

Emerging MNE from Emerging Economies: OFDI from Brazil

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Abstract

Outward Foreign Direct Investments (OFDI) from Multinational Enterprises (MNEs) from emerging countries is a recent phenomenon that is changing the patterns of the international markets. Brazil is among the new significant emerging foreign investors, showing impressive investment growths in the past decades. This paper investigates the locational determinants of Brazilian OFDI, and whether Brazilian foreign investments follow the patterns of the established theory on FDI motivations. This study is made using panel data methodology to analyze Brazilian OFDI data from 2001 to 2010. The results suggest that economic freedom is a strong determinant of Brazilian OFDI; other significant motivations for Brazilian investments include market size, economic openness and cultural proximity. However, the analysis also revealed some unexpected results, in particular, human capital, technology, exchange rate and geographic distance do not result to influence Brazilian OFDI as predicted. In addition, Brazilian investors are not concerned about political risk and macroeconomic instability in the conventional way. These findings suggest that some aspects of OFDI from Brazil are not predicted by the present theories on the determinants of foreign investment.

Keywords

Emerging MNE, OFDI, Brazil outward direct investment, panel data analysis.

1. Introduction

The global growth of new multinationals from emerging economies is a recent phenomenon that is influencing the international market. Multinational enterprises (MNEs) from emerging countries are now competing against their counterparts from developed countries. The reasons for the growing level of outward foreign direct investment (OFDI) from emerging MNEs can refer to opportunities and challenges present in the host economies as well as the characteristics of the home country that may or may not incentive companies to move abroad. In many cases, these new MNEs are gaining market power based in their innovative business strategies.

OFDI from developing countries have risen from US\$145 billion in 1990 to US\$3.1 trillion in 2010 (UNCTAD, 2011). Brazil is among the new emerging economies that have been showing an impressive growth in the last decades. In the beginning of the millennium, there were more than 300 Brazilian MNEs present in the global market; the flows of OFDI from Brazil were located in all 5 continents (Gouvea and Santos, 2004). Comparing to the rest of the world, in 2006 Brazil was ranked the 12th leading global investor (UNCTAD, 2007).

Recently, a growing amount of studies have been made attempting to investigate the main variables that influence OFDI from emerging economies. However, the studies made on the drivers for Brazilian OFDI focused on case studies of the Brazilian firms, none of those studies focused on the country level determinants of OFDI from Brazil; therefore, the contribution of this study is to focus on the locational determinants for OFDI from Brazilian MNEs. The objective of this study is to determine the main host country characteristics that attract Brazilian OFDI; in order to do that, this study uses panel data techniques to investigate the influence that chosen economic and institutional characteristics of countries host to Brazilian foreign investments had on the Brazilian OFDI levels in the last decade.

This paper is organized as follows. In the second chapter there is a literature review, which begins with the presentation of the established theory on FDI, focusing on the most recent influential approaches to FDI motivations for developing countries; followed by a review of the literature on the evolution and main characteristics of Brazilian foreign investments. The third chapter presents the model used for the analysis proposed by this paper; firstly, there is a description of the variables chosen to represent the locational characteristics, that based on the literature review, are expected to influence the levels of FDI outflows and the description of the hypotheses to be tested; followed by a description of the methodology used in this

study. In the fourth chapter it is presented the analysis of the results. Finally, in the fifth chapter it is given the concluding remarks.

2. Literature Review

In this section, the general theory on FDI is reviewed, focusing on the most influential recent approach to FDI from developing countries found in the recent literature based on Dunning's theory. Then, it is given a brief introduction to the evolution of Brazilian OFDI followed by the characteristics of Brazilian foreign investments from the last decade.

2.1. General Theory of OFDI

One of the first economists to address the issue of the FDI determinants was Ohlin in the 1930s, he argued that FDI was mainly driven by the possibility of achieving higher profits in growing markets, as well as the possibility of financing investments at relatively low interest rates in the host country; further motivations were the need to overcome trade barriers and to access new sources of raw material (Nonnenberg and Mendonca, 2004).

Industrial Organization theory's scholars brought the focus of the study of MNEs from the nation to the firm in the 1960s. The argument of this approach was that MNEs were instruments used to reduce competition in industries where strong entry barriers had created local monopolies, so monopolists decide to merge their firms, instead of competing amongst them; therefore the MNEs internalise externalities created by competition. However, this theory failed to explain the existence of MNEs in highly competitive industries. To cover this gap, in the end of the 1970s economists introduced the Transaction Cost/Internalisation theory which argues that a firm expands abroad when it can organize interdependencies between agents located in different countries more efficiently than markets. These interdependencies may involve some type of know-how, raw material and components, marketing and distribution services or financial capital (Hennart, 2001).

The most influent approach used recently in the literature to give a possible explanation for the existence of MNEs and FDI is the Eclectic Paradigm (Dunning, 1988), also known as the OLI model, which pieces together: *Ownership advantages* (such as returns of scale, technology, know-how, trademark, and so forth), *Location advantages* (such as resource availability, special taxes or tariffs and so on) and *Internalization advantages* (advantages resulting from the usage of the firm's own assets instead of producing through a partnership arrangement). An enterprise entering a new market will have the inherent disadvantage trying

to compete against domestic firms, in order for MNEs to be competitive in a foreign country they must have certain specific advantages, which must be enough to compensate the costs of operating overseas.

OFDI can be influenced by the following. *Home country environment*, which includes macroeconomic and policy factors that may influence firms to invest overseas, such as home market growth rate, domestic currency appreciation, capital account liberalisation and so on. *Host country environment*, which includes pull factors related to host country ability to attract investments, such as market size, government incentives, institutional framework and so on. Finally, *corporate specific influences*, which includes push factors such as internalization strategies or following competitors and suppliers; management factors such as the availability of skills and knowledge necessary to implement company strategies and chance factors such as being invited to operate abroad (UNCTDA, 2007).

The motives for OFDI can be classified in four main categories. The first category is *resource seeking investments* which aims to have access to material and human resources at lower costs; in this case OFDI is usually associated with exporting the goods which are intensive in the resources available in the country which receives the investment. The second type is *market seeking investments*, which are intended to have access to the domestic market of the country which receives the investments. The third category is *efficiency seeking investments*, referring to investments that search lower production costs, enjoying economies of scale and scope by concentrating the production. The fourth type is *asset seeking investments*, where already existent assets in the foreign country are acquired, for example through joint ventures, acquisitions, mergers and so on (Narula and Dunning, 2000; Amal and Seabra, 2007).

It is important to consider the role of institutions as FDI determinants. In a global perspective, investors look for locations where the institutional environment facilitates expansion of their specific advantages (Campanario et al, 2011). Institutions form part of the “created assets” of countries, which have come to be more and more significant for foreign direct investors (Narula and Dunning, 2000). When deciding on host countries for investments firms take into account variables such as government policies, intellectual property right protection and political risk. Locational advantages and institutions are very important in international business because they are the main immobile factors in a global market (Bevan et al, 2004).

Dunning (1981) also developed the Investment Development Path (IDP) model, according to this approach the level of economic development of a country is directly related to its level of

inward and outward FDI. The IDP studies how FDI levels respond to changes in the ownership advantage of MNEs and the location advantages of countries (Narula and Guimon, 2010). The IDP theory defends that there are five stages of economic development. At the first stage it is not likely to observe inward or outward FDI, this stage reflects the situation that the least developed countries are in; the country has little ownership and location advantages, generally due to a limited domestic market, the presence of a low skilled labour force and lack of good institutions and government policies. At the second stage, as income per capita grows inward FDI starts to rise, while outward FDI remains low because the ownership advantages of the domestic firms continue to be weak. At the third stage, as domestic firms become more competitive it is expected that inward FDI declines and outward FDI increases. At the fourth stage domestic firms become able to compete in the international market through acquired firm specific advantages and the level of outward FDI is higher than the level of inward FDI. Finally at the last stage, when the country reaches a high level of development, the IDP theory suggests that the net balance of inward and outward FDI tends to be around zero (Duran and Ubeda, 2001; Narula and Guimon, 2010). The literature defends that Brazil is in the third stage of IDP (Gammeltoft, 2008).

For analytical purposes, in a historical point of view the literature suggests that OFDI from emerging countries can be classified in three waves (Gammeltoft et al, 2010). The first wave dated from the 1960s until the 1980s, it was dominated by import substitution strategies predominantly from the Latin American countries, in this wave firms were focused mainly on market and efficiency seeking strategies and OFDI was mainly directed towards other developing countries (usually neighbour countries). Born in the begging of the 1980s a process generically described as economic globalization has raised the increasing cross-border interdependence and integration of production and market for goods, services and capital. This process has caused the continuing growth in the international flows of both portfolio investment and foreign direct investment, as well as in the number of cross-border strategic alliances. Alongside with the growth of the global levels of FDI, there has been also an increase in the competition among governments for such investments, which can provide opportunity for domestic spillovers of technology and organizational skills (Narula and Dunning, 2000). The second wave goes from 1980s to 1990s and was dominated by export orientation strategies mainly from the Asian countries. Finally, the third wave started in the 1990s and it is present until now, this current wave is characterized by the presence of more

advanced structures of emerging MNEs from developing countries in general (Rovai et al, 2004; Gammeltoft, 2008).

The reason why many recent studies have been made focusing on the MNEs from emerging countries is that these emerging multinationals are quickly rising as new players in the flow of global direct investment (Gammeltoft et al, 2010). The emerging economies are expanding worldwide in a speed that is unprecedented and unpredicted by any of the early theories of internationalization. The firms from emerging economies are internationalizing at an earlier stage of economic development than their counterparts from the developed world, before having accumulated strong Ownership advantages as defined by the Eclectic Paradigm. For that reason some authors (Buckley et al, 2007; Carvalho et al, 2010) suggest that these emerging MNEs follow an exclusive rationale, having their own combination of resources and competences.

2.2. Evolution of Brazilian OFDI

The history of the foreign investment from Brazil follows the macroeconomic dynamism of the country; its macroeconomic context has been unstable because of the continuous changes in the economic policies and the high variance in prices, which could incentive or not investments abroad (Iglesias and Veiga, 2002). In the 1970s Brazil witnessed the first movements of OFDI, when Petrobras (a State-owned oil company), Companhia Vale do Rio Doce (a mining company), some engineering services firms and some Brazilian banks were the first companies to invest in neighbour countries (Sauvant, 2005). The foreign investments from Petrobras were mostly seeking resources in other countries; the Brazilian banks were mostly seeking access to a bigger market; and the engineering firms were seeking to take advantages of their specific asset (the know-how that they developed in large public constructions) (Iglesias and Veiga, 2002). A survey focused in the Brazilian MNEs (FDC, 2008) concluded that the majority of the companies which participated in the study introduced their first internationalization initiatives in the 1970s, and from the 1990s the Brazilian companies adopted stronger strategies of internationalization, involving a high level of OFDI, as predicted by the three waves approach to OFDI from emerging countries.

Early in the 1980s, the Brazilian economy had serious macroeconomic problems which decreased the levels of industrial production, the levels of exports and the levels of foreign investment (Iglesias and Veiga, 2002). Later in that decade a bilateral economic integration

agreement was signed with Argentina, which resulted in a wave of Brazilian foreign investment in Argentina, mainly from the industries of auto-parts and electrical appliances (Sauvant, 2005).

The recent processes of economic reforms and liberalization that many emerging economies have gone through contributed to the creation of the necessary conditions for emerging MNEs to compete in the global economy (Goldstein and Pusterla, 2010). From 1990's the Brazilian trade policy makers turned to a more open market approach, the new policies reduced tariff and lowered trade barriers; since Brazil has left behind part of its protectionist tradition it became more open to the influence of the global market. In addition, at the same time many changes in business strategies resulted in relevant increases in exports and OFDI from Brazil. As a consequence, Brazil presented a new trend of companies in expansion seeking alliances with domestic and foreign firms, investing abroad and looking for new technologies overseas (Arbix, 2010; Iglesias and Veiga, 2002).

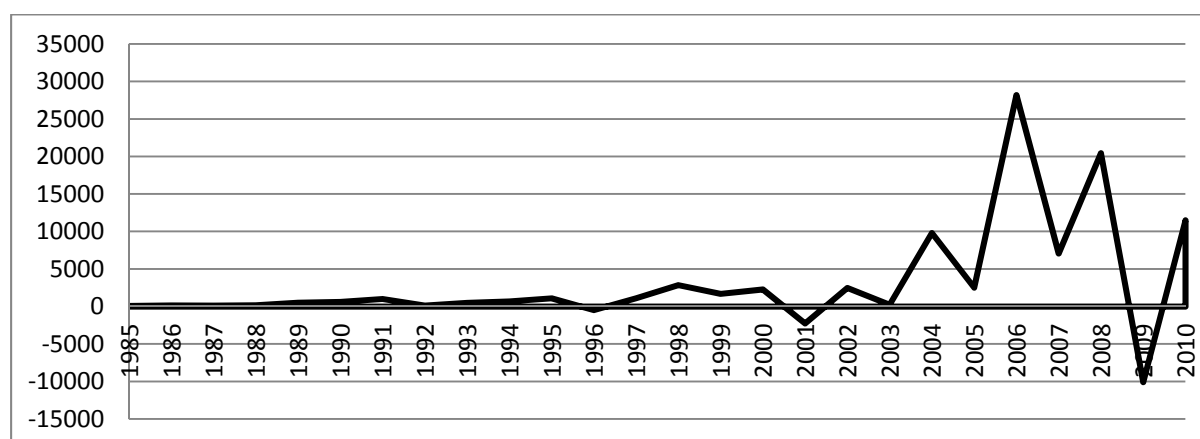
Santiso (2008) indicated that many emerging MNEs have leapfrogged their competitors from developed countries based on their innovative technology and business model, so it would not be fair to reduce the success of emerging MNEs to their abundance in natural resources and cheap labour. Another recent research centred on 29 Brazilian MNEs observed that most of those companies have a high level of technological diversification and sophistication, which is exported as OFDI (Gouvea and Santos, 2004).

The Brazilian government does not have explicit policies to promote OFDI. However, there are two national policies that benefit OFDI: the policy of steady reduction in tax barriers (mostly for capital goods and final consumer goods), which opened the country to higher levels of international trade; and the privatization of industries in many sectors, such as steel, energy, mining, chemistry and telecommunications, which brought to the country new foreign investments and technologies (Campanario et al, 2011). Even in the presence of this lack of incentive from the government, Brazilian firms have a visible position in the global levels of OFDI (Campanario et al, 2011).

2.3. *Characteristics of Brazilian OFDI*

As shown in figure 1, Brazilian OFDI flows have continuously increased since the mid-nineties, with exception of slowdowns in 2001 and 2009, which was when Brazil was hit by major financial crises. In 2009, Brazilian companies repatriated US\$ 10 billion through intra-company loans in reaction to the global crisis (Campanario et al, 2011).

Figure 1: Brazilian OFDI flows, 1985-2010 (US\$ Millions)



Source: Brazilian Central Bank, balance of payments

In 2004, Brazilian OFDI represented over 86% of total OFDI flows from Latin America, and over 11% of the total flows from emerging economies (UNCTAD, 2007). However, Brazil still presents characteristics of an economy with a large internal market, the level of its OFDI stock as a percentage of GDP (11% in 2003) is much lower than the average of South, East and South-East Asia (16%). For Brazilian firms that wish to invest overseas, the main obstacles are financing and accessing the information about markets and FDI regulations in host countries (Sauvant, 2005).

For the first time, in 2004 the OFDI from the BRIC countries accounted for over 60% of total OFDI from developing countries (Gammeltoft, 2008). Comparing to the other BRIC economies, until 2008 Brazil had a second larger stock of OFDI, only behind Russia; then from 2009 Brazil was behind China and Russia, as shown in table 1 (Campanario et al, 2011).

Table 1: OFDI stock – comparison from BRICs (US\$ Millions)

Economy	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Brazil	51,946	49,689	54,423	54,892	69,196	79,259	113,925	139,886	155,668	164,523	180,949
Russia	20,141	44,219	62,350	90,873	107,291	146,679	216,488	370,161	205,631	306,252	433,655
China	27,768	34,654	37,172	33,222	44,777	57,206	73,330	95,799	147,949	229,600	297,600
India	1,733	2,532	4,071	6,073	7,734	9,741	27,036	44,080	63,338	79,164	92,407

Source: UNCTAD FDI database

The OFDI from Brazil is mostly invested in the services sector (around 88% of total OFDI stock in 2008), mainly in the finance sector (representing 62% of the total for 2008), other

than that, OFDI is well distributed across different industries, as shown in table 2 (Campanario et al, 2011; FDC 2008).

Table 2: Distribution of Brazilian OFDI by sector (in US\$ millions)

Sector	2001	2002	2003	2004	2005	2006	2007	2008
Primary	1,962	148	319	1,328	4,133	2,793	3,111	3,173
Secondary	4,031	4,188	2,341	2,340	2,899	4,977	11,462	15,727
Services	44,007	49,663	52,340	65,332	71,969	10,6230	121,426	143,101

Source: Brazilian Central Bank

Brazilian foreign assets are mostly held by the country's biggest MNEs: Itaúsa (holding company), Vale (mining), Odebrecht (engineering and construction), Petrobras (oil and gas), Gerdau (steel), Votorantim (conglomerate), JBS (food) and Embraer (aerospace and defence) (Campanario et al, 2011).

Geographically, the OFDI from Brazil is highly concentrated, in 2009 the Americas was the destination of 70% of the Brazilian foreign investments, Europe had 29% of the total, and the remaining continents had the residual 1%, as shown in table 3 (Campanario et al, 2011). In 2010, the United States was host of over 15% of Brazilian OFDI and Austria was the biggest recipient in Europe, hosting almost 20% to Brazilian OFDI (UNCTAD, 2011).

Table 3: Brazilian OFDI stock by geographic region (in US\$ billions)

Region	2001	2002	2003	2004	2005	2006	2007	2008
Latin America and the Caribbean	41	45	44	48	50	79	97	115
Europe	6	7	8	18	25	30	31	31
North America - United States	1.5	2.1	2.3	2.8	4.3	4.2	8.4	14.0
Asia and Oceania	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.2
Africa	0.4	0.2	0.1	0.1	0.14	0.03	0.1	0.2

Source: Brazilian central bank

Most of Brazil's OFDI stock is found in tax-haven economies, such as the Cayman Islands, the British Virgin Islands and the Bahamas (hosts to over 38% of Brazilian OFDI in 2010). This could suggest that OFDI from Brazil is largely financially motivated, probably due to the high levels of domestic regulations and taxes (Campanario et al, 2011; Sauvart, 2005). It is likely that a large portion of the capital invested in tax havens is reinvested in Brazil, considering that a large amount of Brazilian inward FDI is from tax havens (UNCTAD, 2006; Campanario et al, 2011).

3. The model

This section presents the model used in this study to analyse the determinants of Brazilian OFDI. Firstly, it is given a brief introduction of the variables chosen for the econometrical estimation and the hypotheses made in this study. In the second part of this chapter, it is presented the methodology used for the estimation of the results.

3.1. *Determinants of Brazilian OFDI: Variables and Hypotheses*

Based on the literature review, this section presents a description of the OFDI determinants, which is believed to influence the levels of OFDI flows from Brazil. The model allows considering macroeconomics and institutional factors as OFDI drivers.

Dependent Variable

The dependent variable for the regression is represented by annual flows of OFDI from Brazil. For the purposes of this study, OFDI is composed by foreign direct investments and intercompany loans from Brazil to the selected host countries.

Independent Variables

- *Income*: this variable is represented by the GDP of the host countries. It is a proxy of the size of the host market. A common reason for OFDI is the search for new markets. A bigger market creates more opportunities for more efficient use of resources, and use of economies of scale and scope through foreign investment. In addition, a market with higher demand is more likely to attract market seeking FDI (Buckley et al, 2007; Habib and Zurawicki, 2002).

Hypothesis 1: Brazilian OFDI is positively associated with host market size.

- *Economic freedom*: this variable represents the quality of domestic institutions of countries hosting Brazilian OFDI. It is expected that host markets characterised by economic freedom will attract higher levels of OFDI (Amal and Sebrae, 2007). This variable is represented by the Economic Freedom Index, which is formed by ten components: business freedom, trade freedom, fiscal freedom, monetary freedom, government spending, investment freedom, financial freedom, property rights, freedom from corruption and labour freedom.

Hypothesis 2: Brazilian OFDI is positively associated with higher levels of economic freedom of host market.

- *Exchange rates*: firms from countries with strong currencies can financially support their investments better than firms with weak currencies. The appreciation of the domestic currency decreases the capital requirements of FDI, as the assets in the host country becomes cheaper (Kyrkilis and Pantedelis, 2003). This variable is represented by the annual average of the official host exchange rate in relation to the Real (fixed to the American dollar).

Hypothesis 3: Brazilian OFDI is negatively associated with a relative appreciation of the host country's currency.

- *Host inflation rate*: the inflation rate measures the effects of macroeconomic stability of the country. Unpredictable inflation rates discourage market seeking foreign investments because it generates uncertainty (Buckley et al, 2007). In this study the inflation rate used is based on the yearly average of the consumer price index (CPI).

Hypothesis 4: Brazilian OFDI is negatively associated with high host country's inflation rates.

- *Human capital*: human capital is a strong ownership advantage, which helps to acquire other competitive advantages. Many activities within a firm require competent and skilled labour (Kyrkilis and Pantedelis, 2003). A proxy for human capital used in the literature is the proportion of third level education graduates in the country. This variable finds its theoretical explanation in the asset-seeking type of OFDI.

Hypothesis 5: Brazilian OFDI is associated positively with higher levels of human capital in host countries.

- *Technology*: the ability to undertake the production of technological inputs is another important ownership competitive advantage. The proxy for this proprietary ownership advantage is the number of patents (by residents and non-residents) issued in the country (Buckley et al, 2007; Sulstarova and Kalotay, 2010). The theoretical explanation for this variable is again the asset-seeking type of OFDI.

Hypothesis 6: Brazilian OFDI is positively associated with higher levels of technology in host countries.

- *Economic openness*: total trade (sum of imports and exports of goods and services) in relation to GDP of host country is used to capture the level of economic openness of the host economy. Countries open to international trade are usually seen as a good place for international business operations (Habib and Zurawicki, 2002). It is expected that the liberalisation of host country's foreign economic transactions will have a positive impact on OFDI levels from Brazil. Lower capital controls facilitates funding investments from overseas (Kyrkilis and Pantelidis, 2003). It is expected OFDI from Brazil are directed to countries characterized by an open economy (Amal and Seabra, 2007).

Hypothesis 7: Brazilian OFDI is positively associated with higher degrees of economic openness in host countries.

- *Geographic distance*: this variable has a double effect on OFDI. Geographic proximity facilitates contact with the host country and reduces transportations costs, which may facilitate OFDI. On the other hand, large distances encourage the substitution of exports by market seeking investments (Habib and Zurawicki, 2002). In addition, a geographic distance variable is used to control the effects of the cultural distance variable (Buckley et al, 2007).

Hypothesis 8: Brazilian OFDI is negatively associated with larger geographic distances between Brazil and host countries to Brazilian OFDI.

- *Country Risk*: this variable expresses the host country's political risk level. The data from this variable is based on the Political Risk Index, which is composed by twelve components representing diverse dimensions of the political and business environment that firms operating in the country face (i.e. presence of military in politics, democratic accountability, government instability, external conflicts, ethnical tensions, bureaucratic quality, investment profile, corruption and law and order). The higher the risk score, the less risky the country, therefore the country is more attractive to foreign investments (Amal and Sebrae, 2007).

Hypothesis 9: Brazilian OFDI is positively associated with lower host country risk levels (higher index score).

- *Trade Bloc*: the inclusion in a trade bloc raises the prospect of FDI, as these interactions encourage a better understanding between home and host country (Habib and Zurawicki, 2002). This study includes a dummy variable representing economic ties represented by the Mercosul membership.

Hypothesis 10: the inclusion in the Mercosul has a positive influence in the levels of Brazilian OFDI.

- *Cultural distance*: cultural closeness between home and host country may facilitate foreign investment operations (Habibi and Zurawicki, 2002). Brazilian culture is considered to be similar to other Latin countries culture, such as Portugal, Spain and other Latin American countries (Cyrino et al, 2010). It is included a proxy for Latin countries in the regression to represent this variable.

Hypothesis 11: cultural proximity has a positive influence in the levels of Brazilian OFDI.

- *Tax Havens*: the literature defends that Brazil has a preference for investments in tax havens countries (Sauvant, 2005; UNCTAD, 2006; Campanario et al, 2011). This study includes a dummy variable to represent the classification of the host country as a tax haven country.

Hypothesis 12: the tax haven classification has a positive influence in the levels of Brazilian OFDI.

The data source for the variables are as follows: the values of OFDI from Brazil to each of the host countries are taken from the Brazilian Central Bank database; the GDP of host countries, exchange rates, total trade, human capital and technology proxies are taken from the World Bank Indicators database; the inflation rates are taken from the International Monetary Fund database; the geographic distances are taken from the Google distance calculator; the Index of Economic Freedom is published by the Wall Street Journal and the Heritage Foundation and the Country Risk Index is taken from the International Country Risk Guide published by the PRS group.

3.2. Methodology

Panel data analysis has been widely used in social sciences because it allows the inclusion of cross sections and time periods in the same model. The data matrix set for panel data analysis is composed by a time series for each cross sectional member in the data, therefore the number of observations available increases and it is possible to obtain better estimations (Asteriou and Hall, 2007). The data in this study is transformed into natural logarithms as it is expected non-linearity based on previous works (Bluckley et al, 2007). The regression used in this study can be represented as:

$$\text{LOFDI}_{it} = \alpha + \beta_1 \text{LGDP}_{it} + \beta_2 \text{LFREE}_{it} + \beta_3 \text{LEXR}_{it} + \beta_4 \text{LINFL}_{it} + \beta_5 \text{LEDU}_{it} + \beta_6 \text{LPATENT}_{it} + \beta_7 \text{LTRADE}_{it} + \beta_8 \text{LDIST}_{it} + \beta_9 \text{LRISK}_{it} + \beta_{10} \text{MERCOSUL}_{it} + \beta_{11} \text{LATIN}_{it} + \beta_{12} \text{HAVEN}_{it} + \varepsilon_{it}$$

Where α is the constant for the model, β is the coefficient for each variable and ε is the error term.

Table 4: Summary of the variables used in the estimation and respective hypothesis

Hypothesis	Variable	Proxy
-	LOFDI	Dependent Variable: OFDI from Brazil to host countries
Independent Variables		
H(1) - Income	LGDP	GDP of host countries
H(2) – Economic freedom	LFREE	Index of Economic Freedom of host countries
H(3) – Exchange rate	LEXR	Relative exchange rate
H(4) - Inflation	LINFL	Inflation rate of host countries
H(5) – Human capital	LEDU	Proportion of third level education graduates in host countries
H(6) - Technology	LPATENT	Number of patent issued in host countries
H(7) – Economic openness	LTRADE	Total trade of host country
H(8) - Distance	LDIST	Geographic distance of host country from Brazil
H(9) – Country Risk	LRISK	Country Risk level of host countries
H(10) – Trade bloc	MERCOSUL	Dummy for participation in the Mercosul
H(11) – Cultural distance	LATIN	Dummy for Latin countries
H(12) – Tax Haven	HAVEN	Dummy for countries classified as tax havens

The sample dataset is formed by 30 host countries to Brazilian GDP, the period of analysis is from 2001 to 2010, therefore $N=30$ and $T=10$. The choice of using a time scale of 10 years is an attempt to capture the development of the Brazilian MNEs and consequently of the level of Brazilian OFDI during this very dynamic decade. Because of the lack of availability of some data, the panel is unbalanced.

The model is estimated using two statistical methods: the pooled least squares (POLS) method and the pooled estimated generalised least square (EGLS) with cross section random effects (RE) method. A fixed effects method could not be used as the regression includes dummy variables. The POLS method (also known as common constant method) assumes that there are no differences among the data of the cross section dimension, in other words it assumes that the data set is homogenous, as this assumption is very restrictive usually the inclusion of fixed or random effects are necessary to obtain a better estimation. The Random effects method assumes that there is a variation across cross section entities and this variation is random and uncorrelated with the independent variable (Asteriou and Hall, 2007).

Table 5 presents the correlation matrix of the variables, showing no general problem with the data. In addition, the Levin, Lin and Chu (2002) test for unit roots was applied to each individual series used in the study of each country to test for stationary, the null hypothesis for this test is that the series is a unit-root series, thus not stationary; the null hypothesis was not accepted to each individual series, and thus it is possible to conclude that each series is stationary. Furthermore, serial correlation is a problem that affects mostly macro-panels (with long time series of 20 years or more) (Baltagi, 2008), therefore, this study does not include tests for it.

Table 5: Correlation Matrix of Variables

	<i>LDIST</i>	<i>LEDU</i>	<i>LEXR</i>	<i>LFREE</i>	<i>LGDP</i>	<i>LINFL</i>	<i>LOFDI</i>	<i>LPATENT</i>	<i>LRISK</i>	<i>LTRADE</i>
<i>LDIST</i>	1.0000									
<i>LEDU</i>	0.0465	1.0000								
<i>LEXR</i>	-0.4013	-0.2170	1.0000							
<i>LFREE</i>	-0.1392	0.3776	-0.1855	1.0000						
<i>LGDP</i>	0.3816	0.2687	-0.3861	-0.0011	1.0000					
<i>LINFL</i>	0.2200	-0.0096	0.0544	-0.0864	0.4971	1.0000				
<i>LOFDI</i>	-0.0662	0.2250	-0.2253	0.3145	0.3083	0.1752	1.0000			
<i>LPATENT</i>	0.2902	0.1123	-0.0899	-0.1038	0.8648	0.5482	0.1063	1.0000		
<i>LRISK</i>	0.2719	0.4587	-0.4008	0.4853	-0.2095	-0.4007	0.0759	-0.3646	1.0000	
<i>LTRADE</i>	0.2651	-0.0671	-0.0189	0.2145	-0.5955	-0.3362	-0.1197	-0.6734	0.6068	1.0000

Source: author's calculations

To avoid problems of omitted variable bias all the dependent variables described earlier are included in the same model (Habib and Zuraiwicky, 2002). Also, the estimation was conducted using White cross section standard errors leading to more robust cross section residuals.

4. Results

The results from Pooled ordinary least squares (POLS) and Random effects (RE) models are shown in table 6.

Table 6: Regression Results

	POLS	RE
<i>C</i>	-58.00 (8.97)*	-73.82 (21.43)*
<i>LGDP</i>	1.06 (0.12)*	1.01 (0.30)*
<i>LFREE</i>	6.62 (2.10)*	8.79 (2.19)*
<i>LEXR</i>	-0.07 (0.05)	-0.16 (0.13)
<i>LINF</i>	2.33 (0.54)*	3.84 (1.31)*
<i>LEDU</i>	-0.34 (0.27)	1.58 (1.07)
<i>LPATENT</i>	-0.44 (0.08)*	-0.24 (0.07)*
<i>LTRADE</i>	1.26 (0.46)*	2.80 (0.65)*
<i>LDIST</i>	0.11 (0.81)	-0.51 (1.76)
<i>LRISK</i>	1.71 (1.31)	-2.47 (1.74)
<i>MERCOSUL</i>	-1.18 (0.93)	-4.27 (1.62)*
<i>LATIN</i>	2.66 (0.23)*	3.98 (0.91)*
<i>HAVEN</i>	-1.34 (0.33)*	-0.24 (0.73)
<i>R-sqr</i>	0.45	0.44
<i>Adj R-sqr</i>	0.40	0.40
<i>Observations</i>	154	154
<i>F-stat</i>	9.84*	9.59*

Notes: *, ** and *** indicate that the coefficient is significant at the 1, 5 and 10% levels, respectively; The standard errors are represented in the parenthesis.

Source: author's calculations

The results from the POLS and RE model confirmed the hypotheses 1, 2, 7 and 11, which suggest that income, economic freedom, economic openness and being a latin country have a

positive influence in the levels of OFDI from Brazil. The results for the RE estimation and the POLS estimation are quite similar, however as the RE model is considered superior than the POLS model for analysis of heterogeneous data (in the case of this study the data from different countries with different characteristics), therefore, this study concentrates on the discussion of the results of the RE model. The sign of the regression coefficients for hypotheses 4, 6 and 10 were contrary to the expected, suggesting that inflation, technology and being part of the Mercosul influences the levels of OFDI from Brazil, but not in the expected direction. Finally, the coefficient for the hypotheses 3, 5, 8, 9 and 12 were not statistically significant, suggesting that exchange rate, education, geographic distance, political risk and being a tax haven country does not influence the levels of Brazilian OFDI.

The size of host market measured by GDP (Hypothesis 1) has a positive influence in level of Brazilian OFDI; an increase of 1% of this variable raises Brazilian OFDI by 1.01%. This result captures the portion of Brazilian OFDI that is based on market seeking strategies. The amount of market seeking investments from Brazilian companies is quite small compared to the results of previous empirical studies on other emerging countries, this could be a reflect of the characteristics of an economy with strong internal market, in addition, many Brazilian firms still access external markets through exports and not through investments; however with the increasing levels of internationalization of Brazilian firms, this tendency may change in the near future (Sauvant, 2005).

The level of economic freedom of host countries (Hypothesis 2) also resulted to positively influence the level of Brazilian OFDI; an increase of 1% of this variable raises Brazilian OFDI in 8.79%. This result suggests that a good institutional environment, which is a created locational advantage, largely motivates Brazilian firms to invest in foreign countries.

An increase of 1% in host country economic openness variable (Hypothesis 7) increases Brazilian OFDI in 2.80%. This finding confirms that policies towards economic openness make countries more attractive to Brazilian investors.

The dummy variable representing cultural proximity (Hypothesis 10) also attained positive significance in the regression, Latin countries receive 3.98% more investments from Brazil than non-latin countries, suggesting that cultural similarity is also a driver for Brazilian OFDI, as proposed by the literature review.

The coefficient of Hypothesis 4, which stated that the inflation rate have a negative impact on Brazilian OFDI, attained significance, however with a sign contrary to the expected. Actually the results show that 1% of increase in this variable raises Brazilian OFDI by 3.84%. This is an important finding, which could either suggest that Brazilian firms are unconventionally more tolerant to economic instability; or suggest that demand inflation (i.e. when prices increase as a result of excess demand over supply in the economy) is a driver to Brazilian investments (Buckley et al, 2007). Considering that the variable for political risk did not attain statistical significance, these results could be a sign that either the Brazilian investors do not give the required importance to the political and economic risks of their investments, or do not have the necessary know-how to evaluate these risks.

The number of patents issued in the host countries, representing the variable technology (hypothesis 6) also attained significance with an unexpected sign, with 1% increase in this variable Brazilian OFDI diminishes by 0.24%. Furthermore, the other variable representing asset seeking type of OFDI, human capital (represented by the proportion of third level education graduate in countries host to Brazilian OFDI), was statistically insignificant. These findings suggest that Brazilian investors were not influenced by asset seeking strategies to OFDI during the period studied.

The dummy representing the countries that are part of the Mercosul (Hypothesis 9) also have significance with a sign opposed to the expected. This could be a bias due to the fact that only three countries from the sample are members of the Mercosul.

Finally, the variables representing geographical distance from Brazil to countries hosting Brazilian OFDI and the tax haven dummy (hypotheses 8 and 12) did not attain statistical significance in this regression. The lack of significance for the tax haven dummy may be due to the fact that some tax haven nations that receive large investments from Brazil (Canary Islands, the Bermudas and the British Islands) were not included in the sample, as there was not enough data available for these countries.

5. Conclusions

This study aimed to investigate the determinants of OFDI from Brazil, and to explore whether Brazilian OFDI follows the patterns proposed by the established theories on foreign direct investment. As OFDI from emerging economies is a relatively new phenomenon that is changing the traditional tendencies of the international markets, many recent studies have

focused on the determinants of OFDI from developing countries, in particular from other BRIC countries (Russia, India and China). Until now, the studies made on the determinants of Brazilian OFDI were based surveys and case studies to investigate the firm level drivers for Brazilian investors to invest abroad. The contribution of this paper is to present a first analysis of the host countries' characteristics that attract Brazilian OFDI.

The determinants of FDI are microeconomic variables, linked to firms' objectives and strategies and macroeconomic and institutional variables, linked to the characteristics of countries that receive the investments. Most of the latest studies on FDI from developing countries have changed the focus on the determinants of foreign investments from the firms to locational advantages, such as countries macroeconomic and institutional characteristics. This paper uses panel data estimation to analyse the effect of different variables representing different characteristics of host countries on the Brazilian foreign investment levels. The period studied is from 2001 to 2010, and the sample includes 30 countries hosting Brazilian OFDI.

The literature suggests that emerging countries do not follow the same path of foreign investment as the developed countries did; developing countries' firms are internationalizing at an earlier stage of economic development, and this may have effects on the determinants of foreign investments, for example, the findings of this paper suggest that Brazilian firms are not as concerned with political risk and macroeconomic instability as predicted by the literature when deciding among countries to host their investments.

The findings for this study have confirmed the large importance of the presence of economic freedom representing good institutions; and the importance of policies to improve economic openness in the decision for Brazilian investors to choose the countries to host their foreign investments, as predicted by the literature and previous empirical studies.

The findings also suggest that Brazilian firms seek to invest in countries that resemble the domestic environment, with preference to invest latin countries, which are culturally close to Brazil.

The results for the variable representing market seeking type of foreign investments (GDP of host countries) suggest that the portion of Brazilian OFDI determined to access larger markets is relatively small, comparing to the results of previous empirical studies on other

emerging countries; when seeking to access larger markets, Brazilian firms still tend to prefer to export their goods and services instead of invest overseas.

The results for variables representing technology and human capital suggest that Brazilian OFDI is not determined by asset seeking motivations. In addition, geographic distance is not a determinant in the investment decisions of Brazilian MNEs.

Considering all these findings it is possible to conclude that some aspects of Brazilian OFDI patterns are not explained by the theories present in the literature, which could suggest that there is a need in the literature of a new special theory to explain the behaviour of the new emerging MNEs from emerging economies.

This study has its limitations, the Brazilian Central Bank started publishing the OFDI data divided into host countries in 2001, so in this study, it was not possible to use a longer period in the analysis, which could give a more complete picture on the dynamics of Brazilian OFDI trends. In addition, because of the lack of availability of some data from some countries in the sample of this study, the panel data model was unbalanced; a balanced panel could give more accurate results for the regressions.

As a suggestion for further work, a study including in the analysis both inward and outward Brazilian foreign direct investment could be useful to better understand the Brazilian FDI phenomenon. Furthermore, an issue which still needs further in depth investigation is the effect that Brazilian OFDI has on domestic macroeconomic and institutional variables.

6. References

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