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06. March 2009

Macroeconomic Implications of Capital Inflows in India

Mohd. Izhar Ahmad[1] and Tariq Masood[2]

The study attempts to analyse the behaviour of some macroeconomic variables in response to total capital inflows in India using quarterly data for the period 1994Q1-2007Q4. Time trend of all variables except nominal effective exchange rate-both export and trade based and current account balance shows instability over the period of study. Current account balance is the only variable which is stationary in level form all other variables are stationary in first difference form. Cointegration test confirms the long run equilibrium relation between total capital inflows (TCI) and real effective exchange rate-both trade based and export based and between TCI and nominal effective exchange rate-export based. Granger causality test confirms the bidirectional causality between real effective exchange rate-export based and TCI and between foreign exchange reserve & TCI and unidirectional causality from TCI to real effective exchange rate-trade based.

Field of Research: International Capital Inflows, Time Series Econometrics

1. Introduction

Since 1991 India has undertaken various reform measures to liberalize the economy. These measures include removal of industrial licensing system, reduction in trade barriers and liberalization of capital flows. Over the last several years restrictions on various components of capital account have been relaxed. Due to the various policy measures undertaken by Indian Govt. to liberalize capital flows not only amount of capital inflows increases tremendously but also the composition of capital flows changed significantly. Net capital flows as percentage of GDP increases from 2.2% in 1990-91 to around 9% in 2007-08. The composition of capital flows has undergone a complete change from official debt flows to non debt flows. The share of private capital flows viz. FDI, FII increases while the share of official flows decreases. Fig.1. shows the time series plot of total capital inflows and its components using yearly data for the period 1994-2006. Trends behavior of foreign direct investment does not show much fluctuation while all other component shows variability over the period.

Various Latin American and Asian countries have opened their capital account in the past. Different countries have experienced different consequences in response to large capital inflows. Due to large capital inflows and flexible exchange rate various Latin American countries have experienced large appreciation of domestic currency and consequent deficit in the current account. Other possible effects of capital

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inflows are monetary expansion in the economy and consequent rise in inflation, rise in bank lending and effects upon savings and investment.

Figure 1: Total Capital Inflows and its Various Components
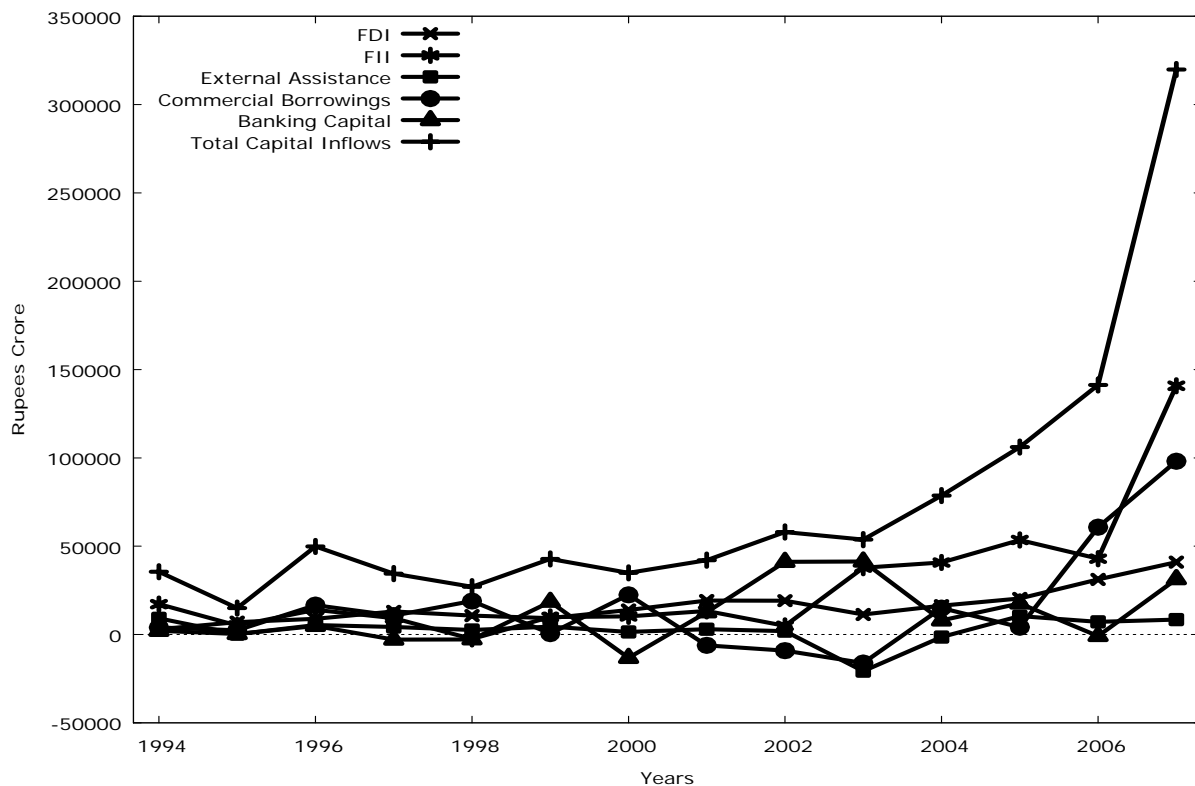
Source: Handbook of Statistics on Indian Economy, RBI

Theories exploring the consequenses of capital inflows are too complex and it is extremely difficult to formulate econometric model that reflect these complexities. The paper is not an attempt to formulate econometric model of simultaneous determination of above variables but analyses the impact of capital inflows on individual variables. The paper consist of six sections, Second section shed some light on previous studies on this particular issue, the third section describes the data source and variables included in the model, forth section analyses trend behaviour of some macroeconomic variables in response to capital inflows with the help of time series plot, fifth section with the help of econometric tecqniques empirically analyses impact of capital inflows on some of the macroeconomic variables in india and sixth section concludes the findings of the study and suggest some policy implications.

2. Literature Review

Calvo et al (1996) while analyzing the impact of capital inflows on a number of Asian and Latin American countries concluded that several Asian countries have experienced capital inflows similar to those in Latin America without associated sizable appreciation of the real exchange rate.

Kohli (2001) examined the trend of capital inflows in India and impact of these flows on some key macroeconomic variables. The study shows that the real exchange rate

appreciates in response to capital inflows. The paper also highlights the pressure of capital inflows upon domestic money supply.

Chakraborty (2001) examined the effects of private foreign capital on some major macroeconomic variables in India using quarterly data for the period 1993-99. The analyses of trends in private foreign capital inflows and some other variables indicate instability. Net inflows of private foreign capital, foreign currency assets, wholesale price index, money supply, real and nominal effective exchange rate and exports follows an I(1) process, current account balance is the only variable that follows I(0) process. Cointegration test shows the presence of long run relationship between a few pair of variables. The Granger causality test shows the unidirectional from private foreign capital to nominal effective exchange rates- both trade based and export based.

Indrani Chakraborty (2003) using VAR model for the period 1993Q2 to 2001Q4 concluded that unlike East Asian and Latin American countries, the real exchange rate depreciates with respect to one standard deviation innovation to capital inflows. The paper argues that monetary policy was effective in avoiding any serious distortion in the real exchange rate.

Pami Dua and Partha Sen (2006) while analyzing the relationship between the real exchange rate, level of capital flows, volatility of the flows, fiscal and monetary policy indicators and current account surplus for the period 1993Q2 to 2004Q1 concluded that variables are cointegrated and each Granger causes the real exchange rate. The generalized variance decomposition shows that determinants of the real exchange rate in descending order of importance include net capital inflows and volatility (jointly), government expenditure, current account surplus and the money supply.

3. Data Source and Variables Included

The Study attempts to analyse the impact of capital inflows on some macroeconomic variables in India using quarterly data for the period 1994Q1 to 2007Q2.Macroeconomic Variables included in the study are Total Capital Inflows (TCI), Real Effective Exchange Rate export based (REERX) , Real Effective Exchange Rate trade based (REERT), Nominal Effective Exchange Rate export based (NEERX), Nominal Effective Exchange Rate trade based (NEERT) , Whole sale Price index (WPI), Money Supply (M0), Foreign Exchange Reserve (FOREX) and Current Account Balance (CAB). Two measures of real effective and nominal effective exchange rate based on export base and trade base using 36 countries weight have been taken. Total capital inflows (TCI) is the aggregate of foreign direct investment (FDI), foreign institutional investment (FII), external assistance (EA), banking capital (BC) and commercial borrowing (CB). All the variables are compiled from various publication of viz. Handbook of Statistics on Indian Economy and RBI Bulletin. Correlations between variables included in the study and summary statistics are shown in Tables 1 and 2 respectively.

Table 1: Correlation Matrix

Variables	TCI	REERE	NEERE	REERT	NEERT	WPI	M0	FOREX	CAB
TCI	1	.271	.138	.380	-.041	.669	.810	.796	-.254
REERX	.271	1	.725	.887	.665	-.074	.076	.115	-.164
NEERX	.138	.725	1	.599	.933	-.370	-.171	-.146	-.187
REERT	.380	.887	.599	1	.586	.238	.332	.359	-.103
NEERT	-.041	.665	.933	.586	1	-.497	-.338	-.336	-.093
WPI	.669	-.074	-.370	.238	-.497	1	.960	.945	-.137
M0	.810	.076	-.171	.332	-.338	.960	1	.988	-.221
FOREX	.796	.115	-.146	.359	-.336	.945	.988	1	-.218
CAB	-.254	-.164	-.187	-.103	-.093	-.137	-.221	-.218	1

Table 2: Summary Statistics

Variables	Range	Minimum	Maximum	Mean	Std. Dev.	Variance
FDI	18089	-3374	14715	4017.34	3360.128	1.129E7
FII	60161	-2301	57860	7100.66	10990.970	1.208E8
EA	17601	-12138	5463	650.82	2754.345	7586417.93
CBs	47578	-18756	28822	3970.68	9131.27	8.338E7
BC	40923	-14004	26919	2824.50	7428.84	5.519E7
TCI	102430	-1400	101030	18564.00	21342.13	4.555E8
REERX	12.74	92.67	105.41	99.19	3.37	11.391
NEERX	15.49	85.64	101.13	90.64	3.54	12.568
REERT	15.29	90.74	106.04	99.49	3.41	11.660
NEERT	17.02	84.16	101.18	90.80	3.75	14.103
WPI	116	100	216	158.17	31.55	995.942
M0	655718.66	134552.66	790271.33	338472.25	168133.67	2.827E10
FOREX	1016870	53412	1070282	318374.67	274282.22	7.523E10
CAB	13658	-6301	7357	-802.30	2922.90	8543378.21

4. Trend Behaviour of Some Macroeconomic Variables in Response to Total Capital Inflows

Under flexible exchange rate with no intervention by the central bank capital inflows generate no change in reserves and cause exchange rate to appreciate. Exchange rate policy in India is managed floating rather than pure floating. Central bank plays active role in minimising volatility in foreign exchange market. Fig.2 shows the behaviour of the real and nominal exchange rate over the period 1994Q1- 2007Q4. Time series plot of nominal exchange rate (both export based & trade based) shows negative trend over the period of study.Time series plot of real effective exchange

rate (both export & trade based) shows some upward trend specially after the year 1999. Behaviour of NEER shows the active interventionist role played by the RBI to reduce the volatility in foreign exchange market.Gap between NEER & REER increases over the time which is due to the price differential in domestic economy and World economy.The pairwise correlation between TCI and NEER is very low and insignificant, but there is a positive significant correlation between TCI and REER. The year 2007 witnessed huge inflows of foreign capital mainly due to FIIs and also high appreciation of both real and nominal effective exchange rate.
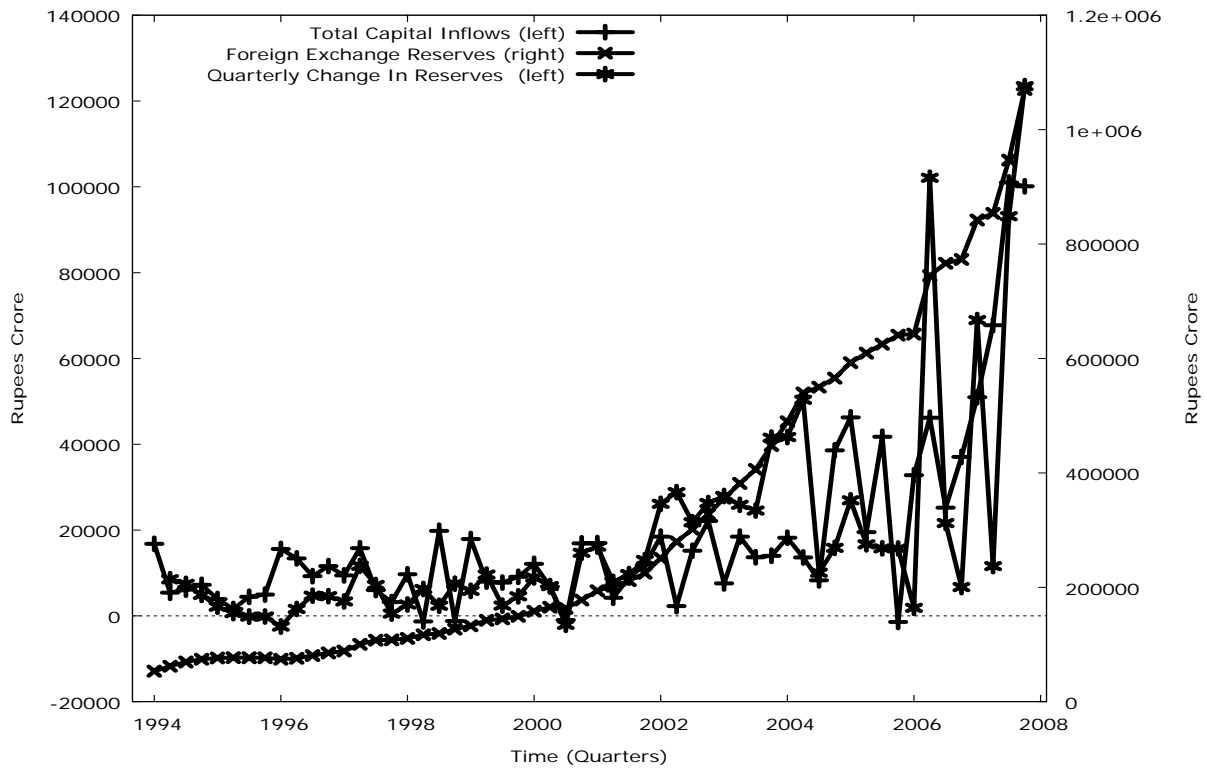
Figure 2: Total Capital Inflows vs. Exchange Rates
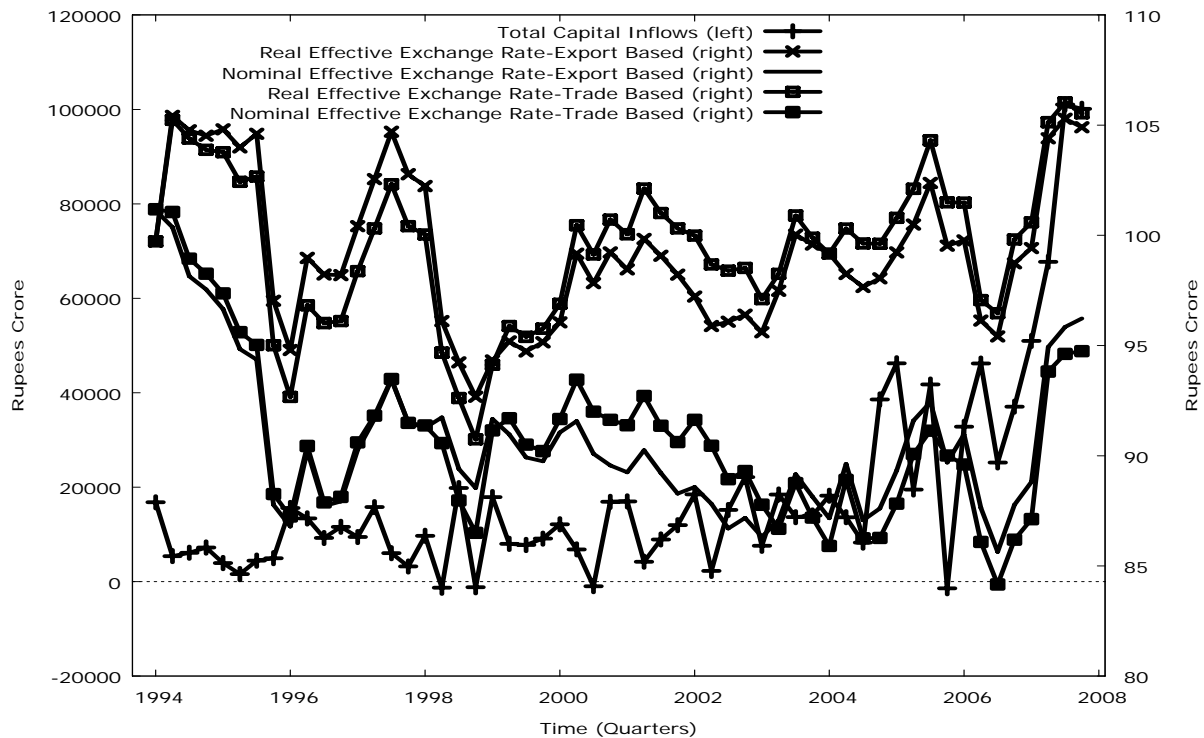
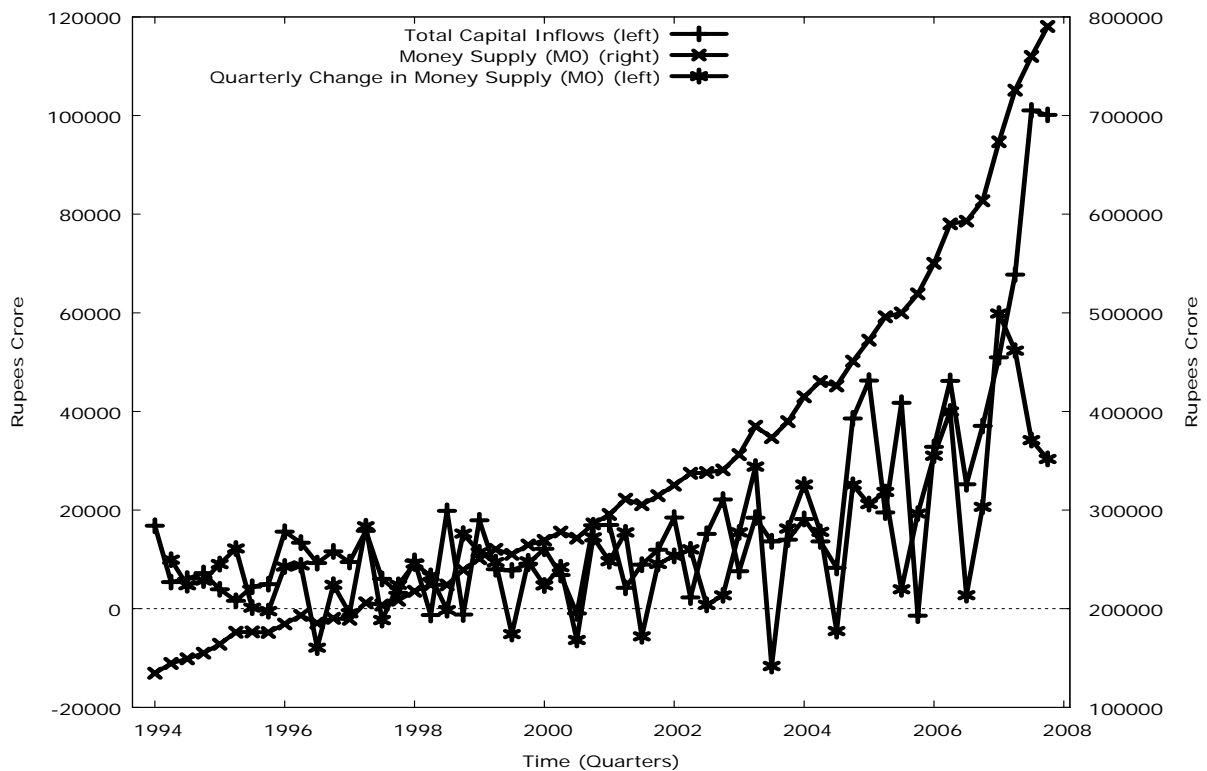*Source*: Handbook of Statistics on Indian Economy, RBI

Intervention by the central bank in foreign exchange market results in changes in foreign exchange reserves so it will be fruitfull now to analyse the behaviour of foreign exchange reserves in response to total capital inflows. Fig.3 shows foreign exchange reserves increases tremendously over the period. In level form there is a high correlation(0.796) between total capital inflows and foreign exchange reserves (table.1). Due to the trending behaviour of the foreign exchange reserves it is difficult to analyse its behaviour in response to total capital inflows. Fig.3 also shows the behaviour of reserves in first difference form which is simply quarterly change in reserves. Quarterly change in reserves is the variable which is more closely related to the total capital inflows. Periods of high capital inflows are associated with large increase in reserves and periods of low capital inflows are associated with the relatively lower increse or decrease in reserves. Close association between capital inflows and foreign exchange reserves also suggest the active role played by the central bank in foreign exchange market.

Figure 3: Total Capital Inflows vs. Foreign Exchange Reserves

Source: Handbook of Statistics on Indian Economy, RBI

**Figure 4: Total Capital Inflows vs. Money Supply**

Source: Handbook of Statistics on Indian Economy, RBI

There are two types of intervention by the central bank in foreign exchange market. In first type, Central bank purchases foreign exchange against domestic currency to prevents appreciation of currency. Foreign exchange reserve being one component of reserve money, such intervention leads to the growth of high-powered money and consequently increases the money supply in the economy. The second type of central bank intervention is known as "sterilized intervention". In this process the central bank buys foreign exchange in exchange of government securities. It helps to curb the growth of money supply in the economy. Time series plot of money supply shows the explosive behavior. Money supply increases tremendously over the period of the study. To trace the behavior of the money supply in response to capital inflows we have also plotted quarterly change in money supply.

To analyse the behaviour of price level we plotted the quarterly inflation over the time period of 1995Q1 to 2007Q4. The behaviour of the variable under consideration does not show much divergence though there are some episodes of high inflation. Simple time series plot of inflation and capital inflows does not suggest much about the underlying relationship between two variables. Due to the price stabilization policies of the Government price remains under control during the period of the study. High capital inflows are not always associated with high inflation specialy during the year 2007 despite huge surge of capital inflows price level decelarates. The relationship between inflation and capital inflows is complex and one can not conclude much with simple time series plot.

Figure 5: Total Capital Inflows vs. Inflation
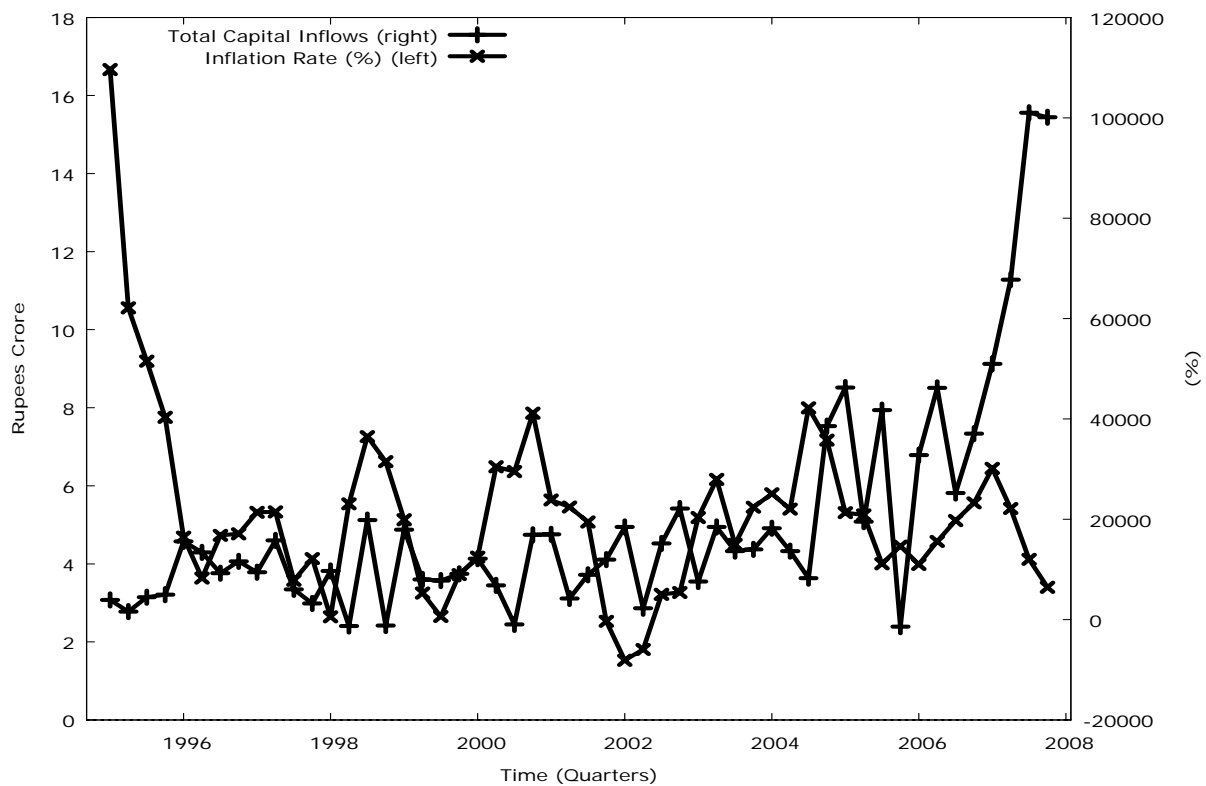
Source: Handbook of Statistics on Indian Economy, RBI

In the last we have analysed behaviour of current account balance (fig.6). In literature 'Dutch Disease Dilemma' suggests the deterioration of current account in

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response to large capital inflows in the long run. Time series plot of current account balance does not show any trend over the period of the study. Correlation coefficient (-0.25) between total capital inflows and current account balance shows some inverse relationship between the two varibles(Table.1) but the value of correlation coefficient is not significant. Thus the notion of Ducth Disease Dilemma has not been observed in the context of India.

Figure 6: Total Capital Inflows vs. Current Account Balance
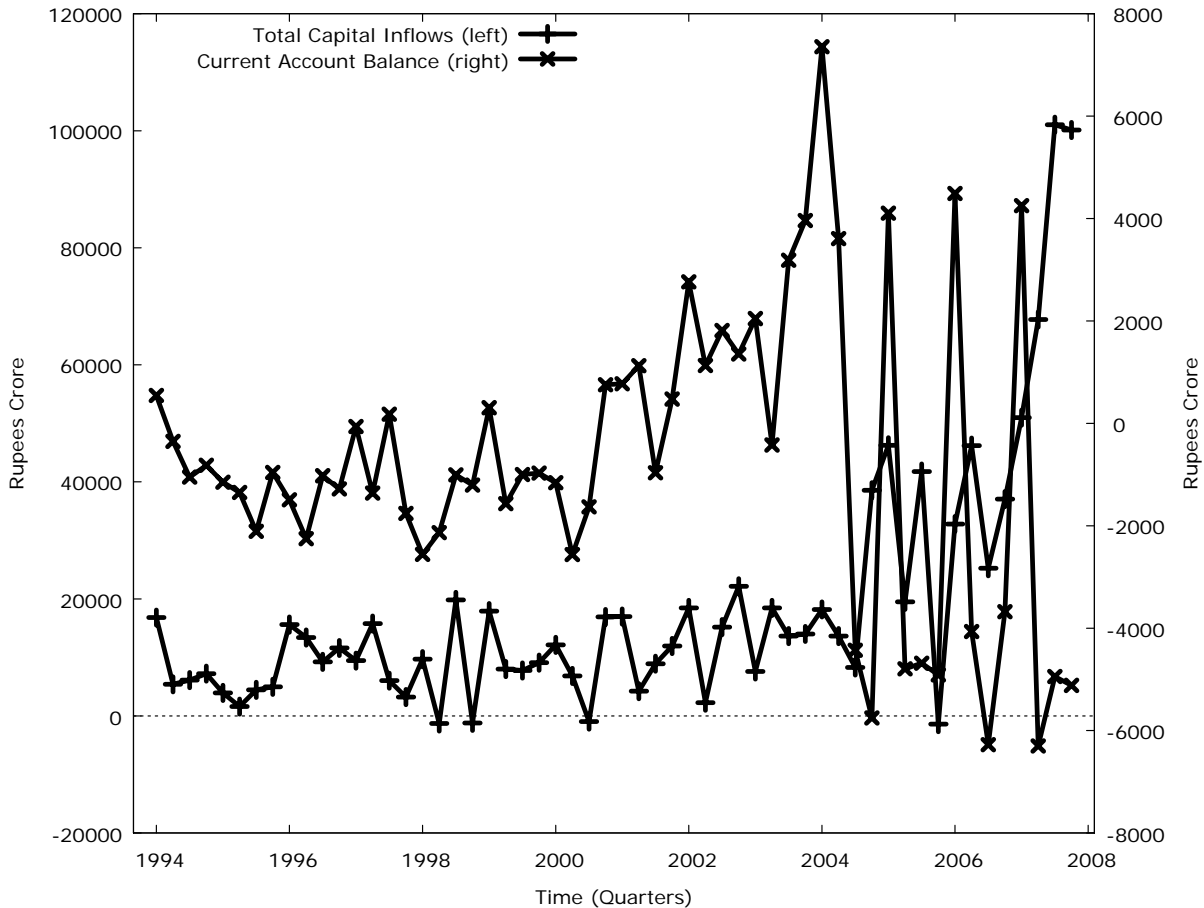
Source: Handbook of Statistics on Indian Economy, RBI

5. Econometric Analysis and Findings

In this section we have applied some econometric test to empirically analyze the behavior of some macroeconomic variables in response to total capital inflows. First, tests of stationarity are applied to each variable. Three tests of stationarity viz. DF test, ADF test and Schmidt and Phillips test have been applied. Since there is no universal test for unit root we have concluded with the help of three tests. DF test is based on the following regression:

$$\Delta Y_t = C + \alpha\, t + \rho Y_{t-1} + \varepsilon_t \qquad (1)$$

Where C is constant and t is trend.

Null Hypothesis H_O: $\rho = 1$ or Y_t is non stationary

H_1: $\rho < 1$ or Y_t is stationary

The null hypothesis is rejected if ρ is negative and statistically significant.

The ADF test is based on the following regression:

$$\Delta Y_t = C + \alpha\, t + \rho Y_{t-1} + \sum_{i=1}^{n} \beta_i\, \Delta Y_{i-1} + \varepsilon_t$$

If C and α failed to be statistically significant we run above regression again dropping the constant and trend. For the choice of appropriate number of lags we have followed Enders (1995). We start with a large lag (n), if the estimated t- statistics for the last lag is not significant, we drop the last lag and repeat the process. The process will continue until we find a lag which is significant.

Table 3: DF & ADF Test

Variables	DF Test		ADF Test	
	Level	First Difference	Level	First Difference
TCI	-2.5949 With C & T	-11.3428*** With C	4.793 With C, Lag-10	-4.1755*** With C , Lag-11
REERX	-2.307 With C	-7.01939*** With C	-1.6872 With C , Lag-15	-5.2671*** With C , Lag-5
NEERX	-3.0908** With C	-7.4581*** With C	-3.9235*** With C , Lag-6	-4.5001*** With C, Lag-5
REERT	-2.31964 With C	-7.08713*** With C	-3.305* With C&T , Lag-1	-4.9903*** With C, Lag-5
NEERT	-3.09247** With C	-6.79982*** With C	-3.9067*** With C , Lag-6	-4.1277*** With C, Lag-5
WPI	-2.22089 With C & T	-7.99156*** With C	-1.707 With C&T, Lag-4	-4.0573*** With C&T Lag-3
FOREX	6.4428 With C	-5.5367*** With C & T	3.0328 With C , Lag-11	-3.1655*** With C&T Lag-8
M0	6.1548 With C	-6.37034*** With C & T	3.2604 With C&T, Lag-11	-3.6879*** With C, Lag-4
CAB	-5.46898*** With C		-3.149** With C ,Lag-13	-4.1440*** With C, Lag-3

Notes
(i)   *Critical Values at 1% , 5% & 10% With C & T are   -3.96 , -3.14 ,   -3.13 resp. , with C without T are -3.43,   -2.86 , -2.57 resp. and without C&T are -2.56, -1.94, -1.62 resp. Source :Davidson, R. and MacKinnon, J. (1993), "Estimation and Inference in Econometrics" p 708, table 20.1,Oxford University Press, London*
(ii)   *C stands for constant and 'T' stands for trend*
(iii)   *** signifies statistically significant at 1 % level*
(iv)   *** signifies statistically significant at 5 % level*
(v)   ** signifies statistically significant at 10 % level*

DF test confirms the presence of non stationarity in the level form for the variables TCI, REERX, REERT WPI, FOREX, and MO. NEERX and NEERT follows I(0) process at 5% level of significance. CAB is stationary at 1% level of significance. ADF test confirm the presence of non stationarity in the level form for variables TCI,

REERX, WPI, FOREX and MO. NEEERX and NEERT are stationary in level form at 1% level of significance. REERT is stationary at 10% level of significance and CAB is stationary at 5% level of significance. Schmidt and Phillips (1992) have proposed a test for the null hypothesis of a unit root when a deterministic linear trend is present. They suggest estimating the deterministic term in a first step under the unit root hypothesis. Then the series is adjusted for the deterministic terms and a unit test is applied to the adjusted series. Schmidt and Phillips test confirms that all variables except CAB are non stationary. In first difference form WPI is stationary at 5% level of significance; all other variables (TCI, REERX, NEERX, NEERX, NEERT, FOREX and MO) are stationary at 1% level of significance. With the help of these three tests we have concluded that TCI, REERX, REERT, WPI, FOREX, and MO are variables which follows I(1) process. DF and ADF test shows that NEERX and NEERT follows I(0) while Schmidt and Phillips test shows they follows I(1) process. All three test confirms CAB follows I(0) process hence we leaves CAB for further analysis. Non stationarity of a variable shows that the time path of the variable concerned is diverging from equilibrium. Hence time path of CAB does not diverge from equilibrium. There is also evidence that NEERX and NEERT follow I(0) and hence time path shows stability over time.

Table 4.Schmidt-Phillips Test

Variable	Level Form	First Difference
TCI	-2.5711	-11.1641***
REERX	-2.4810	-4.2808***
NEERX	-2.4803	-6.0020***
REERT	-2.5923	-4.2808***
NEERT	-2.6472	-5.7530***
WPI	-1.8108	-3.2599**
FOREX	-1.2473	-4.5933***
M0	-1.1747	-7.0589***
CAB	-5.8991***	

Notes
(i)   Critical values at 1%, 5% & 10% for Schmidt and Phillips test are -3.56, -3.02 & -2.75 respectively. Source : Schmidt, P. and Phillips, P. C. B. (1992),"LM tests for a unit root in the presence of deterministic trends", Oxford Bulletin of Economics and Statistics, vol. 54, p. 257-287.
(ii)   *** signifies statistically significant at 1 % level
(iii) ** signifies statistically significant at 5 % level
(iv) * signifies statistically significant at 10 % level

Table 5: Engle Granger Test for Pairwise Co-Integration

Equation Y_t on X_t	Trend	Statistic	p-value	Conclusion(Cointegration Present)
TCI on REERX	YES	-1.1668 (Lag-8)	0.9647	NO
REERX on TCI	YES	-3.9584 (Lag-1)	0.0308	YES
TCI on NEERX	YES	-2.2363 (Lag-6)	0.6613	NO
NEERX on TCI	YES	-3.9147 (Lag-3)	0.0348	YES
TCI on REERT	YES	-3.2122 (Lag-0)	0.2121	NO
REERT on TCI	NO	-3.9983 (Lag-1)	0.0071	YES
TCI on NEERT	YES	-1.4489 (Lag-6)	0.9299	NO
NEERT on TCI	YES	-2.2782 (Lag-8)	0.6397	NO
TCI on WPI	YES	-2.5047 (Lag-6)	0.5173	NO
WPI on TCI	YES	-1.6708 (Lag-7)	0.8833	NO
TCI on M0	YES	-3.8180 (Lag-6)	0.4531	NO
M0 on TCI	YES	-2.6992 (Lag-1)	0.4116	NO
TCI on FOREX	YES	-2.5621 (Lag-6)	0.4858	NO
TCI on FOREX	YES	-2.5621 (Lag-6)	0.4858	NO
FOREX on TCI	YES	-2.1288 (Lag-6)	0.7142	NO
REERT on WPI	YES	-3.7079 (Lag-1)	0.0612	YES
WPI on REERT	YES	-1.5327 (Lag-8)	0.9147	NO
REERT on M0	YES	-3.5710 (Lag-1)	0.0842	YES
M0 on REERT	YES	-0.1010 (Lag-0)	0.999	NO
REERT on FOREX	YES	-3.6618 (Lag-1)	0.0676	YES
FOREX on REERT	YES	-0.0608 (Lag-0)	0.9424	NO
NEERT on WPI	NO	-3.3073 (Lag-3)	0.0537	YES
WPI on NEERT	YES	-1.5182 (Lag-8)	0.9175	NO
NEERT on M0	YES	-3.8045 (Lag-3)	0.0469	YES
Mo on NEERT	YES	-1.0978 (Lag-3)	0.9703	NO
NEERT on FOREX	YES	-3.5267 (Lag-3)	0.0934	YES
FOREX on NEERT	YES	-1.0144 (Lag-5)	0.976	NO
WPI on M0	YES	-2.6311 (Lag-8)	0.4482	NO
Mo on WPI	YES	-1.3032 (Lag-8)	0.9506	NO
WPI on FOREX	YES	-2.565 (Lag-8)	0.4841	NO
FOREX on WPI	YES	-0.8809 (Lag-8)	0.9831	NO
M0 on FOREX	YES	-3.6164 (Lag-8)	0.0755	YES
FOREX on M0	NO	-2.9021 (Lag-8)	0.1354	NO

After tests of stationarity we have applied the test of Cointegration to explore the long run equilibrium relation between a set of variables. If two or more variables which are integrated of the same order are cointegrated then it follows that there exist long run equilibrium relation between them. To test the cointegrating relation between pair of variables we have followed the methodology suggested by Engle and Granger (1987). Engle Granger co integration test is based on two stage regression. In the first stage we have run the following regression

$$Y_t = \beta_0 + \beta_1 t + \beta_2 X_t + u_t$$

If the coefficient of time trend t comes out insignificant we have re run the above regression by dropping the time trend t. In second stage we have run following regression

$$\Delta \hat{u}_t = \delta \, \hat{u}_{t-1} + \alpha_i \sum \Delta \hat{u}_{t-1} + \varepsilon_t$$

The figures given in table (5) are t-values of δ. Cointegration exist between following pair of variables: REERX and TCI, NEERX and TCI, REERT and TCI. No other variable is cointegrated with TCI. In addition cointegration exists between following pair of variables: REERT and WPI, REERT and MO, REERT and FOREX, NEERT and WPI, NEERT and FOREX and between Mo and FOREX.

In last we have applied the causality test to explore the unidirectional or bidirectional causality between pair of variables. If a variable X causes Y and also Y causes X then there is a feedback or bidirectional causality and if only one variable causes other then there is unidirectional causality. In literature number of tests for detecting causality have been discussed but we have used one of the oldest test of causality namely Granger test. The intuition behind the granger causality test is that if X Granger causes Y but Y does not Granger cause X, then past values of X should be able to help predict future values of Y, but past values of Y should not be helpful in predicting X. Since stationarity of variables is precondition for Granger causality test we have used first difference form of variables. The following model has been applied:

$$Y_t = \sum_{i=1}^{p} \alpha_i X_{t-i} + \sum_{i=1}^{p} \beta_j Y_{t-j} + u_{1t}$$

$$X_t = \sum_{i=1}^{p} \gamma_i X_{t-i} + \sum_{i=1}^{p} \delta_j Y_{t-j} + u_{2t}$$

P is the order of the lag. Lag selection is a difficult choice for which we have used Akaike criterion. The null hypothesis that X does not granger causes Y is that $\alpha_i = 0$ for i = 1,2,…..p. the figures reported in table.6 are Wald F statistics and corresponding p values. The first significant result which we get is get is bidirectional causality exist between TCI & REERX and unidirectional causality from TCI to REERT. There is no causality between TCI & NEERX or between TCI & NEERT. Again bidirectional causality exists between TCI & FOREX. In addition unidirectional causality from REERT to FOREX, MO to NEERT, WPI to FOREX and bidirectional causality between MO & WPI exists.

Table 6: Pair wise Granger Causality Test

Dependent Variables	Explanatory Variables	Lags	F-Statistic	p-value	Remarks
ΔTCI	ΔTCI, ΔREERX	1	3.1677	0.0238	Causality From REERX→TCI
ΔREERX	ΔREERX, ΔTCI	1	3.2383	0.0209	Causality From TCI→REERX
ΔTCI	ΔTCI, ΔNEERX	1	0.0981	0.7554	No Causality From NEERX→TCI
ΔNEERX	ΔNEERX, ΔTCI	1	0.0404	0.8413	No Causality From TCI→NEERX
ΔTCI	ΔTCI, ΔREERT	1	0.4542	0.5033	No Causality From REERT→TCI
ΔREERT	ΔREERT, ΔTCI	1	2.1837	0.0416	Causality From TCI→REERT
ΔTCI	ΔTCI, ΔNEERT	1	0.0165	0.8981	No Causality From NEERT→TCI
ΔNEERT	ΔNEERT, ΔTCI	1	0.0711	0.7908	No Causality From TCI →NEERT
ΔTCI	ΔTCI, ΔWPI	4	1.5788	0.1972	No Causality From WPI →TCI
ΔWPI	ΔWPI, ΔTCI	4	0.5752	0.6821	No Causality From TCI→ WPI
ΔTCI	ΔTCI, ΔM0	4	4.5652	0.0037	Causality From M0→ TCI
Δ M0	ΔM0, ΔTCI	4	0.9405	0.4498	No Causality From TCI→ M0
ΔTCI	ΔTCI, ΔFOREX	4	3.4956	0.0148	Causality From FOREX →TCI
ΔFOREX	ΔFOREX, ΔTCI	4	5.6405	0.0010	Causality From TCI→ FOREX
ΔREERT	ΔREERT, ΔWPI	1	0.0990	0.7542	No Causality From WPI→ REERT
ΔWPI	ΔWPI, ΔREERT	1	0.0160	0.8997	No Causality From REERT →WPI
ΔREERT	ΔREERT, ΔM0	4	1.0488	0.3934	No Causality From M0→ REERT
ΔM0	ΔM0, ΔREERT	4	0.4230	0.7912	No Causality From REERT→ M0
ΔREERT	ΔREERT, ΔFOREX	1	0.64631	0.4251	No Causality From FOREX→ REERT
ΔFOREX	ΔFOREX, Δ REERT	1	4.7445	0.0339	Causality From REERT→ FOREX
ΔNEERT	ΔNEERT, ΔWPI	4	0.56306	0.6907	No Causality From WPI→ NEER
ΔWPI	ΔWPI , ΔNEERT	4	1.6480	0.1797	No Causality From NEERT→WPI
ΔNEERT	ΔNEERT, Δ M0	4	2.6760	0.0444	Causality From M0→NEERT
ΔM0	ΔM0, ΔNEERT	4	1.5353	0.2090	No Causality From NEERT→ M0
ΔNEERT	ΔNEERT, ΔFOREX	1	0.3271	0.5698	No Causality From FOREX→ NEERT
ΔFOREX	ΔFOREX, ΔNEERT	1	4.1326	0.0472	Causality From NEERT→FOREX
ΔWPI	ΔWPI, ΔM0	5	2.3144	0.0615	Causality From M0→WPI
ΔM0	ΔM0, ΔWPI	5	5.3932	0.0007	Causality From WPI→M0
ΔWPI	ΔWPI, ΔFOREX	4	1.7871	0.1490	No Causality From FOREX→ WPI
ΔFOREX	ΔFOREX, ΔWPI	4	2.9880	0.0291	Causality From WPI→ FOREX
ΔM0	ΔM0, ΔFOREX	5	1.2155	0.3196	No Causality From FOREX→ M0
ΔFOREX	ΔFOREX, ΔM0	5	3.5077	0.0101	Causality From M0→FOREX

6. Conclusions

Theoretical literature exploring the consequences of capital inflows is complex and cannot be generalized for all the countries. Different countries have experienced different consequences in response to capital inflows. Hence empirical assessment of possible implication of capital inflows is necessary.

Trend behavior of total capital inflows and its components shows that total capital inflows increases tremendously over the period especially after the year 2000-01. Trend behavior of foreign direct investment shows steady upward trend without much fluctuation while foreign institutional investment shows upward trend with fluctuations over the period. Trend behavior of real effective exchange rate (both export based and trade based) shows upward trend especially after 1999, while net effective exchange rate (both export based and trade based) shows some negative trend. Foreign exchange reserve highly upward trend behavior of nominal effective and foreign exchange reserve shows the active interventionist role played by the RBI for maintaining exchange rate fluctuations. Due to the intervention by the RBI domestic currency does not appreciate much over the period though there are some short episodes of appreciation of currency in response to large capital inflows. Money supply increases tremendously over the period but it is difficult to say how much of it is due to the capital inflows. Divergence between real and nominal exchange rate shows that price level in home country increases in relation to trading partners. Current account balance does not experience any significant deterioration in response to total capital inflows. Capital account balanced (CAB) is the only variable which is stationary in level form. There are also some evidence that nominal effective exchange rate (both export based & trade based) is stationary in level form. All other variables are non stationary in level form. Hence time trend of all variables except current account balance and nominal exchange rate are diverging from equilibrium. Cointegration test confirms the long run equilibrium relation between real effective exchange rate and total capital inflows. Causality test shows the bidirectional causality between REERX & TCI, between FOREX & TCI and unidirectional causality from TCI to REERT.

Some of the important findings of our analysis are as follows (a) nominal effective exchange in India does not appreciate in response to capital inflows. (b) There is some linkage between real effective exchange rate and capital inflows. The trend behavior shows that gap between real and nominal effective exchange rate increases which means price level in India increases in relation to trading partners. (c) Foreign exchange reserve increases tremendously due to the intervention by the RBI in foreign exchange market. (d) Current account balance does not deteriorate much as in case of some Latin American countries.

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