

Determinants of Foreign Institutional Investors' Investment in India

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Abstract

The present study aims at exploring the determinants of Foreign Institutional Investors' (FIIs) investment in India. Returns on Indian stock market have positive impact whereas US stock market returns have no significant influence on FIIs investment to India. Stock market risk has negative influence on FIIs inflows to India. Market capitalization and stock market turnover of India have significant positive influence only in short-run. Among macroeconomic determinants, economic growth of India has positive impact on FIIs investment both in long-run and short-run. But all other macroeconomic factors have significant influence only in long-run like inflation in US has positive influence whereas inflation in India has negative influence on FIIs investment. Further, US interest rate has adverse impact on FIIs investment while liberalization policies of India exhibited significant contribution to FIIs inflows. Study concludes that FIIs inflows in India are determined by both stock market characteristics and macroeconomic factors.

Keywords: Sensex, S&P 500 Index, Short-run Dynamics, Long-run Equilibrium

JEL Classification Codes: F3, F21, F32

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1. Introduction

Foreign Institutional Investors (FIIs) were permitted to invest in all the listed securities traded in Indian capital market for the first time in September, 1992. As per the RBI, Report on Currency & Finance (2003-04), since 1991 there has been continuous move towards the integration of the Indian economy with world economy. Since then the regulations with regard to FIIs investment has become more liberal. As a result of abolishment of barriers to capital inflows in the form of FIIs investment, India attracted huge amount of foreign capital particularly from developed countries. The cumulative net investment by FIIs in Indian stock market since 1993 has crossed US\$ 50 billion at the end of March 2007, (SEBI, annual report, 2006-07). International capital inflows have both positive as well as negative impact on the health of the recipient economy. On the positive side, these capital inflows raise the level of economic development by augmenting the domestic investment and widen financial intermediation. But these capital inflows also pose several threats to the domestic economic and financial system of the recipient economy like inflation, appreciation in exchange rate, overheating of the economy and possibility of sudden withdrawal. FIIs investment is volatile by nature and is often termed as 'hot money'. The hot money character of FIIs investment adds to the possibilities of 'contagion'.¹ In the present paper, an effort has been made to estimate the determinants of foreign portfolio investment in India. In the light of huge and growing FIIs investment inflows to India, appropriate policy formulation is the need of the hour which will help in reducing the impact of possible threats and maximizing the benefits from the same to enhance economic and financial development. This in turn calls for the need to estimate the determinants of FIIs investment. Available empirical evidence suggests that FIIs inflows by and large are determined by the performance of stock markets and macroeconomic aggregates of the host country. Thus, FIIs investment is pulled toward an economy with sound macroeconomic factors, high returns, lesser risk and growing stock markets in terms of rising market capitalization and turnover. FIIs, give due consideration to risk-return characteristics in the home (source) country while investing in emerging markets. The profit booking tendency of FIIs depends on the difference in the home country risk-return and host country risk-return. Besides this, official policies of the host and home country i.e. degree of financial liberalisation, also determine the size of FIIs inflows.

¹ Contagion effect refers to the common shocks in the form financial crisis signals that arise due to commercial linkages and financial integration. The causes behind this effect may be for example as a result of crisis in a certain country, investors may face the financial losses which in turn forces the investor to sell their assets in other countries to cover up their net positions and asymmetric information due to which investor links the occurrence of financial crisis in one country with other country.

2. Literature Review

Available evidence on determinants of FIIs investment is presented below in chronological order:

Classens (1993) analyzed the return and diversification benefits for an investor in an industrial country of investing in emerging markets and barriers which prevent a free flow of funds. Study found that equity portfolio flows can be affected by efficiency of domestic stock market as well as market segmentation created by barriers. Investors' perception and attitudes may thus matter as much as formal barriers. Chuhan (1994) analyzed portfolio "switching" behavior by investors between different emerging markets. Study has found that institutional investors from Canada, Germany, Japan, United Kingdom (UK) and United States (US) have not contributed to the growth in portfolio investment in emerging markets. These investors, who otherwise are major players in international capital markets, have approached developing countries securities markets with great caution. Institutional investors generally enter markets with significant liquidity, market capitalization and claim to have a longer time horizon in their risk return assessment than other investors such as performance based retail traders. Study concluded that any country that is showing good track record in its reform process may expect to have a lower risk and higher expected returns from portfolio investment thus, consequently large portfolio flows are expected to go to countries with "good" track records of liberalization, fiscal consolidation and regulatory reform than to those emerging markets that do not exhibit such a performance on sustained basis. According to Gooptu (1994) there is competition between developing countries for portfolio investment from abroad. The study analyzed gross portfolio investment flows for a sample of eight emerging markets over the period of 1989 to 1993 using quarterly data. Four countries in each geographical region, namely, India, Indonesia, South Korea and Thailand in Asia while Argentina, Brazil, Chile and Mexico in Latin America have been examined. All of these countries have experienced large portfolio investment inflows in recent years. However, the gross portfolio flows to Latin America has been observed to be more significantly related to East Asia (Indonesia, South Korea and Thailand) than those to South Asia i.e., India in this study. According to the study, it is important for the policy makers in the developing economies to provide right signals to international capital markets in terms of economic and domestic institutional reforms to successfully compete with other developing economies to attract portfolio investment from abroad. Study found that to attract more private capital flows policy makers must continue to provide right signal to foreign institutional investors in terms of economic and domestic institutional reforms that attract portfolio investment from abroad. Study concludes that there is a need to continue for increasing pace of reforms in any given emerging stock market in order to maintain the steady portfolio flows to developing countries. According to Eun & Rensick (2002) international portfolio Investment has been growing rapidly in recent years due to (a) deregulation of financial markets (b) introduction of such

investment vehicles as international mutual funds, country funds and internationally cross listed stock which allow investors to achieve international diversification without incurring excessive costs. Despite sizable potential gains from international diversification, investors allocate a disproportionate share of their funds to domestic securities displaying the so called home bias. Home bias is likely to reflect imperfection in the international financial markets such as excessive transaction/information costs, discriminatory taxes for foreigners and legal/institutional barriers to international investments. Rai and Bhanumurthy (2006) analyzed the determinants of foreign institutional investment in India using monthly data from January 1994 to November 2004. The study revealed the positive association of FIIs investment with return on BSE Sensex, inflation in US (home country) and negative association with inflation in India (host country), return on S&P 500 index, ex-ante risk on BSE and ex-ante risk on S&P 500 index. However, the ex-post risk neither in US nor in India affected FII inflow to India. Study also did not find any causation running from FII inflow to stock market returns. Study concluded that stabilizing the stock market volatility and minimizing the ex-ante risk would help in attracting more FII inflows. Otherwise there would be adverse impact of non-fundamental factors of FII behavior which in turn would affect the real economy in the long-run.

All these studies indicate impact of liberalization policies and capital market returns on FIIs investment. But there is lack of evidence regarding determinants of FIIs investment in a comprehensive manner consisting of both financial and real economy factors, particularly for India. The present study focuses on determinants of FIIs investment in India considering both financial and economic factors.

3. Database and Methodology

3.1. Database

To ascertain the influence of both domestic and foreign factors following variables have been considered to estimate the determinants of FIIs investment in India.

(a) Domestic (Host) Country Financial Factors:

i) Monthly returns on Sensex (RSS) and $RSS = SS_t - SS_{t-1}$

Where: SS_t = Value of Sensex in month 't'

SS_{t-1} = One month lagged value of Sensex

ii) Market capitalization of BSE in million US\$ (MC)

iii) Stock market turnover of BSE in million US\$ (TO).

(b) Foreign (Home) Country Financial Factors (considering US stock market as base):

i) Returns on S&P 500 Index (RSP) and $RSP = S\&P\ 500_t - S\&P\ 500_{t-1}$

Where: $S\&P\ 500_t$ = Value of S&P 500 in month 't'

$S\&P\ 500_{t-1}$ = One month lagged value of S&P 500

ii) Variability of Sensex over S&P 500 Index (VBSS) calculated as excess of standard deviation of returns on Sensex over standard deviation of returns on S&P 500 Index.

(c) Domestic (host) Country Economic Factors:

i) Index for Industrial Production as proxy for economic growth (IIP).

ii) Wholesale Price Index representing host country inflation (WPI).

iii) Exchange rate of Indian Rupee in terms of US\$ (ER).

(d) Foreign (home) country economic factors:

i) Monthly Producer Price Index of US representing foreign (home) country inflation (PPI).

ii) Monthly rate of US 3-month T-bill representing interest rate in US (USTBR).

Along with the above variables four liberalization dummies representing liberalization policies regarding permission to invest in government securities (L1), increasing aggregate portfolio investment limit of FIIs (L2), permission to invest in equity derivatives (L3) and shift from dual approval of Securities and Exchange Board of India (SEBI) and Reserve Bank of India (RBI) to single approval process of SEBI (L4) respectively have also been considered to capture the impact of liberal policy framework on FIIs inflows. The sources of data for these variables have been presented in Table 1. Table presents the list of variables along with their respective sources.

Table 1: Data Series with Respective Source

Data Series	Sources
FIIs Investment (net)	RBI Bulletin, Various Issues
Wholesale Price Index (WPI)	RBI Hand Book of Statistics, Various issues
Return on S&P 500 (RSP)	http://finance.yahoo.com
Return on Sensex (RSS)	www.bseindia.com
Market Capitalization (MC)	RBI Hand Book of Statistics, Various Issues
Stock Market Turnover (TO)	RBI Hand Book of Statistics, Various Issues
Producer Price Index (PPI)	World Bank, Global Development Finance, Various Issues (CD Version)
Index of Industrial Production (IIP)	RBI Hand Book of Statistics, Various Issues
US 3 month T-bill Rate (USTBR)	http://www.federalreserve.gov/releases/h15/data/Monthly/H15_TCMNOM_M3.txt
Financial Risk of Indian Capital Market (VBSS)	Calculated on the basis of daily values of Sensex taken from www.bseindia.com
Financial Risk of International Capital Market (VBSP)	Calculated on the basis of daily values of S&P 500 Index taken from http://finance.yahoo.com

All these financial and economic factors in domestic and foreign country as shown in Table 1 have been regressed upon FIIs Investment to India. Monthly

observations for all the variables for the period from April 1995 to December 2006 have been considered for the analysis. The time period of the study has been limited to December 2006, as the major policy reforms pertaining to FII investment in India has been pursued by Government of India from 1993 to 2006. Although FII investment in India has its origin since April 1993, however first two years- (April 1993-April 1995) have been excluded from analysis, considering it as learning period for investors.

3.2. Methodology

To explore the various determinants of FII investment in India Autoregressive Distributed Lag (ARDL) model based on bounds test approach proposed by Pesaran, et al. (2001) has been applied to examine the co-integration relationship between FII investment and various macroeconomic and financial indicators of home (US) and host country (India). Before estimating ARDL bounds test, stationarity of all the variables has been examined by applying Dickey and Fuller (1979) unit root test to determine the order of integration. For this the following types of Augmented Dickey Fuller (ADF) regression has been applied:

$$\Delta Y_t = \alpha_1 Y_{t-1} + \sum_{m=1}^n \beta_m \Delta Y_{t-m} + \mu_t \dots \dots \dots (1)$$

$$\Delta Y_t = \alpha_0 + \alpha_1 Y_{t-1} + \sum_{m=1}^n \beta_m \Delta Y_{t-m} + \mu_t \dots \dots \dots (2)$$

Where, μ_t is white noise.

Although ARDL bounds test approach does not require that all the variables should be integrated of the same order but ARDL estimation crashes in the presence of variables integrated of order higher than I(2), since computed F-statistic under bounds testing approach are based on the assumption that variables are either integrated of order zero or one i.e., I(0) or I(1). Thus, implementation of unit root test in ARDL bounds testing approach is still necessary to ensure that none of the variables is integrated of order 2 or higher than I(2).

After ascertaining the order of the integration, the first step in ARDL bounds testing approach is to estimate ARDL equation by ordinary least squares (OLS) method. The equation (3) used for ARDL is specified as below:

$$FII_t = \alpha_0 + \sum_{i=1}^p \alpha_{1i} \Delta FII_t + \sum_{i=0}^q \alpha_{2i} \Delta RSS + \sum_{i=0}^r \alpha_{3i} \Delta RSP + \sum_{i=0}^s \alpha_{4i} \Delta VBSS + \sum_{i=0}^t \alpha_{5i} \Delta MC + \sum_{i=0}^u \alpha_{6i} \Delta TO + \sum_{i=0}^v \alpha_{7i} \Delta IIP + \sum_{i=0}^x \alpha_{8i} \Delta WPI + s \sum_{i=0}^y \alpha_{9i} \Delta ER + \sum_{i=1}^z \alpha_{10i} \Delta DPPI + \sum_{i=0}^a \alpha_{11i} \Delta USTBR + \sum_{i=1}^5 \alpha_{12i} \Delta L + \alpha_{13i} D_t + u_t \dots \dots \dots (3)$$

Where:

FII = Foreign Institutional Investors' Investment

RSS = Returns on Sensex
 RSP = Returns on S&P 500 Index
 VBSS = Variability of Sensex over S&P 500 Index
 MC = Market Capitalization
 TO = Stock Market Turnover
 IIP = Index for Industrial Production
 WPI = Wholesale Price Index
 ER = Exchange Rate of Indian Rupees in terms of US\$
 PPI = Producer Price Index
 USTBR = 3 months US T-bill Rate
 DL = Liberalization Dummies
 Dt = Monthly Dummies

In equation (3), Δ is the first difference operator and u_t is white noise error term. Lag length has been selected using Akaike Information Criteria (AIC). Following Greene (2003) AIC based lag length has been selected as below:

$$AIC = -2l/T + 2k/T$$

Where l is log likelihood, T is number of observations and k stands for the number of variables. The selected lag length is based on lowest value of AIC.

The equation (3) is applied to obtain F-test statistic under bounds testing approach. The F-test so obtained is the statistic for joint significance of the variables. The null hypothesis and alternate hypothesis under the bounds test approach tested on the basis of F test for joint significance of all the regressors are specified as below:

Null hypothesis (H0):

$$\alpha_2 = \alpha_3 = \alpha_4 = \alpha_5 = \alpha_6 = \alpha_7 = \alpha_8 = \alpha_9 = \alpha_{10} = \alpha_{11} = \alpha_{12} = \alpha_{13} = 0$$

Alternate Hypothesis (H1):

$$\alpha_2 \neq \alpha_3 \neq \alpha_4 \neq \alpha_5 \neq \alpha_6 \neq \alpha_7 \neq \alpha_8 \neq \alpha_9 \neq \alpha_{10} \neq \alpha_{11} \neq \alpha_{12} \neq \alpha_{13} \neq 0$$

The F-test statistic of joint significance will lead to acceptance or rejection of the existence of long-run relationship (co-integration) among the variables. Bounds test normalizing on FIIs investment is denoted as below:

$$F_y (\text{FIIs/RSS, RSP, VBSS, MC, TO, IIP, WPI, ER, PPI, USTBR, DL})$$

From Pesaran et al. (2001) two asymptotic critical values bounds provide a test for co-integration when the independent variables are integrated of the order $I(d)$ (where $0 \leq d \leq 1$). From these two asymptotic critical values, lower bound critical values assume that regressors are $I(0)$ while upper bound values assume that regressors are $I(1)$. If F statistic is above the critical value, null hypothesis of no co-integration can be rejected irrespective of the order of integration for time series. But if test statistic falls below the lower bound critical value the null hypothesis of no co-integration is accepted. Finally, if the statistic falls between the lower and upper bound critical values, the result regarding existence of co-integration

remains inconclusive. After obtaining F-statistic of joint significance, if existence of co-integration is confirmed, the next step is to estimate long run coefficients on the basis of coefficients of ARDL equation (3). The long-run equation obtained on the basis of long-run coefficients is specified as below in equation (4):

$$FII_t = \beta_0 + \beta_1 RSS + \beta_2 RSP + \beta_3 VBSS + \beta_4 MC + \beta_5 TO + \beta_6 IIP + \beta_7 WPI + \beta_8 ER + \beta_9 PPI + \beta_{10} USTBR + \beta_{11} DL + \beta_{12} D_t + \mu_t \dots \dots \dots (4)$$

β_i coefficients of long-run equation (4) are derived on the basis of OLS equation (3) of ARDL by applying following formula:

$$\beta_i = \frac{\sum_{i=0}^n \beta_i}{1 - \sum_{i=1}^n \alpha_i}$$

In the third step error term is estimated on the basis of long-run equation (4). This error term is subject to stationarity test. If the error term is stationary then finally short run dynamics can be estimated by following equation (5).

$$\Delta FII_t = \alpha_0 + \sum_{i=1}^1 \alpha_1 \Delta FII_{t-1} + \sum_{i=1}^1 \alpha_2 \Delta RSS + \sum_{i=1}^1 \alpha_3 \Delta RSP + \sum_{i=1}^1 \alpha_4 \Delta VBSS + \sum_{i=1}^1 \alpha_5 \Delta MC + \sum_{i=1}^1 \alpha_6 \Delta TO + \sum_{i=1}^1 \alpha_7 \Delta IIP + \sum_{i=1}^1 \alpha_8 \Delta WPI + \sum_{i=1}^1 \alpha_9 \Delta ER + \sum_{i=1}^1 \alpha_{10} \Delta PPI + \sum_{i=1}^1 \alpha_{11} \Delta USTBR + \phi cm_{t-1} + u_t \dots \dots \dots (5)$$

In equation (5), $\alpha_1, \alpha_2, \alpha_3, \alpha_4, \alpha_5, \alpha_6, \alpha_7, \alpha_8, \alpha_9, \alpha_{10}$ and α_{11} are the short-run dynamic coefficients and ϕ is the speed of adjustment representing model's convergence toward equilibrium.

4. Empirical Analysis

The results of Augmented Dickey Fuller Unit Root Test for selected determinants of FII investment and FII net investment are presented in Table 2. It is clear from table 2 that none of the variable is integrated of order 2 or higher than I(2). Series-return on Sensex (RSS), Variability of Sensex over S&P 500 index (VBSS), stock market turnover (TO), returns on S&P 500 Index (RSP) are integrated of order I(0) i.e. these are stationary at levels. But series Index for Industrial Production (IIP), Wholesale Price Index (WPI), Exchange Rate (ER), Producer Price Index (PPI), FII net Investment (FII), Market Capitalization (MC) and foreign interest rate (USTBR) are integrated of order I(1) i.e., non-stationary at levels but stationary at first differences. Thus, all the series considered for estimating the model, are not integrated of the same order. Since, the series considered for the study are not integrated of the same order, Engle & Granger (1987) method for determining

long-run and short-run impact fails. As a result of this to empirically analyze the long-run relationships and dynamic interactions among the selected variables, bounds testing approach or Autoregressive Distributed Lag (ARDL) co-integration procedure developed by Pesaran et al. (2001) has been applied. The procedure is adopted due to the reason that ARDL estimation is applicable irrespective of whether variables in the model are I(0) or I(1).

Table 2: Augment Dickey Fuller Unit Root Test for FIIs Investment and its Determinants

Variables	At Levels		First Differences	
	Without Intercept and Trend	With Intercept and Trend	Without Intercept and Trend	With Intercept and Trend
FII	-0.34	-2.29	-5.54**	-5.75**
RSS	-8.59**	-9.41**	-	-
MC	4.10	1.27	-8.92**	-9.88**
TO	1.04	-3.24**	-	-
RSP	-9.99**	-9.91**	-	-
VBSS	-.40	-5.85**	-	-
IIP	1.98	2.83	.35	-3.44***
WPI	5.18	-2.45	-6.61**	-8.90**
ER	1.49	.96	-11.14**	-11.83**
PPI	2.77	-.95	-5.42**	-9.64**
USTBR	-.72	-1.42	-3.64***	-3.71***

**indicates significant at 5% level of significance.

*** indicates significant at 10% level of significance.

Secondly, bounds testing approach for determining the co-integration relationship between Foreign Institutional Investors' (FIIs) Investment and its determinants consisting of RSS, RSP, VBSS, MC, TO, IIP, WPI, PPI, ER, USTBR and four liberalization dummies L1, L2, L3, L4 and two seasonal dummies for the month of October and November² have been estimated on the basis of equation 3 following ARDL specification of 3, 2, 1, 1, 2, 1, 0, 2, 3, 2, and 0 selected on the basis of AIC. The results of F-Test obtained by normalizing all regressors on FIIs are presented in Table 3.

Table 3: Results of Bounds Test for Normalizing FIIs Investment on its Determinants

Variables	F-Statistic	Probability	Result
F _{FIIs} (FIIs/RSS, MC, TO, RSP, VBSS, IIP, WPI, ER, PPI, USTBR)	10.00*	0.00	Co-integration
Critical Value ^a	Lower Bound		Upper Bound
1% Level	2.54		3.86
5% Level	2.06		3.25

²Seasonal Dummies were significant only for the month of October and November and thus included in the estimated model.

a. critical values are obtained from Pesaran et. al (2001).

The calculated F-statistic when FIIs investment is normalized on all other regressors turns out to be 10.002 which is higher than upper bound critical value of 2.54 at 1 percent level of significance. Thus, long-run co-integration relationship among the variables, when regressors are normalized on FIIs investment, exists and null hypothesis of no co-integration is rejected.

Having established that long-run relationship exists, the estimates of long-run coefficients using ARDL approach on the basis of equation (3) have been worked out and are presented in Table 4. The perusal of the table shows that returns on Sensex (RSS- host country's returns) have positive and significant impact whereas returns on S&P 500 Index (home country returns) have negative but insignificant influence on FIIs investment inflows.

Table 4: Estimated Long-run coefficients using ARDL approach for FIIs Investment and its Determinants
Dependent Variable: FIIs Net Investment

Regressor	Coefficient	T-Value
Intercept	585.70	0.17
RSS	1.13**	3.89
RSP	-0.00	-0.50
VBSS	-5.33**	-2.43
MC	.0012	0.06
TO	0.21	0.84
IIP	24.44**	2.04
WPI	-139.6**	-3.85
ER	-21.92	-0.32
PPI	129.95**	3.25
USTBR	-294.05**	-2.14
L1	1041.68**	2.22
L2	749.46**	1.80
L3	858.02**	1.90
L4	711.67	1.48
D9	-817.69**	-2.86
D10	-555.53**	-1.89
$R^2 = 0.70$		Adjusted $R^2 = 0.64$
D.W = 1.93		F = 10.00*

** significant at 5% level of significance.

Variability of Sensex over variability of S&P 500 Index has negative and significant influence on FIIs inflows to India. Similarly market capitalization and stock market turnover of host (India) country has positive but insignificant influence on FIIs investment. Among macroeconomic determinants, economic growth in host country (IIP) has significant and positive impact on FIIs investment inflows to India. US 3-month T-bill rate (USTBR) representing foreign interest rate has negative and

significant impact on FII investment in host (Indian) stock market. It implies that increase in foreign interest rate leads to fall in FII investment in India and decline in foreign interest rate will lead to increase FII investment inflows to India. Exchange rate of Indian rupee has negative but insignificant impact on FII investment in India.

Foreign inflation represented by US Producer Price Index (PPI) has significant and positive influence whereas domestic inflation represented by Wholesale Price Index (WPI) has negative and significant influence on FII investment in India.³ The selected liberalization dummies have positive and significant impact on FII investment in India except the dummy (L4) regarding shift of dual approval of RBI and SEBI to single approval of SEBI for which sign is positive but insignificant.

The explanatory power of the model represented by adjusted R² is 0.64 (64 percent) which is quite high. Thus, when FII investment inflows are modeled by including, both financial and macroeconomic variables together, it explains determinants of FII Investment quite efficiently. Further, error correction term (ecm) has been estimated on the basis of long run coefficients of equation (4) and then this error correction term is tested for stationarity. After examining that the estimated error-correction term is stationary at levels, it has been considered for estimating short-run dynamic coefficients. The results of short-run dynamic coefficients associated with the long-run equilibrium obtained on the basis of equation (5) are presented in table 5. It is clear from the table that the signs of short-run dynamic coefficient are similar to those obtained for long-run coefficients. However, for short-run dynamic equation (5), market capitalization (MC) and stock market turnover (TO) also turn out to be significant. Thus, in the short-run besides risk and return factors of domestic (Indian) stock market, FII investment is also determined by size of the market capitalization and stock market turnover. Among the macro economic factors only IIP i.e., economic growth of domestic economy is significant and all other macro economic factors turn out to be insignificant in short-run. Thus, in short-run only financial factors representing capital market of host country and economic growth (IIP) has significant impact on FII investment inflows. The coefficient of error correction term (ecmt-1) (-0.85) is negative and significant as expected. It implies a fairly high speed of adjustment to equilibrium after a shock. Thus, approximately 85 percent of the disequilibrium from previous month's shock converges back to the long-run equilibrium in the current month. Further, it is clear from the above table that estimated ARDL model passes through three diagnostic tests (i) absence of serial correlation (ii) no

³This is in consonance with proposed hypothesis (Rai and Bhanumathy, 2006) i.e., when inflation in foreign country increases, the purchasing power of funds invested in source (home) country declines, thus foreign institutional investors would withdraw from home country and will invest the same in host (Indian) stock market. Thus, foreign inflation leads to increase in FII investment inflows to host (Indian) market. Similarly when inflation in host country increases purchasing power of funds invested in host market declines and thus foreign investors will withdraw from host (Indian) country stock market. Thus, domestic inflation has an adverse impact on FII investment.

functional form misspecification (Autoregressive Conditional Heteroscedasticity (ARCH) test) and (ii) no heteroscedasticity as F-test for each diagnostic test is insignificant at 5 percent level of significance.

Table 5: Error-Correction Model Derived on the Basis of ARDL model for FIIs Investment and its Determinants

Dependent Variable: FIIs Net Investment (Δ FIIN)

Regressor	Coefficient	T-Value	Collinearity statistics	
			Tolerance	VIF
Intercept	61.46	0.56		
Δ RSS	0.39**	2.01	0.66	1.50
Δ RSP	-0.00	-1.38	0.96	1.03
Δ VBSS	-3.10**	-1.76	0.81	1.20
Δ MC	0.22**	5.79	0.56	1.76
Δ TO	0.47**	1.65	0.63	1.58
Δ IIP	21.11**	2.25	0.66	1.50
Δ WPI	-69.27	0.77	0.70	1.40
Δ PPI	17.58	0.31	0.83	1.20
Δ ER	-30.35	0.24	0.73	1.40
Δ USTBR	-462.30	-1.24	0.92	1.02
e_{t-1}	-0.85**	-10.49	0.83	1.20
D9	-739.34**	2.71	0.82	1.22
D10	19.44	0.07	0.88	1.12
$R^2 = 0.63$		Adjusted $R^2 = 0.60$		
D.W = 1.80		F = 16.96		
LM Test for Serial Correlation		F-Statistic= 3.4 P-Value=0.06		
ARCH Test		F-Statistic= 0.04 P-Value= 0.83		
White Heteroscedasticity Test		F-Statistic=3.26 P-Value=0.07		

** significant at 5% level of significance.

Δ is first difference operator.

Collinearity results has been interpreted on the basis of rule of thumb proposed by Kutner (2004). Collinearity test results reveal that none of the tolerance values are close to zero and also none of the Variance Inflation Factor (VIF) is higher than 10. Thus, as per both tolerance and Variance Inflation Factor (VIF) statistics, model is free from any bias due to multicollinearity. Hence, the estimated model is unbiased.

5. Conclusions

For exploring the determinants of FIIs investment, FIIs net investment has been modeled by including, both financial and macro-economic variables together. Host country stock market returns (returns on Sensex) have positive and significant impact whereas home country returns (returns on S&P 500 Index) have negative but insignificant influence on FIIs investment inflows in long-run as well as in short-run. In terms of risk attached to returns on securities variability of Sensex over variability of S&P 500 Index has negative and significant influence on FIIs inflows to

India. Similarly, market capitalization and stock market turnover of India have positive and insignificant influence on FII investment in long-run but positive and significant influence on FII investment in short-run. Thus, risk and return characteristics of Indian capital market are important factors being considered by FIIs both in long-run and short-run while other characteristics of Indian stock market i.e., market capitalization and stock market turnover are relevant only in short-run. Among macroeconomic determinants, economic growth of India (GDP) has significant and positive impact on FII investment inflows to India both in long-run and short-run. However, all other macroeconomic factors have significant influence only in long-run such as inflation in home country represented by US Producer Price Index (CPI) has significant and positive influence while inflation in India represented by Wholesale Price Index (WPI) has negative and significant influence on FII investment in India. This is in consonance with the hypothesis that as inflation in home country increases, the purchasing power of funds invested in home country declines, thus FIIs will withdraw from home (US) country and invest in host (Indian) stock market. This implies that foreign inflation leads to increase in FII investment inflows to Indian capital market. Similarly, when inflation in host country increases purchasing power of funds invested in host market declines and foreign investors will withdraw from host country stock market. Thus, host country inflation i.e., inflation in India has an adverse impact on FII investment. US 3-month T-bill rate (USTBR) representing foreign interest rate has significant and adverse impact on FII investment in host (Indian) stock market. The selected liberalization dummies have positive and significant impact on FII investment in India except liberalization dummy (regarding shift from dual approval of SEBI and RBI to single approval of SEBI) for which sign is positive but insignificant. It can be concluded that FII inflows are determined by stock market characteristics regarding risk-return, market capitalization, stock market turnover, macroeconomic factors like economic growth, interest rate, inflation and liberalization policies.

References

- Chuhan, P. (1994) "Are Institutional Investors an Important Source of Portfolio Investment in Emerging Markets?". World Bank Policy Research Working Paper No. 1243, Washington D.C.
- Classens, S. (1993) "Equity Portfolio Investment in Developing Countries: A Literature Survey". World Bank Policy Research Working Paper No.1089, Washington D.C.
- Dickey, D. A. and W. A. Fuller (1979) "Testing for Unit Roots in Seasonal Time Series". Journal of American Statistical Association. 79 (386): 355-367.
- Eun, Cheol S. and Bruce G. Rensick (2002) International Financial Management. 2nd Edition Irwin: Mcgraw Hill Publishing.
- Gooptu, S. (1994) "Are Portfolio flows to Emerging Markets Complementary or Competitive". World Bank Policy Research Working Paper No. 1360, Washington D.C.
- Greene, W. H. (2003) Econometric Analysis. 5th Edition. India: Dorling Kindersley (India) Pvt. Ltd.

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Kutner, Nachtsheim, Neter (2004) Applied Linear Regression Models. 4th Edition. Irwin: McGraw-Hill Publishing.

Pesaran, M. H., Y. Shin and R. J. Smith (2001) "Bounds Testing Approaches to the Analysis of Level Relationships". Journal of Applied Econometrics. 16 (3): 289-326.

Rai, K. and N. R. Bhanumurthy (2006) Determinants of Foreign Institutional Investment in India: The Role of Risk Return and Inflation. http://iegindia.org/dis_rai_71.pdf.

RBI (2005) Report on Currency and Finance 2003-04. Mumbai: Reserve Bank of India.

SEBI (2008), Annual Report 2006-07, Mumbai: Securities and Exchange Board of India.

Wider (1990), Foreign Portfolio Investment in Emerging Equity Market. Study Group Series No.5. www.wider.unu.edu/publications/working-papers/.../en...5/_.../SGS5.pdf

