



Feedback Trading by Institutional Investors in Indian Stock Market: an Analysis of Foreign and Domestic Institutional Investors.

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Abstract

Institutional investments have acquired a significant role in the Indian securities market. This study investigates the trading behaviour of foreign institutional investors (FIIs) and domestic institutional investors (DIIs) in relation to Indian stock market returns as proxied by SEBI and also analyses the interrelationship between both the classes of institutional investors. The study uses a broader definition of DIIs that includes not only mutual funds (MFs) but also banks, insurance companies and domestic financial institutions. The results revealed that the investment strategy of Foreign Institutional Investors is significantly affected by the

investments of DIIs in the Indian stock market. Contrary to findings of earlier studies that FIIs act as positive feedback traders and DIIs act as contrarian investors, the study finds that there is a positive response of the Investments by DIIs to the monthly returns of Sensex whereas the responses of FIIs are found to be in opposite direction. The study observed that the fund flow from Institutional investors are considerably influenced by the lagged returns of Sensex, implying that they have a tendency to follow recent market behaviour. The study also finds that institutional investors, both foreign as well as domestic, do not have a significant impact on Indian stock market.

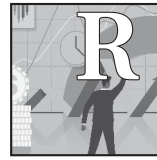
Keywords: Feed-back trading, institutional investors, BSE Sensex, foreign institutional investors, lagged returns.
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INTRODUCTION

Investments by institutional investors play a significant role in the Indian stock market. Apart from augmenting the stock market turnover, both foreign as well as domestic institutional investors play a crucial role in persuading the volatility in the securities market by undertaking the investment decisions which tends to make the prices moving away from the fundamentals. Institutional investment is defined to be the investment undertaken organizations or by foreign as well as domestic institutions such as insurance companies, banks, mutual fund houses, Pension funds etc. in the financial or real assets of a country. Domestic institutional investors are the category of institutional investors who make investments in securities and other financial assets of the country in which they are based. They use pooled funds to trade in assets and securities of their country. These investment decisions are impacted by various domestic, economic, international as well as political trends. Apart from foreign institutional investors, the domestic institutional investors also exercise significant impact on net investment flows into the economy.

Feedback trading refers to the pattern of behavior wherein the investors take their portfolio investment decisions on the basis of the past stock market returns. When the investors, in anticipation of continuation of past trends in the future, undertake huge investments when the market is prosperous and withdraw their investments from the stock market when the market is deteriorating, it is known as positive feedback trading or the momentum trading strategy. It implies that in case the historical stock market returns are positive, the net institutional investment flows are also likely to be positive and vice-versa. An alternate hypothesis suggests that the investors can also select negative feedback trading (or contrarian investment strategy) which is characterized by undertaking investment decision in divergence to the prevailing sentiment of the market. In both the cases, the direction of causality is from the past stock returns to the investment flows. Some researchers also propose that the foreign investors have comparatively less information in comparison to the domestic institutional investors (Choe et al. 2001). Therefore, they pursue the feedback trading strategies. The actual danger of implementing these strategies rises when the institutional investors jointly as a group formulate similar expectations, take similar kind of investment indications from the past price movements and hence take similar portfolio decisions. In such a condition, they make investments and withdraw their investments out of the market, collectively as a group. Such an investment behaviour of the investors when they, in anticipation of similar market sentiments, collectively enter and withdraw from the market is known as Herding behaviour or Momentum trading strategy. The investment strategies of the foreign institutional investors is influenced by similar factors such as fluctuations in exchange rate, performance of domestic stock market vis-à-vis foreign stock markets etc. This may be alternative cause for revealing herding behaviour by the Institutional investors especially the foreign institutional investors. This upsurges the volatility of the securities market and sometimes it may lead to conversion of a trivial financial distress into a complete financial crisis. The related incidence was witnessed in the East Asian markets in the course of the crisis. (Krugman, 1998; Choe et al., 1999; Chakrawarti and Roll, 2002).



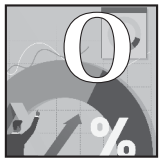
VIEW OF LITERATURE

It is a common belief that Institutional investment is the motivating force in the determination of the market sentiments. A brief description of the past studies related to investments by institutional investors has been given as under:

Chakrabarti (2001) attempted to examine the determinants of Foreign Institutional Investment flows in India. Statistical tools for analysing the presence of causal relationship between the institutional investors and macroeconomic variables were employed for the analysis. The study detected that there existed a high degree of correlation between the institutional investment flows and that they were more likely to be the effect than the cause of these returns. The study concluded that the FII flows have the tendency to increase the volatility in equity market. **Alexakis et al. (2005)** analysed the relationship between mutual fund flows and stock market returns in Greece. The statistical analysis revealed that bidirectional causal relationship existed between mutual fund flows and stock market returns. The analysis using cointegration analysis revealed that mutual funds flow have the tendency to cause the stock returns to rise or fall. **Badhani (2006) and Bhattacharya and Mukherjee (2006)** studied the long run cointegration between FII investment flows and the stock prices. The researchers found that bi-directional long run causality existed between the variables. The findings of **Mukherjee (2006) et al.** specified the likelihood of presence of asymmetry in the dynamic interaction in the FII investment flows and stock market returns. They further found that the FII sales were comparatively more responsive towards returns whereas FII purchase were not. Therefore, FIIs were found to be more responsive to descending price movements than the mounting movements. **Oh and Parwada (2007)** studied the dynamic relationship between mutual fund flows and stock market returns in Korea. The results indicated that there was a significant positive correlation between Returns. It was also revealed that a significant negative correlation was present in the case of net flows. Further, analysis conducted on the direction of causality suggested that stock market returns predominantly contained information on investment flows. **Bose (2012)** discovered the interaction between investment behaviour of foreign institutional investors (FIIs) and domestic institutional investors represented by mutual funds. The study was conducted based on post financial crisis data. A high degree of negative relationship was observed between the investments by these two categories of institutional investors. It was also revealed that the investments by Domestic mutual funds were based on the stock market returns, FII investments as well as their own historical investments. The study also found indication of investments by FIIs having a causal influence on stock market returns. **Qureshi et al. (2016)** attempted to examine the dynamic interaction of aggregate mutual fund flows with stock market variables in ASEAN financial markets. The study included Indonesia, Malaysia, Philippines Thailand and Singapore. GARCH (1, 1) model was estimated and then volatility estimators were found to evaluate conditional variance. The study confirmed the existence of negative feedback trading behavior amongst the institutional investors. In addition, mutual funds were observed to

respond simultaneously to risk-related information in comparison to returns-related evidence in the stock market. **Vardhan and Sinha (2016)** examined the long-term as well as short-term relationships between FIIs and stock market returns as proxied by Sensex returns and also the integration with the US equity market. VAR model was used to analyse the association between various macroeconomic variables. For the purpose of the study, the researcher used cointegration analysis, generalised impulse response analysis, Granger causality test and variance decomposition analysis. The study found that the Sensex returns have a significant impact on foreign exchange rates and variations in the exchange rates were also found to have an impact on outflow of FIIs.

The present study attempts to examine the present feedback trading strategy adopted by both foreign as well as Domestic Institutional Investors in the Indian stock Market.



OBJECTIVES OF THE STUDY

1. To study the investment behaviour of foreign as well as domestic institutional investors in India.
2. To determine whether the institutional investors are the cause or the effect of stock market returns in India.



RESEARCH METHODOLOGY

The present study is based on the monthly data covering a period of 11 years from April 2007 to March 2018. BSE Sensex has been selected as a representative of the Indian stock market. Monthly closing values of BSE Sensex has been used for the purpose of analysis. The monthly data on Foreign Institutional Investment flow and Domestic Institutional Investment flow has been collected from the official website of moneycontrol.com. Closing values of BSE Sensex Index have been obtained from the official website of SEBI.

Ratio of purchases and sales by both foreign as well as domestic institutional investors have been used. This was done to eliminate the problem of non-stationarity of data and to evade the complexity in dealing with the negative figures.



ANALYSIS AND INTERPRETATION

Analysis of the monthly data has been done by means of various econometric tools such as Descriptive analysis, ADF unit root test, Granger's Causality test, Vector Auto Regression (VAR) test, Wald test and Impulse Response Function. For data analysis, Microsoft excel and Eviews have been used.

Statistical and Econometric Tools
Table 1 Descriptive statistics for the period
1st April 2007 to 31st March 2018

	FII_RATIO	DII_RATIO	SENSEX
Mean	1.032700	1.062431	0.871930
Median	1.015500	1.062489	0.575489
Maximum	1.435037	1.698424	28.25510
Minimum	0.755670	0.585485	-23.89010
Std. Dev.	0.154106	0.240969	6.489709
Skewness	0.630018	0.128971	0.078967
Kurtosis	2.978639	2.557780	6.255195
Jarque-Bera	8.734797	1.441506	57.97427
Probability	0.012684	0.486386	0.000000
Sum	136.3165	140.2409	114.2229
Sum Sq. Dev.	3.111082	7.606633	5475.123

Table 1 shows a statistics of sample of 132 observations from 1st April 2007 to 31st March 2018. Descriptive statistics reveal that both the variables, that is, FIIs monthly ratio of investment and Domestic Institutional Investors' monthly ratio of investment are not normally distributed as indicated by the value of JarqueBera statistics which rejects the null hypothesis of normality at 1% level of significance.

The graphical presentation of FIIs investments and Domestic Institutional investors' investments is shown below:

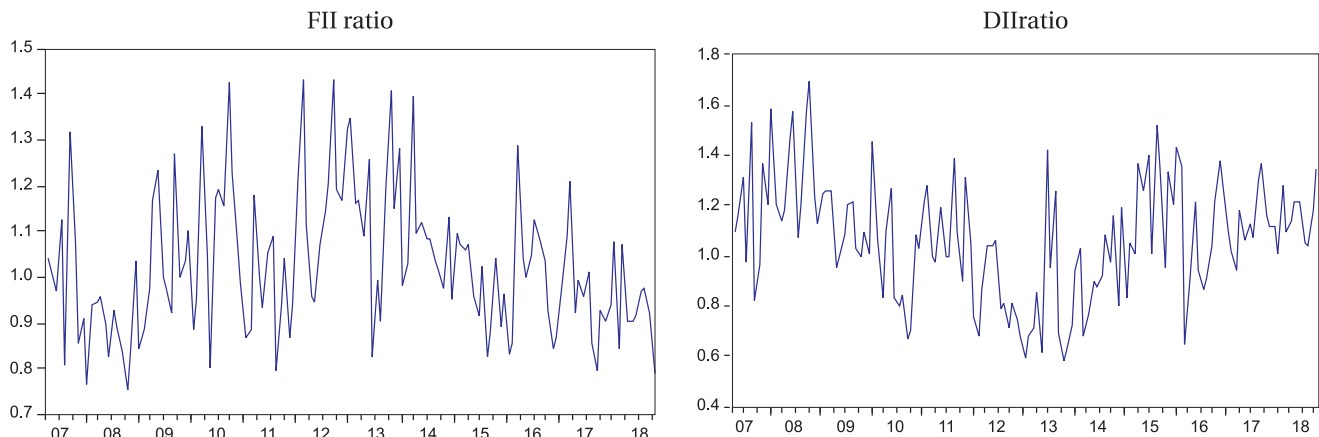


Figure-1
Foreign Institutional Investors investments and Domestic Institutional investors' investments

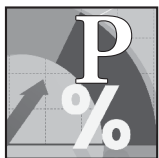
As far as the distribution of series is concerned, both Foreign Institutional Investors as well as Domestic Institutional Investors' monthly ratios of investments are positively skewed as is shown by positive value of skewness at 0.630018 and 0.128971 respectively. Standard deviation, which is the measure of historical volatility, is greater in case of DIIs in comparison to foreign institutional investors. It represents the greater level of volatility in investments by the Domestic Investors. It refutes the results of the prior studies revealing the increase in the level of volatility by the participation of foreign investors in India. Since, the analysis in the present study deals with the time series data, so the primary phase in the analysis is to detect whether the variables contain a Unit Root or not. Stationarity of data is a prerequisite in case of time series analysis because if the data is non stationary then the analysis is considered valid for that particular time period only.



UNIT ROOT TEST

Examination of stationarity properties of the data series is prerequisite under time series analysis. A statistical test of stationarity is known as unit-root test. Amongst the several

unit root tests available (e.g. ADF, KPSS, PP, etc), the present study uses most commonly used Augmented Ducky Fuller (ADF) Unit root test to test the unit root test in the data series. Table- 2 shows the results of ADF unit root test. The results of the analysis as shown in Table-2 depicts that the stock market returns as proxied by Sensex Returns and investments by both the categories of Institutional Investors i.e. Foreign Institutional Investors ratios and Domestic Institutional investors are stationary at level as their ADF test statistics are more than the critical values as shown at 1%, 5% and 10% degrees of freedom. The stationarity of time series data fulfills the purpose of analysis and also provide such results which can be generalized for the entire study period under consideration.



PAIRWISE GRANGER CAUSALITY TESTS

Analysis of the cause and effect relationship between the variables under consideration is one of the necessary issues under time series analysis.

According to Granger causality test, if a variable is the cause of another variable or if it granger causes another, say 'X' granger causes 'Y', then the past values of the variable 'X' are considered to contain information in order to predict the variable 'Y' over and above the information as contained in the past values of variable 'Y' alone.

The test is based on the following two regression equations. These equations help to identify which variable is causing the other and hence it determines the direction of causality amongst the various variables under consideration.

Table-2
Results of ADF Unit Root Test

Variable	ADF Statistics with intercept	ADF Statistics with intercept and trend
Sensex Returns	10.33991	10.29987
Foreign Institutional Investors	7.737849	7.699969
Domestic Institutional Investors	7.190239	7.126854
CRITICAL VALUES		
1 Percent	-3.481217	-4.030157
5 Percent	-2.883753	-3.444756
10 Percent	-2.578694	-3.147221

$$X_t = \alpha_1 + \sum \beta_{1k} X_{t-k} + \sum \chi_{1k} Y_{t-k} + \ell_1 \dots\dots\dots(1)\text{Equation}$$

$$X_t = \alpha_2 + \sum \beta_{2k} Y_{t-k} + \sum \chi_{2k} X_{t-k} + \ell_2 \dots\dots\dots(2)\text{Equation}$$

The equation (1) represents that direction of causality is from X to Y, whereas equation (2) represents that direction of causality is from causality from Y to X.

Where, e_{1t} and e_{2t} are mutually uncorrelated white noise errors, X_t and Y_t denote the variables under consideration to be tested, t denotes the time period, k denotes the number of lags, and m is the maximum number of lagged observations which have been included in the model.

The null hypothesis of no causality between the variables is accepted depending upon the Probability value, if the 'p' value or the Probability value is greater than the critical value at 5% level of significance.

Table-3
Results of Pair-Wise Granger Causality Test

Null Hypothesis:	F-Statistic	Probability	Criterion
Domestic Institutional Investors' investments does not Granger Cause Sensex	0.248890.	7801	Accept
Sensex does not Granger Cause Domestic Institutional Investors' investments	5.39779	0.0057	Reject
FII's Investments does not Granger Cause Sensex	0.12962	0.8785	Accept
Sensex does not Granger Cause FII's Investments	1.94529	0.1473	Accept
FII's Investments does not Granger Cause Domestic Institutional Investors' investments	1.36279	0.2597	Accept
Domestic Institutional Investors' investments does not Granger Cause FII's Investments	3.31686	0.0395	Reject

The results of the Granger Causality test have been reported in Table 3. The causality from FII flows to BSE Sensex returns is found to be insignificant at 5 per cent level of confidence. Results indicated in the analysis are tested at lag 2. Results of Pair-Wise Granger Causality Test as shown in Table 3 clearly indicates that both the categories of institutional investors do not have a significant impact on the Indian stock market return as proxied by Sensex returns. The analysis further indicates that there exists a uni-directional causality from BSE Sensex returns to Domestic Institutional Investors' investments and not the other way round. This indicates that feedback trading practices are being followed by Domestic Institutional Investors i.e. upward trend in the securities market leads to increase in investments by DIIs and downward trend prompts them to book profits. Further, it is also revealed that the investments by DIIs granger cause the level of investments by Foreign Institutional Investors in the Indian Stock Market. It thereby indicates that the FIIs base their investments decisions the investments pattern of local or Domestic investors.



VECTOR AUTO-REGRESSION MODEL

The vector autoregression (VAR) is an econometric model which is used to capture the linear interdependencies among manifold time series. VAR models generalize the univariate autoregressive model (AR model). Each variable in a VAR model has an equation which elucidates its evolution based on its own past lags and the lags of the other model variables.

Table-4
VAR Lag Order Selection Criteria for BSE Sensex returns and investments by Foreign Institutional Investors and Domestic Institutional Investors

Lag	Lag L	LR	FPE	AIC	SC	HQ
0	-1109.137	NA	12382.74	17.93769	18.00592	17.96541
1	-841.2388	518.5121*	190.2525*	13.76192*	14.03485*	13.87279*
2	-835.9029	10.06929	201.8944	13.82102	14.29864	14.01504
3	-827.6752	15.12838	204.5666	13.83347	14.51580	14.11065
4	-819.9222	13.88043	208.9871	13.85358	14.74061	14.21391
5	-814.7788	8.959415	222.8495	13.91579	15.00751	14.35927
6	-810.2160	7.727360	240.0919	13.98736	15.28377	14.51399
7	-807.4115	4.613811	266.4101	14.08728	15.58840	14.69707
8	-801.8951	8.808495	283.3379	14.14347	15.84928	14.83641

LR: Sequential Modified LR test statistic (each test at 5% level)

FPE: Final Prediction Error

AIC: Akaike Information Criterion

SC: Schwarz Information Criterion

HQ: Hannan-Quinn Information Criterion

Different Lag Order Selection Criterion are suggesting 2 lags should be included in the analysis. The number of lags to be included as shown in Table-4 is same in all the criterion.

Table 5
VAR Model for BSE Sensex returns and investments by Institutional Investors

	FII_RATIO	DII_RATIO	SENSEX
FII_RATIO(-1)	0.024523	-0.181965	-1578.747
	(0.18117)	(0.27579)	(1473.33)
	[0.13536]	[-0.65979]	[-1.07155]
FII_RATIO(-2)	-0.287412	0.490292	108.8267
	(0.17420)	(0.26518)	(1416.63)
	[-1.64993]	[1.84892]	[0.07682]
DII_RATIO(-1)	-0.262090	0.342914	-1262.425
	(0.11242)	(0.17114)	(914.275)
	[-2.33125]	[2.00368]	[-1.38079]
DII_RATIO(-2)	-0.211140	0.426833	130.1804
	(0.11182)	(0.17022)	(909.331)
	[-1.88827]	[2.50759]	[0.14316]
SENSEX(-1)	-1.54E-05	2.69E-05	0.971155
	(1.5E-05)	(2.2E-05)	(0.11869)
	[-1.05619]	[1.21005]	[8.18222]
SENSEX(-2)	1.15E-05	-2.35E-05	0.019324
	(1.5E-05)	(2.3E-05)	(0.12115)
	[0.76946]	[-1.03428]	[0.15951]
C	1.892212	-0.150468	3065.619
	(0.43071)	(0.65566)	(3502.67)
	[4.39325]	[-0.22949]	[0.87522]
R-squared	0.211886	0.252371	0.967070
Adj. R-squared	0.173441	0.215901	0.965463
Sum sq. resids	2.450842	5.679448	1.62E+08
S.E. equation	0.141158	0.214882	1147.944
F-statistic	5.511467	6.920012	602.0267
Loglikelihood	73.65967	19.03222	-1096.809
Akaike AIC	-1.025533	-0.185111	16.98167
Schwarz SC	-0.871128	-0.030705	17.13608
Mean dependent	1.032905	1.061470	21253.05
S.D. dependent	0.155263	0.242669	6177.039
Determinant resid covariance (dof adj.)		189.0361	
Determinant resid covariance		160.1142	
Loglikelihood		-883.3187	
Akaike information criterion		13.91260	
Schwarz criterion		14.37581	

The table 5 reveals that Sensex returns are impacted by their own past returns at lag 1. 't- statistics' is 8.18222 in case of Sensex and their past returns at lag 1. Also, the effect is not found to be significant as far as the Sensex returns at lag 2 are

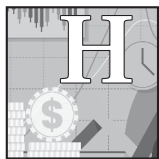
concerned. Further, the Domestic Institutional Investors at lag 1 are found to be significant in influencing the investments by both the categories of institutional investors under consideration. Further, Domestic Institutional Investors are found to be affected by their own investments at lag 2 as well.

The results of VAR estimates as shown in Table 5 reveal that FIIs investments in the Indian stock market are not affected by their own past returns at lag 1 and lag 2. This emphasizes that there might be some other variables like Indian Stock market returns, Exchange rate, Growth prospects of India, Inflation in India, Stock market return in the International market, Global interest rates etc. which act as the determinants of investments by the Foreign Institutional Investors. As far as the investments of Domestic Institutional Investors are concerned, their investment pattern is found to be significantly influenced by their own investments in the preceding months at lag 1 and lag 2. Other variables like savings by household savings, growth rate of the economy, interest rate, exchange rate, rate of inflation etc. can be the basis of investments by Domestic Institutional Investors.



WALD TEST

Under the VAR framework, the impact of individual lags of different variables is being studied on the dependent variable. Wald test studies the combined affect of all lags of a particular variable on the dependent variable.



HYPOTHESIS OF THE TEST

H₁: There is no causal relation between investments by Foreign Institutional investors and Indian stock market.

H_{1a}: There is a causal relation between investments by Foreign Institutional investors and Indian stock market.

H₂: There is no causal relation between investments by Domestic Institutional investors and Indian stock market.

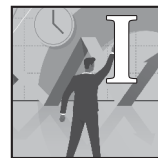
H_{1a}: There is a causal relation between investments by Domestic Institutional investors and Indian stock market.

The null hypothesis of no causal relationship between the variables will be accepted if p>0.05 and the hypothesis will be rejected if p<0.05.

VAR Granger Causality/Block Exogeneity Wald Test for BSE Sensex returns and investments by Institutional Investors Table 6

Dependent Variable: FIIs Ratio	Chi-sq df	Prob.
DII_RATIO	9.150619	0.0103
SENSEX	4.866992	0.0877
All	11.65286	0.0201
Dependent variable: DII_RATIO	Chi-sq df	Prob.
FII_RATIO	3.893547	0.1427
SENSEX	2.779972	0.2491
All	5.522559	0.2378

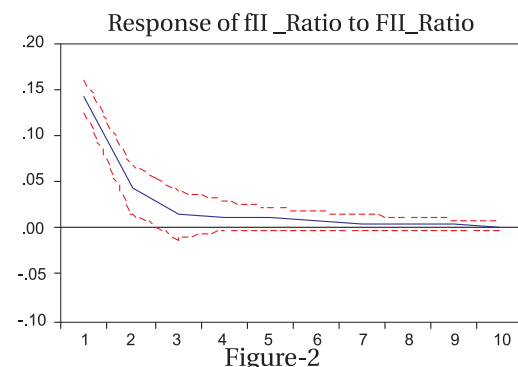
The critical values of Wald test as reported in Table-6 while taking FIIs as dependent variable and investments by Domestic Institutional Investors as independent variable is 0.0103 which is less than .05, so our null hypothesis of no impact investments by Domestic Institutional Investors on FIIs will be rejected. It clearly reveals that domestic institutional Investors have a significant impact on Foreign Institutional Investors in India. Further, the combined effect of Stock market returns as well as investments by Domestic Institutional Investors on the investments by FIIs is found to be significant as indicated by 'p' value of 0.0201. The analysis of the impact of Foreign investors on the domestic investors is found to be insignificant. Also, the impact of Sensex returns on the investments by Domestic Institutional Investors is observed to be insignificant. The results of the Wald test mainly revealed that FIIs base their investment decisions on the investment pattern of Domestic Institutional Investors thereby reflecting chasing behaviour in investment decisions.



IMPULSE RESPONSE FUNCTION

The impulse response studies the responsiveness of the dependent variable in the VAR to shocks to each of the endogenous variables. Figure 2 shows the pair wise impulse response relations among the Domestic Institutional Investors' investment behavior, Foreign Institutional Investor's investment behavior and the monthly returns of the BSE Sensex. As indicated in Figure 2 impulse response analysis shows that the investment decisions of foreign institutional investors as well as domestic institutional investors are influenced by the monthly stock market returns of Sensex. The analysis reveals that there is a positive response of the Investments by DIIs to the monthly returns of Sensex whereas the responses of FIIs are found to be in opposite direction. It can be concluded from the results that Domestic Institutional Investors are engaged in positive feedback trading whereas the Foreign Institutional Investors are engaged in the negative feedback trading. The impulse response analysis also indicates that the level of persistence in the investment behaviour of Domestic Institutional Investors and Foreign Institutional Investor's is up to a period of the lag of three months. Also, the Domestic Institutional Investors' response to the investment patterns of FIIs is observed to be in the opposite direction. This means the Foreign Institutional Investors act as buyers when Domestic Institutional Investors act as the main sellers and vice versa.

IMPULSE RESPONSE FUNCTION
Response to Cholesky One S.D. Innovations ± 2S.E.



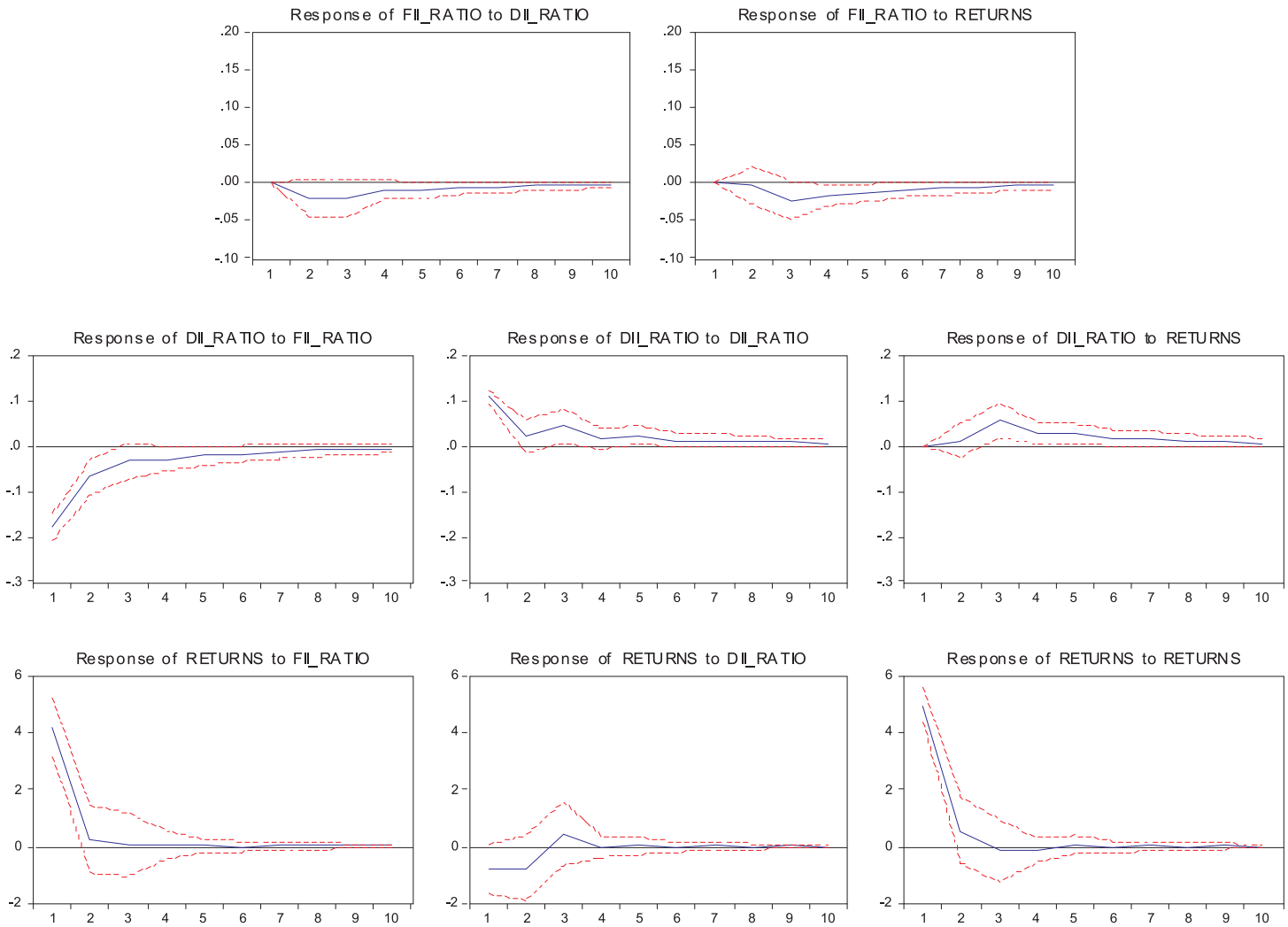
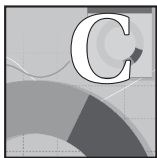


Fig-2



CONCLUSION

The institutional investors such as FIIs and domestic institutional investors have gained a substantial role in Indian equity market. This study analysed the dynamic association between these two categories of institutional investors and the behaviour of stock market return using 11 years of monthly data spanning from 1st April 2007 to 31st March 2018. The study observed that the fund flow from Institutional Investors are considerably influenced by the lagged returns of Sensex, implying that they have a tendency to follow recent market behaviour. This behaviour specifies the momentum trading behaviour or the feedback trading association between the institutional investment flow and Indian stock market returns. The fund flow from Domestic Institutional Investors are significantly affected by their own lags, implying that they pursue their own past strategy while formulating the investment decision. The major implication of the study as revealed from the analysis is that the Domestic Institutional Investors are not dependent on Foreign Institutional Investors. Rather, they base their investment decisions on their own past decisions. The analysis revealed that FIIs flows do not have any significant impact on DIIs. Thus, the study

finds a uni-directional causality running from stock market returns to institutional investment flow. Overall, it can be concluded that the institutional investors are engaged in momentum trading activities and that the trading strategy of the foreign institutional investors is significantly influenced by the investment decisions of Domestic Institutional Investors. Stock market returns are found to be significant in influencing the institutional investors as depicted in the Granger Causality and Block Exogeneity Wald test. The policy holders should lay emphasis on devising such policies which are conducive for increasing the level of investments by Domestic institutional Investors in India. This will act as a source of attraction for the Individual Investors for making an investment in the Indian stock market and as a consequence they can devise their investment strategies accordingly.

The present study based on the monthly data does not find a significant impact of investments by institutional investors on the Indian stock market returns. However, as it is apparent that the trading strategies of different groups of institutional investors are divergent, analysis using daily data of investments may improve the analysis of the dynamic association between institutional investment behaviour and stock market behaviour.

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