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FOREIGN INSTITUTIONAL INVESTMENTS IN INDIA: AN EMPIRICAL ANALYSIS OF DETERMINANTS

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Abstract: *This paper tries to explore the important determinants of Foreign Institutional Investments (FIIs) in India as it has become extremely important to manage such large flows inward and outward for the existing policy makers in recent times. These flows can be trivial for the home country (the country from which they originate), but when changed into rupee their volume can impact the whole financial market. In this study the determinants are identified through Autoregressive Distributed Lag (ARDL) Bounds Testing Approach using monthly data for the period from January, 2000 to August, 2013. Both domestic and foreign factors turned out to be significant determinants of FIIs. Monthly return, market capitalization and price earnings ratio of domestic market and currency exchange rate are country specific or domestic macroeconomic variables which have significant impact on FIIs in India.Monthly returns on S and P 500 Index and Producer Price Index of US representing foreign (home) country inflation (PPI) have negative impact on FIIs.*

Keywords: *Foreign Institutional Investments, Determinants, ARDL, exchange rate, macro-economic variables.*

JEL Classification: *C22, F3, F31, F21.*

INTRODUCTION

India has witnessed a significant increase in cross-border capital flows during last two decades, since the introduction of the reform process in the early 1990-1991. Net capital inflow increased from $7.1 billion in 1990-91 to $34.91 billion in 2010-11 and was highest at $108.0 billion during 2007-08. India has one of the highest net capital flows amongst the emerging market economies (EMEs) of Asia (Mohan, 2008).

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As discussed by Gandhi, Bulsara, and Dhingra (2013) along with some of the EMEs like Brazil and Korea, India witnessed a greater preponderance of portfolio flows. The preliminary objective of management of capital flows is to staunch rapid appreciation of the real exchange rate. Rajan and Subramanian (2005) and Prasad, Rajan, and Subramanian (2007) showed that excessive capital inflows could result in rapid appreciation of exchange rate which can hurt exports of emerging markets, even very short-term appreciation can have messing implications in the form of permanent loss of share in export market and reductions in manufacturing capacity. Another objective of managing capital flows is to cool overheated asset prices such as stock and real estate. Prasad and Rajan (2008) postulated that in an under developed financial system, foreign capital is likely to be diverted towards easily collateralized and non-tradable investments like real estate. This leads to asset price booms and subsequent busts, disrupting the economy severely. Foreign portfolio investments into shallow equity markets also cause sharp valuation swings and phenomena of sudden stop or reversal. Moreover, for the capital control measures to be effective and efficient, the asset prices should exhibit a decline or increase at a slower pace than before.

During early period of Globalization, there was a steady flow of Foreign Direct Investment (FDI) and Foreign Portfolio Investment (FPI), but it gained momentum after 2000. In the year 2005-06 and 2006-07, FDI showed more than 150 percent increase. During 2007-08, FPI was dominant over other types of capital flows. The significant increase in portfolio flows is attributable to many factors like advancement in information technology, greater integration amongst major world economies and growing interest of Foreign Institutional Investors (FIIs) to explore various investment alternatives such as private equity fund, hedge fund, pension fund etc. The basic motive behind this move is to reduce risk through diversification for their international portfolio investment.

FIIs have attracted many criticism such as preferring short term speculative benefits (Radeletand Sachs, 1998 and Bulsara, Dhingra, and Gandhi, 2015), hot money (Stiglitz, 1999), herding behaviour (Tayde and Rao, 2011) and return chasing, momentum trading or feedback trading hypothesis (GrinblattandKeloharju, 2000). Many studies (Dornbusch, Goldfajn and Valdes, 1995; Calvo, 1998) show that sudden stop or sudden withdrawal is followed by large capital inflow in the form of FPI, 2008-10 witnessed depression in overall net capital flows. India's benchmark index S and PCNX Nifty (Standard and Poor's CRISIL NSE Index 50) of National Stock Exchange (NSE) of India plunged to its lowest of 2557. At the end of March 2008, India's foreign exchange reserves at $309.7 billion provided a cover of 140% to total external debt, though there has been an increase in the short-term debt in recent years. This was the result of the massive de-leveraging of US banks after the financial meltdown. For meeting the liquidity requirements of their principals in the US, the FIIs withdrew funds from all over the emerging markets. In this regard it becomes imperative that we understand what determines the flow of FIIs in India. This paper will provide important insight for contemporary policy making since managing such flows has become extremely crucial for the RBI and the Government in recent times.

LITERATURE REVIEW

Portfolio investment in emerging markets is a classic example of speculative bubble. FIIs pump the money to create an asset price bubble which increases the volatility of particular stock market after liberalization (Grabel, 1995).There have been several attempts to explain behaviourof FIIs in India.Inoue (2009) supported the findings of Griffin, Nardari and Stulz (2004) that the existence of unidirectional causality running from FIIs to stock returns only post 2003. Bansal and Pasricha (2009)found no such relationship between FIIs and Indian stock market average returns. Contrary to above observation, the analysis of Srinivasan and Kalaivani (2010) revealed that FIIs followed negative feedback trading hypothesis and positive feedback trading hypothesis before the global financial crisis period and during the crisis period respectively. Bulsara *et al.* (2015) and Tayde and Rao (2011) suggested that FIIs exhibit herding and positive feedback trading while investing in India. Jain, Meena, and Mathur (2012) and Kulshreshtha (2014) proved that FIIs influence the movements of Indian stock market to a greater extent, index value increases during the inflow of FIIs and decreases during the outflow. Similarly, certain studies have analysed the determinants of FIIs in the Indian Financial market.

Prasuna (2000) revealed that the return in the host country stock market is the only significant factor to attract the FIIs and rest of the factors are statistically insignificant. Mukherjee, Bose and Coondoo (2002), tried to explore the relationship of FIIs with the Indian capital market with its possible covariates based on a daily data set for the period from January 1999 to May 2002. They found that the domestic equity market return affects the FII inflow and outflow in India. Further FIIs may get influenced by the exchange rate variation and fundamentals of the Indian economy, but such influence does not seem to be robust. Gordon and Gupta (2003), found out that the external interest rate and lagged domestic stock market return are the key variables for explaining portfolio arrivals in India. Rai and Bhanumurthy (2004)examined the determinants of the FIIs in India for the period January 1994 to November 2002 and found that the yield in domestic country (India) and risk and inflation in foreign country have positive impact on FIIs and these flows react more (*i.e.* sell heavily) to adverse news that to positive news. Prasanna (2008) analysed the preferences of FIIs for the companies while investing in India. They found positive relationship between FIIs preference and the company's structure, corporate performance, its share returns and price earnings ratio. Kaur and Dhillon (2010) proved that equity returns on Indian stock market, market capitalization, stock market turnover, economic growth of India and inflation in US exhibits positive impact on FIIs whereas stock market risk and inflation in India have adverse impact on FIIs.

Mohanasundaram, Karthikeyan, and Krishnamoorthy (2015) analysed that FIIs are determined by both stock market characteristics and macroeconomic factors. Srinivasan and Kalaivani (2013) concluded that FII inflows in India are determined by exchange rate, domestic inflation, domestic equity market returns and risk and return associated with US equity market. As evidenced by the past studies there is a dynamic relationship between FII flows and various economic variables. The present study aims to improve on several aspects. It applies the multiple regression models after verifying the properties of different time series (*e.g.* stationarity, autocorrelation). It encompasses several plausible dependent variables[*] along with price earnings ratio of Nifty (Benchmark index of Indian capital market). It uses longer period data to understand the behaviour of stock market and FIIs.

DATA AND METHODOLOGY

For determining the factors affecting Foreign Institutional Investment flows, monthly data of three types of Foreign Institutional Investments series viz. Gross Inflow (FIII), Outflow (FIIO) and Netflow (FIIN) are considered as dependent variables individually. Monthly average values of Nifty, Price Earnings (PE) ratio of Nifty, Market Capitalization of NSE, Turnover of NSE are considered as host country or domestic market related factors and average monthly value of S and P 500 index (of USA) as foreign market related factor. Monthly value of Wholesale Price Index as proxy for Inflation, short term T-bill rate as proxy for interest rate prevailing in country and Industrial Production Index as proxy for growth of an economy are considered as economy related factors of host country (India).

Monthly Producer Price Index of USA and short term T-bill rate are considered as push or home country factors. The dataset comprises 164 monthly values[4] of considered variables from January, 2000 to August, 2013. Considered variables are listed in Table 1.

Table 1
List of Plausible Determinants of FIIs

Domestic/country specific factors	
Market related factors	
Monthly returns on S and P CNX Nifty	NIFTY
Market capitalization of NSE in Rs.cr	MC
Stock market turnover of NSE in Rs.cr	TO
Price earnings ratio of Nifty	PE
Economy related factors	
Index for Industrial Production as proxy for economic growth	IIPIND
Wholesale Price Index representing host country inflation	WPIIND
Exchange rate of Indian Rupee vis-a-vis US$	ER
Monthly rate of 3-month T-bill representing interest rate in India	TBIND
Foreign factors	
Market related factor	
Monthly returns on S and P 500 Index	SP500
Economy related factors	
Monthly Producer Price Index of US representing foreign (home) country inflation (PPI)	PPIUSA
Monthly rate of US 3-month T-bill representing interest rate in US	TBUSA

The first step of time series analysis is to identify the properties of data series (both dependent and independent) variable.Unit root test for stationaritygiven by Augmented Dickey Fuller (1979, 1981) Regression and Phillips-Perron (1988) Regression involvethe null hypothesis that δ, the coefficient of Y_{t-1} is zero. The acceptance of the null unit root hypothesis implies nonstationarity. They are as follow:

1. Augmented Dickey Fuller Test

$$\Delta Y_t = B_1 + B_2 t + \delta Y_{t-1} + \sum_{i=1}^{m} \alpha_i \Delta Y_{t-i} + \varepsilon_t$$

2. Phillips-Perron Test

$$Y_t = \alpha + \delta Y_{t-1} + \vartheta t$$

The ADF test adjusts the DF to take care of possible serial correlation in the error terms by adding the lagged difference terms of the regressand. Phillips and Perron use nonparametric statistical technique to take care of the serial correlation in the error terms without adding its lagged values. The PP test tends to be more robust to a wide range of serial correlation and time dependent heteroscedasticity.

The time series could be either difference stationary process or trend stationary process. All the time series representing FII flow, show significant trend and leads to detrending process. This has been accomplished by estimating the following regression:

$$Y_t = A_1 + A_2 t + v_t$$

Where t is the trend variable and v_t is the error term with usual properties. By running this regression, we obtain;

$$\hat{v} = Y_t - a_1 - a_2 t$$

The estimated error term now represents the detrended Y time series that is Y with the trend removed.

In this study to explore the determinants of FIIs in India the Autoregressive Distributed Lag (ARDL) bounds testing approach is employed. The ARDL modelling approach was originally presented by Pesaran, Shin, and Smith (1996) and further extended by Pesaran, Shin, and Smith (2001). The approach is based on the estimation of an Unrestricted Error Correction Model that enjoys a number of advantages over the conventional types of co-integration techniques. Firstly it is applicable to a small sample size study and therefore conducting bounds testing will be appropriate for the present study. Second, it evaluates the short-run and long-run variables of the model instantaneously; removing problems associated with autocorrelation and omitted variables. Third, the standardF-statistics or Wald statistics used in the bounds test follows a non-standard distribution with the null hypothesis of noco-integration relationship among the examined variables, regardless of their level of integration *i.e.* the underlying variables are *I(0), I(1)* or fractionally integrated. This technique also provides unbiased estimates of the long-run model and valid t-statistic even when some of the regressors are endogenous (Harris and Sollis, 2003). Pesaran andPesaran (1997) suggest the inclusion of the dynamics, which corrects the endogenity bias. Once the orders of the lags have been selected appropriately in the ARDL model, the co-integrated relationship can be estimated using a Ordinary Least Square (OLS) method.

In view of the above advantages, ARDL used in the study is expressed as

$$\begin{aligned} \ln FII &= \beta_0 + \beta_1 \ln NIFTY_{t-i} + \beta_2 \ln PE_{t-i} + \beta_3 \ln MC_{t-i} + \beta_4 \ln TO_{t-i} + \beta_5 \ln WPIIND_{t-i} \\ &+ \beta_6 \ln TBIND_{t-i} + \beta_7 \ln IIPIND_{t-i} + \beta_8 \ln SP500_{t-i} + \beta_9 \ln TBUSA_{t-i} + \beta_{10} \ln PPIUSA_{t-i} \\ &+ \beta_{11} \ln ER_{t-i} + \sum_{i=1}^{p} \delta_1 \Delta \ln NIFTY_{t-i} + \sum_{i=1}^{p} \delta_2 \Delta \ln PE_{t-i} + \sum_{i=1}^{p} \delta_3 \Delta \ln MC_{t-i} + \sum_{i=1}^{p} \delta_4 \Delta \ln TO_{t-i} \\ &+ \sum_{i=1}^{p} \delta_5 \Delta \ln WPIIND_{t-i} + \sum_{i=1}^{p} \delta_6 \Delta \ln TBIND_{t-i} + \sum_{i=1}^{p} \delta_7 \Delta \ln IIPIND_{t-i} + \sum_{i=1}^{p} \delta_8 \Delta \ln SP500_{t-i} \end{aligned}$$

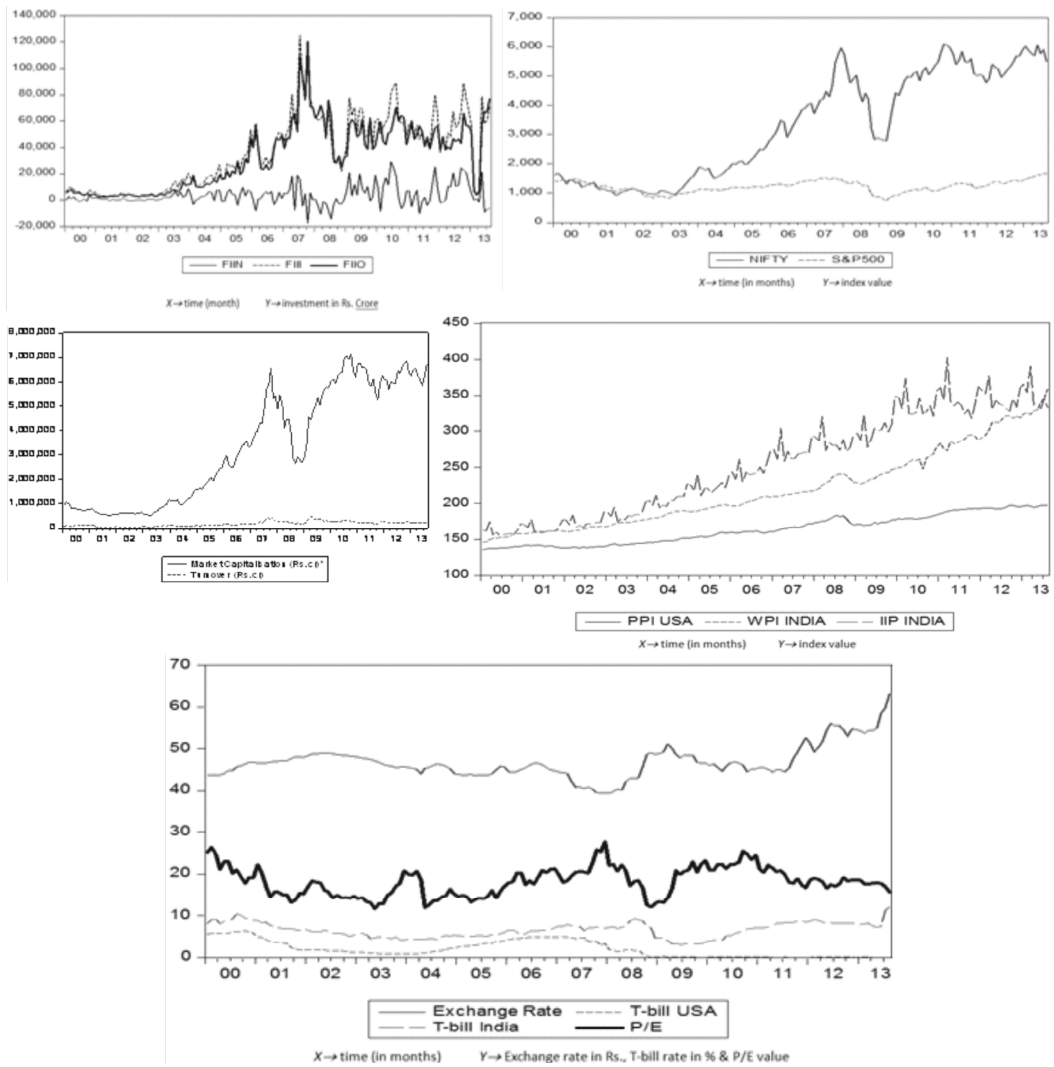

Figure 1: Graphical Representation of different series considered as exogenous/ endogenous variables

$$+\sum_{i=1}^{p}\delta_9\Delta\ln TBUSA_{t-i}+\sum_{i=1}^{p}\delta_{10}\Delta\ln PPIUSA_{t-i}+\sum_{i=1}^{p}\delta_{11}\Delta\ln ER_{t-i}$$

The first step in the ARDL bounds testing approach is to estimate the above equation using ordinary least squares method in order to examine the presence of a long-run relationship among the variables by conducting an F-testthat involves testing the significance of the coefficients of the lagged level variables jointly, *i.e., H0:* $\beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = \beta_7 = \beta_8 = \beta_9 = \beta_{10} = \beta_{11} = \delta_1 = \delta_2 = \delta_3 = \delta_4 = \delta_5 = \delta_6 = \delta_7 =$

$\delta_8 = \delta_9 = \delta_{10} = \delta_{11} = 0$. The critical value bounds for the F-statistic are generated by Pesaran *et al.* (2001). If the calculated F-statistic falls below the lower bound critical value, we fail to reject the null hypothesis of no co-integration. On the contrary, if the calculated F-statistic lies above the upper bound, the null hypothesis gets rejected, implying the existence of long-run co-integration relationship between the variables in the estimated model. However, if the calculated value falls within the bounds, the inference is inconclusive.Establishing general to specific model involves trial and error approach.

Empirical Analysis

Figure 1 shows the plots of different considered series for finding determinants of Foreign Institutional Investments. From the graphical presentation all series seemnonstationary. Further, Index of Industrial Production series seems to possess seasonal trend or pattern, which requires applying of deseasonalising process.

To know the level of integration of the series, it is important to make them stationary. Stationarity can be achieved through differencing, detrending or deseasonalising. NIFTY, MC, WPIIND, ER, TBIND, SP500, PPIUSA and TBUSA are stationary at first difference. FIII, FIIO, FIIN and TO are trend stationary. IIPIND is seasonally adjusted with the help of U.S. Census Bureau's X12 seasonal adjustment program and is stationary at first difference. Table 2 shows the descriptive statistics of all considered stationary series.

Table 2
Descriptive Statistics of Plausible Determinants of FIIs

				Foreign factors		
	FIIs in India			*Market related factor*	*Economy related factors*	
	FIII	*FIIO*	*FIIN*	*SP500*	*PPIUSA*	*TBUSA*
Observations	164	164	164	163	163	163
Mean	0.000	0.000	0.000	0.001	0.002	-0.032
Median	–3021.649	–4369.326	0.342	0.010	0.003	0.000
Maximum	85100.580	83479.580	23773.450	0.114	0.019	2.398
Minimum	–63846.900	–58401.110	–21420.510	–0.228	–0.031	–3.784
Std. Dev.	18006.220	17398.370	7370.814	0.041	0.007	0.459
Skewness	0.581	1.122	0.279	–1.518	–1.057	–2.597
Kurtosis	8.107	8.958	4.184	8.571	5.885	34.412
Jarque-Bera	187.455	276.989	11.706	273.383	86.869	6884.800
Prob.	0.000	0.000	0.003	0.000	0.000	0.000

Cont. table 2

Domestic/country specific factors

	Market related factors				*Economy related factors*			
	NIFTY	*MC*	*TO*	*PE*	*IIPIND*	*WPIIND*	*ER*	*TBIND*
Observations	163	163	164	164	163	163	163	163
Mean	0.008	0.012	0.000	18.270	0.005	0.006	0.002	0.002
Median	0.020	0.020	–22305.790	18.170	0.005	0.004	0.000	0.006
Maximum	0.181	0.302	260284.400	27.620	0.083	0.055	0.066	0.409
Minimum	–0.270	–0.324	–95938.660	11.650	–0.053	-0.050	–0.044	–0.417
Std. Dev.	0.064	0.083	69383.820	3.411	0.020	0.011	0.018	0.077
Skewness	–0.678	-0.640	1.477	0.205	0.345	0.174	0.813	–0.225
Kurtosis	4.775	5.027	5.477	2.465	4.739	9.126	5.125	12.192
Jarque-Bera	33.886	39.039	101.567	3.103	23.755	255.681	48.639	575.248
Prob.	0.000	0.000	0.000	0.212	0.000	0.000	0.000	0.000

From the table 2, it can be inferred that no single series possess normally distributed values. The unit root test statistics given in Table 3 confirms the stationarity of all considered variables. The table also proves that none of the variables is integrated of order 2 or higher than *I*(2).All the series considered for estimating the model, are not integrated of the same order.NIFTY, MC, IIPIND, WPIIND, ER, TBIND, SP500, PPIUSA and TBUSA are *I*(1). FIII, FIIO, FIIN and TO are trend stationary, thus *I*(0).

Table 3
Unit Root test of Plausible Determinants of FIIs

				Foreign factors		
	FIIs in India			*Market related factor*	*Economy related factors*	
Augmented Dickey-Fuller test statistic						
Variable	*FIII*	*FIIO*	*FIIN*	*SP500*	*PPIUSA*	*TBUSA*
t-Statistic	–4.9627**	–4.698**	–8.575**	–10.9384**	–12.3525**	–11.1596**
Slope Coefficient	–0.2666**	–0.244**	–0.64**	–2.79351**	–2.34072**	–4.24575**
Intercept	–116.653	–243.318	61.46879	–0.00105	5.30E-06	0.003107
Trend Coefficient	1.036894	3.32136	–1.09908	1.26E–05	2.27E–07	–9.78E-05
Phillips–Perron test statistic						
Adj. *t*–Statistic	–4.8997**	–4.475**	–8.561**	–50.2693**	–39.3041**	–89.8268**
Slope Coefficient	–0.2666**	–0.244**	–0.64**	–1.3384**	–1.43939**	–1.5807**
Intercept	–116.653	–243.318	61.46879	–0.00084	–0.00016	0.001171
Trend Coefficient	1.036894	3.32136	–1.09908	8.80E–06	1.41E-06	–3.76E-05

Cont. table 3

	Domestic /country specific factors							
	Market related factors				*Economy related factors*			
Variable	*NIFTY*	*MC*	*TO*	*PE*	*IIPIND*	*WPIIND*	*ER*	*TBIND*
Augmented Dickey–Fuller test statistic								
t–Statistic	–5.68**	–11.41**	–3.54**	–3.5383*	–12.4**	–15.9**	–10.2**	–11.1**
Slope Coefficient	–0.63**	–0.897**	–0.15**	–0.1276*	–5.99**	–2.02**	–3.15**	–3.21**
Intercept	0.00588	0.00538	–119.64	2.0082	0.0009	–0.001	–0.0018	–0.0061
Trend Coefficient	–8.4E-06	5.75E-05	–5.8420	0.0033	–9.9E–06	1.6E-05	2.8E–05	9.8E-05
Phillips–Perron test statistic								
Adj. *t*-Statistic	–9.212**	–11.58**	–3.442*	–12.85**	–127**	–49.7**	–36.4**	–59.2**
Slope Coefficient	–0.703**	–0.897**	–0.15**	–1.019**	–1.69**	–1.47**	–1.27**	–1.54**
Intercept	0.00246	0.00538	–119.64	–0.17597	–0.0005	–0.001	–0.0007	–0.0052
Trend Coefficient	2.99E-05	5.75E-05	–5.8420	0.0013	5.1E–06	1.2E–05	1.3E-05	7.9E-05

"*" Significant at 5% level."**"Significant at 1% level

Since, the series considered for the study are not integrated of the same order, Engle and Granger (1987) method for determining long-run and short-run impact fails. As a result, 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 variables in the model are *I(0)* or *I(1)*(Kaur and Dhillon, 2010). Secondly, bounds testing approach for determining

Table 4
Correlation of Plausible Determinants with FIIs series

	LNFIII	LNFIIO	FIIN
LNNIFTY	0.877413	0.895477	0.203444
LNPE	0.387299	0.406918	0.043062
LNMC	0.896132	0.909435	0.233431
LNTO	0.865159	0.873414	0.204269
LNSP500	0.257654	0.283303	–0.0768
LNTBIND	–0.04894	–0.01019	–0.1974
LNWPIIND	0.736991	0.744842	0.245711
LNIIPIND	0.834867	0.844827	0.246347
LNTBUSA	–0.43782	–0.43486	–0.25028
LNPPIUSA	0.792019	0.805735	0.216877
LNER	–0.07475	–0.09197	0.227349

Note: The prefix "LN" represents the logarithmic value (if applicable) of the series at level the co-integrating relationship between Foreign Institutional Investments (FIIs) and its determinants consisting of NIFTY, MC, TO,PE, IIPIND, WPIIND, ER, TBIND,SP500, PPIUSA and TBUSA have been estimated on the basis of ARDL specification of lag 1(Schwarz criterion). The results of F-Test obtained by normalizing all regressors on FIIs are presented in their respective tables. For establishing appropriate model general to specific approach is used.

Table 4 represents the estimated correlation coefficients for FII flows with other plausible variables considered as determinants of it. FIII and FIIO are highly correlated to NIFTY, MC, TO, WPIIND, IIPIND and PPIUSA. The coefficients of correlation are comparatively low for FIIN and NIFTY, MC, TO, WPIIND, IIPIND, TBUSA, PPIUSA and ER.

Table 5
General Model Estimation for Determinants of FIII

Variable	*Coefficient*	*Std. Error*	*t–Statistic*	*Prob.*
C	46.27068	12.53656	3.690858	0.0003
LNNIFTY(–1)	1.888987	0.763016	2.475683	0.0145
LNPE(–1)	–2.34173	0.455559	–5.14034	0.000
LNMC(–1)	0.912593	0.399599	2.283771	0.0239
LNTO(–1)	0.209816	0.158382	1.324747	0.1874
LNSP500(–1)	–0.89166	0.514691	–1.73241	0.0854
LNTBIND(–1)	0.129711	0.247136	0.524855	0.6005
LNIIPIND(–1)	–1.45383	0.954488	–1.52315	0.130
LNWPIIND(–1)	2.453637	1.684176	1.456876	0.1474
LNER(–1)	–2.89348	0.897757	–3.22301	0.0016
LNTBUSA(–1)	–0.02405	0.061757	–0.38938	0.6976
LNPPIUSA(–1)	–9.48567	3.400559	–2.78944	0.006
D(LNNIFTY(–1))	0.52062	0.871191	0.597596	0.5511
D(LNPE(–1))	1.488255	0.544228	2.734615	0.0071
D(LNMC(–1))	0.233588	0.528314	0.442139	0.6591
D(LNTO(–1))	–0.12741	0.200787	–0.63453	0.5268
D(LNSP500(–1))	0.204897	1.203135	0.170303	0.865
D(LNTBIND(–1))	0.307684	0.48081	0.639928	0.5233
D(LNIIPIND(–1))	0.690917	0.752339	0.918359	0.36
D(LNWPIIND(–1))	0.755611	3.364579	0.224578	0.8226
D(LNER(–1))	4.883623	2.479255	1.969795	0.0508
D(LNTBUSA(–1))	0.043992	0.081156	0.542062	0.5886
D(LNPPIUSA(–1))	6.532892	5.487939	1.190409	0.2359
R–squared	0.882725			
Adjusted *R*–squared	0.864163			
Akaike info criterion	1.165409			
Schwarz criterion	1.603772			

Note: No. of lags has been determined using BIC criterion. The prefix "LN" represents the logarithmic value (if applicable) of the series at level and "D(LN...)" represents the first difference of logarithmic values.

Table 5 shows the estimated General Model for determinants of FIII which is gross purchase by Foreign investors in a particular month. All the level variables represent the determinants of FIII in long run, whereas their first difference represents the short run relationship between dependent and independent variables. All the plausible level determinants along with their first difference are considered as exogenous variables in the estimated model. From the general model, NIFTY, PE, MC, PPIUSA and ER are found significant at level and only differenced PE series at first lag is found significant.

Table 6
Co-integration Testing for FIII and Its Determinants

FIII/NIFTY, PE, MC, TO, SP500, TBIND, IIPIND, WPIIND, ER, TBUSA, PPIUSA			
Test Statistic	*Value*	*Probability*	*Result*
F-statistic	47.55658	0.000	Co-Integration
Chi-square	1046.245	0.000	
Critical Value	*Lower Bound*	*Upper Bound*	
1% level	1.83	2.94	Co-Integration
5% level	2.06	3.24	

After estimating general model for determinants of FIII, next presence of co-integration is confirmed using Wald test and Bounds Test developed by (Pesaran *et al.*, 2001) (see Table 6), which rejects the null hypothesis of no co-integration among independent variables in Table 6. F-statistics and Chi-square statistics are highly significant and the value of F-statistic is also greater than the upper bound of *I(1)*, which proves that the determinants are cointegrated and there exists a vector of independent variables, which jointly affects the inflow of FIIs.

Table 7 shows specific model estimation for FIII. All the variables in the model are highly significant, which determine the inflow of Foreign Institutional Investments. FIII is positively affected by the NIFTY and its Market Capitalisation, whereas negatively affected by the PE, ER, SP500 and PPIUSA in long-run. In short-run it is affected by PE, ER and PPIUSA. The adjusted *R*-square is quite high, nearly at 86 per cent. The result of PE is quite impressive as this variable is never considered as plausible determinant of FIIs in previous studies.

Table 8 shows the estimated General Model for determinants of FIIO, which is gross sell or outflow of FIIs in particular month. As discussed earlier, all the plausible level determinants along with their first difference are considered as exogenous variable in estimated model. The results of general model for FIIO share similarity with that of FIII, as the same variables (NIFTY, PE, MC, PPIUSA and ER at level and differenced PE series) are found significant.

Table 7
Specific Model Estimation for Determinants of FIII

Variable	*Coefficient*	*Std. Error*	*t–Statistic*	*Prob.*
C	33.57527	5.083872	6.60427	0.0000
LNNIFTY(–1)	1.712032	0.537762	3.183626	0.0018
LNPE(–1)	–2.19018	0.309239	–7.08248	0.0000
LNMC(–1)	0.971411	0.287117	3.383331	0.0009
LNSP500(–1)	–0.54797	0.252444	–2.17067	0.0315
LNER(–1)	–1.63705	0.601038	–2.7237	0.0072
LNPPIUSA(–1)	–6.84545	1.407465	–4.86367	0.0000
D(LNPE(–1))	1.774308	0.417988	4.244873	0.0000
D(LNER(–1))	4.712425	1.976918	2.383724	0.0184
D(LNPPIUSA(–1))	8.805173	4.623636	1.904383	0.0587
R–squared	0.874603			
Adjusted R–squared	0.867178			
Akaike info criterion	1.071879			
Schwarz criterion	1.262471			

Note: No. of lags has been determined using BIC criterion. The prefix "LN" represents the logarithmic value (if applicable) of the series at level and "D(LN…)" represents the first difference of logarithmic values.

Table 8
General Model Estimation for Determinants of FIIO

Variable	*Coefficient*	*Std. Error*	*t–Statistic*	*Prob.*
C	40.82685	11.79468	3.461463	0.0007
LNNIFTY(–1)	2.272255	0.717863	3.165306	0.0019
LNPE(–1)	–2.29376	0.4286	–5.35175	0.0000
LNMC(–1)	0.836483	0.375952	2.224975	0.0277
LNTO(–1)	0.059336	0.149009	0.398207	0.6911
LNSP500(–1)	–0.88505	0.484233	–1.82774	0.0697
LNTBIND(–1)	0.18631	0.232511	0.801295	0.4243
LNIIPIND(–1)	–1.18919	0.898004	–1.32426	0.1876
LNWPIIND(–1)	0.571624	1.584511	0.360757	0.7188
LNER(–1)	–2.49098	0.844629	–2.9492	0.0037
LNTBUSA(–1)	–0.0343	0.058102	–0.59041	0.5559
LNPPIUSA(–1)	–7.13263	3.199321	–2.22942	0.0274
D(LNNIFTY(–1))	0.473155	0.819636	0.577274	0.5647
D(LNPE(–1))	1.34895	0.512022	2.634554	0.0094
D(LNMC(–1))	0.282342	0.49705	0.568035	0.5709
D(LNTO(–1))	0.086438	0.188905	0.457575	0.648
D(LNSP500(–1))	0.361316	1.131936	0.319201	0.7501
D(LNTBIND(–1))	0.543608	0.452357	1.201724	0.2315
D(LNIIPIND(–1))	0.235732	0.707817	0.333041	0.7396
D(LNWPIIND(–1))	1.891471	3.165471	0.597532	0.5511

Cont. table 8

Variable	*Coefficient*	*Std. Error*	*t–Statistic*	*Prob.*
D(LNER(–1))	4.360355	2.332538	1.869361	0.0637
D(LNTBUSA(–1))	0.032048	0.076354	0.419726	0.6753
D(LNPPIUSA(–1))	2.511411	5.163175	0.486408	0.6274
R–squared	0.902317			
Adjusted R–squared	0.886856			
Akaike info criterion	1.043408			
Schwarz criterion	1.48177			

Note: No. of lags has been determined using BIC criterion. The prefix "LN" represents the logarithmic value (if applicable) of the series at level and "D(LN…)" represents the first difference of logarithmic values.

Table 9
Co-integration Testing for FIIO and Its Determinants

FIII/NIFTY, PE, MC, TO, SP500, TBIND, IIPIND, WPIIND, ER, TBUSA, PPIUSA			
Test Statistic	*Value*	*Probability*	*Result*
F-statistic	58.36204	0	Co-Integration
Chi-square	1283.965	0	
Critical Value	Lower Bound	Upper Bound	
1% level	1.83	2.94	Co-Integration
5% level	2.06	3.24	

Table 9 shows the Wald test and Bounds test for the presence of co-integration, which rejects the null hypothesis of no co-integration among independent variables. F-statistics and Chi-square statistics are highly significant and the value of F-statistic

Table 10
Specific Model Estimation for Determinants of FIIO

Variable	*Coefficient*	*Std. Error*	*t–Statistic*	*Prob.*
C	32.08178	4.758113	6.742543	0.000
LNNIFTY(–1)	1.777702	0.504272	3.525285	0.0006
LNPE(–1)	–2.01409	0.286433	–7.03164	0.000
LNMC(–1)	0.899759	0.268983	3.345045	0.001
LNSP500(–1)	–0.43058	0.236518	–1.8205	0.0706
LNER(–1)	–2.18459	0.556453	–3.92592	0.0001
LNPPIUSA(–1)	–6.32075	1.312658	–4.81523	0.000
D(LNPE(–1))	1.546572	0.391616	3.949208	0.0001
D(LNER(–1))	4.345266	1.831006	2.373158	0.0189
R–squared	0.895525			
Adjusted R–squared	0.890063			
Akaike info criterion	0.937782			
Schwarz criterion	1.109315			

Note: No. of lags has been determined using BIC criterion. The prefix "LN" represents the logarithmic value (if applicable) of the series at level and "D(LN...)" represents the first difference of logarithmic values.

is also greater than that of the upper bound of *I*(1), which proves that the determinants are cointegrated and share relationship with FIIO in long run.

Similarly, specific model for Determinants of FIIO has been estimated in Table 10. NIFTY and MC positively, while PE, SP500, ER and PPIUSA negatively affect the FIIO in long run, while PE and ER also determines the outflow of FIIs in short run. The value of *R*-square is again very high to 89 per cent.

Table 11 shows the estimated General Model for determinants of FIIN. From the table, it is observed that only NIFTY, Market Capitalization, Wholesale Price Index and Producer Price Index of USA influence the Net flow of FIIs in Indian Capital Market significantly. Change in market Capitalization is the only variable which significantly influences the FIIN in short run.

Table 11
General Model Estimation for Determinants of FIIN

Variable	*Coefficient*	*Std. Error*	*t–Statistic*	*Prob.*
LNNIFTY(–1)	–21821.9	10802.56	–2.02007	0.0453
LNPE(–1)	7587.787	6782.764	1.118687	0.2652
LNMC(–1)	17202.67	6965.099	2.469839	0.0147
LNTO(–1)	–1599.69	2794.261	–0.57249	0.5679
LNSP500(–1)	–658.122	8062.377	–0.08163	0.9351
LNTBIND(–1)	–6660.32	3180.468	–2.09413	0.0381
LNIIPIND(–1)	–9357.14	16614.39	–0.5632	0.5742
LNWPIIND(–1)	51549.69	25777.62	1.999785	0.0475
LNER(–1)	5404.294	15262.61	0.354087	0.7238
LNTBUSA(–1)	963.0024	1025.543	0.939017	0.3493
LNPPIUSA(–1)	–60209.5	23740.42	–2.53616	0.0123
D(LNNIFTY(–1))	2892.566	14914.57	0.193942	0.8465
D(LNPE(–1))	9992.129	9136.893	1.093603	0.276
D(LNMC(–1))	–17652.7	9327.88	–1.89247	0.0605
D(LNTO(–1))	–1088.39	3545.381	–0.30699	0.7593
D(LNSP500(–1))	–13843.5	21199.7	–0.653	0.5148
D(LNTBIND(–1))	–4849.38	8372.683	–0.57919	0.5634
D(LNIIPIND(–1))	14756.66	13260.81	1.112802	0.2677
D(LNWPIIND(–1))	–97890.4	59247.84	–1.65222	0.1007
D(LNER(–1))	54994.86	43739.26	1.257334	0.2107
D(LNTBUSA(–1))	273.0212	1413.272	0.193184	0.8471
D(LNPPIUSA(–1))	23091.65	92586.57	0.249406	0.8034
R-squared			0.24105	
Adjusted *R*-squared			0.127208	
Akaike info criterion			20.71809	
Schwarz criterion			21.13739	

Note: No. of lags has been determined using BIC criterion. The prefix "LN" represents the logarithmic value (if applicable) of the series at level and "D(LN…)" represents the first difference of logarithmic values.

F-statistics and Chi-square statistics are highly significant and the value of F-statistic is also greater than that of the upper bound of *I(1)*, which proves that the determinants share the co-integrated vector that explains the dependent variable FIIN (Refer Table 12).

Table 12
Co-integration Testing for FIIN and Its Determinants

FIII/NIFTY, PE, MC, TO, SP500, TBIND, IIPIND, WPIIND, ER, TBUSA, PPIUSA			
Test Statistic	*Value*	*Probability*	*Result*
F-statistic	3.924019	0.000	Co-Integration
Chi-square	86.32842	0.000	
Critical Value	Lower Bound	Upper Bound	
1% level	1.6	2.72	Co-Integration
5% level	1.82	2.99	

Table 13 provides Estimation of Specific Models for determinants of FIIN. In a long run NIFTY, PE, MC, TBIND, WPIIND, TBUSA and PPIUSA affect the net flow of FIIs, as in specific model estimation all these variables are significant. Out of these significant variables PE, MC, WPIIND and TBUSA positively, while NIFTY, TBIND and PPIUSA negatively affect FIIN. In a short run MC and WPIIND negatively, while ER positively affects FIIN.

Table 13
Specific Model Estimation for Determinants of FIIN

Variable	*Coefficient*	*Std. Error*	*t–Statistic*	*Prob.*
LNNIFTY(–1)	–26174.1	7868.31	–3.32652	0.0011
LNPE(–1)	10500.7	4668.889	2.249078	0.0259
LNMC(–1)	15675.33	5644.98	2.776862	0.0062
LNTBIND(–1)	–6903.07	2437.255	–2.83231	0.0052
LNWPIIND(–1)	60648.85	16527.29	3.669618	0.0003
LNTBUSA(–1)	1292.491	693.3586	1.864101	0.0642
LNPPIUSA(–1)	–70825.7	17116.8	–4.13779	0.0001
D(LNMC(–1))	–16249.5	8621.096	–1.88485	0.0614
D(LNWPIIND(–1))	–119833	53259.36	–2.25	0.0259
D(LNER(–1))	60701.52	34200.17	1.77489	0.0779
R-squared			0.217783	
Adjusted *R*-squared			0.171467	
Akaike info criterion			20.60014	
Schwarz criterion			20.79073	

Note: No. of lags has been determined using BIC criterion. The prefix "LN" represents the logarithmic value (if applicable) of the series at level and "D(LN…)" represents the first difference of logarithmic values.

Overall Nifty return shows the positive significant influence on FII inflow and outflow which ascertains the fact that FIIs are involved in feedback trading. These results are consistent with the results of Chakrabarti (2001), Gordon and Gupta (2003), Kumar (2009) and Bulsara *et al.* (2015). FII outflow is also showing positive relationship with Nifty returns in long run, the reason for such relationship might reveal the fact that they are not at informational disadvantage. They indulge in selling activities when the prices are higher. PE ratio of Nifty shares negative significant relationship with FIII and FIIO, proving that FIIs buy when the market is under-priced and withdraw when the market is overpriced. It is interesting to note that the Net flow is showing positive influence of PE ratio, reason being FIIs get attracted when the PE ratio increases and the future prospect of the market seems strong. In any case (be it FIII, FIIO or FIIN) market capitalization has positive impact on flow of FIIs.

Return of home country market share negative significant relationships with FIIs which suggests when the return in home country goes up, they withdraw their fund from Indian capital market. Similarly Exchange rate also influences FIIs negatively which states when the value of rupee vis-à-vis dollar decreases the flow of FII increases inward or outward. This may increase the volatility of stock market returnin long run. Foreign inflation represented by US Producer Price Index (PPI) has significant and negative influence whereas domestic inflation represented by Wholesale PriceIndex (WPI) has positive and significant influence on FIIs in India. The plausible explanation for such phenomena could be the future anticipation of FIIs for the interest rate hike to curb the inflationary situation in India which would earn them more return comparatively. In a short run price earnings ratio of Nifty, Exchange rate of rupee vis-à-vis dollar, market capitalization and inflation in home as well as host country can be considered as determinants of FIIs as they have significant impact on flow of FIIs. It is easily evident from the analysis that only two variables *viz.* Index for Industrial Production as proxy for economic growth and Torn over on NSE do not show any significant influence on flow of FIIs. Further, the explanatory power of estimated models given by adjusted R-square for inflow and outflow of FIIs is quite high (nearly 0.8746 for FIII and 0.8955 for FIIO). Thus the estimated models explain the determinants of FIIs quite efficiently.

CONCLUSION

This paper explores the determinants of Foreign Institutional Investments in India using the Autoregressive Distributed Lag (ARDL) bound testing approach. The analysis uses monthly time series data from January, 2000 to August, 2013. By and large, the analysis reveals that the Monthly returns on S and PCNX Nifty andMarket

Capitalization of NSE have positive significant influence on FII inflow and outflow in long run. This provides the evidence of positive and negative feedback trading practices adopted by FIIs in India in line with the findings of Bulsara *et al.* (2015). Price earnings ratio of Nifty, Monthly returns on SandP 500 Index, Exchange rate of Indian Rupee vis-à-vis US$ and Producer Price Index of US representing foreign (home) country inflation (PPI) have negative impact on FIIs in long run. In short run Price earnings ratio of Nifty and Exchange rates have positive impact on FIIs whereas only Producer Price Index of US has to some extent positive influence on Inflow of FIIs.

Therefore, when FIIs are modelled by including, both financial and macroeconomic variables together, they explain the determinants of FIIs quite efficiently. The econometric results indicate that a combination of both domestic or country specific factors and foreign or global factors are important in determining Foreign Portfolio Flows in India.

Note

1. For most of the economy related factors, daily or fortnightly data are not available. Hence monthly data are considered for carrying out analysis.

References

Bansal, A., and Pasricha, J. (2009). Foreign institutional investor's impact on stock prices in India. *Journal of Academic Research in Economics (JARE)* (2), 181-189.

Bulsara, H.P.B., Dhingra, V.S., and Gandhi, S.B. (2015). Dynamic Interactions between Foreign Institutional Investment Flows and Stock Market Returns – The Case of India. *Contemporary Economics*, 9(3), 271-298.

Calvo, G.A. (1998). Capital Flows and capital Market Crises : The Simple Economics of Sudden Stops. *Journal of Applied Economics,* 1(1), 35-54.

Chakrabarti, R. (2001). FII flows to India: nature and causes. *Money and Finance,* 2(7), 61-81.

Dickey, D.A., and Fuller, W.A. (1979). Distribution of the estimators for autoregressive time series with a unit root.*Journal of the American statistical association,* 74(366a), 427-431.

Dickey, D.A., and Fuller, W.A. (1981). Likelihood ratio statistics for autoregressive time series with a unit root. *Econometrica: Journal of the Econometric Society*,49(4), 1057-1072.

Dornbusch, R., Goldfajn, I., Valdés, R.O., Edwards, S., and Bruno, M. (1995). Currency crises and collapses. *Brookings Papers on Economic Activity*, 219-293.

Engle, R.F., and Granger, C.W. (1987). Co-integration and error correction: representation, estimation, and testing. *Econometrica: journal of the Econometric Society*, 55(2), 251-276.

Gandhi, S., Bulsara, H., and Dhingra, V.S. (2013). Changing Trend of Capital Flows: The Case of India. *International Journal of Management Studies,* 20(2), 71-104.

Gordon, J.P., and Gupta, P. (2003). Portfolio Flows into India: Do Domestic Fundamentals Matter? : International Monetary Fund.

Grabel, I. (1995). Assessing the impact of financial liberalisation on stock market volatility in selected developing countries.*The Journal of Development Studies,* 31(6), 903-917.

Griffin, J.M., Nardari, F., and Stulz, R.M. (2004). Are daily cross-border equity flows pushed or pulled? *Review of Economics and Statistics,* 86(3), 641-657.

Grinblatt, M., and Keloharju, M. (2000). The investment behavior and performance of various investor types: a study of Finland's unique data set. *Journal of Financial Economics,* 55(1), 43-67.

Harris, R.I., and Sollis, R. (2003). *Applied time series modelling and forecasting*: J. Wiley.

Inoue, T. (2009). The Causal Relationships in Mean and Variance between Stock Returns and Foreign Institutional Investment in India. *Margin: The Journal of Applied Economic Research,* 3(4), 319-337.

Jain, M., Meena, P.L., andMathur, T. (2012). Impact of Foreign Institutional Investment on Stock Market with Special Reference to BSE, A Study of Last One Decade.*Asian Journal of research in banking and finance,* 2(4), 31-47.

Kaur, M., and Dhillon, S.S. (2010). Determinants of foreign institutional investors' investment in India. *Eurasian Journal of Business and Economics*,3(6), 57-70.

Kulshreshtha, H., (2014). Impact of Foreign Institutional Investors (FIIs) on Indian Capital Market.*International Journal of Research in Business Management (Impact: IJRBM),* 2(3), 35-52.

Kumar, S. (2009). Investigating causal relationship between stock return with respect to exchange rate and FII: evidence from India. *MPRA Paper*, 15793.

Mohan, R. (2008). Capital flows to India. *BIS Papers,* 44, 235-263.

Mohanasundaram, T., Karthikeyan, P., andKrishnamoorthy, V. (2015). Macroeconomic Dynamics of Foreign Institutional Investments In India. *International Journal of Management Research and Reviews*, 5(1), 39.

Mukherjee, P., Bose, S., and Coondoo, D. (2002). Foreign institutional investment in the Indian equity market: An analysis of daily flows during January 1999-May 2002. *Money and Finance*, 2(9-10).

Pesaran, M.H., and Pesaran, B. (1997). *Working with Microfit* 4.0*: interactive econometric analysis; [Windows version]*: Oxford University Press.

Pesaran, M.H., Shin, Y., and Smith, R.J. (1996). Testing for the'Existence of a Long-run Relationship': Faculty of Economics, University of Cambridge.

Pesaran, M.H., Shin, Y., and Smith, R.J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of applied econometrics,* 16(3), 289-326.

Phillips, P.C., and Perron, P. (1988). Testing for a unit root in time series regression. *Biometrika,* 75(2), 335-346.

Prasad, E.S., and Rajan, R. (2008). A pragmatic approach to capital account liberalization: National Bureau of Economic Research.

Prasad, E.S., Rajan, R.G., and Subramanian, A. (2007). Foreign capital and economic growth: National Bureau of Economic Research.

Prasanna, P.K. (2008). Foreign institutional investors: Investment preferences in India. *JOAAG*, 3(2), 40-51.

Prasuna, C.A. (2000). Determinants of foreign institutional investment in India. *Finance India*, 14(2), 411-422.

Radelet, S., and Sachs, J. (1998). The onset of the East Asian financial crisis: National bureau of economic research.

Rai, K., and Bhanumurthy, N. (2004). Determinants of foreign institutional investment in India: The role of return, risk, and inflation. *The Developing Economies,* 42(4), 479-493.

Rajan, R.G., and Subramanian, A. (2005). What undermines aid's impact on growth? : National Bureau of Economic Research.

*Srinivasan P. and Kalaivani M. (*2013*),"Determinants of Foreign Institutional Investment in India: An Empirical Analysis", Journal of Academic Research in Economics*, 5(3), 361-375.

Srinivasan, P., and Kalaivani, M. (2010). Foreign Institutional Investment and Stock Market Returns in India: Before and During Global Financial Crisis. *IUP Journal of Behavioral Finance,* 7(1), 59-75.

Stiglitz, J.E. (1999). Lessons from East Asia. *Journal of Policy Modeling,* 21(3), 311-330.

Tayde, M., and Rao, S.N. (2011). Do Foreign Institutional Investors (FIIs) Exhibit Herding and Positive Feedback Trading in Indian Stock Markets? *International Finance Review,* 12, 169-185.