



# HOW CORRUPTION AFFECT FOREIGN DIRECT INVESTMENT

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## Summary

Foreign direct investment (FDI) plays an important role on international trade nowadays. And corruption affects economic development and is a characteristic of a country. Recent research has emphasized the relation between them, but shown different opinions as well.

This paper reviews the relevant literature on FDI and corruption firstly, as well as their links. And since gravity models are traditionally used to study bilateral trade and present a geographic view of trade and FDI, after looking back to previous empirical studies, this paper utilizes a Gravity Model as below,  $\log(\text{FDI}_t) = \beta_0 + \beta_1 \log(\text{GDP}_{St}) + \beta_2 \log(\text{GDP}_{Tt}) + \beta_3 \log(\text{DISTANCE}_{ST}) + \beta_4 \log(\text{COR}_{Tt}) + \beta_5 \text{CONTROL}$ .

With a sample of 4 developed European countries as source countries and 12 new EU member states as target countries and the time period being 2007-2012, there is a regression analysis to assess the relationship between FDI stock and corruption. As for details of this model, e.g. corruption data source and control variables, they would be shown in the methodology part.

Moreover, regressions run in Stata statistical software and results reveal that corruption has a negative impact on FDI, while GDP being a positive factor. Besides, on the basis of the results, I also summarize the research part, find out the limitations of this research and suggest to apply this model for further studies.

Finally, after making a conclusion on this paper, I advise managers to choose countries with less bribes and kickbacks and government to rebuild their rules to gain more inward investment.

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# 1 Introduction

Nowadays, foreign direct investment (FDI) has been in general used by international companies. A successful FDI decision not only cut down productive expenditure and gain extra benefits, but would also be helpful to market expansion and brand effect, even gaining a brighter future. On the contrary, blind investment in an unfamiliar industry or market may destroy a good company, which might cause capital chain tension until being bankrupt. Thus, it is a severe test for multi-national enterprises (MNEs) to make a right FDI decision, and the location selection comes first.

In this thesis, I am not concerned with analyzing the general locational variables. Since no matter where managers choose, corruption issues are unavoidable, I focus on this particular element – corruption – in a specific setting instead. Thus, the issue can be explored in more detail. Specifically, the research question is as follows: how does corruption affect the FDI stock from developed European Union (EU) countries to new EU member states?

Corruption, the abuse of public power for private gain, on one hand, may increase unnecessary cost due to bribes and kickbacks, on the other hand, may provide shortcuts for foreigners entering local market more effectively. Meanwhile, corruption is formed by government administration, local culture, economic openness and other factors. Although scholars clarify different stands on how corruption affect FDI over the years, positive or negative, nobody would deny it is an essential factor. So I will try to explore the relationship between corruption and FDI. Moreover, considering the importance of location, I will utilize Gravity Model to verify my hypotheses.

I apply the methodology to a specific sample of countries – 4 developed EU countries and 12 new EU member states, and use the latest data for the 2007-2012 period. To the best of my knowledge, this has not been analyzed before, except for the effort by Bellos and Subasat (2012), but their analysis covers the 1990-2005 period, thereby not taking

into account the latest data, and different source and target countries as well.

Based on the research question, the aim of this thesis is therefore to estimate the direction and significance of the effect of corruption on FDI stock in the 12 new EU member states. In order to reach the aim, I define the following objectives:

- Review the theories of FDI
- Provide an overview of corruption and its effect on FDI
- Review the methods used for analyzing the effect of corruption on FDI
- Perform empirical research on the effect of corruption on FDI stock from developed EU countries to new EU member states
- Provide suggestions for FDI investors.

And the details of thesis structure is shown as below.

Firstly, this paper will start with literature review part, which is expected to get new findings from pioneers. And the theoretical background of FDI should be my first step. This section includes Monopolistic Advantage, Product Life-Cycle Theory and Dunning's theory. Then, after looking back on definition and types of corruption, the following section would be the link between FDI and corruption, including different opinions from previous researches. At the end of this part, I will discuss on the history of Gravity Model, review how others have applied it for FDI, and pay attention on Bellos and Subasat's (2012) regression model. Since Bellos and Subasat's (2012) model was aimed at the relationship between corruption and FDI, it is the basic reference model for this paper.

Secondly, the following part is about methodology. This part clearly pointed out the research model, objects of observations, analysis methods, and data sources of this paper.

Then, since empirical research is performed using regression analysis, regressions would run in Stata statistical software using cross-section data sets. And this part would reveal the regression results. And the following part will be a further discussion on the basis of the results, meanwhile, limitations of this study are also included in this part.

Finally, I will get conclusions from my above research and try to give some suggestions in terms of location selection for FDI investors.

Figure 1. Article Structure



## 2 Literature Review

This part will be divided into four sections. Firstly, we will review the history from an academic perspectives in foreign direct investment, to understand which factors might have an impact on FDI. These factors would determine our choice of the regression model and control variables. Due to the similar reason, the following section focuses on the theoretical background of corruption. Combining both, the third section is about their linkage, as it is at the center of attention of our research. And then we find out that “location” is an essential word in terms of both FDI and corruption. Finally, in respect that I will utilize Gravity Model as the main research method, and the fourth section is a brief introduction on this model and its application.

### 2.1, Foreign Direct Investment

When it comes to foreign direct investment (FDI), there is no doubt that the Monopolistic Advantage Theory is a crucial concept, which broke down perceptions under the assumption of perfect competition market. It suggested that the motivation of FDI is to get the utmost out of monopolistic advantage, and this kind of advantage could offset all the negative factors due to cross-border competition and liability of foreignness, and help the company gain a higher reputation in foreign area. This theory not only lays the theoretical foundation of multi-national enterprises (MNEs) and FDI, but also exerts a profound influence on other scholars. In 1966, Vernon published his paper with respect to FDI outflows of the United States and product life-cycle model. His research, which provided an academic basis for the United States FDI outflows, was concentrated on opportunity selection of the innovation cycle in the oligopolistic industry, and widely used for making a FDI decision and corporate strategy in terms of home country and host country. Finally, we cannot very well avoid mentioning John Dunning, who is known as the father of international business, as well as his Eclectic Paradigm and subsequent reviews. Nowadays, his theory still plays a key role on recent researches.

## Monopolistic Advantage

Monopolistic Advantage Theory, which developed by Hymer (1960), clarified the motivation of FDI and the decisive factor of international specialization. Under the help of Hymer's paper, it started to explain international trade pattern and flow according to enterprise level and in the academic circle. As for my research, it also provides study for the enterprise perspective. The core concepts of this theory are "market imperfections" and "monopolistic advantage".

To be specific, national firms held general advantages as their economy, their language, their law, and their politics (corruption included). In other words, foreigners have to pay these additional cost due to entry barriers. Hymer (1960) believed that market imperfections would be the basic motivation of FDI for enterprises. As traditional theories were under the precondition of perfect competition market, firms were not able to dominate the market, that is to say, every firm produced similar products with similar production factors, and there is no extra interests for them by FDI. However, if the market was imperfect, firms might hold monopolistic advantage in domestic and expand their advantages via FDI. Under the condition of imperfect competition, companies who wanted to get the most out of monopolistic advantages they owned, would drive free competition out and keep monopoly-higher price to achieve excess profit. Besides, only when their monopolistic advantages overcome the bad situation due to cross-border competition and liability of foreignness, firms would reach a decision on FDI. In Hymer's (1960) paper, he also emphasized the importance on "*both international operations and their financing*" to FDI, and suggested that "*direct investments are the capital movements associated with the international operations of firms*".

In the 1970s, Kindleberger refined the Hymer's theory and further clarified market imperfection as below,

(1) Departures from perfect competition in goods markets;

- (2) Departures from perfect competition in factor markets;
- (3) Internal and external economic of scale; and
- (4) Government limitations on output or entry.

He also studied on foreign investments of American companies, and figured out that neither high profits nor low labor cost from foreign markets could be explained the foreign investment. The key point is to explore the reason that host countries preferred American companies producing goods comparing to local companies. General speaking, local companies had more knowledge on the whole business environment, moreover, American investors also had to take the extra cost due to long distance operation. However, foreign investors utilized their monopolistic advantages to offset the loss, even gain more profits. According to his paper, these advantages includes (1) superiority of scale economy, (2) market superiority, and (3) superiority of production factors.

The Hymer-Kindleberger theory is very important to multinational enterprises, and Caves (1971, 1982) has taken a deep analysis and study on it. He believed that “*foreign direct investment occurs mainly in industries characterized by certain market structures in both the ‘lending’ (or home) and ‘borrowing’ (or host) countries*”, and emphasized the necessity of product differentiation (including minor physical variations, brand name and subjective distinctions). If a product is too hard to imitate, or the imitation costs high, it would be suitable for FDI, the same as the differentiate industries. Multinational companies promoted the product diversity to capture the market share. According to different consumer preferences from different levels and different areas, MNEs would make use of their technical advantages to change the original physical forms, such as quality, packing, appearance, etc. They might set up their brand recognition to consumers by sales skill as well.

An international difference in expected returns is not sufficient to induce FDI. However, under the condition of market failure, the product differentiation could be the effective

advantage for MNEs on foreign investment. Furthermore, he agreed that the direct investment by the international corporation is a real capital movement from one country to another.

Differ from his opinion, Johnson (1968) focused more on the technical advantages by themselves and proposed the importance of "Knowledge Capital". He believed that the monopolistic advantages of foreign direct investors, were mainly produced by occupation and use of knowledge capital. There is a high cost on the manufacturing process of knowledge capital, which is also called research and develop cost, while the use cost being low by direct investment. The knowledge capital of foreign companies is the distinct advantage over the local ones.

Although this theory does not pay much attention on corruption, it seems to imply corruption is an obstacle for foreign investor entering new market, since they have to find out more monopolistic advantages to offset the higher cost.

## **Product Life-Cycle Theory**

The Product Life-Cycle Theory (PLC) has paid more attention on the product itself, the reason that I emphasize it here is that the specific characteristics of different regions might not draw the same product life cycle curve. In other words, different competitive positions of the same product in different countries, would determine the changes of international trade and international investment. Thus, the locational characteristics would be one of the important aspects for this theory. The PLC theory would also help us find out which factors have an impact on location selection besides corruption when we consider on FDI, and these findings are likely to be the control variables of regression model for the upcoming parts.

In 1966, Vernon combined his theory of the product life-cycle with United States market characteristics, and put attention on knowledge which regarded as independent variables, locational variables and new product. He proposed that "*all of these*

*considerations tend to argue for a location in which communication between the market and the executives directly concerned with the new product is swift and easy*". At the maturity stage, companies who owned producing facilities in advanced countries, i.e. Canada and West Europe, would produce this product. And in the final stage of the product life cycle, which means the company's characteristic technical advantage has gone and it is no longer necessary to get a license, the product would be produced by lowest factor cost in any place.

In Vernon's (1966) paper, he assumed the average income in United State twice as high as that in West Europe, therefore, this market became the origin of new product. "*The United States market is characterized by high unit labor costs and relatively unrationed capital compared with practically all other markets*". Those companies located in advanced United States market had great motivation to develop new labor-saving products. However, why did they choose to produce in United States market instead of other foreign markets? It was because of external economics (Vernon, 1966). New products was not standardized and companies hoped to promote them to their customers in a swift and effective way. It was another critical reason that producers would save transaction cost with factory location being closed to the market. As new goods produced in the United States, any other countries had to import from United States to satisfy their needs. After the mature period, product become standardized. Companies would compare the total cost in home country and host country in terms of production and transportation, to decide their FDI strategy. It means that managers should take tariff, trade freedom, "land-lock" factor, distance and other relevant information into consideration. Once a United States firm occupied a foreign market, other major producer in United States would treat it as a threat in terms of their market share which might have an influence on their FDI decision as well.

In the final section, Vernon (1966) assumed Japan and Taiwan as less developed areas, who could only involve in the last stage and produce standardized products. In my opinion, this cognition exists historical limitations. However, in a conclusion, locational

variables are very important to cross-country investment.

## **Eclectic Paradigm**

In recent years, when we talk about FDI, it is hard to ignore the Eclectic Paradigm, which is developed by Dunning. The eclectic paradigm is a mix of previous theories, mainly including Monopolistic Advantage, Product-cycle life cycle theory and Internalization theory. Many scholars, even Hymer and Vernon, were affected by his paper. Moreover, as we all know, “multinational enterprise” (MNE) should be a key term to FDI, and according to Dunning’s review (1988), it was also “*first put forward*” as “*the concept of the eclectic paradigm of international production*” by himself in 1976.

For MNEs there are significant costs in gathering and analyzing information for potential investments (Charlton and Davis, 2007). Meanwhile, internalization theory is related to transaction cost. Dunning is the main proponent of this theory, and in the Eclectic Paradigm of international production, we could also find out it. The Eclectic Paradigm, also called OLI Model, includes three advantages.

- (1) It possesses net ownership advantages vis- à-vis firms from other countries. (O-)
- (2) It is beneficial to internalize these advantages rather than to sell or lease to foreign firms. (I-)
- (3) These are some location advantages in using the firm’s ownership advantage in a foreign country rather than at home. (L-)

In his opinion, only when a company satisfy these three conditions simultaneously, it could engage in FDI. He (1998) transformed this model into a metaphor for a three-legged stool, and suggested that these legs should have different functions. However, after considering the purpose of this research and the regression model I will use, I would focus on location advantages here.

Obviously, O is a kind of company –specific advantage, and L is a kind of country-

specific advantage. How to choose a suitable investment destination is a very crucial question for MNEs managers. Geography of international business activity determined the costs and benefits of adding value to products. Locational factors not only affected the entry mode, but also the competitive advantages of the investing firms (Dunning, 1998). There would be some immobile factor endowments or specific intermediate products in a specific country (Dunning, 1988). For instance, some companies developed an Australian subsidiary aimed at the abundant mineral resources; or, more typically, clothing enterprises from Europe and the United States set up their factories in India, Nepal or other developing countries due to their low-cost labor. However, Dunning (1988) also figured out that there might be the possible spatial market failure in specific country because of government intervention or other external factors. He agreed with Rugman's view (1981) of "*internalizing exogenous spatial imperfections*", and suggested that this view "*better explains the common ownership of MNE subsidiaries in different locations, rather than why particular subsidiaries are located where they are*" (1988). In the following research, Dunning (1998) discussed the influence of locational advantages on FDI and the change of geographical choice. Because of the development of economic integration, companies made their decisions about where to locate production with three characters: (1) having more firm-specific knowledge intensive assets and customized assets (e.g. skilled labor or public infrastructure); (2) reduction of trade impediments; and (3) convenience to cooperate with foreign firms. Dunning (1998) believed that "*some of these factors have led firms to own and concentrate particular types of value-added activities within a limited number of locations; others have led them to disperse such activities across several locations*".

To be specific, location variables may have an influence on exchange rate, political risks, cultural differences, laws and regulations. To some extent, it gave the configuration of the O and I advantages (Dunning, 2000). Location variables have different meanings respect to companies in different industries, or from different home countries, however, there is no deny that country-specific characters of recipient might

determine whether foreign subsidiaries operate smoothly or not. Thus many theoretical researches existed for right location in most relevant respects, some related to oligopolistic behavior and product cycle, some related to process of internationalization, some related to spatially specific transaction costs, etc. As for my research, it will concentrate on government influence, since “corruption” is more like a political concept rather than an economic or business one.

Moreover, Dunning (1988, 1998) defined four types of FDI: (1) resource seeking; (2) market seeking; (3) efficiency seeking; and (4) strategic asset seeking. The first two types are easy to understand from traditional theories. Meanwhile, since knowledge becomes more and more important to international business in recent years, companies start to bring in from overseas large numbers of professionals and other intellectual resources in various areas, and integrated MNE activities. They also cooperate with local government aimed at removing the impediment during their FDI process. As for the last one, it requires investor to get more closed to recipient countries. *”As strategic-asset-acquiring investment has become more important, the locational needs of corporations have shifted from those to do with access to markets, or to natural resources, to those to do with access to knowledge-intensive assets and learning experiences, which augment their existing O specific advantage”*(Dunning, 1998). The synergistic effect is necessary for this part, including different culture, institutions and systems. International companies have to satisfy different purchase demand and consumer preferences. As *“the relative roles of markets hierarchies and governments in this recipe are likely to be different”*, Dunning (1998) also figured out that the value-added activities could be coordinated more efficiently under a single governance. A target country, who has locational advantages, should have advantages to facilitate a balance between cross-border activities and external transaction environment. The locational configuration of MNE might strengthen its competitiveness, for instance, optimizing allocation of resources, and gaining more market share.

Overall, the Eclectic Paradigm of international production, by combining with other

academic researches, emphasizes on the importance of location advantage, which represents the specific features of host countries. And location advantage is the content of point respect in this paper, Monopolistic Advantage and Product Life-Cycle Theory also share similar view with Eclectic Paradigm.

Moreover, it also has an important meaning in the following sections. I will explore “corruption” and the relationship between “corruption” and FDI on the basis of previous academic research in the section 2.2 and section 2.3 respectively. In my opinion, “corruption” could be regarded as one of the “locational characteristics” of host countries. Besides, these three theories all emphasize the importance of locational variables, and this is the main reason why I choose Gravity Model for this paper. And these theories also mention that tariff, trade freedom, distance, exchange rate and other factors might have an impact on FDI. Thus, when I develop the model linking corruption to FDI, except distance factor has already been one of independent variables, other factor would be brought under control variables category.

## 2.2 Corruption

Corruption has become a common issue for a long time. There is no country, both developing and developed countries, completely without corruption. It has influence on national economics and political systems. Additionally, it might create more obstacle for foreign investment, and obstruct to build a cross-border cooperation relationships, as well as developing the local economics. However, there are also many scholars having emphasized its positive side. In this section, I will try to provide a comprehensive introduction of corruption. We will firstly discuss on what is the corruption (definition) and how to distinguish different corruptions (main types), followed by the measurement of corruption, and finally concentrating on why I choose corruption as an important variable to FDI (influence).

### 2.2.1 Definition of Corruption

Scholars has given various definitions of “corruption”. It is difficult to judge which definition is the most precise. Shleifer and Vishny (1994) defined “government corruption as the sale by government officials of government property for personal gain”. They believed that corruption is a pervasive and significant behavior around the world. In 2001, Jain argued that “corruption refers to acts in which the power of public office is used for personal gain in a manner that contravenes the rules of the game”. From this definition, Aidt (2003) further confirmed three conditions of corrupt behavior:

- (1). Discretionary power: the relevant public official should have ability to compile and distort rules and laws in a discretionary manner.
- (2). Economic rents: the discretionary power is used for extract rents.
- (3). Weak institutions: the legal institutions gives official opportunities to use discretionary power to extract or create rents.

Many economists (e.g. Mauro, 1995) argue that indulgent government institutions would give rise to a severe obstacle to investment, entrepreneurship, and innovation.

Besides, a venal government may cause a bad social influence, e.g. large local companies would have corrupt behavior as well.

### 2.2.2 Main types of corruption

Jain (2001) divided the corruption into three types as grand corruption, petty corruption and legislative corruption. In his opinion, the differences of these three types are “*the types of decisions that are influenced by corruption, by the source of (misused) power of the decision maker*”. Therefore, he preferred to use agency model to explain grand corruption and legislative corruption, while petty corruption being explained by a supply-demand framework.

Grand corruption: corrupt political elites would administer either the national policies or the implementation of national policies to gain interests for themselves. To achieve a balance, some cost might be added to the populace. This type of corruption may cause the most serious consequences for a society, however, it is difficult to identify and measure.

Petty corruption: which is also called bureaucratic corruption, is the most common type observed in the real world. It refers to bribes that bureaucrats seek for more interests but undeserved either from political elites or the public. For instance, if someone hope to speed up a bureaucratic procedure, bureaucrats would extract payments.

Legislative corruption: refers to the acts that influence the voting system. “*Legislators can be bribed by interest groups to enact legislation that can change the economic rents associated with assets*”.

### 2.2.3 Measurement of corruption

Although it is difficult to find out a direct method to measure the nature corruption, there still have been several attempts from different perspectives.

- Corruption Perceptions Index (CPI)
- Worldwide Governance Indicators (WGI)
- Global Integrity Report
- National Integrity System Assessments
- Open Budget Index
- CRINIS Index

However, I will use CPI and WGI for corruption analysis as many researchers do.

### **Corruption Perceptions Index (CPI)**

CPI, published by Transparency International (TI) since 1995, is a combination of surveys and assessments of corruption with various data from reputable institutions. It is widely accepted, and has become burning issue for the international community when it is published every year. Many scholars utilized it as secondary research evidence. We could apply the simple and clear data for direct-viewing analysis method, to judge various factors whether they have significant impact or not. Moreover, the Worldwide Governance Indicators also have the similar function.

### **Worldwide Governance Indicators (WGI)**

WGI was promoted by Kaufmann and associates as part of the World Bank's Governance Matters project. It includes six dimensions of governance: (1) Voice and Accountability (VA), (2) Political Stability and Absence of Violence/Terrorism (PV), (3) Government Effectiveness (GE), (4) Regulatory Quality (RQ), (5) Rule of Law (RL), and (6) Control of Corruption (CC). It covers more than 200 hundred countries and several different data sources, which obtained from survey respondents, non - governmental organizations, commercial business information providers, and public sector organizations worldwide. As this paper mainly focuses on "corruption", we only take scores of CC into consideration in this part.

## 2.2.4 Influence of corruption

Undoubtedly, there are conceptual and theoretic links between corruption and the functioning of a society's economic and political institutions, as well as a country's legal system. And these factor would be considered when MNEs managers made a FDI strategy.

In Jain's (2001) view, corruption were the incentives and constraints to the elite or the legislator, and also affected their decisions. For example, in the environment of open-system and information transparency, "there is potential for corruption and legislators will balance increased income from corruption against reduced chances for re-election" (Jain, 2001). Therefore, to seek more economic benefits from their current position and keep the benefits constantly, legislators would design policies and strengthen the power of political parties and institutions.

Moreover, corruption also had an influence on the resource allocation. The opportunities for rent seeking, or gray income, widen the gap between the privileged and underprivileged and change the resource base of the state welfare distribution. Rent-seeking activities may also affected the market equilibrium, not only related to governmental intervention in economy but also to the nature of government. Sometimes, bureaucratic service would be from monopolistic areas, and rent-seekers would utilize their advantages to provide more information by taking bribes.

Thirdly, the development of internal market also pushes corruption behavior forward. Jain (2001) also suggested that "*one way to reduce uncertainties and penalties associated with corruption may be to share the gains of corruption with those who can inflict costs on the corrupt official*", and "*an internal market may also develop when an official who is in a position to earn corrupt income attempts to reduce the legal and social costs associated with such income*".

From a positive point of view, corruption would speed up bureaucratic process and

hence promote economic growth. Regarded bribes as opportunity costs, corruption is helpful to overcome bureaucratic rigidities and maintain allocation efficiency. Kaufmann and Wei (1999) also believed that there is a positive relationship between the incidence of bribery in a country and the time that managers of international firms have to spend with bureaucrats.

Overall, as Jain (2001) concluded, “*most macro-economic variables are determined simultaneously with corruption, and that there is a feed back effect between the two*”. And FDI is also directly related to macro-economic variables, therefore, it is a logical presume that there might be an interactional link between FDI and corruption, and I will discuss it in the following section.

## 2.3 The link between FDI and corruption

From the last section, we could find out that corruption has an impact on social and economic functioning. Hence, many scholars turned to the relationship between corruption and FDI, but they held different opinions.

Some of them insisted that corruption is the result of imperfect legal system and weak institutions. It might cause higher political and economic risks, in other words, the higher corrupt level of host country, the more uncertainties investors would have. Meanwhile, corruption might bring more entry barriers for foreign investors, and home countries should have undertaken a higher cost (Habib and Zurawicki, 2002). From above factors, corruption plays a negative role in FDI, while other scholars suggesting the positive function of corruption. In the empirical researches, some countries, like India, Brazil, Mexico, have attracted substantial amount of FDI with high level corruption. Thus, in the following part, we will review literatures on the link between FDI and corruption from previous researchers.

### 2.3.1 Negative impact

Maura (1995) treated corrupt institutions as representative of inefficiency. Kaufmann and Wei (1999) showed companies would spend more time on negotiating with bureaucrat because of bribes. Habib and Zurawicki (2002) argued that “*a corrupt economy does not provide open and equal market access to all competitors*”. Due to corruption, seeking permission to enter is more important than the price and quality of the product itself. Companies should have paid bribes in secret. Compared to another competitive market, it costs more for companies gaining the similar market value. And the behavior is immoral.

Habib and Zurawicki (2002) analyzed three-year data on FDI from 7 source countries to 89 host countries. They used two models for their research, one is OLS regression model, and the other one is PROBIT model. As for their key variables, they utilized

CPI to measure the corruption and the absolute difference in corrupting between home and host countries. Finally, they suggested that *“in both models, difference in CPI remains significant and negatively affects FDI”*. They believed that corruption was a serious obstacle of investment. Countries with higher level corruption seem to be difficult to manage and risky for foreign investors. For example, even if companies enter to countries where there is a high level of corruption, they might fail to gain a reasonable market share, because local companies would have solid relationship with government officials. Or new comers would take over them easily, since they offer a bribe which is more attractive. Corruption, would make them involved into unfair competition. In addition, the ethics of their profession don't permit them to do that.

Besides, in the research of Habib and Zurawicki (2002), they also find out that there would be a negative impact on FDI when the difference of corruption level existed between home and host countries. Since political, social and economic factors changed all the time, corruption level of countries might be different. *“In a dynamic business environment, considering corruption relative to other dimensions will help the managers implement complex analyses and refine country evaluation procedures.”* (Habib and Zurawicki, 2002). Thus, when decision-makers consider the long-term interests of FDI strategy, they should take account the impact from the corruption level of target countries.

### **2.3.2 Positive impact**

Although there are several traditional researches offering support on the negative view, some opposition still exist. Someone insisted that corruption is beneficial to optimize allocation of resources and raise the efficiency. For instance, weak institutions or policy defect and influences would result in cumbersome process, which is unavoidable, however, bribery might reduce the time waste and waiting cost. In other words, corruption can be contributed to circumventing regulatory and administrative restrictions (Leff, 1964). Lui (1985) developed an equilibrium queuing model, which

proved that “*the server could choose to speed up the service when bribery is allowed*”. The study assumed that companies who prefer high-speed service would be more capable to bribe payments. Therefore, if licensing or contract is based on bribe, it would be easy to achieve Pareto optimal allocation of resources. Beck and Maher (1986) had a similar research by utilizing auction model, and the only difference was that government official achieved bribe by license auction. In addition, bribes could help companies keep themselves away from inefficient regulations, thus, they could increase their output even in the bad environment. Levy (2007) discussed the appearance of black market in Republic of Georgia, belonging to the Soviet era, to explain that corruption could relieve the pressure of food shortage due to centrally planned economy. Egger and Winner (2005) suggested that “*in the presence of regulations and other administrative controls, corruption can act as a ‘helping hand’ to foster FDI*”. Moreover, In addition, corruption, as a one-side payment, can be regarded as a kind of Pareto improvement that promotes negotiations between public and private sector agents. Shleifer and Vishny (1994) explored how corrupt behavior change the efficient allocation of resources. As bribe is an easy way for both politicians and company managers to gain their interests, they took full advantage of bribe to convince the other side in terms of the right of control. Corruption gives them a balance to achieve their wealth maximization. Besides bribes, politicians only could seek another inefficient and indirect way to fulfill their requirement, which may cause a drop in aggregate society output.

In recent years, many cross-border studies support “corruption” in becoming the helping hand. Egger and Winner (2005) utilized a Hausman-Taylor model to prove that “*corruption is a stimulus for FDI*”, since this model could overcome the potential endogeneity of the corruption variable. In their research, the data set of 73 developed and less developed countries were used with three corruption index, --- CPI, ICRG and WBGI. Not only analyze on short-term data, they also “*investigated the long run impact of the observed change in the corruption index scoring on both the growth and the cross-country distribution of real stocks of FDI*”. They concluded that corruption would

increase the FDI stock and change its worldwide distribution.

### 2.3.3 The third opinion

However, there is no absolute in the world. As I mentioned, in the research of Habib and Zurawicki (2002), they stated that the significant difference in corruption level between source country and target country would result in a negative influence on FDI. Cuervo-Cazurra (2006) took a further research on this topic. He classified all the study objects into two categories:

- (1) FDI from countries that have signed the Organization for Economic Cooperation and Development (OECD) Convention on Combating Bribery of Foreign Public Officials in International Business Transactions; and
- (2) FDI from countries with high levels of corruption.

His findings further verified the conclusion of Habib and Zurawicki (2002). Countries, even those had the largest sources of FDI, would receive less FDI inflow from countries with laws against bribery abroad due to their high corruption. And usually, these investors would gain good score in corruption test. However, countries paid different cost for bribery abroad due to their own legal restrictions, thus, corruption attached different influence on countries. Cuervo-Cazurra (2006) explained that “*Investors from countries that have laws against bribery abroad are likely to further limit their FDI in countries with high levels of corruption*”, and “*these laws increase the cost of engaging in bribery abroad*”.

Compared to those high-spending countries, investors from countries with high level of corruption would be very active in the new similar area. They have rich experience to deal with corruption. A climate of corruption would help them take a short cut easily. For instance, they could develop relationship with government officials by offering bribes, to achieve the local licenses and gain good resource or skilled workers. Since investors from other countries would be deterred by corruption, they occupied the

market opportunities. Therefore, investors from high corruption countries might prefer to seeking for target countries with high corruption.

Overall, corruption affects flows of foreign direct investment. On the one hand, it increases the cost for investors entering new market, on the other hand, it also offers convenience for foreigners. Besides, as Cuervo-Cazurra (2006) said “*corruption in the host country not only reduces FDI, but also changes the composition of FDP*”. Corruption plays multiple roles between different host and home countries, and it has considerable influence in any case. Scholars above utilized various models to explore the relationship between corruption and FDI, as for me, I will use Gravity Model to state my opinion. Hence, the following section will focus on it.

## 2.4 Gravity model

We have known for decades that gravity model is widely used for bilateral trade issues. The model, which originates from Newton's universal law of gravitation, reflects the relationship between GDP, geographic distance and bilateral trade flow. In 1962, Tinbergen stated briefly that bilateral trade between any two countries is positively related to their economic sizes and negatively related to the cost between them by gravity model.

Anderson (1979) developed a theoretical foundation for the gravity equation. As he chose a given model background, distinguishing goods according to origin country (what is called constant elasticity of substitution, CES), consumers have shown their different preference on different goods. This structure was aimed to ensure that every country would be in need of a certain amount of every individual categories. Assuming each country only produce one specific good, in an equilibrium of an economy, the national income of a country would be the total consumption of one good in terms of domestic and overseas. Therefore, trade flow is relevant to economic size. Subsequent studies further showed that even though the gravity model was a purely econometric tool without a theoretical basis (early criticism of the gravity model), it was still within the scope of Trade Theory. Bergstrand (1985, 1989) further combined it with international trade, and pointed out that the gravity model is affected by monopolistic competition model of Krugman. By this mode, the trade flow among homogeneous countries trade included differentiated goods, due to the different consumer preferences. It overcome the shortcomings of CES, which only sorted out products according to their location. This log-linear equation reflects a flow from origin country (i) to destination country (j) can be measured by economic forces.

In 1995, McCallum applied it to a research of Canada-U.S. border, and estimated the following equation:

$$\ln x_{ij} = a + b \ln y_i + c \ln y_j + d \ln (\text{dist}_{ij}) + e \text{DUMMY}_{ij} + u_{ij}$$

$x_{ij}$  is the shipments of goods from region  $i$  to region  $j$ ,  $y_i$  and  $y_j$  are the gross domestic product in regions  $i$  and  $j$ ,  $d_{ij}$  is the distance between regions  $i$  and  $j$ ,  $\text{DUMMY}_{ij}$  is a dummy variable equal to 1 for interprovincial trade and 0 for state-province trade and  $u_{ij}$  is an error term.

However, this model has not been taken “*multilateral resistance*” into consideration yet (Anderson and Wincoop, 2003). To figure out the border puzzles more deeply, Anderson and Wincoop (2003) applied theoretical gravity model “*both to estimation and to the general-equilibrium comparative statics of border*”. Based on McCallum’s equation as above, their method could measure the impact of many different elements, such as “*trade unions, monetary unions, different languages, adjacency, and a variety of other factors*”. They also believed that the gravity model could be applied to foreign direct investment flows. In their research, they defined the price indices as multilateral resistance, and utilized the price to explain the relative transaction cost between country (i) and country (j). Different from the previous absolute cost, this paper more focused on the relative cost, which referred that the demand of country (j) depends on the bilateral barrier between country (i) and country (j) “*relative to average trade barrier that both regions face with all their trading partners*”. The relative cost method made the model to the general conditions and more universal. For example, under the same condition, there would be less trade contacts between two countries surrounded by sea (e.g. Australia and New Zealand) or desert, and the relative cost could explain the barrier between them. It concluded that “*the multilateral resistance variables are critical to understanding the impact of border barriers on bilateral trade and understanding what accounts for the McCallum border parameters*”. Since the gravity equation was treated more like an empirical model, Anderson and Wincoop (2003) generalized this model and developed their method to put it into a theoretical way.

Besides, some scholars derived the gravity model based on trade theory as well.

Deardorff (1995) regarded the Heckscher-Ohlin (H-O) Model of international trade as a theoretical foundation of gravity equation and divided the research into two cases, one with frictionless trade and the other one without. With frictionless trade, the trade cost between two countries is zero, therefore, neither producer nor consumers would consider about the origin of produces. With identical preferences among the whole country, he got a simplified gravity equation, which is similar to the result of Pure Expenditure System Model by Anderson (1979). And without identical preferences, the model would get a little more complicated. Nevertheless, no matter including identical preferences or excluding it, the model could not regarded as the real gravity equation, because it did not contain the distance variables. The second case took another equilibrium of the H-O Model, and it added the trade cost into the model in view of both Cobb-Douglas preferences and CES preferences. On this occasion, the relative distance should be the critical factor to the trade cost. By this paper, we could find out that the gravity model is from the standard trade theories, but Deardorff (1995) also emphasized that “because the gravity equation appears to characterize a large class of models, its use for empirical tests of them is suspect”.

Meanwhile, the gravity model can be used for different international business researches. As mentioned, scholars believed that gravity model could be applied in FDI flows and they took several specialize researches as well. Brenton, Mauro and Lücke (1999) suggested that the FDI flows related to the level of income of countries and their population, and bilateral trade relationship also affected by their geographic distance. They studied on FDI flows of EU and the Central and Eastern European countries (CEECs), tested the possible divergence by grouping home countries and host countries, and found these dummy variables were insignificant. Moreover, this paper was concluded “*the key determinants of the growth of FDI to the region*” as “*the pace of income growth*” and “*the policies to the conductive to business*”. It happens that there is a similar study by Galego, Vieira, C. and Vieira, I. (2004) discussing the FDI inflows to CEECs. As previous research only put attention on host country, they considered bilateral common effects in gravity model. The model takes the following form:

$$\begin{aligned} \ln(FDI_{ijt}) = & \alpha_{ij} + \gamma_t + \beta_1 \ln(GDPcap_{it}) + \beta_2 \ln(GDPcap_{jt}) + \beta_3 \ln(pop_{it}) \\ & + \beta_4 \ln(pop_{jt}) + \beta_5 \ln(open_{jt}) + \beta_6 \ln(CL_{ijt}) \\ & + \beta_7 \ln(dist_j) + \beta_8 Frontier + \varepsilon_{ijt}, \end{aligned}$$

In this gravity model two dimensions are considered simultaneously in the data structure, namely i (home-investing country) and j (host-recipient country).

However, they shared a similar thought with Bernton et al. (1999) that host countries conditions played a more important role on FDI flows. As for home countries, their population which also related to GDP might be the only significant feature in terms of FDI. What is noteworthy is that Galego et al. (2004) utilized individual time-invariant variables in their model, which is different from the one of Bernton et al. (1999). In 2007, Vogiatzoglou developed a panel gravity model to explore the new determinants of FDI in South and East Asia area, as “*By applying a dynamic panel-gravity framework, information was gained on the persistence in the adjustment process and the short-run as well as long-run impact of the various location factors were assessed and examined*”. The panel data presented a larger sample size, as well as weakened the influence of omitted variable bias.

In view of corruption, Bellos and Subasat (2012) applied their panel gravity model to FDI flows. The following model is the basis for their empirical analysis.

$$\begin{aligned} FDI_{STt} = & \beta_0 + \beta_1 GDP_{St} + \beta_2 GDP_{Tt} + \beta_3 \\ & DISTANCE_{ST} + \beta_4 COR_{Tt} + \beta_5 CONTROL \end{aligned}$$

Where  $FDI_{ST}$  is the bilateral FDI stock in current US Dollars.  $GDP_{St}$  and  $GDP_{Tt}$  are the GDPs of countries in current US Dollars.  $DISTANCE_{ST}$  is the geographic distance.  $COR_{Tt}$  is the level of corruption. And CONTROL refers to the control variables.

This research including 16-year (1990-2005) data discussed corruption variable by using five different measurement criteria between 15 target countries and 24 source countries. Based on this form of gravity model, Subasat and Bellos (2013) developed a similar model to discuss the relationship between governance and FDI. In view of these two successful researches, I will consult it and make some necessary changes to create a new model in the following part.

### 3 Methodology

The purpose of this paper is to explore the relationship between FDI and corruption, and as I mentioned, both of them are closely bound up with geographical location of home and host countries. Meanwhile, in consideration of previous academic researches, I will use the model as the following form:

$$\begin{aligned}\log(\text{FDI}_t) = & \beta_0 + \beta_1 \log(\text{GDP}_{St}) + \beta_2 \log(\text{GDP}_{Tt}) \\ & + \beta_3 \log(\text{DISTANCE}_{ST}) + \beta_4 \log(\text{COR}_{Tt}) \\ & + \beta_5 \text{CONTROL}\end{aligned}$$

S: Source country      T: Target country      t: time

FDI<sub>t</sub>: bilateral FDI stock

GDP<sub>S<sub>t</sub></sub>, GDP<sub>T<sub>t</sub></sub>: GDPs

DISTANCE<sub>ST</sub>: the geographic distance between the source and target country

COR<sub>T<sub>t</sub></sub> is the level of corruption in the target country. (I will use two indicators for discussion: Corruption Perceptions Index (CPI) and Worldwide Governance Indicators (WGI))

CONTROL: Fiscal Freedom, Monetary freedom and Trade freedom.

#### 3.1 Research object

As for this model, the data cover a period of 6 years (2007–2012) whereas the country sample contains 12 target countries (Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, Slovenia, Malta and Cyprus) and 4 source countries (France, Germany, Netherlands and United Kingdom).

All above are from European Union (EU), and they share several similarities, (1) **Legal system**: their behaviors are constrained under common legal provision, and the rules of Treaty on European Union and Treaty on the Functioning of the European Union are increasingly appeared in their own legal system. All EU members are required to

legislate within a common European legal framework; (2) **the Central regulatory authority**: there are seven institutions being responsible for EU balanced management, the European Parliament, the Council of the European Union, the European Commission, the European Council, the European Central Bank, the Court of Justice of the European Union and the European Court of Auditors; (3) **Common goal**, to achieve the team development of EU, trade ties between EU members are getting more and more strengthened. Because of these similarities and non-tariff barriers among EU members, fewer control variables should be taken into consideration in respect to this model.

Besides, these host countries are the new EU members which joined the union in the two latest enlargement (2004 and 2007), while the source countries are chosen because of their higher GDP per capita and GDPs. In my opinion, it would also reduce data bias and control variables, since host countries are less developed while home countries being developed ones.

### 3.2 Analytical method

Multiple regression analysis, which is used for this model, is widely accepted for academic studies. Studenmund (2006) defines regression analysis as “a statistical technique that attempts to explain movements in one variable, the dependent variable, as a function of movements in a set of other variables, called the independent (or explanatory) variables, though the quantification of a single equation”. And this method’s appeal is obvious.

As for any analysis of multi-factor model, regression analysis method would show its convenience and simplicity. Moreover, with the same model and data, the result come out from regression analysis is unique and precise. However, if researchers use other methods in the form of graphs and tables, due to personal differences, they may not

only make various conclusion, but be likely to draw different fitted curve as well. Beside, regression analysis could also improve the validity of prediction equation, because it could calculate the accurate result of reliability coefficient and the best regression fitting degree in terms of multiple factors. However, when we use regression analysis, since few variables are affected by single factor in reality, one variant linear regression analysis is only suitable for an equation when a single dependent variable significantly affects it more than other factors. Therefore, to figure out the economic problems analysis in practice, considering the combined effects of multi-factors, multiple regression analysis is advantageous.

Multiple regression analysis not only contributes for continuous variables, but also for dichotomous variables (0, 1). Multiple regression analysis preserves strict restrictions on its application. First of all, analysis of variance are applied to test the significance level of linear regression relationship between the dependent variable and several independent variables. Even if they showed significant correlation, we could not conclude that all independent variables are linear to the dependent variable. It is necessary to take a t-test to remove the meaningless variables. Or we could set up a regression equation by stepwise regression method. It is a method to test for errors in models created by selecting independent variables gradually, to ensure the model accuracy.

To be specific, the standard and commonly used methods of estimating regression coefficients is Ordinary Least Square (OLS) and Generalized Least Square (GLS). OLS is to minimize the total square error and to obtain optimal kernel functions. While GLS is an extension of OLS, and it could get effective estimates when error terms have heteroscedasticity and self-correlation.

Beside, multiple regression analysis could be used to forecast occurrence and development of certain phenomena. And when observations for each cross-sectional unit are available across a set of time period, the dataset becomes a panel dataset. As I only choose four source countries and twelve target countries, the sample size is

relatively small. Using panel data would increase the number of observation, and may also have a more significant result.

When a model with  $n$  observations and  $K$  independent variables, its panel data can be described as the following form:

$$(X_{1it}, X_{2it}, \dots, X_{kit}, Y_{it}), i = 1, \dots, n, t = 1, \dots, T$$

$n$ =number of entities (states)

$T$ =number of time periods (years)

Moreover, when factor could cause omitted variable bias if they are omitted, we could control them with panel data. Panel data model will help us get consistent estimate, even efficient estimate. Meanwhile, compared to single cross-sectional data, dynamic information is easily found from a panel data model.

As for the regression model of this paper, I will use average value for the period of 2007-2012 to test the hypotheses at first. If the main independent variables (GDP of source and target countries, distance and corruption score) are significantly related to the dependent variable, then I could get conclusions from this test. However, if the result is not satisfactory, the panel data would be applied for the further research.

### 3.3 Data selection<sup>1</sup>

Aimed at reliable results, the full study data is from reputable institutions. **GDP** data of source countries and target countries in current US dollars are from World Bank official website. “**Distance**” is measured between capitals of two countries, for instance, the geographic distance from source country Germany to target country

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<sup>1</sup> All original data will be shown in the Appendix,

Bulgaria is equal to the distance from Berlin to Sofia. “**FDI**” means the FDI stock from source country to target country in different years, published by United Nations Conference for Trade and Development (UNCTAD). Then, I will mainly explain the measurement of “corruption” and choices of control variables.

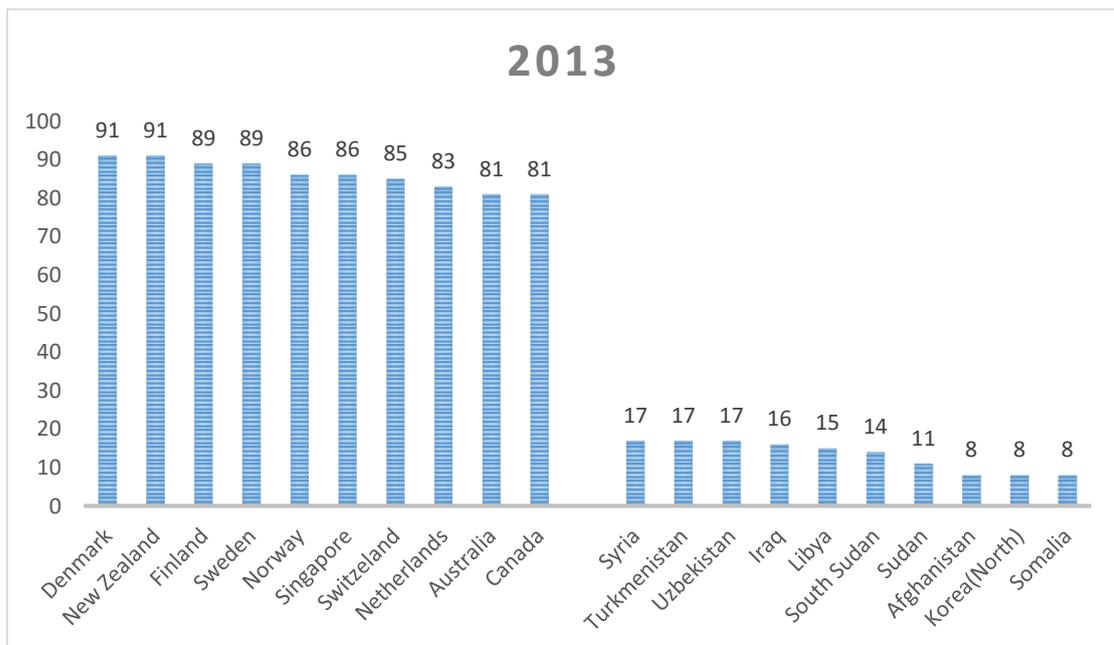
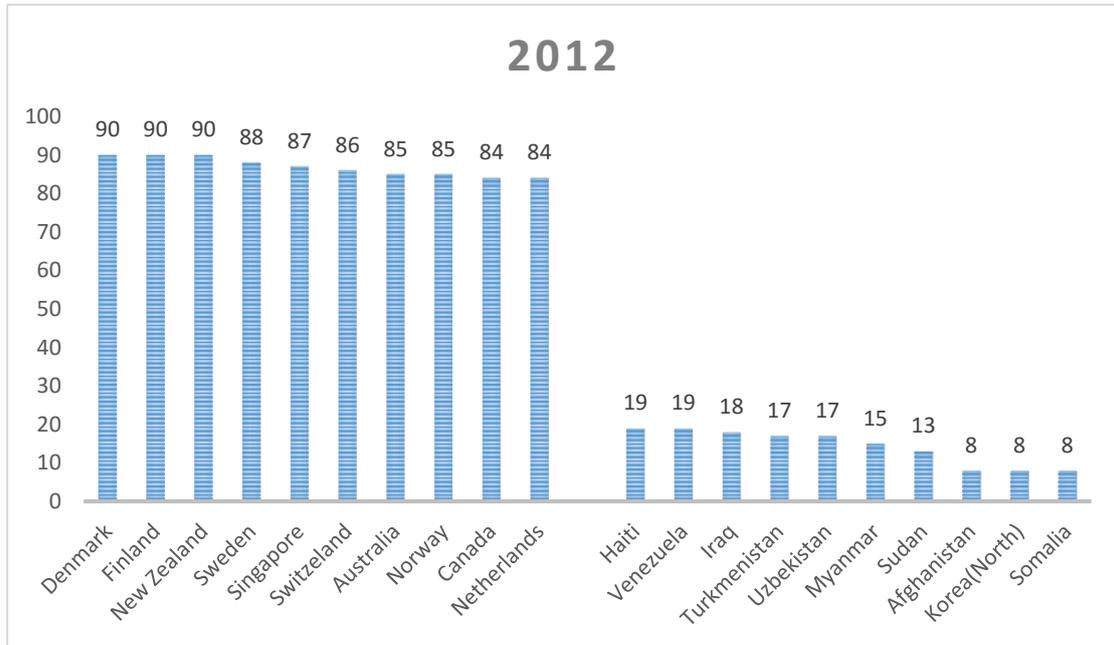
## Corruption

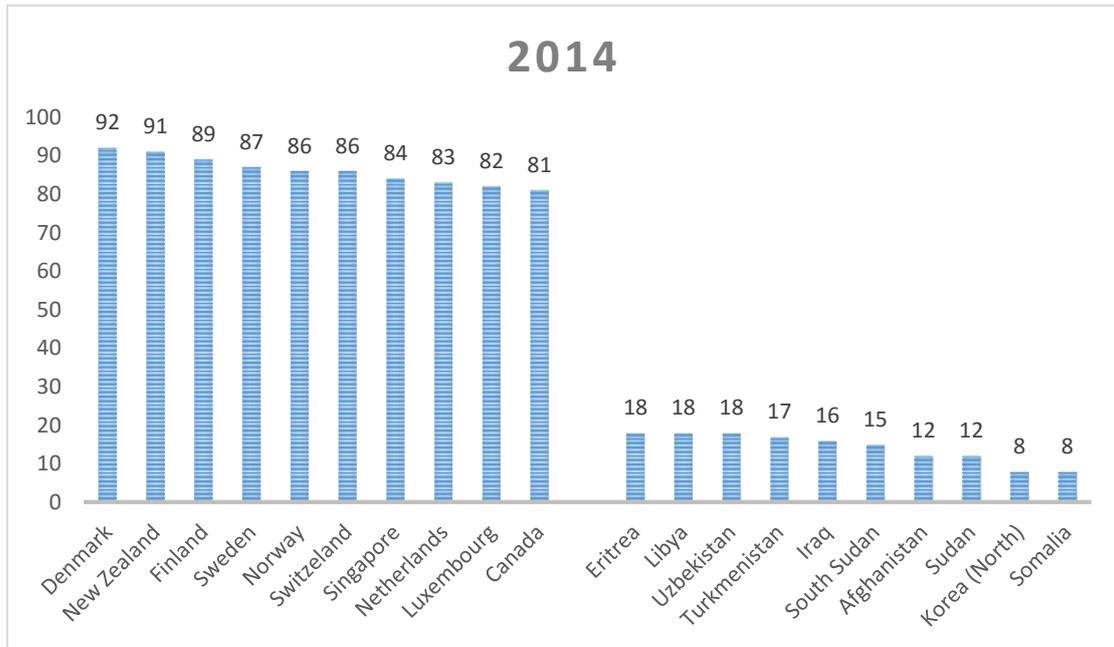
Since many scholars (e.g. Bellos & Subasat, 2012) used CPI and WGI for their academic studies, I will also apply them for the Gravity Model.

First of all, we could get a quick side on CPI according to its scores distribution in the world. The scores of CPI for each country are various in different years, some countries improve their governance gradually, while others falling behind.

The figure below shows the results of Corruption Perceptions Index for the 10 best and 10 worst countries from 2012 to 2014. In recent three years, Denmark gains the highest score invariably, while North Korea and Somalia being the worst. General speaking, most of top 10 countries are developed countries with an open economic environment, however, the worst ones are undeveloped countries — isolated from the world market by trade and other barriers. The closed economies are more likely to have higher levels of corruption than more open ones.

Figure 2. Top 10 and bottom 10 countries according to their scores of CPI (2012-2014)



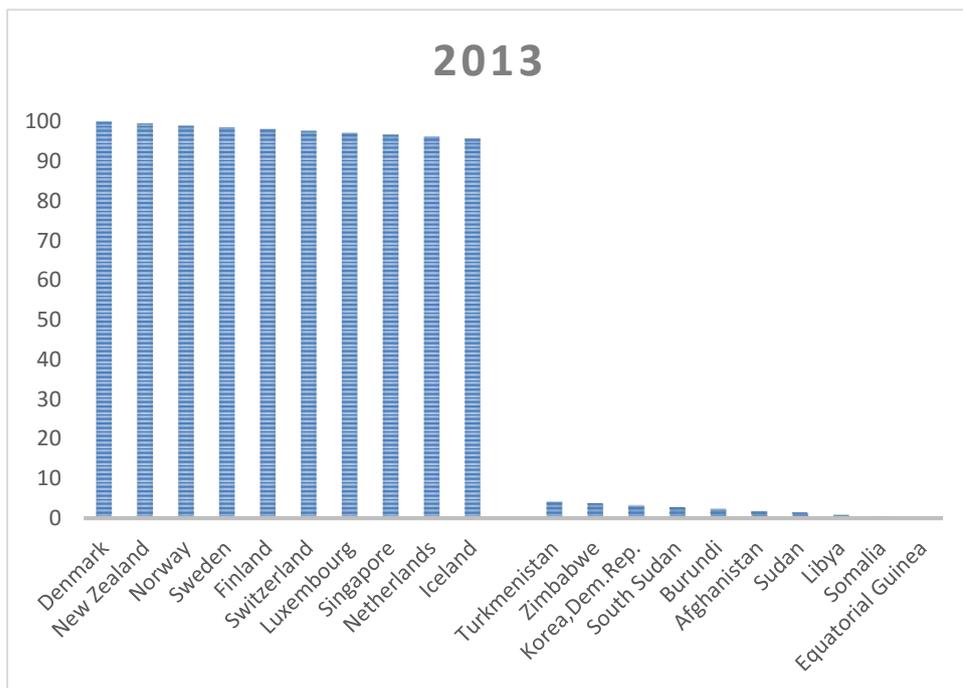
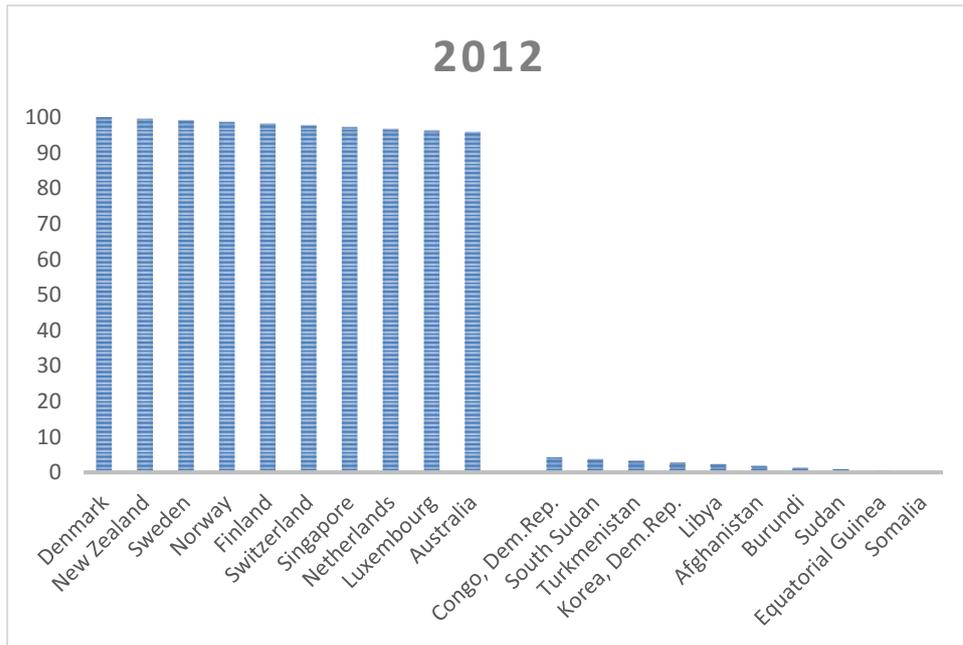


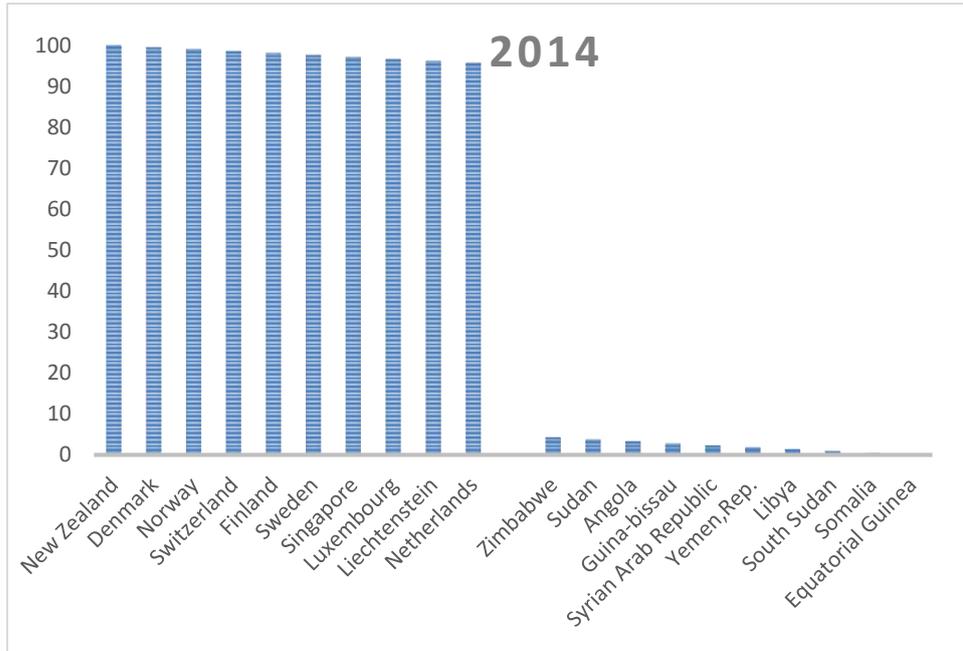
Source: Transparency International (2015)

(Higher score means lower corruption, and vice versa.)

Then, similarly, I will utilize a figure (Figure 2) to show the results from WGI. And because our research only focus on “corruption”, Figure 2 will be only related to the results of Control of Corruption for the 10 best and 10 worst countries from 2012 to 2014, excluding other five dimensions (VA, PV, GE, RQ and RL).

Figure 3. Top 10 and bottom 10 countries according to their scores of CC (2012-2014)





Source: World Bank (2015)

(Higher score means lower corruption, and vice versa.)

We could easily find out that there is a similar result coming out as the previous indicator. Denmark, New Zealand, Sweden, Norway, etc. still occupied the leading position in this test from 2012 to 2014, while, those countries from the Middle East and Africa being at the bottom. Actually, there is not only an overlap between CPI and WGI, but a correlation between them as well. Treisman suggested (2007) that the correlation of WGI and CPI was around 0.96 in 2002 and 0.98 in 2004. And Treisman also agreed that these two corruption indexes “are the most frequently used”, moreover, many researchers use other cross-national corruption ratings (e.g. International Country Risk Guide (ICRG)) are highly correlated with them as well.

Besides, although scores, either of CPI or of WGI, changed year by year, both of them

keep being relatively stable. For example, according to CPI, Canada got 9<sup>th</sup> position and 84 in 2012, and being 10<sup>th</sup> with score 81 in 2013 and 2014, however, it is impossible for them to get a bottom score. As I discussed in “3.2 Analytical method”, the average scores will be used for the following research. And this relative stability is useful.

## Control Variables

As we all know, FDI and corruption would affect many social and economic factors, and be affected by them as well. So we have to choose effective ones to reduce the risk of excluded variables bias from a large list of relevant variables.

As I utilize a similar regression model from Bellos and Subasat’s (2012) study, the control variables they used would be taken into consideration. These variables are “trade” variables, “land-lock”, “colonial-links”, and “EU-links”, “GDP growth”, “fiscal” variables and “inflation”, which also echo the findings from section 2.1<sup>2</sup>. Among all above, I wipe “EU-links” off firstly, because all countries involved in the regression model are EU members. And “land-lock” is regarded as a proxy for transportation cost. For instance, if products have to be transported to Kyrgyzstan, they would be charged for a higher transportation cost due to lack of harbors. However, this variable seems to be useless, since all the transportation are in the Europe. And obviously, we could also ignore another dummy variable, “colonial-links”. Moreover, Bellos and Subasat (2012) argued that “GDP growth” and “inflation” are highly correlated with “fiscal” variables. Therefore, I only pick up “trade” and “fiscal” variables.

Besides, differ from other researches, I will not pay attention on the influence from tariff and legal system for these countries, because they are all EU members (See details in “3.1 Research object”). But some selected countries are not in the euro zone, like United Kingdom and Poland, there would be price variance for same products

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<sup>2</sup> This section suggests that the factors which have an impact on FDI might be regarded as control variables.

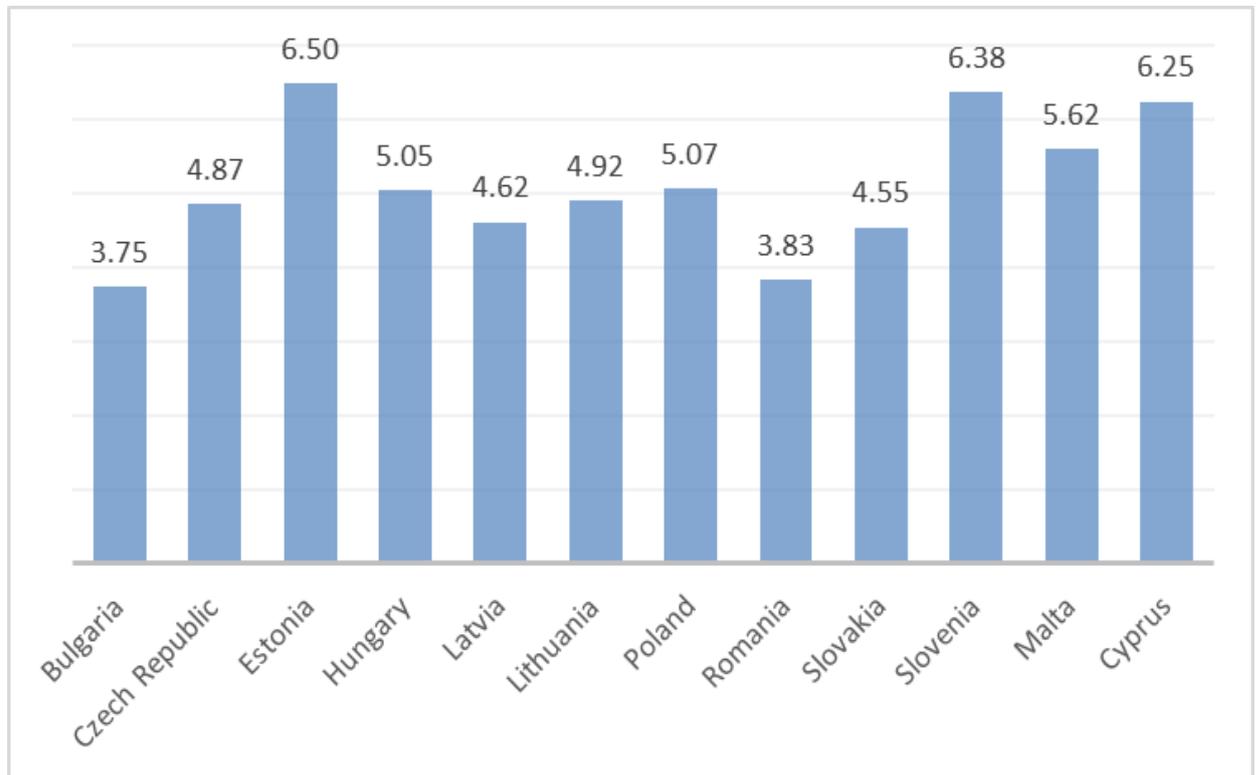
and price control system as results of monetary variation. Therefore, I add “monetary” variables in control variables.

Finally, the control variable for this regression model are “fiscal”, “trade” and “monetary” variables. All of them are taken from “Index of Economic Freedom” (Miller et al., 2015).

### **3.4 Key Independent Variables and Hypotheses**

Since the purpose of this paper is to explore the relationship between FDI and corruption, the key independent variables are FDI (it means the bilateral FDI stock here) and corruption (scores from CPI or WGI). Besides, we only focus on the corruption level of target countries, thus, Figure 3 below would present the average corruption scores of 12 target countries from 2007 to 2012. As the CPI score by 2012 is in hundred-mark system, while others being provided with a maximum score of 10, I divide the scores of 2012 by 10 to calculate the average value. Then the average scores are from 0 to 10.

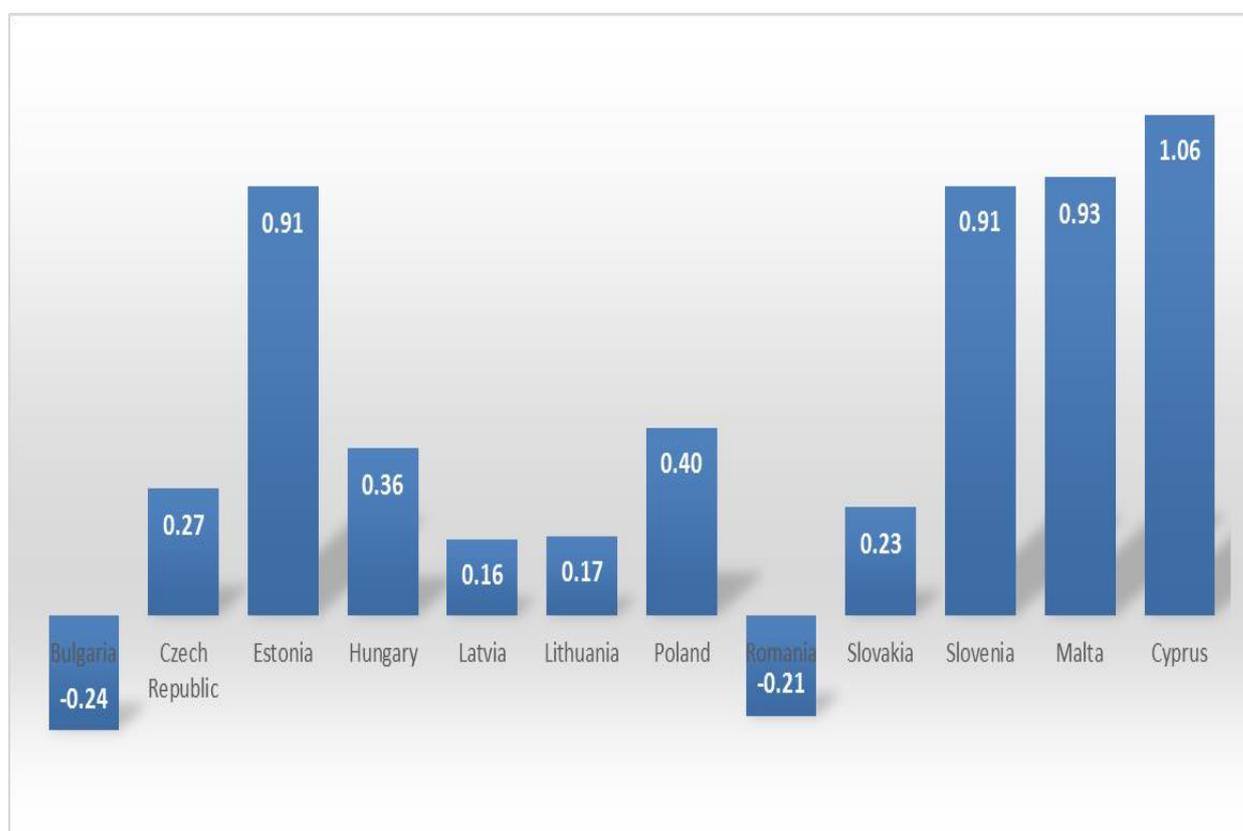
Figure 4. Average Corruption Perceptions Index (CPI) for the period of 2007-2012



Source: Transparency International (2015)

As can be seen, the country with the lowest corruption (highest CPI score) among the 12 countries in the figure is Estonia, and Slovenia comes to the second, followed closely by Cyprus. On the contrary, Bulgaria and Romania are at the bottom. There is an obvious gap between these countries, the score of first one being 6.50, while Bulgaria only gaining 3.75. Additionally, we could also get a similar result when looking at the Control of Corruption index from the World Bank WGI.

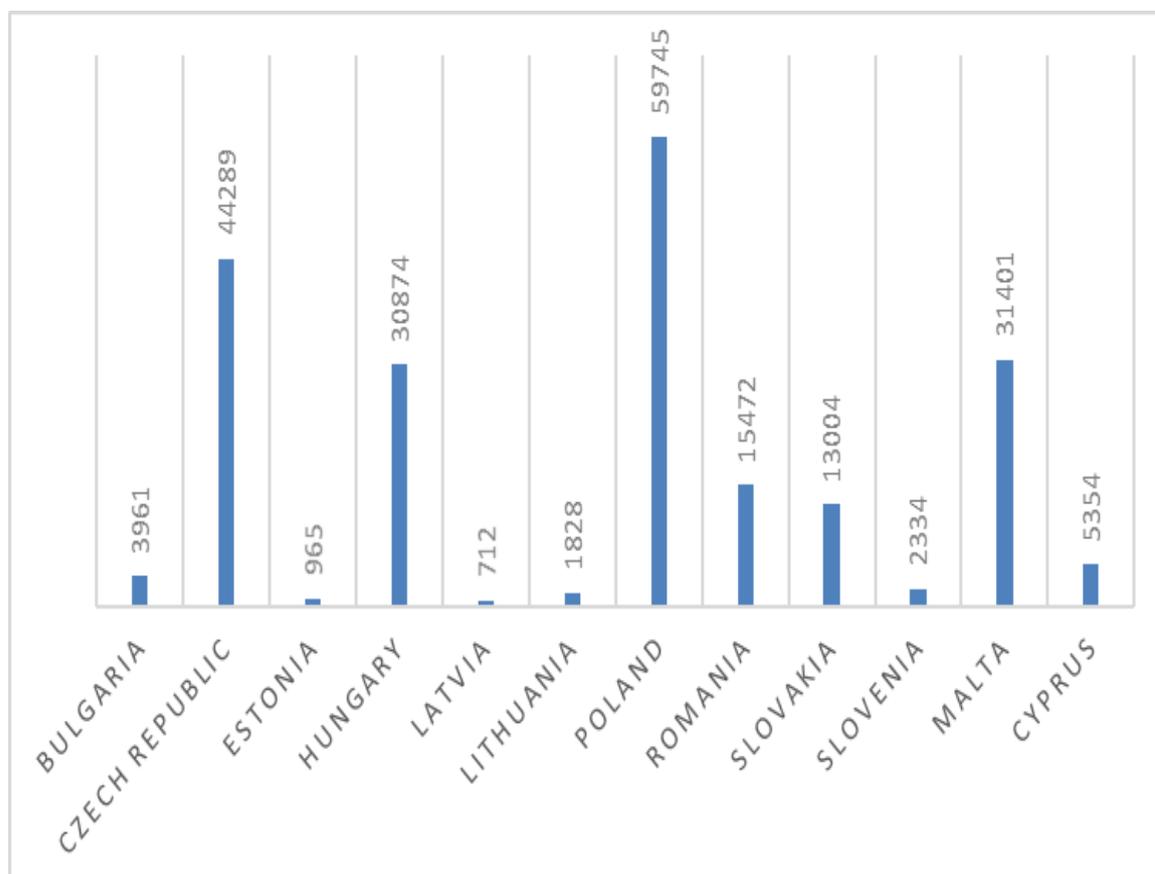
Figure 5. Average Control of Corruption index (CC) for the period of 2007-2012



Source: World Bank (2015)

As the graph above shown, Cyprus was ranked the best country(score, 1.06), followed by Malta and Estonia. Meanwhile, only Bulgaria and Romania gained negative scores, and they became observations of highest corruption as well. We could find out that the second result is only slightly different from the previous one, then I made a correlation calculation on them and gained a highly correlative result with 0.96, being similar to Treisman's (2007) conclusion which was mentioned earlier.

Figure 6. Average FDI stock from source countries for the period of 2007-2012



Source: World Bank (2015)

As for the annual mean FDI stock from the four investment countries, Poland came to the top with 59745 billion dollars, and Czech Republic, Malta and Hungary showed a good performance as well. To our surprise, Estonia, who gained higher scores of corruption index, was at the bottom here, along with Latvia. In comparison with Figure 5 and Figure 3 & 4, it is difficult to conclude that corruption is a help hand or impediment to FDI. As for the literature I mentioned before, scholars hold the personal opinions on it. Therefore, I could only assume that FDI and corruption have correlations among them and then utilize the regression model:  $\log(\text{FDI}_t) = \beta_0 +$

$\beta_1 \log(\text{GDP}_{St}) + \beta_2 \log(\text{GDP}_{Tt}) + \beta_3 \log(\text{DISTANCE}_{ST}) + \beta_4 \log(\text{COR}_{Tt}) + \beta_5 \text{CONTROL}$  to predict their relationship.

**Hypotheses:**

**Corruption will have a significant effect on FDI. When  $\beta_4 < 0$ , corruption is negatively related to FDI.**

## 4 Result

### 4.1 Description of variables

Table 1. Description of initial variables in the dataset

Variable Name	Description
Country	Country IDs (1-48)
y	FDIst, FDI stock from one specific source country to one target country
gdps	GDP of source country in current US dollars
gdpt	GDP of target country in current US dollars
distance	geographic distance between one source and one target country
corr1	Corruption Perceptions Index (CPI)
corr2	Control of Corruption in WGI
fis	Fiscal Freedom
mon	Monetary freedom
trade	Trade Freedom

Since there are four source countries and 12 target countries, I use S1-S4 to represent France, Germany, Netherlands and United Kingdom, and use T1-T12 to represent Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, Slovenia, Malta and Cyprus (see Annex 1 for details). Thus, there are 48 objects of observation being marked their country ID as S1T1, S2T2...S4T12. Below, I also provide the summary statistics for these variables (except for country)

Table 2. Summary statistics of initial variables in the datasets

Variable	Obs	Mean	Std.Dev.	Min	Max
y	48	4374.705	7312.196	0	28861
gdps	48	2442.445	990.2465	862.6417	3548.818
gdpt	48	110.4836	129.7556	8.41	482.115
distance	48	1535.396	585.9819	546	3224
corr1	48	5.116667	0.8871555	3.75	6.5
corr2	48	0.4122222	0.4313042	-0.2433333	1.063333
mon	48	77.99583	3.453153	73.11667	85.2667
fis	48	77.84861	8.727276	62.3	87.45
trade	48	86.1625	1.310878	82.6	86.76667

In this graph, I took the average value of “gdps”, “gdpt”, “corr1”, “corr2”, “mon”, “fis” and “trade” for the period of 2007-2012, because in the regression model:  $\log(\text{FDI}_t) = \beta_0 + \beta_1 \log(\text{GDP}_{St}) + \beta_2 \log(\text{GDP}_{Tt}) + \beta_3 \log(\text{DISTANCE}_{ST}) + \beta_4 \log(\text{COR}_{Tt}) + \beta_5 \text{CONTROL}$ , all above variables are time-dependent. As for “distance”, it is a time-independent and relatively stable variable, so I picked up the data in current according to the geographic distance between two national capitals

## 4.2 Results of regression analysis

Table 3. Results of cross-sectional regressions (CPI)

Source	SS	df	MS			
Model	93.63824	7	13.3768914	Number of obs =	47	
Residual	65.3588851	39	1.67586885	F( 7, 39) =	7.98	
Total	158.997125	46	3.45645924	Prob > F =	0.0000	
				R-squared =	0.5889	
				Adj R-squared =	0.5151	
				Root MSE =	1.2946	

lny	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
lngdps	.7194584	.3445099	2.09	0.043	.0226214	1.416295
lngdpt	.6316691	.2465287	2.56	0.014	.1330177	1.13032
lndistance	-.2998769	.7789237	-0.38	0.702	-1.875399	1.275645
lncorr1	-6.510192	2.197818	-2.96	0.005	-10.9557	-2.064685
lnfis	-6.574078	2.164149	-3.04	0.004	-10.95148	-2.196675
lnmon	23.34901	7.789691	3.00	0.005	7.592878	39.10515
lntrade	5.818663	19.64802	0.30	0.769	-33.92321	45.56054
_cons	-87.44407	112.4174	-0.78	0.441	-314.8297	139.9415

Firstly, we utilize the CPI score as corruption variables for the research, and the results come out as above. Among these, “gdps”, “gdpt”, “corr1” “fis” and “mon” are significantly related to dependent variable y. Meanwhile,  $\beta_1 > 0$  and  $\beta_2 > 0$ , so it implies that, no matter the GDP increase of source or target countries, it would be a

push factor in terms of the investment from source countries to target countries. In addition,  $\beta_4$  is negative, and it means corruption have a negative impact on FDI. In other words, among these 12 new EU members, if a country has higher corruption, it may receive more foreign investment.

Besides, in the literature review part, we have discussed the importance of location selection on FDI. Not only taking transportation cost into consideration, but we also focus on buying habits, customer preferences, culture and relevant factors. When there is a smaller gap between two countries, they would share more similarities in terms of factors above, which may help investors gain more knowledge about their new markets. It is the reason that Uppsala Model suggested that multinational enterprise should expand their market from their neighbors. But, in the graph above, the correlation between distance and  $y$  is insignificant. It might be because that, there is no obvious gap among different distances. As for all the objects, the average distance from source country to target country is 1509 kilometers, and the majority of numerical value appears in the range of 1000 to 2000. For instance, the distance between Bulgaria and United States is 7912 kilometers, and the distance between Germany and India is 5780 kilometers (<http://geobytes.com/citydistancetool/>) . In comparison with them, the latter comes with a more apparent difference. Therefore, if countries from different continent are involved in this research, distance variables might become a significant factor.

Table 4. Results of cross-sectional regressions (CC)

Source	SS	df	MS			
Model	86.3671153	7	12.3381593	Number of obs =	47	
Residual	72.6300098	39	1.86230794	F( 7, 39) =	6.63	
Total	158.997125	46	3.45645924	Prob > F =	0.0000	
				R-squared =	0.5432	
				Adj R-squared =	0.4612	
				Root MSE =	1.3647	

lny	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
lngdps	.7109365	.3631443	1.96	0.057	-.0235921	1.445465
lngdpt	.6508702	.2846998	2.29	0.028	.0750104	1.22673
lndistance	-.1956761	.8338523	-0.23	0.816	-1.882302	1.490949
lncorr2	-3.57143	1.787643	-2.00	0.053	-7.187279	.0444202
lnfis	-7.013704	2.5943	-2.70	0.010	-12.26117	-1.766236
lnmon	24.67425	10.68016	2.31	0.026	3.071592	46.27691
lntrade	6.744686	22.3274	0.30	0.764	-38.41674	51.90612
_cons	-105.6839	135.0041	-0.78	0.438	-378.7554	167.3876

Due to the high correlation between CPI and CC scores, I use CC index to make a

similar regression analysis, and get an expected result. In 90% confidence interval, y has a positive relationship with GDP of source and target country, and a negative relationship with corruption level. Meanwhile, the distance index is still insignificant. Moreover, in terms of control variables, fiscal burden and monetary policy have an impact on FDI stock, while trade freedom being insignificant. Comparing CC index with CPI scores, CPI scores make contribution on a more significant result. If we make a similar regression model in the future, and we do not have time to make two regression analysis on one variable, the CPI index could be the priority selection.

## 5 Discussion

The main part of the discussion is to (1) summarize the research part of the thesis, (2) come to the answer of the research question - *how does corruption affect the FDI stock from developed European Union (EU) countries to new EU member states*, and (3) find out limitations of the research method.

During the process of this research, I mainly applied Gravity Model for the research, since it is a good tool to explain the flow of bilateral trade, and has gained success on the empirical research in international trade. Meanwhile, this model take the importance of location into consideration, look back to the literature review part, we could find out that location variables are able to make a change in company's FDI decision. Besides, in the Dunning's OLI model, location advantage even plays a key role on ownership advantage and internalisation advantage. In the research, I assume "corruption" as the main location variable, to run a regression analysis, and finally draw a conclusion on the significance of different factors.

As for the results, corruption have a negative impact on FDI stock among these selected EU countries, which prove some academicians' viewpoints (e.g. Maura, 1995), - corruption would impede the development of FDI and make the target market more risky at the same time. Differ from previous research, my thesis mainly focuses on EU market, and selected countries are categorized on the basis of their similarity (taking developed EU countries as source country and new EU member states as target country). In addition, this thesis has utilized more recent data to verify the previous academic point.

However, this research exists several limitations. The first problem is the sample size is relatively small. I only utilize a 4\*12 sample with their average value for a 6-year period, which means the objects number is 48. In my thesis, I did not use any optimization method to expand the sample size, since significant test results has already come out. But it would be one potential disadvantage to generalize the method. For

instance, if other researchers apply the same method for either different countries or period, there are possibilities gaining unsatisfied results. As for the further research, I suggest that this method could be tested by a set of panel data. Take my thesis as an example, the objects number would increase from 48 to 288( $4*12*6=288$ ) based on the same original file. Besides, due to lack of statistical data in term of FDI stocks, I only take 6-year data into consideration, and more sufficient data source would improve the research accuracy.

Generally speaking, quantitative research keeps an objective attitude to understand the research activities. But there is no deny that there still exists artificial subjective factors. In my thesis, personal preference would have an impact on country selection, data source selection and research method.

Therefore, in terms of further study, I suggest that this model could be applied for other specific market (e.g. Asia) or the whole world. Researchers can also add extra relevant control variables and data source, to gain more correct results. After more empirical study, it might be a generalized model which explain the real relationship between corruption and FDI stock.

## 6 Conclusion

The previous sections of this paper has tested on how corruption affects the FDI stock. Using data set of 4 developed and 12 new EU member states, we find that corruption is an obstruction for FDI, which confirms the position of Maura (1995) that corruption can reduce social efficiency.

After looking back to academic research on FDI and corruption, we could easily find out that locational variable is a critical factor to FDI, and corruption is a representative body of location characteristic. Thus, in the process of proving, I utilize a gravity model as  $\log(\text{FDI}_t) = \beta_0 + \beta_1 \log(\text{GDP}_{St}) + \beta_2 \log(\text{GDP}_{Tt}) + \beta_3 \log(\text{DISTANCE}_{ST}) + \beta_4 \log(\text{COR}_{Tt}) + \beta_5 \text{CONTROL}$  to set up a link between FDI stock and corruption. And the two different corruption index (CPI and CC from WGI) have proved similar results. The finding of a negative impact of corruption lends empirical support to existence of the “grabbing hand” type of corruption with regard to foreign investment. Target country with lower corruption level and higher GDP would attract more external investment. Besides, the GDP of source countries would have a positive influence on FDI as well. And the regression experiment demonstrates that fiscal burden and monetary policy are two characters of target country that cannot be neglected.

The success of location selection, which means a good begun of foreign investment, occupies an important position in the MNEs manager’s mind. Thus, under a similar condition, comparatively well-off countries with less bribes and kickbacks would be a better choice. Meanwhile, some macroeconomic factors, e.g. openness of monetary policy can be accepted into valuation sessions. As for local government and political elites, if they expect to gain more investment from developed countries, they would make new rules and laws to alleviate the problem of corruption among official institutions and establishment an open and effective market.

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## Appendix

### 1, Original Data

**Table 1, Distance from source countries to target countries**

	(KM)			
	France	Germany	Netherlands	United Kingdom
Bulgaria	1761	1572	1745	2019
Czech Republic	885	546	709	1037
Estonia	1859	1421	1459	1787
Hungary	1247	976	1146	1454
Latvia	1705	1265	1332	1680
Lithuania	1700	1273	1371	1730
Poland	1368	966	1094	1452
Romania	1875	1621	1790	2097
Slovakia	1095	817	987	1295
Slovenia	966	815	987	1231
Malta	1753	1834	1982	2092
Cyprus	2954	2776	2949	3224

**Table 2, GDP of selected countries for the period of 2007-2012**

Unit: billion dollar

Target countries	2007	2008	2009	2010	2011	2012
1 Bulgaria	43.64	53.32	50.16	48.67	55.77	52.59
2 Czech Republic	188.82	235.2	205.73	207.02	227.31	206.75
3 Estonia	22.23	24.18	19.64	19.48	22.8	22.66
4 Hungary	138.58	156.58	129.36	129.58	139.44	126.82
5 Latvia	30.95	35.67	26.16	23.87	28.32	28.55
6 Lithuania	39.74	47.85	37.44	37.1	43.49	42.82
7 Poland	428.76	530.19	436.48	476.69	524.36	496.21
8 Romania	170.61	204.34	164.35	164.79	182.61	169.4
9 Slovakia	86.03	99.83	88.63	89.01	97.53	92.75
10 Slovenia	48.11	55.59	50.24	47.97	51.25	46.26
11 Malta	7.47	8.55	8.1	8.16	9.3	8.88
12 Cyprus	23.72	27.49	25.59	25.25	27.09	24.94
Source countries						
1 France	2663.11	2923.47	2693.83	2646.99	2862.5	2681.42
2 Germany	3435.68	3746.92	3412.98	3412.21	3751.88	3533.24
3 Netherlands	833.19	931.29	858.09	836.44	893.7	823.14
4 United Kingdom	2963.1	2791.68	2309	2407.86	2592.02	2614.95

**Table 3, FDI stock from invest country to recipient for the period of  
2007-2012**

							Million Dollar
Invest country: France							
	2007	2008	2009	2010	2011	2012	Average
Bulgaria	598	583	676	714	652	694	652.83
Czech Republic	6838	9966	11055	12554	10219	11314	10324.33
Estonia	109	96	166	192	131	133	137.83
Hungary	3994	4728	5061	4817	4099	4411	4518.33
Latvia	34	61	37	102	104	106	74.00
Lithuania	523	674	599	521	432	435	530.67
Poland	17309	17875	19000	19494	19148	20629	18909.17
Romania	4184	4786	6003	5794	5024	4749	5090.00
Slovakia	2092	2015	1942	1722	1738	1639	1858.00
Slovenia	907	963	922	762	687	694	822.50
Malta	0	0	0	0	0	0	0.00
Cyprus	234	532	775	790	902	1128	726.83
Invest country: Germany							
	2007	2008	2009	2010	2011	2012	Average
Bulgaria	1999	2083	3496	3437	3448	2963	2904.33
Czech Republic	33000	31142	32537	31405	31182	0	26544.33
Estonia	586	639	592	596	739	0	525.33
Hungary	25494	22998	24571	22695	22491	0	19708.17
Latvia	677	643	655	609	576	0	526.67
Lithuania	1194	1944	1235	1220	1168	0	1126.83
Poland	27999	26460	29666	31588	27887	0	23933.33
Romania	6878	7163	7873	7676	8752	8051	7732.17
Slovakia	10294	12335	13161	12028	11342	0	9860.00
Slovenia	1378	1574	1577	1558	1527	0	1269.00
Malta	36220	37843	36453	38321	24329	0	28861.00
Cyprus	484	472	735	453	382	0	421.00

Invest country: Netherlands							
	2007	2008	2009	2010	2011	2012	Average
Bulgaria	281	208	210	194	308	351	258.67
Czech Republic	6407	5694	5762	5773	6654	7031	6220.17
Estonia	128	185	239	284	233	306	229.17
Hungary	5726	3491	3929	5835	4588	4088	4609.50
Latvia	50	89	118	42	41	39	63.17
Lithuania	116	141	162	156	118	133	137.67
Poland	12788	12456	12456	11055	10104	10163	11503.67
Romania	2342	1189	1821	1630	1756	1862	1766.67
Slovakia	428	1281	770	674	1016	1028	866.17
Slovenia	440	143	111	0	0	0	115.67
Malta	15	831	1001	0	0	0	307.83
Cyprus	1575	1428	3056	3278	3808	4764	2984.83
Invest country: United Kingdom							
	2007	2008	2009	2010	2011	2012	Average
Bulgaria	92	208	189	163	136	84	145.33
Czech Republic	1266	1474	826	834	677	2124	1200.17
Estonia	14	36	53	97	133	103	72.67
Hungary	3746	3114	1129	994	1557	1688	2038.00
Latvia	0	138	2	-41	74	114	47.83
Lithuania	22	0	40	0	63	69	32.33
Poland	4163	4248	6029	5709	5869	6377	5399.17
Romania	805	984	904	859	819	928	883.17
Slovakia	369	571	410	410	425	333	419.67
Slovenia	0	76	84	0	495	103	126.33
Malta	6537	0	2376	1290	515	2675	2232.17
Cyprus	1368	529	807	877	994	2752	1221.17

**Table 4, CPI score of target countries for the period of 2007-2012**

	2007	2008	2009	2010	2011	2012	Average
Bulgaria	4.1	3.6	3.8	3.6	3.3	4.1	3.75
Czech Republic	5.2	5.2	4.9	4.6	4.4	4.9	4.87
Estonia	6.5	6.6	6.6	6.5	6.4	6.4	6.50
Hungary	5.3	5.1	5.1	4.7	4.6	5.5	5.05
Latvia	4.8	5	4.5	4.3	4.2	4.9	4.62
Lithuania	4.8	4.6	4.9	5	4.8	5.4	4.92
Poland	4.2	4.6	5	5.3	5.5	5.8	5.07
Romania	3.7	3.8	3.8	3.7	3.6	4.4	3.83
Slovakia	4.9	5	4.5	4.3	4	4.6	4.55
Slovenia	6.6	6.7	6.6	6.4	5.9	6.1	6.38
Malta	5.8	5.8	5.2	5.6	5.6	5.7	5.62
Cyprus	5.3	6.4	6.6	6.3	6.3	6.6	6.25

**Table 5, WGI-CC score of target countries for the period of 2007-2012**

	2007	2008	2009	2010	2011	2012	Average
Bulgaria	-0.23	-0.3	-0.25	-0.21	-0.23	-0.24	-0.24
Czech Republic	0.23	0.27	0.33	0.26	0.3	0.23	0.27
Estonia	0.91	0.87	0.91	0.86	0.93	0.98	0.91
Hungary	0.56	0.38	0.34	0.25	0.32	0.28	0.36
Latvia	0.25	0.13	0.13	0.13	0.19	0.15	0.16
Lithuania	0.04	0.04	0.12	0.27	0.24	0.31	0.17
Poland	0.19	0.35	0.37	0.41	0.49	0.58	0.40
Romania	-0.17	-0.16	-0.27	-0.22	-0.19	-0.26	-0.21
Slovakia	0.3	0.3	0.23	0.24	0.24	0.07	0.23
Slovenia	0.98	0.91	1.02	0.85	0.9	0.81	0.91
Malta	1.06	1.04	0.83	0.86	0.83	0.96	0.93
Cyprus	1.08	1.24	0.93	1	0.89	1.24	1.06

**Table 6, Control variables data of target countries for the period of 2007-2012**

fiscal freedom							
	2007	2008	2009	2010	2011	2012	Avearage
Bulgaria	82.4	82.7	86.2	86.3	86.9	93.6	86.35
Czech Republic	69.9	71.3	80.2	80.1	81	82	77.42
Estonia	84.5	86	81.5	80.2	80.7	79.1	82.00
Hungary	68.8	70	70.6	68.6	69.7	78.6	71.05
Latvia	83.9	83.4	82.3	82.7	82.5	84.3	83.18
Lithuania	86.5	86.3	87.6	84.6	86.1	93.6	87.45
Poland	68.6	68.6	69	74.9	74	74.4	71.58
Romania	85.9	85.6	87	85.8	86.8	87.4	86.42
Slovakia	89.5	89.4	84.1	84	84.2	84.2	85.90
Slovenia	54.6	62.4	62.9	64	65.1	64.8	62.30
Malta	61.1	61.3	63.1	62.5	62.5	67.8	63.05
Cyprus	79.4	78.2	76.7	72.7	74.6	83.3	77.48
trade freedom							
	2007	2008	2009	2010	2011	2012	Avearage
Bulgaria	70.8	86	85.8	87.4	87.6	87.1	84.12
Czech Republic	86.6	86	85.8	87.5	87.6	87.1	86.77
Estonia	86.6	86	85.8	87.5	87.6	87.1	86.77
Hungary	86.6	86	85.8	87.5	87.6	87.1	86.77
Latvia	86.6	86	85.8	87.5	87.6	87.1	86.77
Lithuania	86.6	86	85.8	87.5	87.6	87.1	86.77
Poland	86.6	86	85.8	87.5	87.6	87.1	86.77
Romania	84	86	85.8	87.5	87.6	87.1	86.33
Slovakia	86.6	86	85.8	87.5	87.6	87.1	86.77
Slovenia	86.6	86	85.8	87.5	87.6	87.1	86.77
Malta	86.6	86	85.8	87.5	87.6	87.1	86.77
Cyprus	81.6	81	80.8	82.5	82.6	87.1	82.60

	monetary freedom							
	2007	2008	2009	2010	2011	2012	Avearage	
Bulgaria	75.8	73.7	72.8	69.5	75.5	77.8	74.18	
Czech Republic	86.3	80.3	79.7	75.6	80	81.5	80.57	
Estonia	83	82	79.7	71.1	78.7	79.3	78.97	
Hungary	76.6	77.2	73.8	74.1	75.9	76.1	75.62	
Latvia	74.2	73.8	71.1	67	73.5	79.1	73.12	
Lithuania	81.1	78.5	75.8	70.8	74.5	79.3	76.67	
Poland	80.3	82.3	80.8	78.1	78.1	79.1	79.78	
Romania	69.7	72.5	75	73.3	74.4	74.3	73.20	
Slovakia	76.7	76.9	78.7	78.2	81.6	83.5	79.27	
Slovenia	78.9	79.5	78.6	76	80.5	81.2	79.12	
Malta	80	79.8	82.7	78.1	80.1	80.5	80.20	
Cyprus	84.7	85	85.7	82.9	87.6	85.7	85.27	

## 2. Source code of STATA

### Part 1, Test with CPI score

```
clear all
cd "C:\Jayden\S\Thesis\Final"
use DATA1130.dta
sum
generate lny=ln(y)
generate lngdps=ln(gdps)
generate lngdpt=ln(gdpt)
generate lndistance=ln(distance)
generate lncorr1=ln(corr1)
generate lnfis=ln(fis)
generate lnmon=ln(mon)
generate lntrade=ln(trade)
reg lny lngdps lngdpt lndistance lncorr1 lnfis lnmon lntrade
```

### Part 2, Test with WGI-CC score

```
clear all
cd "C:\Jayden\S\Thesis\Final"
use data1204.dta
sum y gdps gdpt distance corr2 fis mon trade
generate lny=ln(y)
generate lngdps=ln(gdps)
generate lngdpt=ln(gdpt)
generate lndistance=ln(distance)
generate lnfis=ln(fis)
generate lnmon=ln(mon)
```

```
generate Intrade=ln(trade)
```

```
generate Incorr2=ln(1+corr2)
```

```
reg lny lngdps lngdpt Indistance Incorr2 Infis Inmon Intrade
```