IMPACT OF FOREIGN INSTITUTIONAL INVESTMENT FLOWS

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Abstract: Indian Economy has emerged as one of the highly sought after investment designations for foreign investors (FII in particular) over the last two decades. As a results, a great flows from FII have been observed in the Indian stock market. It has been observed that there has been different trends of FII flows. Though, on the one hand, they have brought in good number of benefits (deepening of Indian capital market, capital formation and so on), on the other hand they have also affected the Indian stock market with few negatives (like enhanced volatility). In the present research paper, an attempt has been made to analyse the impact of FII flows on the volatility of Indian stock market (NSE Nifty). Daily data from January 2015 to March 2015 have been used. ADF (Augmented Dicker Fuller Test, GARCH (Generalised Autoregressive Conditional Heteroscedasticity) Model and ARCH (Autoregressive Conditional Heteroscedasticity) Model and Impulse Response Model have been used for the purpose of empirical analysis. As per the present study, GARCH Model, ARCH Model as well as the impact of FII flows on the volatility of NSE Nifty has been found significant. In the light of the findings, it becomes highly desirable that the market regulator (SEBI) should take sufficient steps to ensure that all the investors are well protected and there prevails a healthy, fair, transparent and secured investment environment in the Indian stock market.

Keywords: FII, NIFTY, Volatility, GARCH, ARCH, Impulse Response.

JEL Classification : F21.

INTRODUCTION

Since the time, Indian economy has been opened to the outer world; it has attracted enormous amount of foreign investment. One of the underlying concerns which every country has faced with these foreign flows (FII in particular) has been their hot nature i.e investing for a short period with prime focus on returns and withdrawing from one country and investing into another leaving all the invertors helpless. This was the same what Malaysia, Thailand and Indonesia faced in 1997. This was also what India faced in 2008 (Sumanjeet, 2010). The worse effect of these FII flows happens to be on the short term volatility of the Indian stock market. Hence, in the light of this fact, gauging and analysing their investment behaviour on regular basis becomes need of the hour. With the same perspective the present research paper has been developed.

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REVIEW OF LITERATURE

Various studies on FII flows and Indian stock market have found diversified results. Rajesh Chakraborty (2001) in his research paper titled, "FII Flows to India: Nature and Causes" observed that since the entry of FII flows in Indian stock market, they have become a reckoned force. They have emerged out as major investment players in the Indian economy. As per this research, it has been observed that there is an important relationship between FII flows and Indian stock market. The impact of FII on the Indian stock market has also been observed to be increasing. Mukherjee (2002) in his paper titled" FII in the Indian Equity Market: An Analysis of Daily Flows during January 1999-May 2002" that there was causation from FII flows to stock marker return, however , the reverse was not found the same. Gordon and Gupta (2003), in their paper "Portfolio Flows into India: Do Domestic Fundamentals Matter", found that FII flows are relatively less volatile as against various studies which found them be highly volatile. Douma, Kabir and Rejie (2006) observed that the FII flows have had a positive impact on the performance of the companies. More interestingly, Klapper and Aggarwal (2005) found that FII preferred those companies which were incorporating good corporate practices.

RESEARCH METHODOLOGY

Research Design: The research design of the present paper is empirical in nature.

    Objectives: The objectives of the present research paper are as follows:

i) To study and analyse the patterns and trends of FII flows in Indian economy.

ii) To analyse the relationship and the impact of FII flows on the volatility of Indian stock market (NSE CNX Nifty).

Hypothesis

The following hypothesises have been framed and tested in the light of the above mentioned objective.

    H_o: The relation between Foreign Institutional Investment flows and CNX Nifty is not significant

    H_a: The relation between Foreign Institutional Investment flows and CNX Nifty is significant

Sources of Data and Statistical Tools and Scope

In the present study, secondary data have been used. This data have been taken from various authenticated sources like Bulletins of RBI, NSE, SEBI Statistics Handbook, etc. The daily data for three months from January 2015 to March 2015 have been used to study and analyse the short term reactions of CNX Nifty due to

changes in FII flows. In the present study, correlation analysis, other econometrics tools like ADF, GARCH and ARCH, Impulse Response have been used for the purpose of empirical analysis.

RESULTS AND DISCUSSION

Relationship Study

For studying and analysing the relationship between the FII flows and CNX Nifty, correlation technique has been used. As per this method, a degree of 0.26 correlations has been found between these variables during the given period, *Mukherjee (2002).* Though the degree of correlation is not very high, it shows that both are positively correlated reflecting that positive/negative change in one variable is followed by same change in another variable *Sumanjeet, (2010).*

Table 1
FII Flows and CNX Nifty

Date	FII Flows (Rs.Cr.)	Closing Value of NSE CNX Nifty
02-Jan-15	259.82	8284
05-Jan-15	472	8395.45
06-Jan-15	-1,570.76	8378.4
07-Jan-15	-1,073.18	8127.35
08-Jan-15	-466.78	8102.1
09-Jan-15	-297.99	8234.6
12-Jan-15	244.95	8284.5
13-Jan-15	235.09	8323
14-Jan-15	-69.74	8299.4
15-Jan-15	1,738.24	8277.55
16-Jan-15	1,099.93	8494.15
19-Jan-15	433.72	8513.8
20-Jan-15	1,275.59	8550.7
22-Jan-15	592.79	8695.6
23-Jan-15	2,019.98	8729.5
27-Jan-15	953.51	8761.4
28-Jan-15	1,723.17	8835.6
29-Jan-15	1,723.77	8910.5
30-Jan-15	-771.55	8914.3
02-Feb-15	-629.97	8952.35
03-Feb-15	-264.35	8808.9
04-Feb-15	-83.8	8797.4
05-Feb-15	-27.43	8756.55
06-Feb-15	-96.45	8723.7
09-Feb-15	-660.3	8711.7

contd. table 1

Date	FII Flows (Rs.Cr.)	Closing Value of NSE CNX Nifty
10-Feb-15	-1,261.19	8661.05
11-Feb-15	-371.27	8526.35
12-Feb-15	-406.28	8565.55
13-Feb-15	390.26	8627.4
16-Feb-15	-182.8	8711.55
18-Feb-15	2,187.96	8805.5
19-Feb-15	1,542.70	8809.35
20-Feb-15	-89.41	8869.1
23-Feb-15	601.91	8895.3
24-Feb-15	697.28	8833.6
25-Feb-15	516.06	8754.95
26-Feb-15	2,312.15	8762.1
27-Feb-15	1,957.10	8767.25
28-Feb-15	614.03	8683.85
02-Mar-15	424.79	8844.6
03-Mar-15	772.92	8901.85
04-Mar-15	2,786.24	8956.75
05-Mar-15	79.84	8996.25
09-Mar-15	838.3	8922.65
10-Mar-15	-748.13	8937.75
11-Mar-15	-444.65	8756.75
12-Mar-15	733.09	8712.05
13-Mar-15	66.98	8699.95
16-Mar-15	-762.55	8776
17-Mar-15	265.52	8647.75
18-Mar-15	-457.43	8633.15
19-Mar-15	1,428.72	8723.3
20-Mar-15	354.59	8685.9
23-Mar-15	417.41	8634.65
24-Mar-15	737.86	8570.9
25-Mar-15	813.19	8550.9
26-Mar-15	-521.23	8542.95
27-Mar-15	-320.52	8530.8
30-Mar-15	-240.34	8342.15
31-Mar-15	356.07	8341.4

Source: NSE Indian Stock Market Review,2015, NSEIndia.Com, SEBI.gov.in

In the above diagram , the patterns of FII flows and Nifty values have been studied. As per this table, it has been observed that FII flows have been showing mixed trends of investment showing that FII flows are no body friend or foe, *Chakrabarti, R. (2001).*

They invest or flee away as per their perceived notion with regard to investment returns in a given economy. On the other hand, Nifty values have also been found
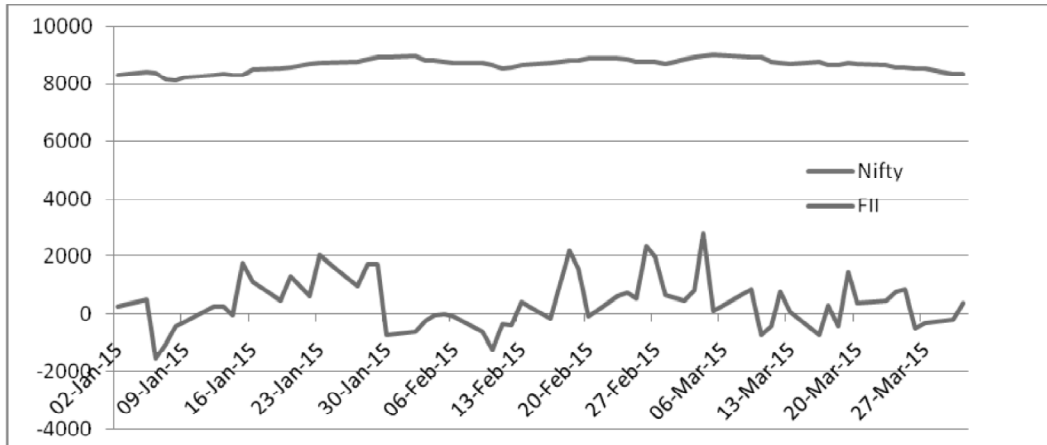
Diagram 1: Trends of Nifty and FII Flows

Source: As per the results received

showing some fluctuation though, by and large, they have remained near to eight thousands.

ADF (Augmented Dicker Fuller Test)

Before ARCH and GARCH methods are applied as empirical tools for analysis, there are three conditions which need to be fulfilled:

    i)   The time series (FII and CNX Nifty here) should be stationary.

    ii)   There should be volatility in the dependent variable (CNX Nifty here).

    iii)   There should be ARCH effect.

There are many methods to determine whether a time series is stationary or non- stationary. Amongst them, one of the most popular methods named Augmented Dicker Fuller (ADF) has been applied in the present study to decide the stationarity of the time series.

- **ADF Equation**

$$Y_t = \beta_1 + \beta_{2t} + \delta Y_{t-1} + \alpha_i{}^m\Sigma_{i=1}\Lambda_{t-1} + \varepsilon_t$$

Where ε_t is a white noise error term and Y_{t-1} means additional lagged terms with an idea to ensure that the error terms are not correlated.

β_1, β_2, δ, α are the coefficients where ä is the first difference operator which is equal to **(p-1),** estimated to test the null hypothesis that $\delta = 0$.

If δ is equal to 0 it mean that there is a no unit root which implies stationarity in the series under consideration.

- **Checking of Stationarity of FII and CNX Nifty Time Series :**

In case of FII, the time series (at level) has been found stationary as depicted by the following table. In this case, t statistics value (5.093756 ignoring signs) has been found more than all the critical values at 1%, 5% and 10%. This shows that there is no unit root in FII time series.

Table 2
Result for Checking Stationarity of FII Time Series

Null Hypothesis: FII has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, max.lag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.093756	0.0001
Test critical values:	1% level	-3.546099	
	5% level	-2.911730	
	10% level	-2.593551	

Source: As per the result received.

In case of Nifty, the original time series has been differenced with 1 difference and the following results have been obtained which shows that this time series has been converted into stationary time series. As per the observations in the following table, the t statistics value (6.859925 ignoring signs) as been found more than all values critical values at 1%, 5% and 10%. Hence, it shows that now the CNX Nifty time series is stationary times series which can be used for further analysis.

Table 3
Result for Checking Stationary of CNX Nifty Time Series

Null Hypothesis: D(NIFTY) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maximum lag=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.859925	0.0000
Test critical values:	1% level	-3.444063	
	5% level	-2.810860	
	10% level	-2.693090	

Source: As per the results obtained.

Cluster Volatility

It is very imprint to observe that GARCH and ARCH models applicability and results become more authenticated in case there happen to be cluster volatility in the time series on which models are to be applied. Hence, with the same objective

in perspective, the cluster volatility in the residuals of variance based on daily data has been checked and following results have been found:
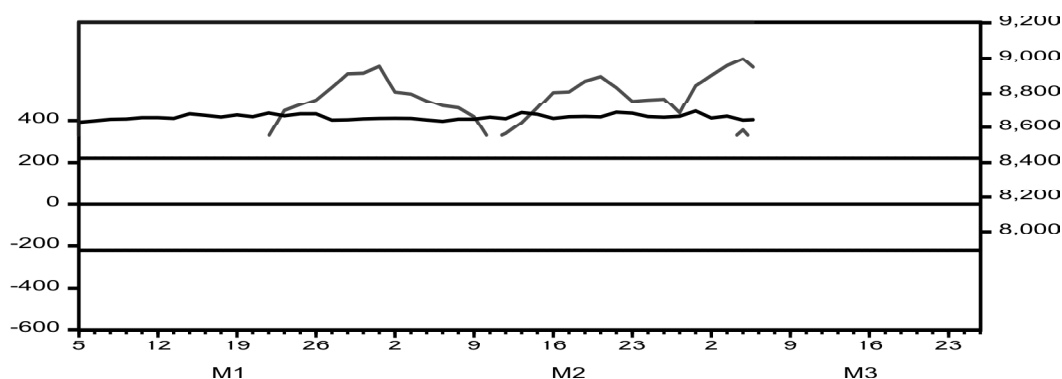

Diagram: 2 Result for Cluster Volatility in the Residuals of Variance (Daily Data)

Source: As per the result received.

As per the diagram 2, there has been observed continous phenomena of volatility during three months from January 2015 to March 2015. Hence, this phenomena qualifies to be investigated in its relation to FII flows.

ARCH Effect Test

The next condition for the applicability for GARCH and ARCH Models has been applied and and analysed i.e the presence of ARCH effect.

Table 4
Results for Checking presence of ARCH Effect

Heteroskedasticity Test: ARCH				
F-statistic	91.23025	Prob. F(1,55)		0.0000
Obs*R-squared	35.56121	Prob. Chi-Square(1)		0.0000
Variable	*Coefficient*	*Std. Error*	*t-Statistic*	*Prob.*
C	8512.697	6559.768	1.297713	0.1998
RESID^2(-1)	0.782434	0.081918	9.551453	0.0000
R-squared	0.623881	Mean dependent var		45667.95
Adjusted R-squared	0.617042	S.D. dependent var		64439.39
S.E. of regression	39877.40	Akaike info criterion		24.05946
Sum squared resid	8.75E+10	Schwarz criterion		24.13115
Log likelihood	-683.6947	Hannan-Quinn criter.		24.08732
F-statistic	91.23025	Durbin-Watson stat		1.578717
Prob (F-statistic)	0.000000			

Source: As per the result received.

As per the table 4, it is observed that P Chi-Square value (0.0000) is less than .05 %, hence, the null hypothesis that there is no ARCH effect is rejected. Moreover, R –square value (0.62) (which shows that how much dependent varaible (CNX Nifty) depends upon indendent variable (FII here) has been found to be more than 50 shows that model is best fitted .

Model Selection Through various Information Criteria with Normal Gaussian Distribution

In case of GARH and ARCH application, it is very important o determine the model along with lag length as it can directly affect the results of tests. In the present study, three major criteria (AIC, BIC and HQC) have been used for the selection of lag length to be used in ARCH and GARCH models. When applied the following results have been found:

Table 5
Lag Order Selection Criteria

Observations	GARCH(1,1)	GARCH(1,2)	GARCH(2,1)	GARCH(2,2)
AIC-Akaike Info Criteria	19.92	19.91	19.97	19.98
SIC- Schwarz criteria	19.06	20.02	20.09	20.13
HQ-Hannan Quinn Criteria	19.99	19.98	20.00	20.03

Source: As per the result received.

As per the table 5, at GARCH (1, 1), the values of all tests (AIC, SIC and HQ) have been found to minimum. Hence, GARCH (1, 1) model has been used for analysis purpose.

GARCH AND ARCH RESULTS

To specify the ARCH/GARCH model, two equations have been specified. One is mean equations and the second is variance equation which is explained as follows:

Mean Equation is as follows

$$\text{Nifty} = K1 + K2 \cdot \text{FII} + e \qquad (1.1)$$

Here Nifty = CNX Nifty of NSE, K1,K2 = constant, FII = Foreign Institutional Investment,

e = Residual.

Second equation is the Variance Equation which is as follows

Residual from mean equation (1.1) is used in the development of the following variance equation.

$$H_1 = K3 + K4 \cdot e^2_{t-1} + K5H_{t-1} + K6 \cdot \text{FII} \qquad (1.2)$$

H_1 = Variance of the residual (error term) derived from equation (1.1). It is also known as current period's variance or volatility of Nifty.

K3, K4, K5……K6 = Constant/Coefficient

e^2_{t-1} or RESID(-1)^2 = Previous period's squared residual derived from equation (1.1).

It is also known as previous period's stock market (Nifty) information about volatility. Thus is also called ARCH term.

H_{t-1} = residual variance of previous days or volatility of stock market (Nifty). It is called GARH term.

FII = FII (variance repressor or exogenous or independent variable)\

Table 6
Results for GARCH, ARCH and FII

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	8733.186	26.12870	334.2373	0.0000
FII	0.015637	0.028805	0.542862	0.0072
Variance Equation				
C	26487.98	14863.20	1.782119	0.0747
RESID(-1)^2 / (ARCH)	1.187051	0.826156	1.436837	0.0458
GARCH(-1)	-0.476451	0.195058	-2.442608	0.0146

Source: As per the results received.

As per the table 6, it has been observed that P value (0.0146) in case of GARCH (1) has been found less than 0.05. This shows that the coefficient of GARCH (1) term is significant. This shows that the immediate previous volatility in the Nifty time series is also effecting the present volatility found in Nifty time series. On the same lines, for ARCH(1) term the p value (0.0458) has been found less that less than 0.05. This shows that the recent past information has also affected the present volatility in Nifty time series. This also shows that the market is not very perfect as all the information is not being absorbed by the market well, *Loomba, Jatinder (2012)*.

Further the table shows that in case of FII, the p value (0.0072) has been found less than 0.005. This shows that FII has been a significant factor in enhancing volatility in NSE market. Conclusively, it can be stated that the GARCH (1), ARCH (1) and FII have been significant in enhancing volatility of NSE Nifty.

IMPULSE RESPONSE FUNCTION

This is a statistical tool through which the change in one variable due to the standard shock in another variable is observed and studied graphically.
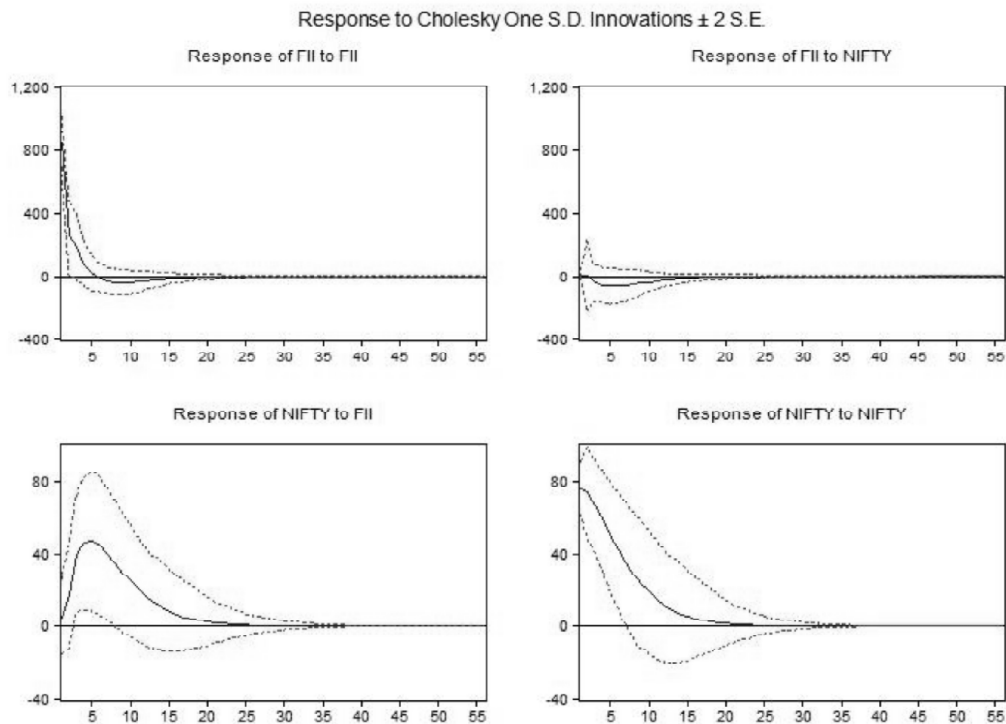

Diagram 2: Impulse Response NIFTY to FII

Source: As per the results received.

The impulse response function between FII flows and CNX Nifty has been displayed in the above diagram 2. From the diagram, it is observed that when there is one standard deviation shock in Nifty value, there is some corresponding change in FII. But the change is neither sustainable nor very sharp for a period of three months. However on the contrary, when there is a standard deviation shock in FII flows, there is a sharp reaction by Nifty in the initial period of twenty days. This reaction dies down thereafter. It is also important to observe that the impulse response of Nifty due to change in FII is more reactive, sharp and sustainable as compared to impulse response of FII due to change in Nifty value, *Pal, P. (2004).*

CONCLUSION

Based upon the above analysis, it has been observed that FII, on the one hand, has become a reckoned force in the Indian stock market and on the other hand, they

have also become a major source of volatility enhancement. The correlation between FII flows and CNX Nifty has been found positive. The GARCH, ARCH and FII models have been found significant stating that GARCH (the impact of previous volatility on the current one), ARCH (the impact of previous news on the current volatility) and the impact of FII flows on the current volatility in Nifty have been found positive. Moreover, it has been observed that Nifty reaction to one standard deviation shock in FII has been found sharper as compared to FII reaction to one standard deviation shock to Nifty. In the light of the above observations , it becomes important for the market regulator (SEBI) to ensure that FIIs do not take undue advantage of their investment strategy leaving domestic investors (small investors in particular) helpless and ruthless in the Indian economy.

LIMITATIONS AND SCOPE FOR FUTURE RESEARCH

As observed by all researches, this research has also some limitations. One of the limitations of this research paper is that the modelling has been undertaken between two factors i.e. CNX Nifty and FII flows and other factors have been assumed to be constant. Secondly, the period taken for this research is short. Hence, the findings and conclusion can not be generalised. In the light of the mentioned limitations, there is a big scope for future research.

SCOPE FOR FUTURE RESEARCH

There is a great scope for future research in this area. For example, other factors or variables like economic growth, money supply, inflation, foreign exchange reserves can also be included for undertaking this kind of modelling. More indexes of different countries can be included. Thirdly, long periods can also be taken for studying the volatility component.

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