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FACTORS AFFECTING FIIS IN INDIA

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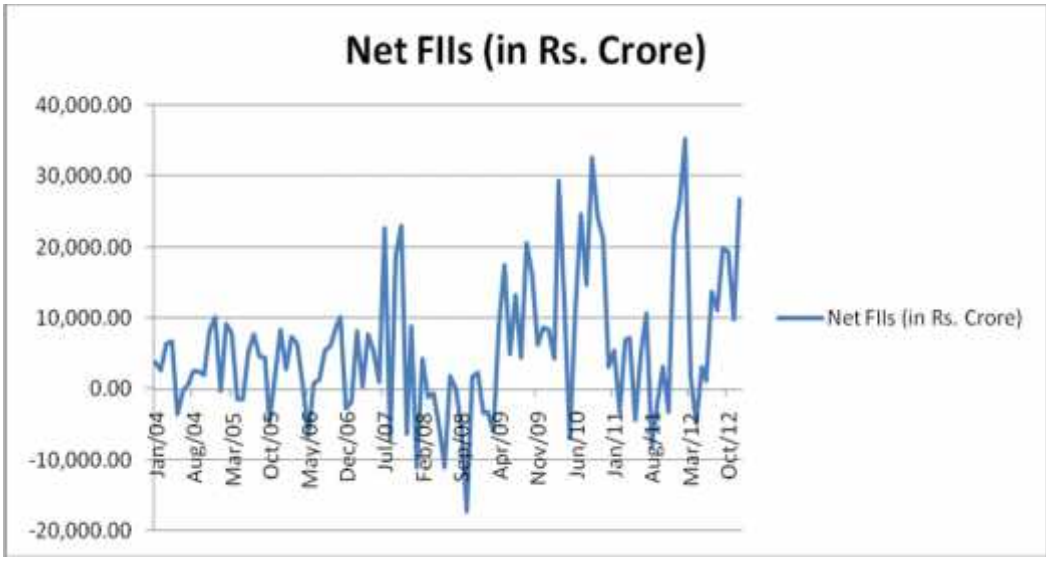
1. Introduction

The present study tries to examine the validity of Mundell-Fleming model in Indian context. Mundell-Fleming model suggests that if there is perfect capital mobility in world capital market then there will be movement of capital flow in that country which has relatively higher interest rate as compare to rest of the world. Capital flow has mainly four components i.e. Foreign Direct Investment, Foreign Institutional Investment, External Commercial Borrowings and Deposits of NRI. ***But FDI and FII equity flows together accounted for around three fourth of the total net capital inflows***. There are also huge fluctuations in Net FII in India as shown in the figure below for period 2004: Q1 to 2012:Q12



Source: SEBI

Therefore it will be interesting to know the factors determining the volatility in Net FIIs in India. Therefore, in this paper we examined the effect of interest rate differential and other variables on Net FII in India using monthly data from period January 2004-05 to December 2012.

2. Literature Review

Gordon and Gupta (2003) applied multivariate regression model using monthly data for the period 1993 to 2001 and analyzed the equity flows into India. Results of the study showed that an increase in external interest rate adversely affected FII flows in India. Also Emerging stocks are found to be positively correlated with FII's flows and FII flows are reduced due to credit rating downgrade and depreciation in exchange rate.

Chakrabarti (2001) founded bidirectional causality between FII inflows on BSE national index using monthly data between 1993 to 1999 with the help of pair wise Granger Causality test. His finding reflected that the FII flows were more an effect than a cause of market returns in India by using daily data at various lags for the period January 1, 1999 to December 31, 1999. Moreover the return on the BSE index explained over three-tenth of the total variation in FII flows through regression of FII flows on monthly rupee return and on the BSE national index over the period 1993:05 to 1999:12.

Singh (2009) also used Granger Causality analysis and found out that bidirectional causal relationship between the portfolio flows and the stock prices have a simultaneous interaction. The long run relationship between the two variables was suggested by the Johansen's approach to the co-integration analysis.

3. Data and Methodology

Monthly data on following variables is taken (January 2004 to December 2012) for present study:

Variable Name	Nature of Data	Steps to get monthly data	Data Source
Net FII inflow (Rs. Crore)	Monthly	-	SEBI
Interest rate on 91 days Indian government T- bills	Weekly	Average of 4 weeks to get data for one month (108 such months)	RBI
Interest rate on 3 months US T-bills	Daily	Average of all days in a month is taken to get data for month (108 such months)	US Treasury Department
BSE index	Monthly	-	Bombay Stock Exchange
Volatility in BSE	Daily	Daily data on BSE stock is taken and then calculate Standard deviation to get volatility in BSE (108 such months)	Bombay Stock Exchange
Inflation in India (CPI)	Monthly	-	www.inflation.eu
Inflation is U.S	Monthly	-	www.inflation.eu
GDP growth rate of OECD	Quarterly	Compound Annual growth rate (CAGR) is used to get monthly data	OECD
Index of Industrial Production (India)	Monthly	-	RBI
Fiscal Deficit	Monthly & Quarterly	1. Monthly data on Gross Fiscal Deficit is taken and Quarterly data on Gross Domestic product at current market price is taken. 2. To get Monthly data on Gross Domestic product at current market price CAGR is used. 3. Fiscal Deficit = Gross Fiscal Deficit/GDP at current market prices	RBI and MOSPI

Methodology

Theoretical framework of the Model: Let there is perfect capital mobility in world capital market. Let i_d is interest rate in domestic country on government Bond & i_f is the interest rate in foreign (US in our case). The equality condition for capital flow is:

$$\mathbf{i_f = i_d - E(e_t - e_{t-1}/e_t) \quad ----1}$$

Where, E $(e_t - e_{t-1}/e_t)$ is the expected rate of change in exchange rate. The RHS equation implies that by investing in domestic market the foreign investors make two investments i.e. one in stock market and other in Indian currency. It suggests that if exchange rate increases (Rupee/dollar) i.e. depreciation of Indian Rupee, then relative interest rate on Indian Treasury bill will decrease and it will lead to decrease in FII.

We can write equation 1 as

$$\mathbf{i_d = i_f + E(e_t - e_{t-1}/e_t) \text{ or}}$$
$$\mathbf{(i_d - i_f) - E\ (e_t - e_{t-1}/e_t) = 0 \quad ----2}$$

So, it means if $(i_d - i_f) - E\ (e_t - e_{t-1}/e_t) > 0$, then there should be inflow of FII in Indian Market.

Now, to capture the net effect of interest rate differential on Net FII inflow we need to control for the other variables that might affect the Net FII inflow.

Multivariate Time Series Model is as follows:

$$\mathbf{(Net\ FII)_t = b_0 + b_1*(i_{dt} - i_{ft}) + b_2*E(e_t - e_{t-1}/e_t) + b_3*BSE_t + b_4*IIP_t + b_5*(Dividend\ yield\ in\ Sensex)_t + b_6*(Inflation)_t + b_7*(Volatility\ in\ BSE)_t + b_8*Crisisdummy + b_9*(rog\_oecd)_t + e_t}$$

Results

Results of Unit root/Stationary Test using STATA

Variable Name	Dicky-Fuller Test	
	Level	1st Difference
Net FII inflow	-6.924***	-15.473***
Interest Rate Differential	-0.627	-9.841***
Rate of change in Exchange Rate	-7.262***	-12.853***
BSE Index	-1.430	-10.152***
IIP Index	-2.251	-17.643***
Volatility in Stock Market	-6.957***	-19.277***
Dividend Yield in Sensex	-1.824	-7.502***
Inflation in India (CPI)	-1.558	-9.210***
GDP growth rate of OECD countries	0.0278**	-13.489***
Fiscal Deficit as % of GDP	-5.931***	-11.671***

Note**:** ***, ** and * denote statistical significance at 1%, 5% and 10% levels, respectively.

Granger Causality Test for Causal relationship between Net FII and other Variables

Equation	Excluded	chi2	Df	Prob > chi2
dnetfiisinrscrore	dinterestratedifferential	7.0384	1	0.008 ***
dnetfiisinrscrore	dbseindex	1.718	1	0.190
dnetfiisinrscrore	diipIndex	.98201	1	0.322
dnetfiisinrscrore	d_dividendyield	1.5884	1	0.208
dnetfiisinrscrore	dvotalityinbse	.07092	1	0.790
dnetfiisinrscrore	dchangeinexrate	2.2618	1	0.133
dnetfiisinrscrore	dinflationcpi	4.3174	1	0.038 **
dnetfiisinrscrore	doecd_growth	4.4411	1	0.035 **
dnetfiisinrscrore	dfd	03903	1	0.843
dnetfiisinrscrore	ALL	27.642	9	0.001***

Monthly analysis of FII net flow reveals that after taking appropriate lags, Granger causality test showed that causal relationship from interest rate differential to net FII inflows existed for the sample period January 2004- December 2012. It also shows causal relationship from inflation in India to Net FII and from Growth rate of GDP of OECD countries to Net FII.

However, Granger causality in VAR framework shows only short run relationship among variables and since Net FIIs are majorly influenced by Equity prices rather than interest rate. So, it is necessary to understand the long run relationship of Net FII with interest rate differential and with other key variables. To get long run relationship of Net FII with interest rate differential and other variables, ARCH and GARCH model has been used. *From the above granger causality test it has been found that coefficient fiscal deficit is highly insignificant in explaining Net FII and the possible reason is that despite of slow economic growth with high fiscal deficit in India there is huge inflow of Capital because of high GDP growth of OECD countries.*

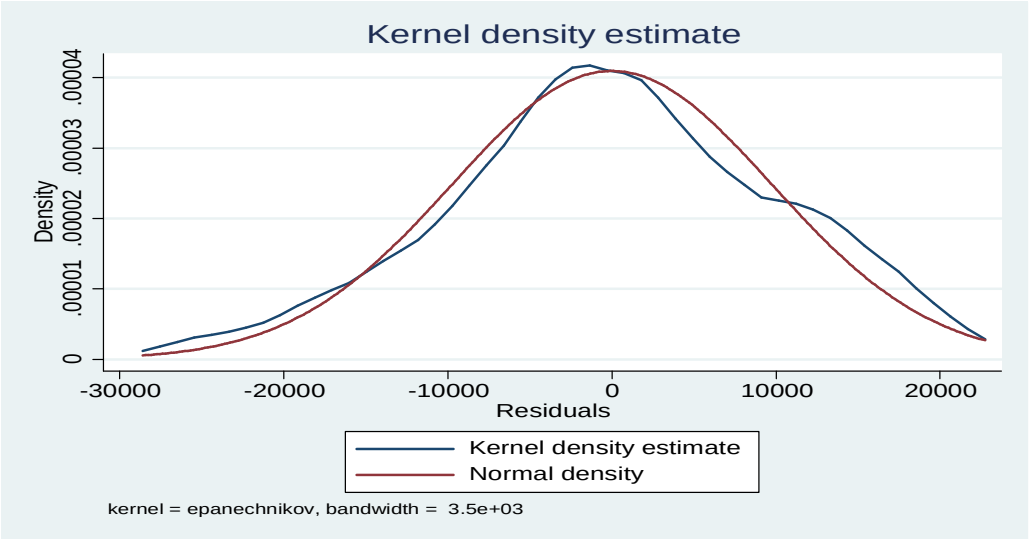
Time Series Analysis

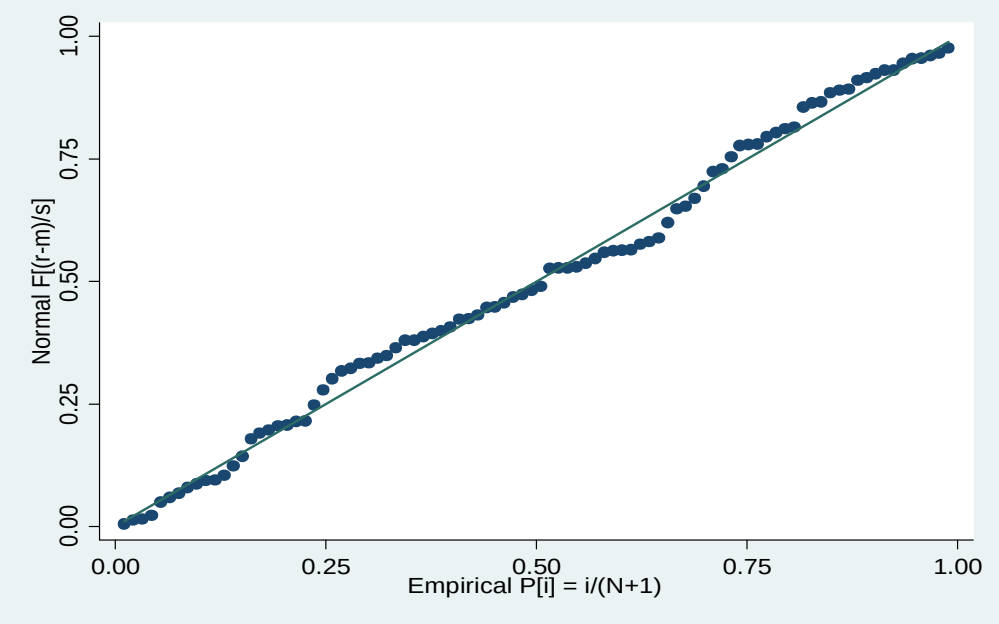
$$(\text{Net FII})_t = b_0 + b_1*(i_{dt} - i_{ft}) + b_2*E(e_t - e_{t-1}/e_t) + b_3*BSE_t + b_4*IIP_t + b_5*(\text{Dividend yield in Sensex})_t + b_6*(\text{Inflation})_t + b_7*(\text{Volatility in BSE})_t + b_8*\text{Crisisdummy} + b_9*(\text{rog\_oecd})_t + e_t$$

Step 1: Check for Stationarity using dicky-fuller test (STATA command: dfuller varname)
Step 2: Make all the variables stationary after taking first difference.
Regress the above model taking first differences of dependent and explanatory variables.
Step 3: Check for Hetroscedasticity using estat hettest command (If hetroscedasticity is there then transform model using GLS method) .But there is constant variance in the above model.
Step 4: Check for Autocorrelation using Durbin-Watson test (STATA command dwstat). Here, we found that there was problem of autocorrelation. So, we use prais-winshten C-O procedure to get BLUE results.

Step 5: After getting regression results using prais-winshten C-O procedure. We checked for the stationary of the residual term and found that error term is stationary.

Step 6: After looking at stationary of residual term, we checked it for normality of error term as normality of residual term is necessary condition. Since t-statistic is based on normality. So, we get following result usingKernel density test for normality (Command Kdensity residual, normal & pnorm residual):





Regression Results

Source	SS	df	MS	Number of obs=91
				F(8, 82)=8.8
Model	5.02E+09	8	6.28E+08	Prob > F=0
Residual	5.85E+09	82	71355686	R-squared=0.4619
				Adj R-squared==.4094
Total	1.09E+10	90	1.21E+08	Root MSE=8447.2

Dnetfiisinrscrore	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]	
dinterestratedifferential	-1427.35	1420.009	-1.01	0.318	-4252.72	1398.027
dbseindex	2.262595	1.015947	2.23	0.029	0.241178	4.284011
diipgeneralindexbaseyear0405	228.0978	121.6069	1.88	0.064	-13.8618	470.0575
d_dividendyieldinsensex	15066.73	9459.965	1.59	0.115	-3755.63	33889.1
Crisisdummy	103.091	1238.993	0.08	0.934	-2362.12	2568.299
Dinflationcpi	-1289.26	824.72	-1.56	0.122	-2930.2	351.6736
Dvotalityinbse	-2.29345	3.72124	-0.62	0.539	-9.69755	5.110654
Dchangeinexrate	-222043	37682.65	-5.89	0	-297020	-147067
doecd_growth	1167.111	2386.739	0.49	0.626	-3581.75	5915.973
_cons	-47.6798	705.7048	-0.07	0.946	-1451.81	1356.451
Rho	-0.58656					

5. Conclusions

Time series analysis suggests that interest rate differential doesn't have any significant effect on Net FIIs in long run as far as Indian market is concern. This result is in contrast with the Granger causality test in which there was found unidirectional causality from interest rate differential to FII inflows. The possible explanation for this short run relationship is that in the short-run, when interest rate differential i.e. increase in interest rate on 91 days T-Bills, bond prices decline as there is negative relationship between price of a bond and its interest rate and due to this bonds are preferred over other financial assets to investors. Because of this some investors may convert their portfolio from equities to bonds. This argument eventually leads to decline in the value of equities which intern shows a surge in the buying of equities by FII'S.

The above result is in the line with RBI working paper of Verma, R and A Prakash (2011): "Sensitivity of Capital Flows to interest rate differentials: An Empirical Assessment for India".

BSE index affects Net FII positively and significantly. This result is obvious. As BSE index is a major pull factor for foreign FIIs into domestic stock market.

IIP Index also affects Net FII positively and significantly. Since, If IIP index increases in India it will attract foreign investors as increase in IIP index is strong indicator of market growth.

Increase in expected growth of Exchange rate leads to decrease in Net FIIs. i.e. expected growth of Exchange rate affects negatively and significantly the Net FIIs. It means when there is increase in exchange rate then domestic currency i.e. rupee value depreciates and as a result profitability of foreign investors decreases.

In long run there doesn't any impact of growth of GDP of OECD countries on Net FIIs and as well as financial crisis doesn't have any impact on Net FII in India.

The sign of Inflation in India and dividend yield in BSE are in the line as expected or as theory suggests and inflation affects Net FII negatively with significantly with 12% level of significance. While, Dividend Yield affects Net FII positively and significantly at 11.5% level of significance.

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