Erasmus School of Economics

# The impact of geographical location and linguistic proximity on bilateral FDI flows to developing economies

Master Thesis

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## Abstract

This study examines the role of geographical location and linguistic proximity incorporated with traditional macroeconomic determinants in explaining the direction and volume of bilateral FDI (Foreign Direct Investments) flows from six major world economies (members of G-7) to a number of developing economies in Asia, Latin America and Central and Eastern Europe (CEE). Using a recently compiled panel data set based on OECD, WDI and UNCTAD databases and extended gravity model, the study investigates whether and how these determinants differ for both industrialized and developing economies over a period from 1992 to 2012. The results reveal a decline of the volume of investments with increasing geographical and linguistic distance between the most populated cities in two countries. Gross domestic product proves to be positive and statistically significant in attracting investors. Interestingly, the results also verify the absence of sufficient differences in how explanatory variables affect the three developing markets. Nevertheless the results are statistically fragile due to the lack of available data and the scale effect in the studied sample.



**Keywords:** Foreign direct investment (FDI), Distance, Linguistic proximity, Gravity model, Industrialized countries, Developing countries

# 1 Introduction

Over the last decades the world has experienced a massive transformation in terms of geopolitics, economics and organization and distribution of production. The Organisation for Economic Cooperation and Development (OECD, 2008) defines FDI as an important vehicle in the integration of the international markets, diversification of the investment opportunities and promotion of financial stability. Cross-boarder transactions arises when multinational enterprises (MNEs) access the foreign market in order to complete different stages of production or/and expand operations of the existing business. Foreign investments boost technology and management knowledge, reduce production price and enhance profit. The most recent theoretical economics and business literature discuss the determinants that increase the probability of FDI projects in both developing and developed countries, in particular GDP, taxation, inflation, corruption and unemployment. Research analyzing geographical patterns and linguistic proximity in international finance is limited, therefore, this paper complements the previous literature on the empirical evidence for bilateral investment flows. Interestingly, with the increasing globalization, the results still reveal the presence of significant influence of geographical and language distance on the volume of investments. This paper investigates the impact of geographical location and linguistic proximity incorporated with traditional macroeconomic determinants on the volume of bilateral FDI from the six largest economies worldwide to a number of developing economies in Asia, Latin America and Central and Eastern Europe (CEE) over the period 1992 to 2012.

With the extensive integration between financial markets, global FDI grew strongly in search for the new investment opportunities (Patterson et al., 2004). Despite the fact that in 2014 the UNCTAD World Report announced a sixteen percent decline of FDI to $1.2 trillion, since the 1990s global investments drastically increased from approximately $200 billion to an amount exceeding $2000 billion in 2007 (see Table 1

in Appendix). Industrial countries have long dominated the FDI inflows and outflows, accounting for approximately 90 and 70 percent in 2001 (see Table 2 in Appendix). Figure 1 below demonstrates that FDI inflows received by developing economies have grown substantially since 1992 and currently account for more than 40% of the total investment inflows. Figure 1 also shows that in comparison to developed economies the volume of investment flows in developing economies were insufficiently influenced by the crisis of 1998 and 2008. Futheremore, in 2012 developing countries received almost the same volume of total FDI inflows as industrialized economies. The different causes of FDI are discussed in the academic literature. Tintin (2013)

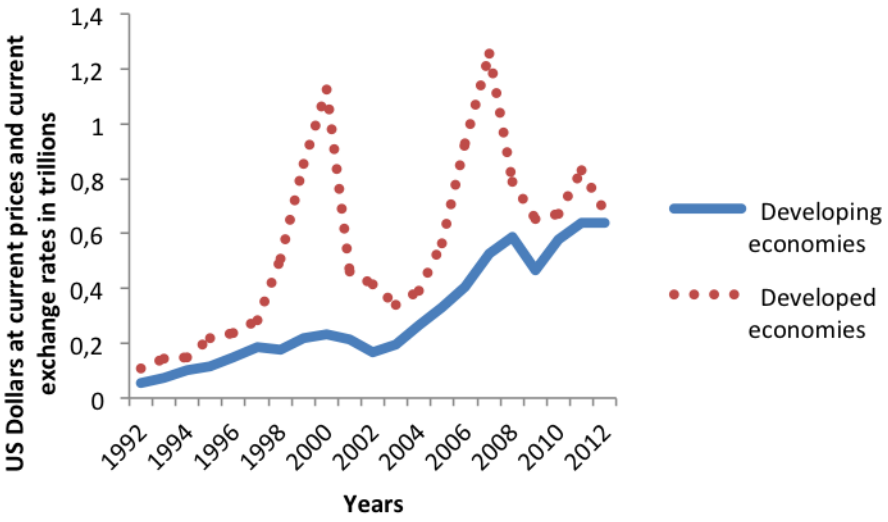


Figure 1: Total FDI inflows

investigates the influence of institutional factors on the distribution of investments in CEEC. Chowdhury and Mavrotas (2006) analyze the relationship between FDI and economical growth. Using the gravity approach, Anderson and van Wincoop (2003) reasons the importance of regional proxy. While a lot of research has been conducted at unraveling the traditional determinants of FDI, there is still a notable differences in the investors preferences across the countries with similar market characteristics. Much of the debate has focused on the relationship of push and pull factors and

private capital flows in both home and host economies. An illustrative example of inflows distribution across developing and developed countries is presented in Figure 2. The Figure demonstrates the importance of receiving foreign direct investments as it has sufficient and positive influence on the overall countries GDP. Developing countries are more interested in attracting foreign private capital flows as FDI inflows account for approximately 3% of the gross domestic product.

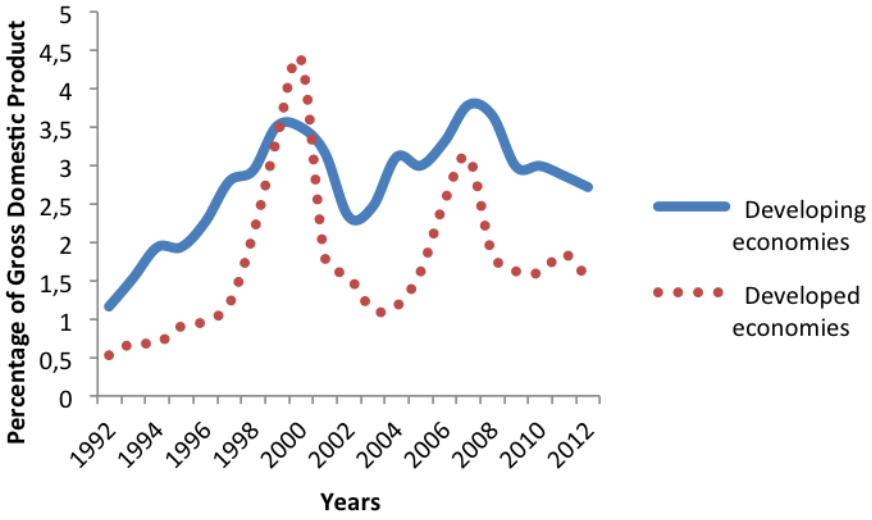


Figure 2: Total FDI inflows as % of GDP

To study bilateral FDI from industrialized countries to a number of developing markets, I build several gravity models. The study uses methodology similar to Frenkel et al. (2004) and triple-indexed-Gravity-model proposed by Matyas (1997). This empirical research contributes to the discussion of push and pull factors of both source and host markets and extends the empirical literature by incorporating the role of traditional macroeconomic factors with time-invariant location and linguistic proximity variables. The panel data set obtained and matched from OECD, WDI and UNCTAD databases. The list of the countries is available in Appendix, Table 3. The selection of the sample

is based on size of the market, Bloomberg ranking of emerging economies[1] and data availability.

In the first step I estimate a general broad OLS model to study the effect of proximity variables. Furthermore, I examine an extended gravity model to test if there is explanatory power of macroeconomic factors and individual markets characteristics. In order to reflect common cyclical factors and country specific characteristics I introduce time and fixed effect.

In the second step I divide the overall data set into three regional panels and proceed the analysis to test whether determinant factors differently influence FDI distribution in these areas. To the best of my knowledge, the analysis of multiple regions based on bilateral flows OECD data has never done before. This paper concentrates on FDI flows, thus the impact of stocks is beyond the scope of the study. The research warns of potential econometrics problems due to the lack of comprehensive data.

The outline of this thesis is divided into six sections. Section 2 explores a brief summary of empirical and theoretical studies of FDI. Section 3 outlines major determinant factors and hypothesized influence on investments. Section 4 specifies empirical analysis, in particular data description and research methodology. The results and robustness check are analyzed in Section 5. The last section summarizes main results and concludes.

[1] http://www.bloomberg.com/visual-data/best-and-worst//best-emerging-markets-2014-countries

# 2 Literature

This section presents a brief literature review of the previous empirical and theoretical studies which focus on one of the main types of international investments, named FDI. The theoretical part defines the connection of FDI and trade models. The empirical considerations review the impact of geographical location, linguistic proximity and cultural ties on investors activity in both developing and industrialized countries.

## 2.1 Theoretical considerations

Theoretical economics and business literature investigates the core determinants of the multinational activity. Studies analyzing geographical patterns and bilateral relations in international finance are limited in comparison to trade research. There are the following possible connections between trade and capital flows: (1) whether FDI can compliment or substitute for trade, (2) whether there is a causal relationship between flows and trade (Liu et al., 2001).

Regarding the causality, academic literature supports the idea of two-way linkages. Vernon (1966) presents the life-cycle theory, where a specific good is produced in a particular country. However gradually or at a particular phase the production is adopted in other countries that might lead to the situation when the country of origin is importing the good. Aizenman and Noy (2006) suggest that the causality depends on the level of country development. FDI is more likely to create trade in developing countries, whereas in industrialized countries trade causes investments. While export involves transportation costs, FDI involves fixed costs of market entry (Buch & Lipponer, 2007). The relationship between trade and financial flows is complex and largely depends on the considered research techniques (Liu et al., 2001). This suggests importance of empirical evidence in determining causality.

Mostly uni-dimensional theories of multinational activities distinguish between two broad strategies, termed horizontal and vertical FDI (Slaughter, 2002; Herger & McCorriston, 2014). FDI flows are considered to be related with trade and viewed as a substitute for trade (horizontal FDI) or as a complement to trade (vertical) FDI. Vertical FDI arises when companies want to take advantage of international factor price differences, in other words, multinationals access the target market to complete different stages of the production process in order to reduce the costs (Brainard, 1997; Helpman, 1984). In particular, a developed source country is seeking for a host developing economy where the market size differs considerably. Vertical FDI firms engage in both FDI and exports.

Horizontal FDI is realized by expending operations of an existing business across countries in order to seek access to the new market. Horizontal approach arises when proximity advantages outweigh concentration advantages. In other words, firms invest abroad when the gains from avoiding trade costs outweigh the costs of maintaining capacity in multiple markets (Helpman et al., 2004). This is known as the proximity-concentration trade-off. The proximity advantage reflects the benefits of locating production close to consumers while the concentration advantage reflects the benefits from economies of scale. Companies choose to export their goods and services if concentration advantages prevail (Carstensen & Toubal, 2004). Buch and Lipponer (2007) further investigate the standard proximity-concentration trade-off model and conclude that multinational enterprises are choosing between exporting, which involves variable transportation costs, and foreign direct investment, which involves the fixed costs of market entry.

One of the first theoretical models for trade was proposed by Heckscher and Ohlin in the beginning of the 20th century. The model is based on the idea of comparative advantage of trade over production in the host country and income distribution within

countries. The model implies that international commodity trade involves an indirect exchange of factors between countries. In particular, factors in abundant supply are exported and factors in scanty supply are imported (Ohlin, 1933).

Mundell (1957) proposes the model of international trade that relaxes the assumption of international factor immobility. The model assumes two identical production functions of two goods in identical countries, where one commodity requires a greater proportion of one of the factors than the other, and that factors endowments are such that they will exclude the possibility of complete specialization. The author considers that capital flows substitute trade. However, empirical research predict the presence of both types of investments. Moreover, the proposed model is lack of explanations power as it does not consider all the complexity of FDI. First, it neglects that FDI involves the transfer of managerial skills and technical knowledge. Second, FDI is not necessary only the international mobility of capital.

The classical model of FDI begins with the OLI paradigm developed by Dunning (1973, 1998). The author claims that FDI emerges if a firm has Ownership (O) advantage like proprietary technology combined with Location (L) advantage such as low production costs, large market size and Internalization (I) advantage as economics of interdependent activities. If an O- and an I-advantage are given, exports instead of FDI are used for servicing the foreign market. Thus, Dunning (1993, 1988) claims that multinational investors are more likely to invest abroad if firms posses all three OLI types of advantages, where geographical location could be the O-specific fixed advantage.

Geographical distance has been frequently used in estimation of gravity-type equations as well as empirical studies (Brainard, 1997). The gravity equation was first conceptualized by Tinbergen (1962) to analyze the bilateral patterns of FDI flows between the

trade partners. Since that time it has been one of the most successful models in economics that study the influence of geographical location and other macroeconomic determinants that affect bilateral trade and FDI (Anderson & Wincoop, 2003).

## 2.2 Empirical Determinants

Due to different purposes of the researches, empirical studies present different estimation techniques and data sources.
The most recent FDI and trade literature concentrate on examining the effects of geographical location, linguistic and cultural ties between the countries, in particular, colonial trade linkages, shared border and difference in time zones. Therefore, the level of FDI is influenced by both traditional economic factors and individual historical characteristics.

Loungani et al. (2002) estimate gravity equation to compare trade and FDI flows for 12 source economies and 45 host economies during 1981-1998. They employ a panel OLS model and for econometric purposes take three-year averages of all variables. The authors demonstrate that bilateral geographical distance is a relative magnitude proxy that also reflects the transactional/informational and transportation costs stemming from cultural differences and familiarities. Moreover, while FDI is more sensitive to bilateral information capability, trade is more sensitive to scale determinants. The results further predict that FDI is distributed to a limited number of countries due to closely related nations and ease of communication.

Daude and Stein (2007) use a traditional gravity panel model to analyze the difference in time zones between locations of 17 host countries and 58 home countries from 1997 to 1999. They found that the volume of investments declines if the time zone increases and the impact of time zone becomes larger if it is more or equal to six hours difference. Interestingly, with an additional hour of time, bilateral FDI decreases

between 17% and 20%. Therefore, the authors emphasise the need to distinguish not only the geographical location but also the time zone to research the direction of bilateral FDI.

Yotov (2012) employs the Poisson pseudo-maximum-likelihood technique to research the interaction between geographical distance and trade over 1965- 2005. The sample includes 93 countries. The empirical research comprises a population weighted distance variable, common language, colonial ties and presence of contiguous borders variables obtained from CEPII's Distance Database. The author claims that gravity approach reflects only relative trade costs. The other remarkable finding is that the impact of location on trade has fallen steadily over time.

In contradiction to Yotov (2005), Disdier and Head (2008) find that since the middle of the 20th century negative influence of geographical distance on trade increased and remained persistently high since then. This effect is also known as "the distance puzzle". The authors use meta-analysis to research 1467 distance effects estimated in 103 empirical studies.

It's remarkable that the negative influence of distance is present even in trade through the Internet (Blum & Goldfarb, 2006). The paper analyzes data on Internet activities of 2654 US users on non US websites. The authors distinguish between two categories of digital products which includes financial transactions and free for usage. Both categories are available through the Internet thus there are no shipment and delivery costs. The striking conclusion is that distance could be a proxy for taste. Therefore, for products and services that reflect tastes, such as music, distance is a vital indicator. However products, where taste indicator is not sufficient, geographical location does not have influence.

The paper by Chaney (2013) investigates the role of geographical location on the sample of French companies representing 42 economical sectors that are involved in export. According to the author there are two ways to cope with the barriers associated with the international trade. In particular, paying a direct cost for establishing an international contact or negotiating with already trading companies and outsourcing the contacts. Thus, neglecting direct contact, even with presence of technical, political or economic influence on the level of exports, lead to the aggregate trade proportional close to country size and inversely proportional to distance.

Lin (2013) states that traditional gravity equation using OLS method is biased and provides invalid results. Thus, the author uses HMR and SST methods to reestimate the distance effects from 1950 to 1999. The empirical results of the SST approach show the decreasing trend of trade cost over the period of time. Furthermore, it encourages economies to extend interaction by involving FDI. From the host country side, FDI is beneficial as it increases employment levels and GDP. From the home country perspective, FDI expands revenues.

Frenkel et al. (2004) contribute to the FDI literature by examining on a macroeconomic level the empirical evidence of bilateral capital flows. The study investigates the interaction between the five largest economies and emerging countries in Asia, Latin America and CEE over the period 1992-2000. Using a panel analyses and applying different specifications to a gravity type model, the authors conclude that distance between the trading partners has a significant negative impact on FDI flows.

Kleinert and Toubal (2010) claim that the success of the gravity model in explaining FDI distribution depends on at least three various theoretical models. First, a monopolistic competition with symmetric firms model deals with the question how to enter the market. Geographical distance increases the costs of exporting, therefore,

MNE faces the decision of either serve foreign consumers through exports or set up affiliates in a foreign country. Second, a monopolistic competition with heterogeneous firms model demonstrate that most productive firms become multinationals and least productive firms are concentrated on the domestic market. The obtained results are consistent with previous research as FDI is positively associated with market size, and geographical distance has a negative tendency. Third, the gravity equation form predicts MNEs to fragment the production into stages that helps to reduce transactional costs. Kleinert and Toubal (2010) study these models with the comprehensive data set on affiliates sales that comprise 600 country pairs for 56 source countries and 75 home counties during 1968, 1990, 1994 and 1998. The main findings support the estimation results from horizontal gravity models.

Another paper analyzing trade flow patterns to East Asian and Latin American countries from developed countries is discussed by Filippini and Molini (2003). The gravity equation is modified by separating developed and developing countries due to difference in demographic variables. They distinguish between manufacturing trade flows and non-manufacturing trade flows considering different trends. The findings show that Asian economies are the leading exporters to developed countries.

Guerin (2006) conducts a comparative analysis of trade, FDI and portfolio flows among both developing and developed countries from 1980 to 1999. Their results demonstrate that whereas FDI among industrial countries are horizontal, most foreign direct investments in developing countries are vertical. Furthermore, Guerin (2006) states that only a few countries in Latin America and East Asia established themselves as important financial centers and main receivers of total developing country FDIs.

Carstensen and Toubal (2004) study a balanced panel data set to investigate distribution of FDI in central and eastern European countries and the Mediterranean. They

estimate a generalised linear model with 6912 observations, covering 48 industries from 1990 to 1997 in 18 counties. Comprising both traditional and country-specific variables the empirical research represents that both horizontal and vertical MNEs are expected to invest in CEEC. Moreover, investors are more likely to invest in the CEEC countries compared to the Mediterranean countries.

Hogenbirk and Narula (2004) research the inward FDI from 28 countries to the 12 regions in the Netherlands from 1987 to 1999. The main aim of the paper is to investigate MNE's location choice and its determining factors. The study comprises market, labour, agglomeration, infrastructural, geographic and government policy variables. The results show that FDI is a cumulative mechanism, this implies that economies that already received FDI are more likely to keep receiving it in the future. Regarding the determinants, while larger markets, presence of infrastructure and qualified labor attract more foreign investors, geographical distance negatively influences the volume of FDI.

Tintin (2013) further investigates FDI inflows determinant factors. The empirical paper identifies whether and how these explanatory variables differ across four investor countries and six CEEC. Using OLS methods for a panel data set over 1996-2009, the authors confirms the existence of notable differences in the determinant factors across the four investor countries. The results reveal that better institutions (measured by economic freedoms, state fragility, political rights and civil liberty indices) attract more inflows in the CEEC. The EU membership enhances FDI inflows. Also, among the traditional determinant factors the results verify the positive and economically significant role of GDP size and trade openness.

# 3 FDI determinants

Theoretical economics and business literature investigates the core determinants of the multinational activity. The intuition behind the factors selection are mostly based on the aim of the research and the insight of the authors. In this section I outline the traditional FDI factors studied in this research and outline expected influence on the investments. In the empirical analysis I check if hypothesise relationship of control variables and FDI is confirmed.

The Table 1 below presents expected influence of control variables on the investments.

Table 1. **Expected influence of control variables on FDI**

| | | Variables | Hypothesized relationship with FDI |
|---|---|---|---|
| 1 | Proximity | Geographical distance | (-) |
| | | Linguistic proximity | (+) |
| | | Colonial linkages | (+) |
| | | Border | (+) |
| 2 | Market | GDP (PPP) home | (-) |
| | | GDP (PPP) host | (+) |
| 3 | Macro-economic | Exchange rate | (-) |
| | | Inflation | (-) |
| | | Openness | (+) |

## 3.1 Proximity

The empirical literature predict negative relationship between increased geographical distance and foreign direct investments (Buch et al., 2005; Frenkel et al., 2004). Since middle of the 20th century the estimated negative impact of location on investments increased and remained persistently high since then (Disdier & Head, 2008). Distance is often used to model trade costs, however, this FDI determinant conveys less

information as it is time-invariant (Carstensen & Toubal, 2004). Remarkably, the negative distance effect is present even in transactions through Internet (Blum & Goldfarb, 2006). Therefore, countries far away from major investment centers may receive relatively small amounts of FDI (Portes & Rey, 2005).

Geographical distance could be a proxy for both transaction/information and transportation costs (Loungani et al. 2002). Investors are more likely to lure capital in the economies which they had previous experience with and which they have more information about and confidence of doing business with. Therefore, I expect positive influence of colonial linkages on FDI.

Linguistic proximity positively influence the attractiveness of the source country to the potential investors (Svetlicic & Jakic, 2013). This implies that countries are more likely to invest in the economies with language and cultural similarities that incur lower transactional costs and simplify negotiations (Oh et al., 2011).

## 3.2 Market

Gross Domestic Product is the traditional macroeconomic indicator of the market size and standard of living in a country. Generally it is measured by Gross Domestic Product (GDP), GDP per capita or GDP growth. While GDP express the total dollar value of all goods and services compared to the previous year, in other words measures economic size, GDP per capita aggregates demand of population and normal GDP (Loungani et al., 2002). Larger home market serve as an indicator of higher economic potential and consequently higher demand. This implies that multinational enterprises have better opportunities for the realization of goods at higher prices and receive higher returns on the invested capital. However, Borensztein et al. (1998) claim that higher productivity of FDI holds only when the host country has a minimum threshold stock of human capital and FDI contributes to GDP only if advanced technologies are

available in the host economy. Regarding GDP growth, positive interaction with FDI is anticipated. A developing country that has high and sustained GDP growth reflects economic stability and higher purchasing power that implies better opportunities for successful business (Jordaan, 2004).

## 3.3 Macro-economic

**Exchange rate**

The strength of a currency is used as proxy the purchasing power of the investing firm. Higher exchange rate variability creates uncertainty that discourages international investment and trade. Fixing the exchange rate eliminates this risk, hence attracting more investments, as well as simplifying for companies decision making process and cost calculations. Frankel et al. (2004) argue that MNEs are searching for predictive markets, thus fixed exchange rate is a indicator of the market stability.

**Inflation**

Rugman (1979) discuss location specific advantages as a mechanism of diversifying business risks. A country which has a stable macroeconomic condition will receive more FDI inflows than a more volatile economy. While low inflation reflects economic stability on the market, high inflation is a negative signal for possible problems present in the economy (Disdier & Mayer, 2004). The negative relationship between investments and inflation is anticipated as potential investors prefer to lure capital in markets with low degree of uncertainty (Nonnenberg and Mendonca, 2004).

**Trade openness**

When planning investments abroad, multinational enterprise is taking into account the level of trade openness. Barrell and Holland (2000) present positive link between trade openness and investments as countries that opened markets more widely to FDI benefit from the transition process, in particular in labour productivity. According

to Frenkel et al. (2004), risk and openness of the economy are highly multi-collinear, therefore this study include only openness indicator.

# 4 Empirical Specification

## 4.1 Data

This section introduces and summarizes the data properties for the empirical analysis of impact of the geographical distance, linguistic proximity and traditional macroeconomic determinant factors on the bilateral FDI. The motivation behind the choice of variables is based on the theoretical literature. Table 4 in Appendix presents brief description and the source of the variables. The study focuses on the outward bilateral investments from six major developed economies (members of G-7) to a number of developing economies in Asia, Latin America and CEE. The recently compiled data set obtained from OECD, UNTCAD, World bank bases and combined in a panel data format. Thus, research in this paper entails a panel of 306 country pairs. The time series in the study spanning the period from 1992 to 2012.

### 4.1.1 Sample

The selection of the countries is following Frenkel et al. (2004) approach. On the side of the home countries, we concentrate on the members of the major developed economies. During the last two decades, the outward FDI from developed countries accounted for approximately 70 % of the worldwide outflows annually (see Table 1, Appendix). Regarding host economies, we concentrate on 18 countries located in three regions. Table 3 in Appendix provides the full list of the counties. While the intuition behind the selection of home countries is based on the size of the economy, the selection of host countries is based on Bloomberg ranking of developing economies and data availability. Unlike Frenkel el al. (2004) I do not include Russia in the sample to avoid double counting as it is developing economy, however during considered time

it was a member of G-8 (currently G-7) group. Moreover, Canada is also excluded due to the lack of available data.

The sample group could be considered representative as it annually accounts for more than 60 % of the total FDI receiving by emerging economies (see Table 5, Appendix).

### 4.1.2 Variables description

**Dependent variable**

the main variable of interest is the annual outward FDI of reporting economy received by the host economy. Data on bilateral flows by a partner county is obtained from OECD international investment statistics database and measured in current millions of US dollars. The variable comprises equity capital, reinvested earnings and intra-company loans between investors and foreign affiliates[6]. Due to disinvestments or reverse investments the initial data consists negative flows. Since FDI includes negatives values I do not transform the data into logarithmic form. Empirical research suggests the following treatment of negative values. Firstly, converting data by adding units or dropping negative observations so variables transformed into natural logarithm and interpreted in terms of elasticities (Frenkel et al., 2004; Head et al., 2010). Secondly, introducing modified bilateral investment variable as a percentage of GDP or sum of all outflows and inflows derived on GDP. However, I believe that it is rational to deal with disinvestments as they have numerical importance and real economic meaning. Thus, transformation could lead to the loss in consistency and variation of the variable. Moreover, reverse investments account for approximately 15 % of all observations, thus excluding flows with negative sign may introduce selection bias and falsifying the results.

**Explanatory Variables**

The set of explanatory variables includes a constant and a subset of variables that

[6]OECD Benchmark Definition of Foreign Direct Investment - 4th Edition

proved to be significant in explaining FDI flows in prior empirical research. The following set of variables is obtained from World Development Indicators (WDI). Gross Domestic Product ($GDP_{idt}$) per capita measures Home (Host) market size. According to World Bank, this market related variable is based on purchasing power parity rates (PPP) and measured in current international $.

GDP growth of Home (Host) country at market prices is measured in annual % and aggregates according to the level of 2005 year in United States $. WDI states that the variable includes the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. Official exchange rate ($Exc_{idt}$) refers to the exchange rate determined by national authorities or to the rate determined in the legally sanctioned exchange market. It is calculated as an annual average based on monthly averages (local currency units relative to the U.S. dollar).

UNCTAD statistics define Consumer Price Index as an inflation indicator ($INF_{dt}$) that measures the weighted average of prices of a basket of consumer goods and services, purchases by a customer during a period of time. Changes in CPI are used to assess price changes in the host economy that reflects the cost of living.

Trade openness indicator $Open_{dt}$ is also obtained from UNCTAD statistics database and constructed as annual sum of exports and imports normalized by nominal gross domestic product (GDP). Imports of goods and services as a % of GDP represent the value of all goods and other market services received from the rest of the world. They include the value of merchandise, freight, insurance, transport, travel, royalties, license fees, and other services, such as communication, construction, financial, information, business, personal, and government services. They exclude compensation of employees and investment income (formerly called factor services) and transfer payments. Exports

of goods and services represent the value of all goods and other market services provided to the rest of the world. They include the value of merchandise, freight, insurance, transport, travel, royalties, license fees, and other services, such as communication, construction, financial, information, business, personal, and government services. They exclude compensation of employees and investment income (formerly called factor services) and transfer payments.

Distance and linguistic proximity are obtained from CEPII database complied by Mayer and Zignano (2011).

$Dist_{idt}$ is the bilateral geographical distance between the industrialized and developed countries. Following Head and Mayer (2002) great circle formula, Mayer and Zignano (2011) calculate the bilateral distance between the biggest cities weighted by the share of the city in the overall country's population.

Colonial past is a bilateral dummy variable that reveals if the countries used to be the same colony or not. The regression analysis include 2 variables to measure linguistic proximity. Common spoken language variable indicate that at least 4 % of the population in 2 countries speak the same language. The second variable is linguistic proximity index between the countries. Melitz and Toubal (2014) constructed index based on the basis of the Ethnologue research project classification of language trees between trees, branches and sub-branches.

The descriptive statistics for all the variables is available in Appendix in Table 6.

## 4.2 Methodology

To build the econometric model I use the similar approach proposed by Matyas (1997) and Frenkel et al. (2004). The authors suggest that FDI home and host country peculiarities together with gravity forces are important in determining variation of bilateral FDI flows. They analyze crude and extended gravity models of the bilateral capital flows with and without fixed effects. Gravity models are theoretically well established and accurate in studying bilateral trade flows (Krugman, 1980; Guerin, 2006). Panel data analysis is a frequently used approach in analyzing FDI since it enables the researcher to study the dynamics of the change of investment flows for a short time series. Furthermore, with panel data, there are more numbers of data points that generate additional degrees of freedom which improve the efficiency of the econometric estimates. Therefore, in most cases researches prefer panel approach than cross-section estimators (Salvatici, 2013). In order to understand the change in FDI levels the following general OLS model is employed:

$$FDI_{idt} = \beta_0 + \beta_1(\overline{FDI_{idt}}) + \beta_2(Proximity_{id}) + \beta_3(Y_{idt}) + \epsilon_{idt} \quad (1)$$

Where FDI is dependent variable that captures the change in Foreign Direct Investment flows from the host country i (6 countries) to the home country d (18 countries) during a period t (21 years). Proximity stands for a set of dyadic time-invariant variables that represent colonial ties and geographical distance between the most populated cities in two countries. According to Head et al. (2010), unobserved dyadic linkages end up in the error term, thus the authors suggest to employ lagged dependent variable to control for unobserved gradually changing influences on FDI over time. $\overline{FDI_{idt}}$ is the average of dependent variable lagged with 3 previous years. This transformation helps to solve possible endogeneity problems and reflects the assumption that foreign investors make a decision taking into account the results of the previous years. Y is vector of explanatory variables that proves to be significant in explaining investment flows in prior empirical research. General specification of the model comprises a

constant and error term $\epsilon$.

In the second step I estimate triple-indexed-Gravity-model (Matyas, 1997). The extended gravity approach and separation of the home and host countries effects facilitate to capture individual characteristics of the G-7 and developing markets, by introducing fixed parameters (Frenkel et al., 2004). Fixed effects model account for constant characteristics that may impact or bias the predictor or outcome variable and capture net effect on FDI.

$$FDI_{idt} = \beta_0 + \beta_1(\overline{FDI_{idt}}) + \beta_2(Proximity_{id}) + \beta_3(Y_{idt}) + \mu_i + \mu_d + \mu_t + \epsilon_{idt} \quad (2)$$

Where $\mu$ captures individual characteristics of host, home economies during a period of time. Although, general specification of the model includes unchanging values, fixed effects methodology assesses the net effect of other time-variant determinants.

Matyas (1997) claim that it is important to correctly specify gravity model in order to avoid false interpretation and improper economic inference. Therefore, I extend the gravity model and estimate several additional specifications, including traditional macroeconomic variables. However this regression is performed without fixed effects.

$$FDI_{idt} = \beta_0 + \beta_1(\overline{FDI_{idt}}) + \beta_2(Proximity_{id}) + \beta_3(Y_{idt}) + \beta_4(\lambda_{nt}) + \epsilon_{idt} \quad (3)$$

Where $\lambda_{nt}$ represents explanatory variables.

In the fourth step I analyze whether there are differences in how the determinants influence three studied regions. Thus, I split the general panel into three regional panels such as Asia, CEEC and Latin America and perform multiple OLS regressions.

In order to increase validity of the analysis, preliminary inspection of the data is required. Firstly, volume of FDI is influenced by the three previous periods, therefore I introduce control variable $\overline{FDI_{idt}}$. The lagged variable is calculated according to

the following formula $\overline{FDI_{idt}} = (fdi_idt + fdi_idt(-1) + fdi_idt(1))/3$. Secondly, it is important to perform unit root test to check if the variables in the econometric model are stationary. Eviews User's Guide[5] suggests that panel based multiple-series unit root tests have higher power than unit root test based on individual time series. According to the results (see Appendix Table 7) all independent regresses are found to be stationary at 5 percent significance level expect GDP of both home and host countries. Therefore, these variables are lagged and accepted after taking unit root in the first difference.

Secondly, to investigate multicollinearity problem in the model, I presents correlation matrix in Table 8 of Appendix. There are highly correlated alternative explanatory variables that are used in main regression and robustness check. None of the other coefficients are close to 1 or -1, therefore explanatory and dependent variables are not mutually correlated.

The next section discusses the results of the estimated models.

# 5 Results

Following different econometric models, this section displays the results of the analysis of the performed regressions. This paper aims is to investigate the impact of geographical and cultural proximity combined with macroeconomic variables on the volume of FDI during the period 1992-2012. In the first step I outline the results of the broad panel models with and without fixed effects. In the second step, I investigate whether the determinants influence studied regions differently. Moreover, I modify the specifications of the regression and present the robustness check to ensure the results of the study.

[5]http://www.eviews.com

## 5.1 The estimation results

To increase the validity of the research prior to general econometrics analysis I performed preliminary inspection of the data that is discussed in the previous chapter. Econometric techniques for panel data are applied to test for exclusion of unit roots and causality, to avoid multucollinearity and control for stationarity.

### 5.1.1 The general panel

Table 2 below presents the estimation results of the broad OLS panel model including industrialized and developing countries. The dependent variable FDI in current US $ is lagged to control for unobserved influences on investments. Regression (1) is performed without fixed effects. The proportion of the sample variance of the dependent variable explained by the model is 51 %. The first column outline the results of the crude gravity model following specification of Equation 1. In this specification explanatory variables are average FDI, geographical distance, language proxy, GDP of the home and host economy, common spoken language index and bilateral variable that indicates if the countries had colonial past. Most of the explanatory variables are significant and have the expected influence on FDI. Average FDI reflects the information about the previous net investment periods, thus companies are more likely to invest in the countries with good investment climate. This variable is significant at 1% level. This result is supported by Loungani et al. 2002 findings which claim that there is lagged relationship between past and current business activity.

The second significant result reveal the negative and economically significant role of the geographical distance, confirming the earlier findings by Frenkel et al. (2004) and Buch et al. (2005) papers. This result is also consistent with Guerin (2006) who suggests that distance determines the cost of acquiring information before entering the market. If the distance between capital cities increases by one kilometre, the amount of investments received from industrialized countries decreases by 0.019 million of US

$. Interestingly, the negative influence of location is moderate, however it remains negative and statistically significant in all the regressions performed during econometric analysis in this paper.

This model includes two different language proximity variables. While linguistic index is found to be insignificant, common spoken language index has a significant deterring effect on FDI at 5% level. This provides further evidence for Svetlicic & Jakic (2013) and Oh et al., (2011) findings. The results verify positive and economically significant role of GDP for both industrialized and developing countries. This result is consistent with Joordan (2004) findings. The dummy reflecting the presence of colonial past is significant and has expected positive influence on the investments. The reason behind this result is that cultural similarities are boosting FDI flows as potential investors are more likely to have positive experience and understanding the way business should be held in the particular region (Guisinger, 1995).

Column (2) presents the estimated results of the first regression performed with Fixed Effects model. The fact that no explanatory variables, except distance proxy and average FDI, are significant suggest that the country-specific, time-invariant proximity variables account for a major part of the variation, confirming the importance in determining FDI. R-squared increased from 51 till 54 % suggesting that fixed effects model is preferred over the first regression.

Following Frenkel et all., (2004) model, in the 3 column I introduce GDP growth of the individual home countries and fixed effects of the developing economies remain. This specification is extension of the regression (2). In comparison to the fixed effects model, most of the home and host country explanatory variables come out significant with anticipated sign and approximately the same numbers as in the regression (1). While the negative impact of geographical and language distance insufficiently increased,

average FDI and GDP of the developing countries decreased. The R-squared value remains approximately the same as in the previous model. This model shows the best results and proves that previous literature used correctly specified models.

Finally, in the specification in column (4) I incorporate all the traditional macroeconomic determinant factors. The importance of proximity variables and GDP is confirmed, as they appear significant with almost identical coefficients as those in column (3). Although, expected sings of the coefficients are obtained none of these variables significantly affect the volume of FDI. A rather surprising result is that openness variable does not generate the expected positive sign. It has significant and negative influence on the FDI volume. If openess of the economy increases by 1 unit, investments decrease by 3.22 millions of US $. Frenkel et al. (2004) claim that oneness and risk indicator are alternative highly correlated variables. Therefore higher openness of economy might be associated with risk considerations that result in reduction of the volume of investments.

### 5.1.2 The regional panel

Table 3 reveals whether and how determinant factors affect FDI in three developing regions studied in this paper. The analysis concentrate on specifications (1), (2) and (4). Also, I exclude colony dummy variable as it did not prove to be statistically significant in the specifications (2) and (4).

According to the results distance plays a vital role in all the three regions. However, Asian region is slightly more influenced by the distance variable. If distance increases by 1 unit, in Asia FDI decreases by 0.049 millions of US dollars, while in CEEC and Latin America it is only 0.036 millions of US $. The results also verify importance of the previous economic activity as average FDI is statistically significant at 1 % confidence level. In the first specification for Asia and Latin America the size of the

**Table 2: Panel including industrialized and developing countries**

The Dependent Variable: FDI in Current US $, millions (Period 1992-2012)

| **Variable** | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| **Constant** | -135.107 | 1335.42*** | -142 | -117,356 |
| | (134.440) | (394.341) | (186.381) | (180.2) |
| **Average FDI** | 0.925*** | 0.801*** | 0.911*** | 0.910*** |
| | (0.025) | (0.031) | (0.027) | (0.027) |
| **Distancecap_id** | -0.019** | -0.053*** | -0.021*** | -0.022** |
| | (0.007) | (0.010) | (0.007) | (0.007) |
| **Langindex_id** | 11,196 | -31,033 | 21,175 | -9,994 |
| | (22.016) | (46.642) | (23.986) | (26.302) |
| **Colony_id** | 280.274* | 212.291 | 295.035** | 284.276 |
| | (145.691) | (154.361) | (147.34) | (152.707) |
| **CSL** | -642.676** | 448.313 | -766.833*** | -680.057* |
| | (239.409) | (449.102) | (271.236) | (272.318) |
| **DGDP_d** | 0.074** | 0.042 | 0.061** | 0,04 |
| | (0.028) | (0.033) | (0.029) | 0,034 |
| Lagged_GDP_d | -0.019** | -0,018 | -0,014 | -0,005 |
| | (0.007) | (0.015) | (0.007) | (0.009) |
| DGDP_i | 0.017 | -0,006 | 0,011 | 0,011 |
| | (0.011) | 0,016 | (0.011) | (0.012) |
| Lagged_GDP_i | 0.016*** | -0.015* | 0.017*** | 0.017*** |
| | (0.004) | (0.009) | (0.004) | (0.004) |
| Growth_i | | | 31.967** | 29,543 |
| | | | (16.303) | (15.943) |
| **Growth_d** | | | | 15.546 |
| | | | | (8.977) |
| **Open_d** | | | | -3.22* |
| | | | | (1.553) |
| **Inflation_d** | | | | -1,828 |
| | | | | (2.17) |
| **Exchange_d** | | | | -0,018 |
| | | | | (0.018) |
| Country_d fixed effects | | Yes | | |
| Country_i fixed effects | | Yes | Yes | |
| Period fixed effects | | Yes | | |
| Number of Observations | 1652 | 1652 | 1652 | 1568 |
| R-squared | 0,51 | 0,54 | 0,52 | 0,52 |
| F-statistic | 194.438*** | 39.769*** | 177.26*** | 119.741*** |
| AIC | 16,83 | 16,81 | 16,83 | 16,87 |
| DW | 2,1 | 2,09 | 2,1 | 2,1 |



Notes: *, **, *** significant at 10 %, 5 % and 1 %, respectively.

Source: Author's own calculations, using the matched data from OECD, WDI, UNTCAD, CEPII

developing economy market matters, however for CEEC the previous GDP of host and home county influence the volume of investments. Fixed effects model did not obtain significant results. Moreover, none of the obtained coefficients of the macroeconomic determinant factors in the regression (4) are statistically significant, apart from GDP growth of industrialized country in CEEC. It should be also pointed out that for Asia and CEEC R- squared is less that 50 % and for Latin America the highest proportion of 62% of the sample variation is explained. The lowest proportion of the model of 28% is explained by CEEC countries in regression (1). This result could be explained that for CEEC countries other macroeconomic determinant factors are more important in attracting foreign capital.

## 5.2 Robustness Checks

The first important issue is to ensure that the results are robust and truly capture the effect of distance and cultural proximity. The robustness check serve as an additional support for the proposed model as it capture if the results are stable after several modifications are performed to the regression. Table 3 demonstrates the results of 3 initial OLS regressions with different determinants. First column includes the alternative measure of linguistic and geographical proximity. While in the initial regression I use common spoken language index, in robustness check I introduce language diversity index and border dummy variable. Greenberg index is obtained from Ethnologue research project and created from the West and Graham (2004) index. Ethnologue presents countries of the world in order of their linguistic diversity, the Greenberg diversity index means that any two people of the country selected at random would have the same mother tongue and spreads between lowest possible value 0 and highest possible value 1. The computation of the diversity index is based on the population of each language as a proportion of the total population[4]. Moreover, I include bilateral dummy variable that indicates whether countries are bordering or

[4]https://www.ethnologue.com/statistics/country

**Table 3: Regional Panel**

The Dependent Variable: FDI in Current US $, millions

Period 1992-2012

| **Variable** | **(1)** | **(2)** | **(4)** | **(1)** | **(2)** | **(4)** | **(1)** | **(2)** | **(4)** |
|---|---|---|---|---|---|---|---|---|---|
| | | **Asia** | | | **CEEC** | | | **Latin America** | |
| **Constant** | 87.45 | 1238.763 | -81.425 | -278.62 | 366.58 | -137.157 | 310.69 | 659.92 | 382.26 |
| | (272.43) | (749.89) | (412.05) | (161.08) | (1213.05) | (226) | (300.82) | (944.57) | (360.61) |
| **Average FDI** | 0.909*** | 0.794*** | 0.888*** | 0.646*** | 0.432*** | 0.623*** | 0.935*** | 0.824*** | 0.919*** |
| | (0.052) | (0.063) | (0.058) | (0.064) | (0.078) | (0.066) | (0.036) | (0.044) | (0.039) |
| **Distancecap_id** | -0.049** | -0.02 | -0.057** | -0.036** | -0.108 | -0.038** | -0.036** | -0.0074 | -0.038** |
| | (0.018) | (0.06) | (0.024) | (0.014) | (0.117) | (0.015) | (0.016) | (0.05) | (0.017) |
| **CSL** | -399.11 | 1138.518 | 253.52 | 211.396 | -952.91 | 135.01 | -1505.435 | 2307.99 | -1265 |
| | (479.79) | (821.49) | (558.2) | (245.37) | (895.47) | (272.647) | (854.65) | (2016.57) | (925.07) |
| **DGDP_d** | 0.316* | -0.112 | 0.171 | 0.027 | 0.04 | 0.0107 | 0.151*** | 0.179*** | 0.121** |
| | (0.15) | (0.197) | (0.211) | (0.029) | (0.05) | (0.038) | (0.045) | (0.058) | (0.057) |
| **Lagged_GDP_d** | -0.02 | 0.051 | 0.062 | -0.027*** | -0,02 | -0.012 | 0.026 | 0.033 | 0.023 |
| | (0.02) | (0.084) | (0.052) | (0.008) | (0.02) | (0.012) | (0.019) | (0.039) | (0.023) |
| **DGDP_i** | 0.037 | -0.024 | 0.03 | 0.003 | 0,003 | -0.002 | 0.007 | 0.017 | 0.007 |
| | (0.02) | (0.03) | (0.024) | (0.016) | (0.022) | (0.017) | (0.018) | (0.027) | (0.019) |
| **Lagged_GDP_i** | 0.016* | -0.019 | 0.017 | 0.022*** | 0.011 | 0.021*** | 0.002 | -0.022 | 0.005 |
| | (0.007) | (0.016) | (0.009) | (0.006) | (0.01) | (0.007) | (0.007) | (0.015) | (0.008) |
| **Growth_i** | | | 44.86 | | | 51.40** | | | 9.327 |
| | | | (32,715) | | | (22.58) | | | (26.96) |
| **Growth_d** | | | 13,751 | | | 2.518 | | | 9.121 |
| | | | (22,374) | | | (13.024) | | | (15.08) |
| **Open_d** | | | -4.402 | | | -5.218 | | | -5.395 |
| | | | (3,616) | | | (3.48) | | | (6.378) |
| **Inflation_d** | | | 28,308 | | | 3.225 | | | -2.341 |
| | | | (19,301) | | | (2.179) | | | (3.847) |
| **Exchange_d** | | | -0,015 | | | 0.078 | | | -0.078 |
| | | | -0,027 | | | (0.567) | | | (0.077) |
| Fixed effects | | Yes | | | Yes | | | Yes | |
| Number of Observations | 612 | 612 | 546 | 452 | 452 | 434 | 588 | 588 | 588 |
| R-squared | 0,45 | 0,49 | 0,46 | 0,28 | 0,36 | 0,29 | 0,62 | 0,65 | 0,622 |
| F-statistic | 63.497*** | 16.672*** | 37.907*** | 25.619*** | 6.872*** | 14.98*** | 135.757*** | 30.268*** | 79.04*** |
| AIC | 17,15 | 17,16 | 17.25 | 15,99 | 16 | 16,037 | 16,853 | 16,86 | 16,86 |
| DW | 2,3 | 1,87 | 2,3 | 1,87 | 1,88 | 1,9 | 1,88 | 1,88 | 1,88 |

Notes: *, **, *** significant at 10 %, 5 % and 1 %, respectively.

Source: Author's own calculations, using the matched data from OECD, WDI, UNTCAD, CEPII

not. Column 2 reports results based on fixed effects estimation. Column 3 determine the effect of explanatory variables on FDI by examining the complete form of the modified gravity model.

Column 1 show that all the variables have anticipated signs. However, the geographical distance and alternative language index are not significant. The shared border dummy variable has a positive significant influence on FDI flows. This result is expected as the closer the country pair the less transaction costs occur. Nevertheless it should be mentioned that presence of national borders reduce trade flows between industrialized countries up till 50% (Anderson & Wincoop, 2003). Common spoken language index and dummy indicating shared colonial history remain the same in terms of size and significance level.

Regression 2 contains the lowers Akaike Information Criterion that is equal to 16.8. Moreover 54% of variation could be explained by the model with fixed effects. Results based on fixed effects estimation show that 1 unit increase in the geographical distance decreased the amount of bilateral FDI by 0.046 US $. While, Greenberg index for industrialized countries is positive and significant at 1%, language diversity index for developing economies is not significant and changed the sign in comparison to the previous regression. The presence of shared border is positively related to foreign investments. However, Anderson and van Wincoop (2003) found evidence that bordering with a home country reduce the volume of trade due to the difference in market size.

The third column highlight the results of the complete form of the modified gravity model, which includes proximity, market and macro economic variables. For robustness check other inflation variable is introduced. The inflation variable ($INF_{dt}$) is calculated according to the annual growth rate of the country. Inflation GDP deflator (annual

%) is measured by the annual growth rate of the GDP implicit deflator that shows the rate of price change in the economy as a whole. The GDP implicit deflator is the ratio of GDP in current local currency to GDP in constant local currency. There is not much difference between the obtained results for average FDI, geographical distance, common spoken language and presence of shared border in comparison to the first regression. A remarkable result is that the openness indicator as well as in the regression (1)is negatively related to FDI. If annual sum of exports and imports normalized by nominal gross domestic product increase by 1 unit then FDI decreases by 3.559 US $.

Finally, all the variables in the regressions jointly could influence the independent variable FDI, as F-test is significant at 1% level. Moreover, since panel data includes time-series, it is important to check for autocorrelation. In all the regressions Dublin Watson statistics is close to 2, therefore there is no first order correlation. Throughout the robustness checks, modification of the model does not change the overall results of the previously performed regressions.

## 5.3 Discussions and limitations

The results of the research are interpreted taking into account limitations. First, more harmonious data should be obtained. The results of the study are based on particular data set. Although in panel data there are more numbers of data points that generate additional degrees of freedom which improve the efficiency of the econometric estimates there is limited available data on bilateral FDI. To my best knowledge, OECD database contains the most complete data for the countries included in this research. Different databases employ various techniques to calculate the volume of bilateral investments. Therefore, it might be interesting to conduct the same research using other data.

**Table 4: Robustness check Panel including industrialized and developing countries**

| The Dependent Variable: FDI in Current US $, millions (Period 1992-2012) | | | |
|---|---|---|---|
| Variable | **(1)** | **(2)** | **(4)** |
| **Constant** | -206.561 | 947.65 | -286,596 |
| | (145.713) | (570.774) | (203.443) |
| **Average FDI** | 0.913*** | 0.769*** | 0.908*** |
| | (0.027) | (0.033) | (0.03) |
| *Distancecap_id* | -0.011 | -0.046*** | -0.011** |
| | (0.006) | (0.010) | (0.009) |
| **Langindex_id** | 11,196 | -31,033 | -9,994 |
| | (22.016) | (46.642) | (26.302) |
| **Colony_id** | 280.274* | 212.291 | 284.276 |
| | (145.691) | (154.361) | (152.707) |
| **CSL** | -642.676** | 448.313 | -680.057* |
| | (239.409) | (449.102) | (272.318) |
| **DGDP_d** | 0.07* | 0.043 | 0,035 |
| | (0.028) | (0.033) | 0,04 |
| **Lagged_GDP_d** | -0.027*** | -0,019 | -0,012 |
| | (0.008) | (0.014) | (0.012) |
| **DGDP_i** | 0.016 | -0,006 | 0,018 |
| | (0.011) | 0,016 | (0.013) |
| **Lagged_GDP_i** | 0.018*** | -0.014 | 0.019*** |
| | (0.004) | (0.009) | (0.005) |
| **GI_D** | -83,498 | 552,518 | 20,067 |
| | (98.535) | (1082.495) | (11.017) |
| **GI_I** | -91,295 | -1138.5*** | 21,616 |
| | (192.397) | (285.001) | (18.138) |
| **Border_id** | 380.292* | 557.454*** | 381.504* |
| | (151.878) | (162) | (171.859) |
| **Growth_i** | | | 21,616 |
| | | | (18.138) |
| **Growth_d** | | | 20.067 |
| | | | (11.017) |
| **Open_d** | | | -3.559* |
| | | | (1.696) |
| **Inflation_d** | | | -0,767 |
| | | | (2.569) |
| **Exchange_d** | | | -0,019 |
| | | | (0.019) |
| Fixed effects | | Yes | |
| Number of Observations | 1652 | 1652 | 1324 |
| R-squared | 0,51 | 0,54 | 0,53 |
| F-statistic | 194.175*** | 41.912*** | 106.92*** |
| AIC | 16,82 | 16,8 | 16,96 |
| DW | 2,09 | 2,08 | 2,1 |

Notes: *, **, *** significant at 10 %, 5 % and 1 %, respectively.

Source: Author's own calculations, using the matched data from OECD, WDI, UNTCAD, CEPII

Second, empirical research suggest other possible solutions to measure distance. Altamonte and Guagliano (2003) conduct a comparative study in Europe. Frankfurt is assumed to be an ideal Central European location. Therefore, they use the standard route software to calculate the distance in kilometers between the host city and the ideal city. Tintin (2013) employ geographical distance from Brussels as the proxy for CEEC capital cities. Frenkel et al. (2004) claim that linear distance between the capitals of trading partners is a proper measure of bilateral FDI flows. Regarding the methodology, the above studies build log-linearized gravity models (Lin, 2013). Due to reinvestments data points contain negative values, thus the parameters of log-linearized gravity models estimated by OLS might be highly misleading. Therefore, the matched data set in this paper includes investments with negative sign.

Third, superior econometric models and statistic program could possibly solve the problem of statistically fragile results and increase the validity of the study.

To summarize the suggestion how to overcome limitations for the future potential study, the following recommendations should be taken into account: (1) obtaining more homogeneous data that would lead to extending the sample of countries and increasing the time frame, (2) comprising more reliable cultural and language proxies and (3) employing different econometrics technique and more advanced statistical tool.

# 6 Conclusion

FDI is an important instrument in developing global linkages between source and home economies. A stream of academic papers research the factors that influence the direction and volume of investments. Finding this relationship provides policy makers with the necessary information to take better decisions.

In this paper I demonstrate that FDI flows can prove useful in achieving understanding of global linkages between six industrialized economies and 18 developed economies located in three regions during the period from 1992 to 2012. This research is extending the existing literature by using a linguistic proxy that determines the similarities in native and spoken language between the countries. To identify the factors that encourage and impede investments from source countries, I include additional location variable that indicates the bilateral distance between the most populated cities. Simultaneously comprising a set of proximity, market and macroeconomic variables gives an opportunity to get a broader understanding of the major determinant factors.

In the first step, I build crude and extended gravity models to research the push and pull factors fo FDI in both source and host countries. Like previous papers, the results present further evidence on the negative relationship between foreign investments and location. Therefore even with the onset of globalization, development of transport and transactional networks geographical distance still matters. The obtained results also predict negative influence of linguistic distance on the investments. The reason behind this finding is that shared common language simplify negotiations that might lead to the reduction of transactional costs for both business partners. Presence of colonial ties between markets verify positive and significant influence on source countries as investors are more confident in particular partners with whom they had previous business linkages. For both markets GDP is a vital determinant that is positively associated with FDI. The other control variables except for the economic openness

indicator are insignificant. This finding is puzzling as the openness variable did not generate the expected positive relation. Frenkel et al. (2004) suggest that oneness and risk indicator are alternative highly correlated variables. Therefore, higher openness of economy is associated with risk considerations that result in the decline of FDI. If more data becomes available, further research would shed some lights upon this findings.

In the second step, I split the data set in three regional panels to examine the direction and volume of FDI for the three markets. This allows to highlight some regional differences as well as regional similarities. Main findings of a negative distance effect is still remaining significant for all of the three regions. While for Latin America findings show significance for host country GDP, for CEEC countries economic growth of the industrialized counties matters.

The general result of this thesis suggest that even in the 21st century of technological progress location and linguistic proximity influence the probability of FDI projects.

It is worth mentioning that the obtained results apply only for the studied sample and should not be generalized for other markets. Therefore, an important challenge for the future research is still remaining. The most important recommendation for the potential study to overcome limitations is to obtain more homogeneous data, extend the sample of countries and increase the time frame.

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# 7 Appendix

Table 1 shows total FDI outflows in millions of US $. The table distinguish between total investment outflows from world, developing/ developed countries and members of G-7. Also the table provides information how much % it consists of the total world outflows.

Table 1: **Total outflows (US $ in millions)**

| | **World** | **Developing economies** | **% of of world** | **Developed economies** | **% of of world** | **G-6** | **% of developed** |
|---|---|---|---|---|---|---|---|
| **1992** | 203810 | 22504 | 11% | 179741 | 88.2% | 134090 | 75% |
| **1993** | 236299 | 34308 | 14.5% | 200967 | 85% | 161327 | 80% |
| **1994** | 285373 | 45789 | 16% | 239271 | 83.8% | 172080 | 72% |
| **1995** | 356651 | 52069 | 14.6% | 303966 | 85.2% | 218729 | 72% |
| **1996** | 392347 | 60504 | 15.4% | 330922 | 84.3% | 229295 | 69% |
| **1997** | 467439 | 65290 | 14% | 398921 | 85.3% | 273295 | 69% |
| **1998** | 681040 | 42866 | 6.3% | 636864 | 93.5% | 431892 | 68% |
| **1999** | 1077058 | 56160 | 5.2% | 1018670 | 94.6% | 675849 | 66% |
| **2000** | 1166145 | 89043 | 7.6% | 1073909 | 92% | 650273 | 61% |
| **2001** | 584021 | 58201 | 10% | 523267 | 89.6% | 367312 | 70% |
| **2002** | 491390 | 36618 | 7.5% | 450674 | 91.7% | 300503 | 67% |
| **2003** | 532023 | 39372 | 7.4% | 481969 | 90.6% | 286055 | 59% |
| **2004** | 887630 | 112445 | 12.7% | 761404 | 85.8% | 511730 | 67% |
| **2005** | 795910 | 109560 | 13.8% | 667170 | 83.8% | 371393 | 56% |
| **2006** | 1344578 | 202727 | 15% | 1111544 | 82.7% | 630452 | 57% |
| **2007** | 2129622 | 269645 | 13% | 1809843 | 85% | 1223651 | 68% |
| **2008** | 1693969 | 275169 | 16.2% | 1359594 | 80.3% | 914273 | 67% |
| **2009** | 1101335 | 234522 | 21.3% | 819605 | 74.4% | 599937 | 73% |
| **2010** | 1366152 | 340876 | 25% | 963293 | 70.5% | 596998 | 62% |
| **2011** | 1587601 | 357570 | 22.5% | 1156290 | 72.8% | 795148 | 69% |
| **2012** | 1283653 | 357249 | 27.8% | 872839 | 68% | 649227 | 74% |

Source: UNCTAD (2015)

Table 2 shows total FDI inflows in millions of US $. The table distinguish between total investment inflows to world, developing/ developed countries, members of G-7 and three regions. Also the table provides information how much % it consists of the total world inflows.

Table 2: **Total inflows (US $ in millions)**

| | World | Developing economies | As % of world | Developed economies | As % of world | G-6 | As % of developed | Africa | Latin America | Asia | CEEC |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **1992** | 163007 | 53407 | 32.8% | 107949 | 66.2% | 57321 | 53% | 3801 | 10535 | 33359 | 2541 |
| **1993** | 220146 | 75705 | 34.4% | 141417 | 64.2% | 85474 | 60% | 5444 | 8047 | 56253 | 5660 |
| **1994** | 254906 | 102387 | 40.2% | 150584 | 59% | 88169 | 59% | 6104 | 14977 | 68445 | 5327 |
| **1995** | 341537 | 117767 | 34.5% | 219772 | 64.3% | 117371 | 53% | 5655 | 18625 | 81704 | 15191 |
| **1996** | 388737 | 147072 | 37.8% | 236327 | 60.8% | 142610 | 60% | 6038 | 32641 | 97332 | 11401 |
| **1997** | 481230 | 185721 | 38.6% | 285703 | 59.3% | 188295 | 66% | 11030 | 49300 | 108595 | 14577 |
| **1998** | 692336 | 176631 | 25.5% | 508537 | 73.5% | 327368 | 64% | 11627 | 52675 | 93555 | 20152 |
| **1999** | 1076313 | 216179 | 20% | 852978 | 79.2% | 490335 | 57% | 11835 | 69632 | 115383 | 22197 |
| **2000** | 1363215 | 232216 | 17% | 1125227 | 82.5% | 706356 | 63% | 9624 | 57106 | 142788 | 24357 |
| **2001** | 684071 | 215594 | 31.5% | 460726 | 67.3% | 309787 | 67% | 19947 | 37851 | 122807 | 22064 |
| **2002** | 591386 | 166732 | 28.2% | 414570 | 70.1% | 221925 | 54% | 14693 | 27990 | 95756 | 27319 |
| **2003** | 551993 | 196308 | 35.6% | 337648 | 61.2% | 171213 | 51% | 18231 | 22685 | 131604 | 19112 |
| **2004** | 682749 | 264080 | 38.7% | 389512 | 57% | 295671 | 76% | 17738 | 36984 | 177939 | 40171 |
| **2005** | 927402 | 330178 | 35.6% | 565423 | 61% | 428028 | 76% | 29506 | 44074 | 224983 | 49408 |
| **2006** | 1393034 | 403881 | 29% | 930175 | 66.8% | 581252 | 62% | 34528 | 43574 | 294410 | 64259 |
| **2007** | 1871702 | 528536 | 28.2% | 1254988 | 67% | 626782 | 50% | 50206 | 73292 | 360562 | 74831 |
| **2008** | 1489732 | 585647 | 39.3% | 787761 | 52.8% | 441305 | 56% | 57770 | 94249 | 387838 | 67404 |
| **2009** | 1186513 | 463637 | 39% | 652306 | 55% | 309337 | 47% | 54379 | 57740 | 323793 | 30372 |
| **2010** | 1328215 | 579891 | 43.6% | 673223 | 51% | 359759 | 53% | 44072 | 96345 | 401851 | 31980 |
| **2011** | 1564935 | 639135 | 40.8% | 828447 | 53% | 391865 | 47% | 47705 | 127426 | 425308 | 43196 |
| **2012** | 1403115 | 639022 | 45.5% | 678960 | 48.3% | 221392 | 33% | 56435 | 143881 | 400840 | 43380 |

Table 3 presents the list of the countries included in this research.

Table 3: **Sample of countries**

| Industrialized Economies | | Developing Economies | |
|---|---|---|---|
| G 7 | Asia | Latin America | CEE |
| Germany | India | Chile | Czech republic |
| France | Indonesia | Mexico | Hungary |
| U.S. | China | Argentina | Poland |
| U.K. | Thailand | Brazil | Slovenia |
| Japan | Malaysia | Colombia | Turkey |
| Italy | Philippines | Venezuela | Latvia |

Table 4: **Explanation of the variables & sources**

| **Variable name** | **Description** | **Data source** |
|---|---|---|
| FDI (dependent variable) | Bilateral Foreign Direct Investnemt outflows from the industrialized to the developing country | UNTCAD |
| Cultural proxy | Bilateral (Dummy) variables of common spoken language, common official language, colonial ties | CEPII, Ethnologue |
| Dist | The value of geographical distance between the biggest cities of the two countries. Thebilateral distances are weighted by the share of the city in the overall country's population | CEPII |
| GDP | The value of Gross Domestic Product per capita of home/host economy | WDI |
| GDPgr | The annual percentage growth rate of Gross Domestic Product | WDI |
| Open | The value of trade openess indicator. Expressed as average of exports and imports of goods and services of host economy divided by GDP | UNCTAD |
| Inf | The value of annual consumer price indices of host economy | UNCTAD |
| Exc | The value of official exchange rate of the host economy | WDI |

The Table 5 shows the total number of FDI inflows in US millions of $. The first column contains the total FDI of all the developing economies according to United Nations Conference on Trade and Development (UNCTAD) classification. The last column indicates how many % the studied sample compile from the total number of FDI inflows received by Developing economies.

Table 5: **FDI inflows to developing markets and importance of countries included in the study (US $ in millions)**

| | **Developing economies** | **Latin America** | **Asia** | **CEEC** | **Total inflows to host countries** | **As % of developing countries** |
|---|---|---|---|---|---|---|
| **1992** | 53407 | 14486 | 19325 | 3142 | 36952 | 69% |
| **1993** | 75705 | 10884 | 36833 | 5604 | 53321 | 70% |
| **1994** | 102387 | 21600 | 42282 | 4824 | 68706 | 67% |
| **1995** | 117767 | 24450 | 49016 | 12540 | 86006 | 73% |
| **1996** | 147072 | 37035 | 55406 | 10507 | 102947 | 70% |
| **1997** | 185721 | 58018 | 60330 | 12041 | 130389 | 70% |
| **1998** | 176631 | 61345 | 60054 | 14963 | 136362 | 77% |
| **1999** | 216179 | 79665 | 53735 | 18148 | 151548 | 70% |
| **2000** | 232216 | 73498 | 53741 | 18638 | 145877 | 63% |
| **2001** | 215594 | 65080 | 58177 | 18973 | 142231 | 66% |
| **2002** | 166732 | 48241 | 66473 | 18367 | 133081 | 80% |
| **2003** | 196308 | 38780 | 65415 | 10476 | 114671 | 58% |
| **2004** | 264080 | 59240 | 79475 | 25748 | 164463 | 62% |
| **2005** | 330178 | 64987 | 102350 | 40380 | 207717 | 63% |
| **2006** | 403881 | 59011 | 116439 | 53217 | 228667 | 57% |
| **2007** | 528536 | 98124 | 138669 | 61165 | 297959 | 56% |
| **2008** | 585647 | 112104 | 181903 | 48974 | 342981 | 59% |
| **2009** | 463637 | 66564 | 143782 | 25014 | 235359 | 51% |
| **2010** | 579891 | 110715 | 175426 | 30700 | 316841 | 55% |
| **2011** | 639135 | 138194 | 194661 | 45553 | 378408 | 59% |
| **2012** | 639022 | 145580 | 184854 | 44210 | 374644 | 59% |

Source: UNTCAD (2015)

Table 6: **Descriptive statistics**

| | **Mean** | **Median** | **Maximum** | **Minimum** | **Std. Dev.** |
|---|---|---|---|---|---|
| FDI_IDT | 674,2699 | 171,493 | 15971 | -7512 | 1571,823 |
| EXC_D | 462,007 | 13,51348 | 10389,94 | 0,001953 | 1686,826 |
| GI_D | 0,387005 | 0,394 | 0,914 | 0,022 | 0,338434 |
| GI_I | 0,264895 | 0,334 | 0,471 | 0,035 | 0,1464 |
| GDP_I | 33916,44 | 34620,93 | 51456,66 | 18389,02 | 8506,339 |
| GDP_D | 5732,772 | 4392,35 | 22649,38 | 308,5348 | 4639,197 |
| GROWTH_D | 4,425195 | 4,769475 | 14,19496 | -14,18598 | 3,837007 |
| GROWTH_I | 1,489849 | 1,786127 | 4,6852 | -5,637954 | 2,019381 |
| INFLWDI_D | 28,57308 | 5,401965 | 2075,887 | -1,407892 | 181,3597 |
| LI_ID | 0,933701 | 0 | 3,891733 | 0 | 1,263537 |
| OPENNEW_D | 38,82819 | 29,2234 | 105,9192 | 7,057658 | 24,31528 |
| DISTCAP_ID | 6998,778 | 8225,232 | 17693,2 | 279,8608 | 4191,237 |
| CSL | 0,131675 | 0,096 | 0,663115 | 0 | 0,13702 |
| CPI_D | 28,53693 | 5,40355 | 2075,888 | -1,401472 | 181,345 |
| COLONY_ID | 0,04916 | 0 | 1 | 0 | 0,216269 |
| BORDER_ID | 0,044804 | 0 | 1 | 0 | 0,206938 |

Table 7 presents the results of unit root test. GDP of both home and host countries are lagged and accepted after taking unit root in the first difference.

Table 7: **Panel Unit root test Levin, Lin & Chu t***

| **Variable** | **Statistics** | **Prob** |
|---|---|---|
| **FDI_av** | 8.20229 | 1 |
| first difference | -107.823 | 0.0000 |
| **GDP_i** | -56135 | 0.2873 |
| first difference | -23,066 | 0.0000 |
| **GDP_d** | 145.110 | 1 |
| first difference | -163.303 | 0.0000 |
| **Open_d** | 111 | 1 |
| first difference | 111 | 0.0000 |

Table 8: **Correlation matrix**

| | **FDI** | **EX_D** | **GI_D** | **GI_I** | **GD_I** | **GD_D** | **GR_D** | **GR_I** | **INF** | **LI** | **OP** | **DIST** | **CSL** | **CPI** | **COL** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **FDI** | 1 | | | | | | | | | | | | | | |
| **EX_D** | -0.029 | 1 | | | | | | | | | | | | | |
| **GI_D** | -0.042 | 0.133 | 1 | | | | | | | | | | | | |
| **GI_I** | -0.047 | -0.009 | -0.010 | 1 | | | | | | | | | | | |
| **GD_I** | 0.277 | 0.146 | 0.04 | -0.158 | 1 | | | | | | | | | | |
| **GD_D** | 0.038 | -0.146 | -0.489 | 0.022 | 0.413 | 1 | | | | | | | | | |
| **GR_D** | 0.109 | 0.042 | 0.305 | -0.002 | 0.020 | -0.262 | 1 | | | | | | | | |
| **GR_I** | 0.029 | -0.058 | -0.011 | -0.032 | -0.164 | -0.146 | 0.289 | 1 | | | | | | | |
| **INF** | -0.001 | -0.031 | -0.110 | -0.002 | -0.124 | -0.072 | -0.022 | 0.012 | 1 | | | | | | |
| **LI** | 0.006 | -0.049 | -0.589 | 0.236 | -0.097 | 0.309 | -0.202 | 0.008 | 0.112 | 1 | | | | | |
| **OP** | -0.122 | -0.144 | 0.189 | 0.001 | 0.126 | 0.357 | -0.062 | 0.005 | -0.151 | -0.274 | 1 | | | | |
| **DIST** | -0.058 | 0.191 | 0.252 | -0.108 | 0.173 | -0.294 | 0.090 | 0.011 | 0.063 | -0.160 | -0.108 | 1 | | | |
| **CSL** | -0.121 | -0.187 | 0.025 | 0.144 | 0.021 | 0.235 | -0.109 | 0.126 | -0.094 | 0.096 | 0.289 | -0.263 | 1 | | |
| **CPI** | -0.001 | -0.031 | -0.110 | -0.002 | -0.124 | -0.072 | -0.022 | 0.012 | 0.999 | 0.112 | -0.151 | 0.063 | -0.094 | 1 | |
| **COL** | 0.037 | -0.059 | 0.165 | -0.028 | 0.001 | -0.093 | 0.053 | 0.051 | -0.027 | -0.074 | 0.062 | 0.028 | 0.336 | -0.027 | 1 |
| **BOR** | 0.269 | -0.054 | -0.183 | 0.169 | -0.007 | 0.164 | -0.057 | 0.029 | -0.023 | 0.173 | 0.024 | -0.300 | 0.255 | -0.023 | 0.242 |