

Economic Growth in Brazil: Granger Causality

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Abstract

Given the continuing economic growth in Brazil, there is a growing interest in examining the variables that fuel such growth. The immense literature on economic growth in Brazil is composed of studies that investigate different aspects of this nation's growth in GDP. However, no study has examined the causality between economic growth and its determining elements.

The purpose of this study is: (1) to determine the economic variables that contribute to Brazil's GDP growth over time, and (2) to examine the causality between these variables and economic growth. To achieve these goals the study uses a model that is based on the postulates of de Mello. Employing annual data, the model will be estimated by using the Beach Mackinnon technique which corrects for autocorrelation.

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1 Introduction

Brazil has emerged as an economic marvel in both Latin America and the third world. In recent years, Brazil's GDP has grown by an average annual rate of over 5 percent, which exceeds the growth of the U.S. and Western Europe. This condition has contributed to the ability of this nation to survive the global

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financial crisis with relatively insignificant effects. Brazil was one of the last nations to plummet into recession in 2008 and among the first to resume growth in 2009. Following its economic recovery, Brazil experienced GDP growth of 7.5 percent and 2.7 percent in year 2010 and 2011, respectively. The Brazilian economy slowed significantly over 2011 and 2012. The GDP growth of 7.5%, decelerated to 2.7% in 2011 and came to 0.9% in 2012. Industrial output and investment demand were affected. Yet, in spite of its economic slow-down, Brazil's strong domestic market is less vulnerable to external upheavals, and its economy benefits from a relatively low inflation rates, stable economic growth, and improvements in social well-being [1].

Today, Brazil, a newly industrialized nation, is the seventh wealthiest economy in the world. It is also the largest nation by area and population in Latin America and the Caribbean [2]. As one of the so called BRICS nations along with Russia, India and China, its economy has overtaken UK as the world's sixth-largest economy by nominal of GDP [3]. Furthermore, along with nations such as China, India, and Indonesia Brazil continues to sustain a strong rebound, even in the face of weak recovery in the advanced economies and continues to attract capital flows [4].

Given the impressive rate of growth of GDP in Brazil in recent years, many researchers have tried to investigate the elements that fuel its GDP growth. However, each of these studies concentrates on only one of the variables that affect the GDP growth. None of these studies examine all of the other economic variables that have an effect on GDP nor do they investigate the interaction of these variables with each other.

The purpose of this study is: (1) to determine the economic variables that contribute to Brazil's GDP growth over time, and (2) to examine the causality between these variables and economic growth.

2 Survey of the Literature

As mentioned earlier, the existing empirical studies on economic growth in Brazil concentrate on examining the relationship between one economic variable and GDP. In this section we review some of these studies and present their results.

In their study C. Calderón and L. Liu [5] use data of 109 developing and industrial countries from 1960 to 1994 to examine the direction of causality between financial development and economic growth. They employ Geweke decomposition test on the pooled data. They conclude that financial development generally leads to economic growth. Additionally they find that the Granger causality from financial development to economic growth and the Granger causality from economic growth to financial development coexist. Their analysis also indicates that financial deepening contributes more to the causal relationships in the developing countries than in the industrial countries. They point out that the longer the sampling interval, the larger the effect of financial development on

economic growth. Finally, they learn that financial deepening fuels economic growth through both a faster capital accumulation and productivity growth, with the latter channel being the strongest.

In their study, F. Seabra and L. Flach [6] employ Granger causality analysis to investigate the nature of the causal relationship between FDI and profit remittance in Brazil. Using the Granger causality test procedure developed by Toda and Yamamoto, their findings suggest that FDI causes profit remittance and emphasize significant adverse long-run effects of FDI attraction strategies for the Brazilian economy.

In their paper P. Sridharan, N. Vijayakumar and K. Chandra [7] use quarterly data and examine the causal relationship between Foreign Direct Investment (FDI) and economic growth for Brazil, Russia, India, China and South Africa (BRICS nations). Their study use Industrial Production Index (IPI) as a measure of Economic Growth. Utilizing Augmented Dickey Fuller (ADF) Test they check for the stationarity of the data series. They employ the Johansen Co-integration to find out the level of consistence of co-integration and learn that Brazil alone was co-integrated among the selected countries. To trace the existence of long run relationship, they use Vector Error Correction Model (VECM) model. The results of VECM indicate that Growth leads FDI bi-directionally for Brazil, Russia and South Africa and FDI leads Growth uni-directionally for India and China respectively.

In their study, E.M. Ekanayake, R.Vogel, and B. Veeramacheneni [8] employ a vector autoregressive (VAR) model and error correction techniques to test for the existence and nature of the causal relationship between output level, inward FDI and exports. Using data from 1960-2001 across a cross-section of both developed and developing countries (including Brazil) they analyze the extent and sources of international linkages between openness and economic performance. Their findings support bi-directional causality between exports growth and economic growth. However, the relationship between the economic growth and FDI growth renders mixed results. Brazil is the only country in their sample that showed bi-directional causality for FDI and growth.

In his paper, Jayme Junior [9] employs cointegration technique and applies Thirlwall's balance-of-payments constraint model to Brazilian economic growth, using annual data from 1955 to 1998. The model is tested on the Brazilian economy after industrial takeoff in 1955 until 1998 using the cointegration technique and a vector error correction (VEC) representation to find the dynamic responses of exports to GDP. The results show that there is a positive cointegration between growth in exports and long-term economic growth in Brazil. Furthermore, the findings reveal the importance of external constraints for long-run economic growth. Additionally, the study suggests that a plan of export promotion along with an import substitution strategy could be rational in terms of policy prescriptions, because both strategies cause moderate balance-of-payments constraints in the long.

In his study, O.S. Oladipo [10] examines the FDI-growth nexus for sixteen

developing countries of Latin America and the Caribbean nations during the last three decades, a time period during which many of these nations introduced various economic and financial reforms. Using the Granger non-causality test developed by Toda and Yamamoto [11], and Dolado and Lutkepohl [12], his results suggest the null hypothesis that “FDI does not Granger cause economic growth” can be rejected for all nations except Dominican Republic, Trinidad and Tobago, and Jamaica. The test result also provides evidence of unidirectional causality from growth to FDI for all countries except Bolivia, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, and Jamaica. Finally, the study finds bidirectional causality for Argentina, Brazil, Mexico, Peru and Venezuela.

3 Theoretical Considerations

One of the main inferences of the neoclassical growth theory is that all nations eventually will approach the same level of productivity. The lack of evidence that this might take place sparked the development of “new growth theories” [13]. One of the main features of these new theories is to make technology as an endogenous variable. Additionally, according to new theories, technology is considered to have both “private good” characteristics and “public good” characteristics [14]. This connotes that the gains of innovations can be partially appropriated. Assuming that technological diffusion occurs more easily within a nation than between nations, a technological gap between nations persists. In another words, no nation can completely depend on “imitation” to approach the technological frontier [15].

The traditional neo-classical growth models postulate that long-run economic growth arises from both technological progress and labor force growth, which are both exogenously determined. In these models, FDI is considered to only have a short-run effect on the growth of output. However, the recent acceptance of endogenous growth theory has promoted research into channels through which FDI can be expected to encourage economic growth in the long-run (see [16] and [17]). This has led to the prevailing view that multinational corporations (MNCs) can complement the local industry and stimulate growth and welfare in the host nations.

The merit of endogenous growth models is the assumption that long-run economic growth is not affected by technological changes alone, but also by institutional and nation-specific factors. The host country’s economic environment portrayed by its rate of economic growth, trade policy, political stability, legislation, domestic market size, and balance of payments constraints, can have significant effect on FDI inflows industries (see [18], [19], [20], [21] and [22]). Thus, a host country government can stimulate economic growth by devising policies that are more conducive to FDI. Additionally, FDI may intensify competition, altering the structure of imperfectly competitive industries. This, in

turn, may generate demand for local output, stimulating supply.

In various theoretical frameworks, a lot of attention has been paid to technological differences as the determinants of international competitiveness and growth of advanced nations. Modern growth theories accentuate the importance of innovative endeavors in the context of imperfect competition models of trade and growth [23].

Dosi and his colleagues [24] introduced neotechnology or evolutionary approaches to technological change and growth in 1990. In their theoretical framework, absolute gaps in technology are perceived to be more significant than endowments-based comparative advantage in exemplifying trade flow and growth. Traditionally, given the assumption of perfect competition, the neoclassical trade and growth theory considers FDI as a form of international capital movement. Accordingly, international capital movements, and hence FDI, are explained in terms of *differential profit*, or *differential interest rates* found in different countries. However, following the earlier Hymer's insights into the determinants of FDI, the inadequacy of the assumption of perfect competition in the analysis of FDI is well established. Today, given the assumption of imperfect competition, the eclectic theory of Dunning implies that firm-specific advantages and their interaction with location and internationalization advantages must also be incorporated into the formulation of international trade and growth theory [25].

FDI affect the economy of a host country in a variety of ways. First, it brings with it the needed capital and modern technology that enhances economic growth in the recipient country (see [26], [27], and [28]). Second, through managerial and labor training it augments the knowledge of the host country, stimulating economic growth [29]. Third, it promotes technological upgrading, in the case of start-up, marketing, and licensing arrangements (see [30] and [31]). Thus, FDI can be considered as an instrument in promoting industrial development and technological upgrading. As such, FDI may enhance productivity and technological progress in the host country, contributing to its economic growth.

Not only does FDI affect the economy of a host country, the economy of the host country has also some bearing on FDI. More specifically, the absorptive capacity of the host country impacts the volume and type of FDI that flows into that country. The absorptive capacity of a host country, in turn, depends on the country's trade regime, legislation and political stability. It also hinges upon scale factors, such as balance of payments constraints, and size of domestic market for the goods produced through FDI. The consideration of such nation-specific factors allows for examination of FDI-induced externalities or "spillovers." [32].

The empirical studies in the area of FDI-led growth can be divided into two approaches. The first approach uses cross-sectional data. The second approach applies time series data. Unfortunately, both of these approaches have met with problems.

Potential problems with cross-sectional analysis stem from the assumption that nations share common characteristics. However, in practice such an assumption is not valid due to the fact that nations differ not only in their political,

economic, and institutional structure, but also in their response to external shocks. In a nut shell, estimates from cross sectional data are misleading because they do not take into considerations nation-specific features.

Potential problems with time-series analysis have been noted by a number of researchers (see [33], [34], [35], [36], [37], and [38]) and is related to the inappropriateness of applying F-test statistics to causality tests.

It is now well established that the F-test statistics is not valid if time series are integrated (see [39] and [40]) and causality tests are sensitive to model selection [41].

This paper examines the causal relationship between economic growth and its determinants by examining unit root properties and the Granger non-causality tests.

4 The Model

The theoretical model employed in this study is based on the postulates of deMello [42], and was set forth in Ericsson and Irandoust [43]. Consider the following production function, depicting an economy that produces a single consumption good:

$$Y = Ef(K, L, FDI) \quad (1)$$

where Y is real GDP, E represents the state of economic environment, K stands for physical capital, L depicts labor, and FDI symbolizes foreign direct investment. In this formulation, E, the state of economic environment encompasses different control and policy variables that affect the economy's productivity level.

Assume that production is performed in the recipient country by combining physical capital and labor. Further suppose that the physical capital is composed of domestic capital (K_d), and foreign-owned capital (K_f) that is generated from FDI.

Let H stand for human capital in the recipient nation. Given a Cobb-Douglass production function, equation (1) can be represented as:

$$Y = Ef(K_d, H) = EK_d^\beta H^{1-\beta} \quad (2)$$

where, β is the share of domestic physical capital. To ensure the existence of diminishing returns to domestic capital, assume that $\beta < 1$. Assume that H depends on domestic-owned and foreign-owned capital, and is represented by a Cobb-Douglass function of the following type:

$$H = (K_d^\lambda K_f^\lambda)^\eta \quad (3)$$

where, λ and η are marginal and the intertemporal elasticities of substitution between foreign and domestically-owned capital stock, respectively. If we merge equation (2) and (3) we get the following equation:

$$Y = EK_d^{\beta+\eta(1-\beta)} K_f^{\lambda\eta(1-\beta)} \quad (4)$$

Taking logarithms of equation (4), we get:

$$\ln Y = \ln E + [\beta + \eta(1 - \beta)] \ln K_d + \lambda\eta(1 - \beta) \ln K_f \quad (5)$$

Taking time derivatives of equation (5) we get:

$$\frac{1}{Y} \frac{dY}{dt} = \frac{1}{E} \frac{dE}{dt} + [\beta + \eta(1 - \beta)] \frac{1}{K_d} \frac{dK_d}{dt} + \lambda\eta(1 - \beta) \frac{1}{K_f} \frac{dK_f}{dt} \quad (6)$$

or

$$G_Y = G_{VA} + [\beta + \eta(1 - \beta)] G_{DI} + [\lambda\eta(1 - \beta)] G_{FDI} \quad (7)$$

where, G_Y represents the growth rate of GDP, G_{VA} stands for the growth rate of value added and is used as a proxy for the economies' productivity level. G_{DI} is the growth rate of DI, and G_{FDI} represents the growth rate of FDI.

5 Data and Estimation Results

The study employs annual data and spans the 1970-2011 period. This provides us with a 40-year observation on the growth rates of all of the variables included in the model. The raw data for the rate of growth of Y, the rate of growth of DI, and the rate of growth of VA were derived from the website of the *United Nations* [44], and the rate of growth of FDI were derived from the website of the *United Nations Conference for Trade and Development* [45]. All the data, derived at constant prices, were used to calculate the growth rate for each variable under consideration. Equation 7 was estimated by using the Beach Mackinnon technique which corrects for the autocorrelation. The estimation results are presented in Table 1. The Value of 0.9836 reported for the adjusted R_2 suggests that the model has significant explanatory power. The estimation results suggest the following:

- a) G_{VA} is positive and highly significant, suggesting that VA growth has a significant impact on the rate of growth of Y.
- b) G_{DI} is positive and highly significant, suggesting that DI growth has a significant impact on the rate of growth of Y.
- c) G_{FDI} is negative and highly insignificant, suggesting that FDI growth has a no significant impact on the rate of growth of Y.

Table 1: Determinants of Economic Growth

Variables	Coefficient	Standard Error	T-Ratio	P- value
V	0.87074	0.03242	26.86	0.000
DI	0.0616	0.01524	3.949	0.000
FDI	-00062707	0.001267	-0.4951	0.621

Having estimated equation 7, the next task was to determine if there is any time-series support for FDI-led growth hypothesis in the Brazil. More specifically to answer the following questions:

1. Does any causality exist between G_Y and G_{FDI} ?
2. Does any causality exist between G_{FDI} and G_{VA} ?

To answer these questions, a Granger non-causality test is performed in each case.

To examine the direction of causation between G_Y and G_{FDI} , the following unrestricted models are set up:

$$G_Y^t = \sum_{i=1}^6 a_i G_Y^{t-i} + \sum_{j=1}^6 b_j G_{VA}^{t-j} + \sum_{k=1}^6 c_k G_{DI}^{t-k} + \sum_{d=1}^6 d_l G_{FDI}^{t-l} + \varepsilon_t \quad (8)$$

$$G_{FDI}^t = \sum_{i=1}^6 a_i G_Y^{t-i} + \sum_{j=1}^6 b_j G_{VA}^{t-j} + \sum_{k=1}^6 c_k G_{DI}^{t-k} + \sum_{d=1}^6 d_l G_{FDI}^{t-l} + \varepsilon_t \quad (9)$$

where, t stands for time, ξ_t and is white noise.

To examine the direction of causation between G_{FDI} and G_{TFP} the following unrestricted models are set up:

$$G_{FDI}^t = \sum_{i=1}^6 a_i G_Y^{t-i} + \sum_{j=1}^6 b_j G_{VA}^{t-j} + \sum_{k=1}^6 c_k G_{DI}^{t-k} + \sum_{d=1}^6 d_l G_{FDI}^{t-l} + \varepsilon_t \quad (10)$$

$$G_{VA}^t = \sum_{i=1}^6 a_i G_Y^{t-i} + \sum_{j=1}^6 b_j G_{VA}^{t-j} + \sum_{k=1}^6 c_k G_{DI}^{t-k} + \sum_{d=1}^6 d_l G_{FDI}^{t-l} + \varepsilon_t \quad (11)$$

The estimation results, as shown in Table 2, suggest the following:

1. The null hypothesis that G_{FDI} does not Granger cause G_Y can be rejected at 10 percent level of significance. This result shows that there is a unidirectional causality from foreign direct investment to economic growth.
2. The null hypothesis that G_Y does not Granger cause G_{FDI} cannot be rejected. This implies that Brazil's economic growth does not have any significant impact on the growth of FDI.
3. The null hypothesis that G_{FDI} does not Granger cause G_{VA} cannot be

rejected. This means that the growth of FDI does not have any significant impact on the growth of VA in Brazil.

4. The null hypothesis that G_{VA} does not Granger cause G_{FDI} cannot be rejected. This implies that the growth of VA has no significant impact on the growth of FDI in Brazil.

Table 2: Granger non-causality Test

Ho	Wald Chi-Square Statistics	P-Value
FDI does not Granger cause growth	2.9522065	0.08576
Growth does not Granger cause FDI	6.2536402	0.39539
FDI does not Granger cause VA	6.2536402	0.39539
VA does not Granger cause FDI	5.2744825	0.50912

6 Concluding Remarks

The purpose of this study was to examine the determinants of economic growth in Brazil and to see if there is any time-series support of FDI-led growth hypothesis in Brazil. To achieve these goals the study used a model that is based on postulates of de Mello. Employing a 40-year annual data, the model was estimated by using the Beach Mackinnon technique which corrects for autocorrelation. The estimation results suggest the following conclusions:

1. The major determinants of economic growth in the Brazil are value added growth, and domestic investment growth.
2. The causal relationship between foreign direct investment growth and economic growth is unidirectional, running from FDI growth to GDP growth.
3. There is no causal relationship between foreign direct investment growth and value added growth in either in Brazil.

The absence of FDI as a determinant of economic growth, evidenced by this study, may be related to the existence of a unidirectional causality from foreign direct investment to profit remittance in the case of the Brazilian economy, adversely impacting economic growth in the long-run [46]. This calls on the Brazilian policy makers to account for this adverse effect when implementing policies to attract foreign investors.

As the survey of literature in this paper indicates, unlike this study that finds unidirectional causality between FDI and GDP growth, previous empirical studies

on Brazil find bi-directional causality for FDI and GDP growth. The difference in the outcome of this study could be related to a number of factors, encompassing different methodologies, different time periods, and different intervals under consideration.

References

- [1] World Bank, "Brazil: Overview," *The World Bank*, Retrieved on 09/01/2012.
- [2] World Bank, *Ibid.*
- [3] Economy Watch, "The World Largest Economy," Retrieved on 10/12/1013.
- [4] United Nations, "World Economic Situation and Prospects 2011", Retrieved on 10/12/1013.
- [5] C. Calderón and L. Liu, The direction of causality between financial development and economic growth, *Journal of Development Economics*, **72**(1), (October, 2003), 321-334.
- [6] F. Seabra and L. Flach, Foreign direct investment and profit outflows: a causality analysis for the Brazilian economy, *Economics Bulletin*, **6**(1), (2005), 1-15.
- [7] P. Sridharan, N. Vijayakumar and K. Chandra, Causal Relationship between Foreign Direct Investment and Growth: Evidence from BRICS Countries, *International Business Research*, **2**(4), (October, 2009), 198-203.
- [8] E.M. Ekanayake, R. Vogel, and B. Veeramacheneni, Openness and economic growth: empirical evidence on the relationship between output, inward FDI, and trade, *Journal of Business Strategies*, **20**(1), (2003), 60-72.
- [9] G. Jayme Junior, Balance-of-payments constrained economic growth in Brazil, *Brazilian Journal of Political Economy*, **23**(1), (Jan.-March, 2003), 62-84.
- [10] O.S. Oladipo, Does Foreign Direct Investment cause long run Economic Growth? Evidence from the Latin America and the Caribbean Countries, *Applied Econometrics and International Development*, **12**(1), (2012), 93-106.
- [11] H.Y. Toda and T. Yamamoto, Statistical inference in Vector Autoregressions with possibly integrated processes, *Journal of Econometrics*, **66**, (1995), 225-250.
- [12] J. Dolado and H. Lutkepohl, Making Wald Tests work for Co-integrated VAR Systems, *Econometric Review*, **15**, (1996), 369-386.
- [13] G.M. Grossman and E. Helpman, *Innovation and Growth in the Global Economy*, Cambridge, MA: MIT Press, 1991.
- [14] K. Wakelin, *Trade and Innovation: Theory and Evidence*, Edward Elgar, Cheltenham, 1997.
- [15] B.A. Lundvall, (ed.), *National Systems of Innovation: Toward a Theory of Innovation and Interactive Learning*, London: Pinter Publisher, 1992.
- [16] G. M. Grossman and Helpman, 1991, *Ibid.*
- [17] R. Barro and X. Sala-i-Martin, *Economic Growth*, Cambridge, MA: McGraw-Hill, 1995.

- [18] J.H. Dunning, *Multinational Enterprises and the Global Economy*, Reading, United Kingdom: Addison-Wesley Publishing Company, 1993.
- [19] R.E. Caves, *Multinational Enterprise and Economic Analysis*, Cambridge: Cambridge University Press, 1996.
- [20] L.R. de Mello, *Foreign Direct Investment, International Knowledge Transfers, Endogenous Growth: Time Series Evidence*, Department of Economics, University of Kent, United Kingdom, 1996.
- [21] L.R. de Mello, Foreign Direct Investment in Developing Countries and Growth: A Selective Survey, *The Journal of Development Studies*, **34**(1), (1997), 1-34.
- [22] L.R. de Mello, Foreign Direct Investment-Led Growth: Evidence from Time Series and Panel Data, *Oxford Economic Papers*, **51**, (1999), 33-151.
- [23] G. M. Grossman and Helpman, 1991, Ibid.
- [24] G. Dosi, K. Pavitt and L. Soete, *The Economics of Technical Change and International Trade*. London: Harvester Wheatsheaf, 1990.
- [25] Dunning 1993, Ibid. and Caves 1996, Ibid.
- [26] Dunning 1993, Ibid].
- [27] M., Blomstrom, R.E., Lipsey and M. Zejan, Is Foreign Investment the Key to Economic Growth?, *The Quarterly Journal of Economics*, **111**, (1996), 269–276.
- [28] E. Borensztein, J. De Gregorio and J-W. Lee, How Does Foreign Direct Investment Affect Economic Growth?, *Journal of International Economics*, **45**, (1998), 115–135.
- [29] De Mello, 1996, 1997, and 1999, Ibid.
- [30] L.R. de Mello and T. M. Sinclair, *Foreign Direct Investment, Joint Ventures, and Endogenous Growth*, Department of Economics, University of Kent, United Kingdom, 1995.
- [31] J.R. Markusen and Venables, Foreign Direct Investment as a Catalyst for Industrial Development, *European Economic Review*, **43**, (1999), 335–356.
- [32] De Mello, 1999, Ibid.
- [33] Y. Toda, Finite Sample Properties of Likelihood Ratio Tests for Cointegration Ranks When Linear Trends Are Present, *Review of Economics and Statistics* **76**, (1994), 66–79.
- [34] R. Bewley and M. Yang, On the size and power of system tests for cointegration, in: McAleer et al., eds., *Proceedings of Econometric Society Australasian Meeting 1996*. Perth, Australia, **3**, (1996), 1–20.
- [35] J. A. Giles and S. Mirza, *Some Pretesting Issues on Testing for Granger Noncausality*, Mimeo. Victoria, British Columbia: Department of Economics, University of Victoria, 1998.
- [36] H.Y. Toda and T. Yamamoto, Statistical inference in Vector Autoregressions with possibly integrated processes. *Journal of Econometrics*, **66**, (1995), 225-250.
- [37] J.A. Giles, and C.L. Williams, Export-led growth: A Survey of the Empirical Literature and Some Noncausality Results, *Econometric Working Paper*

- EWP9901*. Victoria, British Columbia: Department of Economics, University of Victoria, 1999.
- [38] Blomstrom et al., 1996, Ibid.
- [39] Toda and Yamamoto, 1995; Ibid.
- [40] H. O Zapata and A.N. Rambaldi, "Monte Carlo Evidence on Cointegration and Causation, *Oxford Bulletin of Economics and Statistics*, **59**(2), (1997), 285–298.
- [41] Giles and Williams, 1999, Ibid.
- [42] de Mello, 1996, 1997, 1999, Ibid.
- [43] Ericsson and Irandoust. 2001, On the Causality Between Foreign Direct Investment and Output: A Comparative Study, *The International Trade Journal*, **15**, (2001), 1-23.
- [44] <http://data.un.org>
- [45] <http://unctadstat.unctad.org>
- [46] F. Seabra and L. Flach , Ibid