Indian Management Studies Journal 23 (2019) 161-176

Indian
Management
Studies Journal

Assessing Asymmetric Effects of FIIs and Other Select Variables : An Application of Non-Linear ARDL Model

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Abstract

The focus of the present study is to determine whether asymmetric relationship exists between real effective exchange rate and three measures of net FII's flows from the period from January 2008 to May 2018 using monthly data. The NARDL approach was followed in the study. The other control variables Nifty 50 and S&P 500 returns and their volatility were also incorporated. The findings reveal that long-run cointegration exist among the variables. Long-run asymmetric effect of exchange rate was present in net debt flows model. While short-run asymmetry was found in net equity flows and net flows model. In long-run, positive influence of positive and negative real effective exchange rate return was found on all three FII measures. Nifty 50 returns and its volatility impacted negatively the net equity and total flows in the long-run. S&P 500 returns had no significant impact on equity and debt flows in long-run. But in the short-run, its negative influence was found on net debt flows and net total flows. Volatility in Nifty 50 returns and S&P 500 returns can only negatively and positively affect net debt flows. While volatility in S&P 500 negatively influence net equity flows.

Key Words

FII, Debt, Real Effective Exchange Rate, ARDL, Asymmetry, Stock Market Returns.

INTRODUCTION

India observed a large influx of foreign investments since the aftermath

of Asian Crisis (Samal, 1997). Since then, FII flows into the economy were on the rise. In the year 2010 and 2012, the influx of foreign capital was observed where the level has reached to $18 bn (Dhingra, Gandhi, & Bulsara, 2016). The recent data also reveals that India still attracts $11 bn net FII flows after a steep rival from a record low of $11.31 bn in December 2016 post demonetization. India has, with time, evolved as a most attractive nation in Asia after Japan. The reasons pertain to the fact of good signs of growth rate, better policy environment, higher yields in fixed securities and measures taken to stabilize exchange rate volatility. Although inflation stays as a bottleneck against large FII flows. In India, mainly the equity markets have witnessed steady flows of FII's. The FII's holding in bond market is less than 5% of the stocks. The debt market has a much larger potential in attracting the FII's. However the decision of FIIs to invest in any country depends on push&pull factor(Rai & Bhanumurthy, 2004). FIIs are primarily considered the reason for the Asian Crisis due to the effect of capital flight on the economies and a series of currency depreciation deteriorating the trade balances of nations. Thus, they are set to be prime reason of destabilization in stock market. Also, they may cause "positive feedback trading" i.e. they take impulse decisions on the basis of positive and negative news about the stock market and fundamentals of the economy, wiping away the money out of the economy within seconds which causes fluctuations in exchange rate. Therefore, they are termed as "hot money". But they, on other hand, broaden the base of stock market thereby creating liquidity and efficiency in the equity market. They are considered as an attractive source of capital by the government. Their presence further helps the domestic investors in creating the diversification benefits and lowers the premium for risk. Therefore, the presence of FIIs has been an area of concern for the policy makers, regulators, researchers & academicians.

The present study reveals the factors that influence the FII flows in India and the effect of real effective exchange rate on the net FII flows through a non-linear ARDL model. The paper finds the research gap through literature review in the next section. In section IV, the data and methodology adopted is discussed. Section V presents the analysis and results. Conclusion and implications are presented in the Section VI.

LITERATURE REVIEW

Some of the earlier piece of literature reveals that the destabilizing power of FIIs was weak and significant evidence cannot be found in context with the Korean stock market after the post-Asian financial crisis period like found by

Choe, Kho, & Stulz (1998) and Yang (2017). While some studies found the factors both endogenous and exogenous those were affecting the FII flows in India. One such study was done by Chakrabarti (2001)who found that a substantial association exists between BSE returns and flows of FIIs.

Following a regression model, the evidence was supporting the fact that post the Asian Crisis event, flows of FIIs were majorly determined by BSE returns. Other factors like credit ratings of the country, returns of US and World market were insignificant in determining the FII flows. This highlighted that asymmetry of information between home and host country participants were absent. Mukherjee, Bose, and Coondoo (2002) supported that findings of Chakrabarti (2001) that Indian market returns were dominantly causing both inflows and outflows of foreign funds. Exchange rate returns could also influence flows of FIIs. Srinivasan & Kalaivani (2015)have found significant evidence of both positive feedback trading in the short-term period and negative feedback trading in the long-term period from the period covering 2004; 01 to 2011; 11. Further, the exchange rate determines the flow of FII.

Other studies have focused on FII flows and the risk factor associated with those flows. The study on Indian stock market returns and its volatility was done by Rai & Bhanumurthy (2004). The study adopted TGARCH model, for a monthly period ranging from 1994; 2001 to 2002. Positive influential factors on FII flows were returns of BSE and inflation level of US. But negative factors were volatility in BSE returns, volatility of S&P returns and Inflation level of India. While Garg & Bodla (2015) have reported that due to opening of trading by FIIs in the Indian stock market, BSE's daily returns were adversely affected. But a positive effect has been seen on the volatility in daily returns post opening of FIIs trading thus creating a stabilizing effect.

Further studies have studied the impact of Global Financial Crisis. Yaha, Singh, and Rabanal (2017) though the event study approach in the period from 1999 to 2011 attempted to find existence of abnormal responsesin foreign equity flows and in returns of stock market particularly during global shocks. The lack of substantial evidence was associated with either of them during the global shocks. Waqas, Hashmi, and Nazir (2015)based their study from 2000 to 2012 on the effect of macroeconomic factors on investments by foreign portfolio investors in four countries namely China, India, Pakistan and Sri Lanka. A significant relation was found between volatility in FPIs' flows and economic factors was found using GARCH model. Factors like low level of inflation, positive rate of GDP growth, FDI flows, and depreciation of currency were linked to lesser volatility in FPI's flows. Goh, Zam, and Sapian (2017) found that market

returns and net foreign equity flows were negatively related for the period from 2009; 10 to 2015; 12. Unidirectional causality was found from market returns and volatility in returns to net foreign equity flows. A shock in foreign equity flows did not clearly affect market returns and its volatility thereof. But, the substantial evidence was found for a shock in returns and volatility and its response over equity flows.

Investor sentiment could also explain foreign equity flows and market returns. One such study was conducted by French & Li (2017) on Thailand's market. It was found that equity flows were substantially determined by both the stock market and alternative investment market in Thailand. But sentiments could only explain the equity market returns but not foreign equity flows.

Caporale, Menla Ali, and Spagnolo (2015) did an extensive study to investigate the uncertainty of exchange rate on net foreign flow of bond and equity of US with Australia, Japan, Euro Area, Canada and Sweden from 1998 to 2011. The dynamic association of mean and volatility of equity and bond flows were studied using VAR-GARCH-BEKK model. The substantial negative impact of fluctuations in exchange rate was found on net foreign equity flows in UK, Euro Area and Sweden while a positive impact was vigilant in Australia. Fluctuations in exchange rate were severely affecting bond flows in every country except for Canada. Causality was found in both directions for Japan between exchange rate fluctuations and net equity flows. Transmission was found from net foreign equity flows to uncertainty of exchange rate in UK and Sweden. Causality from Bond flows was observed effecting the exchange rate fluctuations in case of Australia and Sweden but opposite happened in case of Canada. Rest of the nations observed bidirectional causality. Further, Caporale, Menla Ali, Spagnolo, and Spagnolo (2017) conducted their study mainly on the Asian economies like Taiwan, Philippines, Indonesia, Pakistan, Thailand, India and South Korea to find effect of volatility in exchange rate on foreign equity flows in these nations through Markov Regime Switching GARCH model. It was found that US was considered the safest investment destination when each of the 7 Asian nations in the study was facing a regime of high volatility except Philippines.

Kim & Yi (2015)investigated whether the trading executed by foreign and domestic Korean investors could strengthen information efficiency in the prices of listed shares through improving the availability of information for 4508 chosen firms in the study over a period from 1998 to 2007. The results revealed that as the trading intensity by investors both domestic and foreign developed, the stock prices became less synchronized. Foreign traders could induce greater

efficiency in equity market than domestic traders with their ability to improve flow of information that gets reflected in stock prices. Thus, it was significantly concluded that stock mispricing can effectively be reduced by the participation of foreign traders and domestic traders in the short-run.

The set of studies on asymmetric effect of exchange rate is presented as follows :

Bahmani-Oskooee & Saha (2018) found inconclusive evidence on the trade balance and exchange rate relation using the Linear ARDL model. However, conclusive uncentred relation was found between exchange rate and trade balance of Singapore, Thailand, Malaysia and Korea in the short-run. While for Indonesia, Japan and Korea uncentered responses were found in the long-run. Further, Fariditavana (2015) has affirmed that exchange rate has asymmetric relation on Chinese, Canadian, US and Japanese trade balance from 1973 to 2014. Chakraborty & Kakani (2016) unveiled that the foreign institutional investors display an asymmetric behavior in context of higher volatility in stock market which is conceived as bad news which further resulted in positive feedback practice. Thus, high volatile regime created a significant impact on FIIs than domestic investors. This study was done from 2000 to 2012 over Taiwan, Vietnam, Korea and India. Liu, Bredin, Wang, and Yi (2014)have found that domestic investors have greater homogeneity in their investment patterns over foreign institutional investors in China over 2003-2009.

From the review of literature, it has been found that the study on asymmetric exchange rate and foreign institutional flows is still left to be delved into. The importance of bilateral exchange rate in determining flows of FIIs was studied extensively. However, the inflation adjusted Real Effective Exchange Rate has not been discussed much. Also, less work has been done to individually look into the three aspects of net foreign institutional flows i.e. net equity flows, net debt flows and net total flows.

RESEARCH METHODOLOGY

Research methodology is presented as follows :

Objectives

Thus, the study aims to find :

1. The existence of long-run cointegration among the three different measures of FII flows and effective real exchange rate, Nifty 50 returns, Volatility in Nifty 50 returns, S&P 500 returns and volatility in S&P 500 returns.

2. Whether the real effective exchange rate movements have an asymmetric impact over India's net FII flows (debt, equity or total flows) while imposing control variables - the return & volatility of Indian & US stock market respectively.

Data and the Variables

The secondary data using monthly frequency from 2008; 01 to 2018; 05 has been employed in the study. The last day of each month has been considered. This period traces the effect of Global Financial Crisis as during the period, volatility in exchange rate was substantial and effecting foreign flow of capital into the economy (Prakash, 2012). The Table 1 lists the variables employed and the sources & symbols in the study.

Table 1
List of Variables

Variables	Source	Symbol
Net Foreign Institutional Investments	www.cdslindia.com	NF
Net Foreign Equity Investments	www.cdslindia.com	NEF
Net Foreign Debt Investments	www.cdslindia.com	NDF
Real Effective Exchange Rate Index Returns	fred.stlouisfed.org.	REER
S&P 500 Returns	Yahoofinance.com	SR
Nifty 50 Returns	www.nseindia.com	NR
Volatility in S&P 500 Returns	Calculated*	SV
Volatility in Nifty 50 Returns	Calculated*	NV

* Standard Deviation of log of 10 days series of monthly returns

Since the study pertains to the period of Global Financial Crisis, Euro Zone Debt Crisis, episodes of volatility in exchange rate, linear regression cannot clearly provide insight as compared to non-linear regression model. Thus, we employed NARDL model as given by (Shin, Yu, and Greenwood-nimmo, 2014). Though this we attempt to study whether the asymmetric affect of effective real exchange rate is present on the net foreign institutional investment flows. It is necessary to check the integration order of each variables under study as NARDL cannot be applied if any of the variables are I (2) order. So, we adopted ADF test with structural break as proposed by(Vogelsang, Timothy J. and Perron, 1998).

It was confirmed that variables are integrated in combination of I(0) or I (1) and the sample size is small, due to which NARDL will be an apt measure for cointegration.

As proposed by Shin *et al.*, 2014, one exogenous variable can be decomposed into partial sums of positive and negative changes so as to measure asymmetric effect of that variable on dependent one.

$$REERP_i = \sum_{i=1}^{t} \Delta REERP_i = \sum_{i=1}^{t} \max\left(\Delta REER_i, 0\right) \quad (1)$$

and,
$$REERN_i = \sum_{i=1}^{t} \Delta REERN_i = \sum_{i=1}^{t} \min\left(\Delta REER_i, 0\right) \quad (2)$$

The model can be expressed as :

$$\Delta NEF = C_{01} + \theta_{11} NEF_{t-1} + \theta^{+}_{21} REERP_{t-1} + \theta^{-}_{21} REERN_{t-1} +$$

$$\theta_{31} NR_{t-1} + \theta_{41} SR_{t-1} + \theta_{51} NV_{t-1} + \theta_{61} SV_{t-1} + \sum_{p=1}^{l} \delta_{p1} \Delta NEF_{t-p} + \sum_{q=1}^{m} \left(\gamma^{+}_{q1} \Delta REERP_{t-q} + \gamma^{-}_{q1} \Delta REERN_{t-q}\right) + \sum_{r=1}^{n} \phi_{r1} \Delta NR_{t-r} + \sum_{s=1}^{n} \pi_{s1} \Delta SR_{t-s} + \sum_{u=1}^{n} \omega_{t1} \Delta NV_{t-u} + \sum_{v=1}^{n} \alpha_{v1} \Delta SV_{t-v} + \alpha \in_{1t} \quad (3)$$

Where, l, m, n, o are optimum lags, C are the constants, θ are long-run coefficients and δ, γ, ϕ, π, ω, α are short-run coefficients.

Similarly, all other (NDF and NF) dependent variables can be expressed as equation (3).

The Wald Coefficient test will be used for assessing the long-run and short-run asymmetric effect of REER.

For the long-run, Coefficients –C3/C2 = –C4/C2 needs to be checked in equation (3). If the equation is significant then symmetric effect is found.

For the short-run, Coefficients C10 = C11 = 0 needs to be checked. If they are not equal then asymmetry is found to exist.

ANALYSIS

Table 2 shows the summary of each variable incorporated in our study. The average flow of net equity institutional investments are more than the net debt flows. The mean returns of real effective exchange rate is negative i.e. on an average, rupee appreciation is observed for the time period under study. The mean returns of Nifty 50 and its volatility is greater than S&P 500 index highlighting the risk return characteristics of stock markets. The volatility of

equity flows is higher than debt flows. The volatility in the exchange rate is larger than S&P 500 index indicating the stable nature of US stock market. The normality in each of the time series distribution is measured through Skewness, Kutosis and Jarque-Bera test. Normality is observed in NEF, NF, REER series.

Table 2
Descriptive Statistics

	NEF	NDF	NF	REER	NR	SR	NV	SV
Mean	4700.538	2949.286	7649.627	-0.000033	0.03159	0.000033	0.011656	0.000076
Std. Dev.	10450.03	9404.497	16212.94	0.017132	0.020343	0.00002	0.029405	0.00001
Skewness	0.152955	-0.212467	-0.273201	-0.469923	0.243258	2.108187	2.966619	1.419931
Kurtosis	2.541019	4.536951	3.537995	3.388261	5.523255	6.457933	13.18939	3.840117
Jarque-Bera	1.584606	13.24368	3.062468	5.385716	34.39329	154.8704	724.0986	45.68028
Probability	0.452801	0.001331	0.216269	0.067687	0	0	0	0
Observations	125	125	125	125	125	125	125	125

Table 3
Correlation

Vari-ables	NEF	NDF	REER	NR	SR	NV	SV
NEF	1						

NDF	0.33169*	1					
	(0.0002)	-----					
REER	0.196341**	0.147692	1				
	(0.0282)	(0.1002)	-----				
NR	-0.021323	-0.181497**	-0.01109	1			
	(0.8134)	(0.0428)	(0.9023)	-----			
SR	-0.101626	-0.059523	-0.067595	-0.17046***	1		
	(0.2594)	(0.5096)	(0.4539)	(0.0574)	-----		
NV	-0.361413*	-0.114588	-0.090738	-0.295634*	0.01577	1	
	(0.00)	(0.2032)	(0.3142)	(0.0008)	(0.8614)	-----	
SV	-0.118885	-0.068323	0.03711	0.021212	-0.083827	0.082544	1
	(0.1867)	(0.449)	(0.6812)	(0.8144)	(0.3527)	(0.3601)	-----

Parentheses shows the p-values.
Significance level is denoted as *, **, *** for 1, 5 and 10% respectively.

Table 3 depicts the unconditional matrix of correlation between each pair of variables. The significant positive correlation is observed between NDF and NEF. The exchange rate return is positively associated with NEF. Thus, whenever the rupee depreciates in real terms against all trading partners signaling an increase in the REER then it positively impacts the foreign investment in stock market. The negative significant correlation exists between Nifty returns and NDF. This signifies that if returns in stock market are positive, then investments in debt market will be lower. The correlation between S&P 500 returns and Nifty 50 returns is negative, i.e., if returns in Nifty 50 are high, then people then to invest more in Indian stock market increasing the prices and hence returns of the stock. The volatility in Nifty 50 returns is negatively associated with its returns. As higher volatility makes the risk averse investors to sell their investments which lowers the prices and hence the return of the underlying index. A negative association was also found between monthly volatility in Nifty 50 and NEF.

Bai & Perron (1998) have proved that exogenous shocks may not be transitory in nature and therefore, the standard unit root tests fail to clearly identify whether the time series is stationary or not. Thus, incorporating structural breaks in the conventional unit root tests becomes vital to attain unbiased results. One of such methods to incorporate structural breaks while checking for the integration order was given by (Vogelsang, Timothy J. and Perron, 1998).

The objective of such test is to minimize ADF test statistics. Thus, we applied such unit root test with intercept break and innovative outlier model with the assumption that breaks occur gradually in respective time series. The results are depicted in the Table 4.

Positive real effective exchange rate returns signaling a series of domestic currency appreciation, observed a sudden revival in March, 2010 due to measures taken by RBI (Prakash, 2012). This series became stationary after first difference after incorporating the break date. Negative real effective exchange rate returns were stationary at 1% after a break of July, 2013 at first difference which was observed due to US quantitative easing program causing sudden depreciation. Net equity foreign flows experienced high sudden inflows in the year 2010 as it emerged as the second most preferred Asian nation after Japan. Net debt foreign flows experienced sudden outflows due to quantitative easing program announced by US fed in 2013. Thus, both these time series were level stationary after incorporating respective break dates. Nifty 50 returns index and its monthly volatility were stationary at level with 2008 period of global

financial crisis where the lagged effect was observed in volatility of Nifty 50 index. S&P 500 index returns became level stationary with October, 2012 event of high returns. The period pertains to the revival of US economy due to lower interest rate, improving employment rate and period of low volatility in Treasury bond market. S&P 500 monthly volatility was found to be stationary at level with June, 2010 break. This date pertains to the event of "Flash Crash" in May 2010 where the equity market dropped by six hindered points in just five minutes span leading to tapering of liquidity and manifolding of volatility.

Table 4
ADF-Unit Root Tests with One Break Point

Series	Test Statistics	P-Value	Break Date	Test Statistics	P-Value	Break Date	Integration Order
REERP	-2.228454	0.959	2009; 08	-11.92059	0.01	2010; 03	I (1)
REERN	-4.527263	0.04	2011; 06	-11.23052	0.01	2013; 07	I (1)
NEF	-8.026936	0.01	2010; 08				I (0)
NDF	-6.196355	0.01	2013; 06				I (0)
NR	-7.721299	0.01	2008; 06				I (0)
NV	-12.17264	0.01	2008; 10				I (0)
SR	-13.60571	0.01	2012; 10				I (0)
SV	-15.04635	0.01	2010; 06				I (0)

Table 5
NARDL Bounds Testing Results

NARDL Model	F-Statistics	Selected Model	Decision
F(NEF|REERP, REERN, NR, SR, NV, SV)	15.9676*	ARDL(1, 1, 1, 0, 0, 0, 3)	Cointegration
F(NDF|REERP, REERN, NR, SR, NV, SV)	5.81892*	ARDL(1, 1, 0, 0, 2, 1, 1)	Cointegration
F(NF|REERP, REERN, NR, SR, NV, SV)	11.54026*	ARDL(1, 1, 1, 0, 1, 1, 0)	Cointegration
Critical Values with Restricted Constant and No Trend (k = 5)			
	AT 1%	AT 5%	AT 10%
I (0)	3.06	2.39	2.08
I (1)	4.15	3.38	3

Table 6
Long-Run NARDL Coefficients

IDV\DV	NEF		NDF		NF	
	Coefficients	**P-Value**	**Coefficients**	**P-Value**	**Coefficients**	**P-value**
REERP	321589.2*	0.0002	215237**	0.0391	557822.7*	0.0002
REERN	332397.9*	0.0001	218191.2**	0.0364	575479.5*	0.0001
NR	-152772.8**	0.0146	-187409.8**	0.035	-316595.9*	0.0026
SR	-77795888	0.1269	-27443152	0.8585	-335000000**	0.0154
NV	-194658*	0.00	-51530.14	0.4795	-238022.5*	0.0055
SV	305000000	0.2319	319000000	0.2227	-218000000	0.1938
ECT	-0.775294*	0.00	-0.46821*	0.00	-0.675364*	0.00
Diagnostic Checks						
LM	0.762299 (0.5521)		0.442331 (0.7778)		1.019671 (0.4006)	
R^2	0.444188		0.439633		0.457986	
Adjusted R^2	0.382998		0.378502		0.404272	
Cusum	Stable		Stable		Stable	
$Cusum^2$	Stable		Unstable		Unstable	
Wald	0.34821 (0.5563)		3.448175 ***(0.066)		0.187578 (0.6658)	

Table 7
Short-Run NARDL Coefficients

IDV\DV	NEF		NDF		NF	
	Coeffi-cients	**P-Value**	**Coeffi-cients**	**P-Value**	**Coeffi-cients**	**P-value**
D(REERP)	62588.29	0.163	-12920.04	0.7471	66621.98	0.3298
D(REERN)	103497.2**	0.0257			208344.5*	0.0047
D(NR)						
D(SR)			-39807728*	0.00	-139000000*	0.00
D(SR(-1))			-78818138*	0.00		
D(NV)			-89739.86*	0.0015	-226152*	0.00
D(SV)	-117000000*	0.00	29981828*	0.00		
D(SV(-1))	-275000000*	0.00				
D(SV(-2))	-205000000*	0.00				
Wald	4.432115**	0.0141	----	-----	9.110162*	0.0002

The NARDL model can be applied as the variables are integrated in the combination of I (0) or I (1). Also, since the break dates are significant, thus applying a linear ARDL model may not bring deeper insight into the relationship of effective exchange rate in real terms and net foreign institutional flows, which can be studied through a non-linear model. The presence of equilibrium relationship in the long-run can be revealed though bounds testing approach. Table 5 represents three different NARDL models with net equity foreign flows, net debt foreign flows and net total flows as dependent variables. The maximum lag length of four was selected since data is small. The selected ARDL model is based on Akaiki Information Criterion. For all the three models, F-statistics value is greater than the upper bound critical value as proposed by(Pesaran, Shin, & Smith, 2001). Thus, we conclude presence of long-run cointegration for each of the three models at 1% significance level.

The long and short-run results for each of the three models are presented in the Table 6 & 7 respectively. In the long-run, the Wald test results show that REER have a symmetric effect on NEF and NF while asymmetric effect on NDF. This can be observed that the REERN, i.e., rupee depreciationand REERP i.e., rupee appreciation in real terms is considered desirable by foreign debt investors so that positive net earnings are guaranteed. The long-run coefficients of REERP and REERN are found to be significant and positively influencing in all the three models. However, the rupee depreciation in real terms in the long-run is considered favorable by foreign investors as India's competitiveness gets improved which can stabilize the economy's position through strengthening current account deficit problem in the country in longer time span. But in short-run, only the REERN was positively affecting the NEF and NF but not the NDF. This signifies that foreign investors favorably view the rupee appreciation in real terms against its trading partners in short time period. In long-run, the NR was negatively influencing all three flows but the negative effect of SR was only found significant in NF. While long-run volatility in NR was negatively impacting only NEF and NF but not NDF. SV in the long-run did not influence the foreign flows. However, in the short-run, the SR and its one period lag was significantly negatively determining NDF. NF was negatively influenced only by the SR. Volatility in NR and SR was determining NDF in short-run in negative and positive way respectively. NEF was negatively influenced by SV along with the lags. The error correction term of all the models was significant and negative. Thus, the disequilibrium occurring in the variables gets corrected to ensure all variables are cointegrated in the long-run. The speed of adjustment is highest in NEF. The adjustment in NDF happens slowly at 46.82% rate. The effect of REER

was asymmetric on NEF and NF at 5% and 1% significance level. This signifies that the effect of REERN is considered significant than REERP by short-run foreign investors.

The diagnostic checks for all models have been performed. The autocorrelation LM test shows that models are free from serial autocorrelation in the residuals since the null of no autocorrelation cannot be rejected. The R^2 value is fairly large. But adjusted R^2 is not that significant. The stability test measured through Cusum is stable for all three models however the $Cusum^2$ is only stable in NEF.

CONCLUSION

The average flow of net equity institutional investments are more than the net debt flows. The mean returns of Nifty 50 and its volatility is greater than S&P 500 index. The exchange rate return is positively associated with NEF. The negative significant correlation exists between Nifty returns and NDF. A negative association was also found between monthly volatility in Nifty 50 and NEF. The unit root ADF test results show that variables are integrated either in I (0) or in I (1) order with incorporating a structural break in each time series to eliminate any biases in unit root results. The significant breaks are observed in number of events like the impact of Global Financial Crisis, the event of flash crash, and the US Fed Reserve Policy of quantitative easing. The evidence of long-run cointegration was found at 1% significance level for all the three independent variables i.e. NEF, NDF and NF. The asymmetric effect of REER on NDF was found in the long-run. REER had a symmetric effect on NEF and NF in long-run, but an asymmetric effect exists in the short-run. The error correction term was found to be negative and significant in all three models. But the speed of adjustment is fastest in NEF model. In long-run, REERN and REERP had a significant positive impact on all three independent variables. While in short-run, only the REERN was found positively significant in determining the NEF and NF. Thus, REER fluctuations can substantially influence FIIs' decisions as found by Mukherjee, Bose, and Coondoo (2002) and Srinivasan & Kalaivani (2015). In long-run, NR and NV had a negative impact on NEF and NF as found by (Rai & Bhanumurthy, 2004). Thus, due to high volatility, even positive stock returns don't attract equity FII inflows. Thus, "positive feedback" is absent as was also found by Choe, Kho, and Stulz (1998) in Korean market. NR negatively impacted NDF. SR only negatively determines the NF in the long-run unlike the findings of Chakrabarti (2001).However, none of the foreign flows were affected by SV in the long-run. But in short-run, SV effects positively the NDF and

negatively the NEF. SR and NV negatively influences the NDF and NF.

Thus, the study can be utilized by domestic investors and potential foreign investors in understanding the asymmetric impact of real effective exchange rate on trading of FIIs in India. It will also help the policy makers in determining the restrictions or extent of liberalization of Indian debt market which is yet to be opened. Deeper insight can be provided to the policy makers and regulators about the asymmetric impact of REER on foreign debt flows and steps that can be taken to ensure stability in exchange rate as one of the significant factors in determining the foreign capital into the Indian economy.

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