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Global Capital Flows and its Impact on Macroeconomic Variables – Evidence from India

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Abstract

In the current global economic scenario, the capital flows are very crucial for an economy as they have spill-over effects on other macro economic variables which are equally vital for the growth of the economy. The objective of the paper is to study the impact of global capital flows on major macro economic variables like GDP growth rate, inflation, exchange rate, etc. The study focuses on the quarterly data of India from 1948 to 2010. The literature on foreign direct investment (FDI) and economic growth generally points to a positive FDI-Growth relationship. The main emphasis is on identifying determinants of capital flows. This paper adds to the literature by analyzing the existence and nature of these causal relationships using multivariate regression analysis and Granger Causality test. The paper focuses on India, where growth of FDI has been the most pronounced. The paper aims to understand capital flows in India and depicting its trends. This study explores the factors, particularly GDP, inflation, export, import, exchange rate, openness and terms of trade that contribute to the explanation of FDI in India. It also tests whether the economic indicators really influence the flow of FDI into the country. The quarterly data post 1991 is tested for stationarity using Augmented Dickey-Fuller test. The results indicate economic growth and FDI are mutually reinforcing. The most important finding of the study has been the statistically significant role of lagged GDP growth rate in determining the capital flows for the next year.

Keywords: *Global Capital Flows, Macroeconomic Variables, India*

1 Introduction

In today's era of globalisation, capital flows know no barrier. Over the last few years the capital flows- both physical and financial- have increased by leaps and bounds. The history of international capital flows goes back more than 100 years. Over the years with increasing liberalisation and deregulation, today the foreign capital flows have become a crucial factor in propelling the growth engine of an economy. Of late there has been a sharp increase in the capital flows in the emerging economies. The emerging economies are those economies which are poised to grow at a rapid pace in the coming years and will play a vital role in the growth of the world as a whole. There has been a marked increase in the foreign direct investments and foreign institutional investors these economies are attracting. Capital flows have a strong impact on the

macro economic variables of a country. There is high degree of correlation between the capital flows in a country and its GDP growth rate. All these macro variables play a pivotal role in formulation of economic policies for the growth of the economy. India too has witnessed a surge in capital flows. There has been an enormous increase of over 400% in the foreign investment flows to India from 1995 to 2007. There is a strong relationship between these capital flows and the performance of the macro economic variables of an economy.

2 Theoretical framework

2.1 Capital

Capital can be either physical or financial. Physical or real capital refers to the machinery and equipment used for the production of goods and services. Financial capital refers to the money that is used to generate profits. According to a famous economist Schumpeter, any money used to generate profits is called capital.

2.2 Capital flows

Capital flows, as the name suggests, refers to the flow of capital. The capital flows from one country to the other. In today's era, there is easy movement of capital from one economy to the other without much restriction. The capital flows can be of the following types:

- Foreign direct investment (FDI)
- Portfolio investments
- Sovereign debt

FDI is defined as the acquisition of real assets abroad by residents of a country. This is done by remitting money abroad to be spent on acquiring land, constructing buildings, mines, or machinery or buying existing foreign business. Inward foreign direct investment similarly is acquisition by non residents of real assets within a country.

On the other hand, portfolio investments are the investments made by the non residents of a country in the capital markets of the country. These investors are called the foreign institutional investors (FIIs). FIIs invest in the stock markets of other countries, specially emerging economies to gain from the rising markets.

Post liberalisation and deregulation of the most economies of the world, both FDI and portfolio investments have jumped dramatically over the years.

FDI is preferred over FII investments. Direct investment increases the capacity/productivity of a firm. In other words direct investment ensures that the capital inflow translates into additional production. Also FDI tends to be much more stable than FII inflows.

Sovereign debt refers to the debt instruments guaranteed by the government. The foreign institutional investors invest in these government-guaranteed bonds. This has also been a major capital flow in recent times.

Also, firms are allowed to borrow abroad through 'External Commercial Borrowings'. These include loans or bond issues that are foreign currency denominated.

3. Previous studies

While many studies of FDI in the US, Japan and Europe have been prevalent, Similar research on FDI in India is however limited. Different explanatory variables have been used in various studies of FDI.

Nandita Dasgupta (2007) has studied the effects of international trade and investment related macroeconomic variables like exports, imports and FDI in India for 1970 to 2005. Unidirectional Granger Causality was found from export and import to FDI Out flows, but no such Causality exists between FDI inflows and the corresponding outflows.

Sarbapriya Ray (2012) has used co integration approach to analyze the causal relationship between Foreign Direct Investment (FDI) and economic growth in India. He tries to analyze and estimate the effect of FDI on economic growth in India using annual data from 1990-91 to 2010-11. Granger causality was found from economic growth to FDI. The Johansen co integration test confirmed an existence of long run equilibrium relationship between FDI and economic growth as approximated by GDP

Jayashree Bose (2007) in his book studied the FDI inflows and sectoral experiences in India and China. This book provides information on emerging issues, globalization, foreign factors, trends and issues in FDI in India and China. A comparative study has also been conducted on FDI outflows from India and China.

Chakraborty, C., & Basu, P. (2002) have studied FDI and growth relationship using a structural co integration model and VECM model. Their model reveals that GDP in India is not Granger caused by FDI and the causality runs more from GDP to FDI. They also found out that trade liberalization policy of the Indian government had some positive short run impact on the FDI. The last conclusion they drew from the study is that FDI is labour displacing i.e. FDI tends to lower the unit labour cost.

This study aims to add to the existing literature by analyzing data post independence and compare pre liberalisation (pre 1991) and post liberalisation impact of capital flows on the macroeconomic variables.

4. Research Methodology

- Research papers and journals were studied to understand the trends in global capital flows.

- Data was collected from various sources like journals, research papers and articles, etc. Data consists of capital flows, GDP growth rate, inflation rates, exchange rates, reserves etc for a pre-decided time span of study.

- The data was analysed statistically to establish a relationship between capital flows and various macro-economic variables.

- Interpretations and conclusions were drawn.

4.1 Objective

The present study tries to assess the determinants and impact of FDI in India at the macro level.

This paper attempts to study in detail the relationship between FDI and macroeconomic variables using various statistical tools and techniques. The objective can be restated as following three points

- To study the trends of capital flows.
- To understand the determinants of FDI inflows.
- To analyze the impact of FDI on the Indian Economy.

4.2 Sample selection

This study focuses on India. It's only after 1991 that there was a surge in FDI flows in the economy. The major flows started only in 1994. The data studied is from 1950 to 2007 for every quarter. The period post 1991 is important for a variety of reasons.

1) 1991 was the year of liberalisation for India its economy.

2) The experiences of South-East Asian economies in 1980s and 1990's economic growth and development

3) There was a considerable change in the attitude of countries towards FDI.

4) An increase in competition for FDI inflows among the developing nations.

4.3 Selection of variables

The factors or the variables on which depends the foreign direct investment inflow in India are:

4.3.1. GDP: The size of the domestic economy is considered to be an important factor attracting FDI in the country. GDP is used an indicator of the market size of the host country.

4.3.2. One year lagged GDP: Many economists and researchers have found that one year lagged GDP has a strong influence on the FDI inflows in the present year. This relationship is considered to be stronger then between present year GDP and present year FDI inflows. Therefore, to dig deeper into this thought, we have identified lagged GDP as one of the variables for the determination of FDI inflows.

4.3.3. Trade openness ((Export + Imports)/GDP): Trade openness is defined as total foreign trade in proportion to GDP. It is supposed to have a positive impact on the FDI inflows in India. Post 1991, India was liberalised and had a significantly liberalised its trade regime. Open economies attract more FDI due to greater confidence and trust a foreign investor can place in the system.

4.3.4. Wage rate: The wage rate prevalent in the host country is another crucial factor affecting the FDI inflow in the country. India by large is a labour economy i.e. there is

no dearth of cheap skilled labour in India. Lower wage rate implies lower cost of production for the investor which attracts them to India.

4.3.5. Tax rate: This is another vital variable affecting FDI inflow in any economy. Many economies have lowered the taxes to be levied on foreign corporations to boost FDI inflow in their own countries. Over the years India too had seen a sharp reduction in the taxes it levies on foreign companies. A lower tax rate acts as an incentive to attract more of FDI in the economy.

4.3.6. Political Scenario: This study would be incomplete without studying the impact of political scenario on FDI inflows. A stable political condition and laws boosts the investor confidence to invest in a foreign land. In this analysis, we use a dummy variable to indicate the political stability in India.

4.4 Data sources

The study uses secondary data taken from International Financial Statistics (IFS), an IMF publication, RBI's Handbook of Statistics for the Indian Economy and RBI's Database on the Indian Economy and for stock markets from the BSE Handbook, World Investment Reports, and various Bulletins of Reserve Bank of India, websites of World Bank, IMF, RBI, UNCTAD etc. are also referred.

4.5 Method of analysis

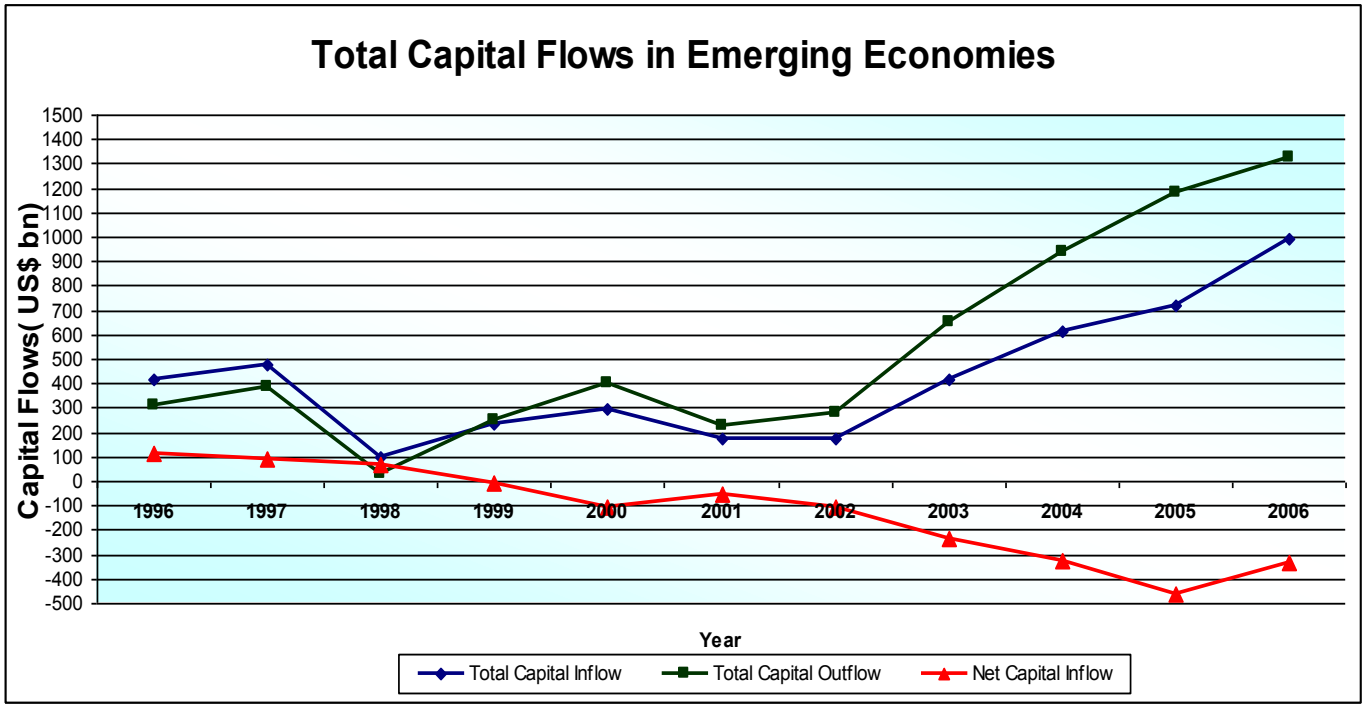
Trends of capital flows in emerging economies have been studied. To identify the determinants of FDI in India, this study uses Granger Causality test and ordinary least square (OLS) regression analysis. In this study we also analyse the impact of GDP, taxes, trade openness, labour cost and political stability on FDI in flows in India by multivariate regression analysis. Before conducting any analysis, stationarity of the data have been checked for using Augmented Dickey Fuller test.

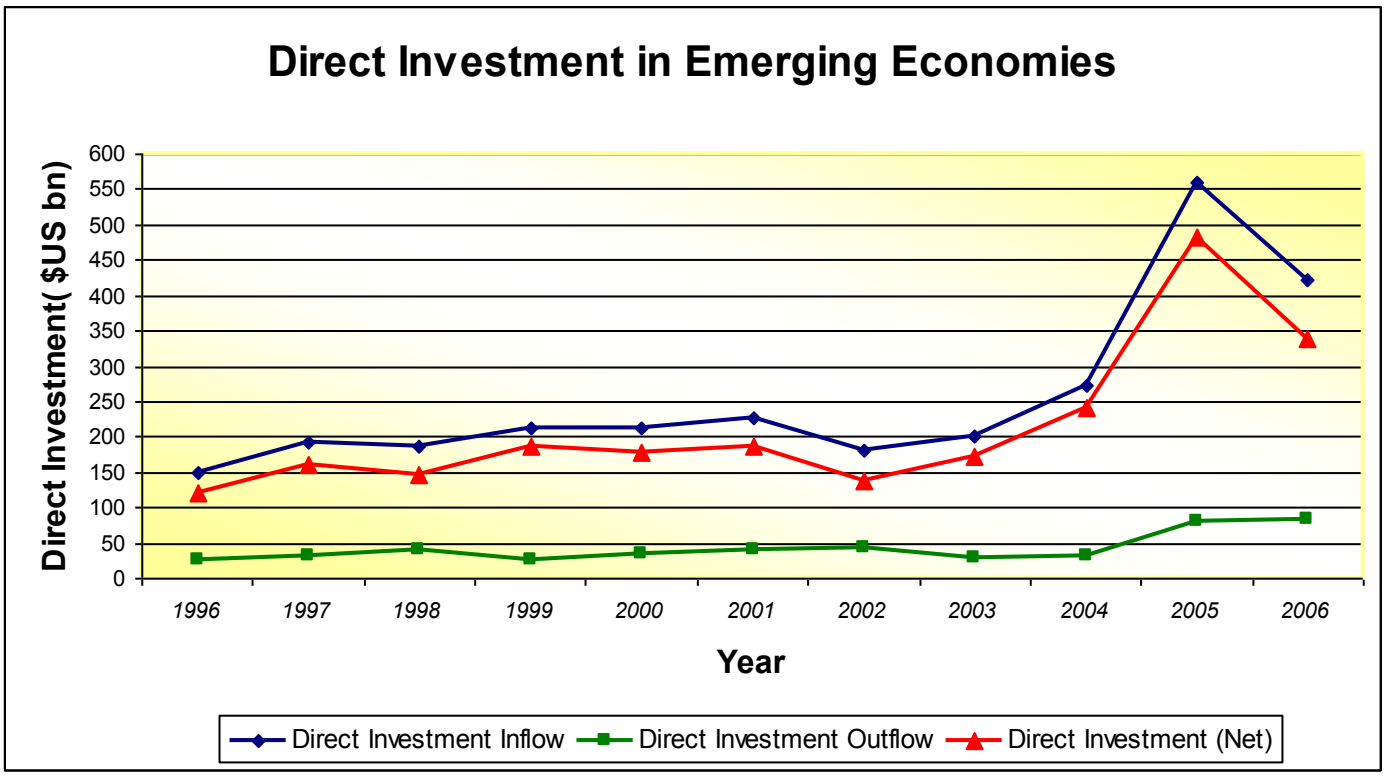
5. Capital Flows and Emerging Economies

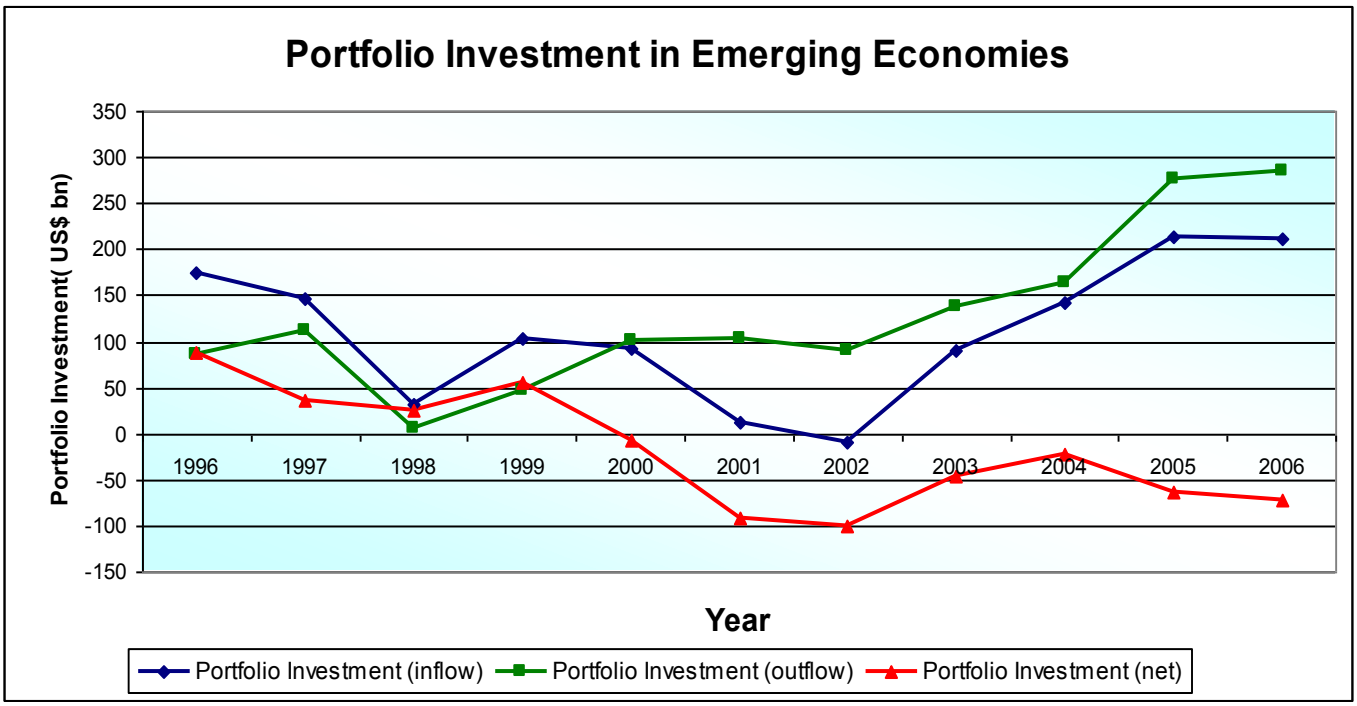
The capital flows have a strong impact on the emerging economies. The fact that these economies are 'emerging' and poised to grow at a high growth rate make them attractive destinations of capital flows. The increase in capital flows further gives a boost to the economy and other macro-variables in the favourable direction. For last couple of decades the major constituent of capital flows has been foreign direct investment and portfolio investment. The emerging economies like China, Brazil, Russia, India, and South Africa attract a lot of investments and there has been a boost in the confidence of investors investing in these markets. These emerging nations have a high credit rating which makes them safe and lucrative for foreign investors. The graphs below depict the trend in total capital flows, direct investment, and portfolio investment in the emerging economies.

Foreign Direct Investment in any economy is dependent on various factors. These factors can be basically classified into 'push' factors and 'pull' factors. The push factors are the factors in the rest of the world that lead to direct investments in a particular economy. The pull factors, on the other side, are the factors relevant for an economy that are favourable for foreign investment. The economic, social, political, legal scenario of an economy, if conducive for foreign investment, attracts FDI in huge amounts. These factors are present in the emerging economies thus making them lucrative investment destinations. These economies helped the investors earn a much higher

rate of return on their investment as compared to the developed nations. The emerging economies such as Brazil, Russia, India, South Africa, and China are among the favourite destination of investments with the foreign investors, companies or institutions. The graph below shows the trends in foreign direct investment in emerging economies. It can be clearly seen from the graph that there was always a marked difference between the FDI inflow and FDI outflow of these economies. The FDI inflow was much larger than the FDI outflow hinting towards the trust and confidence the foreign investors placed in these emerging markets.




Direct Investment in Emerging Economies
Direct Investment($US bn)
600
550
500
450
400
350
300
250
200
150
100
50
0
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
Year
Direct Investment Inflow
Direct Investment Outflow
Direct Investment (Net)


Portfolio Investment in Emerging Economies
Portfolio Investment(US$ bn)
350
300
250
200
150
100
50
0
-50
-100
-150
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
Year
Portfolio Investment (inflow)
Portfolio Investment (outflow)
Portfolio Investment (net)

6. Analysis and findings

6.1 Augmented Dickey-Fuller test

Prior to regression analysis and implementing the Granger Causality test, econometric methodology requires examining the time series for stationarity. Most macro economic data are non stationary, i.e. they tend to exhibit a deterministic and/or stochastic trend. A series is said to be stationary if the mean and variance are time – invariant.

The data used is post 1991 quarterly data which has to be tested for stationarity. The working of this test performed is depicted in the appendix (Table1 - Table 4). The results achieved shows that all the variables (FDI, GDP, GDP-1, trade openness, wage rate, GDP growth rate) are stationary at level 1 and political scenario dummy variable is stationary at level.

6.2 Multivariate regression

After correcting the given time series data into stationary data, we apply multivariate regression. The working is shown in the Appendix.

The regression equation is:

$$\Delta FDI = -672 + 0.0855\ \Delta GDP + (-0.0234)\ \Delta GDP\text{-}1 + 162\ \Delta Trade + 30388\ \Delta W + 441\ \Delta P + 14\ \Delta T + (-304)\ \Delta GGR$$

But not all the variables in the above equation are significant. It's only the ΔGDP-1 that has a statistically significant impact on the dependent variable.

For post 2000 data similar results are found, where only ΔGDP-1 is found to be statistically significant independent variable.

The result obtained in the regression using only post 2000 data is:

$$FDI = -3223 + 0.0435 GDP\text{-}1$$

This result helps us to conclude that GDP-1 (lagged GDP) is an important determinant for attracting FDI in the economy.

6.3 Granger Causality test

The next step is to examine the Granger – Causal relationship among the variables, x is said to "Granger – Cause" y if and only if the forecast of y is improved by using the past values of x together with the past values of y, then by not doing so (Granger 1969).

According to Granger causality test done foreign direct investment (FDI) granger cause GDP. In other words, there is causality relationship running from FDI inflows to GDP.

7. Impact of Capital flows in India

Post 1991, the year of financial liberalisation for the Indian economy, there was a surge in the capital flows. After the economy was liberalised and deregulated, there was a marked change in the quantum and type of capital flows into India. Prior to 1991, the capital flows into India were in the form of aid and borrowings , but after 1991 liberalisation of the Indian economy, the major portion of capital flows were foreign direct investment and portfolio flows. These capital flows had an impact on the other major macro economic variables of India. The various variables affected include economic growth, money supply, inflation, exchange rates, fiscal deficit, etc. it is therefore crucial to study the mechanism through which the capital flows are transmitted into the economic system.

7.1 Capital flows and Economic Growth

Capital flows play a vital role in the economic growth of a nation. At this stage we are not sure of the causal relationship but there exists a strong correlation for sure. In this study we assume Gross domestic product (GDP) is an indicator to the economic growth of a nation. For India, we will study the data of net capital flows and GDP post independence that is from 1950 onwards. The 57 year period of study is divided in two sub periods: 1950-1990 and 1991-2007. The year of liberalisation 1991 demarcates the two periods.

TABLE: Correlation between GDP and Foreign investments (FDI+FII) in India

Period	**Correlation**	**Coefficient of determination**
1950-1991	0.7076	0.5
1991-2006	0.8618	0.7427
1950-2006	0.9167	0.8408

In the above table we assume total (net) capital flows include only FDI and FII. The results from the table can be seen showing high positive correlation reiterating the robust relation between capital flows and the economic growth of a country. Also there is relatively lower correlation in the sub period prior to 1991. Post 1991 when India was liberalised and there was a rapid increase in the volume of FDI and FII in the Indian economy. FDI investments prove to be highly beneficial for the country as they bring with them not only financial capital but also the expertise, technology needed for the growth and development of the economy. A higher positive correlation post 1991 automatically indicates a higher coefficient of determination.

Having seen the high degree of positive correlation in all times post independence, now let's work out the causality relationship between the two variables. In our study, we assume the capital flow as the independent variable and the GDP of the economy as the dependent variable.

We can write our model as:

GDP= f (K flows, GDP-1, Time, D)

Where GDP= GDP of the economy

f =function

K flows (FI) = net capital flows (FII+FDI)

Time = time series effect on regression

D= dummy variable (D=0 prior to 1991 & D=1 post 1991)

We use multivariate regression analysis for the two periods of study 1950-1991 and 1991-2007. The results of this regression can be seen in the table 8 in appendix.

It is observed that prior to 1991, the GDP was dependent only on the 1 year lagged GDP. The other variables like foreign investment FDI+FII and time were insignificant .On the other hand post 1991, the GDP depends on both the lagged GDP and the capital flows. The dependency on both these variables is statistically significant. Post liberalisation and opening up of the Indian economy in 1991, there was a surge in foreign investments in the form of FDI and FII. These foreign investments have played a crucial role in catapulting India from the 3%-4% 'hindu' growth rate to the 8%-9% growth rate.

7.2 Capital flows and Exchange rate

Exchange rate is another major macroeconomic variable to be affected by the capital flows in the economy. Exchange rate is the price of domestic currency in terms of foreign currency. It is indicative of economy's external competitiveness and a reflection of balance of payments position. Exchange rate fluctuations can have a deep impact on the banking and financial sectors of the economy if they are excessive and sudden. An inflow of capital flows causes the real exchange rate to appreciate. This is because an inflow of capital flows means an increase in the amount of dollars vis-à-vis the Indian rupee. The supply of dollars increases as a result of which the dollar weakens vis-à-vis the Indian rupee. This means the Indian rupee appreciates in value. An appreciation in Indian rupee has a negative impact on exports as our exports become relatively more expensive. This in turn impacts the aggregate demand of the economy and hence exchange rate is an important macroeconomic variable for the growth and development of the economy.

We can write our model as below:

ER= f (FI, ER-1, Time, D)

Where

FI= foreign investments (capital flows)

ER-1= lagged exchange rate

Time= time

D=dummy variable D=0 for period before 1991 & D=1 for post 1991

In this study we use data on exchange rate of India with respect to the US dollar from 1970 to 2007. This entire period is divided into two sub periods to highlight the impact of 1991 liberalisation. The sub periods are 1970-1991 and 1991-2007. The results of these regressions are depicted in table 9 below.

It is clearly depicted from the regression analysis that post liberalisation of the Indian economy the capital inflows had an appreciating impact on the exchange rate. This is shown by a negative sign in the regression equation. Prior to 1991 the impact of capital flows on the exchange rate of negligible. But post 1991 the exchange rate is dependent on both the one year lagged exchange rate and the capital flows.

7.3 Capital flows and Exports & Imports

Capital flows impact the exports and imports of an economy. The affect depends on the exchange rate regime followed. If the exchange rate is held fixed, a rise in capital flows will increase money supply in the economy leading to higher inflation levels. This in turn will affect the cost side of domestic production and as a result will lead to increase in demand for foreign products hence increase in imports. In the case of floating exchange rate, an increase in capital flows appreciates the domestic currency vis-à-vis the foreign currency. This makes the domestic goods relatively expensive with respect to foreign goods leading to decline in exports and rise in imports.

The model can be written as follows

X= f (FI, X-1, Time, D)

M= f (FI, M-1, Time, D)

Where

X= exports

M=imports

X-1= lagged exports

M-1= lagged imports

For both these macroeconomic variables the time period of study is from 1970 to 2008. This time period is then divided into two sub periods where 1991 is the year of demarcation. Table 10 and Table 11 in the appendix depict the regression equations of exports and imports respectively.

From table 10 and table 11 shown above it is clearly visible that prior to 1991 the capital flows or foreign investment had a strong positive impact on the exports and imports of India, but post 1991 the dependency of exports and imports on capital flows is not statistically significant.

7.4 Capital flows and Reserves

Capital flows lead to an increase in the foreign exchange reserves as a result of the intervention by the Reserve Bank of India. There is a surge in the flow of foreign currency as a result of capital flows. This, if not prevented, can lead to the appreciation of the domestic currency vis-à-vis the foreign currency. This unwanted appreciation at times can have catastrophic impact on exports and can shatter the balance of trade of the country. Thus exchange rate is maintained in a healthy interval by the Reserve Bank. RBI intervenes in the market and buys the excess foreign currency (usually US dollar) and pumps out the domestic currency to check the domestic currency from strengthening. This accumulation of foreign exchange as a part of economic policy becomes a reserve.

Model can be written as below:

Res= f (FI, Res-1, Time, D)

The data used for this regression analysis is from 1950 to 2007.Like the previous analysis the period is divided into two sub periods.

The results of this regression are depicted in table 12 in the appendix.

It can be inferred from the regression equations that prior to 1991 foreign capital flows had a negative impact on the reserves. Prior to 1991 these capital flows primarily consisted of aid form IMF and World Bank. But post 1991 capital flows had a positive impact on the forex reserves of the country. Greater the proportion of FDI in the total flows, greater the amount of reserves. The only significant dependent variable is the reserves of the previous year.

8. Limitations and future studies

Due to problems in data availability the data for the study is till 2007 only.

Other factors affecting the macroeconomic variables have been assumed to be the same.

In this paper the focus is on India, similar studies can be undertaken for other emerging economies as well.

9. Conclusion

This study deals with the capital flows and their relationship with other macroeconomic variables with focus on Indian economy. Data is collected post independence till 2007. Data is checked for stationarity and is found to be stationary at level1. This study examines the direction of the relationship between economic growth rate, FDI and other macro economic variables. Multivariate regression is performed to get a causal relationship between the capital flows and macroeconomic variable. The macroeconomic variables studied include economic growth, exchange rate, reserves, exports, imports, fiscal deficit, etc. Current year GDP and one year lagged GDP are identified as determinants having significant impact on capital flows in a country. It also tries to study the impact of capital flows on macroeconomic variables. The regression results depict the changes in the dependency of GDP, Exchange rate, Exports, Imports and reserves on capital flows post liberalisation. The global capital flows play a vital role in running the growth engine of a nation and have become a crucial factor for the economic development of an economy. Pre liberalisation FDI had no significant impact on Economic growth but post liberalisation had a positive relation with economic growth. Post 1991 capital flows and one year lagged values are found to be important determinants affecting the current year GDP. Similarly both the quantum of capital flows and last year exchange rate value has a significant impact on the current year exchange rate. However, post 1991 FDI does not have an effect on the exports, imports and level of reserves in India. In other words high or low level of FDI does not impact the level of trade and reserves in India post liberalisation. Pre liberalisation FDI had a positive impact on foreign trade and a negative impact on reserves but had no significant impact post liberalisation.

The major conclusion from the study is that FDI in a particular is highly dependent on the GDP of the previous year. The dependence on the GDP level of this year is not statistically significant. A higher GDP this year will lead to boost in the confidence of the foreign investors and will raise the rating of the economy as an investment destination. These in turn lead to an increase in the FDI inflows in the next year.

Appendix

TEST OF STATIONARITY: AUGMENTED DICKEY-FULLER TEST

1. FDI INFLOWS

Null Hypothesis: D(FDI_INFLOW_NET_RS_CRORES,2) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic based on SIC, MAXLAG=0)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.632561	0.0000
Test critical values:	1% level	-3.574446	
	5% level	-2.923780	
	10% level	-2.599925	

*MacKinnon (1996) one-sided p-values.

2. GDP

Null Hypothesis: D(GDP) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic based on SIC, MAXLAG=10)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.706095	0.0000
Test critical values:	1% level	-3.568308	
	5% level	-2.921175	
	10% level	-2.598551	

*MacKinnon (1996) one-sided p-values.

3. TRADE OPENESS

Null Hypothesis: D(RATIO_OF_TRADE_OPENESS) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic based on SIC, MAXLAG=0)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.087118	0.0000
Test critical values:	1% level	-3.568308	
	5% level	-2.921175	
	10% level	-2.598551	

*MacKinnon (1996) one-sided p-values.

4. LABOUR WAGE RATE

Null Hypothesis: D(LABOR_WAGES__RS_CRORE_) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic based on SIC, MAXLAG=0)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-7.514722	0.0000
Test critical values:	1% level	-3.568308	
	5% level	-2.921175	
	10% level	-2.598551	

*MacKinnon (1996) one-sided p-values.

5. TEST OF CAUSALITY OF VARIABLES: GRANGER CAUSALITY TEST

Null Hypothesis	Obs	F-Statistic	Prob.
GDP does not Granger Cause FDI	50	1.77873	0.1887
FDI does not Granger Cause GDP		8.92986	0.0044
TRADE does not Granger Cause FDI	50	0.07193	0.7897
FDI does not Granger Cause TRADE		0.06982	0.7927
POLITICAL_SCENARIO does not Granger Cause FDI	50	1.7E-07	
FDI does not Granger Cause POLITICAL_SCENARIO		1.15785	
W does not Granger Cause FDI	50	0.16217	0.689
FDI does not Granger Cause W		0.75901	0.3881
GGR does not Granger Cause FDI	51	0.00048	0.9825
FDI does not Granger Cause GGR		3.71443	0.0599
T does not Granger Cause FDI	51	0.21330	0.6463
FDI does not Granger Cause T		0.21623	0.644

6. MULTIVARIATEREGRESSIONANALYSIS

SUMMARYOUTPUT

Regression Statistics	
Multiple R	0.5139947
R Square	0.264190551
Adjusted R Square	0.144407618
Standard Error	3226.859241
Observations	51

ANOVA

	Df	*SS*	*MS*	*F*	*Significance F*
Regression	7	160760896.3	22965842.33	2.2056	0.0525
Residual	43	447742684.1	10412620.56		
Total	50	608503580.4			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-671.953	675.378	-0.995	0.325	-2033.983	690.078
X Variable 1	0.086	0.031	2.730	0.009	0.022	0.149
X Variable 2	-0.024	0.035	-0.687	0.496	-0.094	0.046
X Variable 3	162.243	2168.405	0.075	0.941	-4210.762	4535.249
X Variable 4	30388.714	902985.229	0.034	0.973	-1790654.530	1851431.957
X Variable 5	441.065	1736.435	0.254	0.801	-3060.790	3942.919
X Variable 6	14.075	234.360	0.060	0.952	-458.558	486.708
X Variable 7	-304.195	227.960	-1.334	0.189	-763.921	155.531

7. MULTIVARIATE REGRESSION ANALYSIS (POST 2000 DATA)

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.469117665
R Square	0.220071384
Adjusted R Square	0.157677095
Standard Error	4307.286514
Observations	28

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	2	130874866.27	65437433.13	3.5271	0.0447
Residual	25	463817927.91	18552717.12		
Total	27	594692794.18			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	-581.1705	1072.5626	-0.5419	0.5927	-2790.1545	1627.8135
X Variable 1	0.0476	0.0182	2.6198	0.0147	0.0102	0.0850
X Variable 2	0.0181	0.0213	0.8477	0.4046	-0.0258	0.0620

8. GDP

Period	**Enter Method**	**Stepwise Method**
1950-1991	GDP= -1064 + 1.142GDP-1 + 10.112FI + (-189)Time	GDP = -1671 +1.152GDP-1
1991-2007	GDP= 63483 + 1.087GDP-1 + 2.582FI + (-10124)Time	GDP=77293 + 1.024GDP-1+2.815FI

9. Exchange Rate

Period	**Enter Method**	**Stepwise Method**
1970-1991	ER=-0.428+(4.05x10^-4)FI +5.398x10^-2)time + 1.025 ER-1	ER= -1.346 + 1.19ER-1
1991-2007	ER=10.53+ 0.645ER-1 + 0.942Time + (-1.10x10^-4)FI	ER=5.259 + 0.95ER-1 + (-5.6x10^-5)FI

10. Exports

Period	Enter Method	Stepwise Method
1970-1991	X=453 + 4.754FI + 1.359X-1 + (-211)Time	X= -29.35 + 6.06FI + 1.092X-1
1991-2007	X= 986 + 1.347X-1 + (9.15 x 10^-3)FI + (-3197)Time	X= -3688 + 1.211X-1

11. Imports

Period	Enter Method	Stepwise Method
1970-1991	M=198 + 4.733FI + 1.024M-1 + (-211)Time	M=405 + 1.076 M-1 + 4.472FI
1991-2007	M= -2522 + 1.055M-1 + 0.129FI + (-7740)Time	M= -3087 + 1.58M-1 + (-7823)Time

12. Reserves

Period	Enter Method	Stepwise Method
1950-1991	Res= -275 + 0.964Res-1 + (-2.226)FI + 30Time	Res= -275 + 0.964Res-1 + (-2.226)FI + 31Time
1991-2007	Res= -10896 + 1.002Res-1 + 0.396FI + 5375Time	Res= 12124 + 1.777Res-1

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