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FDI flows into the OECD countries
The impact of labor costs

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Abstract

This study explores the importance of labor costs as a determinant of foreign direct investments (FDI) inflows among the OECD countries between 2003 and 2012. This group of countries makes up for the largest portion of global FDI inflows and outflows and it is of high importance for international trade and investments. In addition, by the implementation of interaction effects, we investigate under which circumstances a lower cost of labor in the host country attracts FDI. For the purpose of this study, we use panel data on bilateral FDI inflows among 31 OECD countries and different measures of labor costs. Furthermore, the fixed effects method has been applied for the estimation of our model. The results of our study indicate that a lower level of host country's labor costs draws more FDI into the economy while a higher level of home country's labor costs increase the amount of FDI deriving from home country. Moreover, the outcome of the interaction effects gives strong evidence that labor costs have a greater impact on FDI inflows into emerging economies but also that, multinational corporations and international investors are attracted by a combination of highly educated employees and a relatively low cost of labor.

Keywords: Foreign Direct Investment, labor costs, OECD.

Table of Contents

1. Introduction

Foreign direct investment (FDI) is considered to be a key driver for the growth of a country's economy and because of this reason, there is an increasing effort by governments and policymakers all over the world to establish a favourable environment for multinational enterprises (MNEs) and foreign investors (Almfraji and Almsafir, 2014). FDI promotes economic growth through the openness of the domestic economy to international trade, the transfer of new production technology and know-how, the improvement of human capital, the enhanced competition among companies in the local market and the restructuring and improvement of local firms (OECD, 2002; Bruensztein, Gregorio and Lee, 1998; Li, Liu and Parker, 2001).

The United Nations Conference of Trade and Development (UNCTAD) (2008) defines FDI as: ''an investment evolving a long-term relationship and reflecting a lasting interest and control by a resident entity in one country of an enterprise resident in another country. Such investment involves both the initial transaction between the two entities and all subsequent transactions between them and among foreign affiliates''.

During the last 30 years, Global FDI inflows have marked unprecedented growth although the financial crisis of 2008 decelerated this process. In 1990, global FDI inflows were just about 175 billion dollars on aggregate while in 2007, just before the financial crisis burst, they reached an all-time high of 1.9 trillion dollars. After this event, FDI inflows decreased to approximately 1.5 trillion dollars until 2017. At the same time, it is important to highlight that in 2012 the amount of FDI to developing economies exceeded the amount of FDI to the developed ones (UNCTAD World Investment Report, 2013; World Investment Report, 2018). FDI is closely related to the activities of MNEs since multinational companies accounted for the greatest portion of global FDI flows during this period, through greenfield investments and cross-border mergers and acquisitions (Blonigen, 2006). For this reason, the biggest part of the literature regarding the determinants of FDI has been studying the subject from the multinationals' perspective on which factors are conducive to investing in a specific economy.

One of the most important factors that make a country an attractive destination for foreign investors and multinational companies is the low cost of labor (Alam & Shah, 2013; Bevan & Estrin, 2004; Bellak, Leibrecht & Riedl, 2008). Countries that provide relatively lower labor costs are more attractive choices for multinational firms that can fragment their production process and through this strategy to substantially reduce their production costs and increase their profits. Indeed, many countries and especially emerging economies, which are in greater need of foreign capital, engage in a

policy ‘’war’’ in order to attract new investments by altering factors like the domestic labor market, corporate taxation, privatization regulations or trade barriers (Agiomirgianakis, Asteriou & Papathoma, 2003).

Furthermore, the engagement of once economically isolated emerging economies like China, India, Turkey or former members of the Soviet Union into international trade have intensified the competition among countries in their attempt to attract more FDI into the domestic economy. These countries, which provide relatively cheap labor, have become major global economic forces and important recipients of FDI through the years (UNCTAD World Investment Report, 2018).

Although the role of labor costs as a significant FDI determinant is confirmed by a big portion of the literature, there are papers that have found controversial results as far as the effect of labor costs on FDI is concerned and doubt the theory that low labor costs enhance a country’s FDI activity (Demirhan & Masca, 2008; Johnson, 2006; Campos and Kinoshita, 2006). Most importantly, some economists claim that in a world of increasingly automated manufacturing processes, where labor tends to be constantly replaced by capital, low labor costs seem to lose their effectiveness as a determinant of FDI (UNCTAD World Investment Report, 2018).

Nevertheless, the international relocation of production from high wage to low wage countries might have significant repercussions for employees. Multinational companies, often, use their capability of moving their production abroad as leverage in order to put downward pressure on domestic wages and keep labor costs low (Lipsey, 2004). In other cases, when domestic labor costs are prohibitively high for companies and they decide to relocate their activities abroad, countries from which corporations move out usually face a higher rate of unemployment (Konings & Murphy, 2005). What concerns researchers and policymakers is the so-called ‘’race to the bottom’’. Many countries, especially emerging economies that fall short in terms of market size or purchasing power of the consumers, have adopted low wage policies in order to attract FDI inflows (Eckel, 2003). The continuous struggle between countries in order to preserve a competitive advantage in terms of low labor costs has been putting increasing downward pressure on wages and labor standards leading to the race to the bottom (Bayraktar - Saglam & Sayer Boke, 2017).

Taking all these into consideration, the primary object of this paper is to examine the importance of labor costs as a determinant of FDI in the OECD (Organization for Economic

Co-operation and Development) members from 2003 until 2012. We decided to investigate this group of countries for several reasons. First of all, the OECD member states are very important for international trade and investments since they receive on average 65 % of global FDI inflows (UNCTAD World Investment Report, 2018). Another critical factor for choosing the OECD countries as our sample has to do with the availability of data on bilateral FDI as well as on labor costs. Especially, as far as labor costs are concerned, information is scarce for many countries outside the OECD. In addition, as far as we know, the impact of labor costs on FDI inflows has not been studied extensively for the period and for the OECD countries.

Furthermore, a secondary aim of this study is to examine whether the effect of labor costs on FDI depends on other factors like the group of countries under examination (developed and emerging) or the quality of human capital of the host country. We will accomplish this by including a number of interaction terms in our regression model.

This master thesis adds to the existing literature through various channels. First and foremost, we conduct a thorough investigation of the effect of labor costs on FDI inflows by analyzing the cost of labor and its' components and then by including different measures of labor costs. We also examine whether the impact of labor costs on FDI depends on other factors like the group of countries under examination or the human capital development of the host country. Furthermore, we conduct a detailed and comprehensive literature review on the impact of labor costs on FDI inflows as well as of FDI determinants in general. Besides that, we empirically examine the effect on inward FDI of a number of other factors like market size, political and macroeconomic stability, trade openness, institutional quality, human capital, infrastructure development, corporate income tax rate, labor productivity, gross capital formation or the total labor force supply.

Additionally, as far as we know, the number of studies that use data on bilateral FDI is still negligible. This is mainly because of the limited available data on bilateral FDI for all countries that engage in international trade and FDI and a rather big number of zero and negative values that come with this set of data since this data are excluded from the analysis when we transform them into logarithms. However, we believe that the use of the bilateral FDI flows is a more effective empirical strategy since it allows us to use both host and home country's labor costs and other control variables, as well as relative labor costs. The latter has also been highlighted by many economists and researchers who argue that the decision of MNEs on whether to relocate their production depends on relative factors like labor costs

rather than the absolute level of labor costs in the host country (Hatzius, 1997; Sleuwaegen & Pennings, 2006; Collins & Grimes, 2011). For this reason, we have decided to use bilateral FDI inflows as our dependent variable so that we can take into account relative labor costs.

Moreover, to our knowledge, only a small portion of the studies that investigate the determinants of FDI has set as a primary object of their empirical research the effect of labor costs on FDI flows and even those who did focus on labor costs have mostly used transition economies as their sample. Since the OECD countries are mainly developed countries, many economists do not focus so much on the effect of labor costs when they study the determinants of FDI in the OECD member states.

The results of this study confirm the hypothesis that relative labor costs have a significant effect on bilateral FDI flows between OECD countries in all specifications. Furthermore, we find a negative and significant effect of the host country's labor costs while the home country's labor costs have a positive and significant effect on FDI bilateral FDI flows. In addition, we find evidence that the effect of labor costs on FDI possibly depends on other factors like on which group of countries we examine (emerging or developed economies) or on the quality of host country's human capital.

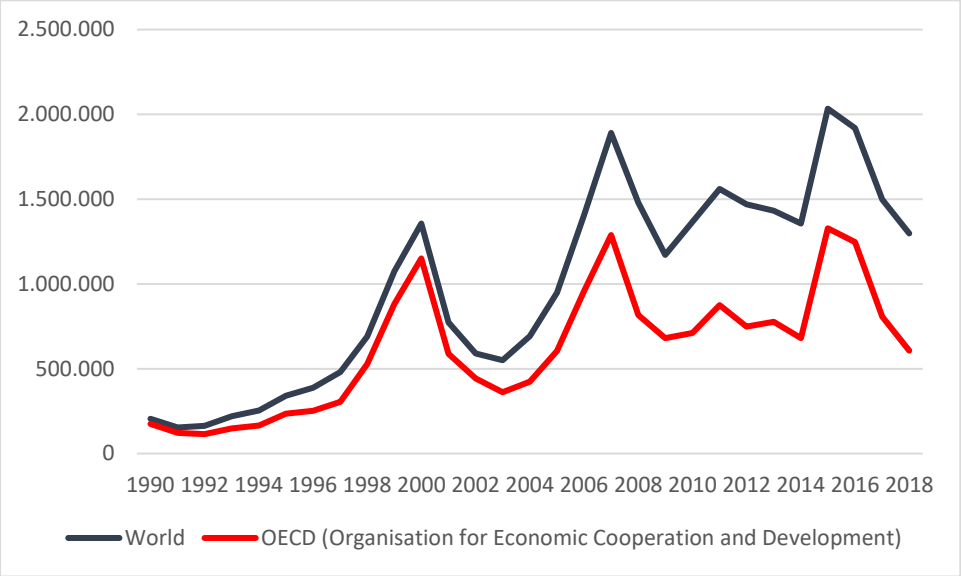
The structure of this paper is as follows. Section 1 provides some information about the development of FDI inflows into the OECD countries and it also discusses in more details the role of labor costs in the activities of multinational corporations. Section 2 consists of the literature review as well as of discussion of the different parameters that constitute the cost of labor. In addition, in section 2 we present the hypotheses of our study. Section 3 describes the data and the methodology of this study. section 4 provides the empirical results of this study and section 5 draws some conclusions. Finally, in section 6, we present the references and appendix.

1.1 FDI statistics

According to the UNCTAD World Investment Report (2007), in 2000 FDI inflows reached 1.4 billion dollars, the highest level until that moment but, during the next years, they were significantly increased. However, global FDI inflows rebounded after 2003 reaching a new all-time high of almost 1,9 trillion $ in 2007. The financial crisis of 2007 significantly affected global inflows of foreign direct investments, though, which dropped by 27.5% in 2008 while during 2009 they decreased even further by 26 % to approximately 1,2

trillion $. Between 2010 and 2012 FDI inflows recovered and returned to the pre-crisis average. In 2015, FDI activity accelerated again and FDI inflows for the first time exceeded 2 trillion dollars. This information can be found in figure 1.1 which shows global FDI inflows as well as inflows into the OECD member states from 1990 to 2018.

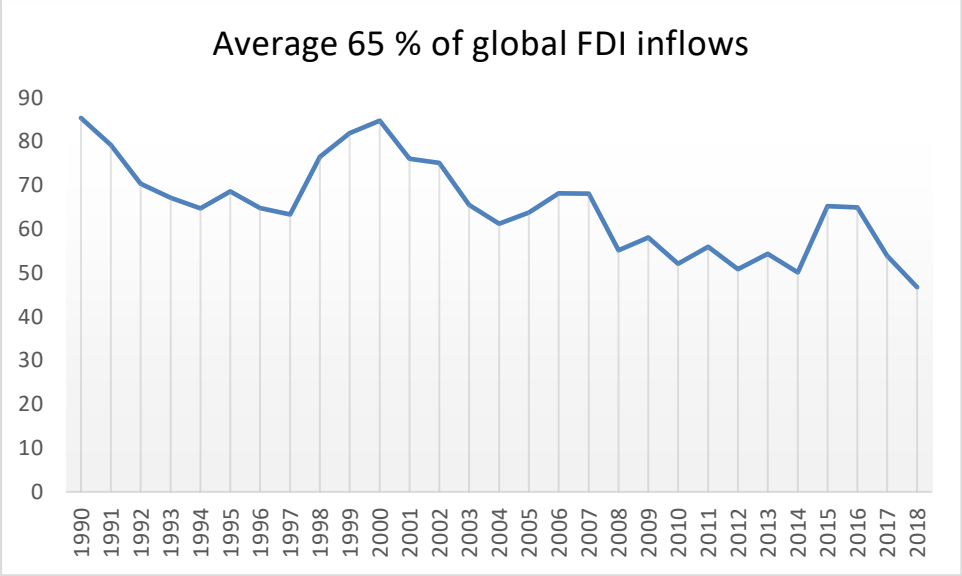
Figure 1.1 FDI Inflows in millions of dollars



Source: Constructed using data from the World Bank database (World Development Indicators)

Figure 1.2 shows the amount of FDI inflows into the OECD as a percentage of global FDI inflows. We can see that on average the OECD member states account for 65 % of global inward FDI for the period 1990-2018. However, this percentage has been displaying a decreasing trend due to the constantly rising amount of FDI that flows into emerging economies like China, India or Taiwan which are not members of the OECD. More specifically, in 2006, 68% of global FDI was flowing into countries of the OECD while in 2015 the percentage was slightly higher than 50%.

Figure 1.2 OECD FDI inflows as % of global FDI inflows



Source: constructed with data from the World Bank database (World Development Indicators)

Nevertheless, the growing rate of FDI that flows into emerging economies is a general phenomenon during the last years. According to the UNCTAD World Investment Report (2013), 2012 was the first year ever that FDI flows into developing economies exceeded those into the developed ones. Consequently, 9 out of 20 major FDI recipients were developing and mainly emerging economies (UNCTAD, 2013).

Although an official definition for emerging markets does not exist, emerging countries usually have lower per capita gross domestic product (GDP) and are striving to become developed economies through the openness to international trade, increases in production, privatizations and the development of domestic capital markets. According to the Morgan Stanley Capital International Emerging Market Index, the emerging economies which are members of the OECD are Czech Republic, Hungary, Slovakia, Slovenia, Greece, Poland, Mexico, Turkey ,and South Korea.

1.2 The role of labor costs

Labor costs have played a major role in the distribution of FDI during the last decades. The integration in international trade and the global economy of countries like China, India, and members of the former Soviet Union resulted in the doubling of the global labor force from 1.5 to almost 3 billion workers and the emergence of a ‘’global labor market’’ during

the 90s'. This led to the introduction of low-skilled and low-wage labor in international labor markets (World Bank, 2018).

The above, in combination with the rapid expansion of globalization, trade liberalization and the reduction of transportation costs have made it easier for multinational enterprises to fragment their production process and their supply chain operations. Therefore, companies have a strong incentive to relocate labor-intensive activities in countries in which the cost of labor is relatively low which often means in developing and emerging economies. This has enabled these countries to attract an increasing rate of FDI inflows by exploiting the comparative advantage that they provide foreign companies with comparing to more advanced economies with higher wages.

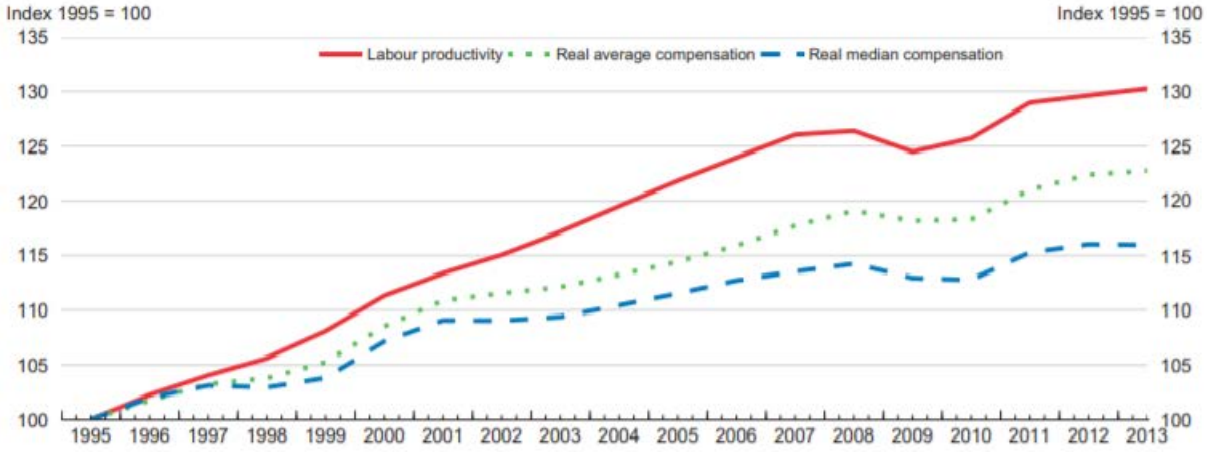
During the last 30 years, some of the biggest multinational corporations relocated their businesses from developed to emerging economies. In 1987 General Motors decided to move its car production from the United States to Mexico. Lee and Levis, two major clothing manufacturing multinational firms, relocated their production facilities from Belgium to destinations with lower wages in 1995 and 1997 respectively (Sleuwaegen et al., 2006). More recently, in 2009 one of the largest computer manufacturers, Dell, announced the relocation of their production plants to Poland (Collines et al., 2011). The reasons behind these decisions are related to the high costs of production and mainly to labor costs. By moving their production to countries with lower wages, corporations are aiming at reducing production costs and maintaining their competitive position in the market (Sleuwaegen et al, 2006; Vestring, Rouse, Reinert & Varna, 2005).

However, it is important to notice here that there is also another reason for the emergence of developing economies as major FDI recipients and this reason is the so-called decoupling between labor compensation and labor productivity. Under normal circumstances, the compensation of workers and employees should reflect their productivity and effectiveness. However, due to the huge technological developments but also, because of the increasing competition in the labor markets that delay the wage growth, in many countries the growth of labor productivity is relatively greater than the growth of wages and salaries (Bivens and Mishel, 2015; Harrison, 2009).

Indeed, we can see in figure 2 the growth of labor productivity, real average compensation and real median compensation (compensation adjusted for inflation) in the OECD from the period between 1995 and 2013. Labor productivity is measured by real value-

added per worker. In fact, the real average and median wages are increasing at a slower rate relative to labor productivity. In addition, we can see that the financial crisis of 2007 substantially affected both productivity and wages in 2008 and 2009. However, according to OECD Economic Outlook (2018), in countries with above average rates of productivity growth like Korea, Czech Republic or the Slovak Republic, which are considered emerging markets, real median wages display higher rates of growth than the OECD average. In contrast, countries which have below-average productivity growth rates, have faced a decoupling between wages and labor productivity with the growth of the wages being slower than the growth of productivity.

Figure 2: Labor productivity and real average/median compensation



Source: OECD economic outlook 2018

Besides, the educational gap between developing and developed countries is closing. In fact, until 2040 the number of skilled workers in the world will rise from 1.6 billion in 2011 to 2.16 billion. Most importantly, this increase will be mostly attributed to a rise in the supply of skilled labor from developing economies (World Bank, 2018). Consequently, companies perceive that moving their production to low wage countries does not necessarily reflect low domestic labor productivity or unskilled labor force nor a low quality of the goods produced by low wage employees and workers. Under these circumstances, the role of labor costs could be even more crucial for the distribution of FDI since MNEs have strong incentives to relocate their facilities to countries that provide them with a lower cost of labor and an equally effective labor force.

2. Literature Review

In this section, we will first analyse the economic theory behind the factors that drive MNEs to invest abroad. Then, we will provide some empirical evidence on the determinants of FDI. Finally, we will discuss the different concepts and measures of labor costs, we will provide the readers with a brief decomposition of labor costs and an explanation of each of the components and we will review empirical studies on the effect of labor costs and FDI.

2.1 FDI determinants

Since MNEs are responsible for the greatest part of the global FDI activity, economists and researchers have put a great effort to comprehend the motives behind the decisions of multinational firms regarding their engagement in FDI. Through the years, various theories and models have tried to explain which factors drive these decisions and therefore the determinants of FDI flows. In this study, we refer to the horizontal and vertical FDI models as well as to the famous OLI framework proposed by Dunning (1997) in order to understand the forces driving FDI.

The horizontal FDI model was mainly developed by Markusen (1984). This theory describes a situation in which MNEs establish multi-plants which roughly produce the same products in different countries aiming at expanding their business into foreign markets. This strategy is profitable for multinationals if the fixed costs for building new facilities in a foreign country are lower than the trade costs that would occur if the company served that foreign market through exports. The market size of the host country and the purchasing power of the population play a major role in this case. When a country is small or its' inhabitants have little purchasing power then, the reduction of trade costs is not sufficient to offset the fixed costs of establishing a new plant there and eventually MNEs will choose to serve the foreign market through exports. In contrast, in countries with greater market size and GDP per capita, demand for the company's products is sufficient to offset the fixed costs of new facilities and thus the company will probably choose to establish new production facilities there. Under these circumstances, it is not strange that horizontal FDI mostly takes place among developed countries with similar size and GDP or GDP per capita and also that horizontal FDI and exports and considered to be substitutes (Markusen, 1984; Markusen & Venables, 2000). Eventually, the factors that are conducive for the horizontal FDI model are the market size of the host country, the transportation costs and other trade barriers like tariffs and the plant level fixed costs that MNEs have to pay to establish their new facilities.

On the other hand, vertical FDI models were firstly introduced by Helpman (1984) and Helpman and Krugman (1985). Unlike horizontal FDI, Vertical FDI describes a situation in which a multinational firm engages in both FDI and exports. In this case, a multinational firm has the possibility to fragment their activities according to their factor intensities and the skill level of labor that is needed in each part of its operations. More specifically, the headquarters that usually require skilled labor will be placed in countries where skilled labor is cheap, usually more advanced economies while manufacturing facilities that are unskilled labor-intensive will be placed in countries where unskilled labor is cheaper, usually in developing ones. Essentially, companies that engage in vertical FDI try to take advantage of differences in the prices of factor endowments and mainly in wage differentials and therefore reduce the production costs. In this case, MNEs have an incentive to engage in vertical FDI if the cost-saving from relocating parts of their business abroad are greater than the transportation costs that are necessary to bring the products back to the home country. So, according to the vertical FDI model, the investment decisions of MNEs are driven by differences in host and home country's labor costs.

In 2001, Carr, Markusen, and Maskus (2001) published the ''Knowledge-Capital Model of the Multinational Enterprise'' in which both horizontal and vertical FDI can occur endogenously at the same time. Their model is based on three principal assumptions. First, services that are knowledge-based like headquarter services and R&D, can be separated by the production facilities. Second, the knowledge-intensive activities require skilled labor while production activities require unskilled labor. Third, the knowledge-intensive services can be supplied to other production facilities at a low cost. The first two assumptions motivate the vertical fragmentation of multinational firms which fragment their production according to relative factor prices between countries. The third assumption gives rise to horizontal multinational companies which produce the same goods and services in different locations.

However, the most well-known and dominant economic theory that tries to explain the motives that drive the decisions of multinational enterprises (MNEs) about their production activities is the OLI (Ownership, Location, Internationalization) framework proposed by Dunning (1977). According to Dunning, a multinational firm has three options when it comes to expanding its business abroad. It can serve the foreign markets either by exporting its products or by providing licenses to domestic companies to produce its products. A third option for MNEs is to directly invest in the targeted economy by establishing affiliates through the construction of an entirely new production facility (greenfield investment) or by acquiring an existing foreign company in the host country.

Dunning (1997), makes three assumptions that must be satisfied so that the conditions are favourable for a company to become multinational and engage in FDI. First of all, it must have and ownership advantage. This might refer to both tangible assets like technology and products and intangible like brands, patterns ,and know-how that will enable it to discriminate its' products from its' competitors, penetrate the foreign market and gain a decent share of it. Secondly, firms must have an internationalization advantage which means that they can get benefited by exploiting their ownership advantages through direct engagement in the foreign market. Finally, the locational advantage refers to macroeconomic, political and other factors of the host country that affect a MNE's investment decisions. Some of these factors can be market size, labor costs, exchange rates and inflation rate, income tax rates, the quality of institutions or labor productivity.

2.2 FDI determinants: empirical evidence

The determinants of FDI have been studied extensively by economists through empirical research. FDI flows are usually measured either in net inflows or outflows in millions of dollars (Alam and Shah, Jadhav, 2012; Chakrabarti, 2001). A small part of the empirical literature has used bilateral FDI flows (Bellak, Leibrecht and Riedl, 2008; Bevan and Estrin, 2004). However, data sets that consist of data on bilateral FDI flows usually suffer from missing values or negative and zero values. This reduces the explanatory power of the model since these values are excluded from the analysis when they have been transformed in logarithmic form. Hence, studies on bilateral FDI have been conducted less frequently.

What is considered by the biggest part of the literature as the most important factor that promotes FDI is the market size of the host country. In most empirical researches market size is proxied by GDP per capita, GDP or GDP growth which reflect the purchasing power, the size and the potential of the domestic economy (Jadhav, 2012; Alam et al., 2013; Gast and Hermann, 2008). Most studies usually choose to use one or more of these variables. For example, Jadhav (2012), found a positive and statistically significant effect of market size, measured by real GDP, on FDI inflows in the BRICS (Brazil, Russia, India, China, South Africa) through the implementation of a panel data model. Alam et al. (2013) in contrast, use GDP per capita as a proxy for market size in their study on the determinants of FDI in the OECD countries. Their panel fixed effects model indicated that the coefficient of GDP per capita is positive and statistically significant. Overall, the size of the domestic market seems to be one of the most important determinants of FDI independently of which measure it is used.

Furthermore, empirical studies also focus on other factors like labor costs, corporate tax rates, macroeconomic and political stability, quality of institutions, infrastructure quality, trade openness.

More recent studies also investigate the effect of human capital, labor productivity and gross capital formation. Labor productivity and human capital development are highly important for studies that focus on the importance of labor costs as an FDI determinant (Ranjan and Agrawal, 2011; Baltas, Tsionas, and Baltas,2018)

Ranjan et al. (2011), for instance, investigate the determinants of FDI in BRIC countries over the period of 1995 to 2009 using panel data and a random effects specification. The authors conclude that the most significant variables are market size measured by current GDP, trade openness, labor costs, infrastructure facilities, GDP growth and inflation which measures macroeconomic stability.

Baltas et al. (2018) used fixed effects and a dynamic panel model of FDI inflows to examine the determinants of FDI in OECD countries from 1980 to 2012. Their results confirm the hypothesis that traditional factors like market size (GDP per capita), labor costs, trade openness, the quality of institutions and corporate taxation significantly attract FDI into the domestic economy. In addition, the authors found that the development of human capital measured by school enrolment has a significant influence on the attraction of FDI.

A different approach has been followed by the study of Economou, Hassapis, Philippas and Tsionas (2017). In their paper, the authors use a panel dataset of 24 OECD and 22 developing (non-OECD) countries from 1980 to 2012. Using fixed effects and dynamic panel model specifications, the researchers found that the factors that make a country attractive to FDI vary between the two country groups. More specifically, in the case of the OECD countries, the most significant variables were lagged FDI, market size (GDP per capita), gross capital formation and corporate tax rates. On the other hand, what matters for developing countries is the previous year's FDI inflows, market size, labor costs and the quality of institutions.

As we saw above, labor costs historically have a strong connection with FDI. This argument is also supported by a great part of the empirical literature. However, there are several opposite opinions on whether this connection is strong and significant. Moreover, researchers often use different variables in order to measure labor costs. Thus, in the next part we will present some empirical evidence from previous studies on the relationship between labor costs and FDI as well as the most commonly used variables as measures of labor costs.

2.3 FDI and labor costs: empirical evidence

Many studies have paid significant attention to the role that labor costs play in the attractiveness of FDI although, only a small number has set this relationship as the central issue of their research and an even smaller has used bilateral FDI data. In table 2 we present an overview of

these studies. However, only a small portion of these studies has used countries of the OECD as their sample since most of them focus on Central and Eastern European Countries (CEEC).

For example, Bellak et al. (2008) used a panel dataset on bilateral FDI inflows into Central and Eastern European Countries from 1995 to 2003. The outcome of their study shows that both unit labor costs (ULC) and total labor costs (measured as labor compensation) per employ are significant determinants of FDI in CEEC and they display a negative sign. In addition, the authors highlight the importance of using unit labor costs as a proper measure for the cost of labor in order to take into account a potential omitted variable bias (OVB) in case we forgo including labor productivity as a control variable. We will elaborate more on this issue later in this study.

In the same direction, Bevan et al. (2004) tried to figure out what causes FDI flows into transition economies of the European Union. They used a panel dataset consisting of bilateral FDI flows between several Western developed economies (mostly European countries) and European transition economies. Their results also show that low unit labor costs are conducive to FDI inflows.

An interesting research was conducted by Economou et al. (2017). Making use of a fixed effects model as well as a dynamic panel model, the authors investigated the determinants of FDI inflows in 24 OECD member states and 22 developing countries that do not belong in the OECD group between 1980 and 2012. The results were very enlightened about the different effects that the included variables had on developed and developing economies. More specifically, labor costs and institutional variables had a significant impact on the attractiveness of investments only in the case of emerging economies.

A similar study was made by Baltas et al. (2018). The researchers studied the determinants of FDI inflows in 24 members of the OECD group from 1980 to 2012. Following the same approach as Economou et al. (fixed effects and dynamic panel model), they found that unit labor costs have a negative and significant impact on investors' decisions. In addition, the authors confirm the argument that FDI determinants do not have the same impact on all different country groups when the dynamic panel model is implemented.

A different measure was used by Hunady and Orviska (2014). Using a panel data fixed effects approach and data on 26 European Union member states between 2004 and 2011, they found that labor costs (measured by hourly labor costs) are of great significance and display a negative sign. Moreover, their research shows that firing costs are also of high importance. Firing and hiring costs were also used by Gast et al. (2008) as a proxy for labor costs. Using a dataset of bilateral FDI between OECD countries during the period of 1991 to 2001 and a fixed effects model, they conclude

that hiring and firing costs have a negative effect on the attraction of FDI between European Union member states.

The paper of Carstensen and Toubal (2004) investigates the determinants of FDI from a number of developed OECD economies to some Central and Eastern European countries. To measure the impact of labor costs on inflows of FDI the authors include in their model the relative unit labor costs (the ratio between unit labor costs in the host economy and unit labor costs in the source economy) instead of just using the unit labor costs of the host economy as it is the case in most empirical studies that use bilateral FDI data. The utilization of relative labor costs is probably the most valuable measure in cases like this because, when multinational corporations develop their investment strategies, they try to discover a comparative advantage in terms of production costs either this is low labor costs or corporate tax rates. Even if labor costs are low in absolute terms in the targeted country, the comparative advantage occurs for an MNE only when labor costs in the host economy are lower than labor costs in the source economy. Thus, relative labor costs measures provide us with a more complete insight when our dataset consists of bilateral FDI.

In addition, Ranjan et al. (2011) explore the determinants of FDI into the BRIC countries (Brazil, Russia, India, China) from 1975 to 2009 by using a panel dataset with annual data. The implementation of a random effects model shows that FDI inflows are highly sensitive to changes in labor costs proxied by the wage rate. The authors argue that these countries are highly attractive to foreign investors because they can supply them with a labor force of great magnitude at a relatively low cost.

However, not all research papers have found a significant or even negative effect of labor costs on FDI decisions of MNEs. For example, the research of Johnson (2006) on the determinants of FDI in CEEC for the period from 1993 to 2003 shows that annual wages in the manufacturing sector (% of GDP per capita), as a measure of labor costs, do not have a significant effect on the attractiveness of FDI. Variables like the population of the host country or GDP per capita play a much more important role in this case.

Surprising results can also be found in the paper of Campos et al. (2006). The authors set under examination the determinants of FDI in transition economies between 1990 and 1998. The results of their research indicate that traditional factors like market size and labor costs (measured as real wages) are not significant determinants of FDI inflows into these countries. Nonetheless, the authors emphasize the fact that labor costs are only significant in specifications in which they do not control for the quality of labor such as the educational level of workers. Once labor quality is added in the

model, the cost of labor loses its' significance. This outcome is of great importance for our study since it points out the necessity of controlling for variables like human capital when we want to define the effect of labor costs on FDI, otherwise, our results might be biased.

An insignificant effect of labor costs on FDI can be attributed to the exploitation of a wrong measure of labor costs. We can see that most studies that were not able to find a significant relationship between FDI and labor costs have used wages as a proxy for labor costs. However, as we will discuss in the next section, wages do not completely reflect the total amount of labor costs that corporations pay because they do not include other costs like social contributions.

Furthermore, there are papers that have found even a positive relationship between labor costs and FDI. However, these studies probably suffer from endogeneity due to unsuitable econometric models or invalid measures for labor costs. Demirhan et al. (2008), for instance, examine the determinants of FDI into 38 developing economies using cross-sectional data. Their results as far as labor costs (measured by labor costs per worker in the manufacturing sector) are concerned are controversial. In most of their specifications the coefficient on labor costs in positive although it is never statistically significant. However, a cross-sectional analysis might not be a credible research design because it cannot capture the dynamic behaviour of the variables.

Also, Yang, Groenewold ,and Toha (2000) find a positive and statistically significant relationship between wages and FDI inflows in Australia between 1985 and 1994. According to the writers, the unexpected positive sign of wages is probably caused by the omission of labor productivity as a control variable. The argument is that an increase in wages might reflect improvements in labor productivity. Due to the positive relationship between labor productivity with wages and labor productivity and FDI, excluding productivity from our model will cause a positive OVB. If this bias is too large it might even cause the coefficients on wages to have a wrong sign.

Another explanation for a potential positive relationship between labor costs and FDI inflows was given by Lucas (1993). Lucas examined the determinants of FDI inflows in East and Southeast Asia and found that an increase in labor costs leads to a rise in FDI inflows. The interpretation that he gave is based on changes in relative factor endowments and factor prices. More specifically, Lucas (1993) argues that when domestic wages increase, labor becomes more expensive and thus a tendency occurs to substitute labor with capital which in turn leads to an increase in FDI inflows that brings more capital into the domestic economy.

Table 1: Literature Review

Reference	Sample	Empirical model	Labor costs measure	Dependent variable	Effect on FDI
Bellak, Leibrecht & Riedl (2008)	*CEEC (1995-2003)*	Panel	Unit labor costs	Bilateral FDI inflows	Negative (significant)
Bevan & Estrin (2004)	CEEC (1994-2000)	Random effects	Unit labor costs	Bilateral FDI inflows	Negative (significant)
Baltas, Tsionas & Baltas (2018)	OECD (1980-2012)	Fixed effects & dynamic panel model	Unit labor costs	FDI inflows	Negative (significant)
Economou, Hassapis, Philippas and Tsionas (2017)	OECD & developing countries (1980-2012)	Fixed effects & dynamic panel model	Unit labor costs	FDI inflows	Negative (significant only for emerging economies)
Hunady & Orviska (2014)	European Union (2004-2011)	Fixed effects	Hourly labor costs & firing costs	FDI inflows	Negative (Significant)
Carstensen and Toubal (2004)	CEEC (1993-1999)	Dynamic panel model	Relative unit labor costs	Bilateral FDI inflows	Negative (Significant)
Ranjan and Agrawal (2011)	*BRIC*	Random effects	Annual wages	FDI inflows	Negative (Significant)
Kinoshita and Campos (2006)	*CEEC (1990-1998)*	Fixed effect and dynamic panel model	Real wages	FDI stock	Negative (Not significant)
Johnson (2006)	CEEC (1993-2003)	Fixed effects	Annual wage (manufacturing)	FDI inflows	Negative (Not significant)
Demirhan and Masca (2008)	38 Developing countries	Cross-sectional data	Labor costs per worker (manufacturing)	FDI inflows	Positive (Not significant)
Yang, Groenewold and Toha (2000)	Australia (2000-2004)	Time series	Average weekly earnings	FDI inflows	Positive (Significant)

2.4 Measures and decomposition of labor costs

Several studies have tried to uncover the relationship between labor costs and the magnitude of FDI inflows (Bevan et al., 2004; Saglam et al., 2017; Lai and Sarkar, 2011). Yet, the significance and the magnitude of the coefficient of labor costs in these studies differ from each other depending on the specific measure of the cost of labor that each of these studies exploits. The choice of the right proxy for labor costs is extremely important as we will see below because it can distort not only the sign of the coefficient but also make its' interpretation more complicated and less intuitive.

The most common and accepted measure for labor costs is without any doubt unit labor costs (Dellis, Sondermann & Vansteenkiste, 2017; Bellak, Leibrecht & Damijan, 2009; Economou et al. 2017). Unit labor cost is the most efficient proxy for labor costs because it takes into account labor productivity which is highly correlated with labor costs. The probability of endogeneity due to omitted variable bias in our model arises if we do not include labor productivity as a control variable (Bellak et al., 2008). As we will discuss below, the correlation between these two variables is so strong that an omission of labor productivity can even lead to a wrong sign in our estimation.

Furthermore, depending on data availability, the countries and the time period under examination, as well as the content of the research, researchers have used various variables to measure labor costs. As we saw in the previous section, wages have been extensively used as a labor cost measure, usually in the form of average annual wages (Ranjan et al., 2011). Also, due to the lack of aggregate data in many cases, many studies use wages and total labor costs in different sectors of the economy (Johnson, 2006; Demirhan et al., 2008). Finally, some studies like the paper of Bellak et al. (2008) make use of labor compensation (total labor costs) while others, use hourly measures of labor costs and wages (Sleuwagen et al.,2006; Hunady et al., 2014). Although all these variables are closely related to each other, there are significant differences between them, and it is likely that each of these measures has a different weight in the strategic planning of MNEs. For this reason, it is crucial to make the distinction between wages, earnings and labor costs to understand which of these similar but, essentially different concepts are important from a corporations' point of view when it wants to make an investment decision.

An intuitive distinction between wages, earnings and labor costs is often difficult to be made since the one is a component of the other. Generally, wages and earnings are components of total labor costs. The decomposition of labor costs can provide us with important information about which of these measures is relevant for the labor demand side (the firms) (Saglam et al., 2017). Labor costs include wages and non-wage factors like taxes, benefits, firing costs and social contributions paid by the employer. Wages are usually a fixed amount of money paid to the employees, while earnings consist of wages but also bonuses and overtime payments. The term wage normally refers to hourly or daily payments to employees. If we add to earnings the costs of social contributions, allowances and other benefits paid by the employer we get the compensation of employees. If we further add any labor market taxes or other costs like the cost of training or the cost of recruitment, we get total labor costs. (Saglam et al., 2017).

Although wages constitute the largest part of labor costs, corporations are not necessarily interested in the wage component of the cost of labor. The level of wages and earnings in a country

could reflect labor productivity and the effectiveness and the skills of employees. On the other hand, the non-wage part of labor costs which consists of social contributions, taxes, firing and training costs paid by the employer reflects the regulatory burden determined by policy-makers and the general conditions in the labor market (Saglam et al., 2017). While corporations can influence the wage part of the cost of labor, they have less effect on the part that mostly reflects the labor laws and regulations in the host country.

As a matter of fact, what corporations actually take into consideration is unit labor costs which are labor costs adjusted for labor productivity and they show the total amount of labor costs that need to be made for the production of one unit of output. (Saglam et al., 2017). As we will discuss later in this paper, this measure of labor costs also helps us to deal with endogeneity issues that derive from a potential exclusion of labor productivity from our econometric specification. However, at this point, we can argue that labor costs and not just wages are relevant for multinational companies and as we will see in the next section, these two measures can lead to completely different outcomes as far as the relation between FDI and labor costs is concerned.

2.5 Hypotheses

Based on the economic theory and the empirical literature we build the main hypotheses of this master thesis. An important component of a company's total expenditures and therefore a determinant of its' profits is the cost of labor. Multinational corporations, especially those ones who produce labor-intensive goods and services, are attracted by countries which are abundant in labor supply and can provide them with low levels of wages and overall labor costs.

Moreover, many studies argue that the home country's labor costs are also a crucial factor for the activities of MNEs. Often, the decision for the relocation of a company's production facilities is taken due to the increasing labor costs in the home country or based on relative labor costs rather than absolute labor costs (Lipsey, 2004; Cushman, 1987). Even if the host country's labor costs decrease, it might not be profitable for a multinational firm to relocate its' facilities if the home country's labor costs also decrease. What is important, from a company's perspective, is relative labor costs, the ratio of the host country's labor costs to the home country's labor costs. Based on these, the main hypothesis of this master thesis is:

Hypothesis 1a: an increase in relative labor costs will lead to a decrease in FDI inflows in the host country.

Hypothesis 1b: an increase in the host country's labor costs leads to decreases in FDI inflows into the host country.

Hypothesis 1c: an increase in the home country's labor costs will cause an increase in host country's FDI inflows.

Furthermore, we build two more hypotheses that we will investigate through the implementation of interaction effects. Firstly, our fourth hypothesis derives from the idea that a significant portion of global FDI inflows goes into emerging economies due to the cost advantages that they provide to multinational corporations. In contrast to most of the developed economies that, to a large extent are attractive for foreign MNEs due to factors like the strong purchasing power of the population or high levels of productivity, emerging economies depend, to an extent, on the comparative advantage that they have relative to developed countries, which is the low cost of labor. In addition, some studies argue that the factors that make a country an attractive destination for FDI vary among different country groups (Economou et al., 2017). Hence, it is possible that the effect of labor costs on FDI is different among emerging and developed economies.

Finally, it is possible that the effect of labor costs on FDI also depends on other variables like human capital. More specifically, a low level of human capital in the host country might deter MNEs from investing in the economy despite a potential low level of relative labor costs because it is likely that inefficient human capital reflects low labor productivity. Under these circumstances, corporations that put more weight on a well-educated and skilled labor force rather than on low wages, have an incentive to locate their facilities in high wage countries. However, if the targeted host country is able to supply MNEs with a skilled and well-trained labor force, then labor costs might play a more decisive role in the strategic planning of multinational firms. Consequently, it is likely that corporations are mostly attracted by a combination of a decent level of human capital and relatively low costs of labor. Hence our two complementary hypotheses will be:

Hypothesis 2a: the effect of labor costs on FDI inflows is stronger for emerging economies.

Hypothesis 2b: the effect of labor costs on FDI depends on the level of the host country's human capital.

3. Methodology and Data

3.1 Methodology

Our empirical model consists of yearly observations for 31 host and source OECD member states between 2003 and 2012. Each observation reflects a bilateral relationship between a host country i and a home country j. We use a panel data approach for the estimation of our econometric specification. Panel data analysis has a number of important advantages compared to regular cross-country or time series analysis. Using panel data when investigating the determinants of FDI can be more efficient than just using either time-series or cross-country models because we can use both the cross-sectional and time series dimension of the dataset and thus, make a more comprehensive and efficient analysis that pure time-series or cross-sectional data cannot do. In addition, the fact that panel data models exploit both dimensions of a dataset, increases the degrees of freedom as well as, the variability and the size of the sample and therefore it enhances the accuracy of the model (Ranjan et al., 2011). Panel data estimations also help us to conduct a meaningful empirical analysis even if our sample suffers from missing values, as in our case (Semykina and Wooldridge, 2010).

Furthermore, panel data methods give us the ability to deal with time-invariant unobserved heterogeneity. In our case, since our sample consists of different pairs of countries observed over a period of ten years, we have strong considerations that there are probably time-invariant country-pair characteristics which can influence the economic relationship between two countries. Such characteristics could be common cultural characteristics, a common language or religion and other political, social or economic relationships between two countries that cannot be observed or measured. Not controlling for unobserved heterogeneity can be considered as an omitted variable bias (OVB) and if we do not deal with it, it leads to endogeneity in our model and thus, our estimates will be biased. Since factors like cultural characteristics and long term economic and political relationships do not vary significantly over time, in other words, they are probably fixed over time but, they vary among different country-pairs, we have decided to implement a fixed effects model.

Moreover, there might exist year specific unobserved characteristics that affected FDI and one or more of our independent variables during the period under examination. Since this period includes the period when the financial crisis burst, we believe that such time unobserved heterogeneity exists. Both cases make our estimates biased and inconsistent. For these reasons, we also include in our regressions time dummies to account for year fixed effects. Our empirical specification will have the following form:

$$lnFDI_{ijt} = B_0 + B_1 \times LC_{it} + B_2 \times LC_{jt} + B_3 \times X_{it} + A_{ij} + T_t + e_{it}$$

where $lnFDI_{ijt}$ is the natural logarithm of bilateral FDI inflows between country i,j in time t, LC_{it} and LC_{jt} stands for the natural logarithms of labor costs of the host and source country respectively in time t, X_{it} is a vector of control variables for the host country, A_{ij} indicates time-invariant unobserved characteristics between country-pairs, T_t are time dummies to control for time trends and year-specific effects and finally, e_{it} is the error term.

Nonetheless, as in any empirical research, we will have to mitigate the chance that endogeneity occurs. There are three sources of endogeneity: omitted variable bias, reverse causality and measurement error. Omitted variable bias occurs when we neglect to include in our regression control variables that are correlated to both our dependent and our explanatory variable of interest. We deal with this issue by controlling for a number of variables that are related to both labor costs and FDI inflows like, labor productivity, human capital or total labor force.

Next, reverse causality exists when there is a bilateral relationship between the dependent and the explanatory variables. More specifically, there is a possibility that causality might run from both directions which means that not only labor costs provoke a change in FDI inflows but also, the opposite could happen. There are studies that confirm this bilateral relationship (Vijaya and Kaltani, 2007; Tintin, 2012; Saglam et al., 2017). Reverse causality could make the interpretation of the coefficient of labor costs less intuitive since it might be the case that a country is using other means like productivity to attract FDI in order to increase domestic wages rather than establish a low labor costs environment to attract foreign investments. This could lead us to underestimate the effect of labor costs on FDI meaning that the actual coefficient of labor costs might be less negative than we have estimated. Finally, we deal with potential measurement error by using different measures of labor costs.

Furthermore, it is possible that FDI inflows react to changes in our variables with some lag. Multinational enterprises and investors make their decisions on whether to build a new production plant or whether to acquire a foreign company based on data from previous years. Following Bevan et al. (2004) and Anyanwu (2012) first we estimate our model with contemporaneous variables and then we estimate it with one period lagged values of our independent variables as a robustness check. This method will also allow us to deal with potential endogeneity that might occur because of the reverse causality issue we mentioned before. Using lagged values copes with this problem since FDI inflows in time t cannot have an impact on unit labor costs in time t-1 while the opposite interaction probably exists.

Finally, we will conduct some robustness checks to support the robustness of our results. Initially, we implement the Hausman test in order to confirm that a potential unobserved heterogeneity is fixed over time and not random. Hence, our decision to use a fixed effect estimation strategy was correct. Secondly, we estimate our model using lagged values of our explanatory variables as we said above. Then, we use different measures for labor costs based on the existing literature. Additionally, we run two tests for heteroskedasticity and autocorrelation. Since both tests indicate that there is evidence of the existence of both heteroskedasticity and autocorrelation, we use robust standard errors clustered at the country-pair level as an extra robustness check.

3.2 Data description

Our model consists of 31 host and source OECD member states for the period between 2003 and 2012. A list of the countries that comprise our sample can be found in the appendix. The choice of the countries and variables included in our model as well as of the time period examined was made taking into consideration the availability of data. We tried to include countries for which we had at least data on bilateral FDI inflows and labor costs at the same time. We excluded countries that there were many missing values in variables of high interest. For example, there are no available data on unit labor costs of Israel or on bilateral FDI inflows of Latvia and Lithuania despite the fact that they are actually members of the OECD. As a result, these countries are excluded from our dataset.

We decided to build our model based on OECD countries because of three main reasons. First of all, the OECD provides, as far as we know, the most complete and comprehensive database in terms of availability of data on bilateral FDI, labor costs and productivity. Secondly, as we discussed before, the countries that are included in the OECD database make up for a significantly large amount of global FDI flows. More specifically, 65 % of global FDI inflows actually go into the OECD countries. Hence, we strongly believe that the analysis of this sample can provide us with some very helpful conclusions about the role of labor costs on the attractiveness of FDI but also, about the effect of other factors. Equally important is the fact that the role of labor on FDI inflows into the OECD countries has not been studied thoroughly. In addition, a portion of the OECD member states are considered as emerging markets. This enables us to investigate whether the effect of labor costs is different for emerging economies compared to the developed ones.

To gather all these data, we used the online databased of organizations like the OECD, UNCTAD (United Nations Conference of Trade and Development) and the World Bank. The world bank provides a substantially large amount of economic and political indicators like the World

Development Indicators (WDI) and the World Governance Indicators (WGI). Through those, we have access to a variety of economic, governance and institutional data.

Our main variable which is bilateral FDI inflows and our main explanatory variables, which are the different measures of labor costs that we use in our model, were obtained by the OECD database. Missing values of bilateral FDI inflows were completed using information from the UNCTAD. However, we were not able to completely avoid missing values. Corporate income tax rates were also extracted from the OECD. All the other independent variables were obtained from the World Bank database. Table 1 presents some descriptive statistics of all the variables that have been used in this study. Negative values of FDI inflows reflect divestments.

3.2.1 Dependent Variable

The dependent variable of our study is the natural logarithm of net bilateral FDI inflows measured in current millions of dollars. The OECD database provides data on FDI in both a common currency (US dollar) and in individual currencies. We use FDI inflows in a common currency so that we do not have to transform our data. This makes the analysis easier and more intuitive since we can better compare the volume of FDI inflows in each country.

3.2.2 Explanatory variables

3.2.3 Labor costs

Based on the existing empirical literature and the availability of data, we have chosen a variety of different measures for labor costs. The most commonly used variable for labor costs is unit labor costs which measures the average cost of labor per unit of output. Unit labor costs is a measure of labor costs adjusted for productivity. The numerator of this ratio is the total cost of labor in an economy measured by labor compensation per hour while the denominator shows the real output of an economy measured by GDP per hour worked. We use these variables both in the form of a ratio (unit labor costs) and separately in different specifications. Compensation per hour is measured in the host country's domestic currency.

These variables have some useful advantages. First of all, they take into account the labor compensation of self-employed persons and thus they are better adjusted for the total workforce of the domestic population. Secondly, they provide us with a more comprehensive measure of total labor costs since the OECD measures total labor costs taking into account not only wages and salaries of workers and employees but also the contribution to social security by the employers.

Finally, we use two more proxies for labor costs. The first one is hourly earnings per employee in the manufacturing sector and the second one is the real annual minimum wage. Hourly earnings are available in domestic currencies while real minimum wages are available in US dollars and constant prices. Although the level of minimum wages partially determines the level of wages and total labor costs, this measure also reflects the regulatory environment of the labor market and is an indicator of the general economic environment. Overall, a higher level of wages and labor costs increase production costs for corporations and directly affect their profits. Thus, we expect the coefficients of our labor cost variables to have a negative sign. Hourly earnings in the manufacturing sector are used as a robustness check.

3.2.4 Trade Openness

Trade openness is considered to be one of the major determinants of FDI. Countries that engage in international trade provide companies and investors with a wider pool of consumers and market opportunities and thus with greater profits. Hence, trade openness should display a positive sign. A variety of measures for trade openness have been used in the literature. We use the most commonly exploited one which is the ratio of total imports and exports to GDP (Hunady, 2014, Tintin, 2013, Anyanwk, 2012).

3.2.5 Human capital

During the last years, increasing attention has been paid to human capital by many studies as an important determinant of inward FDI. Ramasamy and Yeung (2010) argue that a well-trained and educated labor force is attractive for investors since it boosts labor productivity. Better skilled employees have the ability to help companies to better exploit their ownership advantages especially in sectors like marketing, finance, R&D or administrative activities. Furthermore, controlling for human capital factors like education is crucial when we want to discover the impact of labor costs on FDI since it is related to both. An omission of this variable would probably cause an omitted variable bias which would make our estimates inconsistent. The biggest portion of the literature uses secondary school enrolment as a proxy for human capital (Economou et al., 2017; Ramasamy et al., 2010). More specifically, we use the percentage of the population of the host country that has attended secondary education compared to the population of the corresponding age group. We expect this variable to have a positive sign.

3.2.6 Market Size

The market size of the host country is historically one of the most important determinants that drive multinational companies' decisions towards FDI. The most commonly used measures of market size in the literature are tha host country's current GDP, GDP per capita and GDP growth (Blonigen and Piger, 2011; Kumary & Sharma, 2017; Jadhav, 2012). Some studies during the past have also used the population of the host country as a proxy for market size. However, this measure does not capture the economic size of the country and the purchasing power of its inhabitants. Greater market size translates into higher potential demand for a corporation's products or services and thus increased sales and revenues. We use current GDP measured in US million dollars. Data on GDP were gathered by the database of the World Bank. We expect the market size to have a positive influence on FDI.

3.2.7 Macroeconomic Stability

In the largest part of the existing literature, macroeconomic stability is proxied by the rate of inflation (Schneider & Frey, 1985; Jadhav, 2012). Inflation is correlated with the central bank's monetary policy as well as with the value of the domestic currency. For example, in periods of economic slowdown and recessions central banks usually cut interest rates to increase the supply of money and capital and therefore to help the economy to recover. However, this could lead to a depreciation of the local currency but also, to a decrease in the value of money in the domestic market which eventually increases inflation. Thus, inflation is usually related to the effectiveness of the government's and the central bank's monetary policy. A stable and relatively low rate of inflation is an indicator of a country's economic and financial stability. Hyperinflation is usually a sign of recession. Historically, countries with very high rates of inflation have unstable economies. Hence, we expect inflation to have a negative sign. We used the World Bank database for this variable.

3.2.8 Corporate Income Tax Rate

Corporate income tax rate is considered to be of crucial importance for inward FDI since it directly affects the profits of multinational firms. A higher rate of corporate income taxation will deter multinational firms from investing in the local economy. We use the statutory corporate income tax rate of the central government as a measure of the corporate tax rate (Economou et al., 2012). This variable was extracted by the OECD database. A negative sign is expected since higher corporate taxes decrease corporate profits.

3.2.9 Political risk and Institutional Quality

In order to control for the quality of institutions and the political environment in the host country, we use the six Worldwide Governance Indicators (WDI) of the World Bank. These indicators are Voice and Accountability, Political Stability and Absence of Violence, Control of Corruption, Rule of Law and Governmental Effectiveness. Each country is assigned a score from zero to one hundred where zero is the worst score and 100 is the highest. Well-functioning governments and institutions will probably reduce bureaucracy and enhance transparency and therefore improve the overall conditions for potential investors. Moreover, a safe and stable political and social environment with low levels of corruption and the absence of violence and terrorism make multinational firms and investors to feel more confident towards long term investments in the host economy. We have made an average of these six variables and include it as a catch-all variable for the quality of institutions. We believe that our institutional variable coefficient will display a positive sign.

3.2.10 Gross Capital Formation

During the last years, researchers have paid significant attention of the influence of gross capital formation on FDI inflows (Ranjan et al., 2011; Baltas et al., 2018). Gross capital formation is a measure of domestic investment and more specifically it measures the additional expenses for fixed assets and inventories in an economy. Higher gross capital formation is an indicator of improvements in the investment environment of a country and leads to higher economic growth (Ranjan et al., 2011). Thus, increases in gross capital formation make a country more attractive to foreign investors and therefore we expect this variable to a positive effect on FDI inflows. Gross capital formation is measured as a percentage of GDP. Data for this variable were extracted from the World Bank database.

3.2.11 Infrastructure Development

A country's quality of infrastructure is also an important determinant for the attraction of FDI inflows, especially for emerging economies (Asiedu, 2006; Anyanwu, 2012). Countries that have more developed and efficient infrastructure like road or trail networks, ports, airports, availability of electricity, clean water or access to the internet can establish a more attractive environment for investments by foreign investors and multinational corporations. Thus, we expect infrastructure development to have a positive relationship with bilateral FDI inflows. A commonly used measure for infrastructure is the number of telephone subscriptions per 100 people (Asiedu, 2006; Anyanwu, 2012), which is the measure that we also use in our study. Data on this variable can be found in the World Bank's online database.

3.2.12 Labor Productivity

The inclusion of labor productivity is important for two main reasons. Firstly, the productivity of labor is considered a key factor for economic growth and the attractiveness of FDI (Bellak et al., 2008). A higher level of labor productivity has, as a result, more effective exploitation of a company's capital and resources and thus it leads to economies of scale for multinational corporations. Secondly, labor productivity is important for our model due to its correlation with labor costs. As we mentioned previously, our model will probably suffer from endogeneity due to omitted variable bias if we exclude from it the productivity of labor. Since an increase in labor productivity can lead to an increase in wages, the exclusion of this variable from our specification could result in a positive OVB. If this bias is large enough, it could even give us a wrong sign on the coefficient of labor costs. For instance, Yang et al. (2000) found a positive relationship between changes in wages and changes in FDI inflows. However, this is probably a result of the exclusion of labor productivity from their model since the positive effect of wages on FDI inflows potentially includes also the effect of labor productivity through its effect on wages. Hence, the inclusion of labor productivity, especially in studies that aim at examining the impact of labor costs on FDI, is crucial. We use the denominator of unit labor costs as a measure of labor productivity that is GDP per hour worked. This variable is measured in US dollar and constant prices. We expect the labor productivity of both the host and the home country to have a positive sign.

3.2.13 Total Labor Force

The effect of a country's total labor force on FDI has been examined only on a small scale by the empirical literature. Countries which are able to supply corporations with employees and workers on a larger scale will, potentially, attract more FDI especially in the case of labor-intensive production. Some people relate the labor supply only to a country's population. However, in many cases countries with large populations do not have sufficient pools of employees due to the over aging population or maybe because young people migrate abroad, for example. Furthermore, we believe that the exclusion of this variable could possibly cause an omitted variable bias due to its' potential correlation with both FDI inflows and labor costs since the size of the labor force probably affects the level of wages in a country. Increases in labor supply when demand for labor does not change will put downward pressure on wages. Ranjan et al. (2011) investigated the effect of the total labor force on FDI inflows. However, the authors did not find significant evidence on this effect. Nonetheless, we include this variable in our model in order to avoid potential endogeneity due to OVB. We use data from the World Bank for this variable. Total labor force consists of people older

than 15 years old, who are currently employed or looking for a job. We expect this variable to have a positive sign.

Table 2. Descriptive Statistics

VARIABLES	(1) N	(2) mean	(3) sd	(4) min	(5) max
Dependent variable (FDI)					
lnFDI	5,057	4.666	2.974	-6.908	11.68
Labor costs					
lnULC_host	8,643	4.496	0.141	3.922	4.986
lnULC_home	8,629	4.489	0.139	3.852	4.986
lnCompHour_host	8,440	4.510	0.125	3.879	4.705
lnCompHour_home	8,440	4.510	0.124	3.879	4.700
lnMinWage_host	6,700	9.372	0.581	7.488	10.03
lnMinWage_home	6,680	9.454	0.417	8.332	10.03
lnHourlyEarnings_host	7,550	4.391	0.180	3.567	4.682
lnHourlyEarnings_home	7,840	4.390	0.178	3.567	4.682
Market Size and Growth					
lnGDP_host	8,730	26.88	1.479	23.01	30.41
lnGDP_home	8,730	26.88	1.479	23.01	30.41
GDPgrowth (%)	8,730	1.972	3.395	-14.70	11.10
Total labor force					
lnLForce	8,730	15.86	1.436	12.18	18.88
Trade Openess					
TradeOpeness	8,730	92.44	56.88	21.60	343.6
Macroeconomic stability					
Inflation (%)	8,730	2.774	2.327	-4.480	25.30
Corporate income tax rate					
CorporateTaxRate (%)	8,730	26.04	5.739	12.50	36.10
Human capital development					
Education (%)	8,312	105.0	14.56	77.90	161
Institutional quality					
risk	8,730	83.35	12.87	45.71	99.76
Gross capital formation					
GCF	8,730	23.66	4.203	12.80	39.35
Labor productivity					
lnProdHour_host	8,730	4.542	0.172	3.493	4.690
lnProdHour_home	8,728	4.569	0.0661	4.277	4.678

4. Results

Aç we discussed before, we consider a fixed effects model to be the most suitable estimation method for our research. However, we conduct the Hausman test to confirm this argument. The Hausman test displayed a p-value equal to 0.0001 which indicates that we should reject the null hypothesis that a random effects model is more appropriate for our panel data and

thus we should implement a fixed effects estimation (Hausman, 1978). Therefore, our econometric strategy is to implement a fixed effects estimation model which controls for unobserved heterogeneity between the different country-pairs in our sample. We also include time dummies to reduce the risk of running a spurious regression. Furthermore, since the time period that we examine includes the period during which the financial crisis of 2007 burst, we should control for year specific effects that took place due to the financial crisis and, as we also discussed before, have affected global FDI activity.

Tables 3 and 4 present the results of our main specifications. Table 3 shows the results when we use relative labor costs. All our relative labor costs measures display a negative and significant sign. Relative unit labor costs are significant at 1% level while relative labor compensation and relative minimum wages are significant at 5% level. However, the highest coefficient is the one of labor compensation and it indicates that a 1% increase in relative compensation between the host and the home country leads to a decrease in FDI inflows from the home to the host country by 0.9%. These results confirm our hypothesis that when relative labor costs (the ratio of host country to home country labor costs) increases then, bilateral FDI inflows in the host economy decreases.

As far as our control variables are concerned all of them have a significant effect except inflation and corporate tax rate and host country's labor productivity which shows that these variables do not have a significant effect on the attractiveness of FDI. Inflation is only significant in the specification with minimum wages which shows that inflation is related only to the wage part of labor costs. Moreover, the host country's GDP has the expected sign but, it is also not statistically significant which is in contrast to the empirical literature. On the other hand, the home country's GDP is positive and significant. This outcome shows that between 2003 and 2012 only home country's market size had a significant impact on bilateral FDI inflows.

Furthermore, GDP growth enters with a negative and statistically significant sign which indicates that higher economic growth during that period actually led to decreases in FDI inflows. An explanation of this could derive from the fact that most of the OECD countries are developed economies which usually have lower and more stable growth rates than some of the emerging economies. In fact, the average growth rate of our sample is approximately 2 % while the maximum growth rate in our sample is 11 %. Under these circumstances, a decrease in a country's economic growth which brings it closer the average rate might be an indicator that the economy of this country has become more stable which attracts more FDI into the economy.

Variables risk and infrastructure have a negative sign while a positive sign was expected which means that greater infrastructure development, as well as a more stable political environment and higher quality of institutions, do not affect FDI inflows. An explanation for the negative sign of risk might be that investors from countries with low levels of control of corruption and regulatory quality might not be deterred by the presence of corruption and institutions of bad quality in a foreign country in which they want to invest (Cuervo-Cazurra, 2006). Furthermore, greater government effectiveness and regulatory quality might provoke more strict economic policies that make the domestic investment environment less attractive (Yerrabati and Hawkes, 2016). However, variable risk does not display a significant sign in two out of 3 main specifications. Regarding infrastructure development, since our sample mostly consists of developed economies with a sufficient level of public infrastructure, it is reasonable that infrastructure development is not an attractive determinant for FDI. Furthermore, the wrong sign could be a result of the usage of a wrong proxy for the quality of infrastructure for the specific time period and group of countries.

Education has a positive sign and it is significant in two specifications which is in parallel with the portion of the empirical studies that argue that a better qualified and educated workforce is a significant determinant of FDI inflows. Labor force participation is also statistically significant. This means that countries that can supply foreign companies with more labor force, tend to attract more FDI. In addition, gross capital formation and trade openness are also positive and statistically significant, as expected. Countries which are more dependent to trade and have a higher level of domestic investments are more attractive to multinational corporations. Next, the home country's labor productivity is positive and statistically significant which seems reasonable since corporations from more productive countries are more likely to invest abroad. The host country's productivity is statistically insignificant. This is in agreement with the argument that multinationals, especially from the developed countries, are able to transfer their technology and expertise to the home country. These results indicate that most of the countries in our sample, which are developed economies, are able to transfer technology, expertise ,and know-how into the host country. Thus, the host country's productivity has negligible importance.

Table 4 presents our results when we include host and home country's labor costs as absolute and not as relative values. This way we can identify the individual effect of host and home country's labor costs when the other variables do not change (ceteris paribus). The host country's labor costs have a negative and statistically significant coefficient in all specifications although, unit labor costs are significant at 5% level and display a greater coefficient. More specifically, an increase in the host country's unit labor costs by 1% leads to a decrease in FDI inflows into the host country by almost 1.3 %.

Table 3: Fixed Effects estimation results with relative labor costs

Dependent variable: Bilateral FDI inflows (US dollar millions)

VARIABLES	(1) Unit labor costs	(2) Compensation per hour	(3) Minimum Wage
ulc_ratio	-0.696***		
	(0.267)		
compensation_ratio		-0.914**	
		(0.393)	
MinWage_ratio			-0.559**
			(0.277)
lnGDP_host	0.236	0.459	0.313
	(0.287)	(0.310)	(0.369)
lnGDP_home	0.708***	0.532**	0.809***
	(0.227)	(0.241)	(0.264)
GDPgrowth	-0.0368***	-0.0265**	-0.0465***
	(0.0122)	(0.0131)	(0.0153)
education	0.0151**	0.0134*	0.00612
	(0.00673)	(0.00700)	(0.0102)
lnLForce	1.814**	2.757***	1.219
	(0.840)	(0.958)	(1.080)
GCF	0.0330**	0.0233*	0.0315*
	(0.0135)	(0.0141)	(0.0172)
risk	-0.0181	-0.0193*	-0.00648
	(0.0110)	(0.0115)	(0.0143)
TradeOpeness	0.00544**	0.00600**	0.00910***
	(0.00264)	(0.00281)	(0.00347)
Inflation	-0.00249	-0.000540	-0.0412**
	(0.0192)	(0.0200)	(0.0173)
CorporateTaxRate	-0.00350	-0.000612	-0.0165
	(0.0100)	(0.0101)	(0.0138)
lnInfra	-0.412*	-0.508**	-0.0970
	(0.217)	(0.224)	(0.315)
lnProdHour_host		0.395	0.154
		(0.617)	(0.753)
lnProdHour_home		1.379**	1.507**
		(0.599)	(0.693)
Constant	-48.92***	-71.99***	-53.09***
	(15.22)	(17.46)	(19.86)
Observations	4,809	4,542	2,804
R-squared	0.095	0.102	0.129
Number of country pairs	787	733	447

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 4: Fixed Effects estimation results

Dependent variable: Bilateral FDI inflows (US dollar millions)

VARIABLES	(1) Unit labor costs	(2) compensation per hour	(3) Minimum Wage
lnULC_host	-1.291**		
	(0.511)		
lnULC_home	0.423		
	(0.372)		
lnCompHour_host		-0.955*	
		(0.564)	
lnCompHour_home		0.935*	
		(0.545)	
lnMinWage_host			-1.131*
			(0.606)
lnMinWage_home			1.366**
			(0.566)
lnGDP_host	0.412	0.497	0.247
	(0.312)	(0.334)	(0.393)
lnGDP_home	0.773***	0.532**	0.849***
	(0.232)	(0.253)	(0.269)
GDPgrowth	-0.0389***	-0.0270**	-0.0496***
	(0.0123)	(0.0133)	(0.0154)
lnLForce	2.353**	2.695***	1.808
	(0.927)	(0.963)	(1.189)
education	0.0149**	0.0136*	0.00361
	(0.00673)	(0.00700)	(0.0103)
TradeOpeness	0.00501*	0.00597**	0.00815**
	(0.00267)	(0.00281)	(0.00344)
Inflation	-0.000428	0.00112	-0.0385**
	(0.0192)	(0.0202)	(0.0176)
CorporateTaxRate	-0.00193	-0.000400	-0.0143
	(0.0101)	(0.0102)	(0.0139)
risk	-0.0213*	-0.0189	-0.00299
	(0.0113)	(0.0115)	(0.0151)
GCF	0.0301**	0.0224	0.0275
	(0.0136)	(0.0142)	(0.0177)
lnInfra	-0.467**	-0.487**	0.0134
	(0.221)	(0.224)	(0.321)
lnProd_host		0.437	1.323
		(0.664)	(1.079)
lnProd_home		1.399**	0.404
		(0.630)	(0.882)
Constant	-60.22***	-73.26***	-65.52***
	(16.98)	(18.61)	(21.41)
Observations	4,809	4,542	2,804
R-squared	0.095	0.102	0.129
Number of country pairs	787	733	447

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

On the other hand, the home country's labor costs have the expected (positive) sign but, they are significant only in the specification with labor compensation and minimum wages. We can see that a 1 % increase in the home country's labor compensation and minimum wage leads to an increase in FDI inflows from the home to the host country by 0.9% and 1.4% respectively. The insignificant effect of the home country's unit labor costs might be caused by the fact that we control only for a few home country variables. Furthermore, the level of home country's minimum wage is statistically more significant than labor compensation which might indicate that multinationals are more sensitive to changes in the regulations and the standards of the domestic labor market which is reflected by the level of minimum wage in a country.

Finally, time dummies are jointly significant at 10% level in the specification that includes unit labor costs. This is evidence of the existence of year specific factors that influenced the decision of multinational companies regarding their FDI activities during that period. However, only time dummies for years 2006 and 2007 display a significant coefficient. The significance of these year dummies probably reflects the shock of the economy during the year when the financial crisis burst but also the year before that.

4.1 Interaction Effects

Table 5 presents the results when we include in our specifications the interaction effects of host country's labor costs with our emerging market (EM) dummy, which takes the value 1 if the host country is an emerging economy and 0 otherwise.

The interaction effect between the host country's unit labor costs and the dummy variable EM is negative and statistically significant at 1 % level. Furthermore, it displays a large coefficient of approximately 2%. We can also see that the coefficient of unit labor costs in now positive but statistically not significant. This result indicates that the effect of unit labor costs on FDI inflows strongly depends on whether the host country is an emerging market. More specifically, the different effect of labor costs in emerging and developed economies is shown by the coefficient of the interaction term which shows that the effect of unit labor costs on FDI inflows is much stronger (more negative) by 2 % in emerging markets than it is in developed markets. However, we do not find any evidence of this relationship when we use labor compensation and minimum wages as our labor cost variables. This means that there is a different effect of labor costs among emerging and developed markets only in the case that we use labor costs adjusted for productivity.

Table 5: Interaction effect between labor costs and emerging markets dummy variable.

Dependent variable: Bilateral FDI inflows (US dollar millions)

VARIABLES	(1) Unit labor costs	(2) Compensation per hour	(3) Minimum Wage
lnULC_host	0.328		
	(0.686)		
lnULC_home	0.425		
	(0.372)		
lnCompHour_host		-0.923	
		(0.829)	
lnCompHour_home		0.936*	
		(0.545)	
lnMinWage_host			-0.617
			(1.004)
lnMinWage_home			1.354**
			(0.567)
lnGDP_host	0.745**	0.501	0.288
	(0.326)	(0.342)	(0.398)
lnGDP_home	0.765***	0.531**	0.850***
	(0.232)	(0.253)	(0.269)
GDPgrowth	-0.0363***	-0.0271**	-0.0518***
	(0.0123)	(0.0134)	(0.0158)
lnLForce	1.700*	2.678***	1.850
	(0.944)	(1.015)	(1.191)
education	0.0164**	0.0136*	0.00225
	(0.00673)	(0.00700)	(0.0105)
TradeOpeness	0.00539**	0.00598**	0.00872**
	(0.00267)	(0.00281)	(0.00355)
Inflation	-0.00154	0.00108	-0.0378**
	(0.0192)	(0.0202)	(0.0176)
CorporateTaxRate	-0.00179	-0.000454	-0.0160
	(0.0100)	(0.0102)	(0.0141)
risk	-0.0265**	-0.0190	-0.00357
	(0.0114)	(0.0117)	(0.0151)
GCF	0.0212	0.0225	0.0282
	(0.0138)	(0.0142)	(0.0178)
lnInfra	-0.420*	-0.485**	0.0101
	(0.221)	(0.228)	(0.321)
lnProd_host		0.441	1.454
		(0.669)	(1.099)
lnProd_home		1.399**	0.418
		(0.630)	(0.882)
lnULC_host*EM	-1.948***		
	(0.552)		
lnCompHour_host*EM		-0.0282	
		(0.533)	
lnMinWage_host*EM			-0.636
			(0.990)
Constant	-62.04***	-73.20***	-69.61***
	(16.96)	(18.64)	(22.34)
Observations	4,809	4,542	2,804
R-squared	0.098	0.102	0.129
Number of country pairs	787	733	447

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 6: Interaction effects between labor costs and human capital

Dependent variable: Bilateral FDI inflows (US dollar millions)

VARIABLES	(1) Unit labor costs	(2) compensation per hour	(3) Minimum Wage
lnULC_host	-0.957		
	(1.623)		
lnULC_home	0.424		
	(0.372)		
lnCompHour_host		1.330	
		(1.496)	
lnCompHour_home		0.941*	
		(0.545)	
lnMinWage_host			-1.428
			(1.591)
lnMinWage_home			1.365**
			(0.566)
lnGDP_host	0.406	0.496	0.252
	(0.314)	(0.334)	(0.393)
lnGDP_home	0.773***	0.536**	0.849***
	(0.232)	(0.253)	(0.269)
GDPgrowth	-0.0393***	-0.0271**	-0.0492***
	(0.0124)	(0.0133)	(0.0155)
lnLForce	2.346**	2.607***	1.845
	(0.927)	(0.964)	(1.203)
education	0.0309	0.122*	-0.0251
	(0.0739)	(0.0663)	(0.143)
TradeOpeness	0.00503*	0.00624**	0.00805**
	(0.00267)	(0.00281)	(0.00348)
Inflation	-0.000263	0.00560	-0.0385**
	(0.0193)	(0.0203)	(0.0176)
CorporateTaxRate	-0.00168	0.00135	-0.0143
	(0.0101)	(0.0102)	(0.0139)
risk	-0.0211*	-0.0168	-0.00371
	(0.0114)	(0.0116)	(0.0155)
GCF	0.0300**	0.0206	0.0276
	(0.0136)	(0.0142)	(0.0178)
lnInfra	-0.469**	-0.491**	0.0214
	(0.221)	(0.224)	(0.323)
lnProdHour_host		0.345	1.333
		(0.666)	(1.081)
lnProdHour_home		1.394**	0.405
		(0.630)	(0.882)
lnULC_host*education	-0.00356		
	(0.0164)		
lnCompHour_host*education		-0.0243*	
		(0.0147)	
lnMinWage_host*education			0.00301
			(0.0150)
Constant	-61.48***	-82.00***	-63.44***
	(17.94)	(19.35)	(23.78)
Observations	4,809	4,542	2,804
R-squared	0.095	0.102	0.129
Number of country pairs	787	733	447

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 6 illustrates the results of the regressions when we include the interaction effect between our labor costs variables and human capital. In this case, the interaction effect between labor compensation and education is significant and furthermore, it is negative. This means that in countries where human capital development is higher, in terms of the educational level of the labor force, labor compensation leads to a greater decrease in FDI inflows and the difference of this effect is displayed by the coefficient of the interaction term which is approximately -0.3. The non-significant effect of the interaction between education and minimum wages might occur from the fact that the current level of the real minimum wage in a country might reflect the current regulatory burdens in the domestic labor market as well as the current economic environment. In addition, the interaction term between unit labor costs and human capital is also statistically insignificant. This might be due to the correlation between human capital development and the denominator of labor productivity since the quality of human capital is already partially reflected through labor productivity.

4.2 Robustness Checks

In order to check the validity of our results, we conduct a number of robustness checks. Firstly, we tested our model for heteroskedasticity and serial correlation. The modified Wald test for heteroskedasticity and the Wooldridge test for serial correlation displayed P-values of 0.00 and 0.06 respectively. This means that our model suffers from heteroskedasticity and probably from serial correlation, too, since we have to reject the null hypothesis of both of these tests at 1% and 10% significance level respectively. Heteroskedastic and serially correlated errors can give us biased coefficients and thus distort their magnitude and therefore the interpretation of our results.

For this reason, as a first robustness test, we use robust standard errors clustered at the country-pair level. This way, we eliminate most of the heteroskedasticity and serial correlation in our model. Table 7 shows the results with robust clustered standard errors. As we can see, the results do not have significant differences with the results in table 4 although, labor compensation is not statistically significant in this case. Host country's unit labor costs and minimum wages have a negative and significant coefficient while the home country's minimum wages have a positive and significant coefficient. Most importantly, the coefficients of our variables have the same magnitude in both tables. The results with relative labor costs and robust standard errors can be found in table 7 in the appendix. However, the coefficients and their significance levels do not change compared to table 2. This is an indicator of the validity of our main specifications.

Table 7: Specification with robust standard errors clustered at the country-pair level

Dependent variable: Bilateral FDI inflows (US dollar millions)

VARIABLES	(1) Unit labor costs	(2) Compensation per hour	(3) Minimum Wage
lnULC_host	-1.291**		
	(0.588)		
lnULC_home	0.423		
	(0.473)		
lnCompHour_host		-0.955	
		(0.644)	
lnCompHour_home		0.935	
		(0.602)	
lnMinWage_host			-1.131*
			(0.640)
lnMinWage_home			1.366**
			(0.664)
lnGDP_host	0.412	0.497	0.247
	(0.324)	(0.355)	(0.427)
lnGDP_home	0.773***	0.532*	0.849***
	(0.267)	(0.284)	(0.295)
GDPgrowth	-0.0389***	-0.0270*	-0.0496***
	(0.0134)	(0.0145)	(0.0171)
education	0.0149**	0.0136*	0.00361
	(0.00700)	(0.00729)	(0.0118)
lnLForce	2.353**	2.695**	1.808
	(1.133)	(1.139)	(1.441)
GCF	0.0301**	0.0224	0.0275
	(0.0144)	(0.0152)	(0.0181)
risk	-0.0213	-0.0189	-0.00299
	(0.0131)	(0.0133)	(0.0171)
TradeOpeness	0.00501	0.00597*	0.00815**
	(0.00309)	(0.00316)	(0.00386)
Inflation	-0.000428	0.00112	-0.0385**
	(0.0221)	(0.0231)	(0.0191)
CorporateTaxRate	-0.00193	-0.000400	-0.0143
	(0.0121)	(0.0121)	(0.0161)
lnInfra	-0.467**	-0.487**	0.0134
	(0.231)	(0.234)	(0.356)
lnProdHour_host		0.437	1.323
		(0.707)	(1.178)
lnProdHour_home		1.399*	0.404
		(0.771)	(1.052)
Constant	-60.22***	-73.26***	-65.52**
	(19.62)	(20.69)	(26.03)
Observations	4,809	4,542	2,804
R-squared	0.095	0.102	0.129
Number of country pairs	787	733	447

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

As a second robustness check, we use an alternative variable for labor costs, hourly earnings in the manufacturing sector in both relative and individual host and home country values. As we can see in table 8, relative earnings per hour are negative and statistically significant at 5% level which means that if earnings per hour in the host country increase relative to home country's hourly earnings then, FDI inflows fall by 1.7%.

Table 8: Specification with earnings per hour as a labor cost measure

Dependent variable: Bilateral FDI inflows (US dollar millions)

	(1)	(2)
VARIABLES	Hourly earnings	Hourly earnings ratio
HourEarn_ratio	-1.068***	
	(0.339)	
lnHourlyEarnings_host		-0.347
		(0.536)
lnHourlyEarnings_home		1.601***
		(0.493)
lnGDP_host	0.584*	0.456
	(0.341)	(0.359)
lnGDP_home	0.745***	0.646**
	(0.274)	(0.285)
GDPgrowth	-0.0598***	-0.0567***
	(0.0149)	(0.0150)
education	0.0195***	0.0202***
	(0.00710)	(0.00712)
lnLForce	2.983***	2.973***
	(0.907)	(0.911)
GCF	0.0620***	0.0630***
	(0.0163)	(0.0163)
risk	-0.0206	-0.0194
	(0.0130)	(0.0131)
TradeOpeness	0.00503*	0.00487
	(0.00295)	(0.00296)
Inflation	-0.0186	-0.0187
	(0.0161)	(0.0162)
CorporateTaxRate	-0.0161	-0.0156
	(0.0103)	(0.0103)
lnInfra	-0.302	-0.191
	(0.238)	(0.247)
lnProdHour_host	1.292**	0.898
	(0.608)	(0.655)
lnProdHour_home	1.765***	1.548**
	(0.606)	(0.632)
Constant	-91.70***	-89.81***
	(16.80)	(17.35)
Observations	3,967	3,967
R-squared	0.134	0.134
Number of country pairs	632	632

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Furthermore, while the host country's hourly earnings do not have a significant coefficient, an increase in the home country's hourly earnings leads to an increase in FDI inflows from the home to the host country by 1.6% and this result is significant at 1% level. However, our data on bilateral FDI are displayed on an aggregate level while hourly earnings only refer to the manufacturing sector. Thus, there is the possibility that the results of this regression are not completely reliable. However, data on bilateral FDI on the sectoral level are not available which leaves a lot of space for future research.

Table 9: Specification with lagged value
Dependent variable: Bilateral FDI inflows (US dollar millions)

VARIABLES	(1) Unit Labor Costs	(2) Total Labor Costs	(3) Minimum Wage
lagGDP_host	0.196	0.259	0.0115
	(0.324)	(0.344)	(0.384)
lagGDP_home	1.263***	1.033***	1.070***
	(0.263)	(0.288)	(0.297)
lagULC_host	-0.939*		
	(0.561)		
lagULC_home	0.0392		
	(0.396)		
lagComp_host		-0.553	
		(0.632)	
lagComp_home		0.300	
		(0.589)	
lagMinWage_host			-0.0418
			(0.662)
lagMinWage_home			0.637
			(0.610)
lageducation	5.59e-05	-0.00587	-0.00722
	(0.00695)	(0.00732)	(0.0114)
lagOpeness	0.00438	0.00650**	0.0115***
	(0.00292)	(0.00306)	(0.00383)
lagGCF	0.0357**	0.0283*	0.0420**
	(0.0146)	(0.0153)	(0.0187)
laginfra	-0.205	-0.201	0.356
	(0.262)	(0.267)	(0.369)
lagLForce	2.515**	3.001***	1.449
	(1.050)	(1.093)	(1.236)
lagCorporateTax	0.00630	0.00626	-0.00242
	(0.0109)	(0.0110)	(0.0146)
lagInflation	-0.0136	-0.0245	-0.0567***
	(0.0190)	(0.0199)	(0.0169)
lagGrowth	-0.0260**	-0.0186	-0.0341**
	(0.0130)	(0.0140)	(0.0157)
lagrisk	-0.0149	-0.0101	-0.00304
	(0.0117)	(0.0119)	(0.0155)
lagProd_host		-0.443	-0.390
		(0.751)	(0.897)
lagProd_home		1.713**	1.394*
		(0.711)	(0.821)
Constant	-70.01***	-81.43***	-60.18**
	(19.27)	(21.17)	(23.61)
Observations	4,314	4,079	2,528
R-squared	0.066	0.071	0.096
Number of country pairs	787	733	447

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Finally, following Bevan et al. (2004), we conduct our last robustness check by using lagged values of all our independent variables since it is possible that multinational companies act with some lag to changes in factors that potentially affect their investment decisions. Furthermore, through this strategy, we aim at reducing endogeneity due to reverse causality between FDI and labor costs. Table 9 shows the results of the regressions with lagged values of the independent variables. Both host and home country's lagged values of labor costs have the expected negative and positive signs respectively. However, only the lagged value of host country's unit labor costs has a significant effect on the host country's FDI inflows.

5. Conclusion

This study has examined the effect that a country's cost of labor has on the attractiveness of FDI by using bilateral FDI inflows between 31 OECD countries for the period from 2003 to 2012. By making a thorough decomposition of labor costs and by estimating our model with different measures of labor costs, we are able to comprehend which components of labor costs matter the most for the investment decisions of multinational corporations. Unit labor costs are labor costs adjusted for productivity while total labor costs are measured by labor compensation per hour worked. Real minimum wages partially reflect the regulatory burdens in the domestic labor market. Our study uses these measures both in absolute and relative values.

The outcome of our research confirms our hypothesis that the cost of labor is a significant determinant of FDI inflows into the OECD countries. Our analysis shows that relative labor costs have a negative and significant effect on FDI inflows regardless of which measure is used. When the host and home country's labor costs enter the regression separately, there is an inverse and statistically significant relationship between FDI inflows and the host country's labor costs while this relationship is positive and significant for the home country's labor costs. All labor costs variables except from home country's unit labor costs are statistically significant. Hence, we could argue that multinational companies that engage in FDI activities are highly attracted by countries that can provide them with a low cost of labor but also, MNEs are affected by rising labor costs in their home country which motivates them to move part or their whole business abroad.

Furthermore, the study examines the effect of other variables that have been considered to be important FDI determinants. Evidence suggests that countries with higher GDP tend to engage more intensively in FDI. In addition, countries which can supply companies with more and better-educated employees attract more foreign investments. Also, trade openness is another significant

determinant of FDI. Surprisingly, the host country's market size is not a significant determinant of FDI for this sample and this specific period. Moreover, GDP growth and the quality of infrastructure display a negative and significant sign.

The second major objective of this study is to examine whether the impact of labor costs on FDI is stronger for emerging economies and countries with a well-educated labor force through the inclusion of interaction terms in our model. Our results show that the effect of labor costs is significantly stronger in emerging economies only in the specification with unit labor costs. However, in this case, the impact of unit labor costs on FDI is strongly dependent on whether the country is an emerging economy. Finally, the interaction term between labor costs and human capital development is significant only when we use total labor costs in which case it is also negative.

5.1 Policy Implications

The findings of this study support the argument that labor costs are a significant determinant of FDI flows. In comparison with other studies that investigate only the importance of the host country's labor costs, we provide evidence that FDI flows depend on both host and home country's labor costs. Hence, our research shows that a large portion of FDI flows between OECD countries is partially driven by the pursuit of multinational companies of low production costs and basically labor costs. These results have important economic and policy implications, primarily, for countries that try to attract FDI to boost their economic growth but also, for countries that see the domestic business activity shrinking because local businesses and multinational companies move to destinations with lower labor costs.

Under these circumstances, governments should try to maintain a competitive level of labor costs if they want to attract FDI but also if they want to provide incentives for multinational corporations not to move their activities abroad. According to the results of our study, MNEs are sensitive to all the types of labor costs that we have examined. However, unit labor costs and the level of minimum wages seem to have a greater impact on the investment activities of multinationals since labor compensation is a component of labor costs that can be affected by corporations more easily compared to unit labor costs and minimum wages that are strongly determined by labor productivity and the regulatory burdens of the labor market respectively.

However, suggesting that governments reduce labor costs through the reduction of wages or employers' social contributions for employees could be a bit of misleading and not very effective advice for both the society and the economy in the long term. First of all, reducing nominal or real wages would decrease people's wealth and therefore the quality of their life which might have

dangerous social repercussions. Furthermore, from an economic point of view, keeping labor costs at a relatively low level might attract FDI but in the long term, it can also have a negative impact on the economy. Reducing wages while prices remain stable or rise, leads to lower purchasing power for the consumers. Since a large portion of a country's economic size and growth depends on consumption and savings, a reduction in the purchasing power of the consumers will eventually lead to less savings and consumption and therefore to weaker economic growth in the long term. Hence, if governments want to attract more FDI but at the same time to maintain stability in the society and a stable level of domestic savings and consumption, they should focus on enhancing labor productivity which will essentially reduce unit labor costs. This policy advice is even more important for emerging economies since according to our results, unit labor costs have a greater effect on FDI for this group of countries.

In addition, since through our study we implicitly examine the impact on FDI of other factors, too, we are able to provide a more comprehensive set of suggestions for policymakers who try to find ways to make their countries more attractive to MNEs and international investors. Our results show that except labor costs there are also other factors that affect FDI flows to a country. More specifically, factors like trade openness, the quality of human capital or the capability of a country to supply MNEs with labor force play an important role as FDI determinants. Thus, as an alternative to keeping a competitive level of labor costs, policymakers in the OECD countries should promote policies that are friendly to international trade and enhance trading activities. In addition, governments should invest in the development of human capital by improving the educational level of the domestic workforce. Last but not least, it is important for a country to be able to provide an adequate amount of labor force. In fact, many countries, especially after the financial crisis, suffer from low supply of labor force either due to ageing population or due to the fact that a portion of the country's youth, which is often the most educated part of the labor force, move to countries with higher wages and better career opportunities. It is important for a country's economy that governments give incentives to young people to stay and work in their home country. This is in absolute connection with the level of labor costs in the domestic economy since an economic policy that consists of keeping labor costs low at a competitive level could lead to inverse results because that might drive the highly educated part of the country's labor force to move abroad and thus, MNEs that look for countries with well-educated employees will be deterred from investing in this economy.

Finally, the results of the interaction effects give some evidence that the effect that labor costs have on FDI inflows depends on the quality of the domestic human capital. This result suggests

that multinational corporations that engage in FDI activities are attracted by countries that can provide them with a combination of relatively low labor costs and a well-educated labor force. Thus, significant weight should be placed on the improvement of the educational level of a country's labor force as well as on policies and actions that will give incentives to young and more educated employees to keep working in their country and at the same time maintaining a competitive level of wages.

5.2 Limitations

This study suffers from some limitations that are critical to mention because they can affect our results but also the interpretation of them on a more aggregate level. The most important limitation that every study on bilateral FDI suffers from is that, when we transform our dependent variable in logarithms, we end up having a significant amount of missing values due to negative and zero values of bilateral FDI in our sample. From an econometric point of view, our model might suffer from selection bias. Thus, econometricians and researchers need to find ways that allow us to deal with negative and zero values of bilateral FDI flows. However, we believe that our results are robust and even though some of the values of our dependent variable are missing, we get important and comprehensive results.

Secondly, a comprehensive dataset on bilateral FDI is not available. The most completed dataset we are aware of is the one provided by the OECD and the UNCTAD but even these ones mostly cover the period after 2000. Data of earlier years have many missing values while for many countries like China or India the most recent data on bilateral FDI comes only after 2001. Furthermore, and in close connection with the lack of data on bilateral FDI, another important restriction for our study is the shortage of data on labor costs and especially unit labor costs which is the most commonly used and effective measure for the cost of labor. This variable is available only for the OECD member states. Moreover, the OECD database provides us with a number of alternative measures of labor costs which we used in our baseline specifications but also for robustness checks. So, the decision on which database for bilateral FDI to use and which countries to include in our study, was mainly made by taking into account for which countries we have data on both bilateral FDI inflows and unit labor costs. Although the UNCTAD provides data on bilateral FDI for a bigger amount of countries, the lack of data on unit labor costs essentially restricted us in using only the OECD countries.

The limited access in data for our dependent and our main explanatory variable has led us to confine the number of countries under examination and to exclude countries like China, India and more that one would say are important destinations for FDI and most importantly are considered

attractive due to the low domestic labor costs. Nonetheless, since the OECD countries make up for 65 % of global FDI flows we believe that our results can be useful also for countries that are not OECD members. In addition, we would like to point out the need for better cooperation by some countries as far as the availability of data is concerned even in databases of large institutions with great reputation like the World Bank. We are aware that some countries have not developed yet effective institutions and that makes the collection of data slower and less effective or that some others do not disclose information about their economy for strategic reasons. However, the provision of information and data would help researchers and economists to better understand the constantly changing global economy.

To summarize, we suggest that researchers investigate the effect of labor costs on bilateral FDI on a more aggregate level. However, this can only be done if financial institutions find a way to construct more comprehensive databases for both bilateral FDI and labor costs because there is still a lack of this kind of data for many countries. Moreover, our recommendation for econometricians is to discover an effective method that will enable future studies of bilateral FDI to include zero and negative values of FDI since, these observations that are often excluded from similar studies, have very important information to provide us with about the determinants of bilateral FDI flows. Finally, the impact of changes in labor costs on FDI probably varies among different sectors of the economy and depends on which factor is used more intensively during the production process. Hence, in order to get a more intimate understanding of the importance of labor costs as a determinant of FDI, it is important that future studies examine bilateral FDI and labor costs in different subsectors of the economy. However, more detailed and comprehensive datasets need to be constructed for sectoral studies since data on bilateral FDI exist only on an aggregate level.

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7. Appendix

Host countries: Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Japan, South Korea, Luxemburg, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, UK, USA.

Home countries: Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Israel, Japan, South Korea, Luxemburg, Netherlands, New Zealand, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, UK, USA.

Matrix of correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)	(24)
(1) lnFDI	1.000																							
(2) lnGDP_host	0.315	1.000																						
(3) lnGDP_home	0.375	0.009	1.000																					
(4) lnULC_host	-0.007	0.139	0.015	1.000																				
(5) lnULC_home	0.040	0.068	0.115	0.163	1.000																			
(6) lnCompHour_host	0.098	0.254	0.075	0.477	0.405	1.000																		
(7) lnCompHour_home	0.121	0.066	0.258	0.402	0.493	0.712	1.000																	
(8) lnMinWage_host	0.278	0.316	0.031	0.080	0.107	0.362	0.112	1.000																
(9) lnMinWage_home	0.438	0.078	0.260	0.061	0.052	0.091	0.265	0.012	1.000															
(10) lnAvWage_host	0.301	0.400	0.043	0.085	0.052	0.291	0.062	0.939	0.022	1.000														
(11) lnAvWage_home	0.488	0.072	0.417	0.024	0.019	0.054	0.219	0.012	0.906	0.022	1.000													
(12) lnHourlyEarnings_host	0.200	0.246	0.061	0.444	0.271	0.795	0.468	0.626	0.065	0.581	0.037	1.000												
(13) lnHourlyEarnings_home	0.298	0.070	0.268	0.258	0.454	0.461	0.775	0.079	0.545	0.048	0.514	0.294	1.000											
(14) lnLForce	0.195	0.924	-0.007	0.106	0.029	0.099	-0.002	-0.031	0.075	0.044	0.073	-0.020	0.028	1.000										
(15) lnInfra	0.190	0.433	0.027	-0.027	-0.050	0.059	-0.090	0.746	0.017	0.806	0.029	0.324	-0.047	0.178	1.000									
(16) GCF	-0.207	-0.143	-0.022	0.042	-0.178	-0.253	-0.185	-0.410	-0.021	-0.354	0.002	-0.411	-0.104	0.009	-0.178	1.000								
(17) risk	0.218	0.032	0.054	0.020	0.040	0.224	0.019	0.812	-0.004	0.806	0.007	0.536	0.010	-0.295	0.530	-0.433	1.000							
(18) GDPgrowth	-0.066	-0.172	-0.016	-0.348	-0.229	-0.434	-0.322	-0.299	-0.046	-0.254	-0.010	-0.467	-0.197	-0.067	-0.198	0.454	-0.229	1.000						
(19) education	0.147	0.046	0.011	0.040	0.088	0.128	0.038	0.559	-0.016	0.412	-0.013	0.180	0.041	-0.090	0.229	-0.127	0.372	-0.178	1.000					
(20) CorporateTaxRate	0.220	0.634	-0.018	-0.307	-0.004	0.083	-0.147	0.467	0.021	0.457	0.035	0.185	-0.075	0.522	0.490	-0.138	0.217	-0.155	0.366	1.000				
(21) Inflation	-0.117	-0.280	-0.024	-0.245	-0.026	-0.261	-0.041	-0.409	-0.038	-0.377	-0.034	-0.398	-0.022	-0.160	-0.302	0.295	-0.289	0.296	-0.194	-0.238	1.000			
(22) TradeOpeness	-0.031	-0.731	-0.004	-0.112	-0.010	0.012	0.081	0.139	-0.075	0.109	-0.086	0.102	0.018	-0.878	-0.107	-0.083	0.322	0.077	0.082	-0.483	0.147	1.000		
(23) lnProdHour_host	0.104	0.105	0.070	0.057	0.353	0.822	0.534	0.447	0.051	0.327	0.031	0.726	0.343	-0.079	0.106	-0.368	0.355	-0.269	0.194	0.172	-0.216	0.137	1.000	
(24) lnProdHour_home	0.134	0.056	0.106	0.324	0.146	0.520	0.778	0.059	0.365	0.029	0.256	0.342	0.663	0.012	-0.080	-0.104	-0.018	-0.165	0.015	-0.126	-0.013	0.055	0.378	1.000

Test Results

```
. xttest3

Modified Wald test for groupwise heteroskedasticity
in fixed effect regression model

H0: sigma(i)^2 = sigma^2 for all i

chi2 (787)  =   1.7e+05
Prob>chi2 =      0.0000
```

```
. xtserial lnFDI lnULC_host lnULC_home lnGDP_host lnGDP_home lnLForce lnInfra GCF risk GDPgrowth education CorporateTaxRate Infl
> ation TradeOpeness

Wooldridge test for autocorrelation in panel data
H0: no first order autocorrelation
    F(  1,     576) =      3.487
           Prob > F =      0.0623

.
```

```
. hausman fe re

                 ---- Coefficients ----
                 (b)          (B)            (b-B)     sqrt(diag(V_b-V_B))
                  fe           re          Difference          S.E.
-------------------------------------------------------------------------
  lnULC_host   -1.649404    -1.282896      -.3665085        .3781704
  lnULC_home    .1738905     .2032246      -.0293341        .2008337
  lnGDP_host    .8334867     .9490443      -.1155576        .1990684
  lnGDP_home    .9819251     .8484234       .1335016        .1923449
    lnLForce    2.277968    -.057615        2.335583        .8617782
     lnInfra   -.4017623    -.0616589      -.3401034        .1345838
         GCF     .030897     .0216646       .0092324        .0065454
        risk      -.02929     .010724       -.040014        .0079952
   GDPgrowth   -.0274995    -.027129       -.0003705        .0021567
   education    .0134575     .018228       -.0047704        .0046933
CorporateT~e   -.0028434    -.0130591       .0102157        .0051807
   Inflation   -.0093984    -.0180066       .0086082        .0044417
TradeOpeness    .0044086     .0115311      -.0071226        .0018508
-------------------------------------------------------------------------
                           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(13) = (b-B)'[(V_b-V_B)^(-1)](b-B)
                         =       42.66
              Prob>chi2 =      0.0001
              (V_b-V_B is not positive definite)
```

Table 7 Robust standard errors

VARIABLES	(1) Unit labor costs	(2) Compensation per hour	(3) Minimum Wage
ulc_ratio	-0.696**		
	(0.327)		
compensation_ratio		-0.914**	
		(0.446)	
MinWage_ratio			-0.559*
			(0.290)
lnGDP_host	0.236	0.459	0.313
	(0.304)	(0.328)	(0.409)
lnGDP_home	0.708***	0.532*	0.809***
	(0.261)	(0.272)	(0.293)
GDPgrowth	-0.0368***	-0.0265*	-0.0465***
	(0.0134)	(0.0144)	(0.0170)
education	0.0151**	0.0134*	0.00612
	(0.00694)	(0.00728)	(0.0116)
lnLForce	1.814*	2.757**	1.219
	(1.060)	(1.131)	(1.347)
GCF	0.0330**	0.0233	0.0315*
	(0.0141)	(0.0149)	(0.0178)
risk	-0.0181	-0.0193	-0.00648
	(0.0130)	(0.0134)	(0.0163)
TradeOpeness	0.00544*	0.00600*	0.00910**
	(0.00305)	(0.00316)	(0.00402)
Inflation	-0.00249	-0.000540	-0.0412**
	(0.0219)	(0.0228)	(0.0193)
CorporateTaxRate	-0.00350	-0.000612	-0.0165
	(0.0120)	(0.0121)	(0.0162)
lnInfra	-0.412*	-0.508**	-0.0970
	(0.231)	(0.234)	(0.353)
lnProdHour_host		0.395	0.154
		(0.675)	(0.863)
lnProdHour_home		1.379*	1.507*
		(0.737)	(0.871)
Constant	-48.92***	-71.99***	-53.09**
	(18.22)	(19.48)	(24.29)
Observations	4,809	4,542	2,804
R-squared	0.095	0.102	0.129
Number of country pairs	787	733	447