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Corruption Distance and Foreign Direct Investment: Evidence from European Transition Economies

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Declaration of Authorship

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Prague, 10th May 2019 Bin Yu

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Abstract

This dissertation builds on Cezar and Escobar's (2015) study of the relationship between institutional distance and foreign direct investment (FDI), but focuses instead on the nexus between corruption distance and FDI. Along the lines of their study, this dissertation uses a two-stage gravity model derived from the framework of heterogeneous firms to empirically estimate the impact of corruption distance on the inward and outward FDI of European transition economies. This dissertation contributes to the literature in several aspects. First, it proposes a new method for measuring corruption distance, considering the importance of firms' previous experience to the development of necessary skills for navigating a foreign business environment. Second, the empirical study distinguished the impact of corruption distance on the extensive and intensive margin by using a rich dataset with three different corruption indices, which thereby differs from most previous studies on this topic. This is also one of the few papers that specifically study this topic in the context of European transition economies. The results show that both conventional and adjusted corruption distance based on the control-of-corruption index only reduces the extensive margin of transition economies' FDI; and that the magnitude of marginal effects at the sample means is smaller when using the adjusted version. On the other hand, the results are also dependent on the original source of the corruption index used to determine corruption distance. Therefore, this dissertation indicates that the existing empirical studies on this topic are far from robust when considering the source and measurement of corruption distance in the literature.

Keywords

Corruption Distance, FDI, Gravity Model, Heterogeneous Firms, European Transition Economies

Abstrakt

Tato disertační práce navazuje na studii Cezara a Escobara (2015) o vztahu mezi institucionální vzdáleností a přímými zahraničními investicemi (PZI), ale místo toho se zaměřuje na spojitost mezi korupční vzdáleností a přímými zahraničními investicemi. Tato disertační práce v rámci své studie využívá dvoustupňového gravitačního modelu odvozeného z rámce heterogenních firem k empirickému odhadu dopadu korupční vzdálenosti na vnitřní a vnější přímé zahraniční investice evropských transformujících se ekonomik. Tato práce přispívá k dosud existující literature v několika aspektech. Nejprve navrhuje novou metodu měření vzdálenosti korupce s ohledem na důležitost předchozích zkušeností firem s rozvojem potřebných dovedností pro orientaci v zahraničním podnikatelském prostředí. Za druhé, empirická studie odlišila dopad korupční vzdálenosti na rozsáhlé a intenzivní rozpětí pomocí bohaté datové sady se třemi různými indexy korupce, což se liší od většiny předchozích studií na toto téma. Je to také jeden z mála článků, které toto téma konkrétně studují v kontextu evropských transformujících se ekonomik. Výsledky ukazují, že jak konvenční, tak upravená vzdálenost korupce založená na kontrole indexu nadměrných investic korupce snižuje pouze rozsáhlé rozpětí přímých zahraničních investic tranzitivních ekonomik; a že velikost okrajových efektů u vzorku je menší při použití upravené verze. Na druhé straně jsou výsledky také závislé na původním zdroji indexu korupce, který slouží k určení vzdálenosti korupce. Tato disertační práce proto ukazuje, že stávající empirické studie na toto téma nejsou zdaleka robustní, pokud uvažujeme o zdroji a měření vzdálenosti korupce v literatuře.

Klíčová slova

Korupční vzdálenost, PZI, Gravitační Model, Heterogenní Firmy, Evropské Transformační Ekonomiky

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Chapter 1: Introduction

Foreign Direct Investment (FDI) is defined as investment in which a firm acquires substantial ownership over a foreign firm or creates a subsidiary in a foreign country[1] (Markusen, 1995; Navaretti, Venables and Barry, 2006). It is known as a major contributor to economic growth, as it brings extensive capital to the host economy and other indirect benefits through spill-over effects (Hansen and Rand, 2006; Mehic et al., 2013).

FDI also provides an important source of capital for countries struggling to transition from a central planning system to a market economy, due to a lack of savings and external support (Lavigne, 1999). Studies find that inward FDI significantly contributes to economic growth and market restructuring in transition economies (Okafor and Webster, 2016). On the other hand, previously published literature has paid little attention to transition economies' outward FDI, whereas businesses in the region need reliable information to support their international expansion. For example, Jaklic and Svetlicic (2017) find that Slovenian firms have started investing abroad heavily since 2003. Therefore, research on the determinants of FDI should be of particular interest to policymakers and businesspeople in transition economies.

Since 2002, researchers have begun to consider the role of corruption distance as a determinant of FDI (Habib and Zurawicki, 2002; Cuervo-Cazurra, 2006; Godinez and Liu, 2015; Cezar and Escobar, 2015; Qian and Sandoval-Hernandez, 2016). Conventional "corruption distance" was defined as the relative difference between corruption levels in home and host countries (Habib and Zurawicki, 2002). It builds on the concept of psychic distance (Johanson and Vahlne, 1977) that is commonly used in the gravity model, acting as resistance in the trade flows between two countries. Similar concepts include cultural distance (Shenkar, 2001) and institutional distance (Schwens, Eiche, and Kabst, 2011). In practice, it is usually the difference between the corruption level of home and host counties in a particular year.

This dissertation aims to study the impact of corruption distance on transition economies' FDI through adaptation costs based on heterogeneous firms framework. This is motivated by the link between institutional distance and adaptation cost in Cezar and Escobar's (2015) model of heterogeneous firms. According to the original model, institutional distance induces adaptation costs and thus increases the productivity threshold that firms must reach in order to make FDI more profitable than exports. Therefore, corruption distance may also induce adaptation costs

[1] FDI activity is typically conducted by so-called multinational enterprises, or MNEs.

and thus influence FDI, but likewise, the resulting effects may be on the probability of new investment (extensive margin) or on the amount of FDI from MNEs (intensive margin).

However, the conventional estimation method for corruption distance might be inconsistent with the concept of adaptation costs when considering FDI from transition economies. This is because investors from transition economies have developed their skills in a business environment that has changed over the course of the transition period. For example, most of these investors have experienced the economic environment of the central planning system, the dramatic introduction of privatisation, and the swift growth of the market economy. Institutions, as well as the business environment have changed rapidly in these transition economies (Bevan, Estrin and Meyer, 2004). Changes in the overall levels of corruption as an integral part of institutional development are also large, but the changes are not consistently positive or negative. As a result, businesspeople from transition economies have developed their skills for dealing with corruption in their domestic market where the corruption level and the business environment have undergone notable changes. Therefore, it is inappropriate to use the conventional corruption distance model, which only considers the difference between two corruption levels in a particular year. In light of the above, the new definition and the resulting measurement of corruption distance should, therefore, consider the development of a firm's skills.

Therefore, this dissertation also aims to adjust the conventional proxy of corruption distance by introducing the development of firms' skills into the measurement (this dissertation refers to that reconstructed corruption distance as adjusted corruption distance). More specifically, in order to link corruption distance to adaptation costs in the model, this dissertation argues that corruption distance should be defined as the gap between the corruption level in the host country and the corruption level that firms are sufficiently able to deal with.

On the empirical side, this dissertation estimates the impact of corruption distance on FDI by regressing a two-stage gravity equation derived from Cezar and Escobar's (2015) theoretical model. Data are collected from multiple internationally recognised databases covering 11 Europeans transition economies,[2] 18 industrial countries, and 27 developing countries from

[2] Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovak Republic, Slovenia

2001 to 2012.[3] The dissertation estimates the model for outward and inward FDI of transition economies, respectively. All estimates for conventional corruption distance are accompanied by their corresponding adjusted corruption distance. In addition, this dissertation also estimates the outward FDI from transition economies to industrial and developing countries, respectively.

The findings show that corruption distance reduces the extensive margin of both transition economies' inward and outward FDI, but has no impact on the intensive margin, using the conventional measurement of corruption distance using Control of Corruption index, from the Worldwide Governance Indicator (World Bank). This is in line with Cezar and Escobar's results, but are derived using different samples. Besides, the results show that corruption distance discourages firms from transition economies from investing in developing countries, but it does not affect firms' decisions to invest in industrial countries. However, the impacts greatly changed when using different corruption indices to measure corruption distance. In addition, the marginal effects either changed in magnitude or disappeared when using adjusted corruption distance, which thereby indicates that, apart from the source of data, it is important to consider the measurement of corruption distance in order to fit the concept of adaptation cost in the model.

This dissertation, therefore, contributes to the literature in several aspects. Firstly, the dissertation proposes a new definition and its resulting measurement for corruption distance, considering the development of firms' skills. Secondly, the empirical results distinguish the impact of corruption distance on the extensive and intensive margin by using a rich dataset with three different corruption indices from internationally recognised databases, which differs from most previous study on this topic. Also, this is one of the few papers that specifically study this topic in the context of European transition economies.

The dissertation is structured in the following manner. First, in Chapter 1, the literature review will provide a brief introduction to selected theories that explain the presence of FDI. Following the review of theory, this dissertation summarises how the literature has characterised the role of corruption and corruption distance with regard to FDI. This is important for understanding why empirical results are insufficient, and why further research on corruption distance and FDI is needed. Section 2.4 reviews the empirical methodology, the gravity model, which begins

[3] Data after 2012 for bilateral FDI are not available from international database; The classification for industrial countries and developing countries follows Qian and Sandoval-Hernandez (2016). Czech Republic, Hungary, Poland and Slovak Republic are classified as both developing and transition economies.

with an explanation of its development and then extends the review from how the model is applied to trade to how it is applied to FDI. Furthermore, section 2.5 will review previous empirical research about corruption and FDI in transition economies. Finally, section 2.6 will summarise the empirical contributions to the literature from this dissertation.

Then, Chapter 3 will present the theoretical framework of this dissertation. Section 3.1 introduces the background theory with the simplified mathematical model developed by Cezar and Escobar (2015). Following section 3.2 that fits the corruption distance into the model, section 3.3 explains the theoretical foundation of using adjusted corruption distance. Based on the theoretical model, section 3.4 proposes hypotheses for empirical testing in Chapter 5. On the basis of the model in Chapter 3, the dissertation derives the empirical specification in Chapter 4 for the estimation in Chapter 5. In addition, Chapter 3 also introduces the data, variables and estimation strategy for empirical study.

Finally, Chapter 5 presents the results obtained from the estimation, which is followed by a robustness check in Chapter 6. Based on the results of the estimation, Chapter 7 summaries and discusses the results from Chapter 5. Chapter 8 concludes the findings of this dissertation. Possible suggestions for further research are given at the end of this chapter.

Chapter 2: Literature Review

This chapter first reviews previously developed theories about FDI and the role of corruption and corruption distance. Then, it introduces the gravity model that has become popular in international trade and business literature. Finally, the chapter considers previous studies of the relationship between corruption and transition economies, and summarises the contributions of these studies to the literature.

2.1. Theory for FDI

MacDougall (1960) and Kemp (1964) claimed that when capital can move freely between two countries, marginal productivity should equalise between them if the price of capital is equal to marginal productivity. They found that the national income of the investing country did not decrease even though output fell, as investing abroad could bring higher returns in the long run. However, Kindleberger (1969) argued that FDI would never have existed if there were no distortions in the market. According to Kindleberger's theory, FDI only exists in the imperfect market as firms choose to invest abroad directly for monopolistic profit.

2.1.1. Industrial Organisation Approach

Later, Hymer (1976) developed a new theory, known as the industrial organisation approach for imperfect competitive markets, which is based on several previous works including those of Lemfalussy (1961), Knickerbocker (1973), Caves (1974) and Cohen (1975). Hymer's theory states that the benefits of having some form of market power must offset the disadvantages of operating abroad, such as the disadvantageous position when competing with local firms regarding institutions and consumer preferences, and the exposure to exchange rate risks. Market power is associated with firm-specific advantages, such as commercial brand, superior technology, and management capacity. Hymer's main argument is that firm-specific advantages are transmittable among the units of the firm, regardless of its location. Thus, firms can capitalise on the market power derived from a firm's specific advantages to earn higher profits from investing abroad, as the market is imperfect. However, Robock and Simmonds (1983) argued that firm-specific advantages do not necessarily make FDI attractive, since firms

can exploit advantages through exporting and licencing as well. The theory also did not explain the timing and location of FDI.

2.1.2. Internalisation Theory

Some literature analyses FDI using transaction cost theory (TCT) (Williamson, 1993). Williamson (1985, p. 1) states that a transaction "occurs when a good or service is transferred across a technologically separable interface." Under transaction cost theory, the trade-off is the cost of integrating an operation versus the cost of relying on an external agency to represent the firm in an overseas market (Williamson, 1985). Buckley and Casson (1976) explained the creation of MNEs and FDI by emphasising intermediate products and technologies. They found that firms have incentives to create an internal market to internalise the knowledge gained from research and development (R&D) activities and intermedia products under an imperfect market setting. For example, firms may find their new technology, process, and inputs difficult to transfer or sell to other firms, as that would incur high transaction costs. As a result, firms may choose internalisation so that subsidiaries can utilise them by integration. If internalisation involves subsidiaries in a foreign country, it will lead to FDI. The main criticism of the theory is that it mainly links to TCT, whereas TCT is different from internalisation theory. Buckley and Casson (2009) admit that TCT is usually applied in analysis of the domestic market, whereas internalisation theory is mostly used to analyse the international context.

2.1.3. Oligopolistic Theory

Most economic literature explains the motive for FDI as follows: (1) Firms seek access to a foreign market; (2) Firms seek low factor costs by directly producing in the foreign market. However, based on imperfect competition, Knickerbocker (1973) pointed out another motive for firms choosing to invest abroad; namely, following their rivals as the participation of rivals in a foreign market can reduce the uncertainty about production costs in the host country. It is suggested that firms choose to mimic rivals' strategies, for example, FDI activity, in order to maintain a strategic advantage. The theory works well when applied to an oligopolistic industry dominated by large companies. Using data from the United States, Knickerbocker empirically finds that the dates on which MNEs' subsidiaries choose to enter a market are clustered. Therefore, the increased level of market concentration leads to an oligopolistic market.

However, the theory only works when there is uncertainty about the production costs in a foreign country. Moreover, it cannot explain the motive of the first firm that chooses to enter a foreign market.

2.1.4. Eclectic Paradigm

Based on the TCT, Dunning (1977) developed an eclectic paradigm (also known as the Ownership, Location, and Internalisation (OLI) paradigm) in which MNEs develop competitive ownership advantages at home and then transfer them to foreign countries in order to exploits the ownership advantages through FDI based on location advantages (L) and thus allowing the MNEs to internalise such ownership advantages.

Dunning's critics argued that the location advantage in the paradigm was too focused on physical attributes rather than the institutions found in a location. Recognising the absence of institutions in the paradigm, Dunning (2015) expanded the dimensions of location advantage by adding political factors, regulations, and cultural differences. However, this meant that the theory incorporated even more variables, which intensifies the criticism that such a theory could be practically inoperable. More importantly, it fails to address the distinction between the motivations behind horizontal and vertical FDI. Although it is subject to some significant criticisms, it remains a useful way to organise thinking regarding determinants in FDI research.

2.1.5. New Trade Theory

Early work linking FDI to international trade, for example, Product Life Cycle Theory, also failed to take into account the motives for horizontal FDI and vertical FDI (Vernon, 1966 and 1979; Hirsch, 1976; Kojima, 1973, 1975 and 1985). It was Helpman (1984) who developed a general equilibrium model linking vertical FDI activities to international trade. In this model, a firm producing only one product at a single facility either in the home country or abroad, chooses an optimal location based on factor endowments, such as labour, resources, and capital, in order to minimise factor costs and, in turn, maximise profits. Hence, the trade-off is between lower production costs abroad, and the trade cost of bringing goods back home. However, this cannot explain the motive for horizontal FDI, since firms not only invest abroad in order to lower production costs, but also to gain access to the foreign market.

Helpman, Melitz and Yeaple (2004) studied firms' choices between export and horizontal FDI by assuming that industries are characterised by heterogeneity and, that as a result, firms differ in their productivity levels. The theory suggests that only firms with sufficient productivity survive in the market. Firms with higher productivity can sell goods abroad, whereas the rest can only serve the domestic market. Similarly, a firm's decision on how to sell goods abroad also depends on its productivity. The most productive firm sells goods in the foreign market through production in overseas facilities while less productive firms can only sell abroad by exporting. This leads to the proximity-concentration trade-off, whereby firms choose between reducing transportation costs and losing economies of scale due to having multiple production facilities. Helpman, Melitz, and Yeaple found empirical evidence for their theory using data from the US. Although Yeaple (2009) found that the evidence is weak when using disaggregated data according to industry or individual firms, they suggest that the model holds strongly for aggregated multinational-level studies. A comprehensive literature review of the most notable theories of FDI by Choudhury and Nayak (2014) summarised the progress of FDI theories in detail. They suggest that improvements could be made by looking specifically at certain type of FDI, such as mergers and acquisitions, and greenfield investment.

2.2. The Role of Corruption

Corruption is common in international business: in some countries it can even be considered part of the business culture, especially in the developing world (Transparency International, 2018). Scholars traditionally focused on economic factors, such as factor costs, market size, exchange rates, and others in determining a host country's attractiveness to FDI (Caves, 1974; Dunning, 1980; Grosse and Trevino, 1996). After North's (1990) influential paper, researchers dealing with FDI started to shift their attention from economic factors to institutional factors (Wheeler and Mody, 1992; Wei, 2000; Globerman and Shapiro, 2002 and 2003). North (1993) defines institutions as "the humanly devised constraints that structure human interaction." Following North (1990), Dunning and Lundan (2008, p. 579) argued that "anything that is likely to influence individual decision making, such as education, social mores, and belief systems, is also likely to affect the choice of institutions" and thus the location decision.

Bailey (2018) produced a comprehensive statistical literature review of empirical research on the impact of institutions on FDI. Based on this review, Bailey found that six institutional

factors have received the most attention in the literature: political stability, the rule of law, democratic institutions, corruption, tax rates, and cultural distance. Among the above-mentioned institutional factors, corruption is an integral part of a country's institutions (Wei, 2000). Corruption is an important part of institutions in a given location (Peng et al., 2008); researchers have argued that corruption, as an outcome, reflects the legal, economic, cultural, and political institutions in a country (Svensson, 2005). Although the output of relevant research is abundant, the findings of the literature on corruption and FDI are not conclusive (Qian and Sandoval-Hernandez, 2016).

According to Bailey's (2018) statistical literature review, the theoretical literature examining the relationship between institutional factors and FDI is largely based on an economics perspective, particularly the costs associated with choosing one location over another. Based on the literature review, this dissertation summarises the role of corruption on FDI decisions in Table 1.

Table 1 Role of corruption in FDI

Negative	Positive
Latent taxes	
Production and management cost	"Key" for entering new markets
Uncertainty maker	"Grease the Wheels"
The motive for Illegal activity	

In the literature, the role of corruption has commonly been regarded as a deterrent, as follows:

Negative Role

A great deal of literature has argued that host country corruption deters FDI for several reasons.

(1) Latent Taxes

Corruption may act as a tax on investment and may raise a firm's concerns about costs, and thus, deter FDI (Shleifer and Vishny, 1993; Wei, 1997). For example, bribes paid by firms are essentially the equivalent of taxes. This type of corruption activity wastes significant resources. There are also costs due to uncertainty regarding the enforcement of contracts, as a

consequence of corruption (Wei 2000; Habib and Zurawick 2002; Lambsdorff, 2003). More specifically, a bribe cannot guarantee the fulfilment of a promise because, as bribery is illegal, investors have neither recourse nor excuse to demand the commitment by way of legal action.

On the other hand, even where a bribe results in a strong commitment, a firm still faces additional costs (Shleifer and Vishny, 1993). The authorities may suspend approval of a permit until the firm agrees to bribe, thus imposing additional costs on the firm. Moreover, companies' commitment to corruption may encourage government officials to create regulation traps that seek to generate bribes from firms (De Soto, 1989). Therefore, as corruption itself can lead to more corruption, the resulting costs rise with the increased level of corruption in the host country.

(2) Production and Management Cost

Corruption increases production and management costs, and decreases productivity, as it can cause inefficiencies in the market and in resource allocation, (Gastanaga et al., 1998; Habib and Zurawicki, 2002; Lambsdorff, 2003; Robertson and Watson, 2004; Cuervo-Cazurra, 2006) and in turn, deter FDI.

There are also additional management costs from the administrative activity involved in coordinating all parties in business across different locations (Anderson and Gatignon, 1986; Buckley and Casson, 1998).

(3) Uncertainty Maker

Wei (1997) argues that the negative impacts of corruption on FDI primarily originate from the uncertainty induced by corruption. The "grabbing hand" theory argues that corruption increases uncertainty, which leads to additional costs for business operation, and thus discourages FDI (Rose-Ackerman, 1975; Shleifer and Vishny, 1993; Kwok and Tadesse, 2006). This additional cost typically raises the entry barrier for MNEs and makes the host country unattractive. As a result, MNEs may decide to avoid the uncertainty that they may incur through operations abroad and thus either choose to invest somewhere with less uncertainty or keep their capital at home.

(4) The Motive for Illegal Activity

The incentive to engage in illegal activities cause the negative impact of corruption on FDI. For example, Buehn and Schneider (2012) find that shadow economy increases in the high levels of corruption. Buehn and Farzanegan (2012) also find a positive relationship between the levels of corruption and the levels of illegal trade. Thus, by creating the incentive for business to move underground, corruption may also deter investors from entering the host country.

Positive Role

There is a considerable amount of empirical literature that supports the notion that corruption has a negative impact on FDI (Wei 2000, 2008; Hakkala, Norbäck, and Svaleryd, 2008; Bailey, 2018). However, not everyone agrees that there is such a negative relationship (Wheeler and Mody, 1992; Cuervo-Cazurra, 2006). In fact, some even argue that corruption has positive impacts on decisions to engage in FDI. These arguments are reviewed as follows:

(1) "Key" for Entering New Market

The "helping hand" theory (Leff 1964; Huntington 1968) states that, in the presence of a heavy burden of regulations and an inefficient legal system, corrupt interactions between authorities and foreign investors can be useful for reducing barriers to entry. Thus, corruption may in fact help MNEs enter a particular market.

(2) "Greasing the Wheels"

Another similar view is that corruption works as a lubricant for transactions (Meon and Weill, 2010) where problematic institutions are prevalent, especially in developing countries (Khanna and Palepu, 2010). The concept of "greasing the wheels" claims that corruption may improve efficiency by avoiding the distortions caused by less developed institutions, such as inefficient bureaucracy (Huntington, 1968; Leff, 1964). This notion holds that corruption has the potential to help MNEs to avoid bureaucratic procedures, and therefore attracts FDI.

2.3. Corruption Distance, Adaptation Costs and FDI

The lack of universal consensus (at least at the theoretical level) on the effects of host country corruption on FDI leads to the search for an alternative. For example, Cuervo-Cazurra (2006) found that high levels of corruption in host countries deter FDI by MNEs from home countries with low corruption levels. In the meantime, he also found that MNEs from home countries with high levels of corruption are not deterred by corruption and may even prefer to invest in such countries. Also, Peng and Beamish (2008) conclude that the impact of host country corruption levels on FDI differs in countries with different development levels. They found a significant positive relationship between the corruption level of developed host countries and FDI from Japan, whereas they report that corruption has a negative influence on Japanese FDI in developing countries.

The above findings imply that differences in corruption levels between home country and host country affect FDI. Literature defines this difference as the corruption distance (Habib and Zurawicki, 2002). Cuervo-Cazurra (2006) added an interaction term, which estimated the coefficients of host country corruption levels on FDI, conditional on the corruption level of the home country. However, this does not reflect the exact impacts of corruption distance on FDI. A similar study includes Brada, Drabek, and Perez's (2012) study on the impact of home country corruption levels on FDI, while they distinguished the impacts on FDI decisions and the volume of FDI. Nevertheless, both of them separate the effects from corruption by home and host country, and thereby neglect the effects from the "distance" itself.

The first notable empirical work on corruption distance and FDI comes from Habib and Zurawicki (2002), where they adopted the notion of similarity from the argument of psychic distance and introduced the concept of "corruption distance" to study its impact on bilateral FDI. They analysed bilateral FDI between seven developed countries to 89 countries by OLS and Probit estimator. They found that the absolute difference between corruption levels of country pairs deters FDI. Although their Probit model has the potential to avoid the problem of selection bias, they used a separate OLS regression without making a relevant correction for the selection issue. In addition, the model excluded cultural variables and only focused on outward FDI from developed countries.

Following Habib and Zurawicki, Godinez and Liu (2014) examine the relationship between corruption distance and FDI by using data from Latin America from 2006 to 2009. They

distinguished different country-pairs according to their level of corruption and found that corruption distance affects FDI originating from less corrupt countries, but FDI from highly corrupt countries does not respond to corruption distance.

The majority of the literature argues that firms might not be used to operating in a country with a different level of corruption from their own and thus would rather avoid investing in such an unfamiliar market. As a result, corruption distance discourages FDI. However, corruption distance may have different impacts on the number of investing firms (extensive margin) and the volume of FDI from MNEs (intensive margin).

More recent research comes from Qian and Sandoval-Hernandez (2016), in which models distinguished the impact of corruption distance on the number of MNEs and the volume of total FDI. They tested the above relationships empirically through a two-stage Heckman selection model.

Qian and Sandoval-Hernandez's work (2016) argues that firms prefer to invest in markets similar to their home market to reduce uncertainty; "closeness" reduces the perceived uncertainty and its subsequent costs for operating in the host country, thus promoting FDI activities. They used a data set of forty-five countries from 1997 to 2007, which includes both developing countries and industrialised countries. By classifying the direction of FDI as either industrial to industrial, developing to developing, industrial to developing, or developing to industrial, they found that corruption distance between industrial countries does not have impact on the likelihood of FDI, but it reduces the amount of FDI that will be invested.

Qian and Sandoval-Hernandez also found that FDI from developing countries is more sensitive to the corruption level of a host country, rather than the corruption distance when investing in a developing country. Besides, they found that corruption distance has no impact on the volume of FDI when considering FDI flows from developing countries to industrial countries and FDI flows from industrial countries to developing countries. In addition, they also found evidence of asymmetrical effects. However, their selection model uses the cost of regulations as the excluded variable based on Helpman, Melitz, and Rubinstein's (2008) (hereafter referred to in this dissertation as HMR) argument that a variable representing fixed trade costs satisfies the exclusion requirement. However, HMR's argument is based on trade theory, which does not necessarily suit Qian and Sandoval-Hernandez's theoretical framework. On the other hand,

their research incorporated too many variables (a common problem for FDI research without micro foundations), where collinearity severely distorts the final estimates.

It is also natural to connect corruption distance with institutional distance, as Peng et al. (2008) noted that corruption should be regarded as an integral component of a location's set of institutions. Cezar and Escobar (2015) argue that institutional distance can impose adaptation costs. For example, Daude and Stein (2007) found adaptation costs to be higher in cases where investors from countries with weak institutions operated in host countries with well-developed institutions. They found that improvements in the quality of institutions can reduce costs. Nevertheless, firms that are already acquainted with the institutional environments of their domestic markets do not possess the necessary skills to succeed in foreign markets with different institutional environments. On the other hand, companies who have developed skills at home might be capable of dealing with similar environments in a host country, therefore reducing adaptation costs where the institutional environments of the country-pair are similar (Habib and Zurawicki, 2002; Benassy-Quere et al., 2007; Guiso et al., 2009). Likewise, one can foresee a similar relationship between corruption distance and adaptation costs.

Although Cezar and Escobar (2015) primarily studied the impact of overall institutional distance on FDI, their work can also explain corruption distance, since corruption is an important factor in the quality of institutions. Cezar and Escobar extended Helpman, Melitz and Yeaple's (2004) model to explain the impact of institutional distance on FDI. First, in order to justify their model, they presented the background theory based on Helpman, Melitz and Yeaple's work using a simple mathematical derivation. The background theory suggests that the attractiveness of FDI depends on trade friction and the distance between the fixed costs of FDI and exports. They defined two types of fixed costs for FDI activity: the cost of building new facilities, and the costs of adaptation.

According to the demand and price equation, demand increases as prices decrease and prices decrease when productivity increases. This means that firms with higher productivity face higher demand. As a result, they need larger facilities than those with lower productivity. In other words, firms' fixed costs for building new facilities are a function of expected profits (profits increase with productivity). For simplicity, their model assumes the function is monotone and linear.

Adaptation costs arise when firms access a less familiar market where the institutional environment is different from that of their home countries. For example, a firm might not be used to the local legal system, language, and level of corruption, which may lead to additional costs such as recruiting consultants, incurring fees for translations, and inefficient bribery. Cezar and Escobar (2015) assume that adaptation costs are positively correlated with institutional distance.

In general, the model is convincing, backed by statistical evidence from empirical tests using data collected from OECD countries. However, in their robustness check, they found that while corruption distance has a negative effect on firms' FDI decisions, it has no impact on FDI volume. Therefore, this thesis will adopt Cezar and Escobar's (2015) theoretical model, but specifically, study the corruption distance rather than the overall institutional distance. Cezar and Escobar's empirical findings that corruption distance had no impact on the volume of FDI, are contested by Qian and Sandoval-Hernandez (2016). They find that corruption distance negatively affects FDI activity both in the probability of investing abroad and the volume of FDI when using a full sample mixing industrial and developing countries. Even accounting for their analysis on subsamples, the results are still not in line with Cezar and Escobar.

There are also two major issues with their understanding of adaptation costs. MNEs acquire skills for dealing with corruption in their home country. That skill then becomes a competitive advantage for a firm operating in a host country with similar corruption levels (Brada et al., 2017). Following that argument, although the corruption distance between a home country and host country may be large, MNEs might have acquired the skills to survive in such an environment through previous investments in other countries.

Another problem is that a firm's capacity to adapt to a new environment might be influenced not only by today's environment but also by the knowledge and skills gained previously. For example, some transition countries were much more corrupt in the recent past than they are today but have improved their institutional environment over a relatively short period. Therefore, their businesspeople might still be capable of doing business not only under today's business environment but also under the more corrupt environment of the past. Thus, this dissertation assumes that the adaptation cost is also a function of a firm's capacity to adapt to a new environment. For example, the current corruption distance between the home country and host country might be irrelevant if firms have experience doing business in an environment similar to the host country, either in their home country's past, or in a different host market.

Therefore, transition economies can be seen as a laboratory to examine the problems identified above.

2.4. Review of Gravity Model

Nowadays, the gravity model introduced by Tinbergen (1962) has become one of the most popular models for analysing the determinants of bilateral trade flows. However, mainstream trade economics excluded the gravity model from its toolkit until 1995 due to its lack of theoretical foundations. For example, Deardorff (1984, p. 502) claimed that the "theoretical heritage" of the gravity model is "dubious."

At first, Trefler (1995) criticised the Heckscher-Ohlin-Vanek model as it tends to overestimate trade in factor services, before providing a new concept, "home bias", to account for the missing trade. In addition, McCallum (1995) emphasised the importance of the effects of national borders on trade. However, it is Eaton and Kortum's (2002), and Anderson and van Wincoop's (2003) influential papers that finally addressed the absence of micro-foundations. Subsequently, the theory no longer relies on assumptions about imperfect competition and increasing returns but instead becomes suitable for the analysis of any subsets of industries or countries. In more recent articles by Chaney (2008); Helpman, Melitz, and Rubinstein (2008); and Melitz and Ottaviano (2008), the merger of the gravity equation and heterogenous firm theory improves the interpretability of the coefficients in the gravity model. In addition, as trade and FDI flows share some common features, by analogy, the literature has widely applied the gravity model in FDI research (Eaton and Kortum, 2002; Head and Ries, 2008; de Sousa and Lochard, 2011).

Although the gravity model is widely applied to topics beyond trade, such as migration and FDI, the trade gravity model is the only one with firmly established theoretical foundations. However, there are some micro-founded FDI gravity models, which will be reviewed in the next section. The next section will first present the common forms of the trade gravity equation followed by the gravity model used in the FDI literature.

2.4.1. Gravity Equation

The gravity equation, developed by Tinbergen (1962), is named as such in a deliberate analogy to Newton's famous law of universal gravitation[4], to explain the trade flow between two countries. The so-called naive gravity equation is as follows:

$$F_{ij} = G\frac{M_i^{\alpha} M_j^{\beta}}{D_{ij}^{\theta}}$$

Analogous to Newton's law, we have $\alpha = \beta = 1$ and $\theta = 2$. F_{ij} is the trade flow from country i to j. G is a gravitational constant. $M_i^{\alpha} M_j^{\beta}$ is the product of two countries' economic mass that is roughly equal to the product of their gross domestic production (GDP). The D represents the physical distance between country i and country j. By taking a logarithm, the equation will be in linear form, which is convenient for empirical estimation.

Although it can be argued that the world is becoming increasingly flat, in the sense that distance is less relevant now than in the past, Brun et al. (2005) have found that the disappearance of distance effects largely concerns trade between developed countries but not trade between developing countries. Although the model is intuitively reasonable and empirically successful, Baldwin and Taglioni (2007) have referred to the mistake in this early version of the model as a "gold medal mistake", due to the omission of an appropriate multilateral resistance term.

After Eaton and Kortum (2002), and Anderson and Van Wincoop (2003) established micro-foundations for the gravity model, a number of well-derived structural gravity models have been applied in the study of trade, including by Baldwin and Taglioni (2007), Head and Mayer (2011), and Novy (2013). A more detailed introduction to the development of the trade gravity model can be found in Head and Mayer's handbook (2014).

One of the major challenges for estimating the gravity model is the presence of heteroscedasticity. Santos Silva and Tenreyro (2006) propose that applying a Poisson Pseudo Maximum Likelihood (PPML) estimator can solve the problem of heteroscedasticity in the model. Another challenge is having frequent zero trade flows in the dataset, which makes the estimation inconsistent, as by taking logarithms, these observations are simply dropped from the sample. Eaton and Tamura (1995), and Martin and Pham (2008) intended to tackle this by

[4] The gravity force between two objects is proportional to the product of the masses of them, and inversely to the square of the distance between them (Cohen, 1999, p.956)

using a Tobit estimator, but it is hard to find a connection between some parts of the estimation and the theory.

HMR solved the Tobit problem in Eaton and Tamura (1995)'s article, as their approach is theoretically grounded. They extend the Heckman-based approach to tackle the consequence of zero and firms' heterogeneity. The two-step model first estimates the probability of firms choosing to import goods from abroad using a Probit estimator, followed by the second step estimation with only positive trade flows and a selection correction. However, HRM's approach relies on an excluded variable that is correlated with the selection indicator but not with the dependent variable in the second stage. Besides, apparently, using a PPML estimator remains a convenient and effective solution (Yotov et al., 2016).

2.4.2. Gravity Equation and FDI

Gravity models are commonly used in the study of FDI, as it is possible to derive them from various theoretical models, though there are still no such concrete micro-foundations comparable to those found in the trade model. Okawa and Van Wincoop (2012) find that changing assumptions may shift the model away from the gravity equation when dealing with international finance. Therefore, one can observe that micro-foundations for the FDI gravity model vary across the literature, so researchers often choose to develop their equation by choosing different micro-level theory. For example, to explain FDI from mergers and acquisitions (M&As), Head and Ries (2008) designed a two-stage discrete choice framework with gravity specification built on a control-based model in which firms bid to control assets abroad. Motivated by Head and Ries's model, De Sousa and Lochard (2011) built a model in which firms bid for the best investment projects rather than assets.

The growing convergence between previous scholarship on trade using a gravity model, and heterogeneous firm theory has also prompted researchers to apply heterogenous firm theory to the micro-foundations of the FDI gravity model. Helpman, Melitz and Yeaple (2004) derived a model from heterogenous firm theory to explain a firm's choice between exports and FDI. By extending Helpman, Melitz and Yeaple's model, Kleinert and Toubal (2013) found that the choice between foreign distribution and foreign production by FDI depends on the trade-off between variable costs and fixed costs. They successfully tested the model by estimating a gravity equation derived from their theoretical model. Thus, Cezar and Escobar (2015) further

modified the model in order to explain the effects of institutional distance on FDI. They also successfully derived a gravity equation to test their theoretical propositions. Hence, as with the compatibility between the gravity equation and heterogeneous firms in trade, it is likely that one can also develop a gravity equation consistent with theory by modifying the model of FDI under the heterogeneous firm framework.

2.5. Relevant Studies in Transition Economies

Bevan and Estrin (2004) suggest that transition economies, especially central-eastern European countries (CEECs), are ideal subjects for the study of the determinants of FDI, because there were no observable direct investment flows under the previous communist regime until 1990.

In general, most of the literature studying the nexus between FDI and corruption in transition economies supports the "sand the wheels" perspective; that corruption imposes higher costs and slows FDI (Ballos and Subasat, 2012). For example, Resmini (2000) applied sectoral data from 10 CEECs between 1991 and 1995, and found that corruption has a negative impact, albeit to varying degrees across sectors. Cuervo-Cazurra (2008) also found that corruption deters FDI as it imposes uncertainty over operations in transition economies, but that the impacts may differ when considering different types of corruption. However, Ballos and Subasat's (2012) findings support a "grease the wheels" view instead; that corruption facilitates FDI. They even found that FDI can lead to corruption in transition economies by estimating a panel gravity model and applying the Granger causality test.

Most literature analyses the impact of corruption on FDI decisions in transition economies through the OLI paradigm, because it assists in organising the thinking surrounding FDI. For example, Bevan and Estrin (2004) interpret FDI through the lens of the OLI paradigm, analysing FDI from 18 market economies to 11 transition economies from 1994 to 2000 and, by estimating a general gravity model, found that corruption deters FDI. Javorcik and Wei (2008) developed a choice model and, by using firm-level data from 22 transition economies, found that corruption not only deterred FDI but shifted it towards joint ventures.

Research on the relationship between corruption distance and FDI is limited. Using data for CEECs from 1998-2006, Driffield et al. (2010) found that corruption distance negatively

affects the level of foreign ownership, which is in line with Javorcik and Wei's (2008) findings. However, none of them gives a clear economic explanation for the empirical findings.

Other close research includes Cuervo-Cazurra (2006) and Brada, Drabek, and Perez's (2012) studies. They use the interaction term, which estimates the coefficients of host country corruption levels on FDI, conditional on the corruption level of the home country. However, this cannot reflect the exact impact that corruption distance has on FDI. Brada, Drabek, and Perez distinguished the impacts of corruption on FDI decisions and the volume of FDI. They found that the impacts of home country corruption are inverse U shaped. The probability of outward FDI is decreased in home countries with both high and low levels of corruption. In other words, they propose that intermediate levels of corruption encourage companies to engage in FDI. Besides, they found that the home country corruption level is what affects the volume of FDI from firms that have already decided to invest. Overall, unlike the study on corruption distance, the above studies tend to separate the effects of home and host country corruption on FDI.

However, to the author's best knowledge, no previously written articles have specifically studied the relationship between absolute corruption distance and FDI in transition economies. In addition, although some of the relevant studies on this topic have used either a gravity model or added the gravity component into their model, few models are theoretically derived, which makes the results rather vulnerable and difficult to interpret.

2.6. Empirical Contributions to Literature

The review above shows that research on corruption distance and FDI is still a young topic. Notable work from Habib and Zurawicki (2002), Godinez and Liu (2015), Cezar and Escobar (2015), and Qian and Sandoval-Hernandez (2016) has not yet reached an agreement about corruption distance's influence on FDI decisions. For example, Cezar and Escobar found that corruption distance has no impact on the volume of FDI, whereas Qian and Sandoval-Hernandez (2016) found the impact to be negative. Furthermore, Qian and Sandoval-Hernandez noted that their empirical findings changed when applying subsamples, by distinguishing the development level of country pairs; such as developed to developed, developed to developing, developing to developing, and developing to developed countries. Their findings imply that further contextualisation is needed. Hence, this dissertation chooses

to use bilateral FDI in transition economies because there is no literature that has specifically studied the impact of corruption distance on FDI in transition economies.

A considerable body of literature relies on either the OLI paradigm or just simple intuition. As a consequence, the econometric models used are often not theory-consistent, which leads to less convincing results. This dissertation adopts Cezar and Escobar's (2015) theoretical model based on the heterogeneous firm framework. As the gravity equations in this model are derived from the theoretical model, the empirical results are more credible than those that are intuitively constructed. Moreover, heterogeneous firm theory provides a different perspective from which to interpret the empirical results by introducing the concept of extensive and intensive margin.

In addition, this dissertation corrects the definition and measurement of corruption distance, as firms may have previously developed abilities to deal with corruption in either their home market or elsewhere abroad so that simply calculating the absolute difference between corruption levels in the host country and the current corruption level at home is inadequate. Therefore, this dissertation contributes to the literature by correcting the measurement methodology of corruption distance.

Finally, using a rich dataset that includes bilateral FDI of 11 European transition economies from 2001 to 2012, this dissertation distinguished the impact of corruption distance on the extensive and intensive margin of transition economies' FDI. Also, unlike previous studies, this dissertation collects corruption indices from three different databases, and estimates corruption distance based on each of them separately. Although this study found that corruption distance does negatively affect the extensive margin of FDI as Cezar and Escobar's (2015) findings, the empirical evidence is sensitive to the source of corruption index and the measurement methodology of corruption distance and thus indicating the results from existing studies are far from robust. .

Chapter 3: Theoretical Framework

This dissertation adopts Cezar and Escobar's (2015) simplified theoretical model for FDI and institutional development, established by heterogeneous firm theory. Section 3.1 presents the background theory of Cezar and Escobar's model, and then the dissertation introduces the corruption distance into the model in section 3.2. Section 3.3 introduces the concept of adjusted corruption distance theoretically. Section 3.4 summarises the implications from the simplified model and then makes several Hypotheses in the context of transition economies for later testing.

3.1. Background Theory

The simplified model starts from the assumption that all firms around the world operate in a market characterised by monopolistic competition. Consumer constant elasticity of substitution (ε) utility preference is identical across countries. For simplicity, labour is the only input in the model, and firms are heterogeneous with regard to their productivity (φ). It is also assumed that the cumulative distribution functions (cdf) of productivity ($u(\varphi), [\varphi_L, \varphi_H], \varphi_H > \varphi_L > 0$)[5] are identical across countries. There is also a rather strong assumption made by Cezar and Escobar that firms use FDI neither for export-platform nor outsourcing production but only for the purpose of market access.

Firms from country i selling goods to country j need to make trade-offs between exporting and FDI. Regardless of the choice, firms incur two types of costs: variable costs and fixed costs. Marginal costs are unit labour costs (w_i) measured by productivity of country i. Thus, for exports from country i to j, fixed costs are f_{ij}, and we can model variable costs as iceberg transport costs ($\tau_{ij} w_i/\varphi$, $\tau_{ij} \geq 1$) (Krugman, 1991). On the other hand, firms choosing to invest abroad rather than export, incur higher fixed costs ($F_{ij} > f_{ij}$), but lower variable costs by reducing transportation costs ($w_j/\varphi < \tau_{ij} w_i/\varphi$).

Assuming that firms use FDI only for market access, we can write profits (π) for exporting as $\pi_{export}(\varphi)$, and FDI as $\pi_{FDI}(\varphi)$, respectively: [6]

[5] φ_H denotes the productivity level of the most productive firm; φ_L denotes that of the least productive firm.
[6] Mathematical derives by Cezar and Escobar (2015) are in the appendix

$$\pi_{Export}(\varphi) = \Psi_j(\tau_{ij}w_i)^{1-\varepsilon}\varphi^{\varepsilon-1} - f_{ij} \quad (1)$$

$$\pi_{FDI}(\varphi) = \Psi_j {w_j}^{1-\varepsilon}\varphi^{\varepsilon-1} - F_{ij} \quad (2)$$

Ψ_j is the demand adjusted by the elasticity of substitution specifically for country j. As marginal costs are decreasing with productivity, marginal revenue, and profits are increasing with productivity. A firm is willing to sell goods abroad only if there are profits or at least no losses ($\pi \geq 0$). As a result, there are two productivity thresholds for exporting and FDI respectively, since firms need to obtain enough variable income in order to cover the fixed costs incurred.

As $\tau_{ij} \geq 1$, the marginal profit of FDI is always larger than that of exporting. However, as mentioned above, FDI activity involves higher fixed costs than exports, and thus, firms make choices about whether to invest abroad in order to maximise their profits. Therefore, we can denote a country pair specific productivity threshold as $\varphi^*_{FDI,ij}$ that makes $\pi_{FDI}(\varphi) \geq \pi_{Export}(\varphi)$. In other words, a firm from country i chooses to make direct investment in country j when its productivity level reaches or passes that threshold.

However, the productivity level is unobservable, and thus, we use revenue ($r_{ij}(\varphi)$), an increasing function of productivity, as its proxy. Therefore, the revenue of direct investment from country i to country j should be

$$r\left(\varphi^*_{FDI,ij}\right) = \varepsilon \frac{(F_{ij} - f_{ij})}{1 - \left(\frac{\tau_{ij}w_i}{w_j}\right)^{1-\varepsilon}} \quad (3)^7$$

Only firms from country i with productivity higher than the threshold $\varphi^*_{FDI,ij}$ would choose to invest in country j, which represents the higher proportion $(1 - u(\varphi^*_{FDIij}))$ on the cdf of productivity, $u(\varphi)$. However, $\varphi^*_{FDIij} > \varphi_H$ means that there is no firm that is productive enough to invest abroad. According to the equation (3), the increasing difference between the fixed costs of FDI and exports, makes FDI less attractive than exports as it increases the FDI productivity threshold. Also, FDI is less attractive than exports when the distance between their marginal costs is small.

[7] Mathematical derives by Cezar and Escobar (2015) are in the appendix

3.2. Corruption Distance and FDI

Cezar and Escobar (2015) classified the fixed costs of FDI into two categories: the costs of building new facilities and the adaptation costs. This dissertation assumes that investors face increased adaptation costs when there is a larger corruption distance between home country and host country, thus increasing the productivity threshold of FDI, which subsequently discourages FDI.

The investment cost function for building new facilities is a function of expected profit, which is assumed to be monotone and linear (Cezar and Escobar, 2015). As demand depends on productivity, the fixed costs for building new facilities also depend on the productivity level. In other words, the most productive firm faces the highest demand, and as a result, it needs the largest facility to produce enough products, and thus more investment in order to satisfy the demand. Therefore, the cost function for an investment (this is roughly equal to the value of FDI) from country i to j is $\theta w_j \pi_{ij}(\varphi)$, where θ is a positive parameter ($0 < \theta < 1$).

The function for the adaptation costs should link to the firm's ability to adapt to the new environment (for example, adapt to the local business practice in a corrupt host country). Operations abroad usually raise costs as firms are less familiar with the new business environment, which may hinder their investment decisions since managers may find difficulties in evaluating the foreign market or even make a wrong decision (Brouthers and Brouthers, 2001; Tihanyi, Griffith and Russell, 2005). For example, firms from less corrupt countries may find themselves unfamiliar with local business practice in a relatively more corrupt country. As a result, they may incur higher adaptation costs in order to be familiar with the market either through learning from failure or consulting with an external party. On the other hand, firms from corrupt countries may take advantage of their knowledge of how to practise business in such a corrupt environment (Habib and Zurawicki, 2002; Cuervo-Cazurra and Genc, 2008), and thus, they may face fewer adaptation costs than their counterparts. Therefore, the adaptation costs are negatively correlated with the distance of corruption levels between home country and host country.

Cezar and Escobar (2015) use λ_i to denote the level of institutional development in country i, where the corruption level constitutes part of it. Thus, the institutional distance is $|\lambda_i - \lambda_j|$. By analogy, we can also denote the corruption distance as $|\lambda_i - \lambda_j|$. The adaptation cost $w_i c(\cdot)$ measured by unit labour costs in the home country, in turn, should be an increasing function

$(\frac{\delta c(|\lambda_i - \lambda_j|)}{\delta|\lambda_i - \lambda_j|} > 0)$ of the corruption distance. As such, the total fixed costs of FDI are $F_{ij} = \theta w_j \pi_{ij}(\varphi) + w_i c(|\lambda_i - \lambda_j|)$.

3.3. Corruption Distance and Firms' Skills

The body of existing literature argues that firms are not willing to invest in unfamiliar environments with different levels of corruption; in other words, that corruption distance discourages FDI (Qian and Sandoval-Hernandez, 2016). More specifically, as firms can acquire skills for dealing with corruption in their home countries, said skills become a competitive advantage for firms operating in host countries with similar corruption levels (Brada, Drabek and Perez, 2012). Therefore, corruption distance deters FDI when firms have insufficient skills to deal with the corruption levels of foreign markets.

On the other hand, firms that take advantage of corruption with respect to government regulations may not have the sufficient skills to conduct business and will not, therefore, be competitive in a market with strict regulations and supervisions. Cuervo-Cuzarra and Genc (2008) argue that firms from counties with high levels of corruption usually have less firm-specific competitive advantages, whereas firms from countries with low levels of corruption tend to develop advantages in other areas, such as technology, brand name and organisational skills. Following this logic, firms from countries with high levels of corruption may lack the skills necessary to conduct business in a "clean" market.

Therefore, adaptation costs are largely contingent on the gap in knowledge between how to deal with corruption and how to operate in the environment of a host country. Of course, said adaptation costs are not necessarily consistent with the corruption distance, as discussed above. Thus, the measurement of corruption distance may need to be adjusted according to the following scenarios.

For example, if corruption in a firm's home country has changed over the past few years, then, said firm's skills might be not only applicable with respect to practising business in the current environment but also applicable with respect to business operation in the previous environment. This dissertation refers to this phenomenon as the vertical development of skills, which is applicable to firms in transition economies that have experienced the fast growth of the market economy at different stages over the past few decades. In this case, the adaptation cost should

be as follows: $w_i c\{|\lambda_j - E(\lambda_{it})|\}$, where "$E(\lambda_{it})$" is an adjusted corruption level that reflects the level of corruption that a firm is capable of dealing with by virtue of its skills acquired from both the current environment and any previous experiences across time "t" at home.

In addition, firms with managers who have extensive experience with business abroad may also have adopted skills for operating in a business environment that is beyond the current home environment. This dissertation refers to this phenomenon as firms developing their skills horizontally. This may apply to firms from countries such as Japan, the UK and the US, where firms usually have extensive experience with multinational operations. In this scenario, the adaptation cost should be as follows: $w_i c\{|\lambda_j - E(\lambda_i, \lambda_l)|\}$, where the adjusted corruption level "$E(\lambda_i, \lambda_l)$" also considers the skills gained from firms operating in third-party countries "l".

To sum up, this dissertation suggests that corruption distance should be defined as the distance between the corruption level of the host country and the corruption level that firms from the home country are capable of dealing with. This definition presumably fits the concept of adaptation costs better than the conventional version.

3.4. Hypotheses based on the Model

From equation (3), the revenue threshold of FDI from the home country i to country j is

$$r(\varphi^*_{FDI,ij}) = \varepsilon \frac{w_j \theta \pi_{ij}(\varphi) + w_i c(\cdot) - f_{ij}}{1 - \left(\frac{\tau_{ij} w_i}{w_j}\right)^{1-\varepsilon}} \tag{4}$$

The cost function $c(\cdot)$ is an increasing function of corruption distance, whereas the measurement of corruption distance might be expressed as follows:

$$|\lambda_j - \lambda_i|;\ |\lambda_j - E(\lambda_{it})|;\ |\lambda_j - E(\lambda_i, \lambda_l)|$$

Equation (4) indicates a positive relationship between the productivity threshold (φ^*_{Iij}) and adaptation costs. Thus, an increase in adaptation costs shrinks the proportion of firms choosing to invest abroad ($1 - u(\varphi^*_{FDI,ij})$), which can be referred to as the extensive margin. Also, we can obtain the total volume of FDI (intensive margin) from N_i firms in home country i

investing in host country j ($FDI_{ij} = w_j \theta \pi_{ij}(\varphi) V_{ij} N_i$) with the average productivity level (V_{ij})[8]. As a result, the adaptation cost also reduces the total volume of FDI, as it decreases the expected profit $\pi_{ij}(\varphi)$ and the number of MNEs ($V_{ij} N_i$).

Therefore, we can make the following hypotheses in the context of transition economies:

Hypothesis (1)

1. Corruption distance reduces the number of firms in transition economies that choose FDI (extensive margin) by raising the productivity threshold of FDI. 2. On the other hand, it also reduces the number of firms (from abroad) that choose to make direct investments in transition economies for the same reason.

Hypothesis (2)

1. Corruption distance reduces the total volume of FDI (intensive margin) made by MNEs from transition economies. 2. Similarly, it also reduces the volume of FDI from MNEs investing in transition economies.

[8] $V_{ij} = \begin{cases} \int_{\varphi^*_{FDI,ij}}^{\varphi_H} \varphi^{\varepsilon-1} \, d\mu(\varphi), & \varphi^*_{FDI,ij} \leq \varphi_H \\ 0, & \varphi^*_{FDI,ij} > \varphi_H \end{cases}$; $\varphi^*_{FDI,ij} \leq \varphi_H$ indicates that there is at least one firm chooses FDI, otherwise it means no firm is productive enough to produce products abroad.

Chapter 4: Empirical Methodology

This section starts with an introduction to the empirical model and the specification used in the estimation. The specification is consistent with the theoretical model presented in section 3, which is a typical combination of a selection equation and primary gravity equation, as widely used in international business and economics literature. As this follows Cezar and Escobar's (2015) work step by step, the dissertation presents only the final specification in the text. Section 4.2 introduces the data and variable used in the estimation. Finally, section 4.3 summarises the empirical model in detail.

4.1. Econometric Models

The gravity model is one of the most popular models with reasonable intuitions widely used in trade and FDI research as it not only fits the data well in the literature but also can be derived from a variety of theoretical models (Head and Mayer, 2014). This thesis uses a two-stage gravity equation with the specification derived by Cezar and Escobar (2015) who follow the HMR[9]'s estimation on extensive and intensive margins. The two-stage gravity equation has several advantages. Firstly, it can reveal a firm's decision on FDI by a selection equation followed by a primary gravity equation that estimates the volume of FDI that firms are willing to invest. The approach is similar to Heckman (1979). Although it does not control the selection bias, the estimation uses the Santos Silva and Tenreyro (2010) PPML estimator at the second stage estimation, which allows for estimation free from the zero error. Thus, the approach also tackles the econometric problems of having zero FDI observations in the dataset.

Section 4.1.1 details the specification of the selection equation based on the theoretical model. Then, section 4.1.2 introduces the specification that estimates the intensive margin of FDI. Section 4.1.1 and 4.1.2 only presents the cross-sectional version of the empirical model derived directly from theory.

4.1.1. Selection Equation

Cezar and Escobar (2015) derived a theory-consistent selection equation given as follows:

[9] HMR refers to Helpman, Melitz, and Rubinstein (2008) as noted in section 2.3.

$$z_{ij} = x_0 + x_i + x_j + x_{ij} + \eta_{ij} \quad (5)$$

z_{ij} is the logarithmic form of the ratio of the productivity level for the most productive firm (φ_H) to the productivity threshold of FDI ($\varphi^*_{FDI,ij}$)[10]; x_0 is a constant; x_i represents the characteristics of the home country i; x_j represents the characteristics of the host country j; x_{ij} reflects the characteristics of country pair i, j; the error term (η_{ij}) is normally and independent identically distributed (iid).

However, as the productivity level is unobservable, Cezar and Escobar (2015) constructed a latent variable S_{ij} (selection indicator) with zero-one distribution that if $z_{ij} > 0$, $S_{ij} = 1$, otherwise $S_{ij} = 0$. $z_{ij} > 0$ means that there is at least one firm from country i choosing to invest directly in country j. Hence, a Probit equation is given as follows:

$$\rho_{ij} = \Pr\left(S_{ij} = 1 \middle| \text{Observed Variables}\right) = \Phi\left(x_0 + x_i + x_j + x_{ij} + \eta_{ij}\right) \quad (6)$$

ρ_{ij} is the probability that country i chooses to invest in country j. Φ is the cdf of the unit-normal distribution. Therefore, the estimates from the selection equation can predict the logarithmic form of the average productivity (z_{ij}) by taking the inverse of $\Phi\left(\hat{\rho}_{ij}\right)$. In addition, as the section model is derived by firm-level theory, all variables are assumed to be strictly exogenous.

The selection equation shows that marginal changes in the characteristics of the country or country pairs affect the productivity threshold, and subsequently, the FDI decision. More specifically, the probability acquired from equation (6) is exactly the extensive margin of FDI.

4.1.2. Primary Gravity Equation

By taking the logarithm for both sides of the equation of the intensive margin ($FDI_{ij} = w_j \theta \pi_{ij}(\varphi) V_{ij} N_i$) from the theoretical model, the primary gravity equation is as follows:

[10] Cezar and Escobar (2015) denote that ratio as $Z_{ij} = \left(\frac{\varphi_H}{\varphi^*_{FDI,ij}}\right)^{\varepsilon-1}$. They assume that φ_H is given and thus they can estimate the relationship between the distance variable and productivity threshold. Mathematical derivation can be found in their paper.

$$\ln(FDI_{ij}) = \theta + \ln(w_j) + \ln(\pi_{ij}) + \ln(V_{ij}) + \ln(N_i) \quad (7)$$

As profits π_{ij} depend on demand and costs involved in production and operation, the dissertation estimates equation (8) as Cezar and Escobar (2015) did:

$$\ln(FDI_{ij}) = \Upsilon_0 + \Upsilon_i + \Upsilon_j + \Upsilon_{ij} + v_{ij} + \epsilon_{ij} \quad (8)^{11}$$

Υ_0 is a constant; Υ_i and Υ_j represent the characteristics of country i and j respectively. Υ_{ij} represents the characteristics of country pair i and j. ϵ_{ij} is a normally distributed error term. As the model is derived from firm-level theory, it assumes that all variables are exogenous. Following HMR and Cezar and Escobar (2015), v_{ij} is roughly an increasing function of z_{ij} obtained from the estimates of the selection equation. The estimation uses the cubic polynomial of the predicted value of z_{ij} as control variables.

4.2. Data and Variables[12]

The dissertation uses panel data from multiple databases including United Nation Conference on Trade and Development (UNCTAD), World Bank, Centre d'Études Prospectives et d'Informations Internationales (CEPII), The International Country Risk Guide (ICRG) and Transparency International. The panel includes the data from 2001 to 2012 for 11 transition economies, 18 industrial countries and 27 developing countries (Listed in Appendix).

The dependent variable is the ratio of FDI stock to the GDP of the host country. There are three reasons for using FDI stock data instead of the FDI flow data: (1) the host country also finances FDI; (2) Stocks are more stable than flows; (3) There are fewer zero observations in the stock sample (Cezar and Escobar, 2015). Bilateral FDI Statistics are from UNCTAD (2014). The dissertation estimates the model by both inward and outward FDI, and thus, the estimation can distinguish the different impacts from corruption distance on inward and outward FDI.

[11] Theoretical model suggests no log transform needed for independent variables.
[12] Variables description and abbreviation listed in Appendix 3: Variable description

4.2.1. Corruption Distance Index

This dissertation uses the index of "Control of Corruption" (CoC), from the World Bank's Worldwide Governance Indicators (WGI) to approximate the corruption level of each country. Following the main results, there are robustness checks, which replaces the WGI with the Corruption Perceptions Index (CPI) from Transparency International and the corruption index (ICRG) from ICRG.

Almost all early empirical literature mentioned above uses either the WGI or CPI (or both). CoC in WGI measures the perception of the public power that is exercised for private gain (for example, by bribery) (Globerman and Shapiro, 2003; Cuervo-Cazurra, 2006). One of the earliest papers using CPI is from Wei (2000). CPI measures the corruption level of the public sector according to the opinion of experts and business, which currently (2018) includes data for 180 countries and territories (Transparency International, 2018). Qian and Sandoval-Hernandez (2016) use ICRG in their paper, which provides a longer time series than CoC and CPI.

As mentioned in theory, the dissertation provides another definition of corruption distance, which reflects the development of firms' skills. Therefore, in line with the theory, there are two measurements for two different types of corruption distance:

(1) Conventional Corruption Distance

$$|\lambda_i - \lambda_j|$$

This is the most common measurement that is used in the literature. It takes the absolute value of the difference between the corruption level in the host country and the home country. The larger the absolute difference, the larger the difference in corruption levels between home country i and host country j.

(2) Adjusted Corruption Distance

$$|Average(\lambda_{i,t},\lambda_{i,t-1},\lambda_{i,t-1},\lambda_{i,t-3},\lambda_{i,t-4,}\dots) - \lambda_{jt}|$$

This dissertation approximates the $E(\lambda_{it})$ in the model by taking the 5-year moving average (MA (5)) of the home corruption level. The basic assumption is that firms not only developed their skills in the current home business environment but also in the previous environment,

which might be traced back to five years ago or even longer. 10-year and 15-year moving average (MA (10) and MA (15)) indices are applied to ICRG, as there is a longer time series available.

It is difficult to approximate the corruption level adjusted by the horizontally developed skill of firms in the country level analysis. However, this dissertation primarily studies the firms from transition economies where firms usually did not develop skills through such experience.

4.2.2. Control Variables

Most exogenous control variables are a standard package used in the relevant literature. However, the selection still follows the features of gravity equations (7) and (8).

Home and Host Country Characteristics

(1) O_gdp_p: GDP per capita of home country (origin or of FDI)

(2) D_gdp_p: GDP per capita of host country (destination or of FDI)

GDP per capita represents the characteristics of home and host country, which is from World Development Indicators (WDI), World Bank. As this is a cross-country level estimation, the data is in current US dollar adjusted by Purchasing Power Parity (PPP) for their comparability. GDP per capita also proxies the wage level in the theoretical model.

Country-pair Characteristics

(3) GDP Sim: GDP similarity

Data for GDP are also from WDI, with similar adjustments for GDP per capita in the dataset. GDP similarity proposed by Bergstrand and Egger (2007) is one of the country-pair characteristics included in the model.[13]

(4) Distance; Legal; Religion; EU

[13] $GDP\ similarity = \frac{GDP_i GDP_j}{(GDP_i + GDP_j)^2}$

A set of standard control variables, geographical distance, dummy of common legal origin, common religion and dummy of common EU membership are from CEPII. In literature, common language, colonial ties and contiguity are common in use. However, they are not variant enough for Probit prediction, which leads to perfect predict failure. For example, none of the transition economies has a colonial history.

(5) BIT

The data of the enforcement of bilateral investment treaty (BIT) from the International Centre for Settlement of Investment Disputes (ICSID) at the World Bank, also reflects several important aspects of country-pair characteristics.[14]

(6) FTA

In section 5.3.1, selection models also include dummies of the free trade agreement (FTA). Although the use of FTA is unusual in FDI literature, in this particular study, the theoretical framework suggests the existence of the linkage between trade and FDI decision. However, to avoid unnecessary collinearity, this dissertation only uses it when there are no other dummies that satisfy the requirement of estimation.

4.3. Estimation Strategy

In summary, this dissertation estimates the following two-stage models:

$$S_{ij,t} = \alpha + \gamma_1 CorrDist_{ij,t} + \gamma_2 X_{ij,t} + \varepsilon_{ij,t} \quad (9)$$

Equation (9) is a Probit model written in a linear form intuitively, but in the estimation, the dissertation estimates equation (7). The notations of the individual country (i, j) and time (t) are consistent across the whole dissertation. In Equation (9), $S_{ij,t}$, a dummy denotes that if there is the presence of FDI ($FDI_{ij,t} > 0$), the value is one and zero otherwise; α is a constant; $CorrDistance$ is the "corruption distance", measured as proposed in section 4.2.1; γ[15] is a set

[14] BIT data are manually collected from ICSID website.
[15] In the results chapter, the dissertation always reports the marginal effects instead of the real γ.

of coefficients. $X_{ij,t}$ is a vector of control variables including all control variables listed in section 4.2.2; $\varepsilon_{ij,t}$is an error term.

$$FDI_{ij,t} = exp(\alpha + \beta_1 CorrDist_{ij,t} + \beta_2 X_{ij,t} + \beta_3 \hat{z}^1_{ij,t} + \beta_4 \hat{z}^2_{ij,t} + \beta_5 \hat{z}^3_{ij,t}) + \varepsilon_{ij,t} \quad (10)$$

Equation (10) is developed on equation (8), where $FDI_{ij,t}$ represents the volume of FDI that country i invests in country j at the time t. β is a set of coefficients. Equation (10) also includes a set of dummies for time, host country and home country fixed effects, though they are not written in the Equation (10) nor reported in results. As stated in section 4.1.4, the model for intensive margin includes the cubic polynomial of average productivity ($\hat{z}_{ij,t}$) predicted from the estimates of Equation (9). Cezar and Escobar (2015) following Wooldridge's (2002) instruction estimated that variable by each t, and so does this dissertation, which controls the firms' heterogeneity. Unlike Heckman's (1979) approach, this does not control the selection bias, and thus the estimation uses a PPML estimator instead, as Cezar and Escobar (2015) and Yotov et al. (2016) suggest that applying PPML is a convenient way to address the so-called zero error.

More specifically, this dissertation estimates 17 models for every sample in use, including inward FDI, outward FDI and the two subsamples of outward FDI that consider the development levels of transition economies' investment partner. These 17 models include 1 baseline model for the selection of an excluded variable, 8 selection models (based on equation (9)) for the estimation of extensive margins and 8 primary models (based on equation (10)) for the estimation of intensive margins. Table 2 summarises the specifications of the baseline model, selection model and primary model. The interpretations are based on a combination of one selection model and one primary model; thus, there are 8 groups of models with different measurements for corruption distance. Models with corruption distance based on CoC are benchmark models.

Table 2 Models in the estimation

Baseline Model[16]	$FDI_{ij,t} = exp(\alpha + \beta_2 X_{ij,t} + \beta_3 \hat{z}^1_{ij,t} + \beta_4 \hat{z}^2_{ij,t} + \beta_5 \hat{z}^3_{ij,t}) + \varepsilon_{ij,t}$
Selection Model	$S_{ij,t} = \alpha + \gamma_1 CorrDist_{ij,t} + \gamma_2 X_{ij,t} + \varepsilon_{ij,t}$
Primary Model	$FDI_{ij,t} = exp(\alpha + \beta_1 CorrDist_{ij,t} + \beta_2 X_{ij,t} + \beta_3 \hat{z}^1_{ij,t} + \beta_4 \hat{z}^2_{ij,t} + \beta_5 \hat{z}^3_{ij,t}) + \varepsilon_{ij,t}$

[16] Baseline model excludes the variable "corruption distance", as this can decrease the impact of collinearity; after all, the final specification of the primary equation will not work without corruption distance as a variable.

The estimation always begins with a baseline model using PPML estimator, which is used for the selection of a legitimately excluded variable. The selection model uses random effects Probit estimator because a fixed-effects Probit model is infeasible as it may lead to biased estimates because of the incidental parameter problem (Lancaster, 2000; Qian and Sandoval-Hernandez, 2016).[17] Also, Charbonneau (2017) finds that HMR's two-fixed-effects model is inconsistent in the panel setting and argues that Logit is a valid choice. Unconditional fixed-effects are possible in the logit model; however, this model violates the distribution assumption of the theoretical framework and, moreover, it might be incompatible with second-stage regression, considering the distribution of the function itself.

The estimation of the primary model uses the PPML estimator. Following Wooldridge's (2002) suggestion, the primary model must exclude a variable from the selection model. In other words, the selection equation should include an additional variable. The exclusion requirement is that the excluded variable should correlate with the dependent variable in the selection model, but not with the FDI stock in the primary model. More importantly, it should not be correlated with the dependent variables in both models at the same time. Otherwise, the estimation will be inconsistent as said omitted variable will correlate with the predicted variable ($\hat{z}_{ij,t}$) and the residual in the primary model – this is known as the endogenous problem. However, one should not mix the excluded variable with instrumental variable, as the purpose of excluded variable here is mainly for avoiding collinearity. Therefore, all estimations are accompanied by a baseline model in order to nominate the excluded variable in question.

Finally, the testing criteria are based on the sign of $\gamma_1$in the selection model and β_1 in the primary model as follows:

If $\gamma_1 < 0$ and is at least significant at the 10% level[18] for estimates from both outward and inward FDI samples, the empirical evidence supports hypothesis (1). Otherwise, the empirical evidence rejects hypothesis (1);

[17] Author notices that recent paper from Cruz-Gonzalez, Fernández-Val, and Weidner (2017) proposed relevant techniques to tackle the problem of fixed-effects Probit estimator, which is promising, but it remains debatable.
[18] This dissertation sometimes refers to a level significance of 10% as marginally significant, 5% as significant, and insignificant otherwise. This is because a gravity model using GDP or "GDP per capita" as a control variable naturally suffers from the problem of collinearity, which harms the significance of other explanatory variables, though the magnitude of influence is usually unclear. Therefore, the author supposes that 5% or even 10%significance level is sufficient to avoid a type-I error.

If $\beta_1 < 0$ and is at least significant at the 10% level for the estimates from both outward and inward FDI samples, the empirical evidence supports hypothesis (2). Otherwise, the empirical evidence rejects hypothesis (2).

Chapter 5: Results

The theoretical framework developed from Cezar and Escobar's (2015) model demonstrates that corruption distance results in adaptation costs, thus increasing the fixed costs and the productivity threshold of FDI. As a result, it may decrease the extensive and intensive margins of FDI. Following this proposition, this chapter estimates a two-stage gravity equation derived from the theoretical model in order to test the hypotheses proposed in section 3.4 in the context of European transition economies. Firstly, this chapter estimates the impact of corruption distance on the outward and inward FDI of transition economies, respectively. Then, following Qian and Sandoval-Hernandez (2016), the chapter classifies the sample into two categories: industrial economies and developing economies. Therefore, the chapter also studies the impact of corruption distance on the outward FDI of transition economies to industrial countries and developing countries, respectively.

5.1. Determinants of Transition Economies' Outward FDI

Table 3 shows the results of the proposed estimation using a full sample of outward FDI. From the estimates in baseline Model (1) in Table 3, "religion" is a potential candidate for the excluded variable of the primary model, as its coefficient[19] is insignificant at 10% level. In the meantime, estimates of Model (2), Model (4) and Model (6) show that "religion" is always significant with a level of 5%. Thus, the primary models in Table 3 exclude "religion"; i.e., Model (3), Model (5) and Model (7). This is in line with HMR's practice, which suggests that the exclusion of religion is a legitimate choice.

[19] All coefficients in the results are marginal effects at sample means following HMR.

Table 3 Estimates of extensive and intensive margins of outward FDI

	(1) FDI PPML	(2) S Probit	(3) FDI PPML	(4) S Probit	(5) FDI PPML	(6) S Probit	(7) FDI PPML
O_gdp_p	2.153***	0.205***	1.778*	0.211***	1.591*	0.203***	2.057**
	(0.795)	(0.023)	(0.989)	(0.024)	(0.957)	(0.023)	(0.912)
D_gdp_p	-0.134	0.087***	-0.0975	0.077***	-0.277	0.088***	-0.137
	(0.398)	(0.016)	(0.382)	(0.016)	(0.394)	(0.016)	(0.356)
GDP sim	6.836*	-0.723***	8.843**	-0.765***	8.951**	-0.718***	7.594**
	(3.646)	(0.218)	(3.957)	(0.219)	(4.023)	(0.218)	(3.818)
Distance	-2.373***	-0.045***	-2.181***	-0.044***	-2.216***	-0.044***	-2.345***
	(0.580)	(0.005)	(0.508)	(0.005)	(0.496)	(0.005)	(0.468)
Legal	0.833**	0.099**	0.721**	0.120***	0.725**	0.110***	0.783*
	(0.411)	(0.040)	(0.355)	(0.040)	(0.363)	(0.039)	(0.410)
Religion	-0.193	0.169**		0.198***		0.187***	
	(1.422)	(0.071)		(0.071)		(0.070)	
BIT	1.067**	0.059	0.424	0.065	0.506	0.064	0.758
	(0.497)	(0.041)	(0.526)	(0.0403)	(0.530)	(0.040)	(0.528)
EU	0.139	0.037	0.160	0.0415	0.155	0.0460*	0.084
	(0.297)	(0.026)	(0.302)	(0.026)	(0.301)	(0.026)	(0.312)
CorrDist (CoC)		-0.063**	-0.347				
		(0.028)	(0.346)				
CorrDist (CPI)				-0.001	-0.134		
				(0.011)	(0.115)		
CorrDist (ICRG)						-0.028**	-0.009
						(0.013)	(0.262)
$\hat{z}$			0.937***		0.700**		0.736**
			(0.314)		(0.302)		(0.340)
$\hat{z}^2$			-0.379		-0.293		-0.392
			(0.320)		(0.347)		(0.319)
$\hat{z}^3$			0.117		0.190		0.0175
			(0.224)		(0.232)		(0.204)
Obs.	5616	5880	5616	5858	5616	5880	5616
R-square	0.721		0.719		0.727		0.724

*, **, *** indicates the significance level at 0.1, 0.05 and 0.01, respectively. Country-pair clustered robust standard errors are in parentheses. Coefficients of Probit model are marginal effects at sample means. Time, host country and home country dummies are not reported. Every regression includes a constant.

After excluding religion from the primary model, this dissertation predicts $\hat{z}$ in order to control firm heterogeneity in the primary model, as HMR suggests. However, instead of predicting $\hat{z}$ directly from the panel model, the estimation follows Cezar and Escobar's (2015) suggestion that it should be predicted from a cross-sectional probit model on a year-by-year basis. However, since some observations do not carry any information, the estimation drops 264 observations from the dataset. As the sample size is still large enough to accurately reach convergence using PPML estimation, dropping said observations will not have an impact on the estimates. Apart from Model (2) and Model (3), which can be seen in Table 3, this dissertation also estimates the combinations of Model (4) and Model (5), and Model (6) and Model (7), using the exact same specifications used in the benchmark models; i.e., Model (2) and Model (3). However, the variable "corruption distance" is constructed using CPI and ICRG in order to check for robustness.

The estimates of control variables from Model (2), which can be seen in Table 3, demonstrate that the extensive margin of outward FDI increases in the GDP per capita of both home and host countries, as well as "religion" and "common legal origins"; however, the extensive margin decreases in GDP similarity and geographical distance. The results are robust across all models with respect to extensive margin, which can be seen in Table 3.

However, the estimates on GDP similarity are different from the estimates of Cezar and Escobar (2015), which suggest that GDP similarity has positive impacts on FDI decisions. The economic size of transition economies is relatively small compared to most countries in the dataset, especially industrial countries. Thus, considering market-seeking motives, firms from transition economies would prefer to choose FDI over exporting in order to avoid the high variable costs associated with exporting to countries with large economies where demand is supposed to be high. In other words, as the size of transition economies are relatively homogenous, firms from transition economies are more likely to choose FDI for sales in countries with large economies. Radlo and Sass (2012) suggest that some CEECs have invested heavily in Germany, Switzerland, the Netherlands, and the UK, where the economies are much larger than they are in CEECs. This phenomenon is also confirmed by this study; for example, Poland invests more in Switzerland than they do in transition economies. The author argues that the increasing amount of FDI may result from the entry of MNEs from transition economies, which is also supported by the positive coefficient of $\hat{z}$.

Model (3), which can be seen in Table 3, demonstrates that an increasing number of MNEs[20] and the GDP per capita of home countries positively affects the intensive margin of transition economies' outward FDI; on the other hand, geographical distance decreases the intensive margin. Contrary to the results of the extensive margin model, host GDP per capita is insignificant with a level of 10%. Moreover, in contrast to the selection models, estimates from primary Model (3) show that GDP similarity has a positive impact on the intensive margin. Thus, GDP similarity decreases the extensive margin but increases the intensive margin. In other words, GDP similarity increases the volume of investment by MNEs but decreases the number of MNEs from transition economies investing in host countries. According to Radlo and Sass (2012), firms from transition economies often set production facilities in neighbouring countries for abundant natural resources. Therefore, in spite of the relationship between demand and economic size, MNEs do not have to build a large production facility in a large economy as they may still choose to import intermediate goods from home or a third country with similar economic size, while large economies do attract more new investments. Overall, the estimates of control variables in this study are economically reasonable, which enhances the reliability of the models.

5.1.1. Estimates of Conventional Corruption Distance

After confirming the reliability of the estimates, we proceed to the estimates of corruption distance. In Table 3, Model (2) indicates that corruption distance has a negative impact on firm decisions with respect to FDI (extensive margin). On the other hand, the estimates of Model (3), (5) and (7) do not suggest any evidence that the volume of direct investment by MNEs from transition economies will decrease with corruption distance, which is in line with Cezar and Escobar's (2015) estimates. The results are robust as the estimates are similar when only considering model (4) using corruption distance index based on ICRG. However, in Model (6), the impact on extensive margin is insignificant when using CPI. Therefore, the empirical results only roughly support the first part of hypothesis (1), as they are sensitive to the source of data used to calculate the corruption distance; furthermore, they contradict hypothesis (2) as the results show corruption distance does not have significant effects on intensive margin.

[20] This is obtained from the coefficients of $\hat{Z}_{ij,t}$, which is the parameter of the number of MNEs from country "i" investing in country "j" at the time "t".

5.1.2. Estimates of Adjusted Corruption Distance

According to the theoretical linkage between corruption distance and adaptation cost, this dissertation further tests the hypothesis by introducing a set of adjusted corruption distance, which is constructed in section 4.2.2. The adjusted corruption distance aims to reflect the development of firms' skills beyond the current business environment at home. This is because, in theory, adaptation cost affects the extensive and intensive margins, which, in fact, is related to the knowledge and skill of a firm. It is unlikely that firms are able to develop the required skills in a period of time less than one year.

Table 4[21] shows the estimates based on adjusted corruption distance. For brevity, Table 4 does not report the estimates of the baseline model nor the control variables, as said estimates are similar to the results in Table 3. Three types of adjusted corruption distance are based on CoC, CPI and ICRG, respectively. As ICRG provides longer time series than CoC and CPI, this dissertation also constructs another two figures of adjusted corruption distance using ICRG, which takes 10-year and 15-year moving averages of home corruption levels for the calculation of corruption distance, respectively.

The results in Table 4 from Model (1) and Model (2) demonstrate the following: when taking the development of a firm's skills over the previous five years at home into account, the impact of corruption distance on the extensive margin is negative, but it has no significant impact on the intensive margin. However, the impact on the extensive margin disappears when using CPI to construct adjusted corruption distance in Model (3). Estimates of Model (1), which can be seen in Table 4, suggest that the marginal effects of corruption distance on the extensive margin are only marginally significant at 10% level, and the magnitude of marginal effects is much smaller than the marginal effects from the corresponding estimates of Model (2) in Table 3 which made use of conventional corruption distance. Therefore, based on the adjusted corruption distance by CoC and CPI, the impact of corruption distance on the extensive margin of FDI is little or does not exist when one considers the development of a firm's skills over the previous five years at home. This contradicts hypothesis (2) but provides ambiguous evidence for hypothesis (1) as estimates of models using conventional corruption distance.

In addition, the estimates of Model (5) and Model (6), which can be seen in Table 4, demonstrate that the negative marginal effects of adjusted corruption distance on the extensive

[21] Unless explicitly stated, the serial numbers of models in their corresponding section refer to the models in the table of said section.

margin are marginally significant, but the adjusted corruption distance based on ICRG will increase the intensive margin when one considers the development of a firm's skills over the previous five years. Thus, Model (5) and Model (6) support the first part of hypothesis (1) but contradict hypothesis (2). Even when the model takes into account the development of skills over a longer period of time, such as Model (7), Model (8), Model (9) and Model (10), similar results are obtained as Model (5) and Model (6), but with more significant statistical evidence.

Table 4 Effects of different adjusted corruption distance on outward FDI

	(1) S Probit	(2) FDI PPML	(3) S Probit	(4) FDI PPML	(5) S Probit	(6) FDI PPML	(7) S Probit	(8) FDI PPML	(9) S Probit	(10) FDI PPML
CorrDist (CoC)	-0.002*	0.041								
MA (5)	(0.001)	(0.033)								
CorrDist (CPI)			0.000	0.0387						
MA (5)			(0.011)	(0.108)						
CorrDist (ICRG)					-0.024*	0.465**				
MA (5)					(0.014)	(0.216)				
CorrDist (ICRG)							-0.026**	0.675***		
MA (10)							(0.013)	(0.191)		
CorrDist (ICRG)									-0.042***	0.536***
MA (15)									(0.014)	(0.168)
$\hat{z}$		0.826***		0.767**		0.765**		0.499		0.881**
		(0.315)		(0.331)		(0.315)		(0.365)		(0.359)
Observations		5880	5616	5858	5616	5880	5616	5880	5616	5880
R-square			0.729		0.715		0.727		0.780	

*, **, *** indicates the significance level at 0.1, 0.05 and 0.01, respectively. Country-pair clustered robust standard errors are in parentheses. Coefficients of Probit models are marginal effects at sample means. Specifications are the exact same as corresponding models in Table 3. Control variables have not been reported except for $\hat{z}$. MA (n) indicates that the construction of corruption distance uses the n-year moving average of the home country's corruption level.

5.2. Determinants of Transition Economies' Inward FDI

Similar to section 5.1, this section starts with the selection of an excluded variable from baseline Model (1), which can be seen in Table 5. Legal, BIT and EU are not significantly correlated with FDI stock. On the other hand, Model (2) shows that "BIT" alone is significantly correlated with the selection indicator. Hence, it is a statistically valid excluded variable. Some existing literature argues that the enforcement of BIT aiming to promote FDI has significant effects on the increasing FDI stock; however, this is still contested and continues to be debated (Egger and Pfaffermayr, 2004; Busse, Königer and Nunnenkamp, 2010). Therefore, based on this study, the author argues that BIT does encourage firms to invest in transition economies, but it does not necessarily increase the volume of inward FDI from MNEs.

From model (2) in Table 5, the extensive margin of inward FDI increases in home country GDP per capita and BIT and decreases in the geographical distance and GDP similarity. However, the marginal effects of host country GDP similarity are only marginally significant. In contrast to the estimates of outward FDI, the impact of GDP similarity reduces the probability of new FDI. This indicates that transition economies attract foreign investors from countries that are similar in economic size, but the probability of new FDI is not very sensitive to the variation of GDP similarity considering the marginally significant marginal effects from GDP similarity in model (2). Model (4) and Model (6), in general, confirm the results.

On the other hand, the estimates of $\hat{z}$ are insignificant across all primary models, which can be seen in Table 5, indicating that an increased number of MNEs alone may not contribute to an increase in the total amount of FDI. Rather, geographical distance reduces the amount of inward FDI in transition economies. Therefore, the estimates of GDP similarity and distance implies that neighbouring countries with similar economic sizes are more likely to invest in transition economies; however, distance is more important than economic size, as economic size increases the number of MNEs that invest but not the total amount of FDI. All in all, the results for control variables are mostly economically significant, and thus the model is reliable enough to proceed to the interpretation of the estimates of corruption distance.

Table 5 Estimates of extensive and intensive margins of inward FDI

	(1) FDI PPML	(2) S Probit	(3) FDI PPML	(4) S Probit	(5) FDI PPML	(6) S Probit	(7) FDI PPML
O_gdp_p	-0.043	0.191***	0.013	0.187***	-0.005	0.184***	-0.013
	(0.132)	(0.022)	(0.141)	(0.023)	(0.146)	(0.023)	(0.149)
D_gdp_p	-0.124	0.0248	-0.104	0.0255	-0.092	0.025	-0.105
	(0.256)	(0.022)	(0.250)	(0.022)	(0.255)	(0.023)	(0.252)
GDP Sim	-3.508	-0.396*	-3.598	-0.433**	-3.558	-0.407*	-3.671
	(2.202)	(0.218)	(2.322)	(0.220)	(2.307)	(0.216)	(2.308)
Distance	-2.399***	-0.035***	-2.402***	-0.035***	-2.397***	-0.035***	-2.417***
	(0.232)	(0.004)	(0.234)	(0.004)	(0.234)	(0.004)	(0.232)
Legal	-0.161	0.014	-0.168	0.0261	-0.163	0.0361	-0.166
	(0.246)	(0.040)	(0.239)	(0.039)	(0.240)	(0.039)	(0.239)
Religion	1.368***	-0.038	1.221**	-0.018	1.250***	-0.0139	1.239***
	(0.467)	(0.063)	(0.484)	(0.063)	(0.480)	(0.062)	(0.468)
BIT	-0.212	0.115**		0.118***		0.113**	
	(0.232)	(0.046)		(0.046)		(0.046)	
EU	-0.025	0.054	0.018	0.056	-0.003	0.064*	0.087
	(0.125)	(0.037)	(0.146)	(0.037)	(0.148)	(0.036)	(0.153)
CorrDist (CoC)		-0.078***	-0.0942				
		(0.027)	(0.149)				
CorrDist (CPI)				-0.021*	-0.011		
				(0.011)	(0.049)		
CorrDist (ICRG)						-0.018	-0.163***
						(0.015)	(0.060)
$\hat{z}$			0.383		0.372		0.274
			(0.279)		(0.289)		(0.317)
$\hat{z}^2$			-0.103		-0.0628		-0.324
			(0.191)		(0.181)		(0.241)
$\hat{z}^3$			-0.021		-0.031		0.075
			(0.067)		(0.059)		(0.077)
Obs.	5880	5880	5880	5858	5858	5880	5880
R-square	0.818		0.818		0.817		0.818

*, **, *** indicates the significance level at 0.1, 0.05 and 0.01, respectively. Country-pair clustered robust standard errors are in parentheses. Coefficients of Probit model are marginal effects at sample means. Time, host country and home country dummies are not reported. Every regression includes a constant.

5.2.1. Estimates of Conventional Corruption Distance

The estimates of Model (2) demonstrate that corruption distance significantly reduces the probability of new FDI but does not affect the amount of inward FDI in transition economies. This is in line with Cezar and Escobar's (2015) estimates. Moreover, the results are roughly robust with respect to Model (4) and Model (5) using CPI for corruption distance, though the effects are only marginally significant on the extensive margin and the magnitude of marginal effects are smaller. Therefore, the estimates support the second part of hypothesis (1) but contradict hypothesis (2).

However, the impact of corruption distance on the probability of new FDI disappears when using ICGR for corruption distance. On the other hand, Model (7), which can be seen in Table 5, shows that corruption distance decreases the amount of inward FDI. Therefore, estimates of corruption distance based CoC and CPI give similar results – that corruption distance decreases the extensive margins of inward FDI, but it has no impact on the intensive margins of inward FDI in transition economies, whereas estimates based on ICRG show that corruption distance decreases the amount of FDI from MNEs but does not, moreover, necessarily decrease the number of MNEs.

5.2.2. Estimates of Adjusted Corruption Distance

Similar to section 5.5.1, this section also applied adjusted corruption distance to the corresponding models. Table 6 reports the results of estimation, where all specifications were kept the same as the models in Table 5. The results of the control variable are, for the most part, the same as the results from the models in Table 5.

The estimates of adjusted corruption distance based on CoC and CPI show that, when the corruption distance accounts for the development of firms' skills over the past five years, the probability of new inward FDI is reduced; however, this has no impact on the amount of inward FDI from MNEs. This is the same as the results from corresponding models with conventional corruption distance in Table 5, but the effects are more significant for the estimates using CPI than the results from the conventional versions. Moreover, from Model (1) in Table 6, the magnitude of the marginal effects of corruption distance is smaller than that of the corresponding marginal effects of Model (2) in Table 5.

In addition, estimates of adjusted corruption distance based on ICRG demonstrate a negative impact on intensive margins. However, the relationship between corruption distance and intensive margins of transition economies' inward FDI largely disappears when adjusting the corruption distance and setting it to the 15-year corruption level in home countries.

Table 6 Effects of different adjusted corruption distance on inward FDI

	(1) S Probit	(2) FDI PPML	(3) S Probit	(4) FDI PPML	(5) S Probit	(6) FDI PPML	(7) S Probit	(8) FDI PPML	(9) S Probit	(10) FDI PPML
CorrDist (CoC)	-0.005**	-0.015								
MA (5)	(0.001)	(0.013)								
CorrDist (CPI)			-0.026**	0.013						
MA (5)			(0.011)	(0.053)						
CorrDist (ICRG)					-0.021	-0.144**				
MA (5)					(0.018)	(0.070)				
CorrDist (ICRG)							-0.018	-0.163*		
MA (10)							(0.019)	(0.088)		
CorrDist (ICRG)									0.012	-0.139
MA (15)									(0.017)	(0.088)
$\hat{z}$		0.383		0.365		0.260		0.345		0.366
		(0.262)		(0.283)		(0.330)		(0.332)		(0.343)
Observations	5880	5880	5858	5858	5880	5880	5880	5880	5880	5880
R-square		0.818		0.817		0.816		0.815		0.817

*, **, *** indicates the significance level at 0.1, 0.05 and 0.01, respectively. Country-pair clustered robust standard errors are in parentheses. Coefficients od Probit models are marginal effects at sample means. Specifications are the exact same as corresponding models in Table 5. Control variables have not been reported except for $\hat{z}$. MA (n) indicates that the construction of corruption distance uses the n-year moving average of the home country's corruption level.

5.3. Determinants of Transition Economies' Outward FDI with Different Host Country Group

Baes on Ledyaeva et al.'s (2013) finding on the commonality of corruption, Qian and Sandoval-Hernandez (2016) argues that even if the corruption levels are same, firm may still prefer one corruption to another. A simple example was given, wherein US firms preferred to invest in Italy than in Saudi Arabia, even if the corruption levels were the same in both countries (and thus the two corruption distances were equal). This is because firms are more familiar with corruption in Western systems. By analogy, firms from transition economies may also have this type of appetite. Therefore, this dissertation classifies the full sample, which consists of outward FDI according to the development level of host countries, into industrial and developing countries. This is similar to the actions of Qian and Sandoval-Hernandez (2016).[22]

This section studies the flow of FDI from transition economies to industrial economies. The next section studies the outward FDI of transition economies into developing countries in a similar manner.

5.3.1. Determinants of Transition Economies' Outward FDI to Industrial Countries

Again, the estimation starts by selecting an appropriate excluded variable. However, religion no longer satisfies the exclusion requirement, statistically. From the estimates of Model (1) in Table 7, although both religion and EU are potential candidates, both are not significantly correlated with the selection indicator.[23] Thus, this section introduces an additional control variable, FTA, into the baseline model and selection models. Table 7 shows that FTA is not correlated with the transition economies' outward FDI to industrial economies, but it is significantly correlated with the selection indicator. Therefore, it is excluded from the regression of all primary models.

[22] Indeed, the 'industrial countries' in the sample consist mostly of traditional Western industrial capitalistic countries, except for Japan. To be sure, Japan is also an industrial Westernised country, though it is not geographically Western.

[23] Santos Silva and Tenreyro (2015) also suggest that, even in the HMR, the significance level of religion is doubtful, but, generally speaking, it is valid and widely used in the literature.

Table 7 Estimates of extensive and intensive margins of outward FDI (Transition Economies to Industrial Economies

	(1) FDI PPML	(2) S Probit	(3) FDI PPML	(4) S Probit	(5) FDI PPML	(6) S Probit	(7) FDI PPML
O_gdp_p	2.044***	0.242***	1.767**	0.250***	1.575*	0.242***	1.863***
	(0.768)	(0.032)	(0.869)	(0.033)	(0.896)	(0.032)	(0.714)
D_gdp_p	-0.390	0.0526**	-0.303	0.0376*	-0.507	0.050**	-0.198
	(0.539)	(0.023)	(0.498)	(0.022)	(0.525)	(0.022)	(0.499)
GDP Sim	8.067**	-1.010***	9.122**	-1.014***	9.316**	-0.991***	8.099**
	(3.862)	(0.273)	(4.047)	(0.272)	(4.181)	(0.272)	(3.934)
Distance	-2.162***	-0.042***	-2.020***	-0.041***	-2.025***	-0.042***	-2.166***
	(0.560)	(0.008)	(0.590)	(0.008)	(0.588)	(0.008)	(0.561)
Legal	0.870**	0.164***	0.678**	0.179***	0.669**	0.171***	0.808**
	(0.361)	(0.049)	(0.332)	(0.0484)	(0.334)	(0.0480)	(0.350)
Religion	1.098	0.076	0.891	0.112	1.017	0.0953	0.982
	(1.401)	(0.105)	(1.392)	(0.102)	(1.418)	(0.100)	(1.452)
BIT	1.118**	0.064	0.764	0.0700	0.769	0.0713	1.007*
	(0.542)	(0.055)	(0.550)	(0.0533)	(0.557)	(0.0540	(0.528)
EU	0.143	0.0371	0.104	0.0403	0.122	0.0456*	0.0601
	(0.304)	(0.028)	(0.318)	(0.0278)	(0.316)	(0.0275)	(0.317)
FTA	0.422	0.089**		0.091**		0.0891**	
	(0.645)	(0.040)		(0.039)		(0.0394)	
CorrDist (CoC)		-0.0579	-0.271				
		(0.037)	(0.368)				
CorrDist (CPI)				0.001	-0.120		
				(0.014)	(0.120)		
CorrDist (ICRG)						-0.027	-0.050
						(0.016)	(0.318)
$\hat{z}$			0.957**		0.795**		1.044**
			(0.410)		(0.388)		(0.514)
$\hat{z}^2$			-0.671*		-0.565*		-1.158***
			(0.347)		(0.318)		(0.421)
$\hat{z}^3$			0.183		0.188		0.319***
			(0.127)		(0.124)		(0.124)
Obs.	3371	3635	3371	3613	3371	3635	3371
R-square	0.728		0.734		0.739		0.739

*, **, *** indicates the significance level at 0.1, 0.05 and 0.01, respectively. Country-pair clustered robust standard errors are in parentheses. Coefficients of Probit models are marginal effects at sample means. Time, host country and home country dummies are not reported. Every regression includes a constant.

In Table 7, we can find that the sign of coefficients (and their corresponding significance levels) of control variables are similar to the results from the estimation using the full sample of transition economies' outward FDI. The probability of new investment (extensive margin) increases with respect to host and home country GDP per capita, as well as with common legal origins; however, it decreases with respect to GDP similarity and geographical distance. On the other hand, intensive margin increases by virtue of the number of investing MNEs ($\hat{z}$), home country GDP per capita and GDP similarity. The results are robust across the selection models, though the extensive margin seems less sensitive to host country GDP per capita, as it is only marginally significant in Model (4).

5.3.1.1. Estimates of Conventional Corruption Distance

In Table 7, Model (2) shows that all coefficients of corruption distance are insignificant at any given level in the table, regardless of the type of model and the sources of corruption index, which thereby rejects hypothesis (1) and hypothesis (2). This indicates that corruption distance does not affect the decisions of firms with respect to FDI nor the amount of FDI that flows from transition economies to industrial countries, which itself implies that corruption distance may not lead to adaptation costs with respect to the investments of MNEs of transition economies.

5.3.1.2. Estimates of Adjusted Corruption distance

In addition, as with all previous sections, this dissertation further tests the relationship between corruption distance and FDI by using an adjusted corruption distance. The results from Table 8 are mostly the same as the results from corresponding estimations in section 5.1.1.

The estimation based on adjusted corruption distance shows that, when considering the development of a firm's skills over the past five years, the corruption distance based on CoC reduces the probability of firms from transition economies choosing to invest in industrial economies, whereas the magnitude of marginal effects is rather small and does not have any impact on the amount of FDI from MNEs. However, when using the adjusted corruption distance based on CPI, the impact on the extensive margin disappears. In addition, the corruption distance decreases the extensive margin but increases the intensive margin when applying adjusted corruption distance based on ICRG. Even after prolonging the skill-

development period of a firm, the results remain roughly the same; however, the magnitude of marginal effects and the significance level both increase.

Table 8 Effects of different adjusted corruption distance on FDI from transition economies to industrial economies

	(1) S Probit	(2) FDI PPML	(3) S Probit	(4) FDI PPML	(5) S Probit	(6) FDI PPML	(7) S Probit	(8) FDI PPML	(9) S Probit	(10) FDI PPML
CorrDist (CoC)	-0.003**	0.0392								
MA (5)	(0.001)	(0.033)								
CorrDist (CPI)			0.000	0.0741						
MA (5)			(0.015)	(0.125)						
CorrDist (ICRG)					-0.030*	0.488**				
MA (5)					(0.018)	(0.217)				
CorrDist (ICRG)							-0.029*	0.631***		
MA (10)							(0.017)	(0.210)		
CorrDist (ICRG)									-0.047***	0.623***
MA (15)									(0.018)	(0.196)
$\hat{z}$		0.874**		0.911*		1.212**		0.891**		0.951**
		(0.382)		(0.465)		(0.488)		(0.451)		(0.385)
Observations	3635	3371	3613	3371	3635	3371	3635	3371	3635	3371
R-square		0.741		0.734		0.743		0.791		0.766

*, **, *** indicates the significance level at 0.1, 0.05 and 0.01, respectively. Country-pair clustered robust standard errors are in parentheses. Coefficients of Probit models are marginal effects at sample means. Specifications are the exact same as corresponding models in Table 7. Control variables have not been reported except for $\hat{z}$. MA (n) indicates that the construction of corruption distance uses the n-year moving average of the home country's corruption level.

5.3.2. Determinants of Transition Economies' Outward FDI to Developing Countries

This section explores the impact of corruption distance on transition economies' outward FDI that flows to developing countries. The estimation starts with the selection of a valid excluded variable. Table 9 reports the results of estimation, where all previously excluded variables are not statistically valid. However, in this case, "common legal origin" statistically satisfies the exclusion requirement, as it is significantly correlated with the selection indicator but not with the FDI stock.[24] Therefore, primary models exclude "common legal origin" from the regression.

The impact of control variables on the extensive margin is only slightly different from the estimated results of the full sample and the subsample, where an industrial country is set as the host country; however, said impact on the intensive margin differs from the previous estimates in the primary models. GDP similarity is no longer significant across the selection models in Table 9. This indicates that the probability of firms from transition economies to invest in developing countries does not depend on their size. Radlo and Sass (2012) argue that the firms of transition economies use FDI either for abundant natural resources in foreign countries or for market-seeking motives. Thus, according to the statistical results, the author argues that firms from transition economies invest in developing countries mainly because of the associated low costs. Therefore, the economic size of the host country becomes irrelevant.

In the results of the primary model, "home country GDP per capita" and "religion" are significant with a level of 5%. Herein, the most counterintuitive part is the insignificant estimates of geographical distance. Firstly, it may because of the violation of theoretical assumption in Chapter 3 as this study largely focus on market seeking activity, but author believes the second explanation instead. The second explanation is that geographical closeness does not necessarily promote FDI because, in the trade-off between the trade cost of exports and additional fixed costs induced by FDI, geographical closeness may promote trade instead of FDI. In addition, in theory, it is "expected profit" that contributes to an increase in the intensive margin of FDI when controlling the number of MNEs and, unlike trade, geographical distance does not necessarily influence the expected profit for horizontal FDI. Egger (2008) argues that distance mostly harms vertical MNEs engaging in trade, while it promotes FDI

[24] The author did notice that "legal" is not significant enough in Model 4, but, since no other choices are available, a compromise is reasonable. Moreover, HMR finds that changing the excluded variable does not change the estimates (by much).

when one considers market non-trading MNEs. Therefore, the model is credible, and we can proceed to the interpretation of the impact of corruption distance.

Table 9 Estimates of extensive and intensive margins of outward FDI (Transition Economies to Developing Economies)

	(1) FDI PPML	(2) S Probit	(3) FDI PPML	(4) S Probit	(5) FDI PPML	(6) S Probit	(7) FDI PPML
D_gdp_p	2.686**	0.082***	2.700***	0.078***	2.841**	0.074***	3.072***
	(1.072)	(0.019)	(0.893)	(0.018)	(1.162)	(0.019)	(0.933)
O_gdp_p	0.907	0.085***	0.835*	0.079***	0.975	0.090***	1.176*
	(0.593)	(0.014)	(0.458)	(0.013)	(0.627)	(0.0145)	(0.622)
GDP Sim	-15.69	-0.320	-13.53	-0.385**	-13.89	-0.327*	-15.99
	(10.370)	(0.205)	(12.030)	(0.191)	(12.02)	(0.193)	(12.03)
Distance	-0.595	-0.010***	-0.411	-0.010***	-0.389	-0.009**	-0.311
	(0.678)	(0.004)	(0.818)	(0.003)	(0.851)	(0.004)	(0.799)
Legal	0.797	-0.098**		-0.078*		-0.090**	
	(0.719)	(0.041)		(0.040)		(0.042)	
Religion	-2.254**	0.191***	-3.829***	0.206***	-3.601***	0.205***	-2.899**
	(1.032)	(0.051)	(1.408)	(0.051)	(1.339)	(0.0502)	(1.299)
BIT	1.538*	-0.022	1.264	-0.0160	1.281	-0.021	1.523*
	(0.789)	(0.030)	(0.838)	(0.029)	(0.798)	(0.0292)	(0.832)
EU	0.279	-0.010	0.192	-0.000	-0.0421	-0.00145	-0.248
	(0.778)	(0.049)	(0.814)	(0.048)	(0.854)	(0.048)	(0.787)
CorrDist (CoC)		-0.053**	-0.140				
		(0.026)	(0.560)				
CorrDist (CPI)				-0.005	0.162		
				(0.009)	(0.212)		
CorrDist (ICRG)						-0.029*	0.670
						(0.015)	(0.609)
$\hat{z}$			1.257***		1.326***		0.677
			(0.473)		(0.390)		(0.564)
$\hat{z}^2$			-0.018		0.100		0.068
			(0.139)		(0.165)		(0.264)
$\hat{z}^3$			-0.012		-0.009		0.006
			(0.035)		(0.017)		(0.065)
Obs.	2244	2245	2224	2245	2224	2245	2224
R-square	0.970		0.976		0.975		0.973

*, **, *** indicates the significance level at 0.1, 0.05 and 0.01, respectively. Country-pair clustered robust standard errors are in parentheses. Coefficients of Probit models are marginal effects at sample means. Time, host country and home country dummies are not reported. Every regression includes a constant.

5.3.2.1. Estimates of Conventional Corruption Distance

From Table 9, the estimates of Model (2) show that corruption distance reduces the probability of new FDI, but it has no impact on the amount of outward FDI to developing countries from the MNEs of transition economies. This is only slightly robust when changing of index source, as the estimates of Model (6) show that the effects are marginally significant at 10% level. However, looking at the results from the estimations using the full sample, the impact also disappears when using corruption distance based on CPI. Therefore, generally speaking, corruption distance does have a negative impact on the extensive margins of transition economies' outward FDI to developing countries, but the results differ when the sources of corruption index are changed.

5.3.2.2. Estimates of Adjusted Corruption Distance

This section replaces the conventional corruption distance with adjusted corruption distance. Table 10 reports the results of estimation, where corruption distance has no significant effect on both the extensive margin and intensive margin when taking the development of firms' skills over the previous five years into account. However, over a 10-year or 15-year period, the results show that corruption distance increases the intensive margin, which is in line with previous estimates with respect to both the full sample and subsample. This counter-intuitive result reflects the fact that MNEs (or the managers of those firms) in transition economies are unlikely to have business experience over such a long period. Therefore, said adjustments might be implausible. On the other hand, the negative impact of corruption distance on the extensive margin is only evident when one considers the skills acquired over the previous 15 years. Therefore, in general, the results indicate that the use of 10- or 15-year moving averages is sceptical with respect to the corruption levels of home countries in the calculation of corruption distance.

Table 10 Effects of different adjusted corruption distance on FDI from transition economies to developing economies

	(1) S Probit	(2) FDI PPML	(3) S Probit	(4) FDI PPML	(5) S Probit	(6) FDI PPML	(7) S Probit	(8) FDI PPML	(9) S Probit	(10) FDI PPML
CorrDist (CoC) MA (5)	0.000	0.022								
	(0.001)	(0.049)								
CorrDist (CPI) MA (5)			-0.001	0.220						
			(0.009)	(0.189)						
CorrDist (ICRG) MA (5)					-0.012	0.267				
					(0.012)	(0.538)				
CorrDist (ICRG) MA (10)							-0.016	0.957***		
							(0.011)	(0.353)		
CorrDist (ICRG) MA (15)									-0.022*	1.059***
									(0.012)	(0.263)
$\hat{z}$		0.877**		1.213***		0.609		0.566		0.608*
		(0.397)		(0.343)		(0.492)		(0.469)		(0.358)
Observations	2245	2224	2245	2224	2245	2224	2245	2224	2245	2224
R-square		0.974		0.974		0.974		0.980		0.980

*, **, *** indicates the significance level at 0.1, 0.05 and 0.01, respectively. Country-pair clustered robust standard errors are in parentheses. Coefficients of Probit models are marginal effects at sample means. Specifications are the exact same as corresponding models in Table 9. Control variables have not been reported except for $\hat{z}$. MA (n) indicates that the construction of corruption distance uses the n-year moving average of the home country's corruption level.

Chapter 6: Robustness Check

This Chapter further checks the robustness of the above findings. Firstly, section 6.1 applied an additional specification into the estimation, which considers the sensitiveness of the above estimates to the corruption level of transition economies' investment partners. Section 6.2 uses a fixed effects Probit model similar to HRM's model. For simplicity, robustness check only uses CoC bases corruption distance.

6.1. Sensitiveness to the Corruption Level of Investment Partners

According to section 2.2 in the literature review chapter, a large amount of the existing literature emphasises the role of the corruption level in host countries. The corruption level of transition economies is relatively more homogenous than their counterparts in the sample; thus, whether the effects are the result of corruption distance or simply the corruption level of investment partners is unknown. This is also suggested by the findings of Godinez and Liu (2014) in which the impact of corruption distance on FDI is conditional on the level of corruption of host countries. On the other hand, for inward FDI, the effects may also likely from home country corruption level (the counterparts of transition economies), as Brada, Drabek, and Perez (2012) argues that home country corruption level has negative impacts on the FDI. Therefore, this section reproduces the estimates of benchmark models in chapter 5.1,

The new specification includes an additional variable that controls the corruption level of the investment partners of transition economies (ParCorr). In other words, for outward FDI, said additional variable controls the corruption level of host countries, but, for inward FDI, said control variable controls the corruption level of home countries.

In Table 11 and 12, the direction of the marginal effects of conventional corruption distance is the same as suggested by the corresponding results in Chapter 5, where both conventional and adjusted corruption distance negatively affect the extensive margin of inward and outward FDI and, moreover, both have no impact on the intensive margin of FDI. On the other hand, the impact of adjusted corruption distance on inward FDI does not change, but the marginal effects of adjustment corruption distance on the extensive margin of outward FDI are insignificant; however, in the estimates of the benchmark model, the effects are only marginally significant with a level of 10%. However, author supposes this may be caused by collinearity. Therefore,

the results in Chapter 5 are robust with respect to the control of the corruption levels of investment partners of transition economies.

Table 11 Estimates of outward FDI controlled by the corruption level of transition economies' FDI partners

	(1) Probit	(2) PPML	(3) Probit	(4) PPML
O_gdp_p	0.224***	1.769*	0.233***	1.792**
	(0.027)	(0.926)	(0.029)	(0.829)
D_gdp_p	0.067***	-0.233	0.072***	-0.413
	(0.023)	(0.401)	(0.023)	(0.419)
GDP Sim	-0.714***	8.571**	-0.765***	8.104**
	(0.217)	(3.913)	(0.219)	(3.941)
Distance	-0.045***	-2.199***	-0.044***	-2.312***
	(0.005)	(0.507)	(0.005)	(0.488)
Legal	0.099**	0.741**	0.124***	0.727*
	(0.040)	(0.355)	(0.0395)	(0.393)
Religion	0.150**		0.187***	
	(0.072)		(0.071)	
BIT	0.0527	0.473	0.0602	0.697
	(0.041)	(0.536)	(0.041)	(0.529)
EU	0.0379	0.144	0.040	0.156
	(0.026)	(0.307)	(0.026)	(0.315)
ParCorr	0.041	0.723	0.0191	0.696
	(0.027)	(0.636)	(0.027)	(0.568)
CorrDist (CoC)	-0.073***	-0.381		
	(0.028)	(0.349)		
CorrDist (CoC) MA (5)			-0.002	0.039
			(0.001)	(0.030)
$\hat{z}$		0.848**		0.733**
		(0.338)		(0.357)
$\hat{z}^2$		-0.474		-0.545
		(0.383)		(0.402)
$\hat{z}^3$		0.176		0.199
		(0.243)		(0.255)
Obs.	5880	5616	5880	5616
R-square		0.727		0.736

*, **, *** indicates the significance level at 0.1, 0.05 and 0.01, respectively. Country-pair clustered robust standard errors in parentheses. Coefficients of Probit model are marginal effects at sample means. Time, host country and home country dummies are not reported. MA (n) indicates that the construction of corruption distance uses the n-year moving average of home country corruption level. Every regression includes a constant.

Table 12 Estimates of inward FDI controlled by the corruption level of transition economies' FDI partners

	(5) Probit	(6) PPML	(7) Probit	(8) PPML
O_gdp_p	0.193***	-0.037	0.188***	-0.048
	(0.022)	(0.128)	(0.021)	(0.135)
D_gdp_p	0.021	0.021	0.058**	0.038
	(0.023)	(0.235)	(0.025)	(0.236)
GDP Sim	-0.368	-3.293	-0.449**	-3.210
	(0.224)	(2.290)	(0.225)	(2.283)
Distance	-0.035***	-2.411***	-0.035***	-2.412***
	(0.004)	(0.235)	(0.004)	(0.235)
Legal	0.0145	-0.166	0.0455	-0.160
	(0.040)	(0.237)	(0.038)	(0.237)
Religion	-0.047	1.215**	-0.017	1.248***
	(0.063)	(0.491)	(0.062)	(0.481)
BIT	0.116**		0.111**	
	(0.045)		(0.046)	
EU	0.052	-0.054	0.0571	-0.059
	(0.037)	(0.131)	(0.036)	(0.130)
ParCorr	0.032	-0.314	-0.002	-0.289*
	(0.045)	(0.216)	(0.046)	(0.175)
CorrDist (CoC)	-0.080***	-0.066		
	(0.027)	(0.162)		
CorrDist (CoC) MA (5)			-0.005***	-0.015
			(0.001)	(0.013)
$\hat{z}$		0.545**		0.557**
		(0.263)		(0.246)
$\hat{z}^2$		-0.055		-0.055
		(0.161)		(0.156)
$\hat{z}^3$		-0.043		-0.039
		(0.061)		(0.057)
Obs.	5880	5880	5880	5880
R-square		0.818		0.819

*, **, *** indicates the significance level at 0.1, 0.05 and 0.01, respectively. Country-pair clustered robust standard errors in parentheses. Coefficients of Probit are marginal effects at sample means. Time, host country and home country dummies are not reported. MA (n) indicates that the construction of corruption distance uses the n-year moving average of home country corruption level. Every regression includes a constant.

6.2. Alternative Estimator

In the main results, the selection model uses random effects Probit estimator because some literature argues that fixed-effects Probit model produces biased estimates due to the incidental parameter problem (Lancaster, 2000; Qian and Sandoval-Hernandez, 2016). Also, Charbonneau (2017) specifically pointed out that HMR's model in the panel setting may be biased. Therefore, this dissertation follows Qian and Sandoval-Hernandez's (2016) practice by using random-effects model, while the model relies on the assumption of strict exogeneity.

Section 6.2 adopts HMR's two-fixed-effects model in the first stage regression in order to investigate the results from two different estimators and its resulting impact on the estimates of the intensive margin model.[25] Model specifications are in line with models in Chapter 5, but the selection of excluded variable follows the standard procedure introduced in estimation strategy. Table 13 reports the marginal effects of corruption distance on the extensive and intensive margin of transition economies' outward and inward FDI. For brevity, Table 13 only reports the significance level and marginal effects of convention corruption distance and adjusted corruption distance. Insignificant results are marked as "-" in the table. Column (1) (2) (3) (4) shows the estimates from regression using two different estimators produces similar results for the impact of corruption distance on the extensive margin. Column (5) (6) (7) (8) shows estimates from both estimators for the impact of corruption distance on FDI intensive margin is insignificant at any given level in Table 13. Therefore, the results are robust, regardless of which estimator is used. However, as both estimators have their limitations, this dissertation only interprets the relative magnitude of marginal effects among all model and the significance level.

Table 13 Estimates of extensive and intensive margin models. (random effects vs fixed effects)

	Extensive Margin (S) Probit				Intensive Margin (FDI) PPML			
	(1) Outward	(2) Outward	(3) Inward	(4) Inward	(5) Outward	(6) Outward	(7) Inward	(8) Inward
	Fixed	Random	Fixed	Random	Fixed	Random	Fixed	Random
CorrDist	-0.046*	-0.063**	-0.161***	-0.078***	-	-	-	-
CorrDist MA (5)	-0.003*	-0.002*	-0.006***	-0.005***	-	-	-	-

*, **, *** indicates the significance level at 0.1, 0.05 and 0.01, respectively. Appendix 4 reports the complete estimation.

[25] In practice, the methods are similar to least squares dummy variables (LSDV) regression.

Chapter 7: Discussions

This Chapter summarises the results and discusses their implications for the hypothesis of the theoretical model. Table 14 and Table 15 summarises the marginal effects of corruption distance on extensive and intensive margins of FDI, respectively. Column (1) shows the marginal effect of corruption distance on outward FDI; Column (2) shows the marginal effect of corruption distance on inward FDI; Column (3) shows the marginal effects of corruption distance on transition economies' outward FDI to industrial economies; Column (3) (4) shows the marginal effect of corruption distance on transition economies' outward FDI to industrial and developing economies, respectively.

Table 14 Summary of the estimates (extensive margin)

	(1) Outward FDI	(2) Inward FDI	(3) Subsample 1	(4) Subsample 2
CorrDist (CoC)	-0.063**	-0.078***	-	-0.053**
CorrDist (CoC) MA (5)	-0.002*	-0.005***	-0.003**	-
CorrDist (CPI)	-	-0.021*	-	-
CorrDist (CPI) MA (5)	-	-0.026**	-	-
CorrDist (ICRG)	-0.028**	-	-	-0.029*
CorrDist (ICRG) MA (5)	-0.024*	-	-0.030*	-
CorrDist (ICRG) MA (10)	-0.026**	-	-0.029*	-
CorrDist (ICRG) MA (15)	-0.042***	-	-0.047***	-0.022*

*, **, *** indicates the significance level at 0.1, 0.05 and 0.01, respectively; Coefficients are marginal effects; Insignificant marginal effects are denoted by "-"; Subsample 1 and 2 use the transition economies' outward FDI to industrial and developing countries, respectively. MA (n) indicates that the construction of corruption distance uses the n-year moving average of home country corruption level

Table 15 Summary of the estimates (intensive margin)

	(1) Outward FDI	(2) Inward FDI	(3) Subsample 1	(4) Subsample 2
CorrDist (CoC)	-	-	-	-
CorrDist (CoC) MA (5)	-	-	-	-
CorrDist (CPI)	-	-	-	-
CorrDist (CPI) MA (5)	-	-	-	-
CorrDist (ICRG)	-	-0.163***	-	-
CorrDist (ICRG) MA (5)	0.465**	-0.144**	0.488**	
CorrDist (ICRG) MA (10)	0.675***	-0.163*	0.631***	0.957***
CorrDist (ICRG) MA (15)	0.536***		0.623***	1.059***

*, **, *** indicates the significance level at 0.1, 0.05 and 0.01, respectively; Insignificant coefficients are denoted by "-"; Subsample 1 and 2 use the transition economies' outward FDI to industrial and developing countries, respectively. MA (n) indicates that the construction of corruption distance uses the n-year moving average of home country corruption level

In line with the estimates provided by Cezar and Escobar (2015), conventional corruption distance determined based on the CoC from WGI negatively affects the extensive margin of both outward FDI and inward FDI, but it does not affect the intensive margin. This supports hypothesis (1) but contradicts hypothesis (2). The author supposes that it is because Cezar and Escobar assume that the amount of FDI reflects the cost of the construction of new facilities, which depends on demand. However, MNEs may export and conduct FDI during the same period, not necessarily to construct larger new facilities. In some cases, FDI is simply used as an export platform. Cezar and Escobar's assumption that firms use FDI neither as an export-platform nor for outsourcing production is too strong. It may be difficult to distinguish different types of FDI when using aggregate FDI data.

On the other hand, this dissertation also finds that the conventional corruption distance calculated by CoC and ICRG has no impact on the extensive margin of outward FDI that flows from transition economies into industrial economies, but its impact on the FDI that flows into developing countries is significant. This is roughly in line with Qian and Sandoval-Hernandez's (2016) estimates. This indicates that the costs of adaptation mainly influence transition economies' firms' decisions to engage in FDI when they invest in developing countries. However, when corruption distance was measured using CPI and ICRG, the results changed.

Therefore, some recent research on this topic that only used one or two indices should come under scrutiny. For example, Godinez and Liu (2014) only used CPI, Cezar and Escobar (2015) only used CoC from WGI (World Bank), and Qian and Sandoval-Hernandez's (2016) only used ICRG. Indeed, their results contradict each other.

Moreover, this dissertation's estimates of adjusted corruption distance reveal that the impacts of corruption distance on FDI differ from the impacts estimated by conventional measurement of corruption distance when considering the development of firms' skills in the home country's previous institutional environment. For example, for corruption distance using data of CoC, the significance of the marginal effects of conventional corruption distance on outward FDI decreased. Although the significance level of the effects on inward FDI remains the same, the magnitude of marginal effects is reduced sharply. The estimates also show that it is the outward FDI flowing to industrialised countries that is reduced by corruption distance, which is confirmed by the estimates based on ICRG. This contradicts the findings from models using conventional corruption distance. Although there is no concrete statistical evidence that could completely deny the use of conventional corruption distance, theory suggests that whenever the argument is based on firms' skills, one should not expect that firms' skills should only be based on the business environment of a particular year. Therefore, the bottom line is that the empirical evidence indicates that the application of adjusted corruption distance can alter the results obtained from the estimation on conventional corruption distance, thus warning the empirical research based on similar argument or theoretical framework.

The author has also noticed that sometimes, when prolonging the moving average period to reflect the entire 10 or 15 years of home country corruption levels that are included in the calculation of corruption distance, the results become counterintuitive, especially estimates for intensive margin. For example, the adjusted corruption distance based on ICRG shows that when considering the development of firms' skills over the previous 10 or 15 years, the impact of corruption distance on the intensive margin of outward FDI becomes positive. Intuitively, one should not expect MNEs from transition economies to have so much business experience. Even at the managerial level, people in these companies are less likely to have had such a long business history, as most transition economies have only been market economies since the 1990s.

Chapter 8: Conclusion

This dissertation studied the impact that corruption distance has on the extensive and intensive margin of transition economies' FDI. The empirical evidence shows that both the conventional and adjusted corruption distance using the data of the Control of Corruption index only reduce the extensive margin of transition economies' FDI for both inward and outward. Hence, empirical evidence only supports hypothesis (1) that corruption distance reduces the number of firms in transition economies that choose FDI by raising the productivity threshold of FDI; for the same reason, it also reduces the number of firms (from abroad) that choose to make direct investments in transition economies. However, the magnitude of the marginal effects is much smaller when using the adjusted version. It should also be noted that the estimates are sensitive to the sources of corruption index and therefore the results are, indeed, conditional on the sources of corruption data.

Cezar and Escobar (2015) modelled institutional distance as an economic cost (adaptation cost) under the heterogenous firms framework. The model also explains corruption distance, as corruption can be seen as an example of an institution. Nevertheless, the conventional measurement of corruption distance is theoretically not consistent with adaptation cost, as it is essentially the gap between knowledge and skills about how to deal with corruption and conduct business in the host country's business environment that determines adaptation cost. On the other hand, firms used to a corrupt environment may lack other skills necessary for doing business in a less corrupt market. Therefore, this dissertation redefined corruption distance as the gap between the corruption level in the host country, and the corruption level that firms have sufficient skills to deal with. Following this novel definition, this dissertation proposes its resulting measurement, adjusted corruption distance for empirical study by taking the moving average of the home country corruption level for a certain length of time, which therefore considers the development of firms' skills in the previous business environment.

Finally, in Chapter 5, this dissertation uses a two-stage gravity model to estimate the extensive margin of transition economies' FDI. The results show that when using conventional corruption distance built on CoC from WGI (World Bank), corruption distance reduces the extensive margin of transition economies' inward and outward FDI but has no impact on the intensive margin. This is in line with literature using similar methodologies but different samples. Besides, the results show that corruption distance discourages firms from transition economies from investing in developing countries, but does not affect firms' decisions to invest in

industrial countries. However, the observed impacts disappeared when using CPI. On the other hand, by applying the adjusted corruption distance, the magnitude of marginal effects decreased considerably. Moreover, the estimates of subsample show that it is the extensive margin of outward FDI to industrial countries that is reduced by corruption distance, which contradicts the findings from estimations using conventional corruption distance. In summary, the results not only largely depend on the source of corruption index but are also sensitive to the adjustments made in the measurement methodology of corruption distance.

This dissertation suggests that ongoing research on corruption distance and FDI should carefully consider the source of corruption index. Also, whenever the theoretical argument on a relevant topic includes firms' skills and knowledge as a competitive advantage (such as knowledge developed from the experience of corruption in the home country), the home country corruption level in the corruption distance should be measured based on a period rather than one particular year. In general, this argument should also fit other measures of institutional distance, such as political risk, governance, and composite institutional distance. However, future research should also consider that firms may have developed their skills through experience in a third country. Even if it is a local firm, it would be possible that their managers may have international experience.

However, this dissertation also has its limitations. On the methodology side, Santos Silva and Tenreyro (2015) argue that HMR's method largely relies on distribution assumptions which are unlikely to be satisfied by real data. They also argue that the use of excluded variables suffers from a similar problem as the problem of weak instruments in the two-stage least squares estimator. However, this study does not intend to contribute to the literature by fixing the estimator problem but focuses on the topic itself and the measurement methodology of corruption distance. On the theoretical side, some assumptions such as identical distribution of productivity across the world, FDI exclusively serves as an alternative for exporting, and the idea that FDI is only for the purpose of market access needs to be reconsidered, as Okawa and Van Wincoop (2012) argue that the gravity feature of international finance is sensitive to changing assumptions.

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Appendices

Appendix 1: Mathematical Derivation

Demand of ω: $q_i^d(\omega) = \frac{p_i(\omega)^{-\varepsilon}}{p^i} Y_i$ (A1); Price index: $P_i = (\int p_i(\omega)^{1-\varepsilon} d\omega)^{\frac{1}{1-\varepsilon}}$ (A2);

Marginal cost for Trade: $m(\varphi) = \tau_{ij} w_i / \varphi$ (A3); Marginal cost for FDI: $m(\varphi) = w_j / \varphi$ (A4);

Revenue of FDI: $r_{ij}(\varphi) = (\propto P)^{\varepsilon-1} Y_j m(\varphi)^{1-\varepsilon}$ (A5);

Adjusted Demand: $\psi_j = \frac{(\propto P)^{\varepsilon-1} Y_j}{\epsilon}$ (A6); Variable Revenue: $R_{ij}(\varphi) = \frac{r_{ij}}{\varepsilon}$ (A7)

Substitute (A6) into (A5) we have $r_{ij}(\varphi) = \psi_j \varepsilon m(\varphi)^{1-\varepsilon}$ (A8); Substitute (A8) into (A7), we have $R_{ij}(\varphi) = \psi_j m(\varphi)^{1-\varepsilon}$.

Therefore, by substituting (A3) and (A4) respectively, we have equation (1) and (2) in section 3.1. Also, from $\pi_{FDI}(\varphi) = \pi_{Export}(\varphi)$, and equation (1) and (2), we have equation (3) (Cezar and Escobar, 2015).

Appendix 2: Countries in the Sample

Table A1 Country List

Developing Countries	Industrial Countries
Algeria, Argentina, Azerbaijan, Brazil, Bulgaria, Chile, China, Colombia, Czech Republic, Hungary, India, Indonesia, Kazakhstan, South Korea, Malaysia, Mexico, Nigeria, Pakistan, Peru, Philippines, Poland, Russia, Slovak Republic, Thailand, Turkey, Venezuela, Vietnam.	Australia, Austria, Canada, Denmark, Finland, France, Germany, Italy, Japan, Netherland, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, the United Kingdom, the United States.

Appendix 3: Variable Description

Table A2 Variable description

Variable	Description	Data Source
S	Selection Indicator S=1 if FDI>0 and S=0 otherwise.	Self-calculated based on FDI
FDI	Ratio of FDI Stock to the GDP of host country	Bilateral FDI Statistics (UNCTAD) and World Bank
O_gdp_p	GDP per capita of home (origin of FDI) country	World Development Indicator, World Bank
D_gdp_p	GDP per capita of host (destination of FDI) country	World Development Indicator, World Bank
GDP Sim	GDP similarity proposed by Bergstrand and Egger (2007)	World Development Indicator, World Bank
Distance	Geographical distance	Centre d'Études Prospectives et d'Informations Internationales (CEPII)
Legal	Dummy of common legal origin.	CEPII
Religion	"An index calculated by adding the products of the shares of Catholics, Protestants and Muslims in the exporting and importing countries." (CEPII)	CEPII
BIT	Dummy of Bilateral Investment Treaty	International Centre for Settlement of Investment Disputes, World Bank
EU	Dummy of Common EU membership	CEPII
FTA	Dummy of Free trade agreement	CEPII
ParCorr	Corruption level of transition economies' investment partner.	Worldwide Governance Indicator, World Bank
CorrDist (CoC)	Corruption distance based on Control of Corruption index	Worldwide Governance Indicator, World Bank
CorrDist (CPI)	Corruption Distance based on Corruption Perception Index	Transparency International
CorrDist (ICRG)	Corruption Distance based on corruption index from ICRG	International Country Risk Guide

Appendix 4: Estimates from Alternative Estimator

Table A3 Estimates of extensive and intensive margins of outward FDI (fixed effects)

	(1) PPML	(2) Probit	(3) PPML	(4) Probit	(5) PPML
O_gdp_p	2.153***	0.306***	2.556***	0.320***	2.505***
	(0.795)	(0.045)	(0.948)	(0.046)	(0.861)
D_gdp_p	-0.134	0.137***	-0.247	0.151***	-0.478
	(0.398)	(0.046)	(0.451)	(0.046)	(0.483)
GDP sim	6.836*	-0.547*	5.403	-0.574*	5.270
	(3.646)	(0.293)	(4.037)	(0.293)	(4.058)
Distance	-2.373***	-0.229***	-2.202***	-0.232***	-2.245***
	(0.580)	(0.024)	(0.652)	(0.024)	(0.628)
Legal	0.833**	0.090***	0.902**	0.0924***	0.865*
	(0.411)	(0.026)	(0.432)	(0.027)	(0.461)
Religion	-0.193	0.002	-0.268	0.017	-0.061
	(1.422)	(0.061)	(1.345)	(0.061)	(1.300)
BIT	1.067**	0.018	0.983*	0.023	1.097*
	(0.497)	(0.027)	(0.582)	(0.027)	(0.575)
EU	0.139	0.085***		0.087***	
	(0.297)	(0.031)		(0.031)	
CorrDist		-0.046*	-0.343		
		(0.024)	(0.393)		
CorrDist MA (5)				-0.003*	0.046
				(0.002)	(0.038)
$\hat{z}$			0.318		0.332
			(0.237)		(0.228)
$\hat{z}^2$			-0.018		-0.015
			(0.058)		(0.058)
$\hat{z}^3$			-0.005		-0.005
			(0.005)		(0.001)
Obs.	5616	5880	4191	5880	4191
R-square	0.721		0.719		0.727

*, **, *** indicates the significance level at 0.1, 0.05 and 0.01, respectively. Clustered robust standard errors are in parentheses. Coefficients of Probit model are marginal effects at sample means. Time, host country and home country dummies are not reported. Every regression includes a constant.

Table A4 Estimates of extensive and intensive margins of inward FDI (fixed effects)

	(1) PPML	(2) Probit	(3) PPML	(4) Probit	(5) PPML
O_gdp_p	-0.043	-0.028	0.053	0.006	0.078
	(0.132)	(0.043)	(0.152)	(0.044)	(0.159)
D_gdp_p	-0.124	0.302***	-0.877***	0.318***	-0.924***
	(0.256)	(0.045)	(0.333)	(0.0453)	(0.334)
GDP sim	-3.508	0.900***	-3.877*	0.785***	-3.797*
	(2.202)	(0.271)	(2.063)	(0.268)	(2.079)
Distance	-2.399***	-0.114***	-1.798***	-0.138***	-1.811***
	(0.232)	(0.025)	(0.248)	(0.025)	(0.247)
Legal	-0.161	-0.058**		-0.047**	
	(0.246)	(0.029)		(0.029)	
Religion	1.368***	0.188***	1.808***	0.219***	1.672***
	(0.467)	(0.071)	(0.578)	(0.070)	(0.545)
BIT	-0.212	0.036	0.075	0.046*	0.052
	(0.232)	(0.028)	(0.282)	(0.028)	(0.285)
EU	-0.025	-0.002	0.190	0.0269	0.180
	(0.125)	(0.036)	(0.164)	(0.036)	(0.166)
CorrDist		-0.161***	0.198		
		(0.025)	(0.154)		
CorrDist MA (5)				-0.006***	-0.009
				(0.001)	(0.009)
$\hat{z}$			0.417***		0.408***
			(0.117)		(0.122)
$\hat{z}^2$			-0.026		-0.026
			(0.053)		(0.054)
$\hat{z}^3$			-0.006		-0.006
			(0.007)		(0.007)
Obs.	5880	5880	4189	5880	4189
R-square	0.818		0.849		0.848

*, **, *** indicates the significance level at 0.1, 0.05 and 0.01, respectively. Clustered robust standard errors are in parentheses. Coefficients of Probit model are marginal effects at sample means. Time, host country and home country dummies are not reported. Every regression includes a constant.