An Analysis of FDI Outflows from India: Pesaron's Approach

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Abstract

The purpose of this article is to study outflows of FDI from India and its relationship with inflows of FDI, exports and imports over 1990 through 2007. Using Pesaron's methodology of the paper finds cointegrating relationship between the variables and Granger Causality indicates unidirectional causal relationship between inflow and outflow of FDI from outflow to inflow and between FDI outflow and import from outflow to import while outflow of FDI and export is not found to have any causal relation. These results substantiate on facilitating outflow of capital which would help in the inward flow of capital.

Keywords: FDI outflows; Pesaron; Cointegration; Causality

JEL Classification Codes: C32, F21

Introduction

A phenomenon of capital outflows from developing countries is being experienced by many a liberalized developing countries. The study of capital outflow is important because it is an indicator for soundness of the macroeconomic variables and strategies of a country. A latent virtuous cycle is present between domestic macroeconomic performance and capital outflows. Capital outflows can increase with the increase in GDP per capita as foreign portfolio investments increase, increase in the shares of exports and imports in GDP, that is, world integration and development of financial services (Powel et.al, 2002). Capital outflow happens due to integration with the world trading system increase outflows (Gordon & Levine, 1988), discriminatory treatment of resident capital relative to nonresident capital may encourage investors to deposit their wealth in a foreign bank (Lessard & Williamson, 1987). Capital outflows also increase as a result of income inequality as income inequality increases socio-political uncertainty (Alesina & Perotti, 1996), repatriation of capital following privatization of state enterprises (Loungani & Mauro, 2000), increase or discovery of natural endowments like gold and diamond mines (Goreux, 2001), financial and fiscal crisis (Lessard & Williamson, 1987 and Collier et.al, 2001), higher levels of corruption, a weak rule of law and possibly lower levels of accountability may be expected to have higher outflows (Tornell & Velasco, 1992), investment climate,
discrimination between resident and foreign capital and lastly, income and integration effects (Powel et al., 2002) and due to lack of absorptive capacity of the economy.

Previously capital flows were unidirectional from developed nations to the developing nations. But recently there has been a surge in capital flows within the developing countries themselves. Aykut and Ratha (2003) have attributed capital outflows from developing countries to demand side pull factors that attract capital to the home country and supply side push factors that instigate the outward movement of capital. This movement of capital has been facilitated by increased wealth and capital account liberalization in developing countries. Some of the prominent push factors are portfolio diversifications in the form of higher returns and lower risks; improving export competitiveness through investing in efficiency-seeking activities abroad; procurement of raw materials and tariff and non-tariff barriers in trade also encourages its trans-national corporations to invest abroad and fiscal incentives to firms investing abroad. Some important pull factors are capital account liberalization, financial deregulation, market access, proximity in business environment, geography and socio-cultural ethnicity. Ariff and Lopez (2007) have identified rising wealth, financial deepening, development of the stock market, location of the economy on the phase of trade cycle and government's support and facilitation to these flows as the push factors and market seeking, efficiency seeking, resource seeking and international agreements as the pull factors.

India, for the first time in the Export-Import Policy of 1970 officially acknowledged outward investment and in 1974 an Inter-ministerial Committee on Joint Ventures Abroad was formed. Subsequently tax exemptions and loans from EXIM banks were given to investing firms. But only minority participation was allowed that too with stringent monitoring and in an overall restrictive environment. It was only after the EXIM policy of 1992 that procedures were simplified and automatic approvals were granted. In fact, capital outflow increased with a compound annual growth rate (CAGR) of 51.04% while capital inflow, real exports and real imports increased with a CAGR of 27.29%, 10.88% and 12.9% respectively. It is to be noted that India went through a comprehensive economic reforms package which aimed that privatization of the domestic sector, trade liberalization, removal of many controls on capital flows and subsequently integrating the domestic economy with the world economy in the form of globalization. Some important subsequent reform measures were the facilitation of single window clearance through RBI in 1995 and complete abolition of investment limits in 2003-04. Later in 2005, banks were to lend for overseas mergers and acquisitions, and in 2007 the investment limit was increased to 400 per cent of the net worth of the company in September of the same year.

Review of Literature

India is also experiencing capital outflows. There has been a significant increase in outward FDI flows from India as is transnational corporations are investing abroad. (Hansen, 2007; Singh and Varinder, 2009; Lawrence et al., 2010). Much credit of this outflow can be attributed to the policy of liberalization adopted by India. The outward FDI from India has been divided into two phases (Pradhan 2003, 2005; Sauvant, 2005; UNCTAD 2005). The first phase refers to period prior to 1991. In this period investment were particularly by manufacturing sectors and in developing countries with the nature of seeking markets and natural resources and for evading government restrictions. While in the second phase after 1991, outward FDI was from all areas but primarily from the service sector while the reasons besides gaining market access, were acquiring technology, creating brand awareness and setting up trade network. Further, Hansen (2007) differentiated the period after 2001 as a different phase where in firms were moving in the form of mergers and acquisitions to access markets and strategic assets in developed countries. Lawrence et al. (2010) has also noted this change in India's outward FDI whereby Indian firms were attaining well established firms in place of usual practice of investing in Greenfield projects and joint ventures. The intention of these outward FDI besides market seeking is to gain access to strategic skills and assets aimed at increasing competitiveness. (Pradhan
Access to raw materials, foreign technology, and the ambition to become global leaders are prominent motives of outward FDI from India (FICCI 2006). Although the magnitude of outflow is low in India but the rate of outflow has significantly increased over years, particularly after 1991, and is also comparable to other countries (Pradhan 2007). While initially outward FDI from India was concentrated to developing countries in Asia and Africa, more recently after 2000 Indian firms are investing in developed countries and its FDI composition has become more broad-based and manufacturing sector oriented (Rajan, 2009). Indian outward FDI have moved from developing to developed countries, and have invested in technologically advanced sectors (Hansen, 2007). Prior to 1991 FDI outflows was more country and sector specific and was prominently due to lack of profitable market opportunities due to government policies but now outward FDI flows have become more firm specific and other factors like tariff protection, stringent labor laws, high corporate taxes and difficulties in doing business have a mild effect (Athukorala 2009). There are certain features and patterns in Indian outward FDI which differentiates it with such investments of other developing countries as Indian outward investments is in service sector and in technologically advanced IT and pharmaceutical industries (WIR, 2004; Hansen).

Most of the literature reviewed above with reference to India had been exploratory in nature. Few empirical studies reviewed by this study were first, Tolentino (2008) while comparing the outward FDI flows of China and India examined the relationship between outward FDI and macroeconomic factors. Using Granger Causality in the vector autoregressive framework (VAR) in India for the period 1980-2005 he found that national technological capability (NTC) Granger cause outward FDI but other macroeconomic variables namely, income per capita, trade openness, interest rate, human capital, exchange rate and volatility do not cause outward FDI flows. NTC basically includes research and development intensity. He used natural log of annual number of applications for trademark registrations to proxy for NTC. As he found all the variables to be stationary at level one, that is, VAR (1), hence he estimated the regression equation using the method of ordinary least squares (OLS). Second, Banga (2009) using panel data for 1981-2002 for 13 Asian developing countries found that trade related factors: exports to GDP ratio and imports to GDP ratio, regional trading agreements were significant; capability factors: inward FDI flows, educational level and domestic factors: real wages, efficiency wages, low level of infrastructure, high corporate tax had significant effect on outward FDI while GDP, labor productivity and cost of capital are not significant affecting outward flow of FDI. He estimated random effect and fixed effect models in the linear regression framework and uses Hausman's test for testing the significance of an estimator against a different estimator. Third, Rajan (2010) estimated a log linear model on a panel of annual data for 57 countries for the period 2000-2006 using GDP in home and host countries, geographic distance, and a composite factor which included exchange rates of home and host country, R&D expenditure as a percentage of GDP, energy product, ratio of market capitalization to GDP, and ratio of total trade to GDP in the host country. Basically the study aimed to examine as to whether the reasons of India FDI outflows were same or different from the rest of the world in gravity model framework. The results showed that except for geographic distance which had a negative relationship with outflows and exchange rate which had mixed results all other variables had a positive relationship with outflows for all the countries. With reference to India there were three important observations, first, exchange rate was statistically significant, outflows were relatively market seeking and less R&D seeking and more resource seeking than firms from other countries. And fourth, Dasgupta (2008) using Johanson cointegration and Granger Casualty for the period 1970-2005 found unidirectional causality from lagged values of export and import to FDI outflows. However, FDI inflows did not Granger cause FDI outflows. Further the Johanson cointegration equation showed a negative relationship between exports and outflow and a positive relationship between exports and outflow. The above study has an inherent weakness which has been admitted by the author herself. Although the period of study was from 1970-2005 but outflows in India has been of conceivable quantity only after the onset of liberalization process since 1991. And using Johanson method to analyze time series for a short period of 1991-2005 has its own implication. Due to
the methodological concern this paper aims to study the relationship between outflows, inflows and trade variables using Pesaran cointegration method. The remarkable improvement in this methodology is that it can study time series properties for small sample size.

Data and Methodology
The data for the study has been taken from various issues of World Investment Reports of United Nations Conference of Trade and Development (UNCTAD) and Economic Survey (2009-10) published by Ministry of Finance, Government of India. For the present study, following model has been selected to examine the factors affecting outflow of foreign direct investment from India.

\[ O = f(I, X, M) \]  

Where,

- \( O \) refers to outflow of FDI from India,
- \( I \) is inflow of FDI in India,
- \( X \) is real exports from India, and
- \( M \) represents real import of India

All variables are in natural logarithm form.

The direction of relationship between these variables may be stated as follows. There is no clear cut relationship of outward FDI with country’s export, import and FDI inflow. It can be a complementary or it can be substitute for these variables depending upon nature of trade and also on nature of investment. One of the most important factors that drive the multinational corporations (MNCs) of the developing countries is the fierce competition faced in the home country. Trade liberalization in the last couple of decades in developing countries exposed these countries to international competition in the form of more FDI inflow, more imports and more exports. Following trade liberalization, the MNCs of the developed world find more economic opportunities in these liberalized developing countries to invest. This leads to higher inflow of FDI (IFDI) and more competition in these countries. To escape such competition, some of the firms mobilize their capital to other developing countries where they find better opportunities to invest. As a result the outflow of FDI (OFDI) increases. Thus we may expect a positive relationship between IFDI and OFDI.

The relationship between import and OFDI is not unambiguous. If domestic firms do not face restrictions or domestic production does not depend upon imports, higher imports may lead to more OFDI, i.e. we may expect a positive relationship between import and OFDI. However, if domestic production depends upon imports or is interested in gaining access to raw materials, resources or to intermediate goods, the impact of import on OFDI is expected to be negative.

As the export activities of the MNCs help them the initial exploration of overseas market, enhances international competitiveness and provide important information on emerging opportunities in other countries, increase in export may lead to more OFDI. Hence we may expect positive relationship between export and OFDI. However if investment is done to bypass the import restrictions in other countries, if any, then there can be negative relationship between export and OFDI.

The empirical analysis in this paper is based on annual time series data for the period 1991-2007. But the problem with the time series data is that the data may not be stationary at level. And regressing a non-stationary variable on another non-stationary variable may give spurious results. In order to avoid that, first of all, stationary test of these variables have been conducted. For the purpose, Augmented Dicky- Fuller test (ADF-test) and Philips-perron test (PP test) will be applied. The ADF is based on the assumption that the error term is statistically independent and have a constant variance. Philips and Perron (1988) developed a generalization of the ADF test procedure that allows for fairly mild assumptions concerning the distribution of errors. While the ADF test corrects for higher order serial correlation by adding the lagged difference term on the right hand side, the PP test makes a correction to the ‘t’ statistics of the coefficient from the AR(1) regression to account for the serial correlation in residual term. So the PP statistics are just modification of the ADF ‘t’ statistics that takes
into account less restrictive nature of the error process. It is, therefore, the present study has also conducted PP test for the stationarity of the variables under consideration.

If all the variables under consideration were found to be stationary at level, then we may apply ordinary least square method to estimate the relationship among the variables. However, if the variables are not found to be stationary, but are integrated of the same order, then we may still have a long run relationship if there exists a co-integration among these variables.

To examine the existence of cointegration among these variables, bound test procedure developed by Pesaran et al (2001) will be used for certain advantages associated with it. Johansen approach to co-integration does not give reliable result when the number of observations is not sufficiently large. Since the present study uses annual data for the period 1991 to 2007, which is not so large as is required by the approach (Mah, 2000). Bound approach is robust for small size sample. Mah (2000) used Pesaran’s approach to estimate disaggregated import demand function for Korea with 18 annual observations. Other examples are from Pattichis (1999) and Tang and Nair (2002). Another advantage associated with it is that it can be used irrespective of whether the variables are integrated of zero order I(0) or order one I(1).

In order to investigate the presence of long run equilibrium relationship among the variables, following unrestricted error correction model (UECM) as in equation 2 can be estimated for bounds test procedure. The ordinary least square (OLS) method is used for estimation.

$$\Delta lO_t = \alpha_0 + \sum_{i=1}^{p} \alpha_i \Delta lO_{t-i} + \sum_{i=0}^{m} \beta_i lI_{t-i} + \sum_{i=0}^{m} \gamma_i \Delta lX_{t-i} + \sum_{i=0}^{m} \delta_i \Delta lM_{t-i} + \beta_0 lO_{t-1} + \beta_1 lI_{t-1} + \beta_2 lX_{t-1} + \beta_3 lM_{t-1}$$

Where, \(\Delta\) represents first difference and \(l\) is natural log of respective variables. Pesaran et al (2001) proposed that the bound test is based on Wald coefficient test or F –statistics for cointegration analysis. The asymptotic distribution of the F-statistics is non standard under the null hypothesis of no cointegration relationship among the concerned variables, irrespective of whether the variable are I(0) or I(1). The test is conducted in following way. The null hypothesis considers the UECM in equation 2 by excluding the lagged level variables \(lO_{t-1}, lI_{t-1}, lX_{t-1}\), and \(lM_{t-1}\). More formally, a joint significance test is performed. The null (H0) and alternative (HA) hypotheses are

\[H0: \beta_1 = \beta_2 = \beta_3 = \beta_4 = 0; \text{ and}\]
\[HA: \beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq 0.\]

At conventional level of significance of 1 percent, 5 percent or 10 percent, if the calculated F-value falls outside the critical bound values tabulated at Pesaran et al (2001), a conclusive inference can be made about accepting or rejecting the null hypothesis of no cointegration among the variables. If the F-value is greater than the upper limit of the bound values, we reject the null hypothesis that there is no cointegration between the variables under study. If the F-value is less than the lower limit of the bound value, then we accept the null hypothesis of no cointegration among these variables. However, if the calculated F-value falls within the critical bound limits, then the order of integration of the explanatory variables needs to be known before drawing any conclusion. Then Granger causality test through vector error correction model (VECM) is performed to find the causal relation between these variables.

**Empirical Results and Analysis**

On the priori, it is difficult to decide which method, ADF test or PP test, is better to examine the stationary nature of the variables. Enders (1995) suggested that it is safe to use both the methods for the purpose to conclude with confidence. Thus we conducted both the tests at level and at first difference with constant. The result is shown in Table-1. The ADF result shows that all variables are non stationary at level but are stationary at first difference. The Philips-Perron unit root test also confirms the ADF test result. Thus we may conclude that all the variables included in the model are integrated of order one i.e. I(1).
In order to examine the relationship between FDI outflow and these variables, inflation and these variables, the UECM version of ARDL model (Pesaran et al, 2001) with lag one is estimated. Then following Hendry’s general to specific modeling approach, a parsimonious model is selected for equation by gradually deleting the insignificant coefficients. The result of the equation is presented in Table-2. The diagnostic tests like Breusch-Godfrey serial correlation LM test, White test and ARCH test for heteroscedasticity, Jarque-Bera test for normality of the residual term, and Ramsey RESET test for model specification all confirm the validity of the estimated equation. The Breusch-Godfrey serial correlation LM test statistics rejected the first and second order serial correlation for the equation. White test and ARCH test for heteroscedasticity confirm that there is no problem of heteroscedasticity. The Jarque-Bera statistics verifies that the estimated residual term has normal behavior, and the RESET test confirm the correct functional form of the equation.

The result of the bound test to examine the presence of long run relationship between outflow of FDI, inflow of FDI, export of India and India’s import is given in Table-3. The result shows that the computed F-statistics based on the Wald test is greater than the critical upper bound value at 1 percent level. Thus we may conclude that there exists a long run relationship between these variables.

The existence of cointegration relationship between inflow, outflow, import and export shows that there must be Granger causality in at least one direction. The result of Granger causality test within Error Correction Mechanism is shown in Table-3. The significance of error correction term shows the long run causal effect of the explanatory variables on the dependent variable. The F-statistics of the explanatory variables indicate the statistical significance of the short run causal effect. The result shows that there is unidirectional causal relationship between inflow and outflow of FDI from outflow to inflow; and FDI outflow and import from outflow to import. Outflow and export is not found to have any causal relation. FDI inflow and import is found to have bidirectional relation with each other.

**Conclusion**

Using time series data this study attempts to determine the reasons of outward flow of FDI by analyzing the dynamic linkages between outward FDI, inward FDI exports and imports in India for the period of 1991-2008. As all the variables are integrated at order one we look for a long run cointegrating relationship whereby there is at the least one linear combination of the variables in level form which is integrated at order zero. The Pesaron(1988) cointegration results identify a long run relationship between the variables. Once it is ascertained that the variables under study are cointegrated then Granger causality test is used to know as to which variables cause the others. As a home country firm instead of importing a commodity can establish a unit itself in the host country the capital outflow turn out to be resource and strategic asset seeking nature. This is the case for India. Though the variables under study namely, inward DFI, exports and imports do not directly cause outward FDI in the short run but there is a long run relationship between all these macroeconomic variables. Also, as inward FDI besides augmenting capital improves efficiency and competitiveness in the home country and brings new technology with immense productivity spillovers which benefits domestic firms the study recommends that India should promote its firms to invest outwards and facilitate the flow of investments by further simplifying the rules and procedures as outward bound FDI causes inward bound FDI in the Granger sense.

**References**


Appendix

Table 1: Result of Stationary Test

<table>
<thead>
<tr>
<th>Variables</th>
<th>ADF Test</th>
<th>PP test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Level</td>
<td>First Difference</td>
</tr>
<tr>
<td>t/O</td>
<td>-1.124910</td>
<td>-4.482752*</td>
</tr>
<tr>
<td>t/I</td>
<td>-1.091105</td>
<td>-3.091391**</td>
</tr>
<tr>
<td>t/X</td>
<td>0.481847</td>
<td>-4.627830*</td>
</tr>
<tr>
<td>t/M</td>
<td>1.043250</td>
<td>-2.802954***</td>
</tr>
</tbody>
</table>

Critical Values at
1 percent: -3.920350, -3.959148
5 percent: -3.065585, -3.081002
10 percent: -2.673459, -2.681330

Note: *, ** and *** shows significant at 1%, 5% and 10% respectively.

Table 2: Bound Test for Cointegration Analysis

<table>
<thead>
<tr>
<th>Dependent Variables</th>
<th>Calculated F-value:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outflow</td>
<td>16.825</td>
</tr>
<tr>
<td>Inflow</td>
<td>27.61</td>
</tr>
<tr>
<td>Export</td>
<td>13.62</td>
</tr>
<tr>
<td>Import</td>
<td>5.11</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Significance Level</th>
<th>Lower Bounds</th>
<th>Upper Bounds</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 Percent</td>
<td>2.72</td>
<td>3.77</td>
</tr>
<tr>
<td>5 Percent</td>
<td>3.23</td>
<td>4.35</td>
</tr>
</tbody>
</table>

Diagnostic Test
Adjusted R-squared = 0.819443
LM(1) = 0.3131
Heteroskedasticity Test: Breusch-Pagan-Godfrey = 0.7428
Heteroskedasticity Test: ARCH = 0.6232
Heteroskedasticity Test: White = 0.1701
Jarque Bera test = 0.782151 (0.676)

* Represents significant at 1% significance level
Table-3: Granger Causality Test

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>$\Sigma \Delta IO_t$</th>
<th>$\Sigma \Delta II_t$</th>
<th>$\Sigma \Delta IX_t$</th>
<th>$\Sigma \Delta IM_t$</th>
<th>ECT$_{t-1}$(t-statistics)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outflow</td>
<td></td>
<td>69.54</td>
<td>27.98</td>
<td>16.41</td>
<td>-2.52</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(-10.23)</td>
</tr>
<tr>
<td>Inflow</td>
<td>63.22</td>
<td></td>
<td>19.81</td>
<td>10.45</td>
<td>-0.95</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(-8.52)</td>
</tr>
<tr>
<td>Export</td>
<td>7.16</td>
<td>17.12</td>
<td></td>
<td>Nil</td>
<td>-0.01</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(-1.20)</td>
</tr>
<tr>
<td>Import</td>
<td>3.54</td>
<td>1.55</td>
<td>11.89</td>
<td></td>
<td>-0.21</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(-2.60)</td>
</tr>
</tbody>
</table>

Values in parentheses represent the F-value of the coefficients.