FUNDAÇÃO GETÚLIO VARGAS
ESCOLA DE ADMINISTRAÇÃO DE EMPRESAS DE SÃO PAULO

MATTIA AMBROSINI

THE IMPACT OF OFDI ON ECONOMIC GROWTH COUNTRIES. AN ECONOMETRIC APPROACH USING PANEL DATA AND TIME-SERIES EVIDENCE

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Dissertação apresentada à Escola de Administração de Empresas de São Paulo da Fundação Getúlio Vargas, como requisito para obtenção do título de Mestre Profissional em Gestão Internacional.

Campo do Conhecimento: ECONOMIA E FINANÇAS INTERNACIONAIS

Orientador Prof. Dr. ANTONIO CARLOS MANFREDINI DA CUNHA OLIVEIRA

SÃO PAULO
2012

Acknowledgements

This thesis is the result of a year of effort and commitment. The topics I dealt with are the ones which have always fascinated me the most, but they have also posed me great challenges in the last months. If I was able to successfully complete this arduous but rewarding journey, it was mainly because of the great people I had around, which have constantly supported me, and to whom I am gratefully indebted.

First and foremost, I want to express my gratitude to my supervisor, Prof. Antonio Manfredini, for his more than exceptional guidance and support. It has always been a pleasure to discuss with him and to learn from his expertise in the economic field. His insights and his feedback were invaluable in helping me progress through the most difficult phases of the work and his kind encouragements kept me focused and motivated. *Grazie mille!*

I would also like to thank all the friends I made in Padua, Manchester, Milan and São Paulo in the past five years. They have contributed to make my life at university at unforgettable experience. It has been great to meet each one of you.

The greatest "thank you" of all goes to my parents, who have worked extremely hard throughout these years to provide me with the possibility of a high level education. To them, I owe everything.

Last but not least, I want to thank my lovely sister Roberta, for always being such a great source of inspiration and my special girlfriend Lorena, for her unconditional love and support, and for always believing in me.

Grazie a tutti! Thank you all!

Mattia

Abstract

The thesis at hand adds to the existing literature by investigating the relationship between economic growth and outward foreign direct investments (OFDI) on a set of 16 emerging countries. Two different econometric techniques are employed: a panel data regression analysis and a time-series causality analysis. Results from the regression analysis indicate a positive and significant correlation between OFDI and economic growth. Additionally, the coefficient for the OFDI variable is robust in the sense specified by the Extreme Bound Analysis (EBA). On the other hand, the findings of the causality analysis are particularly heterogeneous. The vector autoregression (VAR) and the vector error correction model (VECM) approaches identify unidirectional Granger causality running either from OFDI to GDP or from GDP to OFDI in six countries. In four economies causality among the two variables is bidirectional, whereas in five countries no causality relationship between OFDI and GDP seems to be present.

Key words: emerging countries, OFDI, economic growth, panel data, time-series causality analysis

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A. INDICES

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Index of Acronyms

3SLS	Three-Stage Least Squares
ADF	Augmented Dickey-Fuller Test
AEG	Augmented Engle-Granger test
BRIC(S)	Brazil, Russia, India, China, (South Africa)
CRADF	ADF statistic for the cointegrating residuals
CRDW	Durbin-Watson statistic for the cointegration equation
DOLS	Dynamic Ordinary Least Squares
EBA	Extreme Bound Analysis
ECM	Error Correction Model
ECT	Error Correction Term
EMNEs	Multinational Enterprises from Emerging Markets
FDI	Foreign Direct Investments
GDF	Global Development Finance
GDP	Gross Domestic Product
GLS	Generalized Least Squares
GMM	Generalized Method of Moments
IFDI	Inward Foreign Direct Investments
IMF	International Monetary Fund
MIGA	Multilateral investments Guarantee Agency
MNEs	Multinational Enterprises
NOIP	Net Outward Investment Position
OFDI	Outward Foreign Direct Investments
OLI	Ownership, Location and Internalization
OLS	Ordinary Least Squares estimator
SUR	Seemingly Unrelated Regressions
TFP	Total Factor Productivity
UNCTAD	United Nations Conference on Trade and Development
US$	United States Dollar
VAR	Vector Autoregressive
VECM	Vector Error Correction Model
WDI	World Development Indicators
WIPS	World Investment Prospect Survey
WIR	World Investment Report

1. INTRODUCTION

The globalization process has reached the point where true "corporate giants" from emerging markets, after having been nurtured within their national borders and having strived in their respective domestic economies, are now increasingly gaining turf in the global marketplace (Gammeltoft, 2008). It is not unusual, nowadays, to see emerging markets' multinational enterprises (EMNEs) such as Tata (India), Cemex (Mexico), Gazprom (Russia), Lenovo (China), Embraer and Vale (Brazil), reaching first page headlines in the business press (Holstein, 2007). The astonishing escalade of those companies, which have climbed up the ladders of the "economic food chain", has awakened not only the interest of researchers and policy makers, but also the concerns of those sitting in the boardrooms of multinationals from developed countries (Khanna and Palepu, 2010). Concerns that are not groundless, if one looks at the recent cross border M&A deals performed by EMNEs: in 2004, Lenovo acquired IBM's personal computer division, in 2007 Cemex purchased Rinker (the biggest takeover ever witnessed in Australia), while Tata bought Jaguar and Land Rover in 2008 (Sauvant, 2008; Khanna and Palepu, 2010).

Nevertheless, those acquisitions, for how impressive they might look, represent just the tip of a much bigger iceberg. They are in fact the manifestation of a larger phenomenon that began a couple of decades ago, but that gained an impressive momentum only the past ten years, affecting the global economy: the rise of outward foreign direct investments (OFDI) flows from emerging economies. According to data available from the United Nations onference of Trade and Development (UNCTAD), OFDI flows from emerging countries went from nearly US$ 5 billion in 1980 to US$ 400 billion in 2010. In particular, in the years going from 2002 to 2010, OFDI flows from emerging economies have marked an impressive eightfold nominal increase, with their share of global OFDI flows going from 10% to 28% (UNCTAD, 2011). Surprisingly however, this remarkable growth has not been matched by a parallel increment in the academic contributions to the topic. On the other hand, the academic world has always looked with greater interest at the opposite phenomenon, i.e. inward foreign direct investments (IFDI) entering emerging economies. In fact, at present, there is a substantial literature that aims at investigating, both theoretically and empirically, the potential effects of IFDI on host emerging countries. Conversely, despite the presence of a considerable number

of studies devoted to the assessment of the impact of OFDI on single aspects of a country's economy, such as industrial productivity, employment, domestic investments and the size of international trade, the focus of those works leans disproportionately towards developed economies (Globerman and Shapiro, 2008). Additionally, as the vast majority of those studies consider only firm or industry-level evidence, the scarcity of macro-level evidence on the effects of OFDI on home countries' economic growth, for both developed and emerging countries, is daunting. Furthermore, having looked with considerable attention at the available empirical evidence on the subject, it has been noticed that, excluding the contribution of Wong (2010), which focuses on a single country, and that of Herzer (2010), who used TFP instead of GDP growth as a dependent variable, it appears as no empirical study has yet been performed on the home effect of OFDI on economic growth in emerging economies. The identification of this unexpected gap in the literature has been the major motivation to write this thesis, whose ambitious aim consists in filling that "hole" by means of a comprehensive empirical analysis.

Specifically, the thesis at hand endeavors to assess the existence of a relationship between OFDI and economic growth in a subset of emerging economies. More explicitly, this aim is going to be achieved by answering to the following research questions:

1. *Is there a positive correlation between OFDI and economic growth in emerging economies?*

2. *In case there was a positive correlation, what is the direction of the causality relationship between growth and OFDI?*

The first question is answered by selecting a sample of emerging economies and by modeling a regression equation having economic growth as a dependent variable and OFDI as an independent variable. The approach adopted is panel data analysis, using a random-effects estimator. Additionally, Extreme Bound Analysis (EBA) is performed after the regression, as a way to test for the robustness of the estimates. In case a positive, statistically significant and robust coefficient is found for the OFDI variable, evidence is provided in favour of the existence of a correlation relationship between OFDI and economic growth.

Nonetheless, a positive correlation among the two variables does not allow determining whether it is OFDI that is having a positive impact on economic growth or the other way

around. As a matter of fact, it could as well be that economic growth and development are causing OFDI.

As a way to empirically determine the causality relationship between growth and FDI and, therefore, to answer research question number two, a different econometric framework needs to be employed. The methodology chosen relies on time-series data and adopts a three-step approach. This approach consists of performing non-stationarity and cointegration tests on the time-series data for GDP and OFDI, before selecting a VAR or a VECM model as a way to test for Granger causality.

The architecture of the present work is the following. The next section completes this introductory chapter by providing a quantitative description of OFDI flows from emerging economies, illustrating how they have been a significant trait of the global economy in recent times.

Chapter 2 embodies the review of the relevant literature, and is further divided into three sections. The first one illustrates the potential effects of OFDI on the home economy, the second one looks at the same topic from the vantage point of the host country, whereas the third and last one provides a review of some of the most significant scholarly works investigating the FDI-economic growth relationship.

Chapter 3 is the core of the thesis, the empirical analysis, and is composed of four different sections. The first two sections provide a brief introduction and describe the data on which the analysis is performed. The second one describes with a fair amount of detail the econometric methodologies adopted, while the third one illustrates the results of both the panel data and the time-series analyses.

Finally, room is left for conclusions, which briefly summarize the content of the present work, illustrating the findings obtained and acknowledging its limitations, while also providing suggestions for further research. Some fascinating and intriguing results emerge from the empirical analysis.

1.1. OFDI from emerging economies, trends and figures

As already suggested in the introductory chapter, one of the most recent and most interesting features of the current globalization pattern is the increasing size and relative importance of Outward Foreign Direct Investments (OFDI) from emerging[1] economies (Amighini, 2010). Nevertheless, OFDI from emerging economies is not as a new phenomenon as many would think. As a matter of fact, EMNEs (MNEs from emerging markets) had already begun to invest abroad in the 1970s (Gammeltoft, Pradhan, Goldstein, 2010). It is only by the beginning of the current decade however, that attention has rapidly grown around the increasing importance of outward investment from emerging countries, and that many authors and global institutions have started to devote more attention to this topic (Pradhan, 2009). What we are witnessing may be defined as a third historical wave of OFDI, which started around the mid-90s, whereas the first and second wave originated in the 1970s and in the mid-80s respectively (Gammeltoft, 2008; Rasiah et al., 2010). These three waves can be distinguished by observing Figure 1.1, which illustrates the evolution of emerging economies OFDI flows as a percentage of global flows.

Figure 1.1 - Emerging economies' share of world outflows
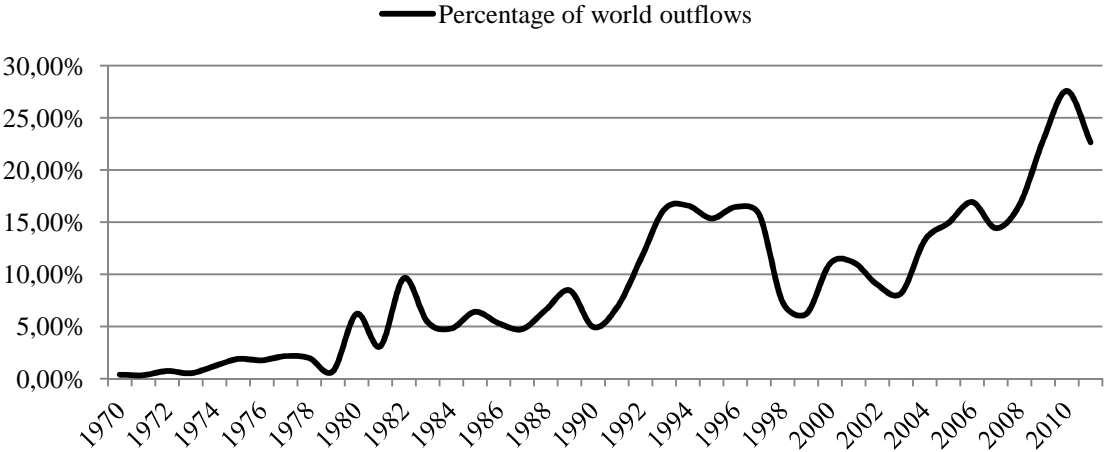
Source: UNCTAD FDI Database, calculations by author

The third wave diverges from the previous ones not only quantitatively, but also qualitatively. As a matter of fact, a greater number of emerging countries have begun to enter the global economy through liberalization policies, and EMNEs have become instrumental to increase domestic competitiveness and access strategic assets located abroad.

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[1] Within the classification "emerging economies" are considered the 113 countries that the UNCTAD catalogs as "developing economies excluding LDCs", with the addition of Russia.

While during the 1970s, EMNEs consisted of a very small number of companies with limited and mostly regional foreign investments, contemporary EMNEs have become global giants with an extensive network and a wide array of activities spread all over the world. These new players and their actions may now have profound implications for home and host countries, implications that must be better understood (Gammeltoft, Pradhan and Goldstein, 2010). From the available information, the growing importance of OFDI flows from emerging economies is unquestionable. The following paragraphs provide quantitative information over the main trends and figures related to emerging countries' OFDI. Data are mainly retrieved from the UNCTAD database and are expressed in nominal US$, while calculations and representations are performed by the author.

Figure 1.2 -FDI outflows from emerging countries by geographical area, 2000–2011
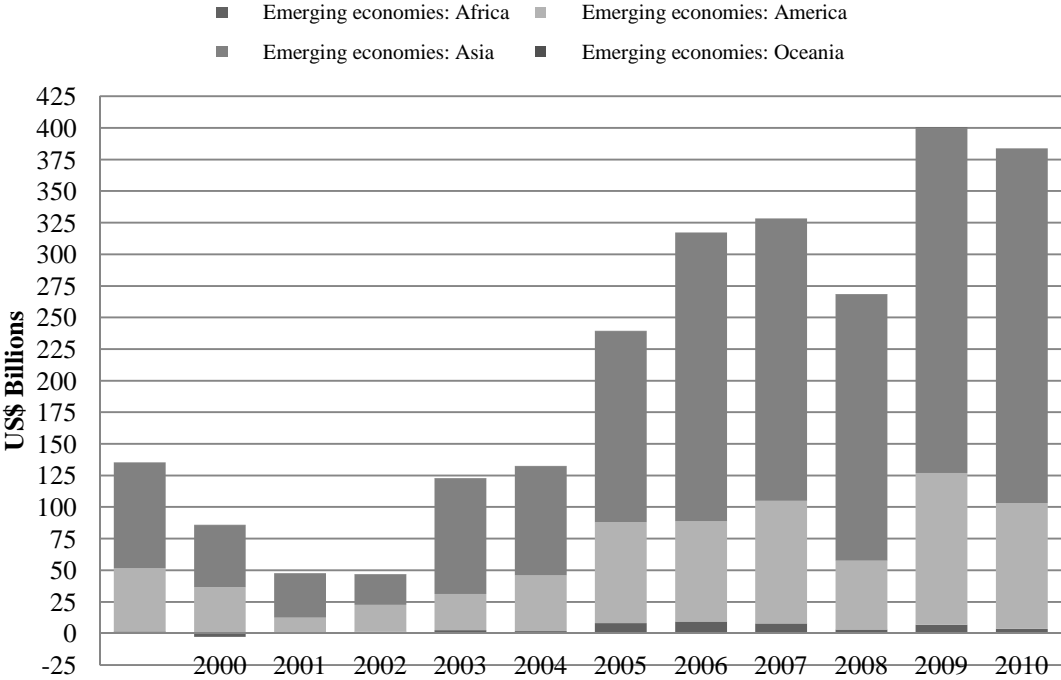
Source: UNCTAD FDI Database, calculations by author

As observable from Figure 1.2, OFDI flows from emerging countries have increased from just US$ 47 billion in 2002 to almost US$400 billion in 2010, a more than eightfold nominal increase. As a consequence, their share in the global OFDI flows has increased from less than 10% in 2002 to 28% in 2010, while developed economies' OFDI share decreased from 89% to 68% (Figure 1.3).

Figure 1.3 - FDI outflow shares by major economic groups, 2000–2011
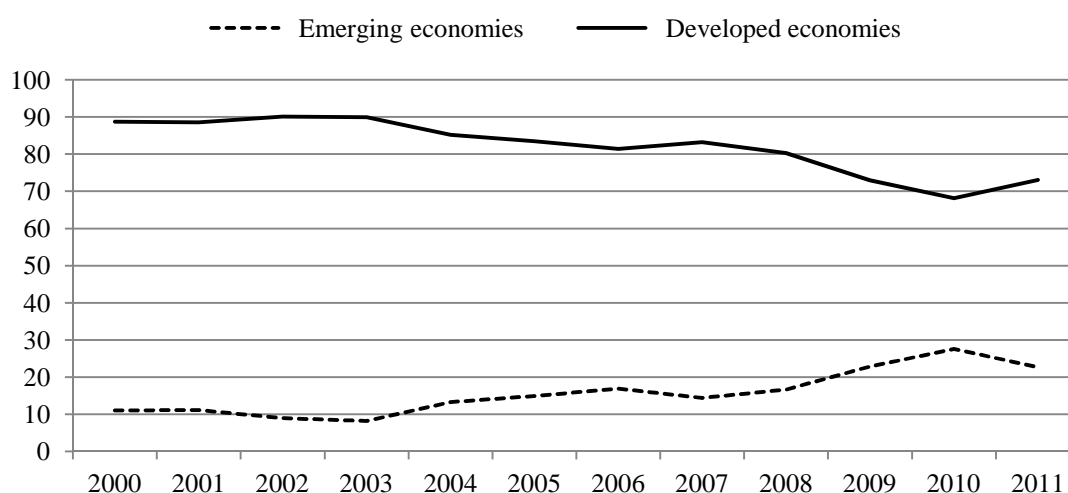
These trends can better be explained by looking at the annual OFDI growth rates, presented in Table 1.1. Already in the 1990-2000 decade, OFDI flows from emerging countries were growing at a remarkable compound annual growth rate of 27.5%, compared to 16.8% for developed economies and 17.6% for the total global flows. In the past ten years, while both growth rates have slowed, OFDI flows from emerging economies are growing at an annual rate that is nearly 2.5 times that of more developed countries, 16.5% versus 6.5%. Overall, in the last two decades, OFDI flows from emerging countries grew at double pace, when compared to flows from developed countries and to global flows, 18% versus 8.3% and 9.7% respectively. Impressively, average annual flows originated in emerging economies went from US$ 53 billion during the 1990-2000 period to nearly US$ 135 billion $ between 2001 and 2011, a fourfold nominal increase.

Table 1.1 - Growth Rates and Averages of OFDI Flows by Major Economic Groups

Region	*Annual Average Flows (US$ Billions)*			*Annual Compound Growth Rate*		
	1990-2000	**2001-2011**	**1990-2011**	**1990-2000**	**2001-2011**	**1990-2011**
World	492.23	1,233.13	862.68	17.6%	8.5%	9.7%
Developed	437.75	984.47	711.11	16.8%	6.5%	8.3%
Emerging	53.14	215.38	134.26	27.5%	16.5%	18%

One peculiarity of emerging economies' OFDI is their concentration. As a matter of fact, few regions, few countries and, quite surprisingly, few EMNCs account for a remarkable share of total OFDI flows from emerging economies. As observed, in Figure 1.2, the predominance of Asia and America is striking. Asia, in particular, has been by far the most important source of OFDI from EMNEs (Sauvant and Pradhan, 2010).

Overall, four countries alone (the BRIC) account for the great majority of OFDI flows. This appears evident from Figure 1.4, where the BRIC share of total OFDI flows from developing countries is illustrated. Interestingly, these 4 economies have accounted, on average, for nearly 40% of total flows from emerging economies in the past four years. At present however, a second tier of emerging economies is coming forward with consistently growing foreign investments. Leading this group are Malaysia and Mexico, with US$ 15 billion and US$ 14 billion OFDI flows in 2010, respectively. Put together, these two economies were close to reaching 10% of global flows from emerging countries (MIGA, 2011). Additionally, OFDI from emerging economies are concentrated within a surprisingly small number of EMNCs. As reported by Globerman and Shapiro (2008), which quoted data from the UNCTAD World Investment Report (UNCTAD WIR) 2005, the five largest EMNEs may be considered responsible for nearly half of the total OFDI flows originating in emerging countries (UNCTAD WIR, 2005).

Figure 1.4 - BRIC share of OFDI flows from emerging economies
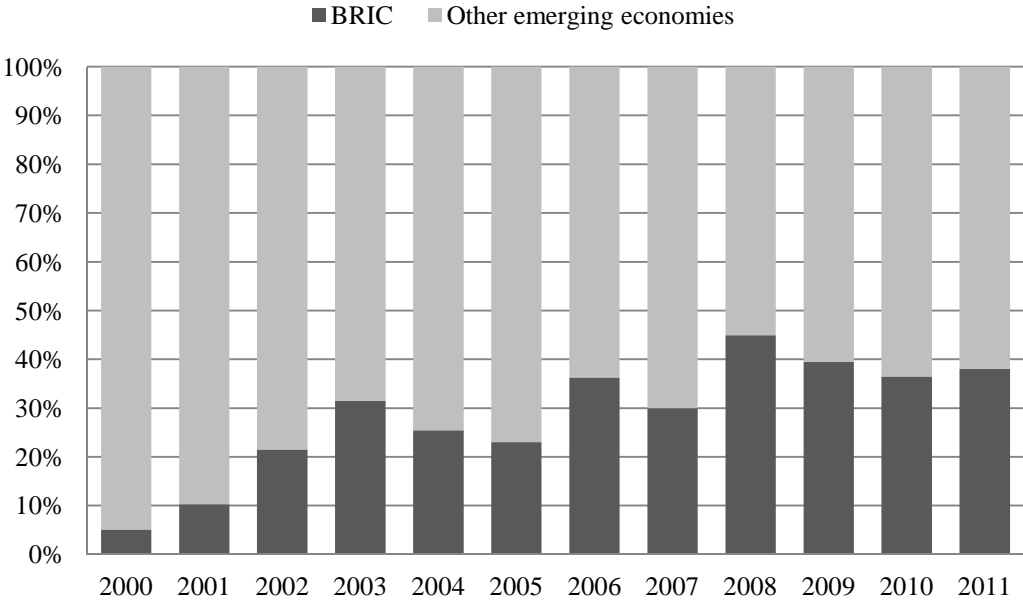
Source: UNCTAD FDI Database, calculations by author

Another feature of OFDI flows from emerging countries that is worth investigating is its destination, both in terms of economic geographies and industries. As observable in Figure 1.5, OFDI flows from emerging economies are increasingly directed to other developing regions. In 2007, 63% of total flows were directed to emerging or transition economies; in 2010, these regions hosted 70% of total OFDI projects from emerging countries.

Figure 1.5 - Distribution of Emerging Countries' OFDI Flows by Host Region
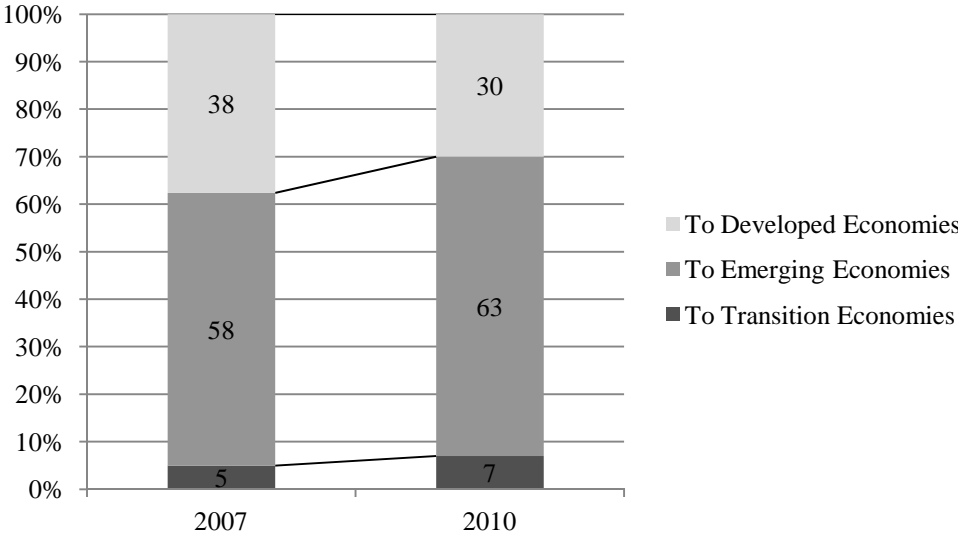
For what concerns the industries of destination, available data refer to UNCTAD's World Investment Report 2009 and are depicted in Figure 1.6. Comparing the 1989-1991 and 2005-2007 periods, it can be noticed that the share of services in emerging countries' OFDI flows went from 35% to 72%, while the manufacturing sector lost importance, going from 60% to 18%. The share of the primary sector remains substantially low, although it nearly doubled from 5% to 9%. A similar pattern can be observed for developed countries, with an increase in the importance of the service and primary sectors at the expense of manufacturing. As described in UNCTAD World Investment Report 2007, the growth in the importance of the primary sector can be attributed to emerging economies such as China, India, Russia, Argentina, Malaysia and Turkey, willing to secure a substantial amount of natural resources that is able to sustain current and future growth rates (UNCTAD, 2007). On the other hand, the impressive growth of the share of the service sectors is the consequence of heavy foreign investments in industries such as financial and business activities, hotel and restaurants, trading and telecommunications (Gammeltoft, Pradhan and Goldstein, 2010).

Figure 1.6 - Outward FDI flows, by sector, 1989–1991 and 2005–2007
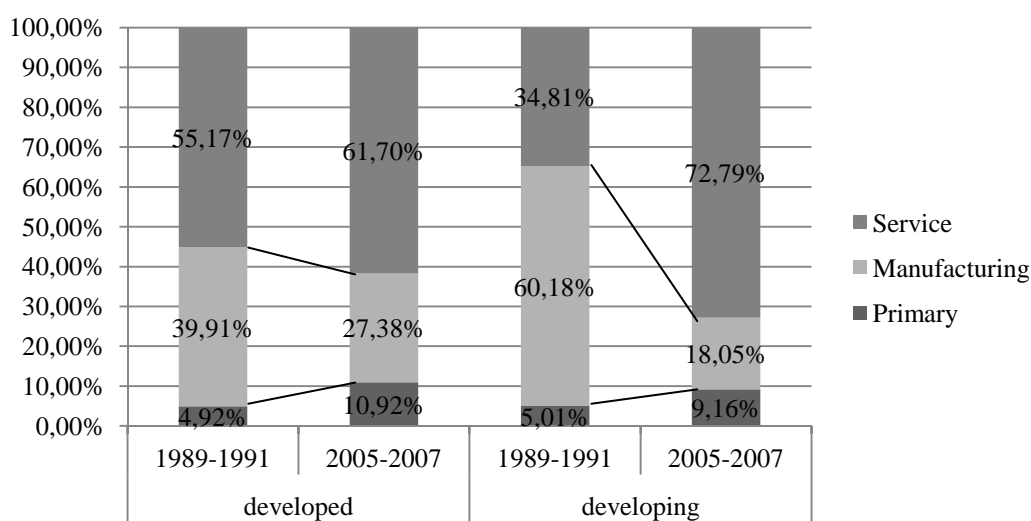
In the past couple of years, foreign investment from emerging countries, proved to be more resilient than those from developed regions. As reported by the World Bank, before the recent global financial crisis, flows of capital, and flows of FDI in particular, had reached a peak in both developed and emerging economies. However, as a consequence of the economic turmoil, affecting a great share of the developed economies, the global patterns in FDI flows are mutating (MIGA, 2009). In 2009, global OFDI flows went down to US$ 1.1 trillion, as a consequence of a 43% decline. In this context, outflows from developed countries registered a fall of 23%, down to 229 billion $. Yet, emerging and transition economies had been able to strengthen their global position as sources of FDI, achieving a world share of 25%, compared to 19% the previous year (UNCTAD WIR, 2010). Data for 2011 however, illustrate an additional twist in OFDI patterns. As a matter of fact, the latest UNCTAD WIR reports that OFDI flows from emerging economies were reduced by 4% to 384 billion $. Contributing to this negative result was a sharp decline in Latin America, slightly mitigated by an increase in OFDI flows from Asian markets (UNCTAD WIR, 2012). On the other hand, developed economies' foreign investments recovered from their previous downturn and marked an impressive increase of 25%, with OFDI flows amounting to US$ 2.24 trillion $. As a direct consequence, emerging countries saw their relative contribution to total OFDI flows declining. Yet, despite the decline of their global share from 28% to 23%, OFDI flows from emerging economies remain extremely important, recording the second highest level ever in history (UNCTAD WIR, 2012).

2. LITERATURE REVIEW

2.1. Home effects of OFDI

As observed in section 1.1, OFDI flows from emerging economies are a phenomenon which has profoundly characterized the global economy in the last decade and are therefore a phenomenon demanding increasing interest from academia.

As the principal aim driving the present thesis is determining the effect of OFDI from emerging economies on economic growth, it was believed necessary to review the relevant literature investigating the home effects of OFDI. While a substantial amount of attention has actually been devoted to the analysis of the home effects of OFDI in developed countries, the published research for emerging economies is still scarce. This, in spite of the recent growth in importance, both relative and absolute, experienced by OFDI flows originated in less developed areas of the world (Globerman and Shapiro, 2008).

The standard practice among scholars seems to be that of analyzing the potential ways through which OFDI impacts developed economies and then attempting at identifying by what measure those effects extend to emerging economies. This, for example, is the approach followed by Kokko (2006) and Globerman and Shapiro (2008), who compiled a comprehensive review of the literature on the home effects of OFDI, highlighting the peculiarities of emerging economies. Following the particular approach adopted by Globerman and Shapiro (2008), the subsequent sections investigate the effects of OFDI on home economies by identifying four main areas in which OFDI can generate positive effects on economic development. These areas are, namely, international trade and exports, technology innovation and spillovers, employment and labour demand and domestic capital formation. An entire section is dedicated to each area.

Each section commences by describing the predicted impact of OFDI on that area and will then focus on the potential effects observed in and predicted for developed economies, before shifting towards the perspective of emerging countries and their specificities.

2.1.1 OFDI effects on International Trade and Exports

One of the main levers through which OFDI may affect home countries' economies is increased trade via greater international integration. The relationship connecting OFDI and trade has also been one of the most investigated topics and has given birth to a quite prolific stream of literature (Globerman and Shapiro, 2008).

The foundation for the relationship between OFDI and trade traces its roots back to the work of Mundell (1957) who, by means of a theoretical framework, argues that OFDI and trade are substitutes, thus suggesting that an increase in outgoing foreign investment negatively affects home production and exports. A similar view has also been promoted by later scholars, such as Markusen and Venables (1995). In their opinion, foreign investment has the main effect of diverting productive activities from home to the host countries, with the direct consequence of a substitution effect on trade. A diverging view is the one proposed by Helpman (1984), who develops a general equilibrium theory of international trade in which MNEs assume an important role by promoting intra-firm trade and intermediate goods exports, thus demonstrating the possibility of a complementary effect between OFDI and trade (Helpman, 1984). Accordingly, it appears as there are principally two types of possible relationships between FDI and trade: whether FDI substitutes trade or complements trade (Kiran, 2011). As will become apparent from the following paragraphs, this dichotomy between substitution and complementary effects has deeply characterized the empirical literature dealing with the OFDI-trade relationship. According to Globerman and Shapiro (2008), in order to fully understand the potential impact of OFDI on international trade, one should first comprehend the reasons that have led to the investment decision in the first place. Dunning (1977) argues, in his eclectic paradigm, that the decision to invest in FDI activities is the outcome of the interplay between three types of advantages: firm-specific (O), location-specific (L), and internalisation advantages (I). Internalisation advantages, in particular, refer to the benefits of internalizing foreign activities when transaction costs (in the tradition of Nobel Laureate Coase) make it more attractive to perform such activities within an organization's boundaries (Dunning, 2001). As a consequence, OFDI may promote international trade by providing an alternative and more efficient channel for international transactions. In turn, this potential increase in trade activities can manifest itself in terms of both export and import increases.

While exports from sectors in which the home country has a (L) advantage are encouraged, the investing MNE may also constitute an important channel for imports of those goods that are more efficiently produced abroad. Accordingly, home country MNEs may assume the role of coordinator for the geographical distribution of value-chain activities, thus further incentivizing the development of intra-industry trade across countries (Globerman and Shapiro, 2008). As imports, in the case they embody new technology, are one of the channels through which R&D spillovers may move towards the home economy (Coe and Helpman, 1995; Bernstein and Mohnen, 1998), they are discussed in section 2.1.2. Consequently, the theme of the following leans toward the more specific exports-FDI relation. According to Kokko (2006), exports constitute one of the "hottest" and most debated topics in the OFDI literature, mainly because of the presence of two problems related to the quantification of their effect. The first one relates to the complexity of theoretically determining the net impact of OFDI flows on exports in the home country. As a matter of fact, while OFDI may clearly have the effect of replacing previous productive activities at home (and therefore the exports related to those activities), it may also stimulate exports of intermediate goods directed to the new facilities in the foreign country. A second problem, is related to the extreme difficulty involved in discerning what would have been the most likely effect on exports, had foreign investment not happened (Kokko, 2006). A direct consequence of these two problems is the necessity to rely on empirical evidence as a way to quantitatively assess the net impact of OFDI on the home country's exports. The empirical literature on the subject is rather extensive and composed of both business-oriented and econometric analyses; it is, however, also quite inconclusive, as confirmed by the heterogeneity of the results obtained.

As common when discussing the home country effects of OFDI, the bulk of these empirical works focuses mainly on developed economies. In the US, one of the earliest contributions dates as far as the late 1970s, when Frank and Freeman (1978) suggested a substitution effect between OFDI and home exports. That same year however, Bergsten, Horst and Moran (1978) obtained opposite estimates, suggesting a complementary relationship between the two variables. Later studies, such as those of Lipsey and Weiss (1981) and Brainard (1997) provide further evidence for the prevalence of complementary effects. In Sweden, Swedenborg (1979) and Blomstrom, Lipsey and Kulchucky (1988) found evidence of only a small positive relation between OFDI and exports, while Svensson (1996), focusing on a later

period, observed an opposite and also small effect. Among the most relevant contributions, there are also the works of Lipsey, Ramstetter and Blomstrom (2000) and Fontagné and Pajot (2002). Investigating two overlapping sets of countries, (Japan, US and France the former, France and US the latter) both sets of authors identify a positive linkage between home exports and OFDI. At the same time however, Bayoumi and Lipworth (1997) and Ma, Morikawa and Shone (2000), focusing specifically in Japanese FDI abroad, bring support to the idea that OFDI substitutes rather than complements trade. Adding to the heterogeneity of the above mentioned analyses are also the contributions of Goldberg and Klein (1999) and Blonigen (2001), whose empirical results provide strong evidence for the existence of both a substitution and complement effect between outgoing foreign investments and domestic exports. Nevertheless, according to Lipsey (2004), such a high variability in the empirical outcomes should have been expected. As a matter of fact, in his opinion, the type of investment (whether horizontal or vertical integration), the level of development of the host economy and the type of technology adopted by the MNEs are all factors that may influence the relation between OFDI and exports (Lipsey, 2004).

In more recent times, some scholars have begun investigating the OFDI-trade relationship also for emerging countries. Two important studies are those of Goh, Weng and Tham (2012) in Malaysia and Kiran (2011) in Turkey. Interestingly, in both cases, the authors do not find any type of relation between OFDI and trade, thus suggesting that in emerging economies, the potential benefits of OFDI via trade increments may be much weaker or inexistent.

These last findings are in line with the opinion of Kokko (2006), according to whom emerging countries may witness a reduced impact of OFDI on domestic exports. In fact, in the case emerging economies, there should be less room for an increase in intermediate goods flowing from home towards the host economy. A main reason for that is the tendency, for EMNEs, to engage in South-South FDI, which prevalently involves the service sector, characterized by the limited presence of intermediate products (Kokko, 2006).

2.1.2 OFDI and Technology spillovers

As indicated by Globerman and Shapiro (2008), OFDI may lead to positive R&D spillovers in home economies and can do so by means of two different channels. The first one consists of spillovers from increased imports from host countries, which embody technology; the second one, more direct in nature, consists of knowledge transfers related to production techniques and managerial practices, that go from the foreign affiliate to the parent headquarters in the home economy (Globerman and Shapiro, 2008). As suggested by Zhao and Liu (2008), until the early 1990s no one had yet considered FDI outflows as an important channel for technology spillovers to the home countries; previous research had in fact only focused on an unidirectional flow of knowledge from MNE's foreign operations towards host economies' firms (Zhao and Liu, 2008). This statement is partially in line with the opinion of Barba Navaretti and Venables, who had already stressed how the home effects of OFDI spillovers have been poorly investigated in scholars' works. In their opinion, such an important topic should have been dealt with more extensively (Barba Navaretti and Venables, 2004). Nonetheless, it is however possible to retrieve a fairly good amount of both theoretical and empirical contributions related to this matter. Yet, it must be noticed how, unfortunately, the studies focusing exclusively on developed economies are disproportionately greater in number.

One of the earliest contributions to the topic comes from Coe and Helpman (1995), who brought evidence to the hypothesis that international trade is a fertile soil for technology spilling over across countries. Their empirical analysis, based on a sample of 21 OECD countries, demonstrates that, especially in smaller economies, a country's Total Factor Productivity (TFP) heavily depends on the technological level of foreign trade partners. In this way, MNEs that by engaging in OFDI expand the international trade flows with the host economy, may contribute to the enhancement of domestic technology and productivity (Coe and Helpman, 1995). Half a decade later, Pottelsberghe and Lichtenberg (2000) found evidence of productivity increments in the case of OFDI in technology-intensive foreign economies, while observing that the same does not happen in case of IFDI from R&D-intensive economies. This suggests that imports of technology-intensive goods from foreign affiliates of MNEs have the potential to raise productivity in the home country. Furthermore,

their research contributes to give additional credit to Dunning's (1994) hypothesis that foreign production augments the technology base of the investing MNE (Dunning, 1994). The work of Branstetter (2000) also confirms this idea. By focusing on Japanese OFDI in the US, the author finds fairly strong evidence that FDI augments the flows of knowledge both from and to the home economy. While professing caution, he also highlights the importance of OFDI as a channel through which the technological development of a country is enhanced (Branstetter, 2000). Conversely, the study of Braconier, Ekholm and Knarvik (2001) has led to an opposite outcome. Their empirical analysis, which utilizes firm and industry-level data for Swedish manufacturers, is inconclusive in finding evidence for technology spillovers from OFDI. In the authors' opinion, this surprising result may indicate that more technologically advanced countries are less exposed to the potential R&D benefits stemming from OFDI activities in other developed economies (Braconier et al., 2001). Nevertheless, in the UK, Driffield and Love (2003) successfully test the presence of reverse knowledge transfers that, originating from domestic firms in the host countries, enable UK MNEs and other home country's firms to upgrade their technological potential and augment their productivity (Driffield and Love, 2003). The existence of positive relationship between technology spillovers and MNEs activities abroad has also been claimed by Singh (2007). Making use of data about patent citation, the author has been able to find out that OFDI may bring important learning benefits to the home country. In particular, he suggests that MNEs are optimal channels for knowledge and technology transfers from foreign affiliates to the home base and that MNEs' activities, creating knowledge flows across country, provide greater benefits to the home establishments than to host country firms. A brief policy recommendation, he argues, would be to encourage domestic firms to seek technologies abroad via OFDI (Singh, 2007). However, Vahter and Masso (2005), who focus their research efforts on Estonia (a transition economy whose OFDI flows have risen significantly in the past years), cannot find robust evidence supporting the existence of positive R&D spillovers from OFDI. In fact, their evidence of positive impact on R&D spillovers is excessively dependent on the model's structure, the sector analyzed and the specification of the variable of interest (Vahter and Masso, 2005). Additionally, Bitzer and Goerg (2005), analyzing a panel of OECD countries, observe that a country's stock of OFDI appears to be negatively related with productivity. This casts ulterior doubts on the theory that foreign investments, by means of R&D spillovers, positively affect an economy's

productivity (Bitzer and Goerg, 2005). Yet, the strong degree of heterogeneity present in their sample, may suggest caution in drawing such conclusions. More recently, evidence of technological externalities stemming from the international activities of MNEs has been also provided by the research activity of Keller (2009), who suggests that OFDI helps enhancing the technological level of the home country (Keller, 2009).

As apparent, the extreme heterogeneity of the empirical analyses performed so far does not allow making any generalization regarding the effects of OFDI on technology spillovers in developed economies.

Before moving towards the perspective of emerging economies however, some additional reflections have to be made. Contributing to a better understanding of the dynamics through which OFDI can provide benefits to emerging home economies, is the work of Tavares and Young (2005). In the authors' opinion, in fact, the "absorptive capacity" of the home firm is pivotal for benefiting from technological advances deriving from international activities (Tavares and Young, 2005). Their suggestion confirms earlier studies, such as that of Cohen and Levinthal (1989), according to which "learning" or "absorptive" capacity, which can also be augmented by R&D activities, is a fundamental prerequisite for assimilating and exploiting knowledge from the external environment (Cohen and Levinthal, 1989). As suggested by Globerman and Shapiro (2008), the argument of Tavares and Young (2005) may be particularly relevant in the case of emerging economies, as the relevant capabilities of local EMNEs might not be "developed" enough to fully identify and exploit spillovers advantages deriving from foreign operations (Globerman and Shapiro, 2008). Additionally, evidence shows that technology spillovers benefits in emerging countries are achieved only when the level of the human capital surpasses a minimum level (Kokko, 2006). Furthermore, since absorptive capacity is directly linked to international competitiveness (Young and Tavares, 2005), and since emerging countries' SMEs lack the technical and managerial expertise to participate into globalized value chains (UNCTAD, 2005), their ability to reap the spillover benefits offered by home EMNEs engaging in OFDI may be particularly scarce (Globerman and Shapiro, 2008). Additionally, as much of the OFDI flows from emerging countries is directed to other emerging economies (South-south FDI) where clusters of the technological expertise are absent or scarce, the potential benefits from reverse spillovers becomes even less significant (Globerman and Shapiro, 2008). On the other hand, however, the smaller

technological gaps between host and home economies in the case of South-South OFDI and the higher propensity of EMNEs towards a deeper integration with local firms could provide a solid base for knowledge and technology to flow back to the home economy (Kumar, 1982; World Bank, 2006). As a consequence, only a review of the empirical analyses performed on emerging economies may allow determining whether they are likely to benefit from technology spillovers originating from OFDI activities. Despite the relevant literature not being particularly rich, some interesting works have emerged in recent times.

Particularly relevant, as it focuses on one of the most significant emerging economies, i.e. China, is the work of Zhao and Liu (2008). Although observing how the scale of China's OFDI cannot be compared to that of developed economies, the authors affirm, by means of their empirical results, that R&D spillovers and technology upgrading effects of foreign investments are clearly identifiable in the country, especially when the host economy is technologically more advanced. Yet, recognizing the limitations of their study and the reduced dimensions of their dataset, they cast some doubts on the accuracy of their assessment and indicate the need for further research (Zhao and Liu, 2008). Similarly, Huang (2009) identifies a positive and significant relationship between OFDI from China and domestic firms' application for patents, thus suggesting the presence of reverse technology and R&D spillovers. Although focusing on a single industrial sector (automotive) in India, interesting has been the research conducted by Pradhan and Singh (2009). In fact, according to them, there is evidence of significant positive benefits from OFDI on the technology intensity of Indian firms (Pradhan and Singh, 2009). Chen, Li and Shapiro (2012) are the authors of one of the most recent studies on the topic. Utilizing firm-level data on almost five hundreds EMNEs, they observe the presence of knowledge and technology spillovers stemming from OFDI. According to them, those EMNEs that engage in foreign activities in more advanced countries are likely to see their technological capabilities at home improving (Chen, Li and Shapiro, 2012).

Concluding, while from a theoretical standpoint one could expect attenuated benefits in terms of R&D spillovers in the case of emerging countries (Tavares and Young, 2005; Kokko, 2006; Globerman and Shapiro, 2008), the empirical evidence presented above proved to be much less controversial and mixed than it was for developed countries, partly reinforcing the arguments of Kumar (1982). Nonetheless, the scarcity of empirical research devoted to this

subject demands caution in drawing a definitive conclusion on the impact of OFDI on technology spillovers for emerging economies.

2.1.3 OFDI effects on Domestic Investments

Until recently, it was commonly believed that OFDI may negatively impact domestic capital formation by relocating abroad significant amounts of capital (Kokko, 2006). The potential negative effects of OFDI on the rate of domestic investment may however be not a great concern, especially in the case of developed countries. A main reason is that the higher efficiency and liquidity of capital markets in more developed countries allows for a greater ability to finance domestic investments locally (Globerman and Shapiro, 2008). Conversely, in the case of emerging economies, less efficient capital markets may obstacle local borrowing and financing of capital investments (Globerman and Shapiro, 2002). Furthermore, in developed countries, the outflows of FDI are usually compensated by a comparable amount of IFDI flows, thus offsetting potential losses in terms of domestic capital formation (Lipsey, 2000). On the other hand, in the case of emerging economies, corruption, government restrictions and inefficient institutions may hamper the attraction of IFDI flows. This, in turn, may increase the concerns related to domestic investments (Globerman and Shapiro, 2002). Nevertheless, the relative small size of OFDI flows compared to domestic investments, and the diffused availability of saving surpluses in emerging economies may help reduce some of the potential concerns (Globerman and Shapiro, 2008). These become even smaller when considering also the potential positive impact that capital flowing abroad may have on investment propensity at home. As a matter of fact, if OFDI is able to raise the profitability of the investing MNEs and to increase the amount of internally generated funds, domestic investments could be also positively affected. Additionally, the greater international integration stemming from foreign investments may allow for better facilitating the access to capital markets and thus cheaper borrowing (Kokko, 2006). In addition, some of the potential drawbacks of OFDI that had been suggested in the past, such as balance-of-payments distortions (Hufbauer and Adler, 1968) and exchange rate risks (Cushman, 1985; Kohlhagen, 1977) have been fading due to the increasing integration of international capital markets and the advent of flexible exchange rates (Kokko, 2006). Emerging from the discussion above, is the fact that, according to the recent literature, OFDI is not believed to cause harm to

domestic capital formation at home, even in the case of less developed countries with weaker institutions and less efficient markets. In order to confirm this view, it would be interesting to quickly revise the main empirical findings related to this topic.

One of the most relevant works in the field is that of Stevens and Lipsey (1992), who focus their empirical efforts on seven US MNEs. They come across evidence of foreign investments competing with and displacing home investments, mainly due to the increased cost of external financing. Similarly, Feldstein (1995), using data for a set of OECD economies, empirically demonstrates that for each dollar invested in foreign assets, domestic investments decrease by a slightly smaller amount. Despite the less than proportional impact observed, he provides strong evidence supporting a substitution effects between OFDI and domestic investments at home (Feldstein, 1995). An important contribution has also been that of Desai, Foley and Hines (2005) who, focusing their analysis on MNEs from the US, suggest a positive linkage between investments abroad and capital formation at home. In their view, a complementary relationship exists between the two variables, which incentivizes home production to combine with foreign activities as a way to increase total output (Desai et al., 2005). Similarly, Goedegebuure (2006), utilizing data for the Netherlands from 1996 to 2000, provides empirical evidence supporting a positive relationship between OFDI and domestic investments. His results hold true for investments in either R&D or capital and even in the case of low-tech industries, for which a negative relationship between capital investments and OFDI was expected (Goedegebuure, 2006). Sauramo (2008) conversely, analyzes the case of Finland and, retrieving the methodology adopted by Feldstein (1995), obtains similar results. Stemming from his analysis, OFDI flows in Finland can be considered as a major determinant for reduced domestic investments in the country (Sauramo, 2008). Mixed are the results of Herzer and Schrooten (2008), which devote their research efforts to Germany and the US. In fact, in the case of the US, they observe a positive effect of OFDI on domestic capital formation; in the case of Germany, the effect is the opposite, and OFDI seems to act as a substitute to investments at home. In the authors' opinion, those results suggest that the effects of OFDI on domestic investments may differ according to individual countries' peculiarities in terms of investment opportunities, economic structure and legal frameworks (Herzer and Schrooten, 2008). Their result however, strongly contrasts with that of Arndt, Buch and Schnitzer (2007) who, by means of a panel cointegration approach, identify a

positive impact of OFDI on domestic capital level across German industries (Arndt et al., 2007). The main reasons for such different outcomes to be obtained for the same country, are probably related to the different data aggregation adopted by the two sets of authors; country-level data in the case of Herzer and Schrooten (2008); firm-level for Arndt et al. (2007). Particularly interesting has also been the work of Braunerhjelm, Oxelheim and Thulin (2004), which separated the results obtained for different types of industries in Sweden. Specifically, they found that in vertically integrated industries, OFDI probably has a positive effect on domestic investments; on the other hand, where productive activities are organized horizontally, OFDI is likely to substitute for investments at home (Braunerhjelm et al., 2004).

One of the very few empirical studies devoted to an emerging economy obtains interesting results. In fact, Girma, Patnaik and Shah (2010) note that, in India, although in the short-term low levels of foreign investment promote domestic investments, high levels of OFDI are related to a reduction in the growth rates of domestic capital formation in the long run. The authors offer two different explanations for this phenomenon. Firstly, the cost of capital for foreign investments is significantly lower than at home; secondly, structural inefficiencies of the Indian economy deter MNEs to invest in domestic assets (Girma, Patnaik, Shah, 2010).

As observed in the previous sections, also in this case, empirical results are extremely heterogeneous, thus increasing the ambiguity involved in drawing some conclusions upon the effects of OFDI on domestic investments. The most striking element is the presence of wide differences between countries, which suggest the necessity of a country-by-country analysis as way to obtain meaningful results.

2.1.4 OFDI effects on employment and the structure of labour demand

Two great concerns related to OFDI are its implications to the composition of labour demand and the level of employment. The former refers to a shift favoring "white-collar" workers at the expense of less-educated workers. The latter, relates to a potential decline in employment rates, stemming from different wage levels between countries and from reduced labor intensity in the production activities of MNEs parents (Kokko, 2006). This vision is shared by Navaretti and Castellani (2002), according to which the loss of jobs at home is one of main problems worrying policy makers when dealing with OFDI. Employment however, is directly

related to domestic output, and the potential impact of OFDI on the productive activities at home can present both a positive or negative sign. In particular, in the case of vertical investments, mainly driven by cost-cutting purposes, employment at home almost always shrinks. Conversely, in the case of horizontal investments, the final effect on employment will be determined by the extent to which foreign activities complement or substitute domestic production (Navaretti and Castellani, 2002). Another channel through which OFDI may impact the level of employment is via changes in the labour intensity of the activities performed at home. The level and direction of these changes is however difficult to predict. On the one hand, labour intensity may increase when MNEs' foreign activities have to be supported by larger and more complex headquarter services; on the other hand, it may decrease if capital intensive activities are kept within national boundaries or if R&D and knowledge spillovers increment productivity at home (Navaretti and Castellani, 2002). Lipsey (2002) makes a similar reasoning, suggesting that OFDI is likely to affect the demand of labour and wages by modifying the allocation of productive activities within the transnational firm. The most likely cause is the decision to transfer labour-intensive production activities in poorer countries with lower wages, while keeping more skill-based operations at home (Lipsey, 2002). A concern on the impact of foreign activities on employment and the structure of home labour demand is expressed also by Visser (2006). In his opinion, even if OFDI may positively affect domestic production and exports, this may have huge repercussions on employment. If, for example, stages of the production process are performed abroad, whereas final processing is made at home, exports and imports increase, while value added and domestic employment decline (Visser, 2006). Additionally, agreeing with Kokko (2006) and Lipsey (2002), the author shares the opinion that OFDI leads to a shift in home labour demand from a lower-skilled to a higher-skilled workforce.

As apparent from this short discussion, despite substantial concerns on the potential negative effects of OFDI on home employment, various are the ways through which foreign activities may impact the labour structure of the home economy, and the final direction of those changes is hard to predict. Due to the high complexity involved in forecasting the final direction of movements in the level of employment, empirical analyses become an essential tool for better understanding. The effect on home employment has been one of the most investigated areas in the OFDI-related literature and empirical analyses have literally

flourished in the past three decades. Consequently, due to the sheer size of this literature, in the following paragraphs only the most significant contributions will be provided.

One of the first available studies is that of Lipsey, Kravis and Roldan (1982). Utilizing data for both Sweden and the US, they observe a higher labour intensity in the activities performed by affiliates in low-wage economies. Conversely, higher capital intensity is observed in the activities performed at home, suggesting a potential adverse effect on total domestic employment levels (Lipsey, Kravis and Roldan, 1982). In a likely fashion, the estimates of Brainard and Riker (1997), which focus on the US alone, show a small substitution effect between employment at foreign affiliates and employment at the US parents' sites, as a response to downward changes in the cost of labour abroad. On the other hand, this substitution effect appears to be fairly strong between affiliates in other host countries (Brainard and Riker, 1997). Nevertheless, as suggested by Kokko (2006), it should not be expected to observe in other economies the same pattern seen in the US, where more advanced activities are always kept within the domestic boundaries. Blomstrom, Fors and Lipsey (1997), for instance, argue that in Sweden OFDI is associated with more employment at home. When foreign activities are located in other developed countries (the majority, in the case of Sweden), the increase in employment is observed in lower-skilled positions. On the other hand, when OFDI is directed to less developed economies, white-collar domestic employment increases (Blomstrom, Fors and Lipsey, 1997). A similar study, conducted by Lipsey, Ramstetter and Blomstrom (2000), finds that also in Japan employment is positively related to OFDI. Braconier and Ekholm (2000) however, observe a substitution effect between employment at foreign affiliates and employment at home. Nevertheless, this relationship holds true exclusively when OFDI is located in other developed economies (Braconier and Ekholm, 2000). Almost identical are the results of Konings and Murphy (2003) which, utilizing an extensive panel of data for hundreds of European MNEs, find that foreign affiliates' employment substitutes domestic employment only when located in more economically advanced countries with higher wages. Substitution effects are absent when investments are located in low-wage regions and, interestingly, in any case of investments related to the non-manufacturing sector (Konings and Murphy, 2003). In a study devoted to Italy, Falzoni and Grasseni (2003) observed that employment is negatively affected by OFDI only in the case of SMEs. Furthermore, also in this case, the effects on employment seem to

be strongly related to the level of development of the host country. As a matter of fact, the negative relation between OFDI and employment was found principally for investments in developed countries, as already observed in Braconier and Ekholm (2000) and Konings and Murphy (2003). Slightly different are the conclusions drawn by Castellani and Navaretti (2002), which observe that foreign investment in Italy is generally associated with improvements in the level of employment.

A different stream of authors has been focusing exclusively on the impact of OFDI on labour demand for skilled or unskilled labour. Among the most relevant contributions, we find that of Feenstra and Hanson (1996). The authors, analyzing data for the US industries, argue that shifting productive activities abroad can be considered as a main determinant of the demand for skilled labour in the country (Feenstra and Hanson, 1996). An additional relevant work in this stream of literature is the one developed by Slaughter (1995; 2000). The author however, does not find empirical evidence supporting the presence of a significant relationship between OFDI and changes in domestic labour demand. A comparable analysis, conducted by Hansson (2001) on Swedish companies, finds a positive and significant relationship between employment in foreign affiliates located in emerging countries and demand for skilled labour at home. On the other hand, no such relationship has been found with the employment rates at affiliates situated in OECD countries. Similarly, Head and Ries (2002), analyzing MNEs from Japan, find a significant and positive relation between skill-intensive employment at home and OFDI. This effect however, declines when investments are directed to more developed economies. In case of investments in countries with particularly high income and development level, OFDI can even result in a reduction of the skill-level of domestic operations, in accordance with the findings of Lipsey, Fors and Blomstrom (1997).

Not surprisingly, also in this case very few empirical works have focused on the home-employment effect in emerging economies. Among those, interesting is the work of Masso, Varblane and Vahter (2007), looking at Estonia, and Huiqun and Jinyong (2011), devoted to China. In each case, a positive and significant relationship between OFDI and domestic employment rates is found. In particular, both authors argue that the home implications of OFDI from emerging economies diverge from those observed in more advanced countries, and that there should not be any concern related to potential job losses in emerging economies

investing abroad. In the opinion of Masso et al. (2007), those findings may be explained by the prevalence of horizontal South-South investments originating from the country.

After having revised the relevant literature concerning the effect of OFDI on employment and labour demand, a general principle seems to emerge. In fact, if one excludes the studies that focused on the US, the vast majority of the empirical findings seem to suggest that a substitution effect between foreign and domestic employments exist only in the case of OFDI directed to more advanced economies. For what concerns the structure of the labour demand, it has been observed that, in the case of investments in less developed economies, the domestic demand for skilled labour increases. Vice-versa, the demand for lower-skilled jobs increases when production activities are installed in less-developed countries. In the specific case of emerging countries, where horizontal investments directed to other emerging economies are prevalent (Kokko, 2006; Masso et al., 2007), policy makers should not worry about the OFDI effects on domestic employment.

Overall, from the aforementioned reasons, it seems that many of the concerns related to OFDI and its impact on employment are exaggerated. Nevertheless, policy makers shall take extreme care in forecasting the likely changes that may happen in the structure of labour demand.

2.1.5 Summary and reflections

In the literature previously reviewed, several ways through which OFDI may impact the home country and its development have been identified. First of all, OFDI may create a more efficient channel for international trade, promoting intra-industry commerce and incentivizing exports of intermediate goods. OFDI may also be an important channel for technology and productivity spillovers, both via imports of technologically advanced products and via intra-firm knowledge transfers. Theoretically, it has also been argued that OFDI should not pose a considerable threat to domestic investments, mainly due to the potential to reinvest domestically the internal funds generated through OFDI. Furthermore, OFDI is not automatically associated with decreases in employment, especially in the case of horizontal investments.

Empirical evidence then allowed a better assessment of those theoretical linkages between foreign investments and the home economy. It has been showed however, that no unanimous response has been given to the question of whether a complementary or substitute relationship exists between exports and OFDI. Also in the case of technology spillovers, the extensive heterogeneity in empirical results does not allow to confirm the presence of linkages with OFDI flows. The same high variation in empirical results does not permit to clarify whether OFDI substitutes or complements domestic investments. A much less ambiguous response has been given regarding the effects on employment and on the structure of labour demand. In the majority of cases, in fact, decreases in employment are usually associated only with investments in developed economies, with the demand for labour usually remaining unaltered. In the opposite case, of OFDI directed towards less developed economies, home employment is expected to increase, accompanied by an increase in the demand for skilled workers. Finally, when focusing on emerging economies and their peculiarities, some interesting findings have emerged. As an example, it seems that OFDI is likely to have a reduced impact on exports promotion in emerging economies. This is due in part to weaker linkages between the MNEs and its foreign affiliates and in part to the geographical and sectoral distribution of OFDI from emerging economies. As a matter of fact, as observed in figures 1.5 and 1.6, emerging countries tend to invest prevalently in other emerging economies (South-South OFDI) and mainly in the service sectors, where less intermediate products are involved. Emerging countries may also find more difficulties in benefiting from technology spillovers, due to their reduced "absorptive capacity" and to their tendency to invest in other emerging (and thus less technologically advanced) markets. Yet, their deeper integration with host countries' firms and the few empirical results available seem to suggest the opposite. In addition, it is possible that emerging economies may be more likely to observe a substitutive relationship between OFDI and domestic investments. This concern, dismissed by the theory, has however been reinforced by the empirical evidence available. Conversely, as observed from empirical studies, emerging countries' governments should not be exaggeratedly worried about job losses at home. As the majority of OFDI from developing countries is South-South FDI, the overall effect on employment should be expected to be positive. The possibility of a fall in the demand for lower-skilled workers should however raise some concerns. Concluding, theory seems to pinpoint the presence of various beneficial effects for the home

country from OFDI, especially in terms of increased international trade and productivity enhancements via technology spillovers. The net effects of those benefits may then translate into greater economic growth. Yet, it would be foolish to expect for emerging economies the same effects predicted for developed countries. As a matter of fact, many are the peculiarities characterizing emerging countries and their OFDI flows. Among those, their less efficient institutions, their lower technological and managerial capabilities, the concentration of OFDI in other less developed areas and in the service sector, all contribute to suggest that the positive home effects of OFDI in emerging countries are likely to be smaller in size than those predicted for more advanced countries. Nevertheless, the mixed evidence obtained in many empirical studies focused on developed regions and the paucity of works related to developing economies makes it necessary to recur to macro-empirical evidence which directly relates foreign investment and economic development.

2.2. IFDI effects on the Host Economy

Despite the focus of the present work being on the effects of OFDI on economic growth and development, some attention shall still be devoted to the implications for the host countries. A brief analysis may be helpful for a better understanding of the topic and can also be useful for comparative purposes with the previous section. As this subject has been heavily dealt with, and as the size of the relevant literature is gigantic, the present section provides only the works of the most relevant scholars and will rely on previously compiled literature reviews. Among the most excellent contributions proposed, there are those of Blomstrom and Kokko (1996), Lipsey (2002), Navaretti and Venables (2004), and Johnson (2006). The next paragraphs are devoted to the analysis of the potential effects of IFDI on the host country in general, while still seeking to keep the focus on the specific case of emerging economies. The relevant literature seems to generally agree on which are the areas of the host economies that may be more positively affected by inward flows of OFDI, and those closely resemble the ones analyzed in the preceding section. The potential for technology spillovers and the effects on employment are the ones on which more scholar work has been published, followed by the impacts domestic investments and trade.

2.2.1 IFDI and technology spillovers

According to Findlay (1978), a firm's technical efficiency is directly and positively related to the presence of foreign competitors established locally. Accordingly, it does not surprise that the possibility of technology spilling over from IFDI is one of the greatest hopes crossing the minds of host-country policy makers when attempting at attracting FDI flows (Johnson, 2006; Blomstrom and Kokko, 2003). Markusen (1995) argues that some of the main features of modern MNEs are knowledge intensiveness, a high level of R&D expenses and advanced products. Additionally, according to Johnson (2006), MNEs are believed to be technologically more advanced than local firms in host economies. As a consequence, there is the possibility for parts of this technology to be transferred, willingly or not, to host countries' firms (Johnson, 2006). Technological spillovers have the potential to generate great benefits for the domestic firms that are able to reap them, for a series of reasons (Blomstrom and Kokko, 1996). First of all, most of the times the practices and technologies utilized by foreign affiliates of large MNEs are often not available in host countries (Blomstrom and Zejan, 1991). Secondarily, it may be easier and less risky to copycat new technologies when they already have proven their potential, instead of developing them in the first place (Blomstrom and Kokko, 1996). Several are the channels through which technology spillovers may occur. As an example, domestic firms may attempt at initiating the technologies and practices of foreign firms by observation, through reverse engineering or by hiring their employees (Javorcik, 2004). This type of spillovers however, may be more easily achievable in relatively more developed host economies, which may possess greater capabilities to emulate the most advanced foreign technologies (Blomstrom, 1991). Furthermore, transfers of proprietary technology or of technology-intensive assets may happen through intentional market-based transactions (Navaretti and Venables, 2004). A different type of spillovers happens when the entry into the local marketplace of foreign firms increases competitions and pushes incumbents to use their technological endowments more efficiently or to engage themselves in more intensive and effective R&D activities (Blomstrom and Kokko, 1998). Generally speaking, when domestic activities are able to take advantage of the presence of more technologically advanced foreign competitors operating locally, we refer to horizontal spillovers (Javorcik, 2004). However, MNEs that are concerned about proprietary technology spilling over to local firms may put in place mechanisms preventing horizontal spillovers

from happening, such as the patenting of proprietary technology or the provision of higher wages to shield against turnover. On the other hand, MNEs are less likely to attempt at inhibiting vertical spillovers, i.e. spillovers occurring through forward or backward connections between domestic firms and foreign firms operating at a different level of the supply-chain (Javorcik, 2004). For instance, MNEs may intentionally commit themselves to augment the quality of the output of local suppliers, for those products that cannot be economically imported from the MNEs' country of origin. Also their customers may be positively affected, when specific training in sales and marketing practices is provided. Additionally, service providers such as accountants or legal advisory firms may benefit from operating with the local branches of foreign MNEs, which have an obvious interest in improving and modernizing the practices of their collaborators (Meyer, 2005). Moreover, the presence of foreign firms may incentivize the development of investments in public goods, such as infrastructure or formal training programmes, and could promote the emergence of local suppliers of inputs that were not previously available in the host country (Navaretti and Venables, 2004).

Spillovers however, may also have a negative effect, and the efficiency and productivity of domestic firms may be reduced when foreign competitors establish themselves in the host country. As highlighted by Lipsey (2002), foreign subsidiaries of global MNEs may enter the host market by acquiring the most efficient firms, thus lowering the average productivity and efficiency levels of the local industry. Additionally, foreign firms may steal market share, reducing the production levels of domestic players that are forced to operate at a much less efficient scale (Lipsey, 2000).

To date, the empirical studies aiming at verifying the presence of technology spillovers from IFDI on host economies have been almost uncountable.[2] One of the earliest contributions is the one of Caves (1974), who identifies a positive, although not particularly strong, relation between FDI and higher productivity of host countries' firms in Australia. Globerman (1979), focusing on Canada, confirms Caves' findings. More than a decade later, Nadiri (1991) identifies a positive and significant relationship between IFDI and total factor productivity in Germany, France, Japan and the UK. More recently however, a bulk of authors focused on the

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[2] Barba Navaretti and Venables (2004) and Gorg and Greenaway (2001) both provide an excellent review of the empirical literature related to this topic.

UK, with mixed results. Amongst those, important have been the works of Girma, Greenaway and Kneller, (2001), Driffield (2001) and Haskel, Pereira and Slaughter (2002). While the latter sets of authors find evidence of positive spillovers from FDI, Girma et al. (2001) are not able to find any significant relationship between FDI and productivity of domestic UK firms. Overall, the picture emerging from the studies presented above, related to developed countries, is rather optimistic with regards to spillovers from FDI.

For what concerns emerging countries, their relatively lower technological level may increase the potential for efficiency increments even in the case of small spillovers (Johnson, 2006). At the same time however, the reduced absorptive capabilities (measured by variables such as knowledge capital, human capital or infrastructure quality) of emerging economies may make it more complicated to take full advantage of all available opportunities for improvements in efficiency (Kokko, 2006). Fortunately, the extensive empirical literature allows us to shed some light upon the effects on FDI on technology spillovers in emerging countries. Focusing on Mexico, Blomstron and Persson (1983) and Kokko (1994) both find evidence of technology spillovers from foreign investments. Aitken and Harrison (1999) look at Venezuela and surprisingly find negative effects of foreign investments on domestic firms' productivity. Haddad and Harrison (1993) and Kathuria (2000), focusing on Morocco and India, respectively, obtain results that vary with the type of industry analyzed. In general, the greater heterogeneity of the results obtained when looking at emerging countries may suggest that they are less likely to benefit from technology spillovers as a consequence of IFDI. Nevertheless, as suggested by Gorg and Greenaway (2001) and Gorg and Strobl (2002), much of the variety in findings can be attributed to differences in the empirical methodologies adopted.

2.2.2 IFDI, employment and wages

Employment and wages are two areas of great interest when discussing the impact of IFDI on the host economy. According to Meyer (2005), FDI has a great potential to increase employment in the host country. Job creation may be may be stimulated directly, principally via Greenfield investments and indirectly, when for instance local suppliers hire new employees as a consequence of an increase in demand from foreign companies (Meyer, 2005). At the same time however, IFDI may cause local employment to shrink, when it crowds out

domestic players with more labour-intensive productive activities (Dunning, 1993). Nevertheless, the overall net impact of FDI on host countries' employment is expected to be positive. As a matter of fact, as observed by Ekholm (2004), both vertical and horizontal FDI can be thought of being positively related to the employment levels. Whereas vertical FDI transfers production activities from home to the host country in the search for cost-efficiencies in production, horizontal FDI substitutes exports with productive activities in the host countries. In both case total production levels in the host economy are supposed to increase, leading to an increase in the demand for labour (Ekholm, 2004). As a consequence, the majority of authors has focused its empirical efforts on a sub-aspect of employment, investigating the impact of IFDI on the level of wages in the host country. Lipsey (2002) provides an accurate and comprehensive review of this topic. According to him, it is almost impossible to come by an empirical analysis that does not find a positive effect of IFDI on salaries, both in developed and emerging economies. Nevertheless, higher wages paid by foreign MNEs may simply mean that these firms employ higher-skilled workers which would receive better salaries anyway (Navaretti and Venables, 2004). For this reason, it would be particularly interesting to assess whether the wages paid by domestic firms rise as a consequence of higher salaries paid locally by foreign firms, a phenomenon described as wage spillovers (Lipsey, 2002). Numerous empirical studies have been conducted to identify the presence of wage spillovers in host countries. In the case of emerging economies, Aitken, Harrison and Lipsey (1996) focus on both Mexico and Venezuela, finding no significant relationship in the former and negative spillovers in the latter, thus hypothesizing the presence of a "relocation effect" of highly-skilled domestic workers from domestic to foreign-owned firms. Lipsey and Sjoholm (2001), conversely, are able to provide strong evidence in favour of positive wage spillovers in Indonesia. In the case of developed countries, much less investigated, Girma et al. (2001) do not find any effect on the level of domestic wages in the UK, while Feliciano and Lipsey (1999) observe a positive relation between IFDI and wage spillovers, although only in some specific industries. In general, it appears as empirical evidence is unable to provide a unique response to the presence of positive or negative wage spillovers. However, from the point of view of host-countries' policy-makers, of greater interest would be to evaluate the overall changes in the average salaries that are induced by IFDI. These changes are affected by a combination of higher wages paid by foreign firms,

wage spillovers and increases in the demand for labour (Lipsey, 2002). Overall, the empirical studies related to this subject provide significant evidence of a positive linkage between IFDI and the average level of wage in the host countries. Aiken, Harrison and Lipsey (1996) in Mexico and Venezuela, Feenstra and Hanson (1997) in Mexico and Figlio and Blonigen (2000) in the US, all observe the presence of positive effects of foreign investment on domestic wages. As a consequence, even in the case of non-significant or negative wage spillovers and both in developed and emerging countries, it can be concluded that there is substantial evidence of a positive overall effect of IFDI on employment and on the wages received by domestic workers.

Nonetheless, some additional employment-related concerns can follow the arrival of foreign investments in the host country. Barba Navaretti and Venables (2004), for instance, discuss the impact of IFDI on the demand for skilled or unskilled labour in host countries. This is a topic that has already been dealt with when analyzing the home country effects of OFDI. When looking at host countries however, no specific patterns emerge. The results provided by empirical research are in fact extremely heterogeneous, especially for developed economies. One of the very few studies that focused on an emerging country, i.e. Mexico, was performed by Feenstra and Hanson (1997) and reported positive evidence supporting a relationship between IFDI and the rise in demand for skilled workers. The absence of analyses on a similar sample however, does not allow confirming their findings. Additionally, as described by Meyer (2005), some worries may be formulated around the possibility that global MNEs, via their enormous bargaining power, might lower their labour and environmental standards in the host country. Although the fear of worsening their reputation may push these firms to operate above usual standard, as suggested by Moran (2002), the chance to reap additional profits may sound tempting enough. In any case, the absence of empirical proof makes it hard to legitimate these concerns (Meyer, 2005).

Notwithstanding these additional concerns, under the light of the literature discussed above, it may be deemed reasonable to expect an overall positive impact of IFDI when looking at host countries' employment variables. More specifically, the attraction of IFDI is likely to benefit the host countries by increasing employment levels and by raising the level of wages. Additionally, significant differences in the forecasted effects between developed or emerging economies should not be expected.

2.2.3 Other effects on the host economies

A certain number of scholars, when analyzing the potential effects of IFDI on the host economies, have considered also international trade and domestic investments as areas of interest. However, as these two subjects are less extensively investigated throughout the literature, less attention will be dedicated to them and they are considered together herein.

Blomstrom and Kokko (1996) provide a comprehensive review of the potential effects of IFDI on international trade in the host country. According to them, few local firms in host countries (particularly those located in emerging economies) possess the same knowledge and capabilities in exporting activities than MNEs, which are able to leverage on an extensive international network of foreign operations and on a high reserve of financial resources. These firms may thus help local players to expand beyond the host country's borders and help the overall trade performance of the host country (Blomstrom and Kokko, 1996). First of all, as suggested by Bhagwati (2004), at a more general and higher-level MNEs may operate as an important opposition force against protectionism and in favour of free-trade and liberalization. More pragmatically, foreign firms may help local players in better accessing international buyers (Blomstrom, 1990). Global MNEs might do so by contracting local firms as suppliers, thus providing them with the possibility to achieve greater scale and to acquire the knowledge required to operate with foreign customers. This knowledge could, subsequently, be transferred to other operations within the domestic firm (Keesing and Lall, 1992). More indirectly, domestic players could increase their ability to operate internationally simply by imitating the behavior of global MNEs operating in their markets, or by hiring some of their former employees, thus achieving important "market access spillovers" (Blomstrom and Kokko, 1996). A series of empirical studies has focused on the relationship between IFDI and the international activities of domestic firms. As an example, both Aitken, Hanson and Harrison (1994) and Kokko, Tansini and Zejan (2001), observe a significant and positive linkage between the presence of foreign MNEs and the export performance of Mexican and Uruguayan enterprise, respectively. Accordingly, it seems safe to conclude that IFDI may have a positive effect on international trade in host economies, especially in emerging countries, where local firms initially lack the scale and knowledge to successfully operate in the global marketplace.

Another macroeconomic variable that may be positively impacted as a consequence of the arrival of IFDI are capital investments, as suggested by Johnson (2006). However, at later stages in time, the physical capital introduced by foreign firms will return to the home economy via profits remittance (Meyer, 2005). Additionally, there may be the possibility of foreign capital to substitute for domestic capital, thus leaving unchanged the overall stock of capital in the host economy. As a consequence, empirical evidence has proven to be necessary in investigating whether IFDI complements or substitutes for domestic investments. Many scholars have engaged themselves in better analyzing this relationship in the past years and several studies have demonstrated a complementary relationship between foreign and domestic capital in both developed and emerging countries (Borensztein at al., 1998; de Mello, 1999). These findings, in turn, imply a positive relationship between IFDI and productivity capacity, via capital investments.

Across the vast literature on IFDI and its effects on host countries, several other areas have been investigated that were not been considered in the discussion above. As an example, Barba Navaretti and Venables (2004) have looked at the potential impact on employment volatility, Lipsey (2002) has considered the potential to create new industries, while Blomstrom and Kokko (1996) have also looked at the implications on the competitive structure of host economies.

2.2.4 Summary and reflections

The literature just reviewed, although brief compared to the available contributions, allows for drawing some conclusions upon the impact of IFDI on host economies. In particular, it has been showed that many are the channels through which foreign investment can benefit host countries, such as increases in employment and the level of wages, promotion of international trade, increments in the stock of capital invested and the possibility of reaping technology and productivity spillovers. All these effects, consequently, have the potential to promote economic development and growth. Also in this case, empirical evidence proved to be an essential tool for the validation of theoretical hypotheses. In particular, the majority of the studies related to technology spillovers confirm the productivity enhancing effects of IFDI. Evidence related with employment and wages substantiates the existence of positive effects of foreign investments on job creation and wage increases in host countries. Empirical results

also provide ample support to the presence of a positive relationship running between IFDI and international trade and between IFDI and domestic investments. Furthermore, it is also possible to outline some specific differences that may involve emerging countries. Interestingly, it seems that emerging economies are likely to see a positive impact on employment, wages and domestic capital which is similar to what would be expected in the case of more developed economies. Moreover, emerging countries may also expect greater advantages from IFDI in terms of increased exports, mainly due to their initial inexperience and lack of knowledge about international trade. Nevertheless, as showed by available empirical research, the relationship between IFDI on technology spillovers in emerging economies cannot be unambiguously determined. These results are similar to those observed when discussing OFDI. As a matter of fact, also in this case, it may be suggested that the minor absorptive capacity of emerging countries may prevent them from fully internalizing the potential productivity spillovers deriving from the interactions with more technologically advanced nations.

Overall however, one of the most fascinating features of the literature reviewed is the fact the potential impact of both IFDI and OFDI on economic growth mainly derives from positive influence in two main areas. These are international trade expansion and productivity enhancements. In both cases, a country can see its economic performance improved as a consequence of either better linkages with and knowledge of foreign markets, or increased knowledge and capabilities in more advanced production technologies. For these reasons, the potential effects of FDI activities on economic growth are best framed within the concepts of the endogenous growth theories developed by Lucas (1988) and Romer (1990), where knowledge, technological progress and productivity are the main drivers of long-run economic growth and development.

The scope of the next section is therefore that of assessing whether, historically, economies have actually been able to harness the potential growth enhancing effects of FDI and translate them in increased economic development.

2.3. The economic growth-FDI nexus. A review of the macro empirical literature

As observed, many are the ways through which foreign capital may positively impact the home and the host economy, thus leading to greater economic development and growth. Yet, many of the empirical works that have focused on a specific area of the home or host country economy have led to heterogeneous results. Additionally, the majority of these works focus only on firm or industry-level evidence. As a consequence, a need for studies of a more overarching nature emerges, studies that specifically focus on the impact of foreign investments on a country's economic growth (Herzer, 2010). As will later become apparent, the empirical studies specifically addressed to the effects of OFDI on economic growth are very scarce. Consequently, researches focused on IFDI and economic development are essential for a better understanding of the topic, the empirical results obtained and the methodologies and techniques adopted. Some of the approaches presented in the following review are in fact utilized to perform the empirical analysis presented in chapter 3, which constitutes the core of the present thesis and will hopefully provide additional insights on the relationship between OFDI flows and economic growth in emerging economies.

The following paragraphs begin by reviewing the works associated with IFDI before shifting to the works addressed at the OFDI-economic growth relationship. The various works are divided by methodology, separating cross-country from time-series analyses. Appendix 2 contains a summary of the empirical contributions herein analyzed.

One of the earliest contributions is that of Balasubramany, Salisu and Sapford (1996), who focus on 46 emerging countries and adopt a cross-country regression analysis to evaluate the impact of FDI flows on economic development. The estimates they compute are significant and positive, although they are stronger for those countries adopting export-oriented policies instead of import-substitution strategies, thus implying the participation of trade openness in the FDI-growth relationship (Balasubramany et al. ,1996). A couple of years later, influential has also been the analysis conducted by Borensztein, De Gregorio and Lee (1998). Their approach adopts a cross-country regression analysis based on FDI flows from industrial countries to 69 developing countries (Borensztein, De Gregorio, Lee, 1998). All their regressions are estimated adopting the SUR (Seemingly Unrelated Regressions) technique and are based on panel data. Among their most robust findings is the fact that FDI is positively

related to economic growth only when it interacts with human capital; that means that in order to promote growth, foreign direct investments must be supported by a certain level of schooling in the host country (Borensztein, De Gregorio and Lee, 1998). In the same period, remarkable has been the work of Olofsdotter (1998). The author utilizes a sample of 50 countries, the majority of which being emerging, and adopts a cross-country regression methodology with an OLS estimator. His results further confirm the presence of a positive and robust relationship between growth and the stock of IFDI. Additionally, this relationship becomes stronger in the case of economies with more developed and efficient institutions. However, as opposed to Brensztein at al. (1998), he does not find evidence of the existence of an interaction effect between FDI and human capital as a condition to promote growth (Olofsdotter, 1998). Bengoa and Sanchez-Robles (2003) focus specifically on Latin-America, performing panel data analysis on a sample of 18 countries. The estimates they obtain show a significant and positive coefficient for FDI, which also proves to be robust to different specifications in the methodology adopted. The most interesting aspect of their study is however that the size of the impact of FDI on growth strongly depends on certain host country's conditions, such as openness, political and macroeconomic stability and a threshold level of human capital (Bengoa and Sanchez-Robles, 2003). Of particular interest is also the work of Carkovic and Levine (2002), who analyze a sample of 72 emerging and developed countries. Their paper aims to innovate the previous literature, by bringing in new statistical approaches and different databases. As per new statistical techniques, they adopt the Generalized Method of Moments (GMM) panel estimator, previously devised by Arellano and Bower (1995), with the goal of controlling for country-specific effects and other biases that might affect both the coefficient estimates and the coefficient standard errors. For what concerns the panel of data, they adopt brand new data from the World Bank, implemented by and checked against the IMF's World Economic Output data on openness (Carkovic and Levine, 2002). According to their findings, it seems as there is no independent exogenous influence of FDI on economic growth. Further significant developments in the field have been brought up by the academic work of Alfaro, Chanda, Kalemli-Ozcan and Sayek (2004), looking at a sample of both OECD and non-OECD countries. The primary objective of their paper is to assess and quantify the relationship that runs among financial markets, economic growth and FDI. They base their study on the hypothesis that more developed financial

institution could improve a country's ability to reap the benefits of FDI (Alfaro et al., 2004). In order to do so, they adopt a series of financial dependent variables drawn from the previous extensive literature on the topic, such as King and Levine (1993) and Levine and Zervos (1998). They implement a standard OLS regression analysis, relating economic growth to FDI, initial GDP per capita, a series of proxies for financial institution development and other control variables widely acknowledged in the literature. Their empirical results, using data from the IMF, display an ambiguous role for FDI in terms of its contribution to economic growth, although the presence of highly developed financial systems completely reverses the outcome of the regression analysis, suggesting a positive impact of FDI on economic development (Alfaro et al., 2004).

Another stream of empirical analyses abandoned cross-country regressions and utilized time-series approaches, as a way to better define the causal relationship between FDI and growth. Confirming the need of a clarification on the causality direction between OFDI and economic growth, many scholars have moved their empirical analysis beyond the evidence from panel data.

As an example, de Mello (1999) complements his evidence from panel data with time series analyses, as a way to estimate the impact of inward FDI on Total Factor Productivity (TFP), capital accumulation and output in recipient countries. The empirical evidence provided in his work is puzzling, as the growth-enhancing effects of FDI appear to be quite sensitive to country-specific factors (de Mello, 1999). Extremely interesting for the purposes of the present work, is also the study of Zhang (2001), who focuses on assessing the causal patterns between FDI and economic growth in 11 emerging economies located in East Asia and Latin America. The approach he adopts, which profoundly influences the methodology chosen for this thesis, consists of a "three-step" procedure, where unit-root and cointegration tests precede both short-run and long-run causality analyses. The results obtained from his empirical analysis suggest different patterns in the FDI-growth nexus across countries. As a matter of fact, more liberal trade regimes, higher education levels and political stability tend to enhance the positive influence of FDI in host economies (Zhang, 2001). Maintaining the focus on understanding the causal linkages between FDI and growth in emerging economies, Basu, Chakraborty and Reagle (2003) adopt a different and particularly interesting econometric approach, based on a panel cointegration framework. As stated by the authors,

that approach allows an increase in the model's flexibility and introduces the possibility of controlling for common time fixed effect across the countries in the sample. The outcomes of their analysis ultimately suggest the presence of a long-run steady-state relationship between FDI and growth. Liberalization, however, plays a key role; in fact, in close economies causality mainly runs from growth to FDI, whereas in more open ones bidirectional causality between FDI and growth is found both in the long and in the short-term (Basu et al., 2003). More recently, Sridharan, Vijakumar and Chandra Sekhara (2009) provide additional contribution to the causality analysis of FDI-growth dynamics, narrowing their focus on BRICS countries alone. The main peculiarity of their work is the adoption of the Industrial Production Index (IPI) as a proxy for economic growth. Although their econometric framework does not innovate from previous empirical works, their results once again confirm the interdependence between patterns of FDI accumulation and economic growth, highlighting country-specific peculiarities. As a matter of fact, while growth is observed to be leading FDI bidirectionally for Brazil, Russia and South Africa, FDI influences growth unidirectionally in India and China (Sridharan et al., 2009). One of the most recent empirical analyses on the effects of IFDI on emerging countries' growth has been that of Herzer (2012). Drawing on the methodology adopted by Basu et al. (2003), the author utilizes panel cointegration techniques on a subset of 44 emerging economies. As opposed to previous scholar works, his coefficient for the FDI variable shows a negative and significant correlation with economic growth. Nonetheless, he also observes an extremely high degree of heterogeneity, with the effects of FDI on growth widely diverging across countries. Such large difference can, in his opinion, be explained by differences in economic freedom, FDI volatility and dependence from natural resources (Herzer, 2012).

The contributions listed above, are just a selected sample of the immense empirical literature looking at the IFDI-growth relationship. Considering the recent upswing of OFDI flows, illustrated in section 1.1, one should expect a similar upward trend in the number of empirical contributions devoted to OFDI. On the contrary, when looking around to retrieve some scholarly works on OFDI and economic growth, the landscape is surprisingly gloomy. As a matter of fact, to knowledge, only very few authors have looked at the macro-empirical relationship between OFDI and economic growth. One of those is Dierk Herzer and, as his

work has been inspirational for this thesis, his main findings and the methodologies he adopted are summarized in the lines that follow.

In 2009, Herzer (2009) made the first attempt at estimating the impact of OFDI flows and stocks on the overall economic growth of a country. His approach includes two different econometric techniques; i.e. a cross-country regression on 50 developed and emerging economies and a time-series analysis on the largest FDI supplier in the world, the US (Herzer, 2009). The regression function and the coefficients he considers, are drawn from previous empirical studies, including those of Barro (2001) and Levine and Renelt (1992), and the data are mainly retrieved from the World Bank's WDI (World Development Indicators) database. Both econometric approaches provide evidence of a positive and significant relationship between OFDI and per capita income growth. Additionally, the long-run causality relationship proves to be bidirectional, meaning that while OFDI boost growth, also GDP enhancements positively affect local MNE's capability to invest abroad (Herzer, 2009). Two years later, he continued focusing on OFDI, employing however a different dependent variable, i.e. Total Factor Productivity (TFP), instead of economic growth. Diverging is also the sample he chooses, which consists of 33 emerging economies. His econometric framework employs, as in Basu et al. (2003) and Hsiao and Hsiao (2006), a panel cointegration approach. In line with modern time-series theory, he adopts both a Dynamic Ordinary Least Square (DOLS) estimator and an Error Correction Model (ECM) as a way to estimate the relationship between OFDI and TFP. Among the most important findings he draws from the empirical analysis, is that there is a long-run positive correlation between the two variables. He therefore argues, based on his results, that promoting OFDI could have a positive impact on economic growth in the home country, via productivity enhancements (Herzer, 2010).

Apart from the two studies presented above, the present work is aware of only one additional contribution that aims at identifying the overall impact of OFDI on economic growth, i.e. an analysis on the causal links between OFDI and economic growth in Malaysia, performed by Wong (2010). Evidence from the Granger test on time series data reports the presence of a unidirectional causal relationship running from economic growth towards OFDI. According to Wong, this result is determined by the scarcity of business interactions between domestic firms and Malaysian MNEs, which are reluctant to source inputs at home due to a diffused lack of price competitiveness in the domestic market (Wong, 2010).

2.3.1 Final reflections

The previous paragraphs have presented a selection of contributions analyzing the macro empirical relationship between FDI and economic growth. Although the majority of contribution dealing with IFDI provides evidence of a positive correlation with economic development, it has proven difficult to identify an unambiguous relationship between the two variables (Johnson, 2006). As a matter of fact, most of the times that such a relationship was found, it was conditional on country-specific characteristics, such as the initial stock of human capital, openness, macroeconomic stability or the development of domestic financial markets. These observations are in line with the opinion that an economy's ability to reap the positive spillovers stemming from foreign investment activities may be hampered by local conditions (Alfaro et al., 2004). Those results concur also with the consideration that a "conductive economic climate" is a prerequisite for exploiting the potential of FDI (Balasubramanyam, 1996) and with the idea that some countries may lack the absorptive capacity required to benefit from technology and productivity spillovers (Borensztein, de Gregorio and Lee, 1998; Tavares and Young, 2005; Kokko, 2006). Moreover, the findings confirm the opinions of Romer (1990), which considers human capital levels and integration across global markets as critical factors to achieve faster economic growth. Lastly, it has also been observed that in some cases (Zhang, 2001 and Basu et al., 2003), the relationship between IFDI and GDP can run in the opposite direction, since economic growth can be considered as a major attractive force for IFDI flows (Ozturk, 2007).

Nevertheless, the most important finding of this review has been the identification of a huge loophole in the relevant literature. Consequently, as mentioned in the introductory chapter, the present works has the ambitious goal of filling that hole, providing a comprehensive empirical assessment of the growth enhancing impact of OFDI in developing economies. Whereas Herzer (2009) already suggested the presence of a positive relationship for developed countries, it has also been showed how emerging home economies may differ in their ability to reap the potential advantages of OFDI. As a consequence, a different result may emerge from the present thesis. Furthermore, acknowledging that the GDP-OFDI relationship may run in the opposite direction, as already demonstrated by Wong (2010), causality analysis is needed to complement our empirical assessment and provide a comprehensive picture of the

complex connections between OFDI and economic growth. The next section deals exclusively with empirical analyses and comprehends a thorough description of the methodologies adopted. As the reader will notice, those methodologies partially draw on the ones employed in the literature just reviewed, having chosen those that appeared to be more suitable for this thesis' purposes.

3. EMPIRICAL ANALYSIS

3.1. Introduction

As suggested in the previous section, a thorough empirical study of the linkages between economic growth and OFDI in emerging countries has not been identified in the literature researched. Accordingly, this thesis' ambitious goal is precisely that of performing such an analysis, drawing on a wide array of econometric tools and techniques. More specifically, an attempt is made at determining whether or not increasing flows of OFDI are related to enhanced income per capita. Additionally, having noticed the heterogeneity of the results provided by most researches dealing with IFDI and growth, a country-by-country causality analysis of the economic growth-OFDI relationship is deemed of extreme importance. The econometric instruments required for these types of investigation pertain to two different families of statistical techniques, i.e. panel data and time-series analysis. In the next paragraphs, a short discussion on the reasons that led to the very adoption of those techniques is presented.

As described in Kennedy (2008), one could roughly divide modern econometric approaches in two branches: microeconometrics and time-series analysis. The former mainly consists of various typologies of cross-sectional data. Among those, there are also longitudinal or panel data, where a determined cross-section of countries, people, etc. is monitored over time (Kennedy, 2008). Many authors have investigated the area of panel data, singling out pros and cons, benefits and drawbacks. One of the main benefits is straightforward and consists in a much wider datasets with greater variability and reduced collinearity between the variables. As a consequence, data become more informative and provide a stronger basis for increasingly efficient estimation. Panel data are also suitable to cope with heterogeneity in the individual units. As a matter of fact, each individual (or country) is influenced by various unmeasured variables, thus biasing the estimation. Panel data performs fairly well in correcting these types of biases (Baltagi, 2005). Additionally, panel data permits better analysis of dynamic behaviours. They do so avoiding the need for very long time-series, by exploiting the dynamic behavior of various countries, individuals, etc. (Hsiao, 1986). This feature of panel data is particularly useful in the case of OFDI, considering the recent nature of the phenomenon and, consequently, the absence of a long time span of analysis.

Among the possible drawbacks and weaknesses of panel data identified in the literature, there are: issues in the construction and data collection of panel surveys (Kasprzyk, Duncan, Kalton and Singh, 1989), measurement errors caused by faulty or deliberately distorted responses, and sample selection problems that amplify biases in the inference drawn from any single sample (Baltagi, 2005). These potential limitations however, refer mainly to data sets obtained through surveys or interviews. Being the data for this work retrieved from reliable statistical databases, there is not concern that any of those weaknesses could affect the empirical analysis presented hereafter.

Nevertheless, despite the many advantages of panel data inferences and, whatever the results of the regression analysis, caution must be taken when drawing conclusions beforehand. As a matter of fact, and as suggested by Herzer (2009) among others, a positive relationship between the two variables might not necessarily result from a causal impact of OFDI on economic growth. In fact, it could be economic growth, in association with higher productivity and more available wealth, which incentivizes and allow local MNEs to invest abroad. As a consequence, endogeneity might become a serious problem, affecting and biasing the regression's estimates (Herzer, 2009). Indeed, as illustrated in many econometric textbooks, the dependence of one variable on another, pictured in regression analysis, does not necessarily imply causation (Gujarati, 2003). For the aforementioned reasons, as a way to clarify which is the causal direction between OFDI and economic growth, cointegration techniques and causality tests are applied to time-series data for each country included in the sample. The decision to adopt this methodology is supported, as depicted in the previous section, by a number of influential scholars (de Mello, 1999; Zhang, 2001; Basu et al., 2003; Hsiao and Hsiao, 2006; Sridharan et al., 2009; Herzer, 2010). Drawing from those authoritative sources, a sound econometric approach has been devised, that extends the analysis beyond the boundaries set by the regression equation inferences.

The following pages discuss with a fair amount of detail, the structure of the empirical analysis and the results that derive from it. The next section describes the data used, their sources and the statistical software employed. Following, another section is devoted to the description of the econometric framework and explains how data are going to be treated. Thereafter, a final section portrays the analysis' results, before leaving room for conclusions.

3.2. Data and statistical software

The software adopted to perform this thesis' empirical analysis is STATA (StataCorp LP, 2012), a general-purpose statistical software package. The choice of STATA has been mainly driven by the software's user-friendly interface, its completeness and, most importantly, the presence of a wide and active user community, who provides support through "Statalist", an active e-mail list where problems commonly encountered in econometric analyses are solved through the support of seasoned scholars.

Data concerning the outward stocks of FDI are retrieved from the UNCTAD database (UNCTADstat, 2012). On the other hand, data for the OFDI flows are taken from the WDI (World Development Indicators) and Global Development Finance (GDF) databases (DataBank, 2012), as well as those for any other variable considered hereafter.

The countries under analysis are sixteen, i.e. the BRICS countries plus eleven other emerging economies. As a way to select those countries, a series of INDICES, developed by investments banks or international organizations was identified, that provide a list of emerging economies with promising growth prospects. Next, all countries appearing in at least three lists were picked and then, those for which not enough data were available were eliminated. Appendix 1 details this selection process. The selected countries are, namely: Argentina, Brazil, China, Czech Republic, Egypt, India, Mexico, Malaysia, Morocco, Pakistan, Philippines, Poland, Russia, South Africa, South Korea, and Turkey. The availability and, therefore, the time-span of the data, change according to the type of analysis performed.

In the case of panel data analysis, due to the higher number of variables employed in the regression, data availability is much more an issue and the time-span of the data is reduced. Observations for Russia, Argentina, Poland and Czech Republic are yearly and span from 1994 until 2010, while observations for any other country start in 1986. As a consequence, the panel is slightly unbalanced; nevertheless, the software employed is able to deal with this imperfection and return accurate estimates.

On the other hand, when operating with time-series, the only two variables utilized are OFDI and GDP, thus allowing a wider time-span. Data for the majority of countries is yearly and go

from 1981 to 2011, thus consisting in 31 observations. However, in four cases, the incompleteness of the UNCTAD database forces the adoption of a smaller sample. In fact, data for Czech Republic and Russia go from 1993 to 2011, while data for Poland and Turkey start, respectively, in 1990 and 1985, always ending in 2011.

Finally, it is worth remarking that while in the regression equation the variable of interest OFDI is expressed in flows, as common in the relevant literature (Alfaro et al., 2004), data used for causality analysis are expressed in terms of stocks and are transformed logarithmically. The main reason is that, according to Zhang (2001), Herzer (2009) and Bitzer and Gorg (2009), stocks should be better able to capture the long-term effects of OFDI on economic growth. Additionally, as common in time-series studies, economic growth is measured by increases in the level of GDP, taken in its logarithmic form.

3.3. The Econometric framework

Despite a thorough description of the various econometric procedures adopted is beyond the primary goals of this thesis, the following paragraphs briefly illustrate what statistical techniques are brought to use, in order to assess the relationship between economic growth and OFDI. The modeling is organized into two sections, one dedicated to panel data and the other one addressing time-series procedure. Note that a slightly greater amount of space and attention is devoted to time-series methodologies, due to their higher conceptual complexity.

3.3.1 Panel data approach: model and variables

When performing a panel data analysis, the choice of the estimator is a fundamental one. The two main estimation methodologies to deal with panel data are the fixed effects estimator and the random effects estimator and, as they possess different statistical properties, their choice is to be made on a case-by-case basis. In particular, the random effects methodology is supposed to lead to more efficient estimates of the slope coefficients, while also allowing for the inclusion of time-invariant variables, which is not possible with a fixed effects estimator (Baltagi, 2001). Nevertheless, in one particular and unfortunately not uncommon case, the random effects methodology creates biases and overestimates the coefficients' slopes. This happens whenever the explanatory variables are correlated with the composite error term, which, in the case of a random effects estimator, also incorporates the extent to which each

individual intercept differs from the overall intercept (Kennedy, 2008). As a way to identify whether correlation between the error term and the explanatory variables exists (and therefore to assess the possibility of adopting a random-effect estimator), various statistical tests have been devised. The most commonly acknowledged and widely adopted is the Hausman test (a more detailed description of the test is present in Appendix 1). Consequently, although utilizing a random–effects estimator would be the preferable choice, a Hausman test is needed to verify its applicability.

Nevertheless, as in any regression analysis, an even more important choice is the one regarding the structure of the regression equation and the variables inserted therein. The following paragraphs deal with this issue and provide a detailed picture of the model and variables adopted.

Following recent economic growth literature and the specifications of panel data econometrics, the following growth regression has been developed:

$$GYP_{it} = \beta_0 + \beta_1 OFDI_{it} + \beta_2 D_{it} + \beta_3 Z_{it} + \varepsilon_{it} \qquad (3.1)$$

GYP is the growth rate of output per capita for country *i* in year *t*, *OFDI* stands for Outward Foreign Direct Investment, *D* is a vector of variables considered to be significant determinants of GDP growth, while *Z* is a vector of control variables, which are inserted in the model one by one, and used to control for other factors associated with economic growth, while ε is the error term. *OFDI*, the variable of interest, is expressed as the share of net OFDI flows in GDP. Many authors, such as Alfaro et al. (2004), investigating the economic impact of FDI, have used this specification. The *D* vector includes three variables that are considered to be the most significant determinants of growth by Levine and Renelt (1992). Those are the logarithm of initial GDP per capita in year t *(lnGDP)*, the ratio of gross capital formation over GDP *(INV)*, and a variable accounting for education level *(SEC)[3]*. Different was the reasoning that led to the choice of the *Z* vector of control variables. The process of identifying those variables has been driven more by educated subjectivity than by the mere following of economic theory's *dogmas*. As a matter of fact, as argued by LeRoy and Cooley (1981),

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[3] A better proxy for education levels would be the average years of schooling in the adult population (Barro, 2001), or scores in internationally comparable examinations, which would introduce a qualitative measure (Barro, 2003). Lack of yearly data for this variables for our sample however, led to the adoption of gross school enrollment in secondary education (the number of children enrolled at secondary level divided by the population of persons of the designated school age) as an explanatory variable.

economic theory "*ordinarily does not specify which variables should be held constant when performing statistical test on the relation between economic growth and the independent variables of primary interest*" (LeRoy and Cooley, 1981). As a consequence, the control variables present in equation (3.1) were selected by reviewing past cross-country empirical analyses[4] and selectively picking those variables that were observed to be more consistently associated with GDP growth dynamics. Namely, those Z-variables are: (a) the inflation rate based on the consumer price index *(PI)*, (b) the value of traded shares over GDP *(FIN)*, (c) the share of government final consumption in GDP *(GOV)*, (d) the annual rate of growth of imports *(M)* and (e) the annual growth rate of patents *(TECH)*.

Uncountable empirical analyses have been performed on and much has been written about the variables contained in the regression equation. The following paragraphs provide a brief description of their theoretical and empirical underpinnings, which is also helpful for a preliminary prediction of the sign of their coefficients.

From the variables in vector D, the initial level of GDP is one of the first which have been investigated in a relationship with economic growth. As a matter of fact, Solow, a father of neoclassical growth theory, suggested an inverse relationship between economic growth and the initial level of GDP per capita more than half a century ago. According to him, in the case of similar countries, the poorer ones will outpace the richer in terms of economic growth, leading to a convergence in levels of GDP per capita across countries (Solow, 1956). Following his lead, other neoclassical models such as those of Cass (1965) and Koopmans (1965) maintained that same relationship. The existence of a convergence effect, predicting higher growth as a consequence of lower starting level of per capita income, has been empirically demonstrated by many scholars, such as Barro (1991) and Mankiw, Romer and Weil (1992). This effect however, is found to be statistically significant only if other variables responsible for economic growth are held constant (Barro, 2003). Supporting this, Levine and Renelt (1992) find evidence of a relationship between growth of GDP per capita and initial levels of GDP only when school enrollment was included in the model as an explanatory variable. Since then, other scholars, such as Sala-i-Martin (1997), have dedicated their work to the empirical analysis of convergence and the vast majority of studies related to the

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[4] Among those, the most relevant were the works of Kormendi and Meguire (1985), Levine and Renelt (1992), King and Levine (1993), Levine and Zervos (1998), Borensztein et al. (1998), Barro (2001), Carcovic and Levine (2002), Holland and Vieira (2005), and Dipendra (2007)

determinants of economic growth include the initial level of GDP as an explanatory variable, observing negative and significant coefficients. Overall, given the focus of the present analysis on a sample made of only emerging economies, a negative coefficient for the *lnGDP*, reflecting convergence towards a higher level of development, is to be expected.

The relationship between growth and investments is also one that traces its roots back to the 1950s. In fact, it was as early as the 1955, when Moses Abramowitz begun dedicating its research efforts on the determinants of divergences in development and long-term economic trends among countries, indicating differentials in capital formation as a major cause (Abramowitz, 1955). Robert Solow has also identified capital formation as a main driver of productivity enhancements, and as a necessary determinant of economic growth (Solow, 1962). Two decades later, Kormendi and Meguire (1985) confirmed the major effects of investments (here gross capital formation) on the growth of income per capita. A robust and positive association between the share of investment and growth has also been found by Romer (1989) and Barro (1991). Levine and Renelt (1992) observe that the share of investments over GDP is the variable more robustly associated with economic growth. Similar results are obtained by Mankiw, Romer and Weil (1992), by implementing an augmented Solow growth model, while Barro (2003), employing lagged, rather than contemporaneous values for the variable, observes a smaller effect of physical capital accumulation on income per capita enhancements. In brief, almost all economists consistently argued that capital formation has a strong and significant impact on per capita income growth. Following, the *INV* variable should have a positive coefficient.

As for capital formation and the initial level of income per capita, also human capital has historically been considered a major contributor to economic growth. In Endogenous Growth Theory, human capital is deemed to be a major responsible for economic development, via enhancements of both labor and physical capital's productivity (Lucas, 1988). One of the first scholars finding empirical evidence on the positive linkages between human capital and growth rates was Romer (1989). Adopting the literacy rate as a proxy for education, he observes a statistically significant relationship between human capital accumulation and both investments and GDP growth (Romer, 1989). Of high relevance in assessing the impact of education on economic growth, has been the extensive research conducted by Barro, who finds evidence of a positive relation between growth and a series of proxies for education,

such as primary school enrollment rate, secondary school enrollment rate and adult literacy rate (Barro, 1991). Secondary school enrollment rates are also found to be a robust determinant of growth by Levine and Renelt (1992). Barro subsequently begins to use average years of secondary male schooling (Barro, 2001) and scores on international examinations (Barro, 2003) as explanatory variables, always obtaining positive and highly significant coefficients. More recently, a significant relationship between education and economic growth has also been found when considering emerging economies in the data sample (Baldacci, Clements, Gupta & Cui, 2008). Therefore, according to economic theory and empirics, a positive coefficient for the *SEC* variable may be anticipated.

Concerning the content of the *Z* vector, the first variable taken into account is the inflation rate (*PI)*. As indicated in the literature, the inflation rate can be interpreted as a comprehensive index of the result of various monetary policies and shocks (Levine and Renelt, 1992). A negative relationship between inflation rates and growth had already been found in Kormendi and Meguire (1985) and in Grier and Tullock (1989). Roubini and Sala-i-Martin (1991) relate financial backwardness with higher inflation and negative GDP growth, while Fischer (1993) also illustrates how inflation potentially harms growth by reducing capital accumulation. Consequently, a minus sign is expected to be found for the coefficient of *PI*.

The amount of traded shares as a percentage of GDP (*FIN*) is the variable chosen as proxy for the countries' financial development. A relationship between economic growth and the development of the financial sector has been extensively researched by a literature that traces its roots back to Schumpeter (1911). Many scholars, such as Goldsmith (1970) and McKinnon (1973) acknowledged that relationship through empirical analysis. More recently, Rajan and Zingales (1996) find that industrial sectors that are highly dependent on external financing benefit, in terms of growth, from the development of their countries' financial systems. Within the realm of finance, stock market liquidity has also proved to be significantly correlated with growth (Levine, 1996). According to Levine and Zervos (1998), both stock markets and the banking sector development positively affect growth, both directly and indirectly, via capital accruals and productivity enhancements. More recently, interesting and more narrowly focused contributions were those provided by Deb and Mukherjee (2008) and by Boubakari and Jin (2010). The former identify a bidirectional causality relation between

per capita income growth and the ratio of market capitalization over GDP, basing their estimations on time-series data for India. The latter, focusing on Euronext countries[5], similarly argue for a statistically significant long-run relation between stock markets growth and economic growth. The variable *FIN*, a proxy for the countries' level of financial development is therefore expected to have a positive coefficient.

Government expenditure (*GOV*) is another macroeconomic variable whose relation with growth has been heavily investigated. One of the first scholars looking at the economic impact of government consumption was Landau (1983). His work illustrates a negative interaction between government expenditure and economic growth. His estimates hold for different time periods and for different typologies of economies, except for the poorest countries (in terms of income per capita), where non-significant positive coefficients are obtained. Those results reinforce the belief, perpetrated by proponents of free market, according to which government consumption expenditure increases at the expense of more efficient private investments (Landau, 1983). A negative relationship between government expenditures and economic growth has also been found by Romer (1989). As a rationale for this phenomenon, he includes the incentive effects of distortionary taxation, reducing the private investments that need to be supplanted by the role of the government (Romer, 1989). Those earlier outcomes are strengthened by Barro (1989), who empirically confirms a supposedly harmful impact of governmental consumption on growth (Barro, 1989). Additionally, Levine and Renelt observe a negative, but rather fragile, coefficient on the share of government consumption expenditures over GDP (Levine and Renelt, 1992). Given the mixed empirical results concerning government consumption, it is difficult to anticipate the sign of the *GOV* coefficient.

The annual growth rate of imports (*M*) is selected as a variable in order to account for the growth enhancing effects of trade. According to Levine and Renelt (1992), a regression of per capita GDP growth on exports, imports or total trade would yield approximately the same results, as those variables are basically interchangeable and measure the same phenomenon, i.e. the growth promoting impact of international trade (Levine and Renelt, 1992). Empirically, the positive effects of trade on growth have been demonstrated by many authors, including Romer (1990). Grossman and Helpman (1990) also suggest a connection between

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[5] Those are, namely, Belgium, France, Holland and Portugal

trade policies and economic development, where less developed economies might reap the most gains. Similarly, Rivera-Batiz and Romer (1991) argued that greater economic integration might lead to a significant increase in countries' growth performances. Although empirical analyses have more frequently focused on the relationship between growth and exports (Levine & Renelt, 1992), it has been decided to include the growth rate of imports as an explanatory variable[6]. For the coefficient of variable M, a positive sign is expected.

Lastly, the annual growth of patents application (*TECH*) is included in the model as a proxy for technological innovation. As claimed in the endogenous growth literature, the role of innovation is pivotal in explaining economic growth dynamics (Romer, 1986). While innovation has been usually measured by variables such as employment in the R&D sector or the share of R&D expenditure in GDP, lack of data for the sample of emerging economies, led to consider the adoption of the growth rate of patents as an explanatory variable. The role of intellectual property has been broadly investigated in the empirical growth literature. As an example, Gould and Gruben (1996), find evidence of a strong correlation between more enforceable intellectual property rights and per capita income growth by means of a cross-country regression. More recently, Dipendra (2007) used a panel data approach to observe a long run relationship between the growth of the number of patents and economic growth in Japan. Similarly, Hu and Png (2012) empirically confirm a stimulating effect of patents rights on a country's economy. This effect however, appears to be slightly weaker in poorer countries. An explanation for that is the lower share of patent-intensive industries in these economies (Hu & Png, 2012). Accordingly, a positive coefficient for TECH is to be expected.

The following table summarizes the variable inserted in regression equation (3.1), providing a brief description and the sign that is expected to be found for its coefficient.

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[6] As a matter of fact, after having included also exports and openness as independent variables, it has been observed that the coefficient for import was more significant and caused a greater increase in the coefficient of determination.

Table 3.1 - Definition of regression variables and expected sign

Variables	Description	Expected Sign
GYP	Annual percentage growth rate of GDP per capita based on constant local currency. GDP per capita is gross domestic product divided by midyear population.	**–**
Variable of Interest		
OFDI	Net outflows of foreign direct investments from the reporting economy to the rest of the world, as a percentage of GDP.	**?**
"D" variables		
lnGDP	The logarithm of the initial level of GDP per capita in year t. Data are in constant U.S. dollars.	*A **negative** sign reflecting convergence towards a higher level of economic development*
INV	The ratio of gross capital formation over GDP. Gross capital formation consists of outlays on additions to the fixed assets of the economy plus net changes in the level of inventories	*Historically, the relationship between per capita GDP and investments has always been a **positive** one*
SEC	Gross enrollment ration in secondary school. It is the ratio of total enrollment, regardless of age, to the population of the age group that officially corresponds to the level of education shown.	*Better education and human capital enhancements are always expected to have a **positive** impact on growth*
"Z" Variables		
PI	Yearly Inflation rate. It is measured by the consumer price index and reflects the annual percentage change in the cost of acquiring a basket of goods and services.	***Negativ**e, as inflation can be considered as a proxy for macroeconomic shocks*
FIN	Value of traded stocks as a percentage of GDP. It refers to the total value of shares traded during the period	***Positive**, as it should represent the growth enhancing effects of a more developed financial system*
GOV	General government final consumption expenditure as a percentage of GDP. It includes all government current expenditures for purchases of goods and services.	***Neither a positive nor a negative sign** for the GOV coefficient would be a surprising result*
M	Annual growth rate of imports of goods and services based on constant local currency. Imports of goods and services represent the value of all goods and other market services received from the rest of the world.	*A **positive** sign, reflecting the growth enhancing effects of trade*
TECH	Annual growth rate of patent applications filed through the Patent Cooperation Treaty procedure or with a national patent office.	***Positive**, as it represents the impact of intellectual property protection and technological enhancements*

Notes: All data are retrieved from the World Bank's World Development Indicators (WDI) Database, as well as the variables' definitions

3.3.2 Time- series approach

As already mentioned, time-series analysis allows identifying the causality direction of the OFDI-growth relationship. In order to do so, a series of econometric procedures needs to be performed. Consequently, the discussion that follows aims at describing those procedures and the theoretical beneath them. Due to the complexity of the concept involved, a considerable amount of effort is dedicated to make the following paragraphs as accurate and detailed as possible, while maintaining a certain degree of synthesis.

As indicated by Granger (1997) and as incorporated in many econometric textbooks, including Kennedy (2008) and Gujarati (2003), a causality analysis is supposed to start with a visual representation and a description of the time-series data, as a way to detect non-stationarity. As opposed to stationary series, where the effects of temporary shocks are eliminated through time as the series returns to its long-run mean values, non-stationary series will maintain permanent components (Asterious, 2006). Harvey (1997), remarks that in modern applied econometrics, testing for non-stationarity has become almost an obligation. Kennedy (2008) stresses the great importance of confirming stationarity, arguing that non-stationarity data might cause spurious estimates, potentially leading to erroneous findings of significant correlations (Kennedy, 2008). The biases and econometric implications of non-stationary processes were also stressed by renowned scholars such as Nelson and Plosser (1982), Nelson and Kang (1981) and Granger and Newbold (1974). Fortunately, there exist multiple ways of detecting stationarity that span from simple visual inspections to much more elaborate statistical techniques. The common trait characterizing those tests is their underlying assumption, i.e. that differencing can remove any non-stationarity (Box and Jenkins, 1970). This same assumption is also at the origin of the concept of integration. In fact, a variable is said to be integrated of order d ($I(d)$) , if it has to be differenced d times before reaching stationarity[7]. Not every non-stationary series however, requires differencing to become stationary, as in certain case this is obtained simply by removing a time trend. These types of series are called trend stationary instead of difference stationary (Kennedy, 2008).

One of the tests for non-stationarity that has currently become standard practice in time-series empirical analysis is the Augmented Dickey-Fuller test (ADF) (Dickey and Fuller, 1979).

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[7] conversely, non-stationary variables are defined as I(0)

Nonetheless, the ADF is not the only statistical test that might be adopted. As an example, Said and Dickey (1984) have developed an extended version of the ADF, while an alternative approach, always based on the DF procedure, was also designed by Phillips and Perron (1988). Additional tests have also been suggested by Hall (1989), Bhargava (1986) and Phillips and Ouliaris (1988). Yet, the limitations involved in any of these later tests, and the extensive use of the ADF statistics in the most recent empirical analysis, led to the adoption of this test as the sole instrument to detect non-stationarity in the empirical analysis that follows

Having assessed the presence of non-stationary behaviour, the subsequent step is testing for cointegration, which is necessary to identify long-term causality patterns between the two non-stationary series (Engle and Granger, 1987). The concept of cointegration was developed in 1978 by Engle and Granger and draws from previous research conducted by Granger (1983) and Granger and Weiss (1983). The basic idea behind cointegration is that although a vector of variables might be non-stationary, a linear combination of those variables might be stationary, even when differencing techniques are not applied to the series (Dolado et al., 1990). In the past two decades, cointegration and non-stationary series have been one of the areas of major growth in econometrics, as observed by Phillips (1995), and currently play an important role in empirical causality analysis, empowering the search for interconnections among economic variables (Phillips, 1995). Among others, Dolado, Jenkinson and Sosvilla-Rivero (1990) have produced an excellent review of the themes related to co-integration and unit-root tests. However, before briefly outlining the most common procedure for testing co-integration relationships, a premise has to be made. As a matter of fact, the variables for which the co-integration is tested must have the same order of integration (Pagan and Wickens, 1989). As a way to test for co-integration, one popular procedure is the one devised by Engle and Granger, and that is based on two separate steps.

The first one consists in defining a cointegration regression like the one depicted below.

$$Y_t = \beta_0 + \beta_1 X_t + u_t \qquad\qquad (3.2)$$

This equation is then estimated using an OLS estimator and the cointegrating residuals are tested for non-stationarity. In case u_t results to be stationary and therefore I(0), the variables Y and X are said to be cointegrated (Gujarati, 2003). To put it simpler, X and Y will be on the

same wavelength and their trends cancel out. If that is the case, although X_t and Y_t, taken individually, remain non-stationary, they can nevertheless be regressed on each other without being differenced, and therefore without losing valuable information (Grifiths, Hill and Jude, 1993). As a way to test the stationarity of u_t, presented in equation (3.2), different techniques have been devised. Among those, some of the most adopted are the CRDW (Durbin-Watson statistics for the cointegration equation), the CRADF (ADF statistics for the cointegrating residuals), the Engle-Granger (EG) and the Augmented Engle-Granger (AEG) tests (Gujarati, 2003; Dolado et al., 1990). However, a different and more powerful test based on maximum likelihood estimation was developed by Johansen (1988) and Johansen and Juselius (1988)[8]. The Johansen test is also the econometric technique that is adopted in this thesis, as a way to detect cointegration between the OFDI and GDP series.

Once non-stationarities have been found, orders of integration determined and eventual cointegration between the variables assessed, ground has been prepared for testing causality. Two different procedures are employed in the present work for determining causal patterns, and the choice of the proper method to use is strictly linked to the concept of integration. As a matter of fact, the Error Correction Model (ECM) for testing long-run causality can be adopted only in presence of cointegration between the two variables, whereas Granger causality is performed in every other case. Without getting involved in complex theoretical details, the following lines attempt at describing the most important concepts underlying Error Correction Models (ECM). As briefly and clearly exposed in Gujarati (2003), an Error Correction Mechanism, firstly theorized by Sargan (1964) and later developed by Engle and Granger (1987), is a statistical representation of the way through which two cointegrated variables, which might be in disequilibrium in the short-run, return to their long-term values. The operator that connects a variable's short term pattern to its long-run position is defined as the "equilibrium error" (Griffiths, Hill and Judge, 1993) and corresponds to error u_t in the cointegration regression represented in (3.2). A simple example of an ECM, as illustrated in Gujarati (2003), is provided below.

$$\Delta Y_t = \beta_0 + \beta_1 \Delta X_t + \beta_2 u_{t-1} + \varepsilon_t \tag{3.3}$$

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[8] According to Dolado et al.(1990) this procedures has several advantages on the EG and other tests.

From (3.3), it can be observed how changes in the dependent variable are related to changes of both the independent variables and the lagged "equilibrium error". An alternative version of the previous equation is provided in Kennedy (2008) and is represented below[9].

$$\Delta Y_t = \beta_1 \Delta X_t + (\beta_3 - 1)(Y_{t-1} - \phi - \theta X_{t-1}) + \varepsilon_t \tag{3.4}$$

A way to interpret equation (3.4) is that in case of error (that is disequilibrium), Y grows at a faster path than it should, the last term (that is the error correction term (ECT) or the "equilibrium error") increases and ΔY is reduced[10] (Kennedy, 2008). The ECM just outlined is usually part of a set of equations and the resulting model goes by the name of Vector Error Correction Model (VECM) (Kennedy, 2008).

Having briefly explained how an ECM works, it is adequate to explain how causality patterns can be inferred by further analyzing our time-series. The concept that will serve to our purpose is Granger causality[11] (Granger, 1969), utilizing, when cointegration is presented, a VECM. The common form of the Granger causality test is presented is presented below in equations (4) and (5).

$$Y_t = \sum_{i=1}^n \alpha_i Y_{t-1} + \sum_{i=1}^n \beta_i X_{t-1} + \varepsilon_t \tag{3.5}$$

$$X_t = \sum_{i=1}^n \alpha_i X_{t-1} + \sum_{i=1}^n \beta_i Y_{t-1} + \varepsilon_t \tag{3.6}$$

The set of equations formed by (3.5) and (3.6) can be considered as a VAR (Vector Autoregression) model, since each variable is expressed as a linear function of its lagged values and of the lagged values of the other variable (Kennedy, 2008). They are adopted to test for bidirectional causality and assume that the current values of a dependent variable are related to past values of another independent variable, as well as past values of the variable itself. Unidirectional causality of X over Y is therefore inferred when the set of estimated coefficients for X are significantly different from zero, while the set of estimated coefficients for the lagged values of Y are not statistically different from zero. Bilateral causality and independence can be defined in a similar fashion (Gujarati, 2003). One of the most interesting

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[9] Note that, as detailed in Kennedy (2008), equation (3.4) is obtained from the following relationship:
$Y_t = \beta_0 + \beta_1 X_t + \beta_2 X_{t-1} + \beta_3 Y_{t-1} + \varepsilon_t$, , based on the assumption that in the long-run $Y = \phi + \theta x$. Note also that both X and Y are expressed in logarithms.
[10] Note than in regression (3.4) the coefficient of the error term is negative by assumption
[11] A plain vanilla explanation of Granger causality is provided in Gujarati (2003). As described by Koop (2000), causality is related to time dependence, as an event cannot cause another if this is happening before (Koop, 2000). Similarly, Diebold (2001) states that x causes y means that x contains useful information for predicting y, better than past values of other variables (Diebold, 2001).

applications of Granger Causality however, is its application in the presence of cointegration between two variables. In fact, when two series are found to be cointegrated, Granger causality must exist, at least unidirectionally (Engle and Granger, 1987). Drawing on this assumption, Granger causality tests can be implemented with the error correction term (ECT) deriving from the long-run cointegrating relations, thus capturing also long-term causality patterns (Oxley, 1993; Giles at al., 1993). The result is the VECM formed by equations (3.7) and (3.8) Note that, as opposed to equations (3.5) and (3.6), that test differs only for the presence of an ECT.

$$\Delta Y_t = \sum_{i=1}^{n} \alpha_i \, \Delta Y_{t-1} + \sum_{i=1}^{n} \beta_i \, \Delta X_{t-1} + \gamma ECT_{t-1} + \varepsilon_t \qquad (3.7)$$

$$\Delta X_t = \sum_{i=1}^{n} a_i \, \Delta X_{t-1} + \sum_{i=1}^{n} b_i \, \Delta Y_{t-1} + g ECT_{t-1} + \varepsilon_t \qquad (3.8)$$

In the case of the equations (3.7) and (3.8), long-run Granger causality is assessed by testing the significance of the coefficients of the error correction terms (ECTs) (Oxley, 1993). A significant coefficient for the Error Correction Term is indication of Granger Causality in the long-run, while non-causality is implied when the adjustment coefficients show no statistical significance (Hall and Milne, 1994; Herzer, 2010).

Overall, the approach adopted in the present work resembles the structure of Zhang (2001). As a matter of fact, it is basically a three-step procedure that includes a series of "unit root[12]-cointegration-causality tests" (Zhang, 2001). In fact, after (i) having pre-tested for non-stationarity, when possible (ii) cointegration between the two variables needs to be tested as a way to establish the long-run relationship between the two variables (Engle and Granger, 1987). If cointegration is found, (iii) an Error Correction Model is used to detect causality patterns. Were cointegration not found, short run causality patterns may still be present, which are investigated by means of a standard Granger Causality test.

Before moving to the next section, a warning on the reliability of the estimates obtained via time-series analysis is needed. In fact, as common when operating within the realm of complex econometric estimations, caution is imperative. As an example, as highlighted by Harvey (1997), VECMs possess numerous limitations, since not many are the situations in which they could be successfully adopted and since the statistical properties of co-integration

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[12] Tests for non-stationarity, such as the ADF test, are also referred to as tests for a *unit root*

tests performed on autoregressive models are quite poor (Harvey, 1997). Additionally, it is worth reminding that also Hall (1986) warns about excessive confidence upon the output of many tests revolving around cointegration and ECMs, mainly due to the unknown properties of many statistical tests under small sample conditions (Hall, 1986). As a consequence, one should be careful when interpreting the present results, considering the limited number of observations that are available.

3.4. Results and analysis

3.4.1 Panel data analysis

The present section reports the empirical results for the panel data analysis and is further divided into two parts. The first one presents the output of the regression analysis and provides some comments on the results obtained, while the second one attempts at assessing the robustness of the estimates.

3.4.1.1 Random effects regression results

As discussed in section 3.3.1, before choosing the right estimation technique, a Hausman Test[13] needs to be performed. Adopting equation (3.1) (with the exclusion of the "Z" vector of control variables), two different regressions are run, one using the fixed effects estimator, the other one adopting the random effects one. Following, the Hausman test is run on the estimates obtained from each procedure. The Stata output (Appendix 3) reports a test-statistic of 1.68 and highly insignificant (p-value = 0.7942). As a result, one cannot reject the null hypothesis that both estimation methods are consistent and producing "similar" results. Accordingly, the random effects methodology is employed, due to its supposedly higher efficiency. Having chosen what should be the most efficient estimation technique, the next step consists in running multiple regressions, where each time a variable coming from the Z subset is added. In this way, it is easier to observe how the regression results mutate when different explanatory variables are entered. Additionally, the reader is also able to better understand which variables are more strongly and consistently associated with economic growth in our sample of emerging economies. A total of six regressions are performed, whose output is schematically portrayed in Table 3.2. The base model, containing our variables of interest and the vector of D variables, is reported in the first column and will be referred to as *model 1*.

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[13] The Hausman Test is described in greater detail in Appendix 1

Table 3.2 - OFDI and Economic growth - Panel Data using GLS Random-effects estimation

Independent Variables	(I) coeff.	(I) std. err.	(II) coeff.	(II) std. err.	(III) coeff.	(III) std. err.	(IV) coeff.	(IV) std. err.	(V) coeff.	(V) std. err.	(VI) coeff.	(VI) std. err.
OFDI	0.632	0.227 ***	0.612	0.229 ***	0.564	0.230 **	0.582	0.228 **	0.478	0.154 ***	0.490	0.158 ***
lnGDP	-0.821	0.375 **	-0.700	0.397 *	-0.748	0.413 *	-0.756	0.421 *	-0.860	0.397 **	-0.859	0.416 **
SEC	0.034	0.015 **	0.028	0.016 *	0.027	0.017	0.040	0.017 **	0.036	0.016 **	0.037	0.016 **
INV	0.278	0.030 ***	0.279	0.031 ***	0.267	0.034 ***	0.266	0.035 ***	0.163	0.030 ***	0.162	0.030 ***
PI			-0.002	0.001 *	-0.002	0.001 *	-0.002	0.001 *	-0.002	0.001 ***	-0.002	0.001 ***
FIN					0.006	0.005	0.004	0.005	0.005	0.004	0.005	0.004
GOV							-0.231	0.081 ***	-0.201	0.075 ***	-0.214	0.077 ***
M									0.164	0.013 ***	0.163	0.013 ***
TECH											0.001	0.001
R2 Within	0.123		0.133		0.136		0.167		0.485		0.486	
R2 Between	0.733		0.736		0.734		0.659		0.650		0.636	
R2 Overall	0.289		0.296		0.298		0.295		0.532		0.529	

Notes: * significant at 0.10 level, ** significant at 0.05 level, *** significant at 0.01 level.
The dependent variable, GYP, is the annual real GDP per capita growth rate. The sample consists of 16 countries and yearly observations span over the 1986-2010 period, except for 4 countries, whose data is observed over the 1994 – 2010 period. The number of observations is 368.
OFDI is the average ratio of FDI outflows to GDP; lnGDP is the log of real GDP per capita in year t; SEC is the total enrolment in secondary education, regardless of age;
INV is gross capital formation over GDP; PI is the average inflation rate based on the consumer price index; FIN is the value of shares traded as a percentage of GDP; GOV is the average ratio of government consumption to GDP; M is the average import growth rate; TECH is the annual growth rate of patent applications.
A detailed discussion of these variables is also provided in section 3.3.1 and in Table 3.1

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The analysis of the results portrayed in Table 3.2 starts from the output of the first regression, corresponding to *model 1*. Note that the comments accompanying the results are formulated in accordance with the contents of section 3.3.1 and Table 3.1.

First of all, it is important to notice how the coefficient of the variable of interest, *OFDI*, is significant at the 0.01 level and equal to 0.632, thus suggesting the existence of a positive correlation between OFDI flows and the economic growth of domestic economies. According to the empirical evidence found, an increase of 1 percentage point of the share of OFDI flows over GDP is associated with an average increase of per capita GDP growth on the order of 0.632 percentage points. If compared with the value of 0.293 observed by Herzer (2009) when analyzing developed countries, those results might suggest that OFDI flows may have a greater positive impact on economic growth when they are originated from emerging economies. The coefficient of *lnGDP* is also significant, even though only at a 0.05 level, and is equal to – 0.821. In accordance with the literature, the results report a negative value, a sign of the convergence effects that might characterize less developed countries. Additionally, the coefficient of *lnGDP* remains significant, at least at a 0.1 level, for all the six regressions run. *INV*, representing the ratio of capital formation over GDP, has a coefficient of 0.278 and is statistically significant at a 0.01 level. Also in this case, the variable presents the expected sign, thus providing evidence for the presence of a positive relationship between investments and economic growth, already observed by a wide array of economists. The variable *SEC*, inserted as a proxy for the level of education, enters *model 1* with a coefficient 0.034 and is statistically significant at a 0.05 level, indicating a positive relation between school enrollments and economic growth. It maintains its significance, at least at a 0.1 level in almost every regression run. Once again, this result is in line with what would be expected from the economic growth literature. Overall, the coefficients observed for our *D* variables enter the model with the expected signs and are strongly significant. The most interesting outcome however, is the statistical significance of the coefficient for the variable of interest, *OFDI*, whose value surpasses the one obtained by Herzer (2009). Hereafter, a brief description will be provided, for the observed coefficients of our z-variables, inserted one by-one in models 2 to 6, as illustrated in Table 3.2.

The inflation rate is the first of the *Z* variables added to *model 1,* turning it into *model 2.* It appears with a significant (although only at a 0.1 level), small and negative coefficient, equal to -0.002. This result is in line with previous empirical works and underlines the persistence of a negative impact of macroeconomic instability on the growth rate of the investigated developing economies. Moreover, the coefficient for the inflation rate stays significant in all the five regressions in which it enters, achieving a noteworthy level of significance of 0.01 in the last two models.

FIN, representing the value of shares traded as a percentage of GDP is the second of the *Z* variables to be added (*model 3*), and represents the level of liquidity of capital markets, adopted as a proxy for financial development. Its coefficient is equal to 0.005, but it is not significant, thus not suggesting the existence of a significant correlation between economic growth and capital markets' liquidity in the analyzed sample. In fact, the coefficient of *FIN* stays insignificant in all the four regressions in which it appears. One potential explanation for that could be the relative youth of capital markets in many of the emerging markets constituting the sample. It must however be added that other variables that might capture the effects of financial development, such as the ratio of liquid liabilities of the financial system to GDP (King & Levine, 1993) or the level of bank credit to the private sector as a share of GDP (Levine & Zervos, 1998), were disregarded due to lack of data.

What, at a first glance, may seem surprising, is the negative (-0.231) and highly significant (0.01) coefficient for the share of government expenditures in GDP (*GOV)*, that is first present in *model 4* and that maintains a minus sign in every regression in which it appears. This might indicate the presence of a particularly inefficient allocation and distribution of governmental expenditures that negatively impacts the economies in the sample, instead of nurturing growth.

The growth rate of imports, which is explanatory variable *M*, enters in *model 5* with a coefficient of 0.164 and is statistically significant at the 0.01 level. This result is in line with previous researches and reinforces common beliefs on the impact of this variable on economic growth. Given the extremely low p-values for the import variable in every model, it could also be particularly interesting to observe the composition of those imports. As a matter of fact, it could be hypothesized that a substantial share of those imports consists of goods used

for capital formation. In this way, the Import variable would also embed some of the growth-enhancing effects that should pertain to the investments domain.

The annual growth rate of patents is entered in *model 6* in order to account for the growth enhancing effects of technological development. It appears in the last regression with a small and positive coefficient of 0.01 and an insignificant p-value. Consequently, empirical evidence for the *TECH* variable fails to sustain the hypothesis of a growth-enhancing effect imputable to technological advancements and intellectual property rights protections. This, in turn, might depend on the embryonic state of patent intensive industries in many of the emerging countries representing the sample.

Despite these regressions being only a first and rough attempt to analyze the economic effects of OFDI in emerging economies, the results obtained are particularly promising. As a matter of fact, the coefficient of determination in the last model is discretely high (0.529) and the majority of the coefficients are statistically significant. Additionally, the value and sign of these coefficients are close to what would have been expected, given in the discussion presented in section 3.3.1 and as reported in Table 3.1. Furthermore, as stated previously, the values obtained for the variable of interest are exceptionally good and might allow the formulation of some preliminary hypotheses[14] upon the positive effects of OFDI in emerging economies. Nevertheless, some adjustments still might be made to improve and perfect the model. Some other variable could and should be inserted to account and control for other growth enhancing effects. Moreover, the adoption of temporal dummies may allow accounting for disrupting effect of events such as the Asian Crisis, which affected a great share of our sample and might have induced some biases in the calculations.

A further step towards the attainment of an improved analysis of the influence of OFDI on economic growth is made in the following paragraphs, where the output of Table 3.2 the variable of interest undergoes a robustness test, as specified in the relevant econometric literature.

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[14] That is that OFDI flows have a positive impact on the growth performance of emerging economies

3.4.1.2 Robustness

The goal of the present section is that of assessing how much confidence one should put in the quality of the empirical results obtained above. That implies probing whether the estimated coefficient for the OFDI variable is robust to alterations in the regression equation's specifications. This type of analysis is of fundamental importance for better gauging the relevance of the previous results. As a matter of fact, as prescribed by McAleer, Pagan and Volker (1985), "*quality control is as important for the econometric profession as it is for automobile manufacturers*" (McAleer et al., 1985). Various scholars, including also Leamer (1983), Cooley and LeRoy, (1986) and Levine and Renelt (1992) among others, have devoted research efforts towards the analysis of the robustness of a regression coefficients when the conditioning information set is modified. In particular, the approach adopted in the present work is the Extreme Bound Analysis (EBA), was originally devised and discussed by Leamer (1983) and by Leamer and Leonard (1983). Central to Leamer's work is the idea that an econometric inference, as it is based on a set "whimsical assumptions", should hardly be considered convincing or believable. Its assumed fragility should only by denied if a proper sensitivity analysis indicates otherwise (Leamer, 1983). According to him, a variable of interest shall be considered robust only if, independently from the presence or absence of other variables, it constantly assumes values which are close to each other; that is, if it consistently shows little variance in face of variations in the set of the control variables (Leamer, 1983). In a joint publication with Leonard, they illustrate how robustness should be determined. They firstly define the "Extreme Bounds" for a particular variable as the range delimited by the lowest among its estimates minus twice its standard error and the highest among its estimates plus two times its standard error. Those estimates are to be computed by running a series of regressions, one for each existing linear combination of the control variables. Only if both the upper and lower bounds lie on the same side of the zero, the variable of interest shall be deemed robust. Additionally, the narrower the range delimited by the bounds, the greater the confidence that one could put in that particular inference's goodness (Leamer & Leonard, 1983). Leamer's EBA analysis however, soon had to face the fierce and constructive critique of his colleagues. In particular, McAleer et al. (1985) argue that EBA shall not be considered as a proper tool for taking the "con" (i.e. the opportunistic behavior in presenting the results of a model whose specifications and variables were selected

arbitrarily) out of econometrics. In fact, according to them, the elements of "whimsy" that the EBA aims at eliminating are re-introduced by the various conventions that underline the EBA itself, and that have to be taken for granted. Additionally, they argue that EBA is as susceptible to manipulation as the traditional results' presentation it attempts to replace. In particular, the utility of EBA is strongly dependent on the selection of the significant (both statistically and economically) econometric model from which the bounds are derived and on a shared consensus over which variables are undoubtedly meaningful in an economic relationship (McAleer et al., 1985). Their arguments however, were promptly dismissed as being without substance (Cooley & LeRoy, 1986). Further discussions on the EBA, which led to its evolution, were started by the work of Levine and Renelt (1992). Their main objection to Leamer's EBA is that it introduces multicollinearity, thus enlarging standard errors and subsequently the extreme bounds. Consequently, in an attempt to avoid this potential flaw, Levine and Renelt (1992) developed a tailored approach that confined EBA in a series of manners. Firstly, they limited the number of explanatory variables in the regression to be eight or fewer. Secondly, they allowed the procedure to select a linear combination of only up to three control variables when computing the estimates of the variable of interest. Thirdly, they excluded from the subset of control variables those that hypothetically measure similar phenomena (Levine and Renelt, 1992).

As a consequence, due to the various improvements made, it has been chosen to adopt this later version of the EBA as a way to test the robustness of the OFDI coefficient. Table 3.3 below, outlines the results obtained.

Table 3.3 - Extreme Bound Analysis on the coefficient of the variable of interest - OFDI

	Coefficient for OFDI	Standard Error	t-value	Z - Variables	Robust / Fragile
Low	**0.156**	0.157	2.99	*PI, FIN, M*	*Robust*
Base	0.632	0.227	2.78		*Robust*
High	**1.102**	0.233	2.72	*PI, GOV, TECH*	*Robust*

Notes: The base coefficient for the OFDI variable is the one estimated from a regression including OFDI and the "D" vector of variables: lnGDP, SEC, INV. The "High" coefficient for OFDI is the estimated coefficient from the regression yielding the highest beta plus two standard deviations. The "Low" coefficient for OFDI is the estimated coefficient from the regression yielding the lowest beta minus two standard deviations. The "Z" vector of variables is made of the following 5 variables: PI, FIN, GOV, M, and TECH. Ten different regressions have been run, each one containing the D-variables and a linear combination of three Z-variables.

As seen in the table above, the extreme low and high bounds computed for the variable of interest are, respectively, 0.156 and 1.102. The former stems from a regression including Z-variables PI, FIN and M; the latter is originated from a regression containing variables PI, GOV and TECH in addition to the D-variables. As both the upper and lower bounds are statistically significant at a 0.05 level and remain positive, the variable OFDI might be considered robust to various model specifications.

Lastly, as an additional way to verify the robustness of the results obtained, it has been decided to check that outliers are not responsible for the significance of the OFDI coefficient. As a way to do so, as specified in Herzer (2009), *model 1*, containing OFDI and the vector of D-variables, is re-estimated excluding one country at a time from the sample. The results are portrayed in Figure 3.1, presented below. As apparent, the positive coefficient for OFDI always remains significant at least at a 0.05 level. Only when Brazil and, to a larger extent, Malaysia are omitted, the significance of our variable falls beneath the 0.01 level of significance. As a consequence, our estimate appears to be quite robust also to the sample choice, thus strengthening the reliability of our finding so far, i.e. that OFDI flows in emerging countries is positively correlated with the growth rate of income per capita.

Figure 3.1 - Estimation with single country excluded from the sample
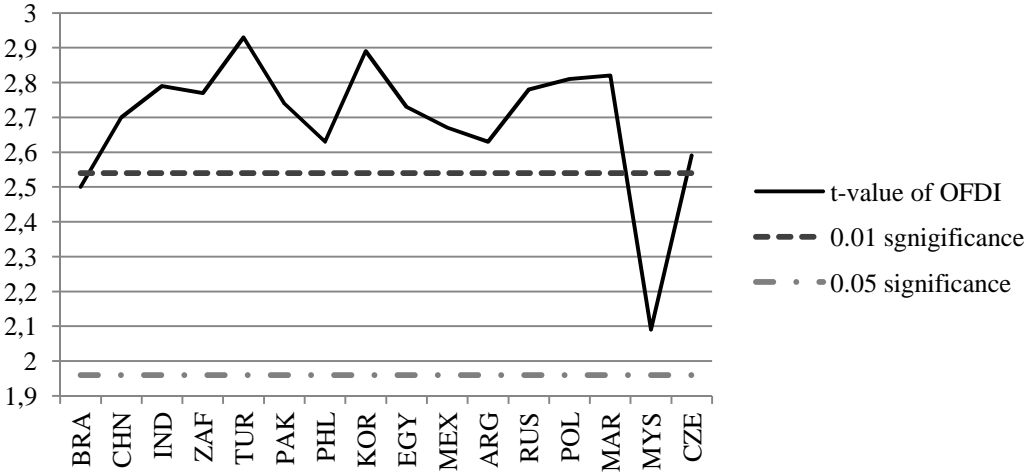
Source: authors computations from Stata regression output

Edward Leamer (1983) once said: "*There are two things you are better off not watching in the making: sausages and econometric estimates[15]*". With this statement he wants to stress the fact that the goodness of econometric inferences is strictly dependent on the subjectivity involved the modeling process. Various types of assumptions or different sets of variables can lead to radically different results, thus undermining the trustworthiness of the findings achieved. The robustness analyses performed above are therefore instrumental in verifying how structural changes in both the independent variables adopted and the sample chosen do not modify the outcome of the regression analysis. Nonetheless, it would probably be a mistake to put excessive confidence in the results of the EBA. As a matter of fact, even Levine and Renelt's (1992) revised version of the EBA had to face the criticism of various colleagues, such as Sala-i-Martin, Hoover and Perez (2000) and Bleaney and Nishiyama (2002)[16] . However, the strength of the outcomes of Table 3.3 and Figure 3.1 clearly adds credibility to the results obtained and to the presence of a strong a positive correlation between OFDI and economic growth in emerging economies.

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[15] Leamer adapts a famous quote generally attributed to Otto von Bismarck, arguing that "*If you like laws and sausages, you should never watch either one being made*"

[16] Sala-i-Martin (1997) argues that Levine and Renelt's (1992) approach is too stringent and results in too many variables to be labeled as fragile. Hoover and Perez (2000) and Bleaney and Nishuyama (2002) suggest that it would be more accurate to use a general-to-specific methodology as a way to determine whether a variable is an important regressor in explaining growth dynamics.

3.4.2 Time-series analysis

As discussed in section 3.3.2, the analysis of time-series data passes through three main stages. The first one (i) consists in adopting an ADF test to look for the presence of non-stationarity. Then (ii), if two variables are found to be both I(1), a Johansen test is employed to determine the existence of cointegration between those variables. The final step (iii), drawing from the results of the cointegration analysis, employs a VAR or a VECM methodology to identify Granger causality patterns. The discussion that follows is split into 2 sections; the first one describes the results of both the ADF and Johansen test, whereas the second illustrates the outcome of the causality analysis.

3.4.2.1 Testing for non-stationarity and Cointegration

This section deals with some preliminary tests on the time series as a way to discover their properties and set up the appropriate causality analysis. Before applying tests for unit roots and cointegration however, an attempt is made to understand the series' peculiarities using a visual representation. In Appendix 4 one finds the line plots of the lnGDP and lnOFDI time series for all countries. From those plots, it appears as almost all series follow a time trend, suggesting the presence of non-stationarity. The following step consists in specifying the order of integration of those series[17], via the Augmented Dickey Fuller (ADF) Test. One of the main issues involved with the adoption of an ADF test is the choice of the number of lags to include in the test's equation, inserted as a way to capture any serial correlation that might affect test statistic distribution and bias the results (Harris, 1992). As a matter of fact, different choices for the number of lags might have a strong impact on the test's results and quality (Harris, 1992; Ng and Perron, 1995). The lag-selection approach will be based on minimizing the Akaike (1973) Information Criterion, as this test proved to perform better than others (e.g. Schwarz (1978) Bayesian Information Criterion (SBIC)) in the case of smaller samples (Lütkepohl, 2006; Enders, 2004). Additional approaches, such as the Schwert (1989) criterion, which defined the number of lags as a deterministic function of T, the time span,

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[17] i.e. the number of times they need to be differentiated to become stationary

proved to be unsatisfactory and/or misleading (Ng and Perron, 1995). A maximum number of three[18] lags were defined, drawing on the methodology adopted by Hsiao and Hsiao (2006).

Another issue might be whether or not to include a time trend among the ADF test's specification. Following a suggestion contained in Kennedy (2008), one should always include a time trend to be "fair to the alternative hypothesis of stationarity". However, if a series is found to be non-stationary, and the ADF needs to be performed on the differenced series, the time trend is excluded in the test. As a matter of fact, as suggested by Nelson and Plosser (1982), in the case of non-stationarity the time trend variable is stochastic, and detrending the data will be misleading. Additionally as described in the Stata Manual (StataCorp, 2009), the choice of employing an ADF with a trend should be driven by theory and visual inspection of the data. When data show an upward trend in time, an ADF with an intercept and a time trend is recommended. As evidenced from the figures in Appendix 3, almost all our data seem to grow over time. Subsequently, following also a widespread practice in the relevant literature, an ADF with a trend will be employed when analyzing series in levels and an ADF with only the constant term when analyzing first differences of the variables. Table 3.4 below, reports the results of the ADF tests, performed in accordance with the approach just described.

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[18] When allowing for a greater number of lags, the AIC criterion would choose a number lags that, in our opinion, did not make economical sense. As a matter of fact, in the case of China, the AIC would choose 6 lags out of a maximum of 8 indicated by the Schwert criterion. As the country is a rapidly growing economy which has been going through important structural reforms, data distanced by 6 years might easily be looking at two different realities.

Table 3.4 – Results of the ADF test for Unit roots

Country	Series	Levels (C&T)			First Differences (C)			Int. Order
		lags	t-test	stationary	lags	t-test	stationary	
Argentina	lnGDP	2	-1.874	no	1	-3.406 (0.05)	yes	I(1)
	lnOFDI	1	-1.867	no	0	-5.969 (0.01)	yes	I(1)
Brazil	lnGDP	1	-2.176	no	0	-4.634 (0.01)	yes	I(1)
	lnOFDI	2	-2.026	no	1	-2.979 (0.05)	yes	I(1)
China	lnGDP	3	-4.834 (0.01)	yes	2	-2.694 (0.1)	yes	I(0)
	lnOFDI	2	-4.271 (0.01)	yes	3	-4.892 (0.01)	yes	I(0)
Czech Republic	lnGDP	2	-2.530	no	0	-2.778 (0.1)	yes	I(0)
	lnOFDI	1	-3.129 (0.1)	yes	0	-5.340 (0.01)	yes	I(1)
Egypt	lnGDP	2	-3.294 (0.1)	yes	0	-3.958 (0.05)	yes	I(0)
	lnOFDI	1	-0.980	no	0	-5.003 (0.01)	yes	I(1)
India	lnGDP	1	-0.449	no	0	-4.639 (0.01)	yes	I(1)
	lnOFDI	1	-2.332	no	0	-5.364 (0.01)	yes	I(1)
Malaysia	lnGDP	1	-1.460	no	0	-4.337 (0.01)	yes	I(1)
	lnOFDI	1	-3.142 (0.1)	yes	0	-5.730 (0.01)	yes	I(0)
Mexico	lnGDP	1	-3.548 (0.05)	yes	0	-5.259 (0.01)	yes	I(0)
	lnOFDI	1	-1.868	no	0	-6.485 (0.01)	yes	I(1)
Morocco	lnGDP	2	-0.798	no	1	-5.220 (0.01)	yes	I(1)
	lnOFDI	1	-1.609	no	0	-4.908 (0.01)	yes	I(1)
Pakistan	lnGDP	2	-2.182	no	1	-2.740 (0.1)	yes	I(1)
	lnOFDI	2	-2.793	no	2	-2.167	no	I(2)
Philippines	lnGDP	3	-2.365	no	2	-3.665 (0.01)	yes	I(1)
	lnOFDI	1	-2.892	no	0	-5.714 (0.01)	yes	I(1)
Poland	lnGDP	2	-3.394 (0.1)	yes	1	-6.476 (0.01)	yes	I(0)
	lnOFDI	1	-2.360	no	0	-4.340 (0.01)	yes	I(1)
Russia	lnGDP	1	-2.401	no	0	-3.484 (0.01)	yes	I(1)
	lnOFDI	1	-0.278	no	0	-3.929 (0.01)	yes	I(1)
South Africa	lnGDP	1	-1.571	no	0	-3.690 (0.01)	yes	I(1)
	lnOFDI	1	-2.919	no	0	-4.267 (0.01)	yes	I(1)
South Korea	lnGDP	1	-1.284	no	0	-4.107 (0.01)	yes	I(1)
	lnOFDI	1	-2.087	no	1	-3.791 (0.01)	yes	I(1)
Turkey	lnGDP	1	-3.026	no	0	-5.451 (0.01)	yes	I(1)
	lnOFDI	2	-2.745	no	1	-2.538 (0.15)	yes	I(1)

Notes: I(1) and I(2) indicate the series to be integrated of order 1 and 2, while I(0) indicates that the series is stationary. The number of observation is 31 for all the countries, except for Czech Republic, Poland, Russia and Turkey, where the observations are, respectively 19, 22, 19 and 27 . The number of lags included in the regressions underlying the tests was chosen via the AIC, imposing a maximum of 3lags. Note that the ADF is based on the following regressions: $\Delta Y_t = \beta_1 + \beta_1 t + \delta Y_{t-1} + \sum_{i=1}^{t} \Delta Y_{t-1} + \varepsilon_t$ when it includes a constant and a trend (C&T); $\Delta Y_t = \beta_1 + \delta Y_{t-1} + \sum_{i=1}^{t} \Delta Y_{t-1} + \varepsilon_t$ when it includes a constant only. P-values, for significant t-statistics, are enclosed in parentheses

As apparent from the last column of Table 3.4, the majority of the series is integrated of order one, being non-stationary at levels and stationary after differencing once. Yet, there are some exceptions. As a matter of fact, lnGDP and lnOFDI for China, lnGDP for Czech Republic, Egypt, Mexico and Poland, and lnOFDI for Malaysia are all stationary at levels. As the ADF test for the series at levels is constructed including a time trend, we can define those series as trend-stationary. This means that those series grow around a deterministic and predictable trend (Kennedy, 2008), a behavior that clearly appears when looking, for example, at the lnGDP series for China. Only one series, the lnOFDI variable for Pakistan, is integrated of order I(2) as it needed to be differenced twice to become stationary.

The next step is that of investigating the existence of cointegration between the two series for each country, as a way to establish long-run relationships when those series are stationary (Engle and Granger, 1987). A necessary requirement of cointegration is that all variables be integrated of the same order (Engle and Granger, 1987). Accordingly, the Johanson test is not performed for those countries in which at least one series is found to be stationary. In the specific case of Pakistan, the country is dropped from any further analysis, to avoid dealing with a variable (lnOFDI) which is integrated of order I(2). Table 3.5 presents the results of the cointegration test for the remaining countries. As for the ADF performed earlier, the optimum number of lags contained in the tests was determined using Schwarz Information Criterion. Note that both the Maximum Eigenvalue and the Trace statistics are reported, as suggested by Luetkepol et al (2003).

Table 3.5 - Results of the tests for Cointegration

| Country | Johansen Test | | | | Cointegrated |
	Max Eigenvalue	significance	Trace Statistic	significance	
Argentina	5.7219	-	7.1075	-	NO
Brazil	4.4506	-	5.2987	-	NO
India	7.929	-	14.0535	-	NO
Morocco	6.2312	-	8.8206	-	NO
Philippines	15.5555	0.05	17.2841	0.05	*YES*
Russia	26.2403	0.01	32.0015	0.01	*YES*
South Africa	14.5537	0.05	17.2026	0.05	*YES*
South Korea	21.6787	0.01	25.9632	0.01	*YES*
Turkey	9.7189	-	11.3525	-	NO

Notes: Table reports the results for co-integration of the OFDI and GDP. The number of lags included in the regressions underlying the tests was chosen via the AIC criterion, allowing up to a maximum of 3 lags. The number of observation is 31 for all the countries, except for Russia and Turkey, where the observations are 19 and 17, respectively. The 5% and 1% critical values for the Trace statistic are, respectively, 15.41 and 20.04 . The 5% and 1% critical values for the Maximum Eigenvalue statistic are, respectively, 14.07 and 18.63.

Table 3.5 indicates that lnGDP and lnOFDI are integrated in four countries; namely, the Philippines, Russia, South Africa and South Korea. By examining the Maximum Eigenvalue and Trace statistics, the Johansen methodology rejects the null hypothesis of no co-integration at the 0.05 level for the Philippines and South Africa, and at the 0.01 level for Russia and South Korea. Evidence thus shows that for these countries, a long-term positive relationship is present, linking together OFDI and GDP. Using the words of Samad (2007), the variables possess a long-term relationship in a sense that they do not arbitrarily diverge from each other and that any departure from the long-term path is corrected.

Drawing from these results, some preliminary conclusion could be also drawn on causality issues. As a matter of fact, when two variables are cointegrated, it has already been proved the presence of a long-term causality relationship between those variables, be it unidirectional or bidirectional (Mashi and Mashi, 1994). Conversely, for the other 5 countries, there is no evidence of forces that drive the two variables towards equilibrium in the long-term.

3.4.2.2 *Causality*

While no long-run relations exist between GDP and OFDI when they are not cointegrated, the two variables might still affect each other in the short-run (Zhang, 2001). In this case, the conventional Granger causality test will be adopted, by means of the VAR framework defined by equations (3.5) and (3.6). On the other hand, when co-integration is present, the Vector Error Correction Model (VECM) is the appropriate procedure to investigate causality patterns. This stems from the interdependence between the concepts of cointegation and ECM outlined in the previous section, where the error of the cointegrating relationship (3.2) is entered as part of equation (3.3). If the two series are co-integrated, there is a long-run equilibrium and, therefore, a valid error correction mechanism (Samad, 2007). The Vector Error Correction Model employed to detect causality and is reported below as the set of regressions (3.9) and (3.10).

$$\Delta GDP_t = \sum_{i=1}^n \alpha_i \,\Delta GDP_{t-1} + \sum_{i=1}^n \beta_i \,\Delta OFDI_{t-1} + \gamma ECT_{t-1} \,\varepsilon_t \qquad (3.9)$$

$$\Delta OFDI_t = \sum_{i=1}^n a_i \,\Delta OFDI_{t-1} + \sum_{i=1}^n b_i \,\Delta GDP_{t-1} + g ECT_{t-1} + \varepsilon_t \qquad (3.10)$$

The causality inference is based on assessing the significance of the coefficients for ECT, which is the Error Correction Term derived from the long-run co-integration relationship between the two variables (Oxley, 1993). Tables 3.6 and 3.7 illustrate the results of the Granger tests for short-run causality and of the ECM test for long-run causality, respectively.

Table 3.6 - Granger tests for short-run causality

Country	Causality direction	Wald-test statistic	Result
Argentina	GDP on OFDI	0.11438	No Causality relationship
	OFDI on GDP	0.00208	
Brazil	GDP on OFDI	$2.3407_{(0.15)}$	GDP $\longleftarrow$ OFDI
	OFDI on GDP	$3.0884_{(0.1)}$	
China	GDP on OFDI	1.8848	No Causality relationship
	OFDI on GDP	3.1272	
Czech Republic	GDP on OFDI	$15.283_{(0.01)}$	GDP $\longrightarrow$ OFDI
	OFDI on GDP	0.23397	
Egypt	GDP on OFDI	$3.9542_{(0.05)}$	GDP $\longrightarrow$ OFDI
	OFDI on GDP	0.04212	
India	GDP on OFDI	0.31696	No Causality relationship
	OFDI on GDP	0.00505	
Malaysia	GDP on OFDI	0.3904	No Causality relationship[19]
	OFDI on GDP	0.88522	
Mexico	GDP on OFDI	1.8133	No Causality relationship
	OFDI on GDP	0.26785	
Morocco	GDP on OFDI	$4.3239_{(0.01)}$	GDP $\longrightarrow$ OFDI
	OFDI on GDP	0.02515	
Poland	GDP on OFDI	0.06221	GDP $\longleftarrow$ OFDI
	OFDI on GDP	$7.0009_{(0.01)}$	
Turkey	GDP on OFDI	$9.5009_{(0.01)}$	GDP $\longleftrightarrow$ OFDI
	OFDI on GDP	$3.6908_{(0.1)}$	

Notes: Table reports the results of the Granger causality tests for the countries where OFDI and GDO were not co-integrated. The number of lags included in the regressions underlying the tests was chosen via the AIC criterion, allowing up to a maximum of 3 lags. P-values for the test statistics that are significant are included in parentheses. Arrows in the last column point to the direction of causality.

[19] Note that this result differs from that obtained by Wong (2009) who found evidence of causality running from GDP to OFDI in Malaysia. This is mainly due the different time span of the data and to the different number of lag inserted in the VAR model

Table 3.7 - ECM tests for long-run causality

Country	Causality direction	Test statistic on ECT	Result
Philippines	GDP on OFDI	$2.12_{(0.05)}$	GDP ⟷ OFDI
	OFDI on GDP	$-2.64_{(0.01)}$	
Russia	GDP on OFDI	-0.05	GDP ⟵ OFDI
	OFDI on GDP	$-7.06_{(0.01)}$	
South Africa	GDP on OFDI	$3.42_{(0.01)}$	GDP ⟷ OFDI
	OFDI on GDP	$-1.85_{(0.1)}$	
South Korea	GDP on OFDI	$1.72_{(0.1)}$	GDP ⟷ OFDI
	OFDI on GDP	$-3.54_{(0.01)}$	

Notes: Table reports the results of the VECM causality tests for the countries where OFDI and GDO cointegration between OFDI and GDP was found. The number of lags included in the regressions underlying the tests was chosen via the AIC criterion, allowing up to a maximum of 3 lags. P-values for the significant test are included in parentheses Arrows in the last column point to the direction of causality.

Table 3.6 shows a rather heterogeneous picture for what concerns short-run Granger causality. As a matter of fact, while in five countries (Argentina, China, India, Malaysia and Mexico) no causality relationship was found, OFDI appears to be causing GDP in Brazil and Poland. Unilateral causality from GDP to OFDI exists for Czech Republic, Egypt and Morocco, while bidirectional causality is present only in Turkey. On the other hand, the output presented in Table 3.7, exhibits less heterogeneity than the results observed for short-run causality. In Russia, evidence was found of long-run causality going from OFDI to GDP, while in the Philippines, South Africa and South Korea the causality is bidirectional, suggesting a long-run equilibrium relationship between OFDI and GDP. A more detailed commentary on the results portrayed in Tables 3.6 and 3.7 is provided in the chapter that follows.

4. CONCLUDING REMARKS

The objective set by the present thesis is a rather ambitious one. As a matter of fact, after having extensively researched the relevant literature, no academic contribution was found, assessing the impact of OFDI on economic growth in a set of emerging economies.

Two different types of econometric approaches have been employed: panel data regression analysis and time-series causality analysis.

The final outcome of the panel data regression model has been a positive and highly significant coefficient for the OFDI variable, which indicates a positive correlation between OFDI and economic growth in emerging economies. Additionally, after having performed an Extreme Bound Analysis (EBA) and checked for outliers, the estimates for the OFDI coefficient always maintained its significance, demonstrating its robustness to different model specifications.

To great surprise, comparing the numeric value of the OFDI coefficient (0.632), with the coefficient found by Herzer (2009) in a similar analysis conducted on developed countries (0.293), it may appear as OFDI exerts a greater influence in emerging economies. This finding apparently contradicts the relevant literature on the home country effects of OFDI. As a matter of fact, as observed in the chapter devoted to the literature review, there is widespread agreement among scholars that OFDI flows may have a reduced impact on emerging economies, given their comparatively reduced absorptive capacity, the greater inefficiency of their institutions and the lower level of their technological and managerial expertise.

Nevertheless, it has also been noticed that the positive results obtained by the regression analysis may be affected by endogeneity biases. In fact, the positive and statistically significant correlation between the two variables does not automatically imply that OFDI is exerting a positive influence on economic growth, as it may as well be economic growth that positively impacts OFDI.

Consequently, it was deemed necessary to rely on time-series data as a way to better understand the causality relationship between growth and OFDI in the selected emerging countries. The adequacy and usefulness of the time-series causality analysis is demonstrated by the results obtained, which provided fascinating insights on the relationship between OFDI and economic growth in emerging economies.

First of all, stemming from the outcome of the ADF test for non-stationarity and of the Johansen test for cointegration, it was found that in only four economies (the Philippines, Russia, South Africa and South Korea) there is presence of a long-term cointegrating relationship between GDP and OFDI. Only for those countries, the direction of causality was inferred by means of a Vector Error Correction Model (VECM). For the other countries (Argentina, Brazil, China, Czech Republic, Egypt, India, Malaysia, Mexico, Morocco, Poland and Turkey) short-run causality was detected via the standard Granger causality test, constructed utilizing a VAR model.

A complex and intriguing picture arises from the results of the causality analysis. As a matter of fact, evidence is particularly mixed and diverging causality patterns emerged. In those countries where OFDI and GDP were not cointegrated, in five cases no causality relationship is found (Argentina, China, India, Malaysia and Mexico), in three countries (Czech Republic, Egypt and Morocco) short-run causality runs unidirectionally from GDP to OFDI, in Brazil and Poland the relationship goes in the opposite direction, whereas only in Turkey there is presence of a bidirectional causality relationship between OFDI and GDP in the short-run.

On the other hand, for those countries in which the variables are cointegrated, the long-run causality relationship runs from OFDI to GDP in the case of Russia, whereas there is presence of long-run bidirectional causality for the Philippines, South Africa and South Korea.

The high heterogeneity observed in the results is however not a major cause of concern. As a matter of fact, that same heterogeneity had already been observed in previous macro-empirical studies (section 2.3), although they considered IFDI instead of OFDI.

Remarkable about the results obtained is the fact that, at first sight, OFDI appears to be causing GDP in only three countries. Nevertheless, overall, taking into account also bidirectional relationship, evidence of OFDI influencing economic growth is present in seven emerging economies out of the ten in which causality is found.

Following a similar line of reasoning, GDP can be considered as causing OFDI in eight countries.

Concluding, the existence of a positive correlation between OFDI and economic growth is confirmed by strong statistical evidence and the outcome of the causality analysis allowed for a better understanding of the relationship between economic growth and OFDI in emerging economies. In particular, whereas renewed evidence has been provided in favour of the idea that OFDI flows are promoted by greater levels of economic development, the presence of a growth-enhancing effect of OFDI has also been demonstrated. As a matter of fact, there is significant evidence that causality may be running from OFDI to the GDP, especially when long-run dynamics are under investigation.

Nonetheless, as already highlighted throughout the text, one should not take those results for granted, but should also pay attention to the various limitations that may affect their validity. Much of the weaknesses that are more easily identifiable are specifically related to the econometric methodology and the modeling of the empirical analysis. As an example, as stated in section 3.3.1, the regression equation adopted in panel data analysis may be perfected by the inclusion of different variables, such as a temporal dummy. Additionally, as mentioned in section 3.3.2, the econometric procedures employed in the time-series analysis (especially the VECM procedure and the Johansen test) have numerous limitations and their statistical properties are not particularly strong. More generally speaking, further empirical analysis can also benefit from greater data availability on a wider time-span. This however, is just one of the compromises that have to be accepted when trying to investigating more recent and under-researched phenomena. Further research should go beyond the scope of the present thesis. As a matter of fact, although having determined the presence of a positive causal relationship between OFDI and growth in a certain number of countries, no attempt has been performed at understanding the specific way through which OFDI has positively impacted economic development in those economies. In fact, as identified in section 2.1, OFDI may have a positive impact on growth through various channels, such as increased access to international markets, higher level of employment or productivity enhancements via technology spillovers.

That last limitation is actually another suggestion for future research in the area. As an example, it could be suggested to focus further analyses on a single country, in which OFDI appears to be causally related to economic growth, and attempt at identifying the elements of that country's economy that have been impacted by OFDI. Additionally, one could also try to look at the various peculiarities of the countries examined in the present work and identify those structural factors, such as openness, more efficient institutions or greater absorptive capacity that may explain the heterogeneity of the results observed. Furthermore, having access to reliable and complete sources of data, the analysis could be extended to a wider sample of emerging economies.

In any case, whatever the direction of future studies, one of greatest aspirations for this thesis is to see the topic herein investigated to be the object of additional research. OFDI from emerging economies are a phenomenon that is constantly gaining momentum in and that is shaping the global economy. So far, scarce have been the academic contributions aimed at assessing the impact of those OFDI flows on home economies. Hopefully, that gap will be covered soon.

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C. APPENDICES

Appendix 1 - Emerging Countries Selection

Emerging Markets by Each Group of Analysts

Country	Next-11/BRIC	CIVETS	FTSE	MSCI	ECONOMIST	S&P	DOW JONES	BBVA	EMGP	#	Selected Country
Afghanistan							*			1	
Argentina							*	*	*	3	**Argentina**
Bahrain							*	*		2	
Bangladesh	*							*		2	
Brazil	*	*	*	*	*	*	*	*	*	9	**Brazil**
Bulgaria							*	*		2	
Chile			*	*	*	*	*	*	*	7	Chile
China	.	*	*	*	*	*	*	*	*	9	**China**
Colombia		*	*	*	*	*	*	*		7	Colombia
Czech Republic			*	*	*	*	*	*		6	**Czech Republic**
Egypt	*	*	*	*	*	*	*	*		8	**Egypt**
Estonia							*	*		2	
Hong Kong					*					1	
Hungary			*	*	*	*	*	*	*	7	Hungary
India	*	*	*	*	*	*	*	*	*	9	**India**
Indonesia	*	*	*	*	*	*	*	*		8	Indonesia
Iran	*									1	
Israel									*	1	
Jordan							*	*		2	
Kuwait							*	*		2	
Latvia							*	*		2	
Lithuania							*	*		2	
Malaysia			*	*	*	*	*	*		6	**Malaysia**
Mauritius							*	*		2	
Mexico	*		*	*	*	*	*	*	*	8	**Mexico**
Morocco		*	*	*	*	*	*	*		6	**Morocco**
Nigeria	*							*	*	3	Nigeria
Oman							*	*		2	
Pakistan	*		*				*	*		4	**Pakistan**
Peru			*	*	*	*	*	*		6	Peru
Philippines	*		*	*	*	*	*	*		7	**Philippines**
Poland			*	*	*	*	*	*	*	7	**Poland**
Qatar							*	*		2	
Romania							*	*		2	
Russia	*	*	*	*	*	*	*	*	*	9	**Russia**
Saudi Arabia					*					1	
Singapore					*					1	
Slovakia								*	*	2	
Slovenia									*	1	
South Africa		*	*	*	*	*	*	*		7	**South Africa**
Sri Lanka							*	*		2	
South Korea	*			*	*			*	*	5	**South Korea**
Sudan								*		1	
Taiwan			*	*	*	*		*	*	6	Taiwan
Thailand			*	*	*	*	*	*		6	Thailand
Turkey	*	*	*	*	*	*	*	*	*	9	**Turkey**
Tunisia								*		1	
UAE			*				*	*		3	UAE
Ukraine								*		1	
Venezuela								*		1	
Vietnam	*	*						*		3	Vietnam

Notes: The table contains all the countries considered for inclusion in the sample. Each column represents a list of emerging countries devised by a group of investment analysts. From left to right, they are; Goldman Sachs' BRICS and Next-11 list, CIVETS list from the Economist Intelligence Unit, the FTSE Emerging Markets index, the MSCI Barra Emerging Markets Index, a list tracked by The Economist, a list compiled by Standard&Poors, the Dow Jones Emerging Markets Index, the EAGLEs (Emerging and Growth-Leading Economies) list from BBVA Research, the Emerging Market Global Players (EMGP) list from the Columbia University. At first, only countries appearing in at least three different lists were taken into consideration. Subsequently, other countries were omitted to due scarce availability of data. These were, namely: Chile, Colombia, Hungary, Indonesia, Nigeria, Peru, Taiwan, Thailand, and UAE. The remaining 16 countries were all included in the sample

Appendix 2 - Empirical studies on the FDI-economic growth relationship

Author	Sample	dep.Variable	Methodology	Result
Balasubramanyam (1996)	46 developing economies	**IFDI**	cross-section regression analysis using OLS and GIVE estimators	FDI has a positive impact on economic growth, although its effects are stronger in countries following exports promoting strategies
Borensztein et al. (1998)	69 developing countries	**IFDI**	panel data analysis using Seemingly Unrelated Regressions (SUR) , three-stage least squares (3SLS) and 2SLS estimation techniques	FDI has a positive effect on productivity and growth, but only when a minimum level of human capital is reached
Olofsdotter (1998)	50 countries (36 developed and 14 developing)	**IFDI**	cross-country analysis using both OLS and maximum likelihood estimators	FDI is positively related with economic growth and this relationship is stronger in countries with greater institutional capabilities
de Mello (1999)	32 countries (17 non-OECD and 15 OECD)	**IFDI**	panel data analysis using a fixed effect estimator & time-series evidence (unit root and cointegration analysis)	*High variations in results. The relationship between FDI and growth is sensitive to country-specific factors, especially in the case of non-OECD countries*
Zhang (2001)	11 developing economies from East-Asia and Latin-America	**IFDI**	time-series analysis using a three-step procedure : unit root, cointegration and causality analysis	relationship between FDI and growth varies across countries and is positively influenced by trade openness, higher human capital levels and political stability
Carcovic and Levine (2002)	72 developed and developing countries	**IFDI**	OLS cross-country regression and dynamic panel data analysis employing the General Method of Moments estimator (GMM)	*There is NO robust evidence of FDI having a positive and independent impact on economic growth*
Bengoa and Sanchez-Robles (2003)	18 Latin-American economies	**IFDI**	Panel data analysis using a random-effects estimator and a two-stage GMM estimator	FDI is positively correlated with economic growth. The effects however are influenced by country-specific variables, such as the level of human capital, economic stability and liberalized markets

Empirical studies on the FDI-economic growth relationship

Author	Sample	dep.Variable	Methodology	Result
Basu et al. (2003)	23 developing countries	**IFDI**	Panel Cointegration approach using a residual-based ADF test and Granger causality analysis using an ECM	There is a long-run positive relationship between FDI and growth. The causal direction of the relationship depends on the degree of openness of the economies. In closed economies the long-run relationship runs from GDP to FDI
Alfaro et al. (2004)	20 OECD and 51 non-OECD countries	**IFDI**	OLS cross-country regression	FDI has a positive impact on economic growth but its effects depend on the level of development of local financial markets
Sridharan (2009)	BRICS economies	**IFDI**	time-series analysis: unit root, cointegration and causality analysis using VECM (Vector Error Correction Model)	FDI is directly related to economic growth in India and China. There is a bidirectional relationship between FDI and growth in Brazil, Russia and S. Africa
Herzer (2012)	44 developing economies	**IFDI**	Heterogeneous Panel Cointegration techniques and general-to-specific model selection approach	*FDI has on average a negative impact on economic growth. Yet, there are various differences in the growth enhancing effects of FDI across countries*
Herzer (2009)	50 developed economies	**OFDI**	OLS cross-country regression and time-series analysis using DOLS (Dynamic Ordinary Least Squares) estimator and a VECM for causality analysis	There is a positive and robust relationship between OFDI and growth. In the US the presence of a bidirectional causality between OFDI and growth is observed
Wong (2010)	Malaysia	**OFDI**	time-series analysis: unit roots and Granger non-causality analysis in a VAR (Vector Autoregressive) framework	*The causality relationship runs from GDP to FDI and not vice versa*
Herzer (2011)	33 developing countries	**OFDI**	Panel cointegration approach using DOLS estimator and Granger causality analysis using ECM (Error Correction Model)	OFDI has on average a positive long-run effect on TFP (Total Factor Productivity). The relationship between OFDI and TFP is bidirectional. There is great heterogeneity across countries, mainly due to labour market regulations

Source: constructed by author drawing from Johnson (2006) and Ozturk (2007)

Appendix 3 - Selecting Estimators - Hausman Test

The Hausman test is the statistical methodology deployed in the paper at hand to select the most suitable estimator. It was devised by Jerry A. Hausman in 1978. It is a statistical experiment which is used to evaluate the possibility of adopting a random-effect estimator, in the case of panel data econometrics. It does so by testing for the existence of a correlation between errors and regressors (Kennedy, 2008). A sound and technical definition of the test is provided by Alberto Holly (1982). In his words, a Hausman test is *"an asymptotic chi-square test based on the quadratic form obtained from the difference between a consistent estimator under the alternative hypothesis and an efficient estimator under the null hypothesis"* (Holly, 1982). As described more recently by Baltagi (2005), the null hypothesis (Ho) in a Hausman test is that the error terms are independent from the explanatory variables. Stemming from the discussion in section 3.3.1, it should be clear that the underlying assumptions is that only the fixed effects estimator is deemed consistent in presence of variables-errors correlation. The idea behind the test is that if the null is true, both estimates should be about the same (because they are both unbiased), whereas if the null is false there should be a substantive difference between the two estimates (one is biased, the other is not). The Hausman test basically observes if there is a significant difference between the two estimates. As a consequence, if a particularly low p-value derives from the test, only the fixed-effects estimator is to be considered unbiased and consistent, and shall therefore be preferred. In the opposite situation (a high p-value stemming from the Hausman test's output), a random effects estimators, considered to be more efficient and therefore more accurate is to be chosen. While it is beyond this paper's purpose to analyze the mathematical/econometric assumptions of the test, it is hoped that the brief discussion above will help the reader in understanding why a specific statistical technique has been chosen over another. The Figure below reports the outcome of the Hausman Test performed with Stata as a way to choose the proper estimator.

```
17 . hausman fixed random

                     ── Coefficients ──
                    (b)           (B)          (b-B)      sqrt(diag(V_b-V_B))
                   fixed        random      Difference          S.E.

  lngdpcapita    -.6612433    -.8207295      .1594862         .8065719
  schoolenro~s    .0392529     .0340445      .0052085         .0143394
  unctadofdi~s    .7225035     .6322136      .0902899         .1820283
  grosscapit~p    .2729827     .2783762     -.0053935         .034661

                   b = consistent under Ho and Ha; obtained from xtreg
     B = inconsistent under Ha, efficient under Ho; obtained from xtreg

    Test:  Ho:  difference in coefficients not systematic

          chi2(4) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                  =        1.68
          Prob>chi2 =      0.7942
```

Appendix 4 - Line plots of the lnGDP and lnOFDI time series

Argentina

Brazil

China

Czech Republic

Egypt

India

Morocco

Mexico

Malaysia

Pakistan

Philippines

Poland

Russia

South Africa

South Korea

Turkey