A GRANGER CAUSALITY ANALYSIS BETWEEN FOREIGN DIRECT INVESTMENT AND ECONOMIC GROWTH

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ABSTRACT

Foreign Direct Investment is globally considered as an inevitable vehicle for the prospective development of developing countries. Governments across the globe are taking all possible efforts to pull in as much Foreign Direct Investment (FDI) as possible. Across countries it has proved significantly time and again that FDI enhances the development of the economy in many channels. This paper examines the existence of link between FDI and economic growth. Pair wise Granger Causality Analysis is used to study causality. Gross Domestic Product is proxied with Economic Growth. With two lags, our results suggest that there exists a bi-directional relationship between lagged values of FDI and GDP.

Key Words: FDI, Economic Growth and Granger Causality.

INTRODUCTION

Globally Foreign direct investment (FDI) is acting as an important vehicle for a nation’s economic growth. Their role in enhancing and speeding up the development phase of developing economies is a hotly debatable issue. FDI is also an important ingredient for an economy as it helps to integrate technology and management know-how necessary for restructuring the firms in the host countries (Borensztein et al., 1998). FDI fills in many development goals of emerging economies. They contribute to capital for domestic investment, brings in foreign exchange, creation of additional socio economic activities and thereby increasing tax revenues, transfer of knowledge and other firm specific assets, increases productivity of domestic firms through spillover effects. Thus foreign investments have the ability to boost the productivity of not only the participating firms but to all the firms in the industry through forward and backward linkage spillovers.

The diverse and significant role FDI plays in enhancing economic growth has kindled in the interest of many researchers. FDI inflow consists of capital provided by foreign investors, directly or indirectly to enterprises functioning in another economy, with an expectation of incurring profit. There are two ways to identify the relationship between FDI and economic growth. One is the Production Function approach and the other is the time series approach. This paper makes use of the time series approach. The purpose of this study is to empirically investigate the relationship between FDI and economic growth in India from 1996 to 2010. At the macro level using aggregate FDI flows for a broad cross-section of countries – generally suggest a positive role for FDI in generating economic growth especially in particular environments (De Gregorio, 1992). For instance, Tanna et al., (2003) argue that FDI has a positive growth-effect when the country has a highly educated workforce that allows it to exploit FDI spillovers. While Blomstrom et al., (1994) find no evidence that education is critical, they argue that FDI has a positive growth-effect when the country is sufficiently rich. Alfaro, Chandra, Kalemi-Ozcan and Sayek (2000) find that FDI promotes economic growth in economies with sufficiently developed financial markets, while Balasubramaniam et al., (1996) stress that trade openness is crucial for obtaining the growth-effects of FDI.

METHODOLOGY

The objective of this paper is to explore the causal nexus between FDI (Foreign Direct Investment) economic growths in India using the quarterly data for the period, 1995 to 2010 which includes the 64 quarterly observations. The two main variables of this study are economic growth and FDI. The real Gross Domestic Product (GDP) is used as the proxy for economic growth in India and we represent the economic growth rate by using the constant value of Gross Domestic Product (GDP) measured in Indian rupee. All data for the sample period are obtained from the Handbook of Statistics on Indian Economy in various time periods and from FDI Fact Sheets for various years.

Econometric specifications: This study aims to examine the long-term relationships between the level of FDI flowing into India and economic growth. Log values of the variables are taken. Lagged values of FDI and GDP are taken for calculation. One period lag is taken. Akaike Information Criteria (AIC) is used for judging the period of lag. The methodology employed in this study is Pair wise Granger Causality Test. EViews 7 is used for the purpose of calculation. The raw data is checked for the auto correlation, stationary and unit root.
Test for Stationarity and Unit Root: When dealing with time series data many econometric issues can influence the parameters. Most of the macroeconomic data are non-stationary which means they tend to exhibit a deterministic and/or stochastic trend. Therefore, it is recommended that a stationarity (unit root) test be carried out to test for the order of integration. A series is said to be stationary if the mean and variance are time-invariant. A non-stationary time series will have a time dependent mean or make sure that the variables are stationary, because if they are not, the standard assumptions for asymptotic analysis in the Granger test will not be valid. Therefore, a stochastic process that is said to be stationary simply implies that the mean \(E(Y_t)\) and the variance \(Var(Y_t)\) of \(Y\) remain constant over time for all \(t\), and the covariance \(cov(Y_t, Y_s)\) and hence the correlation between any two values of \(Y\) taken from different time periods depends on the difference apart in time between the two values for all \(t\), the data shows non stationarity property, and after making first difference, the data is made stationary, which makes the time series data useful for further analysis. Augmented Dickey Fuller test is used widely for testing stationarity. Augmented Dickey Fuller Test (ADF) is performed to check for unit roots and the results are shown in table 1.

Hypothesis: The paper is based on the following hypotheses for testing the causality between GDP and FDI in India

**Null Hypothesis**
- LFDI does not granger cause LGDP
- LGDP does not granger cause LFDI

**Alternative Hypothesis**
- LFDI granger cause LGDP
- LGDP granger cause LFDI

**Granger Causality Test**: Causality is a kind of statistical feedback concept which is widely used in the building of forecasting models and other causality relations. Historically, Granger (1969) and Sim (1972) formalized the application of causality in economics. Granger causality test is a technique for determining whether one time series is significant in forecasting another (Granger, 1969). The Granger causality test (Granger, 1988) seeks to determine whether past values of a variable helps to predict changes in another variable. The definition states that in the conditional distribution, lagged values of \(Y_t\) add no information to explanation of movements of \(X_t\) beyond that provided by lagged values of \(X_t\) itself (Zhang 2000 and 2001). It means that the Granger causality technique measures the information given by one variable in explaining the latest value of another variable. It also says that variable \(Y\) is Granger caused by variable \(X\) if variable \(X\) assists in predicting the value of variable \(Y\). If this is the case, it means that the lagged values of variable \(X\) are statistically significant in explaining variable \(Y\). The null hypothesis \((H_0)\) that we test in this case is that the \(X\) variable does not Granger cause variable \(Y\) and variable \(Y\) does not Granger cause variable \(X\). In summary, one variable \((X_t)\) is said to granger cause another variable \((Y_t)\) if the lagged values of \(X_t\) can predict \(Y_t\) and vice-versa. FDI and GDP are, in fact, interlinked and co-related through various channels. There is no theoretical or empirical evidence that could conclusively indicate sequencing from either direction. For this reason, the Granger Causality test was carried out on FDI and GDP.

RESULTS AND DISCUSSIONS

The results suggest that there exists a causal relation between the lagged values of FDI and GDP and also between the lagged values of GDP and FDI. Two period lag is taken here. The following table indicates the Pair wise Granger Causality between FDI and GDP (Table 2). The \(p\) value of granger causality between LGDP and LFDI is 0.0286 which is less than 0.05, which indicates rejection of null hypothesis and accepting the alternative hypothesis. The \(p\) value of granger causality between LFDI and LGDP is 0.0041, here too reject the null hypothesis and accept the alternative hypothesis. This causality relation leads the researchers that FDI leads to economic growth and economic growth results in more foreign direct investments.

CONCLUSION

The present study explores the relationship between foreign direct investment and economic growth from the year 1995 to 2010 for India. It makes the researchers to conclude that in order to increase economic growth of India more direct foreign investment is required. And in the same line higher inflow of direct foreign investment is enhancing economic growth and for enhancing higher economic growth more foreign investment is required. It is for the government to decide about the policies which will ease and increase the inflow of foreign direct investment and thereby to increase growth of our economy.

REFERENCES


Table 1. Augmented Dickey Fuller Unit Root Test

<table>
<thead>
<tr>
<th>Series</th>
<th>ADF Test</th>
<th>Lags</th>
<th>Conclusion</th>
</tr>
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<tbody>
<tr>
<td>FDI Level</td>
<td>0.9795</td>
<td>0</td>
<td>Non Stationary</td>
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<tr>
<td>LFDI First Difference</td>
<td>0.0313</td>
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<td>Stationary</td>
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<tr>
<td>GDP Level</td>
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<td>Non Stationary</td>
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<tr>
<td>LGDP First Difference</td>
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<td>1</td>
<td>Stationary</td>
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Table 2. Pair wise Granger causality Test

<table>
<thead>
<tr>
<th>Null Hypothesis</th>
<th>Alternative Hypothesis</th>
<th>F Statistics</th>
<th>P value</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>LGDP does not Granger Cause LFDI</td>
<td>LGDP Granger Cause LFDI</td>
<td>3.78511</td>
<td>0.0286</td>
<td>GDP→FDI</td>
</tr>
<tr>
<td>LFDI does not Granger Cause LGDP</td>
<td>LFDI Granger Cause LGDP</td>
<td>6.05137</td>
<td>0.0041</td>
<td>FDI→GDP</td>
</tr>
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