Foreign Portfolio Flows and their Impact on Financial Markets in India

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Introduction:

Over the last decade, there has been an exponential increase in international capital movements. With the ushering of economic liberalisation and globalisation, there has been gradual dismantling of capital controls in India. This gradualist approach followed a particular sequencing pattern: the reforms related to resident and non-resident corporate sectors were followed by reforms in banks/non-bank financial institutions, and then partially for individual residents (Kohli, 2003). India's share in capital flows in Emerging Market Economies (EMEs) has increased significantly over the past few years and these flows have also been affecting the domestic liquidity conditions.

The last decade (1998-2008) witnessed both significant shifts in the operating procedures in the markets as also evolution of more sophisticated instruments and participants. Consequent to a series of reform measures initiated by the regulators (the RBI and SEBI) to develop the markets there has been considerable improvement in market microstructure in Indian financial markets in the recent years.

It is well established in the literature that financial markets suffer from contagion – both foreign and domestic. While the former refers to a shock to a country's asset market caused by changes in asset prices in another country, the latter refers to turbulence in one market spilling over to other market segments of the same country. The movements across financial markets are often synchronous in nature, particularly in EMEs. The aim of the present paper is to analyse the effect of capital inflows on various segments of the Indian financial market over the last decade. Specifically, the paper has two objectives: First, it attempts to model the short run and long run relationship between the capital

inflows and different segments of the financial market. Second, after evaluating the role of market microstructure, it attempts to assess the impact of various shocks on the financial markets. It empirically evaluates the possibility of adjustment and equilibrating mechanism across financial markets which would shed some light on the efficiency gains and institutional development over the last decade.

Section II
International Literature Survey

A large body of research concentrated on the effects of international financial liberalization on economic growth (Ross 2001). Most of these studies indicate the liberalizing restrictions on international portfolio flows accelerate economic growth primarily by boosting productivity growth. Regarding the determinants of such flows, Taylor and Sarno's (1997) study indicated that both domestic and global factors explain bond and equity flows to developing countries while global factors are much more important than domestic factors in explaining the dynamics of bond flows. Brennan and Henry (1997) developed a model of international equity portfolio investment flows based on differences in informational endowments and observed that investors tend to purchase foreign assets in periods when the return on foreign assets is high and to sell when the return is low. Mody and Panini (2005) considered 60 developing countries over 1979 to 1999 and found evidence in support of stronger policy environments strengthening the link between inflows and investment.

With the outbreak of economic crisis in south east Asian countries, issues relating to the dangers of cross boarder capital flows and issues relating to contagion increasing occupied the centre-space of academic research in this area. Froot and Thornton (2002) study found evidence of contagion, which suggest that shifts in demand move predictably from one country to another. They cannot easily be explained by informed trading alone or by wealth effects. consequently many policy makers and economists became skeptical not only

about the benefits of free flow of capital, but also see uncontrolled capital flows as risky and destabilizing. Krugman (1998) underlined the problem of moral hazard in financial intermediaries and noted that it can lead to over-investment at the aggregate level, overpricing of assets and vulnerability of such a regime to financial crises.

Nevertheless, the debate about the benefits and costs of capital flows continued in the literature. Many economists continued to firmly believe that free capital flows will lead to a more efficient allocation of resources and greater economic growth. Empirical studies (*e.g.* Kim and Singal, (2000)) found no evidence of an increase in inflation or an appreciation of exchange rates. Their results also suggest that stock returns reflect a lower cost of capital after liberalization. They found no evidence of increase in stock market, inflation and exchange rate volatility after liberalization of capital flows. (Alfaro *et. al*. 2003) found results indicating that well-developed financial markets allow significant gains from FDI, while FDI alone plays an ambiguous role in contributing to development.

While the debate on the effect of capital flows on EMEs' financial markets is till ongoing, recently a branch of literature has taken up issues relating to diversification and portfolio flows in Middle East and North Africa. Lagoarde and Lucey (2007) highlight outstanding diversification benefits in the MENA region, both in dollar and local currencies. The results by Khan (2007) also indicated, increase in investors interest in African markets, mainly because of structural reforms, higher growth rates, healthier external balances resulting from the strength in commodity prices and the receipt of debt relief.

Section III

The Indian Approach to Capital Flows: An Overview

Until the 1980s, India's development strategy was focused on self-reliance and import-substitution. There was a general disinclination towards foreign investment or private commercial flows. Since the initiation of the reform process in the early 1990s, however, India's policy stance has changed substantially. India has encouraged all major forms of capital flows, though with caution from the viewpoint of macroeconomic stability. The broad approach to reform in the external sector after the Gulf crisis was delineated in the Report of the High Level Committee on Balance of Payments (Chairman: C. Rangarajan). The Report, *inter alia,* recommended a compositional shift in capital flows away from debt to non-debt creating flows; strict regulation of external commercial borrowings, especially short-term debt; discouraging volatile elements of flows from non-resident Indians; gradual liberalisation of outflows; and disintermediation of Government in the flow of external assistance. In the 1990s, foreign investment has accounted for a major part of capital inflows to the country. The broad approach towards foreign direct investment has been through a dual route, *i.e.*, automatic and discretionary, with the ambit of the automatic route progressively enlarged to many sectors, coupled with higher sectoral caps stipulated for such investments. Portfolio investments are restricted to select players, *viz*., Foreign Institutional Investors (FIIs). In respect of NRI deposits, some control over inflows is exercised through specification of interest rate ceilings. In the past, variable reserve requirements were stipulated to modulate such flows. At present, however, reserve requirements are uniform across all types of deposit liabilities (see, for instance, RBI, 2004b).

As regards external assistance, both bilateral and multilateral flows are administered by the Government of India and the significance of official flows has declined over the years. Thus, in managing the external account, adequate care is taken to ensure a sustainable level of current account deficit, limited reliance on external debt, especially short-term external debt. Non-debt creating capital

inflows in the form of FDI and portfolio investment through FIIs, on the other hand, are encouraged. A key aspect of the external sector management has, therefore, been careful control over external debt since 1990s (Reddy, 1998). India has adopted a cautious policy stance with regard to short-term flows, especially in respect of the debt-creating flows. It is worth noting that many countries had earlier viewed appropriate maturity structure of cross-border flows as a part of micro decision-making process. This, however, is increasingly being recognised as a macro factor with crucial implication for financial stability (Reddy, 1999, 2000).

In respect of capital outflows, the approach has been to facilitate direct overseas investment through joint ventures and wholly owned subsidiaries and provision of financial support to promote exports, especially project exports from India. Resident corporates and registered partnership firms have been allowed to invest up to 100 per cent of their net worth in overseas joint ventures or wholly owned subsidiaries, without any separate monetary ceiling. Exporters and exchange earners have also been given permission to maintain foreign currency accounts and use them for permitted purposes which facilitate their overseas business promotion and growth. Thus, over time, both inflows and outflows under capital account have been gradually liberalised.

With this evolving policy framework, there are few empirical studies that have concentrated on the cause and effect of capital flows in India. In this context Gordon and Gupta (2003) study indicated that portfolio flows in India are determined by both external and domestic factors. Among external factors, LIBOR and emerging market stock returns are important, while the primary domestic determinants are the lagged stock return and changes in credit ratings. Gupta (2005) study on remittances to India analyzed the determinants of remittances to India and found that their growth over time can be explained by the increase in migration and total earnings of the migrants and it appear to be countercyclical in nature. Dua and Sen (2005) study found that the real effective

exchange rate is cointegrated with the level of capital flows, volatility of the flows, high-powered money, current account surplus and government expenditure. Trivedi and Nair (2000) results indicated that the returns and volatility in the Indian markets emerge as the principal determinants of FII investment inflows. They also indicate that FIIs have not been looking at the Indian markets as a destination to diversify their portfolio risk. D'souza (2008) noted that the difference between the capital flows in India as compared to other EMEs are mainly on account of (a) they are associated with a deteriorating current account position rather than improving one and (b) the extent of financial outflows have only partially offset the capital inflows. It also notes that capital flow in India have been associated with a buoyant stock market and a rise in investment and interest rates in the economy.

Empirical analysis of the capital flows and its cause and / or effect on macroeconomic / financial variables with the evolving economic conditions have occupied the focal point of academic research. This is especially important for an emerging economy like India, given its favourable demographic characteristics (Mohan, 2004), growth potential, scope of diversification and economic policies. In the recent past India has witnessed two way movement in the capital flows. While most of the previous empirical studies have consider the effect of macroeconomic variables or the effect of stock market on the capital flows, this study focuses mainly on the capital flows and its impact on the financial markets. Literature has documented the integration of financial markets in Indian with the evolving liberalization measures (Sinha & Pradhan, 2007). In this juncture, this paper considers the percolation of capital flows across the financial markets. It particular, this paper would attempt to analyze the short and long term impact of capital flows on stock market, forex market, money market and the bond market in India.

Section IV

Data and Methodology

The major data-source for this study is Handbook of Statistics on the Indian Economy (HBS). This study uses the monthly time series data on USD/INR exchange (both average and end of the month) rate for forex market and yields of benchmark 10 years Gsec to capture the Government securities market. While for the equity market, monthly average data for BSE Sensex has been used, the monthly average call / notice rate is included for the money market. The monthly data on foreign capital inflows and its components (*i.e.* inflows due to FDI, FII and ECB) are gathered from the SEBI web-site. The table-1 below reports the descriptive statistics for these variables

Table 1: Descriptive Statistics

	Net FII	BSE Sensex	Dollar to Rs. Exchange Rate (average)	Call Rate	SGL Yield (10 years)
Mean	1983.94	5907.94	45.10	6.78	8.52
Median	1088.87	4647.34	45.25	6.66	7.68
Maximum	19515.29	15253.42	49.00	14.07	12.33
Minimum	-8930.32	2866.55	39.66	4.29	5.11
Std. Dev.	3280.08	3427.70	2.18	1.96	2.33
Skewness	1.46	1.36	-0.13	0.99	0.33
Kurtosis	9.87	3.62	2.40	4.22	1.72
Jarque-Bera (prob.)	260.09 (0.00)	36.80 (0.00)	2.04 (0.36)	24.45 (0.00)	9.58 (0.01)

It may be noted that the FII flows in Indian markets consist of investments in equities as well as in debt instruments. Even though the FII investments in equities have consistently remained much higher than the same in debt instruments, the FII investments in debt have almost doubled during 2007-08 as compared with 2006-07. Unlike some of the earlier studies, considering the growing investment of FIIs in debt instruments, we have considered both the flows in the present paper.

Section V
Methodology and Empirical Findings

The basic aim of the present paper is to study the interrelationship between the portfolio flows into Indian markets and their effect on the financial markets. For this purpose, monthly data for the period April 1998 to March 2008 have been used on variables like FII flows into Indian markets, exchange rates, stock indices, SGL 10 year yield and call rates in the present exercise.

Following the standard time series methodology, this study would first check for stationarity of the above mentioned variables. This involves determining the order of integration of each of the variables under consideration by employing one of the battery of unit root tests. In this paper we employ the widely accepted Phillips-Perron (1988) t-test.

Table-2 Phillips-Peron Adjusted t-Statistics

	Phillips-Perron test statistic			
	Level		**differenced**	
Null Hypothesis	**Adj. t-Stat**	**Prob.***	**Adj. t-Stat**	**Prob.***
CALL has a unit root	-4.02	0.00		
INRUSD has a unit root	-2.13	0.23	-7.50	0.00
NETFII has a unit root	-10.71	0.00		
NIFTY has a unit root	-0.03	0.95	-7.15	0.00
SENSEX has a unit root	-0.23	0.93	-7.36	0.00
SGLYIELD has a unit root	-1.54	0.51	-9.30	0.00

The Phillips-Perron adj t-Stat and their p-values indicate that call rate and net FII flows are stationary at levels. The Sensex, 10 year SGL yield and INRUSD rate are first difference stationary. The correlation coefficient of the above variables are reported in the Table 3 below. For computing the correlation coefficients the non-stationary series were included in the differenced form (to avoid spirous results) while the stationary variables were in the levels.

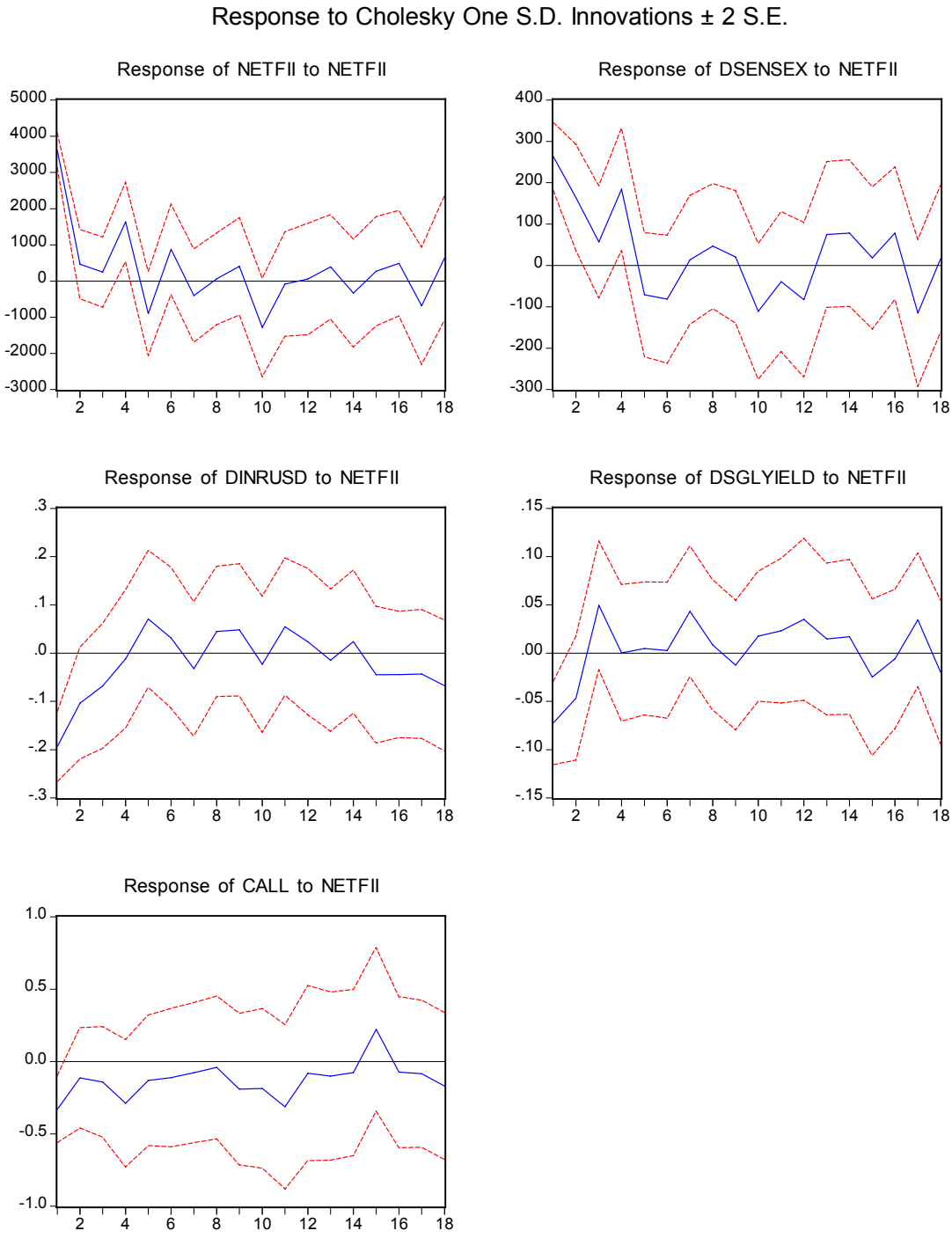
Table 3: Correlation Coefficient

	NETFII	CALL	DSENSEX	DSGLYIELD	DINRUSD
NETFII	1.00	-0.27	0.56	-0.11	-0.48
CALL	-0.27	1.00	-0.21	-0.02	0.12
DSENSEX	0.56	-0.21	1.00	-0.23	-0.38
DSGLYIELD	-0.11	-0.02	-0.23	1.00	0.09
DINRUSD	-0.48	0.12	-0.38	0.09	1.00

Table 3 indicates that NetFII has a high positive coefficient with sensex and negative correlation coefficient with other financial rate variables.

Short Run Adjustments

In order to examine the effect of a change in FII flows on these financial variable over the short run, we employ a basic five variable VAR model comprising of net FII flows (NETFII), exchange rate (INRUSE), Stock indices (SENSEX), call rate and benchmark yield (SGLYIELD). The level stationary variables were used in levels for the VAR, whereas the difference stationary variables were used in difference form. The VAR has been run over the period spanning April 1998 to March 2008. For generating the impulse responses, we used orthogonalised (Choleski) impulse responses to a unit standard deviation shock, Chart 5 reports these impulse responses along with analytical standard error bands (represented by the dotted lines).



A look at the impulse responses, over a one and half-year period, reveals two stylised facts. First, a shock in NETFII has a negative impact on most financial variables – *i.e*. exchange rate (indicating appreciating pressure on INR-USD exchange rate), call and SGL rate (indicating surplus liquidity in the money

market and therefore reduction in the rates). Second, the NETFII shock has a positive impact on the stock market indicating the impact of capital flows on the stock prices. These results are consistent with the theoretical literature on the impact of capital flows in EMEs. This is indicative of the resilience of the financial market in the short run. To ascertain the robustness of the results, we cross-checked the impulse responses through the generalised impulses, as introduced by Pesaran and Shin (1998), which in contrast to Choleski decomposition does not depend on the VAR ordering. The impulse response that arereported in Annex table (A2) confirms the above findings.

Long Term Relation (Cointegration):

In this section we test for the existence of a long-run relationship between NETFII and financial variables within a multivariate framework. The general process for testing the same for a set of non-stationary variables (of same order or integration) is by testing the existence of cointegration vector(s) using Johansen (1988) method. However, the PP test (Table - 4) indicates that all variables under consideration are not of the same statistical property. Therefore, in order to test for the existence of any long-run relation among the variables we used ARDL method and the bounds testing approach to cointegration. The main advantage of ARDL testing lies in the fact that it can be applied irrespective of whether the regresses are I(0) or I(1). The test yields asymptotically efficient long run estimates irrespective of whether the underlying regressors are I(0) or I(1) process. The specification of the ARDL model is as follows:

$$\Phi(L,p)Yt = \sum \beta i\ (L,q)Xit + \delta Wt + \varepsilon \qquad (1)$$

where L is the lag operator and Wt is the vector of deterministic variables and Xit are the set of explanatory variables.

In order to test for cointegration we need to estimate an unrestricted error correction model which is as follows:

$$\Delta Y = \alpha Wt + \sum \beta \Delta Yt\text{- } i + \gamma Yt\text{-}1 + \varepsilon \qquad (2)$$

where βs are short run dynamic coefficients; γ are long run multiplier; and ε is white noise error. Rejecting the null hypothesis γ= *0* indicates that there exists long-run relationship among Yt irrespective of variables' integration properties. The F-statistic is generally used for testing the joint null hyphthesis that the coefficients of these level variables are zero (*i.e.* there exists no long-run relationship between them). However, we have used the critical bounds available in Pesaran, Shin and Smith (1996) for testing the null, as the asymptotic distribution of Wald or F statistics is non-standard. We denote F(Xi), as the F-value associated with the unrestricted error correction model, when ΔXi is used as dependent (LHS) variable in the model. The F-values, so derived is reported in the table-5 below:

Table – 5: ARDL F-Statistics Indicating Long Term Relationship

F(INRUSD)	F(SENSEX)	F(NETFII)	F(YIELD)	F(CALL)
1.94	2.24	1.18	2.20	3.46

As we have already noted under Ho (γ1=γ2=*…=0)* this statistic has a non-standard distribution irrespective of whether the variables are I(0) or I (1). The critical value bounds for this test are computed by Pesaran et al. (1996a), and are reproduced as Tables F and W in Appendix C (Microfit, 1997). Table F gives the critical value bounds for the F-statistic version of the test. The relevant critical value bounds for the present application are given in the middle panel of Table F, and at the 90 per cent level are given by 2.2425 to 3.574 (k=4). Since F(CALL) = 3.46 exceeds the lower bound of the critical value band, we can reject the null of no long-run relationship between, given that some of the variables considered (CALL and NETFII) are I(0). The other F values fall outside the I(0) critical values and therefore indicate no long run relation.

The estimation of the long-run coefficients and the associated error-correction model can now be accomplished using the ARDL methodology. The order of the ARDL model was selected using both the Schwarz Bayesian (SBC) and the

Akaike information (AIC) criteria and the selected model (using SBI as well as AIC criteria) was of ARDL(1,0,0,0,0) specifications. While the ARDL coefficients are reported in the Annex (Table A3) the estimates of the long-run coefficients based on these models are summarized in Table 6 (column 2 and 3) below.

Table- 6: Long Run ARDL Coefficients

Regressor	Coefficient	T-Ratio[Prob]	Coefficient	T-Ratio[Prob]
INRUSD	0.2907	1.9082[.060]	0.2898	1.9058[.060]
SENSEX	0.0002	2.9505[.004]	0.0002	3.0451[.003]
YIELD	0.8060	8.4125[.000]	0.8107	8.7525[.000]
NETFII	-0.0001	-1.8885[.062]	-0.0001	-1.9032[.060]
C	-14.0444	-2.4970[.014]	-14.1583	-2.6093[.010]
T (LAF Cap)			-0.5756	-.62697[.532]
S3 (Mar)			1.4144	2.3649[.020]
S6 (June)			-0.6085	-.98366[.328]
S9 (Sep)			0.0276	.046944[.963]
S12 (Dec)			0.4528	.76875[.444]
R-Squ	0.67		0.69	
D-W Stat	1.99		2.04	

Column 4 and 5 of the Table –6 reports the long term coefficient derived from the augmented ARDL model. The augmented model incorporates five additional dummy variables. The LAF Cap dummy captures months (2007M3 – 2007M7) when the reverse repo window of Liquidity Adjustment facility[2] was caped at Rs.3000 crore and the money market rate plunged considerable. The four end-quarter-dummies are incorporate to capture the seasonal patterns in the Indian money market. The rate and volatility in the money market generally increase during the end-quarter mainly due to advance quarterly tax outflow from the system. The dummy for March was significantly different from zero at five percent level. It may be noted from the above table that the point estimates in both the cases are very similar in magnitude and signs. They indicate that increasing yield (rising cost of capital) and Sensex (booming capital market) put upward pressure in money market rates. The capital flows (Net FII inflow), on the other hand, has an easing impact on the money market rates. This could be due to the fact that

[2] A tool used in monetary policy that allows banks to borrow money through repurchase agreements. Repo (Reverse Repo) indicates injection (absorption) of liquidity by central bank in (from) the banking system.

during the period of large capital inflows, the central bank's forex operations[3], at times, increase the liquidity in the domestic money market and therefore have an easing impact on rates. The sign of INRUSD was found to be positive. This could be because of the fact that the periods characterized by depreciation are generally marked by large capital outflow and therefore relatively tight liquidity conditions (and therefore higher money market rate). All these coefficients were statistically significant at 10 per cent levels.

The error correction coefficient, (Table-7) estimated using the same ARDL model was at 0.661(0.00) statistically highly significant, has the correct (negative) sign, and suggests reasonable speed of convergence to equilibrium[4]. The ECM coefficient for the augmented model was also consistent with the former and indicates the robustness of the mode.

Table-7:ARDL Error Correction Model

Regressor	Coefficient	T-Ratio[Prob]	Coefficient	T-Ratio[Prob]
dINRUSD	0.1921	2.5676[.012]	0.1961	2.6318[.010]
dSENSEX	0.0001	2.8494[.005]	0.0001	2.9907[.003]
dYIELD	0.5327	5.7160[.000]	0.5487	5.8797[.000]
dNETFII	0.0000	-1.9624[.052]	0.0000	-1.9575[.053]
dC	-9.2809	-2.3923[.018]	-9.5820	-2.4866[.014]
dT			-0.3895	-.64023[.523]
dS3			0.9572	2.4026[.018]
dS6			-0.4118	-.98356[.328]
dS9			0.0187	.046938[.963]
dS12			0.3064	.77025[.443]
ecm(-1)	**-0.66082**	**-7.8173[.000]**	**-0.67677**	**-7.8603[.000]**
R-Squ	0.37		0.42	
D-W Stat	1.99		2.04	

[3] The exchange rate policy in recent years in India has been guided by the broad principles of careful monitoring and management of exchange rates with flexibility, without a fixed target or a pre-announced target or a band, coupled with the ability to intervene, if and when necessary. The overall approach to the management of India's foreign exchange reserves takes into account the changing composition of the balance of payments and endeavours to reflect the 'liquidity risks' associated with different types of flows and other requirements. **(**First Quarter Review of Annual Monetary Policy for the Year 2008-09)

[4] The larger the error correction coefficient the faster is the economy's return to its equilibrium, once shocked.

The above error correction model can also be used in forecasting the change in money market rates due to changes in capital flows and in other financial markets variables. To test the robustness of the model *in-sample-forecast* for 2008M4 to 2008M7 was done using both the models (simple as well as Augmented ARDL models) which are referred in Table-8 below:

Table-8: Forecast Errors

	Model I		Model II	
	1998M4-2008M3	**2008M4-2008M7**	**1998M4-2008M3**	**2008M4-2008M7**
Mean	0.000	-0.442	0.000	-0.254
MeanAbsolute	0.678	0.784	0.677	0.694
MeanSumSquares	1.350	0.661	1.252	0.636
RootMeanSumSquares	1.162	0.813	1.119	0.797

The root mean squares of forecast errors of for the estimated period compared favourably with that of the in sample period. The RMSE of the Augmented ARDL model was lower, but in line with the former, which supports finding of the earlier models. The actual and estimated values of call rates are plotted in the Annex.

Section VI

Concluding Observations

The literature so far is not unanimous about the movements in the financial market as a result of capital flows. This paper considers an emerging economy *viz*. India, for shading light on this ongoing debate.

This paper finds that in the short run a shock in net FII flows has a positive impact on equity (BSE Sensex) market and negative impact on money market (Call) rate, benchmark yield and INRUSD exchange rate (indicating rupee appreciation). The magnitude of these responses to a shock in net FII flows dampens over time.

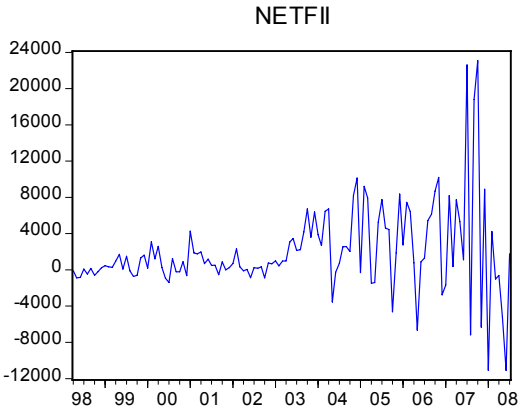
The bound test (of ARDL model) indicates that there exist a long term relation between capital flows and financial variables. The error correction term has a negative coefficient and was found to be statistically highly significant indicating reasonable speed of convergence to the equlibrium. The long run

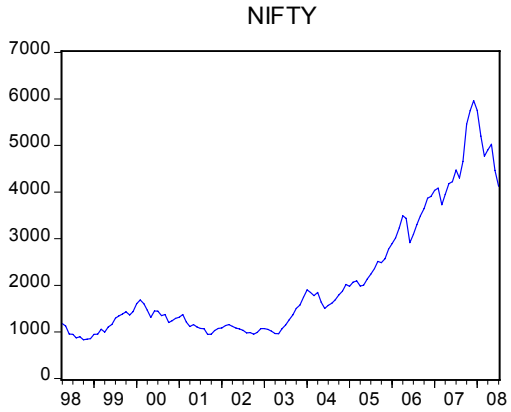
coefficients of the ARDL model for yield, exchange rate (increase indicate rupee depreciation) and Sensex had a positive effect on Call rate, while the net FII inflow has a negative effect on the same.

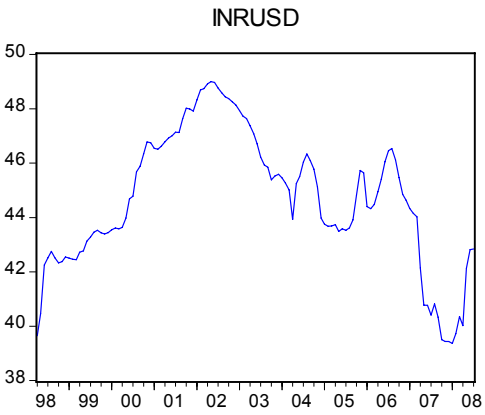
The capital inflows and returns on senex generally have a positive correlation which has found epmirical support for India for the period under consideration. One of the major reasons for surplus liquidity conditions in Indian money market in the recent years was due to large capital inflows (2004 to 2008:03). The Central Bank's forex operation in the face of large capital inflows had its implication on the domestic money supply and interbank liquidity, which in turn impacted the rates in the money market. In an attempt to reduce rate volatility (and excess liquidity) in the money market the central bank sterilises excess liquidity (through OMO or MSS) operations, which influenced the rate in the G-sec market. While this interrelationship of capital flows and the domestic market has been discussed at length in the open economy and emerging market literature, the sign and magnitued of the long term coefficient of ARDL model empirically captures the same for India over the last decade.

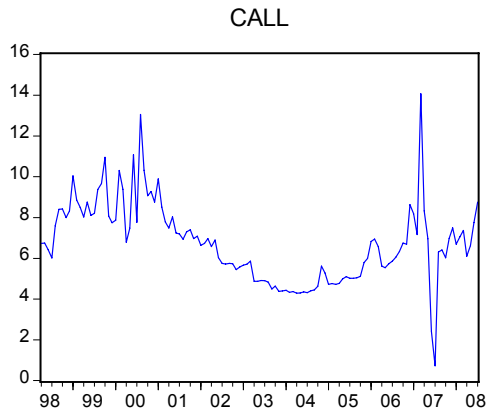
Annex: Graphs

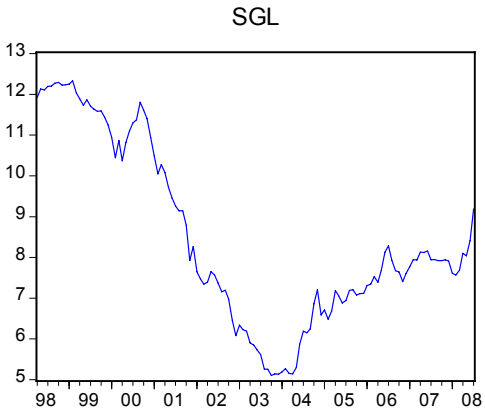
A-1: Variables at Levels











A-2: Generalised Impulse Response Functions

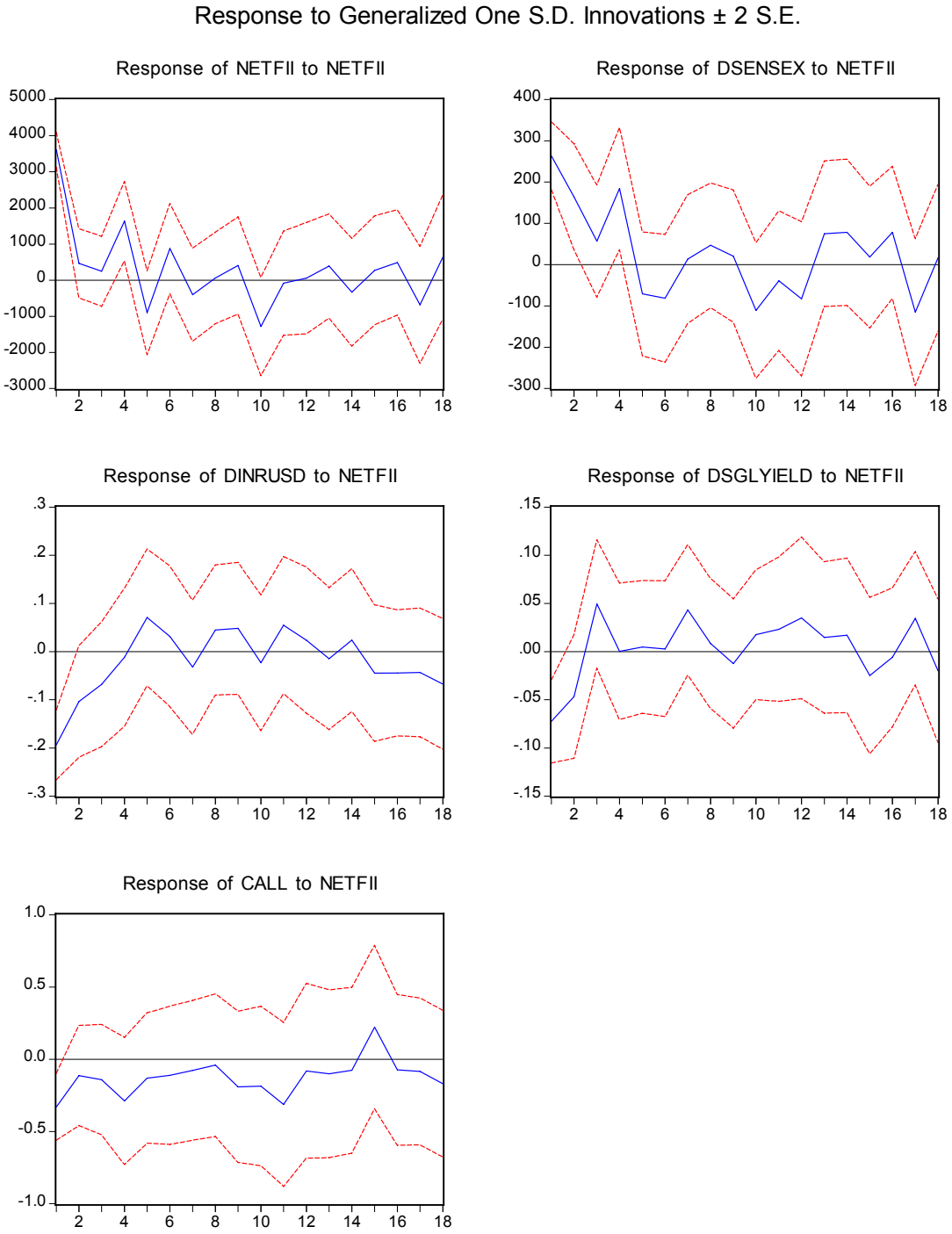
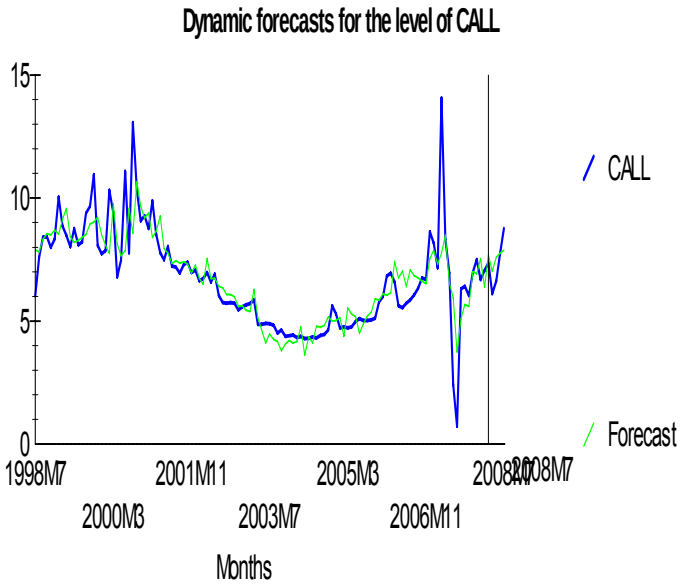


Table A3 ARDL Estimate Results

Regressor	Coefficient	T-Ratio[Prob]	Coefficient	T-Ratio[Prob]
CALL(-1)	0.3392	4.0123[.000]	0.3232	3.7541[.000]
INRUSD	0.1921	2.5676[.012]	0.1961	2.6318[.010]
SENSEX	0.0001	2.8494[.005]	0.0001	2.9907[.003]
YIELD	0.5327	5.7160[.000]	0.5487	5.8797[.000]
NETFII	0.0000	-1.9624[.052]	0.0000	-1.9575[.053]
C	-9.2809	-2.3923[.018]	-9.582	-2.4866[.014]
T			-0.3895	-.64023[.523]
S3			0.9572	2.4026[.018]
S6			-0.4118	-.98356[.328]
S9			0.0187	.046938[.963]
S12			0.3064	.77025[.443]
R-Squ				
D-W Stat				



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