FDI Inflows and Exports in India: Post Liberalisation Experience

Author: Dr. Bipul Kumar Das (Lecturer, Department of Economics, Darrang College, Tezpur. E-mail: bipuldas04sep@gmail.com)

Abstract: FDI is seemed as an important resource for accelerating the industrial development of developing countries as it brings a bundle of capital, technology, skills and as it helps accession of foreign markets. Moreover, the direct and indirect effects of FDI provide a starting-point that FDI is likely to have a positive influence on the host country’s export performance. Therefore, the present study aims to specifically examine the relationship between FDI inflows and exports in India.

Key Words: Exports, FDI, cointegration, VECM, Granger causality, India.

1. INTRODUCTION

FDI is seemed as an important resource for accelerating the industrial development of developing countries as it brings a bundle of capital, technology, skills and as it helps accession of foreign markets (Kumar, 2005). Moreover, the direct and indirect effects of FDI provide a starting-point that FDI is likely to have a positive influence on the host country’s export performance (Zhang and Song; 2000). Given these advantages of FDI on host countries production and exports, the developing countries have significantly eased their retractions towards FDI since the early 1980s and the trend became wider in the 1990s (Barrell and Pain, 1996). Some commonly observed growth impact of FDI inflows have been well documented in recent studies (De Mello, 1996; Borensztein, et. al, 1998, Balasubramanyam, 1999). Moreover, Njong and Raymond (2001) in their study found a positive influence of FDI on the host country’s export performance in the context of Cameroon. In line with this study, Majeed and Ahmed (2007) in their study also found a significant and positive relationship between exports and FDI. For the study, they used a sample of panel observations for 49 developing countries over the period 1970-2004.

The significant impact of these flows on export expansion, particularly in East Asian economies before the crisis of 1997-98, has generated a keen interest in exploring the linkages between FDI and exports. The relationship between FDI and high exports can be visible from the success stories of East and South East Asian countries (Sharma, 2000), which suggests that FDI is a powerful tool in promoting exports of host countries as the Multi-National Companies (MNCs) have the well-established contacts and up to date information about foreign markets (Sharma, 2000). Athukorala and Menon (1996) examined the role of MNE participation towards export-led industrialisation in developing (host) countries. They found that the spread effects of FDI though backward linkage and direct technology transfer seemed limited, but increasing. Similar to this study, Xuan and Xing (2008) in their empirical analysis showed that FDI has substantially enhanced the exports to its source countries. They examined the contribution of FDI to the exports of Vietnam using a gravity model. In the Indian context, Prasanna (2010) tried to explore the impact of FDI on export performance in India. Collecting data from the Reserve Bank of India his empirical findings was that inward FDI has significantly contributed to better the export performance of India and the Indian manufacturing has not contributed significantly in enhancing the export performance. That is why most developing countries offered a welcome attitude towards FDI and attention has been given to the policies that can enhance the development benefits of such investments (UNCTAD, 1999). Against this backdrop, the aim of the study is to specifically examine the relationship between FDI inflows and exports in Indian in the post-liberalisation period, i.e., post-1991.
The paper has been divided into five sections and has been organised in the following way. The introduction in the first section is followed by the theoretical background in the second section. The third section deals with data source and methodology while the fourth section comprises results and discussion part. The paper ends with the conclusion in the fifth section.

2. THEORETICAL BACKGROUND

There are a few theories which show the relationship between host country’s exports and FDI. Most notables are Vernon’s (1966) product cycle theory, flying geese paradigm (Akamatsu; 1930s) and new growth theory.

Based on the experience of US market, the Product Cycle Theory explains how a developed country’s product first becomes an export and then through the life cycle it becomes an import for the country (Denisia, 2010). Unlike this, the flying gees (FG) paradigm of Kamane Akamatsu (1930s) viewed upon the technological development in South East Asia viewing Japan as the leader. The theory explains the occurrence of the sequence of import-production-export for each product in the industrialization process through the paradigm (Kasahara, 2004). Akamatsu (1961) presented a three-stage model of trade to indicate the level of economic development of the late industrialising economies. Besides these, the new growth theory explains the role of foreign capital on host country’s exports. According to Njong (2008), the two important points that the new growth theory emphasises are: (a) the theory views technological progress as a product of economic activity and (b) it suggests that knowledge and technology are characterised by increasing returns and these increasing returns drives the growth process (Cortright, 2001). Consequently, the growth is endogenous rather than exogenous as in the old growth theories. Along with this theoretical background, to have a more clear idea about FDI-exports relationship, we have to go through various empirical evidences which analyses the relationship between exports and FDI in various countries in different time periods.

3. DATA SOURCE AND METHODOLOGY:

Annual data from 1991-92 to 2011-12 for aggregate exports and aggregate FDI inflows are used for the analysis. The data are collected from Reserve Bank of India’s (RBI) handbook of statistics on Indian Economy. Here the raw data were used for the analysis.

The analysis was purely time series analysis. For analysis, Johansen’s (1991, 1995) co-integration method has been used to check long run relationship, Vector Error Correction Model (VECM) to check short run relationship and Granger Causality has been used to check the causality between exports and FDI.

For cointegration, the data series should be non-stationary. That is why; the test of stationarity was used. To test whether the data series were stationary or not, unit root method had been applied. After testing the stationarity test, we have applied the Johansen cointegration test. For the analysis, Eviews (version 6) software has been used.

The basic equation of FDI-exports relationship for analysis is;

\[ X_t = \alpha_1 + \alpha_2 Y_t + \epsilon_t \]  
\[ i.e., \epsilon_t = X_t - \alpha_1 - \alpha_2 Y_t. \]

Where the letter \( X \) implies exports and \( Y \) implies FDI; \( \alpha \) is the intercept term and \( \epsilon \) is the random disturbance term; \( t \) implies the time period.

This basic equation is used to check whether the two variables are associated or not or whether the two variables moves together or not. We have two time series: one is random walk model with drift and trend (for exports) and the other is random walk without drift and trend (for FDI). The justification for selecting two different forms of time series is presented in the result section.

\[ X_t = \alpha + \beta t + \varphi_1 X_{t-1} + \epsilon_{1t} \]  
\[ Y_t = \varphi_2 Y_{t-1} + \epsilon_{2t} \]

If \( \varphi_1 = \varphi_2 = 1 \), the equations have unit root, i.e. the two equations (3) and equation (4) will be non-stationary. When we lag one time period then the time series may become stationary. The new series can be written in the following way for one lag period:
\[
\Delta X = \beta_1 + \beta_2 t + \delta_1 X_{t-2} + \epsilon_{t-1} \quad (5)
\]
\[
\Delta Y = \delta_2 Y_{t-2} + \epsilon_{t-1} \quad (6)
\]

The Dicky-Fuller (DF) unit root test (1979) suggested that the null hypothesis \( \delta_1=\delta_2=0 \). The DF unit root test is based on the assumption that the error terms in the equations (5) and (6), i.e., \( \epsilon_1 \) and \( \epsilon_2 \), are serially uncorrelated. When the error terms are correlated, then the Augmented Dicky-Fuller (ADF) test is used. In ADF test with the assumption with drift and trend and no drift and no trend, the following regressions are estimated for exports and FDI respectively:

\[
\Delta X = \beta_1 + \delta_1 t + \theta_1 \sum \Delta X_{t-1} + \epsilon_{t-1} \quad (7)
\]
\[
\Delta Y = \delta_2 Y_{t-2} + \theta_2 \sum \Delta Y_{t-1} + \epsilon_{t-1} \quad (8)
\]

In regressions (7) and (8), \( \epsilon_1 \) and \( \epsilon_2 \) are white noise error terms and the ADF test also tested the null hypothesis that \( \delta_1=\delta_2=0 \). It is a better test than the DF test because it takes into account the presence of the correlation between the error terms by adjusting one time differenced terms of the dependent variable (Ali, 2013).

If exports and FDI are cointegrated, then we can apply the VECM test to check the short run relationships between them. To check the short run relationship, the following equation will be estimated:

\[
\Delta X = \beta_1 + \beta_2 \Delta Y_1 + \beta_3 u_{t-1} + \epsilon_1 \quad (9)
\]

Where \( \Delta \) is the first difference operator, \( \epsilon \) is the random error term and \( u_{t-1} \) is the one period lagged value (i.e., \( u_{t-1} = X_{t-1} - \alpha_1 - \alpha_2 Y_{t-1} \)). \( \Delta X \) depends on \( \Delta Y \) and equilibrium error term.

4. RESULTS AND DISCUSSIONS

To check whether the two time series are non-stationary or not for cointegration test, we applied the ADF test with drift and trend for exports and without drift and trend for FDI at levels and at first difference, because the results show that intercept and trend are significant for exports and insignificant for FDI. This can be seen from the following chart.

Chart 1: Exports and FDI over the years since 1991-92.

From the Chart it is seen that exports shows both an intercept and trend since exports is rising over the years. But the FDI line remains close to zero, indicating no intercept and trend. Although FDI series shows some increase later but it is not enough to show a rising trend. If we draw a trend line for exports, then we will get an intercept and trend. But if we draw a trend line for FDI, then we will get a flat line close to zero. Therefore we can say that exports have both an intercept and trend, but FDI has no trend and no intercept. That is why, in ADF test we select random walk model with drift and trend for exports and without trend and drift for FDI to check unit root.

### Table 1: Unit Root Test Results

<table>
<thead>
<tr>
<th>Unit Root Test</th>
<th>Level</th>
<th>( X )</th>
<th>( Y )</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADF Test</td>
<td>Level</td>
<td>2.28</td>
<td>-0.72</td>
</tr>
<tr>
<td></td>
<td>(1.00)</td>
<td>(0.39)</td>
<td></td>
</tr>
<tr>
<td>ADF Test</td>
<td>1st</td>
<td>-6.16</td>
<td>-2.62</td>
</tr>
<tr>
<td></td>
<td>(0.00)</td>
<td>(0.01)</td>
<td></td>
</tr>
</tbody>
</table>

Note: Figures in the brackets indicates the Mackinnon one sided \( p \) values for rejection of null hypothesis.

The null hypothesis for both the variables is that the series has a unit root. The Mackinnon one sided \( p \) values are used for rejection of null hypothesis. We reject the hypothesis if the \( p \) value is less than or equal to 5%. But here, both the \( p \) values are greater than 5% at level, therefore we cannot reject the null hypothesis. This implies presence of unit root at level in both the series, i.e., the series are non-stationary. In the first difference, we found that both the export and FDI series are stationary. The \( p \) values are less than 5%, so we can reject the null hypothesis at first difference. Therefore,
both the series are stationary at the first difference.

Before we apply cointegration and other test to check long run relationship and causality between exports and FDI, we need to fix an optimum lag to carry out these operations. Since the data are annual and the sample size is very low, therefore we fix lag length 1.

Having non-stationary series at level for both the export and FDI series, and stationary at the same order, we can use the cointegration techniques to see long run relationship between the variables. The cointegration technique will give us whether the two variables are associated in the long run or not, or whether the two variables move in the same direction in the long run or not. For this, we applied Johansen Cointegration Test.

### Table 2: Johansen Cointegration Test results

<table>
<thead>
<tr>
<th>Linear deterministic trend</th>
<th>No deterministic trend</th>
<th>Quadratic deterministic trend</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Intercept, no trend</td>
<td>No intercept, no trend</td>
<td>Intercept, trend</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Intercept and trend</td>
</tr>
<tr>
<td>Trace</td>
<td>0.00**</td>
<td>0.00*</td>
</tr>
<tr>
<td></td>
<td>(0.57)</td>
<td>(0.75)</td>
</tr>
<tr>
<td>Maximum Eigen</td>
<td>0.00**</td>
<td>0.00*</td>
</tr>
<tr>
<td></td>
<td>(0.54)</td>
<td>(0.71)</td>
</tr>
</tbody>
</table>

Note: 1. **denotes rejection of null hypothesis that there is no cointegration at 0.05% level. 2. Figures in the brackets shows the ‘p’ values for the null hypothesis that there is at most one cointegration

The existence of cointegration between FDI and exports is obvious from the Table 2. Since we have considered two different type of time series, i.e., random walk with trend and drift for exports and without trend and drift for FDI, we check all the cointegration test specifications. First, assuming no deterministic trend in data, we reject the null hypotheses that there is no cointegration in both intercept and trend in CE and no intercept and no trend in CE. Second, allowing linear deterministic trend we reject the null hypothesis that there is no cointegration and accept the alternative hypothesis that there is at most one cointegration equation for both intercept and trend in CE and no intercept and no trend in CE. Third, allowing quadratic deterministic trend in data also, we found that there is at most one cointegration.

The presence of cointegration between the two variables implies that there is long run relationship between the variables. In other words, exports and FDI have long run association or in the long run, exports and FDI moves together.

As there is long run relationship between exports and FDI, it is important to check their relationship in the short run. To check the short run relationship, we applied Vector Error Correction Model (VECM). VECM also provides information about whether they cause one another or not in the short run. VECM also shows how quickly the variables adjust towards equilibrium in the short run.

### Error Correction Mechanism Results:

To check the short run relationship between exports and FDI, we have two equations:

**Equation (I):** \( D(X) = C(1)* (X(-1) - 83.87*Y(-1) +924406.49) + C(2)*D(X(-1)) + C(3)*D(Y(-1)) + C(4) \)

**Equation (II):** \( D(Y) = C(5)* (X(-1) - 83.87*Y(-1) +924406.49) + C(6)*D(X(-1)) + C(7)*D(Y(-1)) + C(8) \)

Exports is the dependent variable in equation (I) and C(1), C(2), and C(3) are independent variables and C(4) is the constant. C(1)*X(-1) - 83.87*Y(-1) +924406.49 in equation (I) represents the cointegration equation. It shows the long run adjustments and C(2) and C(3) shows the short run adjustments towards equilibrium. Similar is the case in equation (II), where the dependent variable is FDI. We are concerned with only equation (I). To check the percentage of adjustments in the long run and in the short run, we have the following results:

### Table 3: VECM estimates for equation 1

<table>
<thead>
<tr>
<th>Coefficient</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>C(1)</td>
<td>-0.01**</td>
</tr>
<tr>
<td>C(2)</td>
<td>0.04</td>
</tr>
<tr>
<td>C(3)</td>
<td>-1.78***</td>
</tr>
<tr>
<td>C(4)</td>
<td>16477.70</td>
</tr>
<tr>
<td>R²</td>
<td>0.34</td>
</tr>
<tr>
<td>F</td>
<td>2.78***</td>
</tr>
</tbody>
</table>

Note: ** and *** denotes significant levels at 0.05% and 0.10% level of significance
As stated above, C(1) is the cointegration equation which represents long run adjustments towards equilibrium. The coefficient should be negative and significant which indicates long run relationship. The result shows that the coefficient is negative and significant at 5% level of significance. The coefficient value of cointegrating equation is 0.009690 which means that in the long run the adjustment is only 0.97%, which is very low indicating a weak relationship. C(2), i.e., C(2)*D(X(-1)) is insignificant. C(3), i.e., lag FDI adjusts or corrects 178% in the short run indicating a strong relationship and significant at 10% level of significance. R² value is moderate which means the model is moderately fitted, and the F-statistics is significant at 10% indicating overall significance is significant at 10% level of significance.

Therefore, we see that the adjustment process is very weak in the long run. In the short run, previous exports adjust moderately but it is not significant. Lag FDI greatly adjusts towards equilibrium and it shows significant and strong influence on exports in the short run.

Granger Causality Using Wald Test:

To check short run causality from FDI to exports, i.e., whether FDI Granger cause exports or not in the short run, we applied the Wald test. The results of the Wald test are shown in Table.

<table>
<thead>
<tr>
<th>Test Statistics</th>
<th>Value</th>
<th>df</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>F-statistics</td>
<td>2.06</td>
<td>(2, 16)</td>
<td>0.16</td>
</tr>
<tr>
<td>Chi-square</td>
<td>4.13</td>
<td>2</td>
<td>0.13</td>
</tr>
</tbody>
</table>

The probability value is greater than 5%, therefore, we cannot reject the null hypothesis, i.e., C(2)=C(3)=0. It implies that there is no short run causality from FDI to exports.

5. CONCLUSION

From the analysis, it is found that there is long run relationship between FDI and exports. But in the long run, error correction is weak while FDI corrects significantly on exports in the short run. From the Granger Causality analysis, we found that FDI does not Granger cause exports. Therefore the relationship between FDI and exports in India is found positive in the long run, but in the short run it is quite obscure. Thus, we can conclude that FDI is not sufficient to forecast India’s exports.

REFERENCES:


