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# Causal Relationship of Foreign Direct Investment, Trade and Economic Growth of Brazil

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**Abstract**

*Trade and investment are considered as the crucial determining factors of the economic growth, especially in developing countries. Foreign Direct Investment (FDI) has recently become more crucial especially in developing countries which strive for the modernization of their industries and support their socio-economic developments. FDI remains the biggest component of net resource flows to developing countries, and since 1990 it has been a growing part of the total investment in these countries. The relationship between FDI and economic growth has been a debatable topic because of contradictory views of researchers and policymakers regarding the positive and negative aspect of FDI and economic growth. The study is an investigation into the growth trajectory of Brazil and trying to find out how inflow and outflow of foreign direct investment and international trade influence the economic growth of the country. Cointegration technique has been employed to examine the causal relation among GDP, inward FDI, outward FDI and trade in Brazil. Results of Johansen Cointegration test shows there exists a long-term association ship between variables. Granger causality test for Brazil gives strong evidence of unidirectional causality running from GDP to IFDI and Trade to OFDI i.e., GDP influences the FDI inflow and trade influences the FDI outflow.*

***Keywords:*** *Inward FDI, Outward FDI, Economic Growth, Granger Causality, Cointegration.*

## Introduction

Trade and investment are considered as the crucial determining factors of the economic growth especially in developing countries. Foreign Direct Investment (FDI) has recently become more crucial especially in developing countries which strive for modernization of their industries and support their socio-economic developments. It is expected that the high absorption capacity of the developing countries towards the foreign investment naturally helped to raise the trade and outward investment of developing countries. FDI can be understood as the long term financial participation by an

investor from one particular country in an enterprise to another country, thereby having a significant degree of influence on management of the enterprise (at least a 10 per cent share of capital). It can take in the form of acquisition of already existing host firms or establishment of new companies in the host country, usually referred to as Greenfield investments (Gursoy and Kalyoncu, 2012). FDI remains the biggest component of net resource flows to developing countries, and since 1990 it has been a growing part of total investment in these countries. The amount of FDI flowing to developing countries increased remarkably in the 1990s and 2000s account for about 25 per cent of global FDI (Erdal and Tatoglu, 2002). The relationship between FDI and economic growth has been a debatable topic because of contradictory views of researchers and policy makers regarding the positive and negative aspect of FDI and economic growth (Kumari, 2014). Since, the role of foreign investment and trade in the economic growth in developing countries remain as one of the controversial subjects of research and it is crucially depends on the motive for such investment and trade research. The BRICS countries attracted considerable international attention prior to the 2009 global crisis, primarily as a result of their phenomenal GDP growth rates. Much of their robust growth was driven by the rapid expansion of both the goods and services trade. BRICS is an informal organization or trade block started at Yekaterin Burg summit in 2009. BRICS consisted about five-member countries include Brazil, Russia, India, China, and South Africa. BRICS trade block contributed 15 per cent of trade volume in international market during 2010s. Brazil is one of the biggest and faster growing emerging markets in the BRICS. Trade and foreign direct investment are major engines of growth in emerging countries like Brazil since these countries have high growth potential and absorption capacity in terms of Foreign Direct Investment and International Trade. This study is an investigation into the growth trajectory of Brazil in response with the bidirectional FDI and international trade. It is expected that the empirical results of this study may help the policy makers to formulate foreign trade policy fine tune with the inflow and out flow of foreign direct investment to accelerate economic growth.

**Need and Significance**

The relationship between foreign direct investment (FDI), international trade and economic growth in host countries remains one of the most important issues in the economic literature and met with renewed interest in recent years mainly for countries suffering from unemployment

problems and lack of technological progress. Inward FDI can play an important role by increasing and augmenting the supply of funds for domestic investment in the host country. This can be done through the production chain when foreign investors buy locally made inputs and sell intermediate inputs to local enterprises. Furthermore, inward FDI can increase the host country's export capacity, causing the developing country to increase its foreign exchange earnings. FDI can also encourage the creation of new jobs, enhance technology transfer, and boost overall economic growth in host countries (Belloumi, 2014). FDI can provide much more resources like, capital, technology, managerial skills, skilled labourers, access to markets for the developing countries. So, the developing countries supposed to attract the FDI for their further growth and development. In this context, this paper intents to make an empirical analysis on the growth trajectory of the Brazil in relation with the change inflows and outflows of foreign direct investment and international trade.

In 1990s, during the fluctuations of capital flows, foreign direct investment (FDI) was the main source of flows to developing countries. Contrary to other capital flows, FDI is less volatile and does not show a pro-cyclical behaviour. It has therefore become the "favourite capital inflows" for developing countries. The FDI increased rapidly during the late 1980s and the 1990s in almost every region of the world revitalizing the long and contentious debate about the costs and benefits of FDI inflows. Globalization offers an unprecedented opportunity for developing countries to achieve faster economic growth through trade and investment. In the period 1970s, international trade grew more rapidly than FDI, and thus international trade was by far than most other important international economic activities. This situation changed dramatically in the middle of the 1980s, when world FDI started to increase sharply. While global FDI flows increased by 25 per cent during 1991-2009, developing countries as a group show an FDI increase of 22 per cent at constant prices (World Bank, 2010). FDI flows to poor countries increased to almost 5 per cent of GDP. However, FDI provides much needed resources to developing countries such as capital, technology, managerial skills, entrepreneurial ability, brands, and access to markets. These are essential for developing countries to industrialize, develop, and create jobs attacking the poverty situation in their countries. As a result, most developing countries recognize the potential value of FDI and have liberalized their investment regimes and engaged in investment

promotion activities to attract various (Louzi and Abadi, 2011). It is well documented that inward FDI can increase host countries exports and outward FDI can increase home countries import. The impact of outward FDI in developed countries and the impact of inward FDI in developing countries are the central point of debate in the earlier periods of study. But in the period of globalization and trade liberalization the importance of research shifted towards the outward and inward FDI of developing countries, because both inward and outward FDI is increasing faster in developing countries than international trade. Among the developing countries China, Brazil and India are the important countries which attract more FDI.

The growing importance of trade and investment in the globalized period, especially, when the rate of growth of FDI exceeds the growth of GDP in most of the developing countries particularly in BRICS economies during the last decades opened up the arena for further research of trade, investment and growth. Limited country wise studies are available for India and China for analyzing the trade, investment and growth relations. However, the country specific studies of Brazil, Russia and South Africa are scarce among BRICS countries. In this context, this study gets significance because it can provide the country specific results for Brazil regarding the trajectory of economic growth in response to inward and outward FDI and international Trade.

Review of Literature

The empirical literature demonstrates enormous studies about foreign direct investment, economic growth and/or trade relationships in both developed and developing countries with different time periods cases and methodology frameworks. Most of the studies explain the bivariate relationship only. Among these some of the studies are mainly focused on the relation between FDI and economic growth (Shan, Tian and Sun, 1997; De Mello, 1999; Lheem and Guo, 2004; Asheghian, 2004; Chowdhury and Mavrotas, 2005; Frimpong and Oteng-Abayie, 2006; Yao and Wei, 2007; Alexiou and Tsaliki, 2007; Herzer, Klasen and Lehmann, 2008; Mun, Lin, Man, 2008; Karimi and Yusop, 2009;Pradhan, 2009; Yalta, 2011; Louzi and Abadi, 2011; Gürsoy and Kalyoncu, 2012; and Agrawal, 2013), and some others on the relation between FDI, export and economic growth (Haseeb, Hartani, Baker, Azam and Hassn, 2014; Ismail, Sadaih, Ridzuan and Ahmed, 2014; Kumar, 2012; Sharma, 2002; Tiwari and Mutascu, 2011). Along with these variables some other studies included the variables like trade openness (Ahmadi and Ghanbarzadeh, 2011; Awan, Javed and

Sher, 2012; Belloumi, 2014), import (Shu and Sinclair, 2009; Ozturk and Acaravci, 2010; Liu, Pramadhani, Bissondeeal and Driffield, 2011; and Awan, Javed and Sher, 2012) and domestic investment (Sharma, 2002 and Awan, Javed and Sher, 2012). The relationship between outward FDI and economic growth also had been studied (Chen and Zulkifli, 2012).

However, there are limited studies on the linkage between FDI, trade and economic growth in the literature. FDI inflows and trade have been widely recognized as an important factor in the economic growth of countries. Previous empirical studies (Balasubramanyam, Salisu, and Sapsford, 1996; Shan, Tian and Sun, 1997; Borensztein, Gregorio, and Lee, 1998; Lipsey, 2000; Pahlavani, Lheem and Guo 2004; Wilson, and Worthington, 2005; Liu, Shu and Sinclair, 2009; Tiwari and Mutascu, 2011; Kumar, 2012; Haseeb, Hartani, Baker, Azam and Hassn, 2014; and Ismail, Sadaih, Ridzuan and Ahmed, 2014) have mostly concluded that trade and FDI inflows promote economic growth. While some other studies showed that FDI has no significant impact on the economic growth (Sharma, 2002; Frimpong and Oteng-Abayie 2006; Alexiou and Tsaliki, 2007; Herzer, Klasen and Lehmann, 2008; Karimi and Yusop, 2009; Sridharan, Vijayakumar and Rao, 2009; Yalta, 2011; Louzi and Abadi, 2011; and Belloumi 2014). However, the growth effects from FDI inflows and trade vary from country to country; particularly depending on various country specific factors. A positive effect of FDI and trade on economic growth may simply reflect the fact that FDI is attracted to countries that are expected to grow faster and follow open-trade policies (Maki and Somwaru, 2004). Since the studies analyzing the interrelationship between inward-outward FDI, trade and economic growth is scarce, it is, therefore, important to understand the interrelationships among inward-outward FDI, trade, and economic growth. Since the question of whether inward-outward FDI and trade trigger economic growth or the economic development brings inward-outward FDI and trade is an unresolved issue, this issue has been the subject of empirical studies.

The notion of 'Investment led Economic Development' has put forward the idea that the outward and inward FDI position of a country is related to its Economic Development relative to the rest of the world. Despite the plethora of studies on the direction of the causal link between FDI and economic growth, the empirical evidence is not clear for country groups. The studies in the Brazil are scarce in this area. The inconsistency of the existing findings made difficult to recommend a reliable policy direction for Brazil. The

study is an investigation into the growth trajectory of the Brazil and trying to find out how inflow and outflow of foreign direct investment and international trade influence the economic growth of the country.

**Methodology and Data base**

The study uses the annual time series data of Brazil from 1980-2013 for the variables GDP, outward FDI, inward FDI and Trade, with values in million US dollars which was collected from United Nations Conference on Trade and Development (UNCTAD). Brazil is one of the countries which included in the list of top 10 developing country traders (both export and import) and ranking of FDI (World Bank, 2012). Unit root, cointegration and causality tests are the main tools of analysis.

The long-run model specification employed in this study is expressed as:

$GDP_t = \alpha + \beta_1 IFDI_t + \beta 2 OFDI_t + \beta_3 TRADE_t + \varepsilon_t$ (1)

Based on equation (1), $\beta_1$ and $\beta_1$ and $\beta_1$ are the parameters to be estimated while $\varepsilon_t$ is error term. All variables are measured in real term of natural logarithm. Economic growth is measured by GDP. IFDI and OFDI are inward and outward FDI flows respectively and the expected coefficient sign can be positive or negative. Export and import of the country together measured as Trade. Trade is expected to be positively related with growth.

The first step in the analysis is to verify the stationarity of the data series. Augmented Dickey-Fuller (ADF) test has been employed for this purpose. The unit root property of the data series is crucial for the causality analyses. Variables that are non-stationary can be made stationary by differencing the number of differencing (d) required to make the series stationary identifies the order of integration 1(d). The unit root test results reveal that the null hypothesis of unit root for the selected variables such as GDP, Outward FDI, Inward FDI and Trade in the country was not rejected at levels. But, when the series are first differentiated, both the series are found to be stationary and integrated at the order of one 1(1). All the variables (GDP, OFDI, IFDI and TRADE) have been taken in logarithmic form to make them stationary at lesser order of integration.

The next step is to test for cointegrating relationship. The concept of cointegration was first introduced into the literature by Granger (1980). Cointegration implies the existence of a long-run relationship between economic variables. The principle of testing for cointegration is to test whether two or more integrated variables deviate significantly from a certain relationship (Abadir and Taylor, 1999). In other words, if the variables are

cointegrated, they move together over time so that short-term disturbances will be corrected in the long-term. This means that if, in the long-run, two or more series move closely together, the difference between them is constant. Otherwise, if two series are not cointegrated, they may wander arbitrarily far away from each other (Dickey et al., 1981). The Johansen's procedure is useful in conducting individual cointegration tests but does not deal with co-integration test in panel settings. This paper test for the presence of cointegrating relationships between the variables using the Johansen (1988) maximum likelihood method within a vector autoregressive (VAR) framework as it is most commonly used procedure for time series.

Analysing the causal relationship between variables is the next step of estimation. Regression analysis deals with the dependence of one variable on other variable only, does not prove causality or the direction of influence. The Granger causality test, developed by the Nobel Prize winner Clive Granger, is performed in order to estimate the relationship between the variables and the relationships direction. The time series X is a Granger cause of the times series of Y if X is useful in forecasting Y. In the case where both time series or variables are causing each other we speak of it as a feedback system. The Granger causality is built on the VAR model and F test is used to find the probable causality. After running the cointegration test (Johansen test), if we explored that there is no cointegration between the variables, Hassapis (1999) in his paper implied that, the direction of causality can be decided by applying standard F-tests in the VAR model. The Akaike Information Criteria (AIC) is used for estimating the optimal lag order in the model. Choosing the optimal lag order is crucial for ensuring the white noise process of error terms.

**Estimation and Result**

The results presented in Table 1 shows that the null hypothesis; existence of a unit root which means non-stationary series, cannot be rejected for GDP, IFDI, OFDI and Trade. Since the calculated test statics is greater than the critical values at 5 per cent significant level, all the variable in the levels are non-stationary. Similarly, the ADF test performed for the first differences of variables, concludes that since we reject the null hypothesis of the presence of a unit root, all variables are stationary in the first difference i.e. I (1). This result allows to test for cointegration, i.e., test for same random trend between the variables, so that it can make some comments about the long run relationship of IFDI, OFDI, Trade and economic growth of Brazil.

To analyze the long run relationship between GDP, IFDI, OFDI and Trade, Johansen's cointegration test was performed. AIC information criteria is used to estimate the optimal lag; 4 lags offered by AIC which is the lowest information criterion. To conclude the cointegration properties, Table 2 points out that, since the test values fall in the rejection area, it rejects the null hypothesis of "no cointegration between the variables", thus there is a long run relationship between IFDI, OFDI inflows, Trade and economic growth in Brazil.

After constructing the VAR model, the causality test is performed. The results of the Granger causality test presented in the Table 3, indicates that since p-Values are higher than 5 per cent significance level, it cannot reject the null hypotheses of OFDI does not Granger Cause TRADE, IFDI does not Granger Cause TRADE, TRADE does not Granger Cause IFDI, IFDI does not Granger Cause OFDI, OFDI does not Granger Cause IFDI, GDP does not Granger Cause TRADE, TRADE does not Granger Cause GDP, OFDI does not Granger Cause GDP, GDP does not Granger Cause OFDI, IFDI does not Granger Cause GDP, rather it can accept the null hypotheses. GDP cause the FDI inflow to Brazil rather than FDI-led growth. The outward FDI is caused by trade. Thus, it can conclude that there is a unidirectional causality between GDP and FDI inflows, and Trade and FDI outflows in Brazil in the long run.

**Conclusion**

Objective of the present study is to check the causality between GDP, inward FDI, outward FDI and trade. For this objective, Cointegration technique has been employed to examine the causal relation among GDP, inward FDI, outward FDI and trade in Brazil. Granger causality test for Brazil gives strong evidence of unidirectional causality running from GDP to IFDI and Trade to OFDI i.e., GDP influences the FDI inflow and trade influence the FDI outflow. The empirical results indicate a virtuous procedure of development for Brazil; more FDI into Brazil leads to more imports, which in turn leads to more exports because of synergies created by this procedure. In this sense, inward FDI at economy level in Brazil can be regarded as efficiency seeking, which increases the volume of trade.

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Table 1: ADF Tests for Unit Roots

| Variable | Level | First difference |
|---|---|---|

| | Critical values at 5% | t-Statistic | Prob. | Critical values at 5% | t-Statistic | Prob. |
|---|---|---|---|---|---|---|
| ln_GDP | -2.957 | -0.416 | 0.680 | -2.957 | -4.005 | 0.000 |
| ln_IFDI | -2.954 | -0.755 | 0.456 | -2.957 | -5.983 | 0.000 |
| ln_OFDI | -2.957 | -1.243 | 0.224 | -2.986 | -3.936 | 0.001 |
| ln_TRADE | -2.954 | 1.077 | 0.290 | -2.957 | -5.105 | 0.000 |

**Table** 2: **Johansen Cointegration Test Results for GDP,IFDI,OFDI and TRADE**

| Null Hypotheses | Max-Eigen Statistic | 5% Critical Value | Prob.** | Trace Statistic | 5% Critical Value | Prob.** |
|---|---|---|---|---|---|---|
| r=0 | 78.375** | 27.584 | 0.000 | 122.144** | 47.856 | 0.000 |
| r=1 | 37.988** | 21.132 | 0.000 | 43.770** | 29.797 | 0.000 |
| r=2 | 4.454 | 14.265 | 0.809 | 5.782 | 15.495 | 0.721 |
| r=3 | 1.327 | 3.842 | 0.249 | 1.327 | 3.842 | 0.249 |

Max-eigenvalue and Trace test indicates 2 cointegrating eqn(s) at the 0.05 level

** denotes rejection of the hypothesis at the 0.05 level

**Table** 3: **Granger Causality Test for for GDP,IFDI,OFDI and TRADE**

| Null Hypothesis: | F-Statistic | Prob. |
|---|---|---|
| IFDI does not Granger Cause GDP | 0.30914 | 0.8185 |
| GDP does not Granger Cause IFDI | **4.65203** | **0.0106** |
| OFDI does not Granger Cause GDP | 0.14042 | 0.9348 |
| GDP does not Granger Cause OFDI | 1.6517 | 0.2039 |
| TRADE does not Granger Cause GDP | 0.94862 | 0.4328 |
| GDP does not Granger Cause TRADE | 0.7937 | 0.5094 |
| OFDI does not Granger Cause IFDI | 1.68592 | 0.1966 |

| | | |
|---|---|---|
| IFDI does not Granger Cause OFDI | 1.2936 | 0.2994 |
| TRADE does not Granger Cause IFDI | 1.91246 | 0.1545 |
| IFDI does not Granger Cause TRADE | 1.34149 | 0.2844 |
| TRADE does not Granger Cause OFDI | **3.43768** | **0.0328** |
| OFDI does not Granger Cause TRADE | 1.17766 | 0.339 |