VOL. 2, NO. 1, March 2013
International Journal of Economics, Finance and Management

http://www.ejournalofbusiness.org

Causal Relationship between Foreign Capital Inflows and Economic Growth: Empirical Evidence from India

Narayan Sethi
Assistant Professor in Economics, Dept. of Humanities and Social Sciences,
National Institute of Technology (NIT), Rourkela, Odisha, Pin 769008, India,
nsethinarayan@gmail.com

ABSTRACT

The present study attempts to examine the casual relationship between foreign capital inflows and economic growth in India. Using the pair-wise Granger causality test (1969), this paper specifically examines casual relationship between foreign capital inflows and economic growth in India. The important observations emerge from pair-wise Granger causality test which shows there is the long-run equilibrium relationship is restored between the following pairs of variables viz., economic growth and Foreign Direct Investment (FDI), economic growth and Foreign Portfolio Investment (FPI).

Keywords: *Private Foreign Capital Inflows, Macroeconomic Variable, Vector Autoregression (VAR), India*

1. INTRODUCTION

International capital investment can play a useful role in development by adding to the savings of low and middle income developing countries in order to increase their pace of investment. However, foreign investment can also prove unproductive to developing economies by exposing them to disruptions and distortions from abroad, and by subjecting them to surges of capital inflows or massive outflows of capital flight. During 1997 to 2001 the capital movement to developing countries has declined, but increased marginally in 2002. International capital flow can help developing economies spread the benefit, when the flows are steady and do not undermine the stability of financial system.

Though capital account liberalization in India began only in 1993-94, India has history of capital inflows in the form of external assistance (during 1950s), external assistance and foreign investment (during 1960s), external assistance, foreign investment, External Commercial Borrowing (ECB), NRI deposits and other capital since the 1970s. Economic growth is a long-term phenomenon: its casual factors are best studied over a period of time. Therefore the present study restricts itself to the impact of capital inflows on economic growth in the after liberalization period 1990s. The hypothesis in the study is based on the experience of developing countries on the growth related experience with capital inflow. The economic growth of any country is financed either by its domestic savings or the foreign saving that flow into the country. Though foreign capital flows into the country in the form of aid, External Commercial Borrowing (ECB), and NRI deposit, it does not contribute much towards India's capital formation and economic growth. After 1993, when the capital account is partially liberalized, capital inflows have contributed toward the industrial production and economic growth.

The present paper is divided five sections including introduction. Section II describes the review of earlier theoretical and empirical literatures. Section III reports the data and methodology. Section IV presents the empirical findings and its discussion thereof. Section V presents conclusion with policy implication.

2. CAPITAL FLOWS AND GROWTH: LITERATURE SURVEY

There have been large number empirical and theoretical studies in the recent years on capital inflows and their impact on macroeconomic variables. Recently, Alfaro et al. (2005) examine the empirical role of different explanations for the lack of flows of capital from rich to poor countries the "Lucas Paradox". The theoretical explanations include differences in fundamentals across countries and capital market imperfections. They show that during 1970-2000 low institutional quality is the leading explanation. This study emphasizes the role of institutions for achieving higher levels of income, but remains silent on the specific mechanisms. The results indicate that foreign investment might be a channel through which institutions affect long-run development. Another important study by Alfaro et. al. (2002) examine the various links among FDI, financial markets and economic growth. The empirical analysis using cross-country data between 1975 to 1995 shows that FDI alone plays an ambiguous role in contributing to economic growth. However, countries with well-developed financial market gain significantly from FDI.

Studies on capital flows into India and its impact in macroeconomic variables have been analyzed by Kohli, (2003), Chakraborty (2001 & 2003), and Dua and Sen (2006). Kohli (2003) examines capital flows on macroeconomic variables such as exchange rates, interest rates of foreign exchange reserves, domestic monetary condition and financial system in India during the period 1986 to 2001. She concludes an inflow of foreign capital has a significant impact on domestic money supply, stock market growth, liquidity, and volatility. Correlation between domestic and foreign financial market highlights India's vulnerability to external financial shocks. Chakraborty (2003) analyses the financial crisis like East Asian crisis of 1997-98 and the Mexican crisis of 1994. She uses the vector auto regression (VAR) method to

examine the external shock generated by capital inflows led to appreciation in the real exchange rate as observed in the East Asian and Latin American countries. She finds from the impulse response of the analysis which reflects the fact that the impact of inflows of foreign capital on the real exchange rate during the liberalized regime in India was different from that observed in East Asia and Latin America.

Studies relating to capital flows and its impact on economic growth in India have carried out by Rangarajan, (2001), Sethi and Patnaik (2007). One of the studies by Rangrajan (2000) investigates the capital flows into India and its impact on the capital formation and economic growth taking into the variable as net private capital flows, net direct investment, net official flows, net portfolio investment and other net investments during 1992 to 2000. He argues capital flows can be promoted purely by external factors which may tend to be less sustainable than those induced by domestic factors. Both capital inflows and outflows, when they are large and sudden, have important implication for economies. He concludes that the capital account liberalization is not a discrete event. Sethi and Patnaik (2007) examine the impact of international capital flows on India's financial markets and economic growth. Using monthly time series data from April 1995 to July 2005, they found that Foreign Direct Investment (FDI) positively affects the economic growth, while Foreign Institutional Investment (FII) negatively affects the economic growth in India.

In the conclusion of the above literature, we find that, capital flows has significant impact on some macroeconomic variables in India. Also the capital flows between the countries reduce the cost of capital, increase investment and raise output. At a deeper level, however, it suggests that the experience of growth enhancing effects of capital inflows has been varied across countries.

3. DATA AND METHODOLOGY

3.1 Descriptions Variables and Sources of the Data

The data for the study have been collected from the secondary source such as Handbook of Statistics in Indian Economy (RBI) and International Financial Statistics (IFS), (IMF). The monthly data have been taken for the period from 1995:04 to 2011:07. The data of the study are private foreign capital inflows (FINV), Foreign Direct Investment (FDI), Foreign Portfolio Investment (FPI), Foreign Institutional Investment (FII) and index of industrial production (IIP). The Index of Industrial Production (IIP) has taken as the proxy of GDP, though my study is based on monthly time series data, the monthly data of GDP is not available. The period of study is constrained due to the unavailability of data after the liberalization period from 1991. So, the period of the study has been taken from 1995:04 to 2011:07.

3.2 Methodology

To examine the impact of capital flows on economic growth in India, pair-wise Granger causality test (1969) is used. However, the non-stationary nature of most series data and the need for avoiding the problem of spurious nonsense regression calls for the examination of their stationary property.

In first stage, Stationary of series on each variable is examined using both Dickey-Fuller test and Augmented Dickey-Fuller tests. The Dickey-Fuller test involves estimating regression equation and carrying out the hypothesis test. To show the Dickey-Fuller (DF) test, the AR (1) process is shown.

$$Y_t = \alpha + \rho.Y_{t-1} + \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1.1)$$

Where α and ρ are parameters and ε_t is a white noise. Y is stationary, if $-1<\rho<1$. if $\rho= 1$, y is non stationary. if the absolute value of ρ is greater than one ($\rho > 1$), the series is explosive. Therefore, the hypothesis of a stationary series involves in whether the absolute value of ρ is strictly less than on ($\rho < 1$). The test is carried out by estimating an equation with Y_{t-1} subtracted from both sides of equations.

$$\Delta Y_t = \alpha + \gamma\, Y_{t-1} + \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1.2)$$

Where, $\gamma = \rho - 1$ and the null and alternative hypothesis are

$$H_{0:}\ \gamma = 0$$
$$H_{1:}\ \gamma > 1$$

The t-statistics under the null hypothesis of a unit root does not have the conventional t-distribution. Dickey-Fuller (1979) shows that the distribution is non-standard, and simulated critical values for the selected sample. Later Mackinnon (1991) generalizes the critical values for any sample size by implementing a much larger set of simulations.

One advantage of ADF is that it corrects for higher order serial correlation by adding lagged difference term on the right hand side. If the simple unit root test is valid only if the series is an AR(1) process. One of the important assumptions of DF test is that error terms are uncorrelated, homoscedastic as well as identically and independently distributed (iid).

$$\Delta Y_t = \alpha + \gamma Y_{t-1} + \delta_1 \Delta Y_{t-1} + \delta_2 \Delta Y_{t-2} + \ldots + \delta_p \Delta Y_{t-p} + \varepsilon_t \ldots\ldots\ldots\ldots (1.3)$$

This augmented specification is then tested for

$$H_{0:}\ \gamma = 0$$
$$H_{1:}\ \gamma > 1$$

In final stage Granger's test causality is also known as Weiner-Granger test, since its origin has been traced to Wiener. To explain Granger test, we will consider two stationary processes namely Y_t and X_t are considered. The test involves estimating two regressions namely,

$$Y_t = \sum_{i=1}^{n} \alpha_i X_{t-i} + \sum_{j-1}^{n} \beta_j Y_{t-j} + u_{1t} \quad \text{.....(1.4)}$$

$$X_t = \sum_{i=1}^{n} \lambda_i X_{t-i} + \sum_{j=1}^{n} \delta_j + Y_{t-j} + u_{2t} \quad \text{.....(1.5)}$$

Equation (1.4) and (1.5) respectively postulate that current Y is related to past values of itself as well as that of X and a similar relation for X. In the above equations, α's, β's and δ's are parameters. In this context it is possible to distinguish three cases: Unidirectional causality from X to Y is indicated if the estimated coefficients on the lagged X in equation (1.4) are statistically different from zero as a group (i.e. $\sum\alpha_i \neq 0$) and set of estimated coefficients on the lagged Y in (equation (1.5)) is not statistically different from 0 (i.e. $\sum\delta_j = 0$). Feedback or bi-directional causality is suggested when X causes Y and Y causes X. In this case, the set of coefficient of X and Y are statistically significant different from zero in both regressions. Finally, independence is suggested when X does not cause Y and Y does not cause X that is, the set of coefficients are not statistically significant in both the regressions.

4. EMPIRICAL ANALYSIS

This section of the study discusses the impact of private foreign capital inflows on economic growth using pair-wise co integration test and pair-wise Granger Causality test. The descriptive statistics of the variables are mentioned in table 3. Unit root test in table 4 shows that none of the variables are stationary at level, but they are becoming stationary on first difference.

4.1 Granger Causality Test

Since the reliability of results of the Granger causality test depends on whether the variables are stationary or not, we first tested unit root of the variables using ADF and DF test. The result of the unit root test is reported in table 2. It shows that all the variables are stationary on first difference. It is well-known that Granger causality test is sensitive to the choice of lag length. To avoid this problem, as noted in Enders (1995), we have applied Akaike information criterion to choose the optimum lag length.

The results of pair-wise Granger Causality tests are reported in table 3. Major observations are discussed here. The most important observation is that Economic growth (IIP) Granger causes FDI and FPI. This has relevance for the economic policy after liberalization in India. It implies is that the past information on economic growth (IIP) improves the predictability of FDI. The above finding, however, challenges this objective. We further observe that there is a bi-directional casual relationship among these variables RFII and RFDI, RFDI and RFII, RFPI and RFDI, RFDI and RFPI, RIIP and RFDI, and RFDI, RIIP. But interestingly, RIIP has a unidirectional casual relationship with RFPI and RFII. It explains that the sound economic growth of the country attracts additional capital inflows (FPI, FII), whereas FII and FPI have no casual relationship with IIP. It means that the high inflows of capital have no positive impact on economic growth. This result suggests that, in the post reform period, instability in the trend behaviour of index of industrial production (IIP) can be explained partly by the instability in the trend behaviour of the inflows of private foreign capital with some lagged effect.

Table 1: Summary Statistics for FDI, FII, FPI and IIP

Description	FDI	FII	FPI	IIP
Sample Size	136	136	136	136
Mean	268.0368	255.8235	343.2721	102.6006
Median	209	123	188	99.9796
Maximum	1240	3276	3711	155.414
Minimum	58	-3906	-3334	69.4087
Std. Dev.	195.5226	727.1173	729.3599	20.46626
Skewness	2.749598	0.031879	0.759359	0.465736
Kurtosis	12.2881	13.19313	11.37023	2.35266
Jarque-Bera	660.223	588.7891	410.081	7.291245
Probability	0	0	0	0.026105
Sum	36453	34792	46685	13953.69
Sum Sq. Dev.	5160927	71374450	71815397	56547.13

Table 2: Unit Root Tests Results for FDI, FPI, FII and IIP

LEVELS				
Variable	**Without Trend**		**With Trend**	
	DF	ADF	DF	ADF
FDI	-7.511*	-0.989 (4)	-8.689*	-1.853 (4)
FII	-9.166 *	-1.234 (12)	-9.558*	-1.989 (12)
FPI	-9.081*	-1.163 (12)	-9.652*	-2.022 (12)
IIP	-1.212	-0.207 (4)	-6.046*	-2.021 (6)
FIRST DIFFERENCE				
Variable	**Without Trend**		**With Trend**	
	DF	ADF	DF	ADF
RFDI	-19.681*	-7.903 (4)*	-19.646*	-8.006 (4)*
RFII	-18.276*	-7.134 (4)*	-18.216*	-7.106 (4)*
RFPI	-18.541*	-6.782 (4)*	-18.479*	-6.774 (4)*
RIIP	-20.544*	-6.572 (2)*	-20.490*	-7.309 (4)*

Notes: The critical values for unit root tests are -3.47, -2.88 and -2.57 without trend and -4.02, -3.44 and -3.14 with trend. Figures in brackets against ADF statistics are the numbers of lags used to obtain white noise residuals and these lags are selected using AIC. *, **, *** imply significance at 1%, 5% and 10% level respectively.

Table 3: Pair wise Granger Causality Test for FDI, FPI, FII & IIP

Dependent Variable	**Explanatory Variables**	**m**	**F-Statistics**	**P-Value**	**Remarks**
RFII	RFII, RFDI	3	6.33757	0.00049	causality from RFII→RFDI
RFDI	RFDI, RFII	3	6.87915	0.00025	causality from RFDI→RFII
RFPI	RFPI, RFDI	3	6.22400	0.00057	causality from RFPI →RFDI
RFDI	RFDI, RFPI	3	6.41634	0.00045	causality from RFDI → RFPI
RIIP	RIIP, RFDI	3	5.44986	0.00149	causality from RIIP → RFDI
RFDI	RFDI, RIIP	3	3.09119	0.02954	causality from RFDI→ RIIP
RFPI	RFPI, RFII	3	1.81059	0.14864	No causality from RFPI → RFII
RFII	RFII, RFPI	3	1.68368	0.17391	No causality from RFII → RFPI
RIIP	RIIP, RFII	3	3.33509	0.02166	causality from RIIP→ RFII
RFII	RFII, RIIP	3	1.83586	0.14405	No causality from RFII→ RIIP
RIIP	RIIP, RFPI	3	3.25568	0.02396	causality from RIIP→ RFPI
RFPI	RFPI, RIIP	3	1.89509	0.13382	No causality from RFPI → RIIP

Notes:

(i) Optimum lag lengths (m) are determined by minimizing the Akaike Information criteria (AIC) by E-views package

(ii) R: defines the percentage change of the variables

5. CONCLUSION

The present study examined the impact of private foreign capital inflows on economic growth using pair wise Granger causality test. The causality test suggests a short and long run equilibrium relationship between the variables like economic growth and foreign direct investment and economic growth and foreign portfolio investment and vice-versa. However, our empirical findings strongly show that there is dynamic short and long equilibrium relationship between variables during the study period from 1995:04 to 2011:07. The study also finds that private foreign capital inflows have a positive and direct impact on economic growth. In other words, for the sound economic growth of a country attracts additional private foreign capital inflows.

REFERENCES

[1] Alfaro Laura., Kalemli-Ozcan Sebnem.,and Volosovych Vadym.,(2005) "Why doesn't Capital Flow from Rich to Poor Countries? An Empirical Investigation", Harvard Business School.

[2] Chakrabarti, Rajesh., (2001) "FII Flows to India: Nature and Causes", Money and Finance, 2 (7).

[3] Chakraborty, Indrani., (2003) "Liberalization of Capital Flows and the Real Exchange Rate in India: A VAR Analysis", CDS Working Paper, No. 351.

[4] Chakraborty, Indrani., (2001) "Economic Reforms, Capital Inflows and Macro Economic Impact in India", CDS Working Paper, No.311.

[5] Chitre, Vikas., (1996) "Foreign Capital Flows and Financial Market in India", Journal of Foreign Exchange and International Finance, 4, 275-282.

[6] Dicky, D.A. and W.A Fuller., (1981) "Like hood Ratio Statistics for Autoregressive Time Series with a Unit Root", Econometrica, 49, 1057-72.

[7] Dua, Pami and Sen, Partha., (2006) "Capital Flow Volatility and Exchange Rates: The Case of India", Centre for Development Economics, Working Paper No. 144, Department of Economics, Delhi School of Economics, Delhi University, New Delhi.

[8] Engle, R.F. and Granger, C.W.J., (1987) "Cointegration and Error Correction: Representation, Estimation and Testing", Econometrica, 55.

[9] Khanna, Sushil., (2002) "Has India Gained from Capital Account Liberalization? Private Capital Flows and Indian Economy in the 1990's", Paper Presented at the IDEAS Conference, "International Money and Developing Countries", Dec.16-19.

[10] Kohli, Renu., (2003) "Capital Flows and Domestic Financial Sector in India", Economic Political Weekly, 22, 761-68.

[11] Mazumdar, T., (2005) "Capital Flows into India: Implications for its Economic Growth" Economic Political Weekly, May.

[12] Rangarajan, C., (2000) "Capital Flows: Another Look", Economic Political Weekly, 9, 4421-27.

[13] Reserve Bank of India, RBI (2011) "Report on Currency and Finance", Govt. of India, India

[14] Sethi, Narayan and Patnaik, Uma Shankar K. (2007) "International Capital Flows on India's Economic Growth-In View of Changing Financial Market", The Indian Journal of Economics , 45 (348).