Determinants of Foreign Institutional Investment in India: An Empirical Analysis

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Abstract

The purpose of the study is to explore the determinants of foreign institutional investments in India through the Autoregressive Distributed Lag (ARDL) bounds testing approach. Using quarterly time series data, the empirical analysis was carried out for the period from January 2004 to December 2011. Our study result shows that exchange rate has significant negative impact on FII inflows both in the short-run and long-run, implying that depreciation of currency adversely affects the FII flows into India. Moreover, the Indian equity market returns has negative short-run and positive long-run effects on FII inflows to India. This confirms the evidence of positive and negative feedback trading hypothesis in the short-run and long-run, respectively. The US equity market returns has positive and significant influence on FII flows in the long-run but positive and insignificant influence on FII flows in the short-run. The risks associated with US equity market encourage foreign institutional investors to invest more in Indian equity markets. Furthermore, domestic inflation exerts negative and positive significant influence on FII flows in the long-run and short-run, respectively. It can be concluded that FII inflows to India are essentially determined by exchange rate, domestic inflation, domestic equity market returns, returns and risk associated with US equity market.

Keywords: FII inflows, Equity market returns, Exchange rate, Inflation, ARDL-UECM, Cointegration

JEL Classification: C22, F31, F32

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1 Introduction

With the advent of globalisation, there have been massive Foreign Institutional Investment (FII) flows into emerging equity markets like India during the past two decades. Foreign equity investment is widely viewed as one of the principal vehicles for obtaining the capital easier by the start-up companies as well as existing companies. The foreign investors' participation also increases the liquidity of local markets, makes the base of investor broader, increases risk sharing, and thus lowers the cost of capital for investment. Further, the foreign investors' demand for higher investment leads to better rules and regulations in local markets. These rules primarily relate to information quality and higher accounting standards (Evans, 2002). Hence, financial markets become more transparent by the participation of foreigners, leading to better allocation of resources and healthier financial markets. The foreign institutional investors may smoothen or stabilise the local stock markets if they tend to follow contrarian or negative feedback trading strategies i.e., investors buy when prices are low and sell after prices increase. Conversely, the foreign portfolio flows may exert a destabilising influence on emerging market economies. Dornbusch and Park (1995) argued that foreign investors pursue positive feedback trading strategies that make stock price overreact to changes in fundamentals and such trading strategies may cause bubbles and crashes in local markets. By positive feedback trading is meant the practice of buying shares as prices move up and selling them as prices come down. Thus, the positive feedback trading hypothesis reveals that foreign institutional agencies make investments in the market in response to the increasing returns. Moreover, the foreign institutional investment flows may be driven by changes in investor sentiment unrelated to fundamentals, causing local prices to rise or fall. Prices exhibit reversal after such pressure has subsided.

The foreign institutional investments seem to influence the emerging equity markets to a considerable extent. During 1992-93, net FII flows in the Indian equity

market segment was only about 13.40 crore and it witnessed a significant increase afterwards and reached a level of Rs. 10,206.70 crore in 2001-02. Moreover, net inflows by FIIs in the equity market segment amounted to Rs. 110,120.80 crore in 2009-10 compared to Rs. 53,403.80 crore during 2007-08. However, FII flows in India significantly declined to Rs. 43,737.60 crore in 2011-12 from Rs.1,10,120.80 crore in 2010-11. This leaps and bounds in foreign institutional inflows into India may affect the stability of the local stock markets. If foreign institutional investment can destabilise emerging stock markets, the benefits from opening markets to investors from abroad would get substantially weakened. Owing to the changed Indian economic scenario, where huge foreign institutional investment flows have been witnessed in Indian equity market associated with increased chances of vulnerability and destabilisation of an economy, a need was felt to examine the determinants of FII in the Indian context. The issue is extremely important for contemporary policy making since managing the large foreign institutional investment inflows into India in recent times has come to haunt both the capital market regulator (SEBI) and the Government. It is hoped that the insight offered by this paper will help us identify the important determinants of FII inflows into India, the knowledge of which can be used to construct suitable policies to manage the problem of large FII inflows into our economy.

In this backdrop, the present article attempts to examine the determinants of foreign institutional investment flow into India. The rest of the paper is organised as follows: Section 2 provides the review of related literature. Section 3 discusses the methodology of the study. Section 4 presents empirical findings. Concluding remarks are given in Section 5.

2 Review of Literature

Several studies have examined whether foreign investors are positive feedback traders or they destabilise the functioning of local stock markets in developed and

emerging economies. Scholars like Tesar and Werner (1994; 1995a; 1995b), Bohn and Tesar (1996) and Brennan and Cao (1997) have investigated the relationship between foreign equity flows and local market returns with an emphasis on detecting the trading behaviour of foreign investors and making inferences on their comparative information advantage or disadvantage relative to local investors. Froot et al. (2001) identified that foreign investors tend to employ positive feedback trading strategies and foreign inflow has forecasting power for future returns in local markets with reference to emerging economies. Richards (2002) also found evidence of positive feedback trading strategies in emerging Asian equity markets and that foreign flow had significant short-term impacts on emerging markets. The study of Griffin et al. (2002) for nine emerging countries has found further evidence of positive feedback trading at daily frequency. However, Lin and Swanson (2004) found only minimal evidence that foreign investors employ momentum trading with reference to eight largest emerging Asian markets.

Using daily data information, Batra (2003) found that foreign investors tend to follow positive feedback trading strategies with reference to India. Using daily data on net foreign institutional investment and Indian equity market return series, Srinivasan and Kalavani (2010) found the evidence of negative feedback trading hypothesis and positive feedback trading hypothesis by foreign investors before the global financial crisis period and during the crisis period respectively. By contrast, Ananthanarayanan et al. (2005) had examined the impact of foreign institutional investors on stock market returns in India using monthly data series and did not find any evidence regarding momentum or contrarian strategies being employed by foreign institutional investors. Similarly, Bowe and Domota (2004) for Indonesia found no evidence that foreign investors engaged in momentum strategies during the Asian crisis period. Besides, the study by Adabag and Ornelas (2005) revealed that foreign investors adopted negative feedback trading strategies in Turkish stock market.

Prasuna (2000) studied the determinants of FII in India using monthly data from January 1993 to March 1998 and found that lagged FII and BSE returns turned out to be significant variables whereas exchange rate, interest rates, forward premium and foreign exchange reserves have been turned out to be insignificant variables. Kumar (2001) studied the dynamics of foreign institutional investments and stock market returns in India and found that no evidence of contrarian call is being taken by the foreign institutional investors rather they follow the positive feedback that FIIs move money into the market in response to the increasing returns at the market and withdraw with the decrease in returns. Using monthly data from January 1994 to November 2002, Rai and Bhanumurthy (2004) found that FII inflows to India depends on stock market returns, inflation rates (both domestic and foreign), and ex-ante risk. Saraogi (2008) investigated the determinants of FII flows into India using monthly data from January 2001 to December 2007 and found BSE market returns has positive impact on FII. Besides, the study revealed that standard deviation of BSE market returns, US market returns, US market volatility, inflation and exchange rate were found to have negative impacts on FII flows into India. Kaur and Dhillon (2010) explored the determinants of foreign institutional investment in India using monthly data from April 1995 to December 2006. They found that Indian stock market returns have positive impact on FII flows whereas US stock market returns have no significant influence on FII flows to India. Besides, the study revealed that inflation in US has positive influence whereas inflation in India has negative influence on FII flows into India. Kumar (2011) found that stock market return, IIP and exchange rate are the main determinant of FIIs flows in India.

From the review of empirical literature on determinants of FII flow, it is clear that the majority of the studies mainly focused on emerging economies like India. However, the studies pertaining to Indian context reveal mixed results. Hence, the determinant of FII flows into India is still a debatable issue. The present study

attempts to investigate the determinants of FII flows into India using the newly developed ARDL-Bounds testing approach. Unlike other cointegration techniques, the ARDL does not impose a restrictive assumption that all the variables under study must be integrated of the same order. Secondly, while other cointegration techniques are sensitive to the size of the sample, the ARDL test is suitable even if the sample size is small.

3 Methodology

The Autoregressive Distributed Lag (ARDL) bounds testing approach has been employed in this paper to explore the determinants of FII flows in India. The ARDL modeling approach was originally introduced by Pesaran and Shin (1999) and further extended by Pesaran et al (2001). This approach is based on the estimation of an Unrestricted Error Correction Model (UECM) which enjoys several advantages over the conventional type of cointegration techniques. First, it can be applied to a small sample size study Pesaran et al (2001) and therefore conducting bounds testing will be appropriate for the present study. Second, it estimates the short- and long-run components of the model simultaneously, removing problems associated with omitted variables and autocorrelation. Third, the standard Wald or F-statistics used in the bounds test has a non-standard distribution under the null hypothesis of no-cointegration relationship between the examined variables, irrespective whether the underlying variables are I(0), I(1) or fractionally integrated. Fourth, this technique generally provides unbiased estimates of the long-run model and valid t-statistic even when some of the regressors are endogenous (Harris and Sollis, 2003). Inder (1993) and Pesaran and Pesaran (1997) have shown that the inclusion of the dynamics may correct the endogenity bias. Fifth, the short as well as long-run parameters of the model could be estimated simultaneously. Sixth, once the orders of the lags in the

ARDL model have been appropriately selected, we can estimate the cointegration relationship using a simple Ordinary Least Square (OLS) method.

In view of the above advantages, ARDL-UECM used in the present study has the following form as expressed in Equation (1):

$$\Delta InFII_t = \beta_0 + \sum_{i=1}^{p} \delta_1 \Delta InER_{t-i} + \sum_{i=1}^{p} \delta_2 \Delta InINDR_{t-i} + \sum_{i=1}^{p} \delta_3 \Delta InUSR_{t-i} + \sum_{i=1}^{p} \delta_4 \Delta InINDV_{t-i} + \sum_{i=1}^{p} \delta_5 \Delta InUSV_{t-i} +$$

$$\sum_{i=1}^{p} \delta_6 \Delta InWPI_{t-i} + \sum_{i=1}^{p} \delta_7 \Delta InFII_{t-i} + \beta_1 InFII_{t-i} + \beta_2 InER_{t-i} + \beta_3 InINDR_{t-i} + \beta_4 InIUSR_{t-i} + \beta_5 InINDV_{t-i} +$$

$$\beta_6 InUSV_{t-i} + \beta_7 InWPI_{t-i} + \varepsilon_t \text{ ....(1)}$$

where, FII represents net foreign institutional investment flows into India. ER is nominal exchange rate of the Indian rupee vis-à-vis US dollar. INDR and USR represent returns on S&P CNX Nifty index of India and returns on S&P 500 index of US, respectively. INDV and USV denote the volatility of S&P CNX Nifty and S&P 500 index, respectively. WPI indicates the Wholesale Price Index of India. t is the time dimension and Δ denotes a first difference operator. β_0 is an intercept and ε_t is a white noise error term.

Depreciation in the nominal exchange rate (i.e. a depreciation of the INR against the USD) lowers the value of foreign investments in India while an appreciation of the Indian Rupee increases the value of foreign investments. So the expected relation between FII flows and nominal exchange rate is negative. If National Stock Exchange (NSE) Nifty return rises along with increase in FII inflows to India, then the positive feedback trading hypothesis hold true. Otherwise, the foreign institutional agencies follow the contrarian or negative feedback trading strategies that FII flow increases in the market in response to the decreasing returns. Therefore, the relationship between the returns and FII inflows is indeterminate. Further, it is expected that if the S&P 500 index returns of US market shows a bullish trend, meaning that stock returns outside of India are higher, FII investments into

India should decrease. The opposite would hold if S&P 500 turns bearish. The more bearish are stock returns abroad, the greater will be FII inflows into the Indian stock markets. Hence, the expected sign is negative. Volatility of NSE Nifty returns shows the riskiness of equity investment in India. We therefore expect a negative relationship between volatility of local stock market and FII inflows into India. On the other hand, the volatility of S&P 500 index returns of US stock market represents the riskiness of equity investment abroad. When the riskiness of equity investment abroad increases, we expect the attractiveness of more FII inflows in Indian equity market, therefore, the expected sign is positive. In addition, one would expect that increase in inflation level of the home country results in decrease in the FII inflows from abroad. A high rate of inflation is a signal for macroeconomic instability and it lowers the purchasing power of investments. Hence, we expect negative impact of WPI on FII flows into India. Thus, it is expected that $\delta_1 < 0$, $\delta_2 < 0$ or $\delta_2 > 0$, $\delta_3 < 0$, $\delta_4 < 0$, $\delta_5 > 0$ and $\delta_6 < 0$.

The first step in the ARDL bounds testing approach is to estimate Equation (1) by ordinary least squares in order to test for existence of a long-run relationship among the variables by conducting an F-test for the joint significance of the coefficients of the lagged level variables, i.e., H_0: $\delta_1 = \delta_2 = \delta_3 = \delta_4 = \delta_5 = \delta_6 = \delta_7 = 0$ against the alternative H_1: $\delta_1 \neq \delta_2 \neq \delta_3 \neq \delta_4 \neq \delta_5 \neq \delta_6 \neq \delta_7 \neq 0$. Two sets of critical value bounds for the F-statistic are generated by Pesaran et al (2001). If the computed F-statistic falls below the lower bound critical value, the null hypothesis of no-cointegration cannot be rejected. Contrary, if the computed F-statistic lies above the upper bound critical value; the null hypothesis is rejected, implying that there is a long-run cointegration relationship amongst the variables in the model. Nevertheless, if the calculated value falls within the bounds, inference is inconclusive.

In the second step, once cointegration is established, the conditional ARDL long-run model for FII_t can be estimated as:

$$InFII_t = \beta_0 + \sum_{i=1}^{p} \delta_1 \Delta InER_{t-i} + \sum_{i=1}^{p} \delta_2 \Delta InINDR_{t-i} + \sum_{i=1}^{p} \delta_3 \Delta InUSR_{t-i} + \sum_{i=1}^{p} \delta_4 \Delta InINDV_{t-i} + \sum_{i=1}^{p} \delta_5 \Delta InUSV_{t-i} +$$

$$\sum_{i=1}^{p} \delta_6 \Delta InWPI_{t-i} + \sum_{i=1}^{q} \delta_7 \Delta InFII_{t-i} + \varepsilon_t \text{.....(2)}$$

where, all variables are previously defined. This involves selecting the orders of the ARDL (p, q) model using Akaike Information Criterion (AIC). In the third and final step, we obtain the short-run dynamic parameters by estimating an error correction model associated with the long-run estimates. This is specified as follows:

$$In\Delta FII_t = \beta_0 + \beta_0 + \sum_{i=1}^{p} \delta_1 \Delta InER_{t-i} + \sum_{i=1}^{p} \delta_2 \Delta InINDR_{t-i} + \sum_{i=1}^{p} \delta_3 \Delta InUSR_{t-i} + \sum_{i=1}^{p} \delta_4 \Delta InINDV_{t-i} + \sum_{i=1}^{p} \delta_5 \Delta InUSV_{t-i} +$$

$$\sum_{i=1}^{p} \delta_6 \Delta InWPI_{t-i} + \sum_{i=1}^{q} \delta_7 \Delta InFII_{t-i} + \varphi ECM_{t-1} + \varepsilon_t \text{...(3)}$$

where, δ_1, δ_2, δ_3, δ_4, δ_5, δ_6 and δ_7 are the short-run dynamic coefficients of the model's convergence to equilibrium and φ is the speed of adjustment parameter and ECM is the error correction term that is derived from the estimated equilibrium relationship of Equation (1).

The necessary data on net foreign institutional investment flows into India are collected from various issues of Securities Exchange Board of India (SEBI). The composite National Stock Exchange (NSE) Nifty Index of major 50 companies (NSE S&P CNX Nifty) is used for Indian stock prices that collected from the National Stock Exchange (NSE) website and the Standard & Poor's 500 Index (S&P 500) is used for US stock prices that obtained from Bloomberg database. Stock market returns of India and US are calculated on the basis of first difference of log NSE S&P CNX Nifty and S&P 500 closing price index series, respectively. To capture risk, monthly standard deviations are computed from daily returns on composite NSE-Nifty and S&P 500. The wholesale price index (WPI) of India, is used as a proxy for inflation in India, and the nominal exchange rate of the Indian rupee vis-à-vis US

dollar was collected from the various issues of Hand Book of Statistics on Indian Economy, Reserve Bank of India, Mumbai. Monthly data has been used from January 2004 to December 2011. It is appropriate to mention that, all econometric exercises are carried out by using EViews 7.1 and Microfit 4.1 software.

4 Empirical Results and Discussions

4.1 Unit Root Test

Prior to the application of the ARDL approach, it is appropriate that all the series be tested for stationarity or the 'same statistical property'- means the series have to be differenced or de-trended by the same number of times to render them stationary. The traditional approach of first differencing disregards potentially important equilibrium relationships among the levels of the series to which the hypotheses of economic theory usually apply (Engle and Granger, 1987). The use of non-stationary variables in the time series analysis leads to misleading inferences (Libanio, 2005). Besides, the unit root test is applied to check the order of integration and it is a crucial requirement for the existence of cointegration links (John et al. 2007). We use the Augmented Dicker Fuller (ADF) test to check for the unit root in each variable and thereby determine the order of integration. The results of unit root test are presented in the Table 1. The table results confirm that variables, FII, ER and INDV are stationary at levels and are integrated of order I(0), while INDR, USR, USV and WPI are integrated of order I(1) i.e. they are non stationary at levels but stationary at first differences. Since the variables are either I(0) or I(1), the ARDL process is used.

Table 1 Augmented Dickey-Fuller Test Results

Variables	Intercept		
	Levels	**First Difference**	**Decision**
FII	-6.442*	-	I(0)
ER	-5.557*	-	I(0)
INDR	-1.616	3.938*	I(1)
USR	-2.483	-8.709*	I(1)
INDV	-3.273**	-	I(0)
USV	-1.680	-2.922**	I(1)
WPI	0.087	-4.538*	I(1)

Notes: *, ** (***) – indicates significance at the one, five and ten per cent level, respectively. Optimal lag length is determined by the Akaike Information Criterion (AIC).

4.2 Bounds F-test for Cointegration

Table 2 presents the result of ARDL Bounds F-test for Cointegration relationship based on equation (1). The appropriate lag length was selected on the basis of Akaike Information Criterion (AIC) for the conditional ARDL-UECM.

Table 2 Results of Bounds Test Approach to Cointegration

Computed F-Statistic:	Critical Value	
3.539**	Lower Bound	Upper Bound
1% significance level	2.96	4.26
5% significance level	2.32	3.50
10% significance level	2.03	3.13

Notes: ** indicates that computed statistic falls above the upper bonds value at five percent significance level. The Bounds critical values are obtained from Pesaran, et al. (2001, pp. 300), Table: CI (iii) Case III: Unrestricted intercept and no trend (k=7).

The table result reveals that the computed F-statistic is obviously greater than the upper bound critical value of 3.539 at the five percent significant level. Thus, the null hypothesis of no cointegration is rejected, indicating there is a stable long-run

cointegration relationship among FII flows into India and its determinants consisting of exchange rate, stock market returns of India and US, stock market volatility of India and US, and inflation. This implies that the considered variables are cointegrated among them i.e. these series cannot move too far away from each other or they cannot move independently of each other. Besides, the variables are cointegrated implies that there is some adjustment process in the short run, preventing the errors in the long run relationship from becoming larger and larger.

4.3 Long-run Estimates of ADRL process

Once the existence of cointegration relationship among the variables is confirmed, Equation (2) was estimated for the long-run coefficients of the selected ARDL (0, 0, 1, 0, 0, 3, 0) model based on the Akaike Information Criterion (AIC) and its results are presented in Table 3[3].

Table 3 Estimated Long-Run Coefficients using the ARDL (0,0,1,0,0,3,0) Approach

Dependent variable: lnFII			
Regressor	**Coefficient**	**t-statistic**	**Prob. value**
constant	22.851	2.846*	0.006
lnER	-1.7771	-1.857***	0.069
lnINDR	0.0801	1.941**	0.029
lnUSR	0.4610	1.766***	0.081
lnINDV	-0.0445	-1.113	0.269
lnUSV	0.0836	2.071**	0.042
lnWPI	-1.8309	-1.869***	0.065

Notes: *, ** (***) – indicates significance at one, five and ten per cent level, respectively. Optimal lag length is determined by the Akaike Information Criterion (AIC).

[3]The long run estimates and their standard errors were obtained using Microfit 4.0 (Refer to Pesaran and Pesaran, 1997). This uses Bewley's (1979) regression method to estimate the asymptotic standard errors and is equivalent to the so-called 'delta' method (Greene, 1993).

The results indicate that exchange rate has negative and significant influence on FIIs inflows to India in the long-run, implying depreciation of currency tend to lowers the value of foreign institutional investments in India. It is worth noting that the estimated coefficient of NSE-Nifty market return is positive and statistically significant at one percent level, signifying that foreign institutional agencies follow the positive feedback trading strategies in the long-run, i.e. they make investments in the market in response to the increasing returns. Moreover, the estimated coefficients of US equity market returns and volatility have positive influence on FII inflows to India. This reveals that the risks associated with US stock market encourage foreign institutional investors to invest more in Indian equity markets. The foreign institutional agencies consider the Indian equity markets constructively due to the existence of overwhelming opportunities based on the extrapolations from past equity returns. Volatility of Indian stock market has negative but insignificant impact on FII flows into India. Besides, the inflation variable has negative and significant impact on FII flows into India in the long-run. This indicates that soaring instable macro economic conditions in India tend to impinge the confidence level of foreign investors on return on investments and thereby discourages FII inflows to 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 FII flows will withdraw from home country and invest in host country's stock market.

4.4 Short-run Dynamics of ADRL process

The results of short-run dynamic coefficients associated with the long-run relationships obtained from the ARDL-ECM equation (3) are presented in Table 4. The optimal lag length for the selected error correction representation of the ARDL (0, 0, 1, 0, 0, 3, 0) model is determined by the Akaike Information Criterion (AIC).

Table 4 Error Correction Representation for the Selected ARDL (2,0,2,0,0,0,0) Model

Regressor	Dependent variable: ΔlnFII		
	Coefficient	t-statistic	Prob. value
constant	-0.0259	-0.571	0.569
$\Delta lnFII_{t-1}$	0.2301	2.259**	0.027
$\Delta lnER_t$	-3.4289	-1.672***	0.093
$\Delta lnINDR_t$	-2.3431	-3.441*	0.001
$\Delta lnINDR_{t-1}$	-1.1543	-1.730***	0.088
$\Delta lnUSR_t$	0.2821	0.642	0.523
$\Delta lnINDV_t$	-0.0708	-1.376	0.173
$\Delta lnUSV_t$	0.0955	2.669*	0.009
$\Delta lnWPI_t$	5.0286	1.886***	0.063
ecm_{t-1}	-1.8648	-10.60*	0.000
ecm = lnFII + 1.8387*lnER + 0.2005*lnINDR - 0.1512*lnUSR + 0.0380*lnINDV - 0.0512*lnUSV - 2.6966*lnWPI + 0.0139*C			
R^2 = 0.802		AIC = -38.09	
F-stat.(9, 76) = 33.94 (0.000)		SBC = -51.59	
D-W statistic = 2.050			
Short-run Diagnostic Tests			
Serial Correlation LM Test (χ^2)	= 0.2776 (0.598)		
Heteroscedasticity Test (χ^2)	= 0.9234 (0.337)		
Functional Form Test (χ^2)	= 1.7907 (0.181)		

Note: *, ** (***) – indicates significance at one, five and ten per cent level, respectively. Optimal lag length is determined by the Akaike Information Criterion (AIC).

The table result reveals that the estimated error correction coefficient is negative and significant at one percent level, ensuring the disequilibrium in FII flows from the previous period's shock converges back to the long-run equilibrium in the current period. The empirical results indicate that exchange rate has positive and significant influence on FII flows into India in the short-run. This indicates that the depreciation of currency tends to condense the FII inflows to India. The estimated coefficient of lagged stock market returns of India has negative and significant influence on FII flows. This is an evidence of validity of contrarian or negative feedback trading hypothesis in the short-run, i.e. the foreign institutional investors

make investments in the Indian equity market in response to the decreasing returns. The foreign investors buy when equity prices are low and sell after prices increase and thereby foreign institutional investment acts as smoothening effect on the stock market returns. The stock market volatility of US has a positive impact towards FII flows in the short-run, implying that risks associated with US stock market encourage foreign institutional investors to invest more in Indian equity markets. The US stock market returns and volatility of Indian equity market are found to be insignificant in influencing FII flows into India. The domestic inflation represented by Wholesale Price Index (WPI) has positive and significant influence on FIIs investment in India.

4.5 Stability of the ARDL process

Besides, the study employed a sequence of diagnostic tests, viz. Breusch-Godfrey Serial Correlation LM test, Autoregressive Conditional Heteroskedasticity (ARCH) test, White Heteroskedasticity test and Ramsey RESET specification test to examine the validity and reliability of the short-run ARDL-ECM model and the results are shown in table 5. The results indicate that short-run model passes through all diagnostic tests where there is no evidence of autocorrelation in the disturbance of the error term. The ARCH tests suggest that the errors are homoskedastic and independent of the regressors. The RESET test indicates that the model is correctly specified.

Finally, we also examine the stability of the long-run coefficients together with the short-run dynamics by applying the CUSUM (Cumulative Sum of Recursive Residuals) and CUSUMSQ (Cumulative Sum of Squares of Recursive Residuals) plots (Brown et al. 1975). The CUSUM and CUSUMSQ plots for the estimated model are shown in Figure-1. If the plots of the CUSUM and CUSUMSQ statistics stay within the critical bounds of five per cent level of significance, the null hypothesis of all coefficients in the given regression are stable and cannot be rejected. Examination of

plots in Figure 1 shows that CUSUM and CUSUMSQ statistics are well within the 5% critical bounds implying that short-run and long-run coefficients in the ARDL-Error Correction Model are stable.

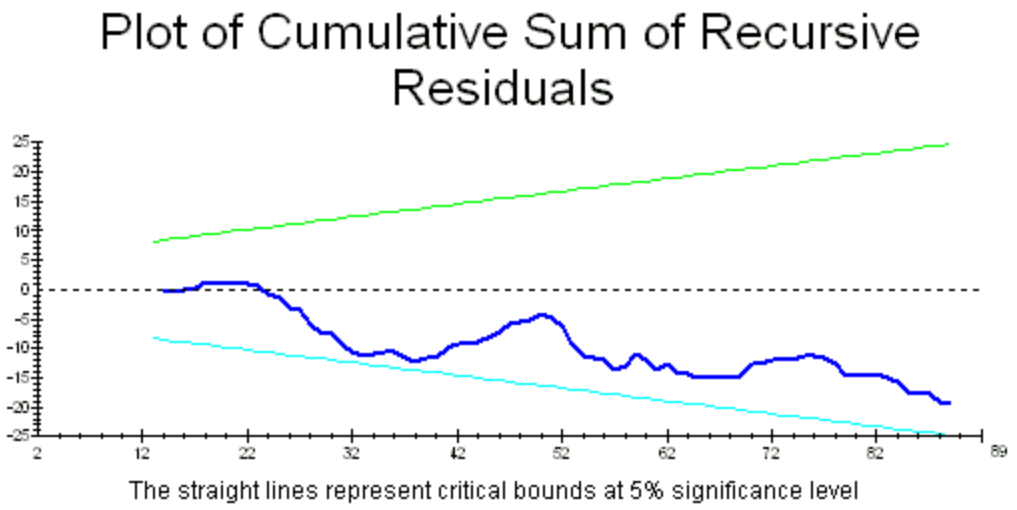
5 Conclusion

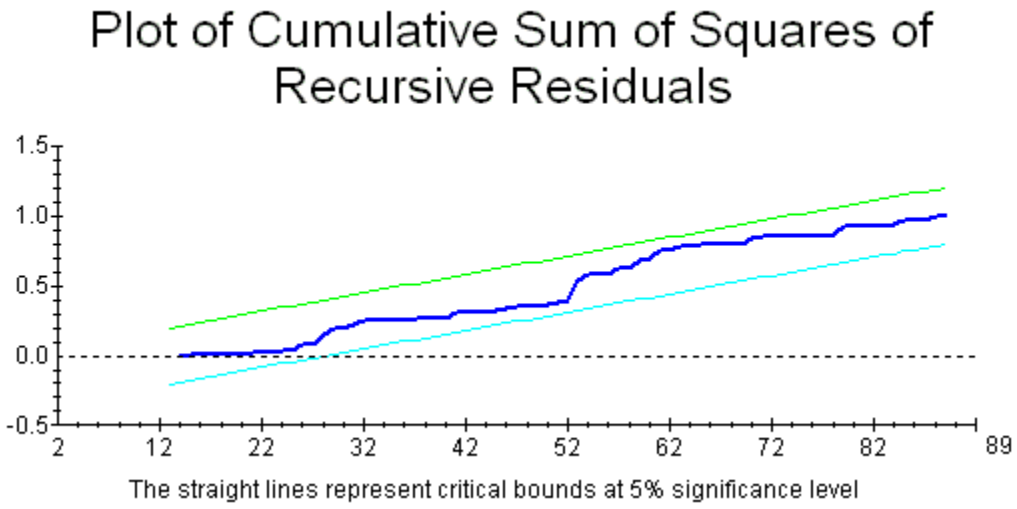
The paper explores the determinants of foreign institutional investments in India through the Autoregressive Distributed Lag (ARDL) bounds testing approach. Using quarterly time series data, the empirical analysis was carried out for the period from January 2004 to December 2011. By and large, our analysis reveals that exchange rate has significant negative impact on FII inflows both in the short-run and long-run, implying that depreciation of currency adversely affects the FII flows into India. Our findings also indicate that Indian equity market returns has negative short-run and positive long-run effects on FII inflows to India. This confirms the evidence of positive and negative feedback trading hypothesis in the short-run and long-run respectively, implying that foreign institutional investments has a smoothening effect in the short-run and acts as destabilising force in the long-run. Therefore, the process of liberalizing capital account adopted by the Indian government seems to be more appropriate measure in determining the foreign inflows to Indian equity markets in the short-run. However, the central government should implement the selective capital control measures related to FII inflows in the long-run.

The US equity market returns has positive and significant influence on FII flows in the long-run but positive and insignificant influence on FII flows in the short-run. Besides, the study results reveal that risk associated with US equity market returns has positive and significant impact on FII inflows in the short-run as well as in the long-run. In other words, the risks associated with US equity market encourage foreign institutional investors to invest more in Indian equity markets. As expected, the risks associated with Indian equity market returns have negative but insignificant

influence on FII inflows to India in the short-run and long-run. The domestic inflation represented by Wholesale Price Index (WPI) exerts negative and positive significant influence on FII flows in the long-run and short-run, respectively. It can be concluded that FII inflows to India are essentially determined by exchange rate, domestic inflation, domestic equity market returns, returns and risk associated with US equity market.

Figure 1





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