Institutional Investment and Stock Returns in India:
Exploring Dynamism and Causality

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Abstract
Institutional Investment occupies a major role in the economy of any country today, given its ever-increasing volume. Institutional investors are brought into the limelight like never before, in developing nations, such as our country India. There is a premise that swings in institutional demand have a larger effect on stock prices than swings in individual demand. However, ironically, there are many studies relating to individual investors’ herding behaviour but there are no recent studies on institutional investors’ dynamic patterns. Significant market turnovers can be attributed to FIIs it is necessary for investors to chalk their strategy after observing FII movements and investment patterns. In this paper an attempt has been made to find the best fit model that can best predict stock returns on the basis of institutional investment. Also, various long-term and short-term relationships are deduced between the FII, DII and stock return variables.

Key Words
Institutional investment;Dynamic Interaction;Granger causality;Impulse response; co-integration

Introduction
There are two broad categories of Institutional Investment- Foreign Institutional Investment and Domestic Institutional Investment. Unlike FDIs, FIIs can be very unstable, because an institutional investor is not necessarily a long-term investor. FIIs simply seek return on their investments (ROI) to distribute to their investors. Thus FII investment serves mutual advantage for a country as well as for investors. These investment decisions are influenced by various domestic economic as well as political trends. In addition to the foreign institutional investors, the domestic institutional investors also affect the net investment flows into the economy.
The bulk of Domestic Institutional Investment in India is constituted by, Mutual funds companies, Insurance companies, Development FIs like IDBI, IFCI, etc and Commercial banks. Among domestic institutions with differing investment horizons, short-term investing institutions, such as securities and investment trust companies, play a more important role in
incorporating firm-specific information into stock prices via their trading activities, compared with long-term investing institutions, such as banks and insurance companies. Institutional Investment and their impact on stock market have been largely discussed by researchers as they do enormous trades in the past two decades in India. This paper tries to emphasise on the long term relationship and bi-direction causality among Stock returns and Institutional Investment.

**Objectives**

The objectives of this paper are three-fold.

(a) To predict future stock returns based on Institutional Investment.

(b) To find whether equity FII, debt FII, equity mutual funds and debt mutual funds have any long-term relationship with returns and with each other.

(c) To find the presence bi-directional causation between equity FII, debt FII, equity mutual funds debt mutual funds and returns.

**Review of Existing Literature**

Over the years, a number of researches have been conducted to study the pattern of institutional investments, with its components – FII& DII, taken together or separately. Dr.M.Thiripalraju and Dr.Rajesh Acharya of IFCAI, Hyderabad, published their paper titled ‘Dynamic Interaction between Institutional Investment and Stock Returns in India.’ This was conducted for the period from 2000 to 2009. In full period, as well as sub periods, bi-directional causality is found between FIIs investment and return.

M.Thenmozhi and Manish Kumar published their study as a working paper, “NSE working Paper: Dynamic Interaction among Mutual Fund Flows, Stock Market Return and Volatility”. A strong positive relationship has been found to exist between stock market volatility and mutual fund flows measured as stock purchases and sales. VAR approach is used. The period of study is from 2001to 2008.

To take the study of DIIs forward, James Gordon and Poonam Gupta have worked extensively to publish an IMF working paper, titled,‘Portfolio flows into India: Do Domestic Fundamentals matter?’ During their period of study from 1993-2000, they have concluded that, while magnitude of FII flows are small compared to other emerging markets, they are less volatile.

FIIs should be at a disadvantage relative to domestic institutional investors. Grinblatt and Keloharju (2000), Seasholes (2000) and Froot and Ramadorai (2001), among others, have provided evidence in favour of this in the study, ‘Institutional Portfolio Flows and International Investments’. 
Chakrabarti (2001) conducted the pair-wise Granger Causality tests between FII inflows and returns on the BSE National Index. He found that portfolio investment from FIIs was more an effect than a cause of market returns in India.

Mukherjee, Bose and Coondoo (2002) studied the cause-and-effect relationship between FII flows and returns on the Indian equity market found that FII flows to and from the Indian market tend to be caused by returns in the domestic equity market and not the other way round.

Kohli (2003) examined how foreign capital flows affected macro-economic variables during the period 1986–2001. She found that foreign capital inflows have a significant impact on domestic money supply (M3), stock market growth, liquidity and volatility.

In 2012, MaramSrikanth and Braj Kishore, published “Net FII Flows into India: A Cause and Effect Study”, and found that there existed a bi-directional causality between net FII inflows and the BSE Sensex, with the variables mutually reinforcing each other during the period of study, from 2003 to 2011.

**Data and Research Methodology**

**Sources Of Data And Variables Used**

Monthly investment details of the following variables have been collected from the websites of SEBI, National Securities Depository Limited (NSDL), Central Depository Services Limited (CDSL) and National Stock Exchange, for the period between 2000 and 2016.

1. FII Equity Investments denoted as D_FII_EQUITY; 2. FII Debt Investments denoted as D_FII_DEBT; 3. Mutual Fund Equity Investments denoted as D_MF_EQUITY; 4. Mutual Fund Debt Investments denoted as D_MF_DEBT; 5. Nifty returns during the period denoted as D_RETURNS.

The returns of the Nifty index were calculated from the average of the monthly closing prices given in the SEBI Handbook of Statistics using the formula:

\[ \ln \left( \frac{P_t}{P_{t-1}} \right) \]

Where \( P_t \) is the present closing price

and \( P_{t-1} \) is the closing price of the previous period

As monthly data is considered, there are a total of 204 observations for each variable. For the complete analysis, EViews software has been used.

**Stationarity tests:**

The basic objective of the test is to examine the null hypothesis

\[ \phi = 1 \text{ in } y_t = \phi y_{t-1} + u_t \]

against the one-sided alternative \( \phi < 1 \). Thus the hypotheses of interest are

H0: series contains a unit root versus H1: series is stationary.

In practice, the following regression is employed, rather than the previous equation, for ease of computation and interpretation,
\[ \delta y_t = \psi y_{t-1} + u_t \]
so that a test of \( \phi = 1 \) is equivalent to a test of \( \psi = 0 \) (since \( \phi - 1 = \psi \)).

**Heteroscedasticity tests:**

It has been assumed thus far that the variance of the errors (\( \sigma^2 \)) is constant, this is known as the assumption of homoscedasticity. If the errors do not have a constant variance, they are said to be heteroscedastic. The Breusch-Pagan-Godfrey test is used to check the presence of Heteroscedasticity. Heteroscedasticity may be a linear function of all the independent variables in the model. This assumption can be expressed as

\[ \sigma_i^2 = \alpha_0 + \alpha_1x_{i1} + \ldots + \alpha_kx_{ik} + u_i \]

The values for \( \varepsilon_i^2 \) aren’t known in practice, so the \( \varepsilon_i^2 \) are calculated from the residuals and used as proxies for \( \varepsilon_i^2 \).

**Serial Correlation Tests**

EViews will display the autocorrelation and partial autocorrelation functions of the residuals, together with the Ljung-Box \( Q \)-statistics for high-order serial correlation. If there is no serial correlation in the residuals, the autocorrelations and partial autocorrelations at all lags should be nearly zero, and all \( Q \)-statistics should be insignificant with large \( p \)-values.

**Cointegration Test**

The significance of cointegration analysis is its intuitive appeal for dealing with difficulties that arise when using series that are assumed to have a long-run equilibrium relationship. We specify the endogenous variables here. An endogenous variable is a classification of a variable generated by a statistical model that is explained by the relationships between functions within the model. In simple terms, it is the dependent variable. For example, the equilibrium price of a good in a supply and demand model is endogenous because it is set by a producer in response to consumer demand. We also specify the lags of the test VAR as pairs of intervals. The lags are specified as lags of the first differenced terms used in the auxiliary regression, not in terms of the levels. To determine the number of cointegrating relations conditional on the assumptions made about the trend, we can proceed sequentially

from \( r = 0 \) to \( r = k - 1 \), where ‘r’ is the lag length, until we fail to reject the null hypothesis.

**Granger Causality**

The cointegration Test gives an idea if there is a long-term relationship or not. But the direction of relationship is yet to be known. It is vital that any cointegrated system should have bi-directional causality variables, as it is these that maintain the equilibrium of the system."If two
or more time-series are cointegrated, then there must be Granger causality between them - either one-way or in both directions. However, the converse is not true."

**Impulse Response Function**

As econometric applications go, this is a powerful tool, represented pictorially for developing perspective on a recurring question in all things economic and financial: What could happen to $y$ if $x$ changes by $z$ percent?

There are several ways we can search for an answer, including a simple regression model. But the flexibility and power of a VAR-based IR simulation presents a number of benefits over the usual suspects. VAR modeling via IR simulation is especially useful when the analysis is focused on exploring dynamic relationships with feedback effects.

**Analysis and Results**

I) **Stationarity Test**

The results of ADF test are presented in Table 1. We find that apart from mutual funds-debt, which is stationary at first difference, all the other series are stationary at level.

<table>
<thead>
<tr>
<th>Variable Series</th>
<th>Result</th>
<th>Denoted As</th>
</tr>
</thead>
<tbody>
<tr>
<td>Returns</td>
<td>Stationary at level</td>
<td>I(0)</td>
</tr>
<tr>
<td>FII-Equity</td>
<td>Stationary at level</td>
<td>I(0)</td>
</tr>
<tr>
<td>FII - Debt</td>
<td>Stationary at level</td>
<td>I(0)</td>
</tr>
<tr>
<td>MF - Equity</td>
<td>Stationary at level</td>
<td>I(0)</td>
</tr>
<tr>
<td>MF - Debt</td>
<td>Stationary at first difference</td>
<td>I(1)</td>
</tr>
</tbody>
</table>

II) **Regression Model Specification**
The specification of the regression model is a trial and error process, where we seek to increase the value of R-square. This value is the measure of the fitness of the model. A percentage above 50% is considered acceptable. Here, in the model, we get 54%, after considering lagged returns also as an independent variable. The addition of the ‘ma(1)’ term was necessary here, because of the presence of serial correlation without it. The f-statistic is also significant, meaning that this model explains the behaviour of the population very well. R-squared value is a good fit measure of the sample whereas, f-statistic is a measure of the fit for the population.
Table 2

Dependent Variable: D_RETURNS  
Method: Least Squares  
Date: 03/16/17  Time: 04:07  
Sample (adjusted): 2000M03 2016M12  
Included observations: 202 after adjustments  
Convergence achieved after 13 iterations  
MA Backcast: 2000M02

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>-9.60E-05</td>
<td>9.78E-05</td>
<td>-0.981810</td>
<td>0.3274</td>
</tr>
<tr>
<td>D_FII_EQUITY</td>
<td>4.45E-06</td>
<td>6.07E-07</td>
<td>7.326528</td>
<td>0.0000</td>
</tr>
<tr>
<td>D_FII_DEBT</td>
<td>-7.74E-07</td>
<td>6.17E-07</td>
<td>-1.253178</td>
<td>0.2116</td>
</tr>
<tr>
<td>D_MF_EQUITY</td>
<td>2.58E-06</td>
<td>1.55E-06</td>
<td>1.662735</td>
<td>0.0980</td>
</tr>
<tr>
<td>D_MF_DEBT</td>
<td>-4.12E-08</td>
<td>2.24E-07</td>
<td>-0.183681</td>
<td>0.8545</td>
</tr>
<tr>
<td>D_RETURNS(-1)</td>
<td>0.138038</td>
<td>0.061446</td>
<td>2.246495</td>
<td>0.0258</td>
</tr>
<tr>
<td>MA(1)</td>
<td>-0.990764</td>
<td>0.007481</td>
<td>-132.4388</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

R-squared        0.541888  Mean dependent var -0.000260
Adjusted R-squared 0.527792  S.D. dependent var 0.076050
S.E. of regression 0.052259  Akaike info criterion -3.031155
Sum squared resid  0.532554  Schwarz criterion -2.916512
Log likelihood    313.1467  Hannan-Quinn criter. -2.984770
F-statistic       38.44334  Durbin-Watson stat 1.909865
Prob(F-statistic) 0.000000

Inverted MA Roots .99
Once the model is constructed, the presence of serial correlation and heteroscedasticity is checked. If they are absent, it is necessary to compare the accuracy of the prediction by plotting both the fitted values and the actual values together. The forecast is done only for the year 2016, which makes it an ex-post forecast. The ex post forecasts are made when the “future” observations are known during the forecasting period. It is used as a means to check against known data so that the forecasting model can be evaluated. It is found that they move very close together, thus proving that the prediction is close to perfection.

![Graph](image)

**Fig.1**

On observing the regression equation we find that FII_Equity is one of the significant independent variables. This is because, Indian markets are primarily driven by FII equity fund flows according to leading economic researches.

A look at stock indices since 2006 shows that the markets peak when FII inflows are the highest and fall when FIIs are missing in action. For instance, in 2008, the indices fell almost 50% due to the global financial meltdown, wiping out the gains of 2007.

Secondly, we observe that the returns are quite dependent on their past values. This fact has also been previously established by Steven L. Heston and Ronnie Sadka in “Seasonality in the Cross-Section of Stock Returns” in October 2006. The findings of this project go along with Heston and Sadka’s findings.
Thirdly we observe that there is a negative correlation between the two debt variables (FII_Debt and Mf_Debt) and stock returns. Historically, there has been an inverse correlation between the movement of stock and bond prices. Earnings drive stock prices and interest rates drive bond prices. The performance of the economy, then, is the axis around which these two drivers revolve.

iii) Cointegration Test
To check for cointegration, we use the Johansen Cointegration test. The test output shows the presence of 4 cointegrating vectors. These vectors are ordered and rearranged in simplified form as shown below.

\[
\text{Returns} = (-7.81E-05) + (1.33E-06 * \text{MF\_DEBT})
\]

\[
\text{FII\_EQUITY} = (-168.8684) + (1.124004 * \text{MF\_DEBT})
\]

\[
\text{FII\_DEBT} = (-158.4499) + (0.808429 * \text{MF\_DEBT})
\]

\[
\text{MF\_EQUITY} = (77.84775) - (0.140480 * \text{MF\_DEBT})
\]

All the four show a long-term relation with the domestic debt investment in India, i.e., the variable MF\_Debt. Silvia Argadna of Harvard University, in her 2009 paper on the behaviour of financial markets in OECD (Organisation for Economic Cooperation and Development) economies, between 1960 to 2002, showed that the government’s fiscal position has a significant impact on the economy-wide interest rates, particularly those of long-term government bonds. Therefore domestic debt of our country has a strong impact on the economy.

iv) Granger Causality
In order to check for bidirectional causality we use the Pairwise Granger Causality test.
Table 3

Pairwise Granger Causality Tests

Date: 04/21/17  Time: 02:17
Sample: 2000M01 2016M12
Lags: 5

<table>
<thead>
<tr>
<th>Null Hypothesis</th>
<th>Obs</th>
<th>F-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>D_FII_EQUITY does not Granger Cause D_RETURNS</td>
<td>198</td>
<td>0.82652</td>
<td>0.5322</td>
</tr>
<tr>
<td>D_RETURNS does not Granger Cause D_FII_EQUITY</td>
<td></td>
<td>0.90378</td>
<td>0.4798</td>
</tr>
<tr>
<td>D_FII_DEBT does not Granger Cause D_RETURNS</td>
<td>198</td>
<td>1.38663</td>
<td>0.2311</td>
</tr>
<tr>
<td>D_RETURNS does not Granger Cause D_FII_DEBT</td>
<td></td>
<td>0.78971</td>
<td>0.5583</td>
</tr>
<tr>
<td>D_MF_EQUITY does not Granger Cause D_RETURNS</td>
<td>198</td>
<td>1.19761</td>
<td>0.3120</td>
</tr>
<tr>
<td>D_RETURNS does not Granger Cause D_MF_EQUITY</td>
<td></td>
<td>1.54049</td>
<td>0.1792</td>
</tr>
</tbody>
</table>
It can be seen that the null hypothesis of “No Granger Causality” is rejected at five places.

This means that there is Granger causation between these variables. They are:

- MF_Equity does not Granger cause FII_Equity
- FII_Equity does not Granger cause MF_Equity
- MF_Equity does not Granger cause FII_Debt
- FII_Debt does not Granger cause MF_Equity
- MF_Debt does not Granger cause MF_Equity

It has been found that all variables Granger cause at least one other variable. The reasons for these may be varied. According to an article in the Economic Times, “FII Funds can cause Market Turbulence” dated January 16, 2011, lack of attractive
opportunities in developed economies sends many FIIs hunting in global pastures and when the domestic economies roll back on the road to recovery, FIIs may contemplate going back with their money. The phrase, “Rats abandon a sinking ship”, may be appropriate here. When the emerging market is considered a ship, the FIIs exit, and the domestic equity investors follow suit. FII_Equity also drives the foreign debt investment in India.

But equity mutual funds are also found to granger cause FII_Equity. Though FIIs have a much wider range of international equities to choose from, in times of global market upheavals, they are more likely to adjust their holdings in accordance with global market developments. On the other hand, domestic institutional investors like mutual funds are likely to have a home advantage compared with FIIs.

V) Impulse Response Function
An IRF indicates the impact of an upward unanticipated one-unit change in the "impulse" variable on the "response" variable over the next several periods (typically 10)

![Impulse response for the next 10 periods](image)
Although for the 10-month period, the shock produces drastic variations, they are smoothed out for the 24-month period. Considering the signs of the responses, innovations to unexpected change in returns always have a negative impact on the foreign investments and the domestic debt component, since the impulse response is negative for all these cases, and the effect of the shock dies down, only by 24 months.

**Summary and Conclusions**

This paper has examined the dynamic interaction between institutional investment flows of two of the most important classes of institutional investors operating in the Indian stock market, namely, mutual funds and FIIs. The paper examines this relation in a multivariate VAR framework bringing in stock market returns and daily data of net investment flows from these two investor groups for the period between 2000 and 2017. The study has found that equity FII investments drive stock returns, along with the one period lagged value of returns. In a unified VAR system we find that FII investment patterns are consistently significant as the causal variable for changes in mutual fund flows, with a significant negative relationship existing between the mutual fund debt component and a positive relationship between the mutual fund equity components.

The effect of Nifty returns is sometimes overshadowed by the effect of FII investment in determining mutual fund flows in this framework, particularly seeing that there is no Granger causality concerning stock returns. This finding is obviously important for policy purposes and justifies the need to study FII and mutual fund flows within the same framework while determining their individual investment patterns and their effect on the stock market.
References


