
# Determinants of Inward Foreign Direct Investment
# The Case of European Developing Economies

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## Abstract

Foreign Direct Investment (FDI) has been viewed in recent years as an important tool for economic development. This paper explores in detail the determinants of inward FDI from a set of developed source countries into European developing economies. The analysis starts with a conceptual framework, continues with a brief literature review and an overview of FDI in the region, and moves on to the econometric specification. A gravity model was chosen as the benchmark equation and was then built upon, to analyse the behaviour of the chosen variables for the developed economies included in the sample during 1992-2013. The main purpose of the research is to identify whether countries in the Balkan area: Bosnia and Herzegovina, Bulgaria, Croatia, Macedonia, Montenegro, Romania, Serbia, and Slovenia are affected by a location bias. Furthermore, the role of local technology levels is included as a determinant of inward FDI. Both hypotheses were found to be true, and the level of local technological advancement was found to overshadow the negative location bias.

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**Note**: Unless stated otherwise, all the graphs and tables contained within are the Author's representations of numbers and figures obtained from having granted access to multiple databases, all of which are cited in the last section of the paper.

**Keywords:** FDI, inward FDI, FDI determinants, transition economies, developing economies, Balkans, Europe, Technology

## Contents

## 1. Introduction

The existing literature on determinants of foreign direct investment (hereafter, FDI) can be regarded as being rather extensive. A simple query on any popular internet search-engine returns millions of results in a few milliseconds. However, we believe the topic has not been exhausted yet. FDI is a proxy for multinational firms'[1] activity, which has grown at an accelerated rate compared to other international transactions (Blonigen, 2005). At the same time, FDI has played an important role in the development of transition economies, especially in the Eastern and South-Eastern part of Europe, where the levels of foreign investment grew from virtually nothing in the period pre-1990s to billions of Euros worth today (UNCTAD, 2014). So, it can be argued that it is a mechanism which links economies and aids their growth (Kok and Ersoy, 2009). According to a recent report, developing economies have attracted even higher levels of FDI than in the past, reaching peaks of over $700 billion, and a global share of 56% (UNCTAD, 2015). A number of European economies have gone through a rapid systemic transition, starting with the late 1980s, from centrally planned economies which had strictly prohibitive capital inflows to a fully liberalised capital setting; a process that went hand-in-hand with the democratization of the region. Various experts argue that we have been experiencing a change in the determinants of FDI in developing countries due to the process of globalization and economic integration, making it insufficient to offer promising markets performance to induce the accumulation of inward FDI (Nunnenkamp, 2002; Kokko, 2002). In recent years, European developing economies have pursued numerous policies to attract investment and have increasingly liberalised local FDI regimes. FDI inflows are increasingly important through their contribution to trade integration, enhancement of competition and economic development (OECD, 2002). The dynamic and volatile past of the analysed countries and their increased interest into foreign investment make the developing economies of Europe an interesting study object.

The focus of this paper is to analyse determinants of FDI inflows into developing economies in South-Eastern, Eastern and Central Europe from a set of developed economies, predominantly from Europe, allowing for a better understanding of the forces

[1] For the remainder of the paper, the terms MNEs and MNCs will be used interchangeably, referring to - Multinational Enterprises and/or Multinational Corporations.

which have driven investments in the area in the past two decades. The purpose of the paper is twofold: firstly, it investigates whether inward FDI is systematically lower in the South-Eastern part of Europe as a result of a negative 'location bias' in the Balkan area; secondly, we analyse whether differences in nation-wide technology levels have a significant impact on inflows of FDI. We contribute to the existing literature in multiple ways: primarily, by setting up an index that can be used as a means of comparison for the technological levels of the countries in question, and then using it as a variable in our econometric specification in order to determine the impact of technology differences across countries on FDI inflows. Secondarily, we extend the research of Estrin and Uvalic (2013) who identified a negative location bias for FDI in the Balkan area, by analysing whether this bias is still worthy to take into consideration after including technological development as an explanatory variable. To put it differently, the research question this paper attempts to answer can be formulated in the following way:

*Is there a location bias for inflows of FDI into developing economies in the South-Eastern part of Europe and do country specific technology levels have a general positive significant effect on levels of inward FDI?*

A significant number of papers analyse determinants of FDI and some look at region-specific effects on FDI inflows, but there are very few published studies which look at how a country's level of technological knowledge impacts inward FDI. Therefore we would argue that theoretical and empirical curiosity is yet to be exhausted when it comes to these topics, especially in the context of developing economies.

The structure of the paper is as follows: the upcoming section presents a general discussion on the topic of foreign direct investment and then links it to the topic of technology advancement and democratization. The third section represents an in-depth literature review of studies which look at determinants of FDI. The fourth section offers a better understanding of the region in question through a case study type analysis of the region in question. The next part represents the econometric analysis and describes the data and methodology used before presenting and interpreting the results of our study. Finally, before a conclusion is drawn, the limitations of our research will are discussed in the sixth part of this paper and where possible, suggestions for improvement are addressed.

## 2. Foreign Direct Investment – A Conceptual Framework

The second section of the paper is designed to guide readers through the theoretical background of our study, allowing them to become familiar with concepts and definitions. In addition, the intertwining topics of foreign direct investment, technology and democratization will be discussed afterwards.

### 2.1. FDI – General Discussion

The earliest collection of comprehensive interpretations and definitions of Foreign Direct Investment can be found in the IMF's Fifth Edition of the Balance of Payments Manual (BPM5) (IMF, 1993) and OECD's Detailed Benchmark Definition of Foreign Direct Investment (BD3) (OECD, 1996). BPM5 regards FDI as an investment that *"…reflects the objective of a resident entity in one economy obtaining a lasting interest in an enterprise resident in another economy"* (BPM5, page 86). Similarly, OECD builds on this definition providing further explanations on the lasting interest of the investor, adding the fact that a certain significant degree of influence should be exerted on the management of the enterprise which received the investment. It is generally accepted, and also recommended by the two organisations that a threshold of 10 per cent of equity ownership is needed to qualify an investor as a foreign direct investor and allow for voting power and control. Perhaps one of the most important characteristics of FDI is being undertaken with the purpose to exercise influence over the strategic direction of an enterprise. This makes it different from portfolio investment which covers an extensive range of asset classes[2], but is a rather passive means of equity ownership made with an expectation of earning a return – directly correlated with investors' expected risk.

One of the oldest theories on why firms engage in multinational activity is Dunning's (1980) OLI paradigm. In his theoretical proposition, Dunning argues that firms look for ownership, location and internalisation advantages when engaging in cross-border investments. Ownership advantages are brought about by possessing a collection of assets which enables

[2] Examples of asset classes considered by portfolio investors include, but are not limited to: stocks, treasury bills, corporate and government bonds, real estate investments, exchange-traded funds, certificates of deposits, mutual funds, and others (Investopedia.com, 2015).

the firm to compete efficiently in the foreign market. Locational advantages should entice firms to operate in the local market rather than abroad; for example, these include lower transportation costs, access to a bigger potential market, favourable tax regimes, etc. (Wadhwa, 2011). Internalisation advantages are seen as the most important of the three strands. Ethier (1986, p.803) poetically states that internalisation seems to emerge as "the Caesar of the OLI triumvirate". The firms should be offered sufficient incentives to internalise production of products or services, rather than outsource it, such as lower transaction costs or lower chances of technology spillovers and imitation.

It is important to make a distinction between the different types of FDI that can be undertaken. Firstly, we distinguish between horizontal and vertical investments, which have distinctive benefits for the host country. Horizontal FDI is widely known as a market-seeking form of investment, where MNEs aim to replicate production and distribution facilities and operations on a foreign market (Dubovecky and Garoseanu, 2015). Derived from Dunning's (1980) OLI paradigm, market seeking investment targets local market penetration of host countries and is most often linked to per capita income, market size and potential market growth, access to regional markets or/and a certain type of consumers. Vertical FDI is carried out for efficiency-seeking purposes; it refers to the action of a MNE to offshore part of their production stage to another country in order to decrease global production costs. Dunning (1993) argues that efficiency-seeking FDI occurs especially in the case when firms are looking to exploit arbitrage opportunities arisen due to differences in the costs and availability of factor endowments, or to benefit from economies of scale and scope.

Secondly, FDI can be categorised depending on its direction into inward and outward investments. Inward FDI, also known as direct investment in the reporting economies, encompasses the total amount of assets and liabilities transferred between foreign investors and the resident enterprises, as well as between non-resident and resident organisations, provided that the ultimate controlling body is non-resident. Outward FDI, also known as direct investment abroad, encompasses the total amount of assets and liabilities transferred between resident investors and the foreign enterprises, as well as between non-resident and resident organisations, provided that the ultimate controlling body is resident (Worldbank, 2015). For the remainder of this paper, the terms 'inward FDI' will be used interchangeably with 'FDI inflows', and 'outward FDI' with 'FDI outflows' respectively.

The countries included in our study have previously gone through a gradual process of transition from closed socialist economies to open capitalist ones – something that Addison and Heshmati (2003), quoting Huntington (1993) referred to as a 'third wave of democratization' which started in the early 1980s and was accelerated in the following years due to the rapid spread of (information and communication technology) ICT. Following this brief general discussion on FDI, we believe it is essential to understand a couple of other characteristics of the area on which we are going to focus our econometric analysis. Therefore from a purely contextual perspective, the remainder of this section will focus on the relationship between FDI, the process of democratization and the role of technology.

### 2.2. FDI and Technology

There seems to be a wide consensus in the development economics literature that technological progress is essential to economic growth and national welfare, regardless of the local level of development, and considering the quick pace of technological change, it is essential for developing countries to try to close the gap between them and developed economies and make sure to stay on the path of development (UN, 2010). A simple way to do this is through attracting FDI inflows. The topic of technology and inward FDI has been researched extensively. Academics usually find a significant positive relationship between technological spillovers in the host countries and FDI levels (De Mello, 1999; Liu and Wang, 2002). But the causality of the relationship could be debatable. Gholami et al. (2003)[3] showed that it could go both ways: in developed economies, existing information and communication technology (ICT) infrastructure attracts FDI, whereas in the developing ones the causality appears to go from FDI to ICT.

From a different perspective, FDI could lead to technological change that is neutral to both labour and capital. A major FDI project can raise the level of technology in the host country not only through the project affecting local skills, enhancing learning, but also through a diffusion of knowledge concerning product and process design, organisational techniques, production methods and others (Campos and Kinoshita, 2002). Also, Driffield and Henry (2007) looked at the impact of inflows of foreign knowledge through trade and FDI on economic development in a group of 57 developing countries, over 28 years. Their

[3] Gholami et al. (2003) based their findings on results from the Granger causality test. The causality might change if a different sample is taken into account, however we find their results to be reliable.

research shows there is no homogeneity when it comes to the interaction between FDI and technology, but according to them, human capital is found to be an important variable for a limited group of countries. The ambiguity of results is one of the reasons that motivated us look into the relationship between a country's technological level and FDI.

To summarise, it is widely accepted that technology dissemination arises through the internalised channels of MNEs. FDI has assumed the form of sources of new technologies to the developing world, but the extent to which the valuable and new technologies are being transferred seems to differ significantly from one region to the other and from one country to the other (UNCTAD, 2007). This makes one wonder again about the causality of this relationship and whether the current technological level in a given country influences the inflows of FDI and subsequently the new transfer or diffusion of technology.

### 2.3. FDI and Democratization

Even though the focus of this paper is not the relationship between democracy and FDI per se, it is important to discuss it to allow for a better understanding of the sample of countries included in our analysis.

Samuel Huntington (1993) discusses in detail the phenomenon of transitions to democracy between 1974 and 1990. For the purpose of this essay we will not be commenting on concepts and definitions intrinsically related to democracy, but since we are looking into determinants of FDI, highlight the link between these and democratization. Addison and Heshmati (2003) argue that the process of democratization which spread briskly throughout Europe might have increased both the demand for foreign investment and its supply. This was done firstly by the emergence of new markets due to market reforms, such as privatisation, which created a favourable business climate for foreign investors. Secondly, the new economic policies, characterised by financial stability were drawn to encourage investment from abroad. Third, because of democratic oversight, the expropriation of assets has become less of an issue. This logic is also supported by Pandya (2014), who argues that as countries switch to democracy, they increase the limits of foreign ownership allowed, and that this change in investment opportunities is generated by the shift in policymaking incentives brought about by the process of democratization. Addison and Heshmati (2003) built an extensive econometric specification and used an unbalanced

panel data model to look at 72 countries for the period of 1970 to 1999, for a varying number of years depending on data availability. Their research shows that investors are increasingly taking into account whether or not a society is a democracy, one one hand because of the indications that well-functioning democratic countries pursue better policies and on the other hand because of an increasing trend towards social responsibility. Asiedu and Lien (2011) looked even further and concluded that the effect of democracy on FDI is dependent on the share of natural resources exported, democracy facilitating FDI where the ratio of natural resources to total exports is low. The Balkan, Central and Eastern European area is historically known to have low exports of natural resource, compared to Western European countries, due to the protectionist mentality installed because of the Soviet bloc's influence in the area, and later on by the European Union[4].

Knowing this, the question we are trying to address is how FDI inflow and its determinants changed in the European developing economies after this process of democratization ended. The fourth section of the paper will look at real-life evidence and contrast it to the concepts discussed in the second section by presenting a series of case-studies on our region of focus and a few representative countries.

## 3. Determinants of FDI – Literature Review

The topic of FDI inflows and its determinants has been extensively researched in the past. However, with the recent increase in MNEs activity backed up by globalisation and the rising importance of MNEs in national growth, the topic of FDI has been experiencing renewed interest from international economists. Chakrabarti (2001, p.113) blissfully describes this by stating that *"…the literature is not only extensive, but controversial as well"*. He further argues that this lack of consensus can be motivated by the diversity of sample sizes, variables used, and analytical tools applied. The purpose of this section is to try to paint the bigger picture by reviewing a number of empirical findings we consider to be in line with the focus of our paper

[4] This is still visible with European countries exporting 82.1% of its natural energy exports within Europe (WTO,2010). For more information see part B of the latest World Trade Report – Natural resources: definitions, trade patterns and globalization.

**3.1. Distance -** Spatial interdependence has been mostly ignored in past empirical studies of FDI determinants, and only more recent papers account for it in their econometric estimation. The first paper that used spatial econometric techniques to look at FDI behaviour was Coughlin and Segev (2000). The authors considered US FDI activity in Chinese provinces. Their results show that a particular region's FDI levels are correlated with those in the neighbouring ones, which could be attributed to agglomeration economies. Baltagi et al. (2005) develop a model to observe US MNEs activity across seven manufacturing industries in both developed and developing economies. Their findings showcase substantial evidence of spatial interactions, but they cannot conclude whether this occurs because of export-platform or vertical FDI activities.

On the grounds of these studies and other similar ones[5], it appears that spatial interactions are an important determinant of FDI inflows. In the geographical context of our sample, distance seems to be a simple and efficient way to include the dimension of space into the model. Given the fact that we are implicitly discussing the activity of multinational corporations, distance could also be seen as a proxy of transportation costs. Egger and Pfaffermayr (2004) introduced distance as a barrier to FDI and used a three-factor model to show that distance affects both exports and outward FDI in a rather non-trivial way. The negative impact of distance on exports could be, at least theoretically offset by increases in outward FDI. The authors do acknowledge that the overall effect could only be shown through empirical estimations. Bevan and Estrin (2004) refer to distance as the cost of undertaking foreign activities such as sending personnel abroad, transport, communications, dealing with cultural and legal differences or dealing with other institutional and legal factors such as property rights, regulations, and tax systems. Building on this, Estrin and Uvalic (2014) who looked at determinants of FDI into Europe's transition economies used distance to take into account the remoteness between host and partner countries, looking at it as representing an indicator of the cost of doing business across economies. In their estimated equations, distance has a pertinent significant and negative effect, which is what we also expect in our econometric specification. However, this will be discussed to a larger extent in the following parts of the paper.

[5] Other similar studies include, but are not limited to: Garretsen and Peeters (2009), Ng and Tuan (2006), Bode and Nunnenkamp (2012)

**3.2. Human Capital – Labour Costs and Education -** The locational theory implies that one of the main motivations for multinational enterprises to engage in foreign direct investment is the immobility of certain factors of productions such as labour. Furthermore, efficiency-seeking investment aims for securing lower unit labour costs of unskilled and skilled workers. Analysing labour costs together with education seems essential when looking at FDI determinants, therefore the large number of academics carefully catering to labour costs in their studies does not seem surprising.

On one hand, Bellak et al. (2008) analysed determinants of FDI in Central and Eastern European Countries (CEECs) using a panel-gravity model and focusing on labour costs. Their findings support the idea that high labour costs deter investment; but, they appear to have a relatively low magnitude compared to other determinants such as host market size and distance. Johnson (2006), when researching FDI inflows into transition economies in Eastern Europe, found a negative effect of wages on his chosen independent variable. The variable remains significant even at a 1% significance level. This simply confirms the efficiency-seeking motive for FDI into transition countries. A market supplying cheap labour provides a locational advantage for companies following labour-intensive production processes. As the argument goes – a host country providing strong locational advantages such as cheap labour costs, will encourage multinational firms to opt for local production and then export to meet global demand. In a European context, the low wages of developing economies are likely to attract investment from MNEs operating in countries with higher labour costs. This is one of the reasons our sample is formed of developing host countries and developed source ones. However, more on this will be discussed in the following parts of the paper.

Janicki and Wunnava (2004), take the research related to labour costs one step further and argue that one should take into account the type of investment undertaken. Wages are regularly dependent on the competition within a certain industry and a country's unemployment level. Hence, MNEs relying on labour-specific activities will most likely invest in countries with high unemployment since they offer a lucrative pool of labour to be used for production.

On the other hand, improving levels of education are essential for attracting and absorbing higher levels of FDI (Blomstrom and Kokko, 2002). It could be easily argued that

the role of secondary and primary education in the activity of MNEs and FDI is insignificant, having larger effects on the demand side. FDI inflows bring about employment opportunities to students enrolled in, or graduated from, tertiary education, The education level of human capital in host countries is usually assessed prior to engaging in FDI projects in order to ensure their successful implementation. Noorbakhsh et al.'s (2001) empirical analysis found that the coefficient of tertiary education is significant at a 1% confidence level and positive. Results were similar for other academics[6].

Throughout academic literature, there is a consensus on the positive effect of tertiary education on inward and outward FDI. Even though significance levels differ due to the diversity of the samples analysed. A good level of education increases FDI and helps in grasping economies of scale and scope which leads to higher efficiency and subsequently to lower marginal costs, and in turn to the possibility of gaining higher market shares (Bhavan, Xu and Zhong, 2011; Hejazi, 2009).

**3.3. Trade Openness -** Aizenman and Noy (2006) argued that even though it is reasonable to expect links between FDI and the level of trade in a certain country, whether one can find a different effect depending on industries or countries in different stages of development is rather ambiguous. Their paper focused on the interaction between trade and foreign direct investment and also investigated possible intertemporal effects. In addition to finding an overall positive effect between the two, the authors decomposed goods trade into four industries, namely fuel, foods, and manufacturing. Interestingly, for developing countries they found that trade openness and FDI are positively correlated in the foods and manufacturing sectors, but negatively correlated in the fuel sectors. Overall, for developing countries they found a significant positive effect in the goods and incomes industries, and a negative but insignificant effect in the services industry. Weaker, positive results were obtained for their sample of developed countries. Furthermore, Liargovas and Skandalis (2012) argued that developing economies which are more open to trade are more likely to attract FDI inflows. Theoretically, trade openness is highly important for developing and transition countries since it can boost the economy and increase production, for example by importing raw materials from developed nations and exporting primary products to others. However, Adhikary's (2010) results show a significant negative, yet

[6] See Egger (2004), Shatz (2010), Martinez et al., (2012)

diminishing effect – which contradicts their theoretical suppositions but is in line with previous older studies of Renelt (1992) and Krugman (1994) that trace a negative or insignificant negative relationship between trade openness and economic growth. Finally, Asiedu (2002) reviewed various determinants of foreign direct investment into developing countries and concluded that when it comes to trade openness, is common for researchers to find a positive effect[7] on FDI.

**3.4. Exchange Rate and EU Membership-** The importance of exchange rate movements and national currency performance on determining FDI inflows has been reiterated in the academic literature over the years[8], especially ever since the Economic and Monetary Union, has proved to play an important part in attracting FDI in the developing countries of the European Union (Petroulas, 2006). A devaluation of the home country's currency compared to the one of the host country, or to put it differently an appreciation of the spot exchange rate, has the potential to reduce production costs and increase the relative equity of foreign investors, ultimately leading to increases in FDI inflows. Conversely, a depreciation of the exchange rate, nonetheless can have inverted effects on inward foreign direct investment (Xing and Wan, 2006). This is also supported by Goldberg (2009) who argues that real depreciation of the currency in the source country are associated with reduced investment in the host economy. However, her study on the relationship between foreign exchange rate movements and foreign investment in the context of UK, US, Canada and Japan shows weak results when it comes to the significance of the exchange rate variable. This might occur due to the fact that the sample consists of highly developed economies from which MNEs can hedge the risk of exchange rate movements by investing in less developed ones and taking advantage of various arbitrage opportunities. Furthermore, Chen, et al. (2006) have modelled the FDI decision of market and cost-oriented firms from a theoretical perspective using Dixit's (1989) real options framework, and then assessed it empirically showing that overall, exchange rate uncertainty has a significant negative effect on a firm's outward FDI and implicitly on the inward FDI received by the host country, regardless of whether the MNE is considered market-oriented or cost-oriented.

[7] Asiedu's (2002) arguments are based on studies carried out by Edwards(1990), Gastanaga
, et al. (1998), Hausmann and Fernandez-Arias(2000). However, Martens (2008), Ang (2008), Buthe and Milner (2008), and others find similar results.

[8] See Froot and Stein (1991), Klein and Rosenger (1994), Blonigen (1997) for older studies on the relationship between exchange rate and FDI inflows

Secondly, as we previously hinted, the affiliation to a politico-economic union seems to have positive effects on the amount of investment received by a member state. Perhaps one of the best explanatory studies - Globerman et al. (2004), looked into the determinants of inward FDI for 20 European transition economies over 6 years. A critical point in their analysis was examining the prospects of future EU membership on foreign direct investment. Their methodology was simplistic – splitting their sample into countries which were accepted in the EU prior and after a certain date. Their hypothesis referred to the existence of a so-called "halo effect" brought about by *de jure* standards of governance promoted by the EU. Moreover, they split their sample into countries which were part of former communist regimes, and the ones that were not; and also considered geographic position and previous connections with other socio-economic trade unions[9]. It appears that the future EU membership coefficient is positive and significant for former communist countries, whilst it exhibits insignificant effects on non-communist transition economies. Besides this, countries that were part of previous trade unions experience the strongest effect of EU membership on FDI inflows and outflows. Their study is supported by other similar ones such as Alguacil et al. (2008) who find that the process of EU enlargement promoted a significant positive effect on inward FDI during the 1990s, especially new EU accession countries.

## 4. FDI activity into Central and South-Eastern Europe

Having previously discussed the theoretical determinants explored by academics in the past, the next step in our analysis is to allow for a better understanding of the sample used in our study before the upcoming econometric analysis. In order to do so, this section will cover an overview of the FDI activity in Central and South-Eastern Europe throughout our data span of 22 years (1992 to 2013). First, an overview of the FDI inflows into transition and developing economies will be presented; then, inward FDI will be explored by region, countries and industries.

[9] More specifically – the Central Europe Free Trade Association (CEFTA)

## 4.1. Main Features of FDI inflows into European Transition and Developing Economies (1992-2013)

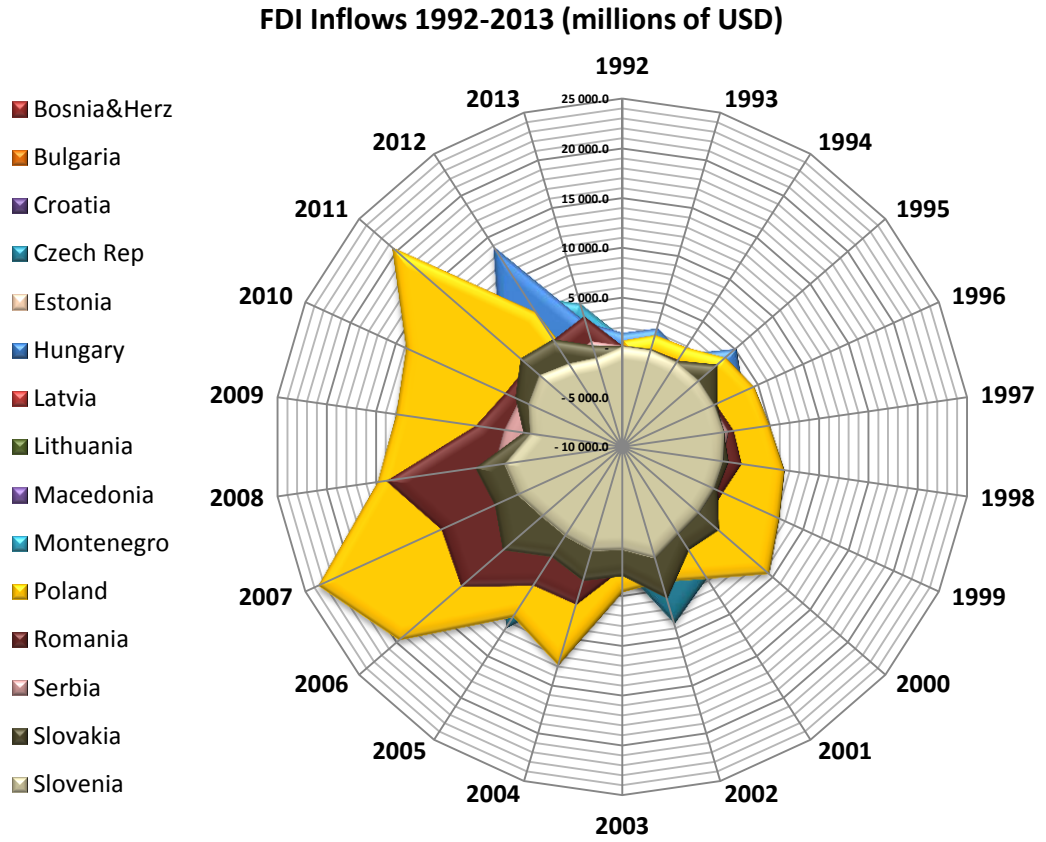


Fig.4.1.0

Data source: Vienna Institute for International Economic Studies (WIIW, 2015)

It has been argued in the previous sections that FDI inflows potentially provide advantages to transition and developing economies, but the logic behind the distribution of the FDI inflows amongst developing economies seems ambiguous at an initial screening[10] (Fig. 4.1.0). From a historic perspective, until the mid-1990s the South-Eastern and Central European Economies have attracted modest amounts of FDI, most likely because of the political instability in the region. Countries were transitioning from being closed economies to opening borders and actively encouraging foreign investment through various policies. At the beginning of the 1990s, Asia and the Pacific were the leading recipients of FDI of all the clusters of developing economies. For investors, a rapidly expanding South-East and East Asia compensated for the sluggish growth of Western developed economies. UNCTAD's (1992) World Investment Report announces total investments of over $9 billion into the

[10] See Appendix 1 for a similar figure with inverted axis for a different representation.

region, with Hungary and Romania becoming the largest host countries with regards to the number of registered joint-ventures and fully-owned foreign enterprises (see Appendix 2 for more details). A possible plausible reason for 'kickstarting' the FDI in the region could be the access to new domestic markets. Companies from manufacturing industries such as automobiles could have considered developing Central European Economies such as Hungary, Poland and Czechoslovakia (later separating into Czech Republic and Slovakia) as a connection between Western and Eastern Europe, establishing production in the area to supply the entire European Market (UNCTAD, 1992).

The beginning of 1995 marked the ending of a freshly renewed attractiveness of developed countries that impacted FDI inflow levels negatively in previous years. The restored success of the region lies in growing markets and favourable *'regulatory frameworks coupled with the general trend for firms to invest abroad in order to remain competitive internationally'*(UNCTAD, 1995, p.23). By now, analysts regarded the region to be split into three main categories: the Visegrad countries (Czech Republic, Hungary and Poland) which accounted for about 69% of the region's FDI stock, the 'next-tier' countries (Bulgaria, Estonia, Romnania) accounting for about 29% of the stock, and the negligible others (Albania, Latvia, Lithuania) (UNCTAD, 1995).

The 2000s started an upsurge of FDI inflows due to improving political and socio-economic conditions (Estrin, 2014). By this date, the European Union established itself as an institution committed to improvement, and it's upcoming 2004 enlargement stage had already been confirmed (European Commission, 2014).This might be one of the reasons one can observe steep increases in FDI inflows into Central European Economies such as Poland, Lithuania and Hungary. This 'halo effect' of the EU membership can also be seen for Romania which becomes a favourite destination amongst Europe's developing economies until 2007. The onset of the US credit crunch and subsequently the Eurozone Crisis had a large negative impact on investment volumes into Europe. A sharp decrease in inward FDI can be observed in Fig. 4.1.0 in the case of Poland and Hungary, whilst Romania and Slovakia continued to attract significant volumes, but only for a short period of time. After this massive divestment, it appears that investors' confidence was restored in the early 2010s by the better performing countries of Hungary and Poland, whilst Romania's rapid economic growth promoted an apparent prosperity of the Balkan area.

### 4.2. Overview of FDI Inflows (1992-2013)

The Balkans and the Central and East European Countries (CEEC) follow similar patterns of FDI inflows over the time-span taken into account. As shown in Fig. 4.2.0, a 2-period moving average shows a similar trend for the two regions, with a noticeable trough in 2003 for the CEEC. This is compensated by a more aggressive increase in 2007 prior to the Eurozone crisis. Investors' confidence in the Balkan area has gradually increased over the years and culminated with higher FDI inflows in 2008, compared to the CEEC.

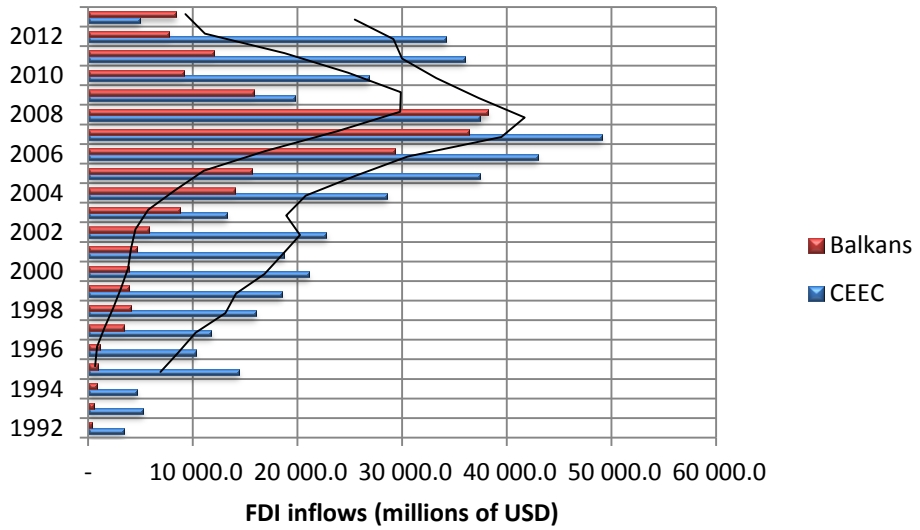


Fig. 4.2.0

Data Source: Vienna Institute of International Economics (WIIW, 2015)

The drastic decrease in inward FDI in 2009 affected both regions, but the CEEC seems to have recovered faster to levels similar to the ones prior the Eurozone crisis until 2012, when data suggests the Balkans were seen as a better investment choice.

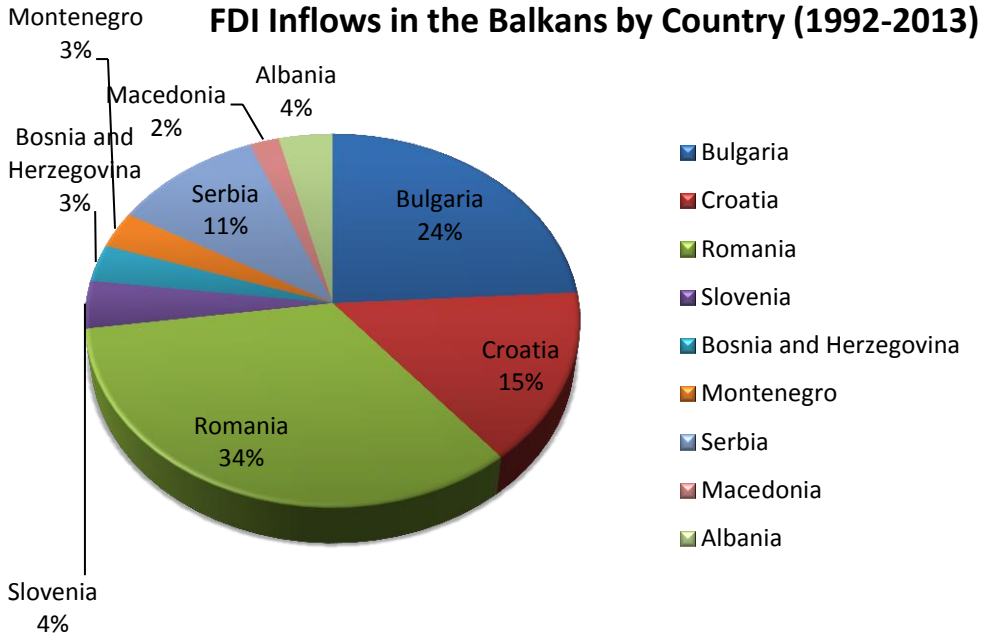


Fig. 4.2.1

Data Source: Vienna Institute of International Economics (WIIW, 2015)

The volume of FDI by country over the analysed time-span in the Balkans was relatively uneven, with Romania attracting over one third of the total FDI inflows, followed by Bulgaria which was lagging behind by 10 per cent, and Croatia – by another 9 per cent (Fig. 4.2.1). Serbia had attracted about 4 per cent less than the 3rd most attractive country, and 23 per cent less than investors' top choice. The rest of the transition economies situated in the Balkan area have attracted modest levels of investment of less than 5 per cent each. This could have happened due to exposure to relatively small domestic markets and political unrest in the region. According to Estrin and Uvalic (2014), in 2000 the top 3 investment destinations in the Balkans attracted more than 80 per cent in the total inward FDI stock in the South-East region with similar percentages describing FDI inflows. In comparison, Bosnia and Herzegovina had started being considered a viable investment opportunity only after the end of the Bosnian war. FDI inflows were only 66.7 mil. USD in 1998 and 331 mil. USD in 2013 (UNCTAD, 2015).

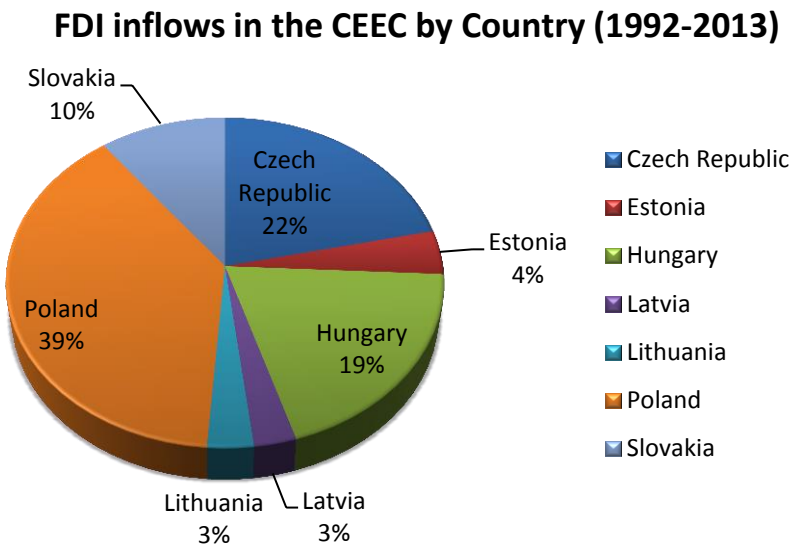


Fig. 4.2.2

Data Source: Vienna Institute of International Economics (WIIW, 2015)

The distribution of FDI inflows is similar for the remainder of our sample. Poland has attracted over one third of the total volume, followed by Czech Republic and Hungary each receiving about one fourth of the total inward FDI. Even though we are now looking at countries getting higher absolute levels of investment, the FDI shares are similar to those in the Balkan area: the top 3 investment recipients receive about 80 per cent of the total inflows. Poland has been considered a world-leader for FDI inflows with industries such as automotive manufacturing, food processing and pharmaceuticals attracting high volumes of foreign investment (fdipolandawards.pl, 2015). We expect the distribution to change slightly in the favour of the Baltic countries - Estonia, Lithuania, and Latvia after recently joining the Eurozone.

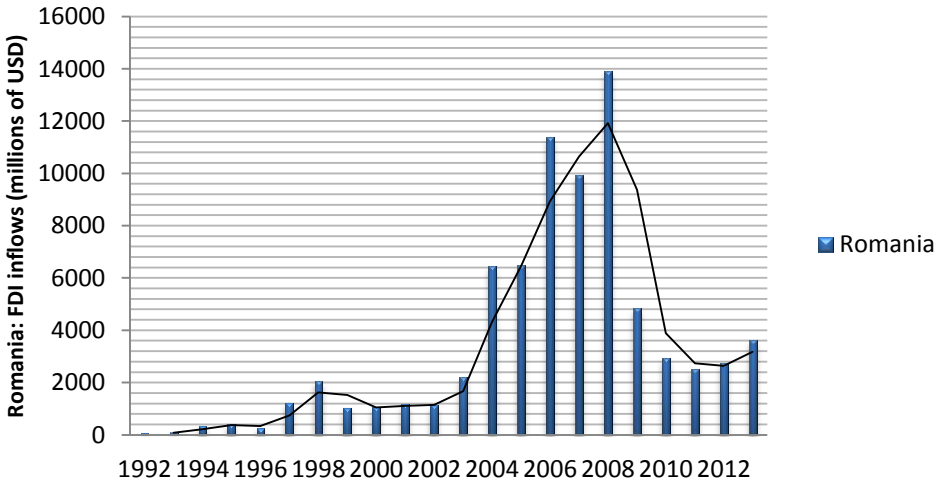


Fig. 4.3.0

Data Source: Vienna Institute of International Economics (WIIW, 2015)

From receiving only modest values after its change of political regimes in the late 1989s, Romania has gradually become a top investment choice in South-Eastern Europe, constantly being engaged in a catching-up process with other Central-European economies. The low levels of FDI inflow at the beginning of the 1990s could be an effect of an unsatisfactory macroeconomic performance which negatively affected the onset of fundamental macroeconomic reforms needed after becoming an open economy (Estrin and Uvalic, 2013). Even though FDI stock per capita is low compared to neighbouring countries – reported as only 35% of that of CEEC in 2006, the net FDI inflows sharply increased after 2004 to the point where it exceeded inflows recorded in most of the countries that were part of the 'EU-enlargement' process ending in 2004 (Pauwels and Ionita, 2008). Interestingly, the pattern of FDI inflows into Romania is similar to Bulgaria and Croatia, the the 2nd and 3rd most attractive economies in the area, but the targeted industries benefit differently (see Appendix 3). If 2008 represented a grim year for global FDI inflows, Romania benefited from increased levels. It is most likely that investors considered the heavy austerity measures adopted during the Eurozone crisis, such as a sudden increase of 5% in the VAT, to be appropriate for the local economic climate. As it turned out, Romania became one of the fastest growing European economies in 2013, with a GDP growth of around 3.5 per cent (Hunya, 2014), therefore we expect the upward trend in FDI inflows which started from mid-2010 to continue.

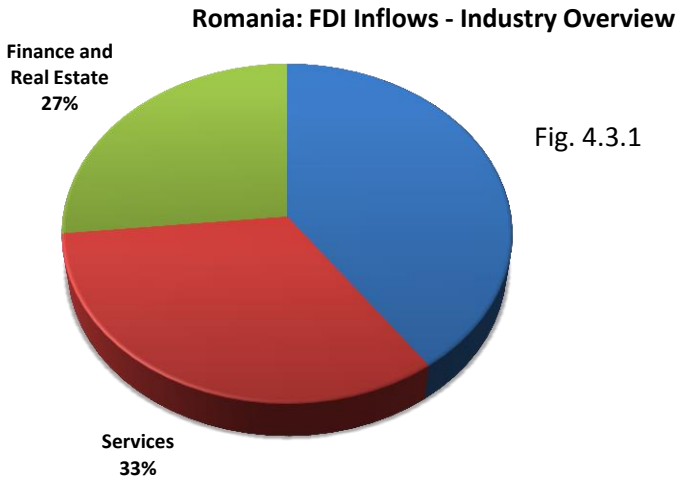


Fig. 4.3.1

Data Source: Vienna Institute of International Economics (WIIW, 2015)

Historically, the manufacturing sector attracted most of the FDI inflows into Romania (Fig. 4.3.1). However, it appears that the sectoral composition is changing. Investors are switching from the exploitation of low-cost advantages of developing countries' manufacturing industries towards value-added production, encompassing the growing domestic market. This can be seen through the relatively high (and increasing) share of

services, finance and real estate as a destination for FDI inflows – which amounts to a total of 60% of total inward FDI.

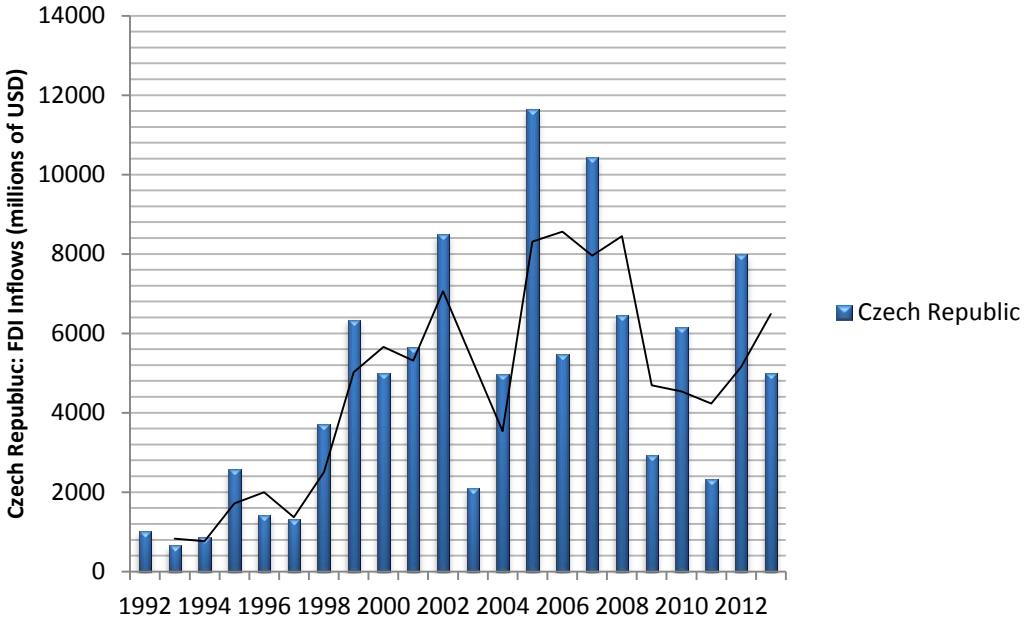


Fig. 4.3.2

Data Source: Vienna Institute of International Economics (WIIW, 2015)

Similar to other CEEC and Balkan countries, the Czech Republic went through a privatisation programme to attract foreign investors to the local market (Kay, 2007). Being one of the earliest in the region, it helped the country to gain competitive advantage and become one of the fastest growing European economies in the mid-1990s. The large amount of inward FDI developed an economic climate suitable for opening up small business which boosted economic growth even further. However, the recession of 1996 led to rising costs of wages and increased inflation and subsequently to lower FDI levels (Kay, 2007). In 2003, China overtook the US as the largest recipient of FDI which signalled a growing interest for foreign investors in East and South-East Asian developing economies. OECD countries were drastically affected, with inward FDI decreasing by about 28% in a single year. The Czech Republic

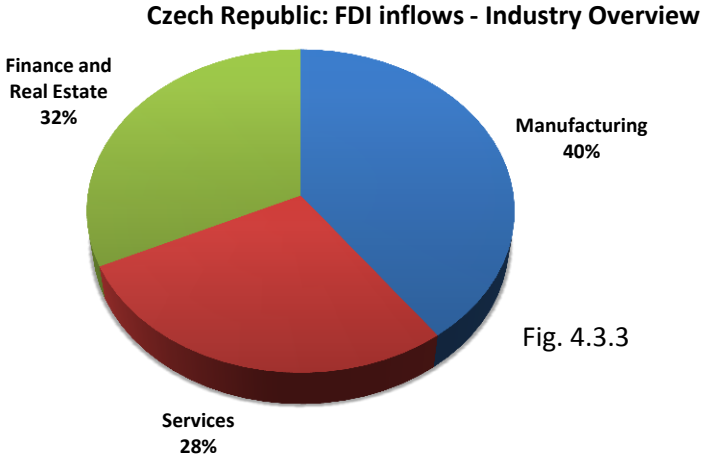


Fig. 4.3.3

Data Source: Vienna Institute of International Economics (WIIW, 2015)

was negatively impacted by a concerning 70% from 2002 to 2003 (OECD, 2004). After 2003, local macroeconomic stability attracted even higher inflows of investment, culminating with over 11.5 bn. USD in 2005. The volatility of the inward FDI levels could be attributed on one hand to foreign enterprises outperforming domestic counterparts and domestic firms, and on the other hand to increasing competition from South-Eastern European economies such as Romania.

The sectoral overview is similar to that of the Romanian economy, with the manufacturing industry attracting most of the foreign investment flows, being followed up closely by the financial and real estate sector. A significant fragment of FDI inflows is concentrated in the field of automotive manufacturing and components. But the services sector is expected to gain a significant share of future inflows with more investment being directed to high-technology and R&D sectors (Czechinvest, 2013).

## 5. Hypotheses

Having presented so far a conceptual framework, literature review and the foreign direct investment activity in the two regions we considered for our study, namely Central and East European Countries and South-East European Countries; the following part will focus on discussing the main aims of this paper by presenting a couple of main hypotheses which will then be tested using standard econometric methods. Taking into account previous literature, this paper firstly contributes by extending the sample used by Estrin and Uvalic (2013 and 2014) by two extra years whilst using different determinants for FDI inflows, and looking into whether a country's geographic position has a significant effect on inward FDI. Hence, our first hypothesis is formulated as follows:

**$H_0$***: Geographic position has no significant effect on the inflows of Foreign Direct Investment into developing countries in Europe.*

**$H_1$***: Geographic position has a significant effect on the inflows of Foreign Direct Investment into developing countries in Europe.*

Secondly, we add to the existing literature by creating a personalised technology index[11] and ranking the countries in the sample accordingly. We then move on to test whether our technology variable has a significant effect on inward FDI. Therefore, our second hypothesis is formulated as follows:

**$H_0$**: *The level of technology in a country has no significant effect on the inflows of Foreign Direct Investment into developing countries in Europe.*

**$H_1$:** *The level of technology in a country has a significant effect on the inflows of Foreign Direct Investment into developing countries in Europe.*

In order to test whether the null-hypotheses are to be rejected or not, the following sections will present the data, methodology and results of our research.

## 6. Data and Methodology

As mentioned in the previous parts of the paper, FDI inflows were found to be influenced by a large number of variables. We are aware it would be unrealistic to expect our model to fully explain the phenomenon of inward foreign direct investment; as it should be for any other related model, given the complexity of the topic. This section presents the data used for the empirical investigation on geographic position and local technology levels on the inflows of FDI. We will firstly talk about the different sources of data used for the purpose of this analysis and then present the variables employed in the econometric specification, then summarize their conception where needed, and state our expectations regarding their effect on the dependent variable.

The majority of the variables included in the econometric specification were set up using data from the Vienna Institute for International Economic Studies (WIIW, 2015) and the World Bank Dataset was used as a secondary source (Worldbank.org, 2015). A couple of dummy variables were created according to previous literature to aid us into the analysis of

[11] The procedure of setting up the index, the technologies considered and the results of the index will be presented in a following section.

our hypotheses. Finally, we have created our own technological index to serve for the same purpose.

The main aim of the model is to test whether geographic position and local levels of technology impact the flows of foreign direct investment into a country. As advocated by Moore (2011), a significance level of 5 per cent will be used as a threshold for the previously stated hypotheses. However, throughout the analysis, other control variables will also be considered significant at a level smaller or equal to 10 per cent.

The observations collected are used under the form of a panel dataset. We are looking at FDI inflows from a sample of 12 developed source[12] economies into 15 developing host[13] economies over a period of 22 years (1992-2013). A panel regression can be expressed using the following equation:

$$\boldsymbol{y_{it} = a + \beta x_{it} + \epsilon_{it}}$$

Where $y_{it}$ stands for the dependent variable, and $x_{it}$for the independent and control variables used in the different regressions generated. It is important to highlight that $\epsilon_{it}$ is assumed to vary non-randomly (non-stochastically) over 'i' and 't' (over the different countries and years). The quantities observed as explanatory variables are treated as if variables are non-random (Verbeek, 2012).

Following the work of Estrin and Uvalic (2013, 2014) and Bevan and Estrin (2004), the first model employs a simplistic regression as follows:

$$\boldsymbol{LOGiFDI_{i,j,t} = \alpha + \beta 1 * LOGgdp_{\,i,t}1 + \beta 2 * LOGgdp_{\,j,t}1 + \beta 3 * LOGdistance + \epsilon}$$

Where:

$LOGiFDI_{i,j,t}$*: The natural logarithm of Foreign Direct Investment inflows from source country 'j' to host country 'i' in a given year as measured in millions of EUR*

$LOGgdp_{\,i,t}1$*: The one-period lagged value of the host country's natural logarithmic Gross Domestic Product value in a given year as measured in millions of EUR*

[12] The source economies sample is constituted from 10 European developed economies, the US and the 'EU15' countries (referring to the 15 Members States as of 31st of December 2013).

[13] Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Macedonia, Montenegro, Poland, Romania, Serbia, Slovakia, Slovenia

$LOGgdp_{j,t}1$*: The one-period lagged value of the source country's natural logarithmic Gross Domestic Product value in a given year as measured in millions of EUR*

*LOGdistance: The natural logarithm of the distance between the capital cities of the host and source countries, as measured in km.*

We used a log-log model for a clear interpretation, which will be given as an expected percentage change in $\mathrm{LOGiFDI_{i,j,t}}$ when the dependent variables change. The upcoming analysis is based around the gravity model firstly developed by Linnemann (1966) which attempts to explain trade flows between two countries, based on characteristics that are considered to be the main determining factors explaining FDI direction. The basic idea behind this type of model is that larger economies should have larger FDI flows and volumes should be increased by the proximity of the host to the source country (Janicki and Wunnava, 2004). Therefore, we expect $\mathrm{LOGgdp_{i,t}1}$ and $\mathrm{LOGgdp_{j,t}1}$ to have a positive effect on $\mathrm{LOGiFDI_{i,j,t}}$, and *LOGdistance* to have a negative impact on the dependent variable. We included the lagged value of the two types of countries' GDPs considering that investors' need time to observe macroeconomic performance and decide whether it is optimal to invest in a certain country or not.

The second regression takes into account the host countries' performance and cost of labour by adding to extra variables:

$$\boldsymbol{LOGiFDI_{i,j,t} = \alpha + \beta 1 * LOGgdp_{i,t}1 + \beta 2 * LOGgdp_{j,t}1 + \beta 3 * LOGdistance + \beta 4 * LOGdgdp_i + \beta 5 * LOGulc_i 1 + \epsilon}$$

Where:

$LOGdgdp_i$*: The natural logarithm of the host countries' change in Gross Domestic Product year-on-year*

$LOGulc_i 1$*: The one-period lagged value of average monthly gross wages measured at the real effective exchange rate at the base value of 2005 (2005 = 100)*

In accordance with past literature (Bellak et al., 2008; Johnson, 2006), we expect LOGulc1 to be negatively related to $\mathrm{LOGiFDI_{i,j,t}}$. Since companies are looking to minimise costs, an increase in local wages should lead to a decrease in FDI inflows. However, we have no expectation for the effect of $\mathrm{LOGdgdp_i}$. An increase in a country's GDP could on one hand signal the expansion of local markets or the increase in local customers' incomes, but also an increase in wages which according to academic literature (Johnson (2006); Bellak et al.

(2008), Bevan and Estrin (2004), Estrin and Uvalic (2014)) has a negative impact on $\mathrm{LOGiFDI}_{i,j,t}$.

The third model adds to the existing one the effect of exchange rates against the Euro, and investigates the impact of trade openness. Furthermore, it looks at the relationship between tertiary education and inward FDI:

$$\boldsymbol{LOGiFDI_{i,j,t} = \alpha + \beta 1 * LOGgdp_{i,t}1 + \beta 2 * LOGgdp_{j,t}1 + \beta 3 * LOGdistance + \beta 4 * LOGdgdp_i + \beta 5 * LOGulc_i 1 + \beta 6 * LOGtrade_{i,t}1 + \beta 7 * exchange_{i,j,t} + \beta 8 * education_{i,t} + \epsilon}$$

Where:

$LOGtrade_{i,t}1$*: The one-period lagged value of the natural logarithm of total exports and imports as a percentage of GDP*

$exchange_{i,j,t}$*: The year-on-year spot exchange rate expressed as the local National Currency Unit (NCU) over Euro (NCU/EUR)*

$education_{i,t}$*: The gross enrolment ratio, total enrollment in tertiary education regardless of age, expressed as a percentage of the total population of the five-year age group*

We expect exchange rate to be positively related to $\mathrm{LOGiFDI}_{i,j,t}$, the closer the parity to the Euro, the easier it would be to invest in the foreign developing economy, the smaller the investors' exchange rate exposure. Education should have similar effects on $\mathrm{LOGiFDI}_{i,j,t}$, the higher the number of people enrolled into tertiary education – the greater the number of skilled and highly skilled workers available. We are unsure about the overall effect of trade openness. Previous literature usually identified a positive effect on FDI inflows; however, under a European context and considering the fact that the developing economies we took into account are rather small, a higher level of trade openness could be translated into fewer opportunities for investors.

The fourth regression adds two dummy variables to help investigate one of our hypothesis:

$$\boldsymbol{LOGiFDI_{i,j,t} = \alpha + \beta 1 * LOGgdp_{i,t}1 + \beta 2 * LOGgdp_{j,t}1 + \beta 3 * LOGdistance + \beta 4 * LOGdgdp_i + \beta 5 * LOGulc_i 1 + \beta 6 * LOGtrade_{i,t}1 + \beta 7 * exchange_{i,j,t} + \beta 8 * education_{i,t} + \beta 9 * EU + \beta 10 * BLK + \epsilon}$$

Where:

*EU: A dummy variable taking the value of 1 starting with the year when a certain country in the sample acceded to the European Union. Do note that it does not reflect the announcement of a country regarding its future membership, but the total length of that country's membership.*

*BLK: A dummy variable taking the value of 1 if a country is part of South-Eastern Europe[14], 0 otherwise.*

Our expectations are in line with regards to EU affiliation, and we anticipate a positive effect on $\mathrm{LOGiFDI_{i,j,t}}$. This is in line with most of the academic research concerning either the announcement of future accession to the European Union, or membership. The effect of geographic position will be analysed through our Balkan dummy. Similar to Estrin and Uvalic (2013,2014), Bevan and Estrin (2004), Brada , et al.(2006) and Mateev (2009), we expect BLK to be negatively related to $\mathrm{LOGiFDI_{i,j,t}}$. Even though we showed in the fourth section of this paper that some Balkan countries such as Romania have started receiving an increasing volume of FDI, we believe the overall effect to be negative and similar to the one we expect from LOGdistance, since most of the developed source countries are situated in the Western part of Europe, and the Balkan countries are clustered in the South-East.

The fifth and final model helps us analyse our second hypothesis and adds two extra variables which are strictly related to the level of technology in a given country:

$$\begin{aligned} \boldsymbol{LOGiFDI_{i,j,t}} = {} & \boldsymbol{\alpha + \beta 1 * LOGgdp_{\,i,t}1 + \beta 2 * LOGgdp_{\,j,t}1 + \beta 3 * LOGdistance + \beta 4} \\ & \boldsymbol{* LOGdgdp_i + \beta 5 * LOGulc_i 1 + \beta 6 * LOGtrade_{i,t}1 + \beta 7} \\ & \boldsymbol{* exchange_{i,j,t} + \beta 8 * education_{i,t} + \beta 9 * EU + \beta 10 * BLK + \beta 11} \\ & \boldsymbol{* LOGhightechexp_i 1 + \beta 12 * TECH + \epsilon} \end{aligned}$$

Where:

$LOGhightechexp_i 1$*: The one-period lagged value of high-technology exports - products with high R&D intensity (aerospace components, computers, electrical machinery, pharmaceutics, and scientific instruments)*

A similar approach was followed by other academics, but from a reversed-causality perspective: Prasanna (2010) and Turen and Gökmen (2013) found a positive relationship

[14] The Balkan countries we considered are: Bosnia-Herzegovina, Bulgaria, Croatia, Macedonia, Montenegro, Romania, Serbia and Slovenia. We decided to remove Albania from the sample due to lack of data availability.

between high technology exports and FDI. Along the same lines, we expect the $LOGhightechexp_i1$ variable to be positively related to $\mathrm{LOGiFDI_{i,j,t}}$ since technology-related MNEs are increasingly targeting European countries as recipients for FDI due to higher availability of highly skilled workers.

*TECH: Technological Index. The value calculated for each country over a period of 50 years.*

The technological index was calculated using information from the CHAT [cross-country historical adoption of technology] database - put together by Comin and Hobijn (2009). CHAT is an *"unbalanced panel dataset with information on the adoption of over 100 technologies in more than 150 countries since 1800"* (Comin and Hobijn, 2009, p.2).

We decided to follow a slightly different approach from that of Lebesmuehlbacher (2014) who calculated technology diffusion with respect to years, using the US as a benchmark country. Nowadays technology diffusion is unavoidable and is highly dependent on the availability of capital, so using years to measure technology levels seemed to be superficial idea.

Given the fact that we are looking at developing economies in Europe, we used the United Kingdom as a benchmark country and looked at certain technologies which we considered relevant for FDI activity in the region. The index assigns each country a value from 0 to 1 (1 being the highest) which makes it easier to rank the economies for informative purpose, and then use in the final model of the econometric specification. The CHAT database is an unbalanced panel which has a lot of missing data, especially for the host countries we considered in our analysis. Therefore, we averaged figures on a total of 14 technologies, namely: the number of harvesters, tractors, milking machines, personal cars, commercial vehicles, telephones, cellphones, tv sets, computers, internet subscriptions, rail-ton-km freight, air passengers, air cargo, and percentage of literate inhabitants. All of them had been adjusted accordingly depending on country size and population. The averages were then divided in turn with the ones calculated for the UK, as shown in the following formula:

$$\boldsymbol{TECH_{\bar{\imath}} = \sum_{i=1}^{n} \frac{\left( tech_{i,j} \div tech_{i,UK} \right)}{n}}$$

Where i = technologies taken into account, j= countries included in the sample, n = number of technologies considered. The countries were ranked as shown in Table 6.1.0.

United Kingdom was considered the benchmark of the index. Albania was later excluded from the sample due to insufficient data concerning the rest of the variables included in the previously mentioned models. We also lacked information for Serbia and Montenegro on the chosen technologies, therefore coming up with a different reliable estimate could have been considered an attempt at data manipulation, therefore they will be automatically disregarded when running the final regression. We do not expect this to influence the direction and magnitude of the result in any way, since the two countries are on a similar technological level as their neighbouring economies, and there are still enough observations available for the results to be considered valid.

We expect the TECH variable to be positively related to LOGiFDI. A more advanced country from a technological perspective could assimilate investments faster and cheaper.

Table 6.1.0

| **Country** | TECH |
|---|---|
| **Albania** | 0.116288 |
| **Bosnia-Herzegovina** | 0.113436 |
| **Bulgaria** | 0.416369 |
| **Croatia** | 0.388061 |
| **Czech Republic** | 0.755166 |
| **Estonia** | 0.7964 |
| **Hungary** | 0.651454 |
| **Latvia** | 0.577438 |
| **Lithuania** | 0.569352 |
| **Macedonia** | 0.225692 |
| **Montenegro** | N/A |
| **Poland** | 0.724774 |
| **Romania** | 0.500352 |
| **Serbia** | N/A |
| **Slovak Republic** | 0.535081 |
| **Slovenia** | 0.894953 |
| **United Kingdom** | 1 |

## 6.1. Descriptive Statistics

Before interpreting the results of the models presented in this section, a preliminary inspection of the data is presented via a set of descriptive statistics of all the variables used in the econometric specifications. Table 6.1.1 shows the descriptive statistics of the full dataset created for the purpose of this paper. Apart from $GDP_j$, which is the only measure reflecting a characteristic of the source countries – the initiators of FDI, the rest of the variables describe activity in the host countries. It is rather difficult to distinguish a relationship between the variables just from looking at the descriptive statistics. The sample we have chosen can be characterised as being, by all means, diverse, with levels of FDI

inflows, and GDP varying by billions of EUR. The negative minimum value of iFDI reflects the heavy divestment undertaken after the recent economic crisis in developing countries that were considered to be economically unstable such as Bosnia and Herzegovina, or Montenegro. The 'Distance' dimension's maximum value of almost eight thousand kilometres is shown due to the fact that the distance between the United States and host

| Variable | Mean | Max. | Min. | Std.Dev. | Obs. |
|---|---|---|---|---|---|
| **iFDI (mil. EUR)** | 316.876 | 18408.9 | -3657.667 | 1246.02 | 4526 |
| **$GDP_i$ (mil. EUR)** | 5518.861 | 18800 | 400 | 4266.253 | 4620 |
| **$GDP_j$ (mil. EUR)** | 35091.6 | 100898.4 | 2268.4 | 18301.47 | 3630 |
| **Distance (km)** | 2046.948 | 7986 | 79 | 1608.931 | 4620 |
| **dGDP (%)** | 0.07315 | 1 | -0.966 | 0.233 | 4358 |
| **ULC (index 2005=100)** | 94.25 | 160.9 | 44.95 | 29.21 | 4274 |
| **Trade (%)** | 100.96 | 181.4 | 23.2 | 30.16 | 4256 |
| **Exchange (NCU/EUR)** | 31.3 | 508.1 | 0 | 72.19 | 4480 |
| **Education (%)** | 44.6 | 88.46 | 9.932 | 19.57 | 3850 |
| **HighTech Exp (mil. EUR)** | 2168.6 | 23365.83 | 4.15 | 4465.85 | 3864 |

Table 6.1.1

economies was also taken into account. The biggest percentagewise difference from the maximum and minimum value can be observed in the case of tertiary education. But it is important to remind that the data spans over 22 years. The 9.9% gross enrolment ratio is found in Romania in 1992, while the 88.46% one represents Slovenia's tertiary education level in 2010. In terms of absolute values, the biggest difference can be spotted for high tech exports. Lithuania's 1992 technology exports of 4 million in 1992 could hardly be compared to Czech Republic's 2.3 billion in 2011. Having said that, it is now safe to assume the complexity of determining FDI inflows is further exacerbated by the diversity of our sample and the relatively long time span we have chosen.

### 6.2. Preliminary Tests

Before running the aforementioned regressions and interpreting their results, it is common practice to investigate whether the variables included in the analysis are

stationary. If they are found to be non-stationary, then what it shows up as a statistically significant coefficient can turn out to be spurious, and no inference should be drawn from spurious regressions (Hill et al., 2011). The most commonly used methods include taking the first difference, or/and the natural logarithm of the non-stationary variables and then repeat the test for their first differences (Garoseanu and Lamens, 2014). Due to economic interpretation, the natural logarithm has been taken for most of the variables and we do not expect any stationary issues to affect the model. However, to be certain of this, all the variables were tested using an Augmented Dickey Fuller (ADF) test. For the variables which did not contain a natural logarithm or a first difference, the test was carried out at a normal level. The null of the test is usually rejected when the p-value is less than or equal to the specified significance level. For example, the critical value for the ADF is +/-2.86% given a 5% confidence level (Cheung and Lai, 1995). Since the test statistics are much lower than the chosen critical value, we can reject the hypothesis that our time series has a unit root (Table 6.2.0)

| Variable | T-stat. | P-value | Observations | Stationarity |
|---|---|---|---|---|
| $\mathbf{LOGgdp_{i,t}1}$ | 1350.16 | 0.0000 | 2566 | Yes |
| $\mathbf{LOGgdp_{j,t}1}$ | 1692.32 | 0.0000 | 2618 | Yes |
| **LOGdistance** | 67.70 | 0.0123 | 4312 | Yes |
| $\mathbf{LOGdgdp_i}$ | 79.63 | 0.0002 | 3482 | Yes |
| $\mathbf{LOGtrade_{i,t}1}$ | 1518.52 | 0.0000 | 3683 | Yes |
| $\mathbf{LOGulc_i1}$ | 1665.30 | 0.0000 | 3881 | Yes |
| $\mathbf{exchange_{i,j,t}}$ | 122.995 | 0.0000 | 4378 | Yes |
| $\mathbf{education_{i,t}}$ | 466.45 | 0.0000 | 3048 | Yes |
| $\mathbf{LOGhightechexp_i1}$ | 1598.23 | 0.0000 | 3002 | Yes |

Table 6.2.0

The second test we carried out before running the regressions is the Durbin-Wu-Hausmann Test to test the exogeneity assumption in our panel data model. To put it in other words – the null hypothesis of the test indicates that a random-effects model is appropriate, while the alternative suggests that a fixed-effects one should be chosen. If the p-value of the Hausmann test is significant, a fixed effects model should be used (Verbeek et al., 2012). The highly significant p-value clearly shows that a fixed-effect model is appropriate.

| Test Summary | Chi-Sq. | Chi-Sq. d.f. | P-value |
|---|---|---|---|
| Cross-Section RANDOM | 34.987 | 12 | 0.0005 |

Table 6.2.1

| CORRELATION | BLK | EU | $exchange_{i,j,t}$ | $education_{i,t}$ | $LOGdgdp_i$ | LOGdistance | $LOGgdp_{i,t}1$ | $LOGgdp_{j,t}1$ | $LOGhightechexp_i1$ | $LOGtrade_{i,t}1$ | $LOGulc_i1$ | TECH |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **BLK** | 1 | | | | | | | | | | | |
| **EU** | -0.244285 | 1 | | | | | | | | | | |
| **$exchange_{i,j,t}$** | -0.191772 | -0.007281 | 1 | | | | | | | | | |
| **$education_{i,t}$** | 0.023955 | -0.047185 | 0.003975 | 1 | | | | | | | | |
| **$LOGdgdp_i$** | -0.071546 | -0.21225 | -0.161292 | -0.027418 | 1 | | | | | | | |
| **LOGdistance** | 0.005645 | 0.008711 | -0.115665 | -0.003218 | 0.081969 | 1 | | | | | | |
| **$LOGgdp_{i,t}1$** | 0.050515 | 0.029812 | -0.033718 | -0.004012 | -0.04714 | -0.285366 | 1 | | | | | |
| **$LOGgdp_{j,t}1$** | 0.014811 | 0.000977 | -0.009232 | 0.00144 | -0.003065 | 0.034386 | -0.014041 | 1 | | | | |
| **$LOGhightechexp_i1$** | -0.033005 | 0.049052 | 0.124156 | -0.009898 | -0.061225 | -0.230769 | 0.567599 | -0.002691 | 1 | | | |
| **$LOGtrade_{i,t}1$** | -0.007294 | 0.017653 | 0.003619 | 0.118597 | -0.017734 | 0.019992 | -0.011985 | -0.013252 | 0.003326 | 1 | | |
| **$LOGulc_i1$** | 0.005 | 0.021145 | -0.013081 | 0.169942 | -0.010076 | 0.045231 | -0.045185 | -0.009432 | 0.014144 | 0.356412 | 1 | |
| **TECH** | -0.486769 | 0.226483 | 0.039007 | 0.013276 | -0.026098 | -0.038718 | 0.050015 | -0.003818 | 0.030676 | 0.018007 | 0.02557 | 1 |

Table 6.2.3

The correlation coefficients between the independent variables are reported in Table 6.2.3. The correlation analysis is satisfying, with no multicollinearity issues detected. Collinearity is a serious issue when one model is used with data from a certain sample and time span, and then replicated with different data from another sample (Dormann et al., 2013). The TECH variable is correlated to a certain degree with the BLK dummy, as we expected prior to the analysis and more on the relationship between the two will be discussed in the next section of the paper. It can also be argued that some sort of correlation can be observed between the TECH and EU variables, which could occur due to technological spillovers in the region; and between technology-intensive exports (LOGhightechexp1) and local gross domestic product (LOGgdp$_i$1) which seems natural since GDP is dependent on exports. Trade openness appears to be correlated labour cost, but we believe this is due to the fact that a higher level of exports and imports is related to increased demand for labour.

None of the correlation coefficients are high enough to be considered an impediment to running the previously mentioned regressions, since it is generally agreed that a correlation coefficient below 0.7 does not affect the estimation and predictive power of a model (Dormann et al., 2013, p.3). Futhermore, a visual inspection of the data based on a scatterplot, boxplot and histogram of the residuals against time shows an overall low level of autocorrelation and non-heteroskedastic, normally distributed residuals (Appendix 4). Having taken all these into account, the next part of the paper will present and discuss the results of the empirical analysis.

## 7. Results

| Variable | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| C | 7.872*** | 7.579*** | 7.231*** | 7.244*** | 5.394*** |
| | (0.586) | (0.756) | (0.849) | (0.831) | (0.864) |
| $LOGgdp_{i,t}1$ | 1.689*** | 1.545*** | 1.654*** | 1.609*** | 0.794** |
| | (0.313) | (0.358) | (0.370) | (0.361) | (0.479) |
| $LOGgdp_{j,t}1$ | 0.681*** | 0.662*** | 0.654*** | 0.638*** | 0.627*** |
| | (0.061) | (0.071) | (0.076) | (0.074) | (0.072) |
| LOGdistance | -0.649*** | -0.658*** | -0.628*** | -0.621*** | -0.581*** |
| | (0.078) | (0.090) | (0.099) | (0.096) | (0.097) |
| $LOGdgdp_i$ | | -0.185 | -0.209 | -0.311*** | -0.041 |
| | | (0.127) | (0.139) | (0.137) | (0.141) |
| $LOGulc_i1$ | | -0.084 | 0.101 | -0.208 | -0.816 |
| | | (0.475) | (0.817) | (0.795) | (0.812) |
| $LOGtrade_{i,t}1$ | | | -0.665* | -0.657* | -0.759** |
| | | | (0.384) | (0.373) | (0.393) |
| $exchange_{i,j,t}$ | | | 0.002* | 0.001 | 0.002** |
| | | | (0.001) | (0.001) | (0.001) |
| $education_{i,t}$ | | | 0.003 | 0.005 | 0.003 |
| | | | (0.004) | (0.003) | (0.004) |
| EU | | | | 0.154 | -0.601** |
| | | | | (0.245) | (0.280) |
| BLK | | | | -0.995*** | 0.072 |
| | | | | (0.173) | (0.207) |
| $LOGhightechexp_i1$ | | | | | 0.338*** |
| | | | | | (0.111) |
| TECH | | | | | 3.961*** |
| | | | | | (0.567) |
| $R_2$ | 0.168 | 0.179 | 0.203 | 0.247 | 0.288 |
| Observations | 1626 | 1142 | 943 | 943 | 846 |
| Cross-Sections | (21) | (20) | (20) | (20) | (20) |

Notes:

Table 7.0

1. First number in each column represents the coefficients of the variables.
2. The second number represents the standard error of the variables.
3. *** indicates a significance of 1 per cent; ** 5 per cent; * 10 per cent.
4. All regressions consider time and country fixed-effects.

As mentioned throughout the paper, the purpose of this analysis is to identify the effect of geographic position on FDI inflows and to check whether existing technological levels impact volumes of inward FDI. On account of this, five models were tested, starting with a simplistic gravity equation and building it up to a rather complex econometric specification which gave some insights that contribute to the existing literature. Table 7.0

contains all the relevant results. The constants of the five specifications will not be discussed since economic theory suggests on viable economic inference could be drawn looking at their values ceteris paribus (Hill et al. 2011). The econometric analysis starts with a log-log relationship and aims to maintain it as much as possible. . Taking the base log of a value means that in a regression setting means that one may conclude that a marginal percentage change in total services corresponds to a percentage change in GDP (Garoseanu and Lamens, 2015). However, as the complexity of the model increases we switched to a log-linear relationship, in line with the work of other academics (Estrin and Uvalic, 2013, 2014; Bevan and Estrin (2004); Brouwer et al., (2008)).

The first model, derived from Tinbergen's (1962) gravity equation shows that distance (**LOGdistance**) is negatively correlated with $\mathbf{LOGiFDI_{i,j,t}}$, meaning a 1% increase in the distance between the capital cities of the host and source countries leads to a decrease of approximately 0.65% in the value of FDI inflows. Interestingly, the effect oscillates only by a maximum of 0.07% as the complexity of the specification increases. The result is in line with our expectations and might be due to the fact that distance increases the costs of management and control in the case of MNEs (Ross, 2015). Macroeconomic performance of both countries ($\mathbf{LOGgdp_{i,t}1}$ and $\mathbf{LOGgdp_{j,t}1}$) has a positive effect on the volume of FDI inflows into the recipient economy. Throughout the models, the effect of a 1% change in the gross domestic product of the source country impacts the volume of FDI inflows on average by approximately 0.64%. In the case of the host country's GDP, the effect becomes less important as more control and independent variables are added, and the first model reveals an impact of around 1.7% on inward FDI for a 1% change in national output. The significance of the three initial variables is maintained at a 5% and even 1% level as the model becomes more complex, confirming the robustness of the analysis.

The second model adds the host countries' year-on-year change in gross domestic product and unit labour cost to the analysis. The relationship between the change in GDP ($\mathbf{LOGdgdp_i}$) and $\mathbf{LOGiFDI_{i,j,t}}$ is negative, but is not significant at a level of 10% or lower. The negative relationship is not striking; Brecher and Alejandro's (1977) theoretical research of the concept of immiserizing growth suggested similar results could be found, and Iqbal et al. (2012, p. 860) argued that foreign capital inflows could lower growth by earning *'excessive profits in the country with severe trade distortion such as high tariff'.* The

negative, yet insignificant, relationship between labour costs($\mathbf{LOGulc_i 1}$) and FDI inflows reinforces one of the arguments we listed in the previous sections regarding the investors' increasing shift towards value-added production and not necessarily towards an exploitation of cheap labour (see Section 4.3)

The third specification takes into account three extra variables, contributing to the complexity of the final model. Trade openness was analysed by looking at the one-period lagged value of the total value of exports and imports as a percentage of GDP. We were unsure about the effect of trade openness on the inflows of FDI since our sample consists of small and medium European developing economies. Our analysis revealed the fact that in this context, there is a significant negative relationship between $\mathbf{LOGtrade_{i,t}1}$ and $\mathbf{LOGiFDI_{i,j,t}}$, a 1% increase in a country's trade openness leading to a decrease of 0.66% in the value of FDI inflows. Adhikary (2010) had similar results in the context of developing economies, reasoning that this is due to negative trade balance positions generated by high imports and depreciating exchange rates. We add to this by arguing that, given the fundamental characteristics of our sample, a high degree of trade openness could signal a loss of opportunities to be exploited by foreign investors. Exchange rate ($\mathbf{exchange_{i,j,t}}$) was added as the national currency unit's parity against the EURO, since we are looking at countries highly dependent on the Eurozone. Since we are looking at absolute values, and not logarithmic ones any longer, the relationship between the two, ceteris paribus, can no longer be expressed in percentages (Hill et al., 2011). Our results show that the closer the local currency unit is to the value of the Euro, the more attractive it is to invest in the respective country. A marginal decrease in the yearly spot exchange rate is associated with an increase of 0.2% in the value of FDI inflows. Next, the percentage of students going into tertiary education is taken into account ($\mathbf{education_{i,t}}$). In this particular case, the relationship between the independent and dependent variable is insignificant at our at our chosen significance levels, positive and relatively small. However, the direction of the relationship is in line with our expectations and previous academic research.

The fourth specification adds two dummy variables to the existing model. The **EU** variable refers to the years starting from which countries were officially made members of the European Union. Previous research mostly analyses the effect of an accession announcement on inward FDI, and our expectations were similar to those of previous

academics – a positive significant relationship between FDI inflows and the EU dummy. Despite this, the relationship between the two was found to be insignificant. Perhaps this might be because of our different methodology – the dummy variable getting a value of 1 only starting from the year in which they became official members. The variable does become significant in the final specification, but it does change direction, impacting LOGiFDI with a negative 0.6%. The result is not necessarily shocking given the characteristics of the sample. Developing economies in the European Union have experienced a steep decrease in absolute levels of FDI inflows after the economic crisis, reflecting investors' dangling confidence. The other dummy variable of the equation – **BLK** proves our first hypothesis and answers the first part of our research question. There is a *highly* significant relationship between a country's geographic position and volumes of FDI inflows. In this case, whether the economy is located in the Balkan area or outside it made a huge difference; Balkan countries being more likely to receive less FDI. This could occur for a number of reasons, such as less attractive assets in the region, weaker institutional arrangements (Estrin and Uvalic, 2014), smaller domestic markets, or as it will be shown later on – lower technological levels. The results for this particular variable change when technology is taken into account (i.e. final specification). We believe this ensues due to the fact that Balkan countries show lower technological values, and subsequently lower scores in the TECH index, with most of the countries which were assigned a BLK dummy showing scores lower than, or around 0.5 (Table 6.1.0).

The fifth and final equation adds the effect of technology in the model through two extra variables. The level of high-tech exports ($\mathbf{LOGhightechexp_i1}$) has a significant positive effect on FDI inflows: a 1% change in the value of high-tech exports leads to an increase of 0.3% in the value of FDI inflows. The result is in line with our previous expectations. Technology plays an increasing role for local development and subsequently for attracting higher FDI inflows as developing economies evolve from traditional to highly technologized processes in manufacturing industries; or as they shift to a greater extent to service, financial and real-estate sectors. A higher level of high-tech exports could send out a positive signal to investors that future commitments will be successfully carried out. The last variable considered in this analysis – the local level of technological advancement (**TECH**), alongside the inclusion of high-tech exports as a determinant of FDI inflows, marks

our personal contribution to the existing literature. The TECH variable is highly significant and has a positive effect on $\mathbf{LOGiFDI_{i,j,t}}$ – a marginal increase of 0.1 in the value of the TECH index leads to an increase of almost 4% in the value of FDI inflows. This answers the second part of our research question and confirms our second hypothesis. The level of technological advancement in a country does have a significant and positive effect on the inflow of FDI in developing economies in Europe. FDI is an important channel of technology transfer and diffusion into developing countries, yet as we have shown throughout this paper not all developing countries attract similar FDI levels. Judging by our results, it could be argued that the level of technological advancement in a given country could be one of the reasons why this happens.

## 8. Conclusions

It was clear from the beginning that analysing a complex subject of international economics such as FDI requires more than looking at a limited set of variables. It could be argued that the R-squared value is relatively low, but is similar to previous studies conducted by academics (Estrin and Uvalic, (2013); Janicki, (2004); Mateev (2009)). As more variables were added to the specification, the R-squared value increased as expected. The model is robust and the Wald test for overall fixed-effects goodness-of-fit shows the specification is suitable given the data we had access to (Appendix 5). Nonetheless, the specification could be improved by adding more or better suited variables, depending on the objective of further studies.

Data availability was limited or non-existent for some European developing economies. Due to this fact alone, we have decided to exclude Albania and the Republic of Moldova from the econometric model. A bigger sample could be constructed in the future, as official country records and reports become digitalised and a bigger amount of data points becomes available. The TECH index constructed specifically for the purpose of this study could not be calculated for Serbia and Montenegro due to lack of data on the technologies which were chosen to be part of the index. A possible solution to this issue was

to average the score of neighbouring economies and arbitrarily assign it to the two countries. However, this method would be highly subjective and further research should find a way around it, perhaps by using a different database than the one constructed by Comin and Hobjin (2009). We strongly believe that excluding Serbia and Montenegro from the index did not impact the final result, the TECH variable proving to be highly significant even at a level of 1 per cent.

This study is focusing solely on European developing economies and most of the explanations given throughout the paper take into account the political, economic and social background of the countries included in the sample. A possible direction for further research is to use the same model and add data from other developing economies around the world, aiming to develop one step further the holistic approach we tried to maintain. Caution should be given on the increasing complexity of such an econometric model, new source economies should be taken into account and given the global outlook aimed for, the new model could become misspecified.

The paper started with a presentation of the concepts that were used as the framework of our study. A clear distinction was made between the different types of foreign direct investment, then linked FDI to technology and democratization, issues we thought to be an important point for discussion prior to our analysis. The next part presented a brief literature review regarding determinants of FDI explored by papers which guided our research. The following section presented a case study of the regions included in the analysed sample, and a more in-depth presentation of a couple of representative countries to show the differences between European developing economies. Having fully presented the background of our research, the next part presented the hypotheses, the data and methodology of the analysis. Finally, we concluded with a presentation of the results, limitations and a few suggestions for further research. We strongly believe the econometric model holds and could be used for future research. As more data becomes available, results could reveal even more interesting insights. European developing countries are by all means going through an intriguing period in their evolution and it would be a shame not to keep them under continuous observation.

The main purpose of this study was to analyse determinants of FDI inflows into developing countries in South-Eastern, Central and Eastern Europe. The paper has firstly argued that a location bias does exist for FDI inflows into developing economies in South – Eastern Europe. We found that countries in the Balkan part of Europe are more likely to receive lower values of inward FDI, confirming our initial hypothesis that geographic position has a significant impact on the inflows of foreign direct investment for developing countries in Europe. We then moved on to show that a country's technological advancement level influences the inflow of foreign direct investment, confirming our second hypothesis. Perhaps one of the more interesting findings of our study was the fact that technology rendered the location bias insignificant when added to the econometric model, together with labour costs and education. This supports arguments of previous researchers (Pauwels and Ionita, 2008) who identified a shift in investors' interest towards value-added sectors. The European developing countries in general, and the ones in the Balkans more specifically, have completed a transition process from being closed markets to open economies, and private investors together with MNEs are increasingly exploring the untapped potential of these local markets. These results hint towards a series of policy implications and suggestions concentrated around the idea of attracting investors on the verge of a new period of volatile markets and economic instability, by focusing on generating incentives in sectors such as research and development to speed up local technological development.

## 9. References


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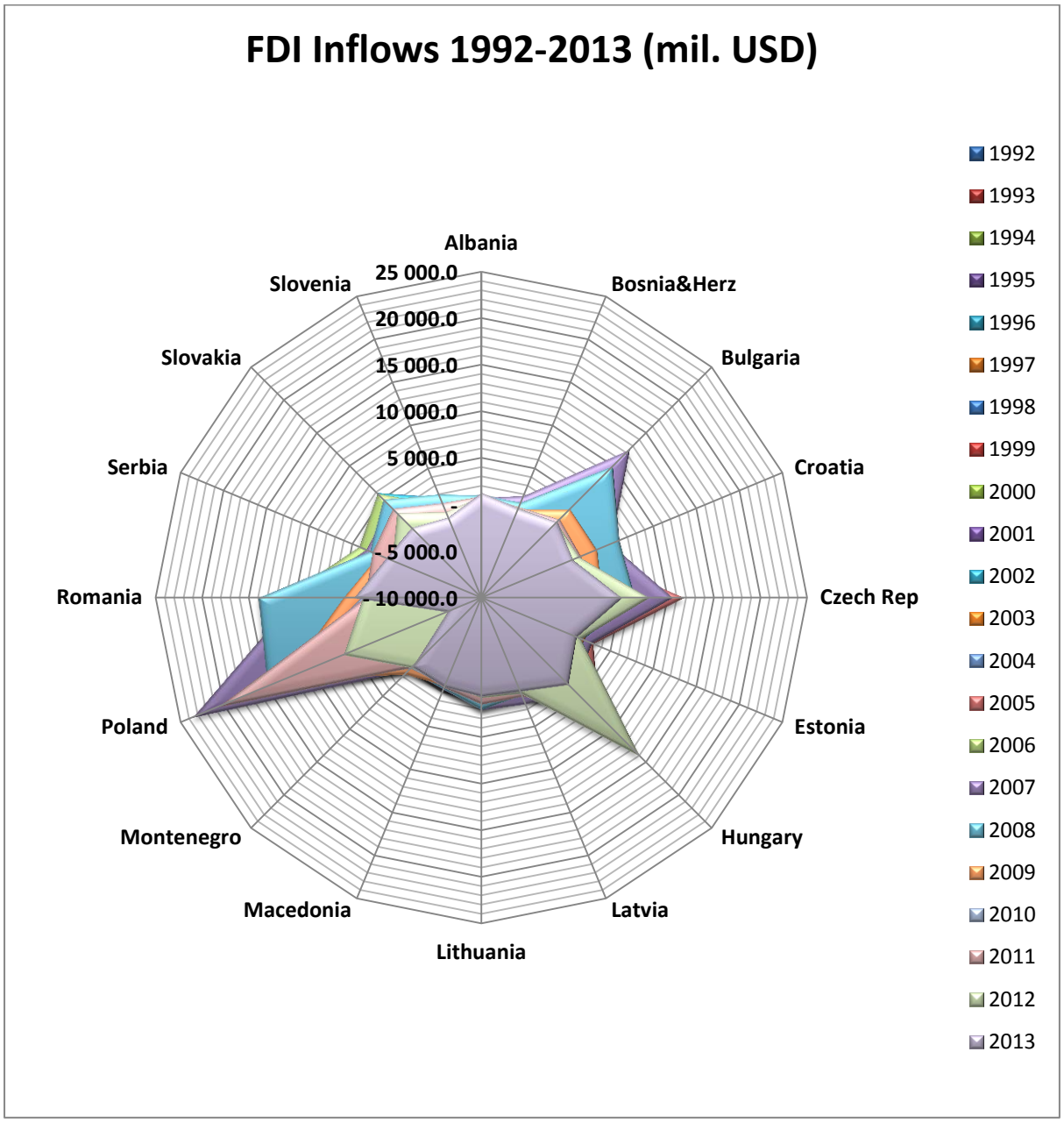
## 10. Appendices

### Appendix 1

FDI Inflows representation of countries and years (1992-2013)




Data Source: Vienna Institute of International Economics (WIIW, 2015)

Fig. 4.1.1.

**Appendix 2**

Foreign Investment Registrations in Central and Eastern Europe by number and value of foreign equity participation, beginning of 1992

| Country | Number | Equity ($ mil.) |
|---|---|---|
| Bulgaria | 900 | 300 |
| CIS | 5400 | 5650 |
| Czechoslovakia | 4000 | 480 |
| Hungary | 11000 | 2089 |
| Poland | 5100 | 670 |
| Romania | 8022 | 231 |
| **Total** | 34422 | 9420 |

Table 4.1.0

Data Source: United Nations (1992). World Investment Directory 1992. Transnational Corporations and Management Dvision and ECE. Central and Eastern Europe. (New York, 1992).

**Appendix 3**

FDI Inflows in other South-Eastern developing economies (expressed in mil. USD) & sector overview.

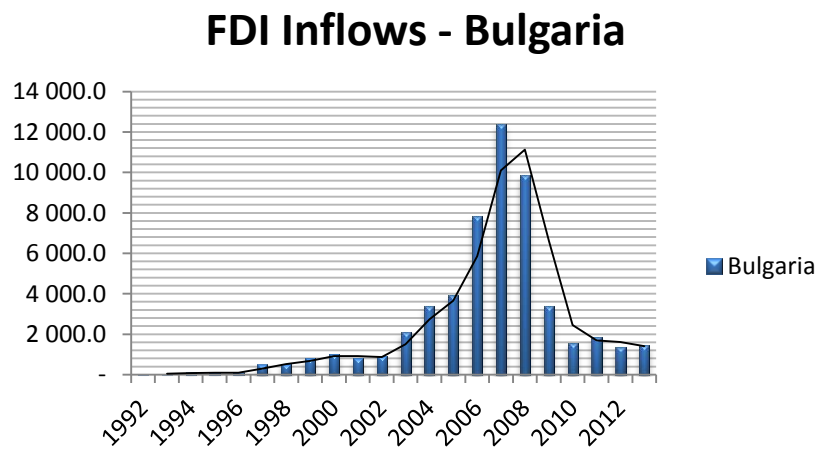



Fig. 4.3.4

Data Source: Vienna Institute of International Economics (WIIW, 2015)

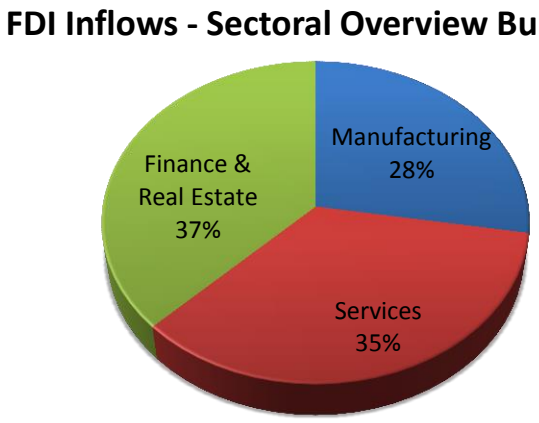



Fig. 4.3.5

Data Source: Vienna Institute of International Economics (WIIW, 2015)

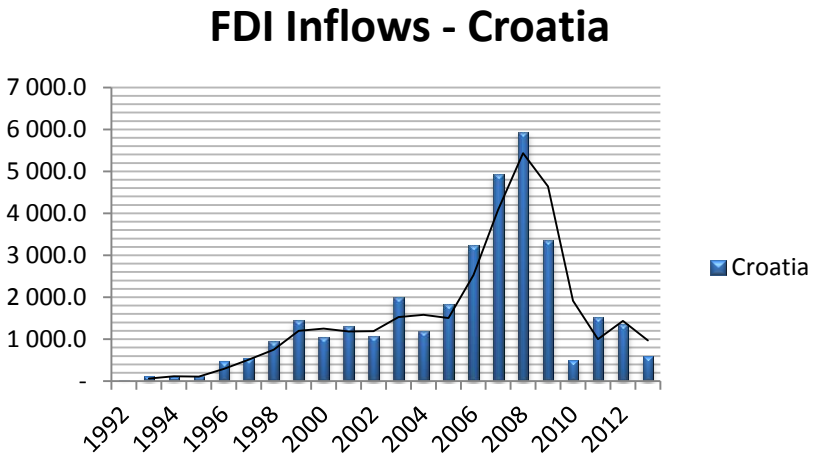



Fig. 4.3.6

Data Source: Vienna Institute of International Economics (WIIW, 2015)

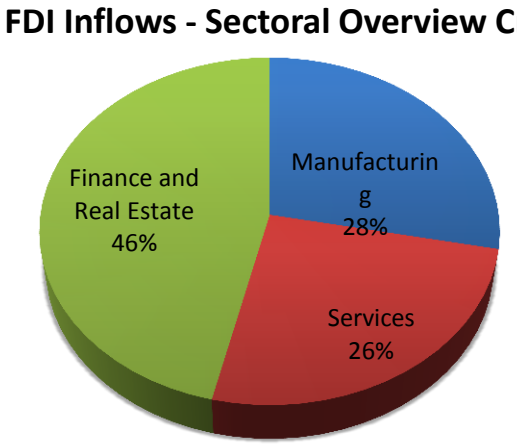



Fig. 4.3.7

Data Source: Vienna Institute of International Economics (WIIW, 2015)

**Appednix 4**

Histogram and line graph describing the residuals of the data.

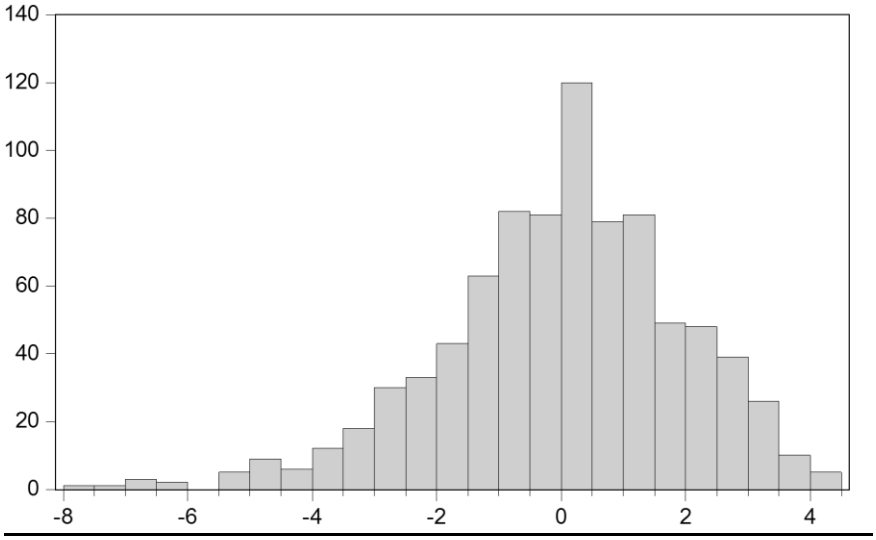



Fig. 6.2.0

Source: Author's representation using Eviews 7 statistical software.

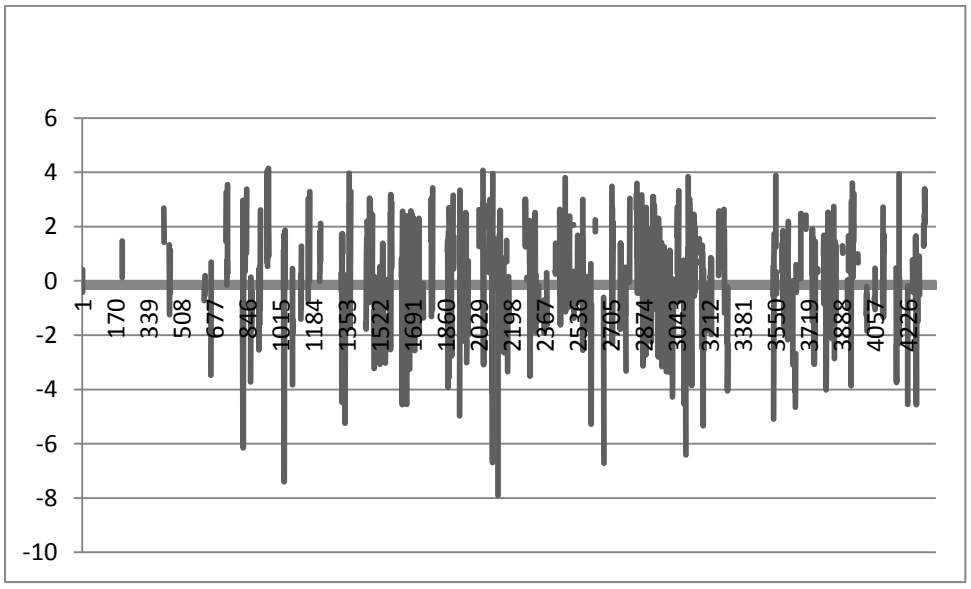



Fig. 6.2.1

Source: Author's representation using Eviews 7 statistical software.

**Appendix 5**

| Test Statistic | Value | Df | Probability |
|---|---|---|---|
| F-Statistic | 73113.38 | (11,814) | 0.0000 |
| Chi-Square | 8024247.2 | 11 | 0.0000 |

Table 8.1.0

**Wald Test**

| Test Statistic | Value | Df | Probability |
|---|---|---|---|
| F-statistic | 73113.38 | (11,814) | 0.0000 |
| Chi-square | 804247.2 | 11 | 0.0000 |

Null Hypothesis: C(2)=1, C(3)=1, C(4)=1, C(5)=1, C(6)=1, C(7)=1, C(8)=1, C(9)=1, C(10)=1, C(11)=1, C(12)=1

Table 8.1.1

Source: Author's representation using Eviews 7 statistical software