FIIN has a positive influence on volatility of Nifty. It means that the period of post economic crisis (2008-17) witnessed the strong influence of FII on volatility in Nifty and BSE 100 market indices.

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Appendix

Table 1: GARCH Model with FII – Two Sub Periods
(Period I: April 1999 – March 2008)

Panel A: Nifty Return				
<i>Variable</i>	<i>Coefficient</i>	<i>Std. Error</i>	<i>z-Statistics</i>	<i>Prob.</i>
C	29.10948	11.61205	2.506834	0.0122
RESID(-1) ²	0.285070	0.165642	1.720998	0.0853
GARCH (-1)	-0.522792	0.345034	-1.515188	0.1297
FIIN	0.000774	0.000473	1.637517	0.1015
Panel B: Sensex Return				
C	1.912648	1.416920	1.349863	0.1771
RESID(-1) ²	-0.122528	0.039639	-3.091114	0.0020
GARCH (-1)	1.060148	0.000441	2405.057	0.0000
FIIN	-0.000117	0.000257	-0.454064	0.6498
Panel C: BSE_100 Return				
C	2.016005	4.949461	0.407318	0.6838
RESID(-1) ²	0.123809	0.095337	1.298639	0.1941
GARCH (-1)	0.805674	0.144739	5.566376	0.0000
FIIN	0.000246	0.000395	0.622146	0.5338

Source: Computed from RBI, BSE, NSE and SEBI Handbook of Statistics

Table 2: GARCH Model with FII – Two Sub Periods
(Period II: April 2008 – March 2017)

Panel A: Nifty Return				
<i>Variable</i>	<i>Coefficient</i>	<i>Std. Error</i>	<i>z-Statistics</i>	<i>Prob.</i>
C	0.300450	0.170208	1.765194	0.0775
RESID(-1) ²	-0.056459	0.002128	-26.53025	0.0000
GARCH (-1)	1.053594	0.000156	6734.059	0.0000
FIIN	0.000000	0.000000	-1.679673	0.0930
Panel B: Sensex Return				
C	0.306346	0.189399	1.617468	0.1058
RESID(-1) ²	-0.064573	0.001960	-32.94515	0.0000
GARCH (-1)	1.050992	0.000197	5323.002	0.0000
FIIN	0.000000	0.000000	-1.172823	0.2409
Panel C: BSE_100 Return				
C	0.423500	0.291661	1.452027	0.1465
RESID(-1) ²	-0.059491	0.003817	-15.58699	0.0000
GARCH (-1)	1.040075	0.000000	71548.69	0.0000
FIIN	0.000000	0.000000	-1.180499	0.2378

Source: Computed from RBI, BSE, NSE and SEBI Handbook of Statistics

Table 3: GARCH Model with FII – Three Sub Period
(Period I: April 1999 – March 2005)

Panel A: Nifty Return				
<i>Variable</i>	<i>Coefficient</i>	<i>Std. Error</i>	<i>z-Statistics</i>	<i>Prob.</i>
C	5.06730	8.003522	0.633188	0.5266
RESID(-1)^2	-0.005342	0.164337	-0.032507	0.9741
GARCH (-1)	0.6373646	0.396259	1.700013	0.0891
FIIN	0.002419	0.003129	0.772946	0.4396
Panel B: Sensex Return				
C	6.359268	17.90330	0.355201	0.7224
RESID(-1)^2	0.000422	0.164147	0.002571	0.9979
GARCH (-1)	0.717838	0.755754	0.949830	0.3422
FIIN	0.000788	0.002053	0.383665	0.7012
Panel B: BSE_100 Return				
C	3.570449	7.798758	0.457823	0.6471
RESID(-1)^2	0.118527	0.107808	1.099430	0.2716
GARCH (-1)	0.814311	0.177341	4.591776	0.0000
FIIN	-0.000730	0.001147	-0.636530	0.5244

Source: Computed from RBI, BSE, NSE and SEBI Handbook of Statistics

Table 4: GARCH Model with FII – Three Sub Period
(Period II: April 2005 – March 2011)

Panel A: Nifty Return				
<i>Variable</i>	<i>Coefficient</i>	<i>Std. Error</i>	<i>z-Statistics</i>	<i>Prob.</i>
C	5.964231	4.777675	1.248354	0.2119
RESID(-1)^2	0.019992	0.014345	1.393623	0.1634
GARCH (-1)	0.847607	0.135742	6.244264	0.0000
FIIN	-0.000440	0.000150	-2.930380	0.0034
Panel B: Sensex Return				
C	22.62449	8.031478	2.816977	0.0048
RESID(-1)^2	0.788840	0.330797	2.384667	0.0171
GARCH (-1)	-0.133907	0.112799	-1.187129	0.2352
FIIN	-0.000402	0.000366	-1.097459	0.2724
Panel C: BSE_100 Return				
C	6.825334	6.140287	1.111566	0.2663
RESID(-1)^2	0.210653	0.213986	0.984424	0.3249
GARCH (-1)	0.664821	0.248321	0.677270	0.0074
FIIN	-0.000226	0.000317	-0.715143	0.4745

Source: Computed from RBI, BSE, NSE and SEBI Handbook of Statistics

Table 5: GARCH Model with FII – Three Sub Period
(Period III: April 2011 – March 2017)

Panel A: Nifty Return				
<i>Variable</i>	<i>Coefficient</i>	<i>Std. Error</i>	<i>z-Statistics</i>	<i>Prob.</i>
C	0.532573	0.310038	1.717769	0.0858
RESID(-1)^2	-0.139317	0.017076	-8.158881	0.0000
GARCH (-1)	1.098028	0.000564	1945.771	0.0000
FIIN	0.000000	0.000000	-0.727821	0.4667
Panel B: Sensex Return				
C	0.672666	0.147032	4.574951	0.0000
RESID(-1)^2	-0.144936	0.000425	-340.7239	0.0000
GARCH (-1)	1.104557	0.000264	4189.579	0.0000
FIIN	0.000000	0.000000	-0.980811	0.3267
Panel C: BSE_100 Return				
C	0.475089	0.201687	2.355571	0.0185
RESID(-1)^2	-0.116036	0.000963	-120.4554	0.0000
GARCH (-1)	1.107240	0.000227	4874.604	0.0000
FIIN	0.000000	0.000000	-0.873719	0.3823

Source: Computed from RBI, BSE, NSE and SEBI Handbook of Statistics

Table 6: GARCH Model with FII – Six Sub Period
(Period II: April 2002 – March 2005)

Panel A: Nifty Return				
<i>Variable</i>	<i>Coefficient</i>	<i>Std. Error</i>	<i>z-Statistics</i>	<i>Prob.</i>
C	13.13340	15.90991	0.825486	0.4091
RESID(-1)^2	0.118329	0.211013	0.560768	0.5750
GARCH (-1)	0.553085	0.609725	0.907106	0.3644
FIIN	-0.002125	0.001204	-1.764877	0.0776
Panel B: Sensex Return				
C	29.07461	27.29154	1.065334	0.2867
RESID(-1)^2	0.367581	0.497787	0.738431	0.4603
GARCH (-1)	-0.170522	0.608410	-0.280275	0.7793
FIIN	-0.002711	0.003461	-0.783299	0.4335
Panel B: BSE_100 Return				
C	34.89509	41.42615	0.842344	0.3996
RESID(-1)^2	0.128990	0.416538	0.309671	0.7568
GARCH (-1)	-0.157430	1.168843	-0.134688	0.8929
FIIN	-0.002590	0.003528	-0.734241	0.4628

Source: Computed from RBI, BSE, NSE and SEBI Handbook of Statistics

Table 7: GARCH Model with FII – Six Sub Period
(Period III: April 2005 – March 2008)

Panel A: Nifty Return

<i>Variable</i>	<i>Coefficient</i>	<i>Std. Error</i>	<i>z-Statistics</i>	<i>Prob.</i>
C	15.19717	12.14226	1.251593	0.2107
RESID(-1)^2	0.807927	0.690376	1.170272	0.2419
GARCH (-1)	-0.095218	0.384661	-0.247538	0.8045
FIIN	-0.000457	0.000577	-0.791241	0.4288

Panel B: Sensex Return

C	6.188460	4.418619	1.400542	0.1614
RESID(-1)^2	1.132449	0.560127	2.021773	0.0432
GARCH (-1)	-0.108080	0.079445	-1.360435	0.1737
FIIN	0.000670	0.000000	82.95526	0.0000

Panel C: BSE_100 Return

C	17.35964	7.221882	2.403756	0.0162
RESID(-1)^2	0.827303	0.597676	1.384198	0.1663
GARCH (-1)	-0.272875	0.145052	-1.881221	0.0599
FIIN	0.000000	0.000508	0.065679	0.9476

Source: Computed from RBI, BSE, NSE and SEBI Handbook of Statistics.