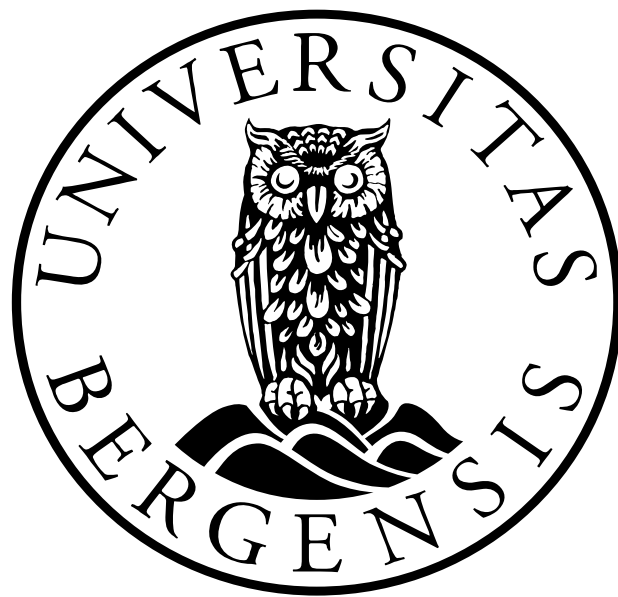


# Foreign Direct Investment and Corruption

*An econometric analysis of the multidimensional effects  
of corruption upon FDI inflow*

Vegard L. Kolnes



Master's thesis in Comparative Politics  
University of Bergen

Spring 2016

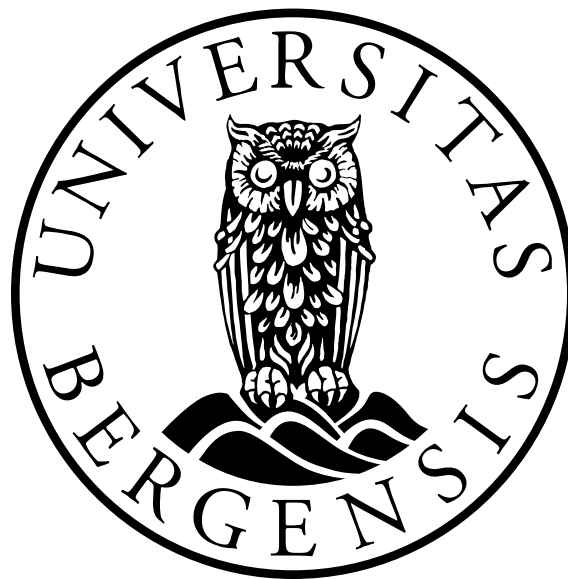
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# Abstract

The goal of this thesis is to estimate the effect of corruption upon the levels of FDI inflow and it poses the following research question: What effect does corruption have upon the level of foreign direct investment inflow to a country? Moreover, do internal types of corruption (e.g. bureaucratic corruption), and external contexts (e.g. level of development) affect the manner in which corruption affects foreign direct investment inflow to a country?

The thesis attempts to clear up a contention in the literature in which the effect of corruption upon FDI inflow is contested. It does this in two ways. First, proposing a theoretical framework to understand the effects corruption can have by fusing together elements from political risk theory and the OLI-paradigm. Second, using a relatively unused econometric method, which allows one to use a random effects model to distinguish between the effects which key independent variables have: (1) across time “within” countries and (2) “between” countries. Panel data from 1995 – 2012 are employed with a global coverage. The dataset is compiled from three different original datasets.

The findings of the thesis suggests that the effect of corruption is on average negative for FDI inflow. However, the thesis also finds that the effect of corruption is very dependent on context. In some contexts, corruption is found to have a positive effect on FDI inflow in this thesis. Unfortunately, the data for different types of corruption are not good enough to perform reliable estimations. The results show in a clear manner that the contention in the field is due to systematic differences produced by different estimation techniques, and an overly simplified view of what corruption is. The suggested theoretical framework is able to explain the results and incorporate the different findings of the literature and this thesis by focusing on corruption as a multidimensional phenomenon.



# Acknowledgements

First, I want to thank my two supervisors, Michael Tatham and Michael Alvarez. Michael Tatham proved to be an expert in asking the right and critical questions concerning what I was interested in, and whether I was actually looking at the right things. Without that feedback, the thesis would have been aimless. Michael Alvarez gallantly stepped in when Michael Tatham went on his paternity leave. However, Alvarez has provided feedback and invaluable input throughout the entire process alongside Tatham. In addition, reading through an extra entire thesis is no small thing, and to do so without any formal obligation is extremely appreciated. I am in your debt. Without the two of you, this would have been 100 pages of deluded rambling.

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# Abbreviations (by appearance)

FDI – Foreign Direct Investment

MNC – Multinational Corporation

UNCTAD – United Nations Conference on Trade and Development

IMF – International Monetary Fund

OECD – Organization for Economic Co-operation and Development

UN – United Nations

OLI – Ownership, Location and Internalization

GDP – Gross Domestic Product

CPI – Corruption Perceptions Index

The US – The United States of America

GMM – Generalized Method of Moments

OLS – Ordinary Least Squares

FE – Fixed Effects

RE – Random Effects

QoG – Quality of Government

IPD – International Profiles Database

WGI – Worldwide Governance Indicators

WDI – World Development Indicators

HDI – Human Development Index

CoC – Control of Corruption

GCB – Global Corruption Barometer

UNDP – United Nations Development Programme

GEE – Generalized estimating equations

BLUE – Best Linear Unbiased Estimator

IID – Identically and independently distributed

AR 1 – Autoregressive 1

VIF – Variance inflation factor

GLS – Generalized least squares

W – Within effect

B – Between effect

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# 1.0. Introduction

## 1.1. Research question

*“What effect does corruption have upon the level of foreign direct investment inflow to a country? Moreover, do internal types of corruption (e.g. bureaucratic corruption), and external contexts (e.g. level of development) affect the manner in which corruption affects foreign direct investment inflow to a country?”<sup>1</sup>*

The research question above is the focus for this thesis. As such, the thesis focuses on two variables, foreign direct investment (FDI) and corruption. It also goes one step further, focusing on different *types* of corruption and different *contexts* for corruption, such as country characteristics. It is motivated by two factors, one theoretical and one empirical. The relationship between corruption and foreign direct investment has been studied closely, and there is a large literature on the subject. However, there exists two contradicting camps of understanding amongst scholars. One is the sand camp. They argue that corruption works like sand in machinery, because it increases the costs of an investment through several factors, thus corruption has a negative effect on foreign direct investment.<sup>2</sup> The other is the grease camp. They argue that corruption can work like grease in the machinery, because it can create several benefits and increase the efficiency of market processes. Thus, corruption has a positive effect on foreign direct investment (Cuervo-Cazurra 2008, 13). Several researchers also find a non-significant relationship in econometric analyses. This contention in the literature creates an interesting puzzle, why are there two camps? What causes them to find different answers to the same question? The second motivation is an empirical one. The majority of the literature on foreign direct investment and corruption find support for the sand logic. The official stance of multinational corporations (MNCs) is also null-tolerance of corruption. As such, one would expect countries with high corruption to receive less foreign direct investment. However, with a simple search through the data available and economic news, one can observe that highly corrupt states such as China, Indonesia, Angola, Mozambique and Tanzania, to mention a few, receive very large sums of foreign direct investment (UNCTAD 2014). In addition the inflow

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<sup>1</sup> According to Wendt, these are essentially constitutive questions, and cannot hope to provide answers in terms of causality (Wendt 1998). Indeed, I argue that my results cannot prove causality, but correlations and associations. Theory and framework will be used to discuss possible causalities.

<sup>2</sup> For a detailed walkthrough of the sand and grease camps, see chapter two.

of foreign direct investment continues to increase in magnitude even though the levels of corruption, as measured by several organizations, does not change, or even change for the worse (Transparency International 2016). This is also puzzling, and very interesting.

After studying the literature on foreign direct investment, corruption and foreign direct investment and corruption separately, several potential caveats presents themselves in regards to previous scholarly work on the theme. First, the conceptualization and measurement of corruption is not discussed or critically analyzed. Second, much of the early econometric work employs cross-sectional data, which has its limitations, and these results are rarely questioned in regards to these limitations. Thirdly, most relatively new econometric studies employ the fixed effects technique, which is completely valid, as long as it is reflected in your research question and theoretical interest. For the large majority of the published articles on this theme, it is not.

All these factors motivated the choice of theme and the research question presented at the start of this section. Further, the relevance of the theme in terms of the importance for society, nations, the world, was an important factor in deciding on the theme of this thesis.

## **1.2. Relevance of the theme**

The magnitude of foreign direct investment has increased very much during the last two decades. In 1990, the global size of FDI was at 172 billion dollars. In 2005, it had increased to a stunning 1060 billion dollars, and by 2013, the total was at an overwhelming 2202 billion dollars (UNCTAD 2014). Multinational corporations, the entities which conduct foreign direct investment, constitute over one quarter of total global output (Dunning and Lundan 2008, 15). Thus, MNCs play a critical role in the global economy, and therefore, a critical role in the economy of nations. While some of the effects of FDI is somewhat contested in the literature, a large majority finds that it has a very positive effect on economic growth. As all governments are interested in furthering their nation's development because this increases the living standards of people and/or the elites, securing FDI should be an important political strategy. Several of the determinants of foreign direct investment are influenced by political-decision making, such as locational advantages and the investment climate. One potentially important factor for the investment climate or locational advantages of a country is corruption.

Corruption is viewed as the number one enemy of development, and particularly so for developing countries. However, it is not just a developing country issue. In 2013, about 50 people in the Spanish government were convicted in a massive corruption scandal. In 2003,

several political leaders in France were involved in a corruption scandal with the oil company Elf. In addition, in 2016, the Vimpelcom (with Telenor) case is still ongoing in Norway, and Statoil is once again in trouble for large payments that can be construed as corruption in Angola. Lastly, the recent panama papers clearly show that systematic corruption and attempts to hide it is also very common in highly developed countries. (Aase 2016; Henley 2003; Kagge 2015; Kassam 2014; ICIJ 2016). These are just a very few of many corruption cases with developed countries involved. Further, corruption is stated to cost as much as 5 percent of global GDP every year (Heywood, 2015, p. 1). It creates deviations in investments, undercuts political institutions, and increases inequality, poverty and in general is argued to decrease economic growth (Søreide, 2014, foreword).

While corruption does seem as an important and logical determinant for foreign direct investment however, as stated, its effect is contested. Corruption is also a phenomenon that is affected by political decision-making. Whether corruption is high or low, criminalized or not is up to the politicians in a country. Therefore, I see this theme as highly relevant for political science. The findings on the relationship between corruption and FDI has large implications for what policies should be undertaken in regards to attracting FDI, and FDI is important for development.

### **1.3. Contribution of the thesis**

This thesis attempts to make several important contributions, both for theory on the field of foreign direct investment and corruption, methods in social science, and political policies.

The theoretical contribution is partly the added focus on the importance of the conceptualization of corruption, and viewing corruption as a multidimensional concept. Much literature view corruption as a single dimensional phenomena, while others argue that corruption comes in different types and manifests itself in many different acts (Søreide 2014). This thesis attempts to conceptualize corruption as a very broad phenomenon, and further that corruption can be thought of as different types, which will have consequences for the type of effect we can expect upon multinational corporations. Further, drawing on political risk theory the thesis also suggests a framework for understanding the effects of corruption on multinational corporations. It is argued that corruption can produce mainly three different effects: risk, uncertainty, and potential benefits. The relative size these effects have in regards to each other will define what sort of effect corruption has on FDI. The thesis also emphasizes the importance of contextual factors for the effect of corruption. The thesis finds that the data on different types of corruption

is of very low quality in terms of coverage. As such, the thesis cannot confirm or disprove that different types of corruption matters for the effect on FDI. The context of corruption however is found to be very important for the effect of corruption on FDI. The institutional quality of a country and the level of development is found to be important, and the effect of corruption is also found to have changed over time.

In order to estimate the effect corruption has on FDI, this thesis employs panel data and regression analysis. It is argued that the type of estimation used is very important for the type of results one will get, and that it is vital to be aware of exactly what the different estimations estimate, and what implications this has for interpretations of the results, and for the research question. This thesis uses a relatively unused transformation to create two components for the variable of theoretical interest, a within component and a between component.<sup>3</sup> This will allow me to estimate the entire effect corruption has on FDI inflow in one estimation, instead of only the within effect with fixed effects estimation, the net effect of a random effects estimation, or the between effect of a between estimation, and it will take care of a major econometric issue, unobserved heterogeneity. This estimation method will thus use the entire variance spectrum of the variables of interest, while at the same time producing, to a high degree, efficient and unbiased coefficients. The thesis also controls for a wide variety of econometric caveats that are not always considered in the published articles on the field. In order to maximize the point of different estimations, the consequences for results and interpretation, and the importance of knowing what the different estimations estimate and make it as clear as possible, several estimations and estimation techniques are used. These are presented in a structured, simple and pedagogical manner, so that the arguments and points are directly illustrated with coefficients for the reader to see. The thesis finds that indeed, the estimation technique chosen has large implications for the results produced, and that these implications are very systematic across different models.

In terms of contribution for policies, the thesis argues that if the effect of corruption is changing across different types of corruption and different contexts, then the policies recommended against corruption needs to be nuanced. The thesis finds that corruption is indeed a multidimensional phenomenon, which is highly dependent on the context. As such, simple one size fits all policies against corruption is not to be recommended. Depending on the institutional

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<sup>3</sup> The within component consists of variance within a group (country) over time, essentially the longitudinal variance. The between component consists of the variance that is specific to the group (country) and different between the different groups, essentially the cross-sectional variance.



context of the country and the level of development, different types of policies should be recommended.

To summarize then, the thesis contributes with an attempt to clear up a contention in the literature by adding an *original theoretical* contribution. It will contribute in the form of a relatively unused econometric technique in social science, within and between estimation with a clear presentation of what it does and how the results can be interpreted. It will produce results that contribute to the types of policies academics should recommend to decision-makers in regards to foreign direct investment. Lastly, it contributes in the form of a summary of a very large and relatively scattered literature.

#### **1.4. Structure of the thesis**

This thesis is structured into seven chapters. Chapter two will define and present framework for foreign direct investment and corruption. It will also present the framework used in this thesis to understand and explain the effects of corruption on foreign direct investment.

Chapter three will present the literature on the field of FDI and corruption through a literature review, and will also simultaneously produce hypotheses based on the literature and the research question of this thesis.

Chapter four will present the data of the thesis. It will present and discuss the choice of measurement for the dependent variable, FDI inflow. It will present the choice of all independent variables of theoretical interest, and discuss the choice of their measurement. It will also present the choice of control variables and their measurement. Finally, it will present some descriptive statistics for the dataset and discuss the country coverage.

Chapter five will present the method and methodology. The econometric assumptions of linear regression will be presented and discussed with a focus on any potential flaws my data might have. Different estimations for estimating panel data will be presented and discussed, namely fixed and random effects. Then the within and between transformation will be presented. The method of multiplicative interactions will also be discussed, as several of the hypotheses in the thesis have a conditional nature. Finally, the decisions made in terms of fixes and solutions will be presented.

Chapter six will present, analyze and discuss the findings of the hypotheses specific models. The theoretical implications will be discussed throughout the chapter, and summarized at the end, with the consequences for policies.

Chapter seven will conclude the thesis, directly answer the research question and point out potential areas for further research.

## **2.0. Setting the theoretical framework for FDI and corruption**

The function of this chapter is to introduce the reader to the theoretical frameworks used to understand foreign direct investment and multinational corporations. It will also define corruption and frame it within the theoretical framework of FDI and political risk. Much literature on both FDI and corruption will be reviewed in this chapter, but this is literature that is in general foundational for the thesis and the framework employed, *not* a review of literature that pertains directly to my research question.<sup>4</sup> Finally, it proposes a descriptive and causal model of how corruption could affect FDI.

### **2.1. Foreign Direct Investment**

FDI is a type of investment that MNC's (publicly or privately owned) can do in foreign countries (Dunning and Lundan 2008, 7). It is a mode of entry into another country from the one that the MNC is located and operates from. When Coca Cola invests directly in Guatemala to create a factory, or when Statoil invests enough to create a significant ownership share in a gas company in Mozambique, it is FDI. What is essential is that the corporation maintains a significant degree of control in the asset it invests in, and that the investment has a long-term horizon. In contrast, there is, for example, volatile stock market investments, which have short-term profit horizons or exports, which requires no investment into the receiving country. Institutions such as the IMF, OECD, UN and the World Bank have quantified FDI as an ownership stake of 10 percent or more, and this is usually the operationalized measure criteria of FDI (Almfraji and Almsafir 2014; Dunning and Lundan 2008; Teixeira and Guimarães 2015). Historically FDI has been a very small part of the economy, however with increasing globalization, massive improvements in communication, transport and liberalization of capital, FDI has grown extremely fast, and is now a key component of both the international economy, individual nation-economies, and particularly of developing-economies. In 1985, the net inflow of FDI in the world was at 51 billion dollars, in 1995, it was at 331 billion dollars, in 2005, 1062 billion dollars, and in 2013, it was at a staggering 2202 billion dollars (Chakrabarti 2001; Dunning and Lundan 2008; UNCTAD 2014). The reason for this massive increase is, as stated, increasing globalization with technology, communication, the liberalization of capital and the

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<sup>4</sup> This will be done in chapter 3.

economic field after the fall of the Bretton Woods system in the early 70s, and FDI's unique stability as opposed to other forms of investment and capital flows (with its long term horizon)(Chakrabarti 2001, 89).

One important distinction when talking about FDI is flows and stock. FDI stock is the accumulated and current size of FDI in a country, and it includes reinvested earnings and intracompany loans, not just the capital investment itself (equity capital). This must not be confused with FDI inflows, which is the level of FDI that comes into a country from year to year (the capital investment). As such, FDI inflow is in its own way a stock variable of FDI inflow for the entire country year, making the distinction rather confusing. FDI inflow is *not* a change variable of FDI stock (Wacker 2013, 5). It is simply the total amount of FDI inflow to the country for the year, and as such, it can be negative and positive. For this thesis, I employ *FDI inflow* as the dependent variable (see chapter 4, section 4.1).

### **2.1.1. Foreign direct investment and development**

The aforementioned effects FDI can have on a host-country is dependent on whether the investment is horizontal or vertical, plus some host-country characteristics.<sup>5</sup> Navaretti and Venables argue that the effects come from three primary channels. The product markets, factor market and spillover effects (Navaretti and Venables 2006). Product market effects happen particularly from horizontal FDI. The products that have previously been exported/imported are now manufactured in the host-country. This reduces import and increases host-country production. This can have either a positive or a negative effect, depending on host-country characteristics. Factor market effects can happen in both the capital and labor market. FDI can increase the amount of capital that is available for investment, thus increasing aggregated supply. In the labor market however, the logic is not as straightforward. On one hand, it can increase the demand for labor, increasing employment. On the other hand, it can create demand for a skill level and composition that differs from the existing one in the host-country, decreasing employment. The last channel, and arguably the most important one, is technological spillovers in the form of technology transfer in the local market, the acquisition of competences in labor, and learning from markets. In addition, FDI can affect secondary parties such as sub-contractors of supplies of necessary goods in raising their standards and efficiency, thus affecting the entire relevant sector of the country (Navaretti and Venables

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<sup>5</sup> Vertical FDI is when a company breaks up its production chain in different countries. For example moving their production facilities to a developing country. Horizontal FDI is when a company duplicates itself (the entire product chain) in another country (Navaretti and Venables 2006, 26–28; Protsenko 2004)

2006). Considering that FDI affects countries through several channels, and that the effects are dependent on host-country characteristics, it should come as no surprise that FDI's effect on economic growth and development is somewhat contested. However, the majority of the literature finds a strong, positive effect of FDI on economic growth (Almfraji and Almsafir 2014)(Also, see table 1)

**Table 1, FDI effects on Economic growth**

<b>Effect</b>	<b>Sources</b>
<b>Significant positive</b>	Manuchebr and Ericsson (2001)
	Nair-Reichert and Weinhold (2001)
	Choe (2003)
	Chowdhury and Mavrotas (2006)
	Shaik (2010)
	Griffiths and Sapsford (2004)
	Chakraborty and Nunnenkamp (2006)
	Al-Iriani (2007)
	Faras and Ghali (2009)
	Umoh, Jacob and Chuku (2012)
<b>Weak positive</b>	De Mello (1999)
<b>Null</b>	Sarkar (2007)
<b>Negative</b>	Shaik (2010) – For the primary sector
	Khaliq and Noy (2007)

(Almfraji and Almsafir 2014, 207)

### **2.1.2. Determinants of foreign direct investment**

The list of previous studies on the determinants of FDI is long, and cannot be accounted for in its entirety in this thesis. I will instead present here some of the most important findings and variables that have been found to determine FDI flows that I will use as control variables. This is by no means an exhaustive exercise, but a brief introduction to the previous studies.

Chakrabarti criticized previous literature on FDI for being unwieldy, and without meaningful, conscious and constant use of control variables. He went on to test the most used variables in the literature in a sensitivity analysis. He found several variables to be of consequent importance. Among these were: Market size, labor cost, growth rate, openness, trade deficit,

and tax levels (Chakrabarti 2001). However, with the exception of market size, most variables were susceptible to small alterations in the conditioning of the data set. An important argument in his summary of the literature is the fact that there are several articles in conflict on the same variables, thus the effect of, for example, trade deficit is contested (See table 2). Research on FDI determinants after Chakrabarti’s review have continued to use variables such as exchange rate/inflation effects (volatile vs stable), taxes, political institutions, trade protection and trade effects (Blonigen 2005). Blonigen also argues that the reason earlier literature reviews found such instability in the established determinants were because panel data was scarce, thus allowing small variations to have large impacts. Thus, the variables previously found to be “unstable” might be determinants after all.

**Table 2, Determinants of FDI**

<b>Potential determinants</b>	<b>Positive</b>	<b>Negative</b>	<b>Insignificant</b>
<b>Market Size:</b>	Bandera & White (1968) Schmitz & Bieri (1975) Swedenborg (1979) Lunn (1980) Dunning (1980) Root & Ahmed (1979) Kravis & Lipsey (1982) Nigh (1985) Schneider & Frey (1985) Culem (1988) Papanastassiou & Pearce (1990) Wheeler & Mody (1992) Sader (1993) Tsai (1994) Shamsuddin (1994) Billington (1999) Pistoresi (2000)		
<b>Labor Cost</b>	Caves (1974) Swedenborg (1979) Nankani (1979) Wheeler & Mody (1992)	Goldsbrough (1979) Saunders (1982) Flamm (1984) Schneider & Frey (1985) Culem (1988) Shamsuddin (1994) Pistoresi (2000)	Owen (1982) Gupta (1983) Lucas (1990) Rolfe and White (1991) Sader (1993) Tsai (1994)

<b>Trade Barrier</b>	Schmitz & Bieri (1972) Lunn (1980)	Culem (1988)	Beurdeau (1986) Blonigen & Feenstra (1996)
<b>Growth Rate</b>	Bandera & White (1968) Lunn (1980) Schneider & Frey (1985) Culem (1988) Billington (1999)		Nigh (1988) Tsai (1994)
<b>Openness</b>	Kravis & Lipsey (1982) Culem (1988) Edwards (1990) Pistorresi (2000)		Schmitz & Bieri (1972) Wheeler & Mody (1992)
<b>Trade Deficit</b>	Culem (1988) Tsai (1994) Shamsuddin (1994)	Torissi (1985) Schneider & Frey (1985) Hein (1992) Dollar (1992) Lucas (1993) Pistorresi (2000)	
<b>Exchange Rate</b>	Edwards (1990)	Caves (1988) Contractor (1990) Froot & Stein (1991) Blonigen (1995) Blonigen & Feenstra (1996)	Calderon-Rossell (1985) Sader (1991) Blonigen (1997) Tuman and Emmert (1999)
<b>Tax</b>	Swenson (1994)	Hartman (1984) Grubert and Mutti (1991) Hines & Rice (1994) Loree & Guisinger (1995) Guisinger (1995) Cassou (1997) Kemsley (1998) Barrel and Pain (1998) Billington (1999)	Wheeler & Mody (1992) Jackson & Markowski (1995) Yulin & Reed (1995) Porcano & Price (1996)

(Chakrabarti 2001, 91–92)

By studying the previous literature, it is clear that the most important determinants in the FDI literature is the size of the potential market, the costs associated with investing and hiring, and the stability and effectiveness of the government and the national economy. This makes both intuitive and logical sense, as all these factors can directly affect the profit margin and risk of an investment, and according to the laws of capitalism, all investments must maximize profit,

and at the very least be projected to be profitable.<sup>6</sup> The variables I chose to represent these factors will be fleshed out in detail in chapter 4.

### **2.1.3. The theories and frameworks of FDI**

The different theories on FDI have primarily come from previous research on multinational corporations in developed countries. This is natural, as these were the first to internationalize. There are primarily three different theories for understanding and framing FDI; the production cycle theory, the internationalization theory, and the framework employed in this thesis, the eclectic or Ownership, Location and Internalization (OLI) paradigm. These theories, or frameworks, are used to understand the decision-making process of MNCs. As such, my proposed causal model of corruption is subject to this framework, as illustrated by figure one and two.<sup>7</sup>

The production cycle theory explains FDI decisions out from the production of new products, and how it then is beneficial for MNCs to engage in FDI. It suggests four stages in a production cycle: innovation, growth, maturity and decline. While this theory can explain certain types of investments during the 50s and 60s, it is too specific to be employed as a general theory of FDI, because it is unable to explain the investment trends in and after the 70s. Particularly in modern times, companies do not necessarily follow the production cycles four stages, and so the theory no longer fits the empirical reality (Denisia 2010).

The internalization theory has become the core for understanding FDI. It is the activity in which MNC's internalizes the global operations with a common governance structure and ownership. Hymer argues that MNC's will engage in FDI only if they have some advantage over the local competition (which their governance structure and competences could be, which by internalization will be the same no matter where in the world the company is placed), so that they can profit from the investment (Denisia 2010, 105). An example could be Coca Cola investing in a foreign country to compete with some unknown brand of Cola soda. Their advantage then being their company structure and brand. The governance structure of the company would be the same in the US and in, say, South Africa. The logic of this theory is

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<sup>6</sup> For more details on determinants and control variables, see chapter 4, section 4.3.

<sup>7</sup> All of the elements discussed on corruption, such as potential benefits, risk and uncertainty, is subject to the cost – benefit analysis that takes place in multinational corporations, which the OLI paradigm attempts to describe and explain. So, if corruption produces very high risk relative to the potential benefits, the effect of corruption would be to increase the cost factor in the multinational corporations decision making process, making it less likely to invest.



adopted into the eclectic paradigm and not rejected, which is currently the most used framework for understanding FDI today.

In 1977 John Dunning proposed the OLI framework, which is a general framework for understanding all foreign direct investment by drawing on both macroeconomic and microeconomic theory (Denisia 2010; Dunning 2001). Dunning argues that there are three overarching competitive advantages, which spurs three different motives for FDI. The first is the ownership-specific advantages. This can be anything from the amount of physical capital, technological patents, and management strategies and/or staff. These advantages are strictly firm specific. The second one is the location specific advantages. These characteristics of a potential host-nation makes it more or less attractive for FDI. This is the advantage in which the focus of this thesis is placed, and most of the previous literature on FDI determinants is also focused here. The last advantage is the internalization advantages, as briefly discussed above. Internalization advantages influence how a company decides to do business in a foreign country. FDI is not the only mode of entry available; there is export, licensing or joint ventures, which all have their own pros and cons. If a MNC sees a large foreign market, which they can make a profit on, but do not see it as worth the risk of directly investing, or that their company structure might be less efficient there, they might opt for exporting or maybe a joint venture instead.

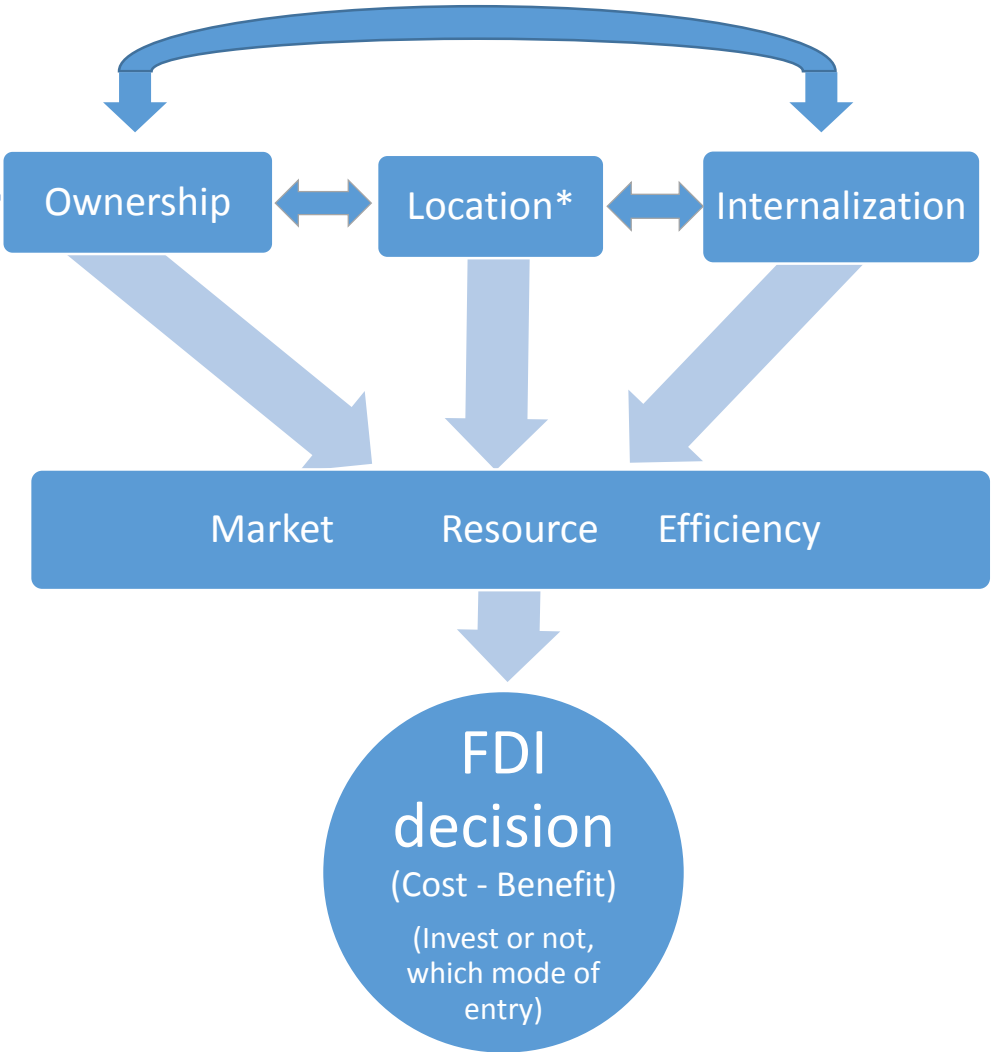
These advantages lead to three motives for FDI. The first is market seeking. MNC's will be attracted to a foreign location because of the size of the host-nation market, the potential growth, and/or the investment climate. The second motive is resource seeking. Resource seeking is further divided into natural resource-seeking, strategic asset seeking and technology seeking. The last is efficiency seeking. This motive is created when a MNC can lower the costs of its operations and production by moving to another country. This motive is more likely to spur vertical FDI, than horizontal FDI.<sup>8</sup> It is also natural to assume that these three motives are not separated, but can work in conjunction to either increase or decrease the probability of a FDI decision in a given host-country. Navaretti and Venables, amongst others, have found that the theoretical predictions of the OLI framework is usually consistent with the empirical evidence of FDI (Dunning 2001; Dunning and Lundan 2008) . I therefore use this framework for understanding the behavior of FDI, and subject my proposed theoretical framework of

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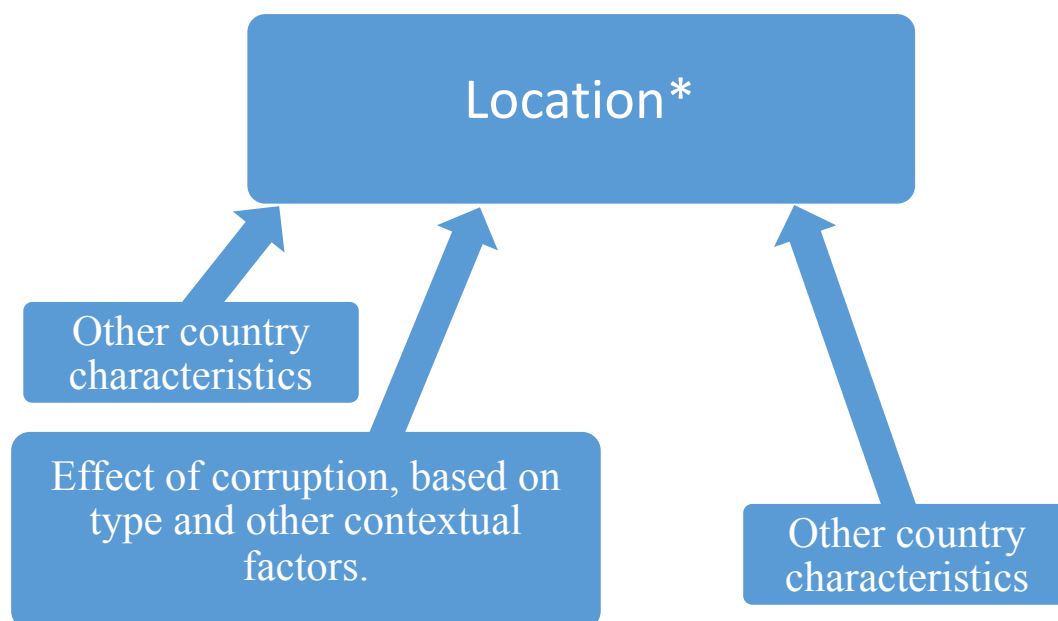
<sup>8</sup> If the prime motivation is to cut costs, not to explore a new market or get access to some resource, there is essentially no need to duplicate the entire corporation in a new country. You could simply build for example the factories producing the product in the new country (a part of the value chain).

corruption and its effects and proposed causal model under the eclectic paradigm (see figure 1 and 2). This means, as touched upon previously, that the proposed model for corruption works within the locational factors in the OLI-framework, as such, it is marked with a star in figure 1.

*Figure 1: The OLI paradigm.*



*Figure 2: Effects on location advantage*



## **2.2. Corruption, what is it and how do we define it?**

Corruption has received more and more attention during the last decades. In 2011, “World Speaks” announced that corruption was more discussed than poverty, unemployment and security issues. This is partially attributed to the increasing awareness that corruption is extremely costly, not just in economic terms in which it is estimated to cost as much as 5% of the world GDP annually, but also societal in distorting the distribution of resources, causing more inequality, poverty and misery on a large scale (Heywood 2015b, 1). In the academic circles, it is obvious that corruption has received increased focus. There has been a sharp increase in published articles concerning corruption during the last 25 years, with a cumulative total of over 6000 as of 2010 (Heywood 2015b, 1). However, even though it has received much attention, scholars still disagree as to the basic definitions of corruption, and as such, it is essentially a contested concept. Conceptualization of corruption is thus important for this thesis in terms of validity.

### **2.2.1. Defining corruption**

Corruption is a complex concept and phenomenon, which has had many different meanings over time and in different parts and cultures of the world. This is also what makes it such a

difficult phenomenon to agree on and measure in social science, and it is to this day essentially a contested concept (Kurer 2015, 30). To attain as much validity for the measurement of a concept as possible, Adcock and Collier presents a ladder of abstraction in which concepts can be divided into different levels (Adcock and Collier 2001). The first and most general of which is the background concept. What are the broad constellations and meanings behind the concept of corruption? Historically, corruption in the west has been tied to a conception of decay or flaw. Something that does not fulfill its intended traits or function, something that is dissolving from that which constitutes it. These broad understandings have been deemed as corruption. Within political science then, the term is associated to political institutions, decision-makers and processes that does not fulfill their function and/or traits (Philp 2015, 20). This makes a definition of political corruption (hereof: corruption) dependent on our understanding of politics and its functions. In this process, it is easy to be biased by political systems and orders that are not necessarily universally the same in a globalizing world, i.e. democracy/autocracy and cultural norms and values. I will argue in this thesis, for example, that one can have relatively solid political institutions and corruption at the same time. Corruption is not *necessarily* only a characteristic of poor institutions. Suffice to say, that all actions or perception of situations where someone uses their position, knowledge and/or contacts to achieve a benefit that goes against social norms or the law is associated with corruption, for understanding the background concept.

Following Adcock and Colliers' ladder of abstraction, the next step is to define the systematized concept. Before entering into a detailed discussion on conceptualization, one must define the framework for concepts that one employs. Goertz argues that there are mainly two groups when it comes to concepts. The necessary and sufficient group and the family resemblance group. The necessary and sufficient concepts consist of certain indicators, which must *all* be fulfilled for the concept to be relevant. Family resemblance concepts also has certain indicators, however *not all* need to be present for the concept to be appropriately used (Goertz, 2005) . A classic example of this is the concept of democracy, which has been defined under both groups. Alvarez et. al used a necessary and sufficient framework to define democracy as a regime. Their definition consisted of the following indicators: The chief executive must be chosen by popular election or by a body that was itself popularly elected (offices) and an alternation in power under electoral rules identical to the ones that brought the incumbent to office must have taken place (contestation) (Alvarez et al. 1996). If one of the indicators is missing, it is not a democracy. Others employ the family resemblance group in which a democracy qualitatively

becomes better when adding higher scores on indicators of political rights, civil rights, political freedom and degree of political contestation, and not excluded as democracies for low or zero score on some of the indicators (Goertz 2005, 9). Because corruption is such a diffuse concept, and materializes in many different ways, I will employ a family resemblance understanding of the concept.

One of the earliest to be referenced on a definition of corruption in the systematized sense was Nye. Collier and Adcock argued that a systematized concept is characterized by a specific formulation and definition, making it much clearer and narrower than the background concept. Nye employed a wide definition, which several others have tweaked and used as a template for later definitions (Kurer 2015).

“Corruption is behavior which deviates from the normal duties of a public role because of private-regarding (personal, close family, private clique) pecuniary or status gains; or violates rules against certain types of private-regarding influence”(Nye 1967, 417)

Several later definitions have tried to specify the behavior that deviates from the normal duties of a public role, because it is so ambiguous. Important to note is that already the private – private relation is discarded. For the purpose of this thesis, and in terms of available data, I only focus on the public – private dimension of corruption.<sup>9</sup> Scott provides three approaches to interpret Nye’s ambiguity: legal norms, public interest and public opinion (Scott 1972, 3).

- *Legal definition*: “Prohibited by laws established by the government” (Kurer 2015, 34).
- *Public-interest definition*: “If an act is harmful to the public interest, it is corrupt even if it is legal; if it is beneficial to the public, it is not corrupt even if it violates the law” (Gardiner 1993, 32)
- *Public opinion*: “.. the public is asked whether it considers an act corrupt, and the public’s judgement is used as the definitional criterion”(Kurer 2015, 34).

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<sup>9</sup> Note that there is a large debate as to whether private – private corruption should be included. That is corruption that takes place entirely in the private sphere, and does not include the public sector or government. Without entering into this discussion here (due to space limitations), suffice to say that because it is the norm in the academic literature to exclude it, and because data for this dimension is largely unavailable, I exclude it as well. To include it would require a different systematized concept (deviating from existing literature), following that, different indicators and operationalizations, and thus, different measurements and data that I simply do not have because it is not available and very little of it exists. However, corruption is measured by perceptions, and peoples perception on corruption could very well be affected by corruption scandals in the private – private dimension, thus spilling over into the measurement of corruption as it is understood in this thesis. This is quite the quagmire, and I cannot solve it in this thesis.

There are obvious advantages to the legal definition. It makes the edges of the concept clear, it is easy to operationalize the concept, and counting the acts of corruption becomes very straightforward. However, there are clear issues with this. Rules change over time and space. Which rules should then be applied? In addition, acts that are not strictly illegal are not corrupt. Bribery, nepotism and collusion can easily be made legal in a nation, thus making it non-corrupt, but most of us would see this as corrupt. Most of the actions in the banking and finance sector in light of the financial crisis of 2007 were not illegal per definition, but would be viewed as a corrupt situation by most.<sup>10</sup>

Where the legal definition fails to capture what most people associate with corruption the public-interest definition does. The financial crisis example would now be encompassed by the definition of corruption, as would any bribery, nepotism or collusion, even though it was strictly speaking legal. This definition however also has its limitations. Firstly, it presupposes that the social consequence of corruption is negative, which is highly problematic given that several articles and scholars find or argue that there are positive effects of corruption. It also requires a universal definition of the public interest, which is by nature heterogeneous and contentious. This is why we have politics in the first place.

The public opinion definition, while from a democratic value standpoint might be attractive, is argued to be far too volatile and unstable to be used as a definition. The concept of corruption would change, quickly, based on new inputs to and outputs from the population (Kurer 2015, 34–35). The paradox then, is that most aggregated measures of corruption are based on the public opinion from surveys and interviews. However, to the defense of the aggregated measures newer research has actually found that the background concept of corruption carries much consensus globally.<sup>11</sup> The world values survey finds that nearly all the countries in their sample condemn bribery, with very little variation. The Afrobarometer finds that nearly all the Sub-Saharan nations view both bureaucratic corruption and nepotism as deplorable and unjustifiable acts (Kurer 2015, 37–38).

In this thesis, I will employ the general definition of Nye on corruption as the systematized concept in a family resemblance understanding as used by the major organizations in the world:

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<sup>10</sup> In addition, after the government bailout it is a more fitting example of corruption in this thesis, as the public involvement is much clearer. .

<sup>11</sup> This could be a relative inertia effect though. Who knows if this consensus will hold over the next 30, 40, 50 years? The issue with a human lifespan and academia is that we see things in our lifetime as constants, when indeed it is simply a passing moment in the grand scale of things.

*Corruption is the misuse of public office for private gain.*<sup>12</sup> Employing either the legal, public interest or public opinion definitions as the systematized concept alone could force the thesis to focus on a limited geographical and longitudinal area, increasing the intention of the concept at the cost of extension. A too intensive definition can cause the relation between the dependent variable and the independent variable to break down all together (Goertz 2005, chap. 3). This thesis is global in its statistical approach, and aims to cover as much time as possible in determining the effect corruption has on foreign direct investment. Using Nye's definition, written as the World Bank, Transparency International, OECD, the EU and the UN does, allows for all of them to be included, making the concept very extensive and broad.

As for the operationalization of corruption, following Adcock and Colliers conceptualization ladder (2001), the next step in conceptualizing is to list different indicators that is observable in the physical world, things we can actually measure. Note that as I have chosen to follow the family resemblance logic, it is enough for any one of the indicators to be positive for the concept of corruption to be applicable, as opposed to the necessary and sufficient logic. Indicators of corruption are then the acts of or the degree to which people perceive the acts of corruption. For example, indicators of corruption could be acts of collusion, acts of bribes, and acts of embezzlement. In the family resemblance logic, we would call something corrupt if only an act of bribe was observed or perceived to be happening, while no acts of collusion or embezzlement happened or were perceived to be happening, while we would not do so in the necessary and sufficient logic.

### **2.2.2. Acts and types of corruption**

Corruption manifests itself empirically in many different ways. Since the systematized concept is very broad and open, this is only natural. In many cases, corruption is often written and spoken of in very concrete ways, such as bribes required to gain access to certain services, or the nepotism involved in the hiring process in an institution, or the collusion between elite decision-makers and leaders in the private sector. The concept of corruption catches all these specific acts, because they all fit into the misuse of a public office for private gain, which we can see if we back trace the conceptualization ladder of Adcock and Collier.

Tina Søreide argues that corruption can take many forms. However, it usually has some resemblance towards extortion or collusion. The problem with most previous literature on

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<sup>12</sup> The World Bank, United Nations, OECD, European Union, Transparency International.

corruption, she argues, is the notion that corruption is a single dimensional phenomenon. When there are clearly many different forms of corruption, the results you get can depend on which act of corruption you chose to look at (Søreide 2014, 5). Based on previous literature one can summarize the following acts of corruption:<sup>13</sup>

**Table 3, Acts of corruption**

Act of corruption	Description
<b><i>Bribery</i></b>	The act of intentionally forcing someone to pay something extra, or being paid something extra for a service or product. This something can take the form of gifts, loans, rewards or other advantages. Bribes can be seen as both extortive and collusive.
<b><i>Embezzlement</i></b>	To use ones position to steal, misdirect or misappropriate funds or assets that one is entrusted with the control of.
<b><i>Fraud</i></b>	To intentionally deceive someone so as to get an illegitimate advantage, either economically, political or otherwise.
<b><i>Collusion</i></b>	To have two parties come to an illegitimate agreement to achieve personal benefits by use of public office or power, also including improper influence on the actions of one of the parties (such as top level decision-makers).
<b><i>Patronage, clientelism and nepotism</i></b>	To use ones position to gain systematic advantages by allocating resources to others or giving official positions to friends or relatives to further one’s own position or benefits.

(Søreide 2014, 2)

While corruption can manifest in many different ways or acts, I argue in this thesis that one can categorize corruption by type, which encompasses the different acts of corruption. Corruption can happen at the civil servant or institutional level, such as the bureaucracy, referred to as

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<sup>13</sup> This table is not exhaustive, but a summary of the most common acts of corruption. Note that it is not always clear if an act is corrupt in terms of the definitions of corruption, or simply criminal.



bureaucratic corruption. These are the types of situations where one can bribe to speed up a process, or gain the upper hand in a procurement process, or where it is necessary to bribe to get access to the service the bureaucracy provides. This type of corruption tends to be relatively systematic and predictable. To add to the scope of literature, this type of corruption is also very similar to what Karklins called low-level administrative corruption and self-serving asset stripping by officials (Karklins 2002, 24). Corruption can also happen amongst the elites, the elected officials or at the leadership of the political institutions, referred to as political corruption. This type of corruption happens in different settings. This could be the collusion between corporations and politicians, which not only corrupts a process in the system, but also creates a corrupt system in itself. Often, the potential gains are higher and so is the risk and uncertainty (Ackerman 1999, 27; Amundsen 1999, 3; Dahlstrom 2011, 5). Relative to the degree to which political corruption occurs, the third type of corruption suggested by Karklins is synonymous here as well (Karklins 2002, 27), which is state capture. State capture (a term used by many scholars) usually happens through political corruption, and warps the entire purpose of the state.

The two different types of corruption (political and bureaucratic) argued for in this thesis could have different causes, happen in different places, and most likely have different causal mechanisms (Goswami and Haider 2014, 242; Jakobsen 2012, 97). It is therefore not unnatural or illogical to assume that their effects are different as well, even though they are both part of the concept corruption. It is logical to assume that an investor would react differently to a country with a history of unpredictable and powerful political leaders, prone to bribery and collusion, than to a country that is known for systematic bribes in the bureaucracy. Political corruption potentially changes the entire system, while bureaucratic corruption, at most, bends the rules within the given system. This might be a factor for the theoretical dispute between the grease and sand logic in the matter of corruption and FDI.<sup>14</sup> For the purpose of this thesis then, I differentiate between two internal types of corruption, political corruption and bureaucratic corruption.<sup>15</sup>

One important issue to comment on here is that even though I argue for two different types of corruption, these two types of corruption often go hand in hand. If a country has corrupt political

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<sup>14</sup> The grease and sand theories of corruptions effect on FDI is explained in section 3.1.

<sup>15</sup> These types are by no means exhaustive, but they fit the data available for this thesis, and the theoretical framework I employ for corruption. Other types of corruption that have been researched are for example absolute and relative types of corruption and arbitrary and pervasive types of corruption, types by degree of corruption in the public sector (Cuervo-Cazurra 2008; Habib and Zurawicki 2002; Karklins 2002)).

leaders, the bureaucratic system is also often corrupt. If the bureaucratic system is corrupt, it is usually an indication that the higher levels are also corrupt, particularly if the corruption is systematic and over time. However, there are several cases where there are individual instances of bureaucratic and political corruption that does not imply that the “political elite”, the “entire bureaucracy”, or the entire system in the country is corrupt. An example could be Denmark, which is the highest scoring (non-corrupt) country in Transparency International’s Corruption Perception Index (CPI). There are several cases there of bureaucrats that have been caught red handed in corruption. I do not believe that the political leaders in Denmark are corrupt for that reason (and neither does Transparency International). In addition, individual political leaders have been caught in corruption, but I do not believe I can bribe the Danish bureaucracy for a building permit for that reason. The point remains though, that since these two types often go hand in hand, it will be difficult to measure any differences between them (this translates to multicollinearity). This is perhaps the biggest caveat of this thesis, and the degree to which I can say anything on this will come down to the quality of the data.

### **2.2.3. The contextual and conditional nature of corruption**

As is clear from the research question, this thesis is not only concerned with the internal dimensions of corruption, but also how the context might shape the effects corruption has. From the early theoretical works, which are the foundation for the grease and sand camps of the literature, it is obvious that the contextual factors are important. Huntington argues that corruption can have a positive effect for investment and economic growth, because it can in the absence of efficient institutions (context) work as an informal institution through which business can occur (Huntington 1968). Further, Leff argues that in countries that are known to be slow and inefficient in the bureaucracy (context), corruption can work as an efficiency increasing factor, thus increasing investment (Leff 1964). The entire framework of political risk consists of several factors, as will be described below, which can increase risk and uncertainty for investors when deciding on a foreign direct investment (Jakobsen, 2012, ch. 3). It thus follows that an effect of corruption could be very dependent on the context these variables create (see figure 3). For example, whether a country is seen as having a high quality bureaucracy or a solid rule of law could potentially affect the effect of corruption. The choice of contextual factors to investigate in this thesis will be guided by previous literature, and will be discussed in chapter 3 with the literature review of the field and hypotheses generation.

### 2.3. Corruption and the political risk framework

“Political risk is any political event, action, process or *characteristic* of a country that have the potential to, directly or indirectly, significantly and negatively affect the goal of a foreign direct investor” (Jakobsen 2012, 39). Whenever a MNC considers making a foreign direct investment based on any of the motivations outlined in the OLI-paradigm, all the possible costs to the profitability of the investment must be considered in a cost-benefit analysis. These costs, be they economic or political in nature, will affect the attractiveness and the degree of motivation the MNC will have for investing in a given country.

There are essentially four sources of political risk; the obsolescing bargain mechanism, political institutions, socio-political grievances and attitudes and preferences. In this literature, corruption is seen to work primarily through political institutions, but can also work through the obsolescing bargain mechanism. I argue that corruption is a phenomena in its own right, not just a characteristic of flawed institutions.<sup>16</sup> These sources of risk act through mainly five different types of actors; Government, rebel/terrorists, non-governmental activists, other companies and foreign state or multilateral organizations. For the purpose of this thesis, in terms of potential costs, the government and state apparatus is the focus. There are primarily three different effects, government intervention (creeping or outright expropriation and renegotiation), war and unrest, and interventions by other non-state actors (Jakobsen 2012, 41). As such, the political risk theory or framework posits that political factors and phenomena can be understood as factors that enter the cost-benefit analysis of multinational corporations when they decide if and where to invest. All political factors, decisions and events are seen as creating some degree of risk, a probability that it will negatively affect the economic profit of an investment.

Drawing partly on the political risk framework and the theories on corruption and its effects on investment I argue that corruption can have mainly three effects on multinational corporations, which will increase either the cost factor or the benefit factor in the corporations cost-benefit analysis when deciding to perform a foreign direct investment.<sup>17</sup> The first is the potential

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<sup>16</sup> Investments in natural resources are particularly prone to this type of political risk. To the degree that corruption indicates or works as a proxy for political leaders with short time horizons and self-interested profit maximization, corruption will increase the likelihood that the deals and contracts negotiated beforehand between the MNC and the state could be renegotiated in lieu of the MNC’s decreasing power of negotiation as the capital and physical equipment is sunk into the investment in the host nation.

<sup>17</sup> The political risk framework does not entirely suit my proposed framework for how corruption can affect FDI inflow. I therefore only borrow its mechanisms and proposed causality for how political factors can affect

benefits corruption can provide. By drawing on parts of the corruption literature, we can observe there have been several who state that corruption can provide opportunities that can decrease costs, increase profit margins of investments, give certain competitive advantages and provide access to otherwise unavailable sectors (Egger and Winner 2005; Huntington 1968; Leff 1964). All else held constant, these benefits will increase the benefit factor in a cost-benefit analysis, and thus corruption can increase FDI inflow.

The second is that corruption can increase the risk of a foreign direct investment. When you bribe someone for a service, or collude with someone for a better deal or access to something, there is for example usually a monetary cost. However, corruption is by nature unenforceable. You cannot know with absolute certainty that what you paid for is what you get, if you get something at all. The degree of risk corruption can create for an investment is dependent on many sub-factors, such as the size of the monetary cost, the familiarity and degree of systematism in the country regarding corruption, how likely it is to get caught, and then, how likely it is to get prosecuted and how likely it is that the media will run with a scandal and expose you to reputational costs (Busse and Hefeker 2007; Shapiro and Globerman 2002; Wei 2000).<sup>18</sup> Disregarding all these factors, the key aspect that defines the risk effect is that it is indeed a risk. Relying on the seminal work of Knight, risk is something in which you can quantify to some degree the likelihood of success or failure (Knight 1921).

The third effect is that corruption can create outright uncertainty. To the degree to which you know nothing, or extremely little about how corruption will affect the security and profit margin of your investment, corruption is not creating a risk effect, but uncertainty. Uncertainty is separated from risk because you *cannot* quantify to any substantive degree the likelihood of corruption affecting your investment in a negative or a positive way (Knight 1921). For example, if you know country A is corrupt, and you know the political elite is corrupt, you might have to collude with a powerful individual or elite group. If you do not know at all whether they will keep their end of the deal you cannot calculate any probabilities, and you cannot work it into the budgeting of the investment. They are then just as likely to expropriate or renegotiate the investment once it is done, as they are to honoring their side of the deal.

Now, I would argue that these three factors are by no means separated from each other. Corruption does not create either a degree of risk, uncertainty or some potential benefits. These

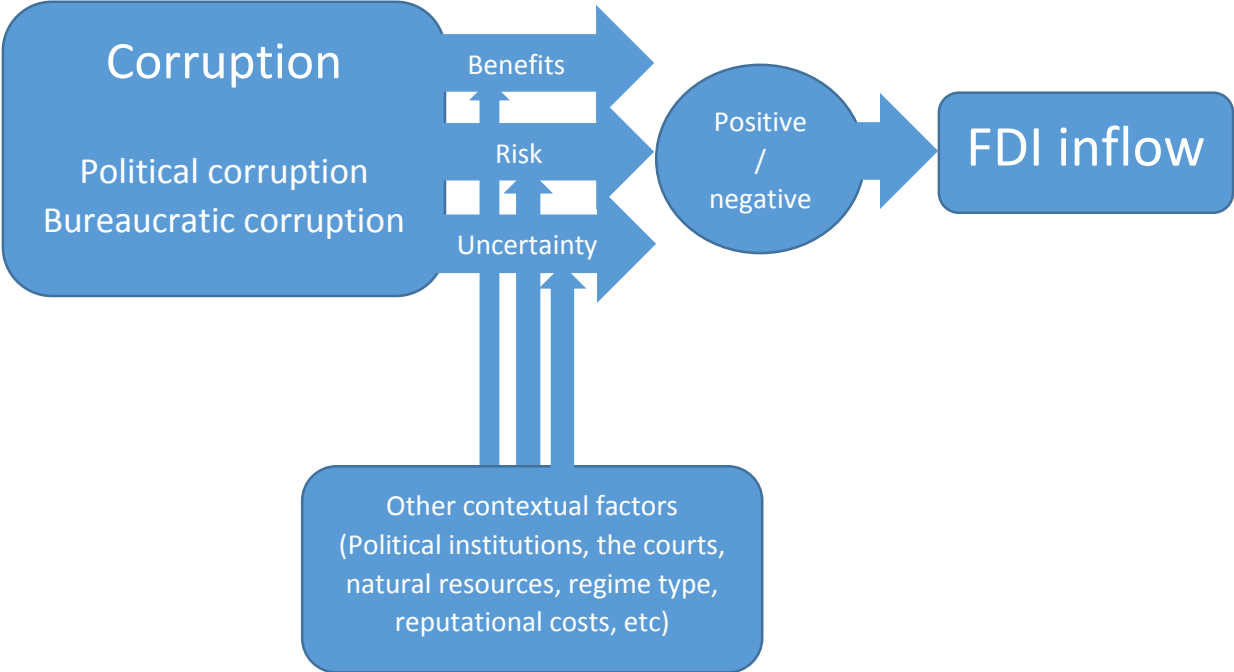
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multinational corporations through their cost – benefit analysis. Political risk is far broader, and it is inherently *negative* for FDI, whereas I argue that corruption can also be positive.

<sup>18</sup> This list is by no means exhaustive, but merely illustrating.

effects work together in relative size to each other. So, depending on internal (types of corruption) and external (contextual setting) factors, I expect that the degree of risk, uncertainty and potential benefits will change, relative to each other. If the potential benefits increase because corruption gives you access to and monopoly on an oil field, the effect of corruption will be quite different than if corruption gives you a small competitive advantage in a relatively small procurement process. The reason for this is that the potential benefits *change relative* to the risk and uncertainty effect corruption can produce. Referring back to section 2.2.2 and 2.3., I argue that political corruption will create more uncertainty because of its nature, bureaucratic corruption will primarily produce a degree of risk due to its nature, whereas the contextual factors will affect the relative size of both the degree of risk, uncertainty and potential benefits. Thus, my proposed causal figure is the following: <sup>19</sup>

**Figure 3: Corruptions effect on FDI inflow:**



<sup>19</sup> Note that I in no way claim to prove causality in this thesis. Statistical techniques allow us to see correlations, and we can then apply theory to try to interpret causality. This is what this model is for, and it builds my expectations in regards to the effects of corruption on FDI and makes this clear to the reader.

## 3.0. Literature review and hypotheses

This chapter will go through relevant literature on corruption, FDI, and corruption-FDI to generate hypotheses on the effect corruption has upon FDI inflow in order to answer my research question. Primarily, I focus on literature that produces different answers as to the relationship between FDI and corruption, studies that employ different typologies of corruption, and studies that use different contextual factors that are relevant for corruption or interact corruption with contextual factors.

### 3.1. Corruption and FDI

In the literature, there exists mainly two scholarly camps on corruption and its effect on FDI. One negative (corruption decreases the inflow of FDI) where corruption is viewed as sand in the machinery, decreasing FDI because it could increase costs in terms of risk and outright uncertainty. The other is positive (corruption increases FDI inflow) where corruption is viewed as grease in the machinery, increasing FDI because it allows for short-cuts, lower taxes, beneficial regulations and rules, and in fact, less uncertainty and risk. These two camps are contradictory in their findings on effects, but their proposed causal mechanisms are essentially the same, which is that corruption has characteristics that decision makers in MNCs analyze in their cost – benefit analysis (Cuervo-Cazurra 2008, 13). Several articles have found corruption to have a negative effect. Kaufmann argues that corruption forces firms to devote human and financial resources to manage bribes, when these resources could be more productively employed elsewhere on other tasks. Thus, the MNC invests somewhere else (Kaufmann 1997). Payment of bribes is also prone to a certain degree of risk because it implies that the receiver of the bribe will do what he or she promises, which they might not, there is no enforceable agreement. In addition, since bribery is an illegal action there is no security net, such as the courts, to adjudicate if promised or “paid for” services are not delivered, as one can do with legitimate contracts (Cuervo-Cazurra 2008, 14). In his seminal article, Wei finds that corruption decreases the amount of FDI flows to a country, as does several others (Busse and Hefeker 2007; Cuervo-Cazurra 2008; Habib and Zurawicki 2002; Lambsdorff 2007; Shapiro and Globerman 2002; Wei 2000). Based on this I present the first hypothesis:

**H1a:** Corruption decreases the amount of FDI inflow to a country.

However, as indicated above, several scholars also find a positive relation between corruption and FDI. Corruption can act as a grease, speeding up transactions, creating incentives for action,

and making procedures happen that would otherwise not (Huntington 1968). According to Leff, corruption can thus work as a market correcting incentive against ineffective regulation and bureaucracy, bringing competition into a non-existing or monopolistic sector/market (Leff 1964). Empirically, Wheeler and Mody found no significant relation between corruption and FDI (Wheeler and Mody 1992). Hines found no relation either, except for US based MNCs (James R. Hines 1995). Egger and Winner found that corruption increases FDI in both the short and long run, and particularly so in developing countries (Egger and Winner 2005). As such the second hypothesis is:

**H1b:** Corruption increases the amount of FDI inflow to a country.

### **3.2. Types of corruption and FDI**

As I argue above in chapter two, corruption is a multidimensional concept. It is then not illogical to assume that the different internal types of corruption might have different effects on FDI. In fact, several scholars have pointed out that the ambiguity of corruption's effect on FDI might come from the fact that researchers use an aggregated measure for the whole concept of corruption, instead of using disaggregated, more intensive parts (Søreide, 2014, p. 5). Several articles on corruption differentiate between bureaucratic corruption and political corruption (Amundsen 1999, 3). Bureaucratic corruption can be the systematized, everyday corruption in which lower government officials require bribes to produce a service. This can be anything from admitting a child to a school, putting someone on a waitlist for a health service, stamp and/or sign documents that will allow a business venture to start up or proceed, and so on. This type of corruption, since it is often systematic and on a large scale, is often predictable and stable. As such, it is possible to budget the potential cost of this type of corruption. Following the "sand" logic of corruption, this will make investments less profitable, or if at the margins, not profitable, affecting the decision of a MNC to invest somewhere else, decreasing FDI flow. On the other hand, following the "grease logic", it could allow processes to be sped up by increasing incentives for getting work done and pushing through services and paperwork to maximize the gain from bribes. From the framework employed in this thesis on corruption and FDI, I expect that if any type of corruption has more positive than negative effects, it is bureaucratic corruption. Thus, I propose the following hypothesis:

**H2b:** Bureaucratic corruption increases the amount of FDI into a country.

Political corruption, as argued before, takes place at the highest levels of politics and the state (Amundsen 1999, 3). When the members of government who are in a position to affect the creation and enforcement of legislation and policy are able to twist or side-step the laws and rules of the state, prolong and increase their power above their initial mandate or enrich themselves by influencing policy or laws from a personal motive, we are dealing with political corruption. Political corruption creates larger issues than merely disturbing the allocation of resources, it can also affect the very climate around which the state and nation exists and decay institutions such as for example the rule of law (Amundsen 1999, 3). To the degree to which political corruption becomes widespread, the term state capture is also applicable (Karklins 2002). Political corruption is often manifested in the manipulation of political/governance institutions, making the “rules of the game” in both politics and the economy unclear and unpredictable, particularly for outsiders. This is why some scholars (Ackerman 1999; Amundsen 1999; Dahlstrom 2011; Karklins 2002) and I argue that this type of corruption does not only increase the risk of an investment through for example bribes, it also increases the general uncertainty around the safety of an investment and the profitability altogether. If politicians and top state-bureaucrats are corrupt, it is very possible that the political stability around those in power, either the regime, party or individuals, is at best unstable. This could indicate that the top decision-makers have short time horizons in their decisions, thus a higher likelihood for them to amass short-term gains for themselves. This would increase the probability of expropriation of FDI. Expropriations, while possible to insure against, are of course extremely costly to whatever MNC that experiences it. In addition, less extreme but still unpredictable outcomes are possible, such as renegotiations of contracts or increases of taxes and ownership shares. A regime or politician would not even have to go back on their deal with the MNC for these outcomes to happen. If a deal is made while engaging in political corruption, the next regime, party or leader might view it as void and criminal, changing the deal. As such, I propose the following hypothesis:

**H3a:** Political corruption decreases the amount of FDI into a country more than bureaucratic corruption.

### **3.3. Corruption and the institutional framework**

As was touched upon in chapter two, section 2.3, it is very possible that corruption is affected by contextual factors, such as all the factors that comprise the investment climate. Huntington and Leff (1968; 1964) stated that in lieu of non-existing or inefficient formal institutions,



corruption could increase investment based on the potential benefits it can provide. I therefore create hypotheses with two institutions, or collection of institutions, namely governmental/state institutions, and the judicial institution.

### **3.3.1. Corruption and governmental/state institutions**

One of the arguments made in this thesis is that the conceptualization of corruption is lacking and flawed in the literature. Some view corruption as flaws in governmental and state institutions (Goswami and Haider 2014; Shapiro and Globerman 2002), and therefore not a true phenomenon in its own right.<sup>20</sup> Others view corruption as a phenomenon of its own, separate from any particular institution, such as the bureaucracy, justice system, public services, and so on.<sup>21</sup> In addition, Tina Søreide argues in her new book on corruption and the justice system that corruption is something that can take place in countries with solid institutions, referring to the French Elf case (Søreide 2016). I adhere to this understanding as well. It is perfectly possible to have good institutions, be they of democracy, bureaucracy or juridical. For yet another example, Italy is acknowledged as a highly developed, democratic and institutionalized country. It is also infamous for relatively high levels of corruption (“Transparency International” 2016).

As discussed, I argue that the negative effects of corruption in terms of affecting foreign investors, is the relative degree of risk involved, and the relative degree of uncertainty it can create around the investment relative to the potential benefits. Now, clearly there are benefits as well, as described in chapter two. If governmental and state institutions such as the bureaucracy, public services, and the civil servants are of high quality in terms of competences, efficiency and capacity, several of the advantages that comes with corruption would be less needed (the function as an informal market, increasing speed and efficiency, making up for lacking incentives in bureaucracy). As such, the amount of risk and uncertainty relative to the potential benefits would change, possibly making corruption mainly a cost in a cost – benefit analysis taken in the decision making process of the multinational corporation, framed by the OLI-paradigm. I therefore propose the following hypothesis

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<sup>20</sup> Whether by explicit explanation, such as “levels of corruption as a proxy for the quality of x institution” or by not explaining it, adding it into a government or institutions aggregated variable.

<sup>21</sup> Note that even in the cases where corruption is seen as a phenomenon in its own right, high levels of corruption is often associated with poor quality of different institutions.

**H4:** In countries that have high quality governmental and state institutions, corruption decreases the inflow of foreign direct investment.

### **3.3.2. Corruption and the judiciary.**

The juridical institution, or rule of law as some refer to, has from both the FDI literature and the political risk literature, received special attention. It is by many viewed as a key institution for both business and the quality of governance in terms of providing secure property rights and protecting the individual from the state and others (Herzfeld and Weiss 2003, 621; Jakobsen 2012, 96–97). If corruption negatively affects FDI inflows by increasing risks and uncertainty around the investment concerning whether or not people will hold up their end of the deal, by doing unfair renegotiations, creating problems, or even outright expropriate the investment, a solid and institutionalized judiciary and rule of law would be a great security net. If the courts are independent of the state and government, not arbitrary and unfair (prioritizing country interests over the law), issues can be subjected to fair arbitration. For example, if a key bureaucrat or politician suddenly reneges on a contract, or subjects the investment to increased costs or even tries to expropriate it, it will not necessarily be of any real consequence if the courts could reverse it and impose sanctions. In addition, a strong rule of law and judiciary would work as a check on leaders and decision-makers, reducing uncertainty around them holding their end of the deal (Jakobsen 2012, 96).

On the other hand, if the courts and rule of law are highly institutionalized, it might actually reinforce the risks and uncertainty corruption creates,<sup>22</sup> because you would have no control or influence over what the judiciary would or could do. If a deal is made through corrupt processes, the judiciary might find the company equally responsible, finding the deal null and void, and imposing fines on the company. In addition, the risk of someone leaking the information to the judicial authorities are larger, and the certainty of sanctions are larger (you would be less able to bribe your way out). The degree to which one can trust the individuals one engages with in corruption would also be lower, because they would have a viable option of reporting this to the judicial authorities. Therefore, I present the following hypothesis:

**H5:** In countries that have high quality juridical institutions, corruption will decrease the inflow of foreign direct investment.

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<sup>22</sup> To be perfectly clear, I am not arguing here that a strong judiciary and rule of law would deter FDI inflow in and of its own (it would probably increase it), but that the effect of corruption would be different in this setting.

### **3.4. Corruption and political regime type**

Scholars have argued that democratic governance is ineffective in a global economy, dragging out processes, increasing transaction costs, increasing uncertainty through channels for the people to interfere and change policies and deals, and in many ways being in friction with a free market capitalist economy (Li and Resnick 2003). Meanwhile, other scholars contend that democratic institutions and regimes actually increase FDI inflows because they create a predictable and stable climate through checks and balances on the people in power. It also provides promises of market friendly policies, because those in office want to remain there, and investments are good for the economy, which is a major determinant for electoral victory (Jensen 2003).

If the argumentation for why democracy should reduce FDI inflow is true, then one can observe that the mechanisms through which the potential benefits of corruption work become more relevant and important (Leff 1964). If democracy reduces efficiency, slows down bureaucratic processes, makes access to certain sectors difficult, and subjects contracts and investments to pressure from the people, the possible advantages of corruption becomes larger, and possibly, more necessary. Corruption could then increase the efficiency and speed of the bureaucracy by creating incentives for action, it could allow access into sectors that officially are off limits, and it could hide deals from the public, because corruption is a hidden phenomenon (Huntington 1968; Leff 1964). If this logic were true, then one would expect corruption to increase FDI inflow in democratic countries. I therefore propose the following hypothesis:

**H6:** In highly democratized countries, corruption increases FDI inflow to the country.

### **3.5. Corruption, natural resources and FDI**

From the literature, we can observe that FDI could be both attracted by and deterred by corruption. Researchers have found positive empirical findings to both these strands of logic. One dimension that could affect these results, but that is not captured by single aggregate measures of FDI and corruption is that of foreign direct investment into countries with natural resources. In the extractive industries (mining, oil and gas, forestry), the rents or profits to be gained are potentially massive due to the demand for these goods and the magnitude of supply such a project can create. If we consider the proposed framework and causal logic above (section 2.1.3, figure 1 and 2, section 2.4 and figure 3), all that corruption does in the decision-making model of the OLI framework is to increase a risk, uncertainty factor and potential

benefits, which when all else is held constant will affect the cost – benefit equation multinational corporations perform before investing. However, when the possible gains are so potentially massive this logic might not be as straight forward anymore, and the potential benefits that are pointed out from the grease logic of corruption might increase.

As such, for foreign direct investment into countries with large natural resources, the potential benefits of corruption might become so large, that the risks and uncertainty becomes relatively small. Wiig and Kolstad also show that MNC's can benefit from dysfunctional institutions with corruption in the oil sector, because they allow for collusion between the political elite and the MNC (Wiig and Kolstad 2010). In a later article, Wiig and Kolstad also find that countries with extractive resources receive more FDI as corruption increase, but however, at a diminishing rate (Kolstad and Wiig 2013). Thus, I argue that some of the potential benefits from corruption (lower taxes, larger ownership share, competitive advantage in procurements), can become larger under different circumstances, such as with large natural resources, very much larger. I therefore propose the following hypothesis:

**H7:** In countries with large natural resources, corruption increases FDI inflow to the country.

### **3.6. Corruption and increasing reputational costs**

As has been presented several times in this thesis, early theoretical work on investments, economic growth and corruption argued that corruption could have characteristics that would actually increase investment. Now, I argue that these potential benefits will always be relative to the potential risk and uncertainty that corruption creates for investors. As time has progressed, the degree of risk in terms of getting caught, and the costs associated with this should one get caught have increased dramatically. As the effects of corruption upon society have received attention, countries have become much more negatively oriented towards corruption, and the tolerance for it has decreased significantly. The media is also always on the lookout for a potential corruption scandal. Corruption has also been criminalized over the years. Several laws and conventions make multinational corporations responsible and prosecutable if they engage in corruption in a growing number of countries. The US enacted the Foreign Corrupt Practices act in 1977, and increased its scope, application and sanctions in 1998 (US Department of Justice 2015). The OECD enacted the convention on Combating Bribery of Foreign Public Officials in International Business Transactions in 1999 (OECD 2016). The EU ratified and enacted the Criminal Law Convention against Corruption in 2002 (Council of Europe 2016). The United Nations Convention against Corruption was enacted in 2005, though

having been in the works since 2000 (UNODC 2016). Several MNCs have been convicted and sanctioned by use of these laws and conventions, for example Statoil (Jakobsen 2012, 97). The publicity received if caught in such a corruption scandal is also potentially very costly, with stock prices potentially falling. As such, I argue that over time, the risk/uncertainty factor relative to the potential benefits of corruption has increased in general over time, because you are now much more likely to be caught than before, and corruption has been criminalized to a much larger degree over time. Thus, I present the following hypothesis:

**H8:** The effect which corruption has upon the inflow of FDI has become more strongly negative since the year 2000.<sup>23</sup>

### **3.7. Corruption in developing countries and FDI**

Scholars have pointed out that in developing countries the political and economic institutions are not mature enough to handle the pressure of the global market or attract and create investment, thus they fall behind on infrastructure and further development (Sachs et al. 2004). As such, one could expect that the positive aspects of corruption in terms of providing speed and effectiveness in bureaucratic processes, competitive advantages in tenders and procurements, granting access to otherwise monopolistic sectors, and in many ways function as market institutions where there are none, could become more important than the relative negative aspects. This is also the logic behind Huntington and Leff's arguments for a positive effect of corruption on investments and economic growth (Huntington 1968; Leff 1964). As the bureaucracy, ministry of finance, and politicians are slow and inefficient, corruption's greasing effect could negate this and work in place of these formal institutions. In addition, some scholars have studied specifically country samples with less developed countries (Busse and Hefeker 2007; Cuervo-Cazurra 2008), finding differing results. As such, corruption could very well have a different effect in developing countries, than in developed countries because the potential benefits of corruption becomes relatively larger than the risks and/or uncertainty. I therefore propose the following hypothesis:

**H9:** In less developed countries, corruption increases FDI inflow.

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<sup>23</sup> The year 2000 may appear to be an arbitrary choice. However, both the US legislation and the OECD convention are adopted before 2000, and discussions of conventions in the EU and UN is ongoing right after 2000. I therefore believe the year 2000 to be a natural cut off point for a cumulative effect, though this is open to debate. Regressions were also run with 2002 as the year dummy, but the results did not significantly change.

### 3.8. Methodological review

As previously stated, the literature on foreign direct investment and corruption is already quite large, and growing. With a main divide between the grease logic and the sand logic camps there is quite some ambiguity in findings, which has been illustrated in the hypothesis generation and literature review. One aspect of this thesis is to use a relatively unknown and unused method to achieve estimations that are more precise. It is not unnatural to think that the reason for so many differing findings is due to methodological choices, with estimation techniques and data samples. I will here list in table 4 several studies that have been used in this thesis with their finding and methodological choices.

*Table 4: Literature by methodology and data*

Article	Method	Data	Finding (+ = positive, - = negative, / = insignificance)
<b>Evidence on corruption as an incentive for foreign direct investment (Egger and Winner 2005)</b>	Fixed effects and instrumental variables estimation. Lags all independent variables	Panel, 73 countries, 1995 – 1999. FDI stocks as dependent variable, corruption as main independent variable	+ Corruption is insignificant in the fixed effects estimation. Positive in the instrumental variable approach.
<b>Political risk, institutions and foreign direct investment (Busse and Hefeker 2007)</b>	Fixed effects and General method of moments (GMM). Lagged FDI as independent variable.	Panel, 83 countries, 1984 – 2003. Foreign direct inflow as dependent variable. Political risk factors as main independent variables.	- / Fixed effect: Corruption is not significant. GMM: Significant at 10%, corruption decreases FDI.
<b>Does political risk deter FDI inflow (Goswami and Haider 2014)</b>	Fixed effects and pooled OLS.	Panel, 146 countries, 1984 – 2009. FDI inward stock as the dependent variable. 3 political risk factors as main independent variables.	+ / Fixed effects: Governance failure (amongst it corruption) increases FDI. Pooled OLS: Governance failure factors are not significant.
<b>Corruption and Foreign Direct Investment (Habib and Zurawicki 2002)</b>	OLS and Probit regression	Cross sectional, 89 countries, 1996 – 1998, averaged. FDI inflow and outflow as dependent variable.	- - + In absolute terms, corruption deters FDI. In relative terms, it depends on differences between

		Corruption as main independent variable.	host and home country.
<b>What determines Chinese outward FDI? (Kolstad and Wiig 2012)</b>	OLS regression	Cross sectional, 104 countries, 2003 – 2006 averaged. FDI inflow from China as dependent variable. Institutions (arguing that corruption is partly a proxy for this) and natural resources as main independent variables.	++ Higher institutional quality decreases Chinese FDI. This effect is magnified when the home country has large natural resources.
<b>Digging in the dirt? Extractive industry FDI and corruption (Kolstad and Wiig 2013)</b>	Fixed effect	Panel, 81 countries 1996 – 2009. FDI inflow(extractive) as dependent variable, corruption as main independent variable	+ More corruption attracts more FDI in extractive industries.
<b>How Taxing is Corruption on International Investment? (Wei 2000)</b>	OLS regression	Cross sectional, 45 countries. FDI inward stocks as dependent variable, corruption as main independent variable	- Corruption has a strong negative effect on FDI
<b>Global Foreign Direct Investment Flows: The Role of Governance Infrastructure (Shapiro and Globerman 2002)</b>	OLS regression	Cross sectional, 144 countries, 1995 – 1997 averaged. FDI inflow and outflow as dependent variables, governance infrastructure (corruption as component) as main independent variable	- The better governance infrastructure (and the lower corruption) the more FDI inflows and outflows.
<b>Better the Devil You Don't Know: Types of Corruption and FDI in Transition Economies (Cuervo-Cazurra 2008)</b>	Quasi-Fixed effects.	Cross sectional, 74 countries, 1999. FDI inflow as dependent variable, corruption, arbitrary corruption and pervasive corruption as main independent variables	- + Corruption negatively affect FDI inflow in general, in transition economies there is a small positive effect. For arbitrary corruption the effect is positive, for pervasive corruption the effect is very negative.
<b>The Effects of Corruption on FDI Inflows (Al-sadig 2009)</b>	OLS regression and Fixed effects	Panel, 117 countries, 1984 – 2004. FDI inflow per capita as dependent variable, corruption as main independent variable	- + / The OLS regression finds a significant negative effect of corruption. The fixed effect estimation does not find a significant relation.

			A sample without OECD countries finds a nearly significant positive effect in fixed effects estimation.
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### 3.8.1. Panel versus cross-sectional data, and heterogeneity

Of the studies that use econometric estimation, several employ cross-sectional data, particularly so for the studies of the early 2000s (Habib and Zurawicki 2002; Shapiro and Globerman 2002; Wei 2000). This is of course perfectly natural, as panel data was scarce and panel data estimation relatively new. All of these studies mainly find a negative effect of corruption (or indexes of which corruption is a part) on foreign direct investment. This is criticized by Egger and Winner, who state that the negative effect is sensitive to both the relatively small country sample of these studies, limited amount of observations due to the lack of a time dimension, and unobserved heterogeneity bias which cross-sectional OLS regressions cannot control for (Egger and Winner 2005, 933). For the newer panel data studies, all of them employ either a pooled OLS or fixed effects estimation. As I will discuss in detail in this thesis, fixed effects is excellent if you are only interested in the within effect over time on some dependent variable. However, most of the studies in this field make no distinction as to whether they are interested only in a within effect, a net effect or a between effect. To allow for the between variation, some of them employ pooled OLS, but this technique is unable to differentiate the cross sectional and the time dimension, potentially inducing massive bias in our coefficients. All the studies that employ fixed effects state that they do this to control for unobserved heterogeneity,<sup>24</sup> which is the norm in both political science and particularly so in economics. However, the cost of performing fixed effects seems to be extremely underestimated by the studies analyzed here. The effect of corruption is largely between countries (see section 4.5). This is seen when most studies show that corruption is not significant in a fixed effects estimation (which only estimates its effects within countries over time). This could potentially lead to wrong conclusions when your research question is concerning simply the effect of

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<sup>24</sup> By creating separate intercepts for each group unit, country, and then controlling this variation away, fixed effects controls for unobserved heterogeneity at the group level. Unobserved heterogeneity, if present, will bias our coefficients, making the results unreliable. This will be discussed in detail in chapter five.



corruption on FDI, not only the effect corruption has over time within a country (Al-sadig 2009; Busse and Hefeker 2007; Goswami and Haider 2014). We can also observe that the sign of the relationship between corruption is very sensitive to the country sample (i.e OECD, African, Chinese outward FDI), and particularly so to the estimation method. Fixed effects tends to, as said, produce insignificant and in some cases positive effects, pooled OLS tends to produce negative or insignificant relationships, while OLS regression on cross-sectional data estimates a negative relationship. In this thesis, I will estimate both the within and the between effect specifically, by using the random effects estimation. As such, I will be able to clearly disentangle the different effects of corruption within the same model.

### **3.8.2. Endogeneity as reverse and simultaneous causality**

Most studies mention to a certain degree that corruption and foreign direct investment might have an endogenous relationship.<sup>25</sup> This is given more focus in the newer studies than in the older ones. Kolstad and Wiig openly state that corruption is endogenous to FDI, however they do not differentiate between endogeneity as reverse causality, omitted variables and unobserved heterogeneity, and that an instrumental variable is needed to control for this. Because this is unavailable they rely on the fixed effects estimation to negate the collective issue (Kolstad and Wiig 2013, 373). Al-Sadig also writes that endogeneity in the form of simultaneity and reverse causality is an issue, but argues that this problem is alleviated by lagging the independent variables (Al-sadig 2009, 273). Busse and Hefeker also briefly discuss the endogeneity of FDI, quality of institutions and factors of risk (corruption), and they add the lagged version of the dependent variable as an instrument to control for endogeneity (Busse and Hefeker 2007, 400). In their article on economic growth, foreign direct investment and corruption, Freckleton et.al also argues that endogeneity is a serious issue in the literature, and that it has not received enough attention. They argue that introducing lagged variables negates some of the issues of endogeneity (Freckleton, Wright, and Craigwell 2012, 644). As I will show and discuss in the methods chapter, the fixes employed against endogeneity as reverse causality and simultaneity which we see in the literature are not nearly efficient enough to be called solutions. If the issue of reverse causality and simultaneity is not handled in the data collection phase it is nearly impossible to fully guard against its potential bias (Bellemare, Masaki, and Pepinsky 2015).

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<sup>25</sup> In this thesis, all references to endogeneity is to be understood as reverse and or simultaneous causality, if not explicitly stated otherwise. Other phenomena that are in some literature also referred to as endogeneity, such as unobserved heterogeneity, is not part of the endogeneity term for this thesis, unless specified for a given section or argument.

What are the implications of the issues of endogeneity and unobserved heterogeneity in the literature? Essentially, we cannot claim causality directly from the statistical results and we need to be skeptical of our coefficients.<sup>26</sup> If it is not clear whether it is corruption or some other unobserved variable (as with the issue of unobserved heterogeneity) that causes some effect in foreign direct investment, we cannot know whether the coefficient we observe is due to our included independent variable, or some other factor. The same goes for reverse causality and simultaneity. If it is not clear whether the change in corruption causes a change in FDI, or a change in FDI causes the change in corruption, we cannot argue on causality, only association or correlation.

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<sup>26</sup> Causality must be argued for on theoretical grounds following the theory and frameworks one employs.

## **4.0. Data and Determinants**

This chapter will present an overview of and describe the data I employ in this thesis. I will show how my variables are measured and discuss the validity between the theoretical phenomenon I want to measure, and the actual measurement. I will further describe the dataset I use for my regressions with some descriptive statistics, and comment on its qualities, flaws and characteristics.

The dataset used in this thesis is comprised of three different databases. The dataset (Teorell et al. 2016) from the Quality of Government Institute is used as the template dataset, because it contains the majority of the variables I need for my estimations. The second dataset is from the United Nations Conference on Trade and Development (UNCTAD), and the third is from International Profiles Database (IPD). The Quality of Government (QoG) dataset is used by several scholars in several fields, and is regarded as being of high quality. The UNCTAD dataset is much used in literature on foreign direct investment, several of which have been referenced in this thesis. The IPD dataset is one of the datasets used by Transparency International for their corruption index and it is from a state institution (French). I therefore consider the sources of my data to be of high quality, and very reliable. These datasets have been merged together using the “merge” command in STATA.

### **4.1. The dependent variable: Foreign Direct Investment**

The dependent variable in this analysis is the annual aggregated FDI inflows by country-year. I use data on global FDI flows for a maximum of 171 countries for the period 1995 – 2012. The data for this variable is collected from the UNCTAD database. This is done because the Quality of Government dataset only provides FDI flows in terms of percentage of GDP and the regular FDI inflow variable is more used than the FDI/GDP measure in the literature. UNCTAD is the United Nations branch that is tasked with compiling and analyzing development issue data. It is a highly reliable source, which is used by many scholars in the field. The use of either FDI inflow or FDI stock to measure FDI is used interchangeably in the literature, but with a small majority employing flow data. I have chosen to use FDI inflow, because I see it as measuring more directly what I am interested in, which is the annual level of FDI from decisions made by multinational corporations on a yearly basis, as they react to changes and differences in the

independent variables in this thesis.<sup>27</sup> FDI inflow also has some advantages over FDI stock. FDI stock is less comprehensive in coverage than FDI inflow and the change in FDI stock is not only predicated on decisions to invest or not by multinationals (revaluations, reinvested earnings and write-downs also affect stock). FDI inflow must not be confused with a pure change variable either. It is, in its own right a stock variable with an absolute value. FDI inflow is the added sum of FDI compiled quarterly during a year (Wacker 2013, 5).

The dependent variable is measured in millions of US dollars. In the literature, it is very common to use a logarithmic transformation on FDI (Al-sadig 2009; Busse and Hefeker 2007; Cuervo-Cazurra 2008; Egger and Winner 2005; Gani 2007; Habib and Zurawicki 2002; Kolstad and Wiig 2013). The reason for this is that due to extraordinary circumstances there are some extreme outliers in FDI inflow, which causes the variable to be skewed, and not normally distributed. This is confirmed when looking at histograms of the variable, and normality tests (see method chapter). As the logarithmic transformation is recommended in econometric literature for this type of variable, and because the majority of the literature on FDI employs it, I chose to transform my dependent variable into a logarithm. However, the procedure turned out to not be as simple as typing a command into STATA. Due to mathematical theory, one cannot log a negative value. In FDI inflows, the extreme outliers are both positive and negative. Negative FDI inflows occur when something dramatic happens, such as war, civil war, financial meltdown, and so on. In addition, large negative values can indicate restructuring of some sort in the corporate sector.<sup>28</sup> These numbers are then not to be interpreted directly (OECD 2006). There are 155 country-years of negative values in my dependent variable, of a total of 3455 in the time period 1996 – 2012. To avoid dropping these observations, I tried a transformation that added a constant positive value, thus putting all negative values between 0 and 1.0. This was also done by Busse and Hefeker in their article (Busse and Hefeker 2007). This transformation however created some serious issues in my regressions.<sup>29</sup> Because I am interested in the general

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<sup>27</sup> FDI inflow per capita was also considered as the dependent variable. However, because it has only been used by one source I was able to find, the country sample of FDI would decrease (for example Montenegro lacks population data), and because the effect of population size is partly controlled for in the GDP variable I have chosen not to use this. It could be interesting to try this variable out in future research though, to see if it has any significant changes on the findings in this thesis.

<sup>28</sup> For example, Afghanistan experienced negative FDI inflows in 1997 – 1999, just on the precipice of invasion and stayed around 0 until 2004. When the situation stabilized (relatively) FDI inflow increased. Iraq also experienced negative FDI right before and during the invasion of 2003. Denmark in 2010 and Australia in 2005 are examples of corporate restructuring.

<sup>29</sup> The baseline regression was run without the transformation, and results were in line with previous literature. The economic determinants (control variables) were all more or less significant, and the results made intuitive sense. When the transformation was added to the dependent variable, nearly all of the variables lost their significance, and some coefficients changed sign. Several scholars have criticized this transformation (STATA forums), stating that it should be avoided as a fix for logarithmic transformations.

trends of FDI inflow, the factors that normally affect multinational corporations to invest here as opposed to there, these extreme outliers, caused by exceptional circumstances, are not really of theoretical interest to me.<sup>30</sup> Therefore, due to the technical complications and focus of this thesis, I chose to drop the 155 negative observations.<sup>31</sup> Fortunately, the negative values are scattered across several countries and in relatively short time spans; thus, I do not lose a country unit by dropping these observations, only the 155 country-year observations.

The logarithmic transformation is done by the “log (x)” command in STATA, which effectively drops out any negative observations automatically. The dependent variable, log FDI inflows, is then left with 3300 observations between 1995 and 2012.<sup>32</sup> Because the dependent variable is logarithmically transformed, the interpretation of the coefficients in the regression results will not be interpretable as one unit increase in X causes Z unit increase in Y. This is because we are now estimating *proportional* change using geometric means (Noymer 2011). The interpretation becomes one unit increase in X causes Z *percentage* increase in Y. What is key to have in mind when interpreting the coefficients of the independent variables then, is the *scale* of the independent variables. Corruption has a 0 – 10 scale, while taxes is scaled 0 – 100. If corruption has a coefficient of 0.2 and taxes has a coefficient of 0.02, it might seem like taxes has an unsubstantial coefficient size, at least compared to corruption. However, taxes has the potential for more change in values than corruption. Taxes could change from a value of five to 35, which would make the coefficient quite substantial indeed, 60 percent increase of FDI inflow in this abstract example. The interpretation for taxes would be, for one unit increase in taxes, FDI inflow increases with 2 percent, all other variables held constant at their mean.

## 4.2. Independent variables

The independent variables reflect the theoretical discussion that lead to the hypotheses in chapter three. The measures used for the dependent variable, independent variables of theoretical importance and control variables in this thesis is presented in the table below, with the sources and how they are measured.<sup>33</sup>

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<sup>30</sup> To study the effects of these exceptional circumstances would be an interesting project in itself.

<sup>31</sup> I would not have dropped these observations had there been another way. I spent much time and resources to find a way around this, but to no avail. The country-years that are dropped are listed in appendix 9.3.

<sup>32</sup> Because the corruption variable is measured to 2013 and some of the control variables are only measured up to 2012, the effective scope of the thesis becomes from 1995 – 2012.

<sup>33</sup> This table describes the variables as they are from the source. For example, Trade goes from 1960 – 2012 in the source dataset. I however only use data from 1995 – 2012.

**Table 5: Variables, measures and sources**

<b>Variable type</b>	<b>Variable</b>	<b>Measure</b>	<b>Source:</b>
Dependent variable	<i>FDI inflows</i>	Foreign Direct Investment inflow (Millions of dollars). Min. Year: 1980 Max. Year: 2014 N: 211. n: 7174 T: 34	UNCTAD.
<b>Independent variables:</b>	<i>Corruption</i>	Perceptions based index, consisting of surveys and expert interviews. 0 (highly corrupt) – 10 (not corrupt). Min. Year: 1995 Max. Year: 2013 N: 185. n: 2429 T: 18	Transparency International – QoG: ti_cpi
	<i>Natural resources</i>	Total natural resources rents are the sum of oil rents, natural gas rents, coal rents (hard and soft), mineral rents, and forest rents, divided by GDP (% of GDP). Min. Year: 1970 Max. Year: 2012 N: 193 n: 6734 T: 43	World Development Indicators – QoG: wdi_natrr
	<i>Regime</i>	The polity score is computed by subtracting the p_autoc score from the p_democ score; the resulting united polity scale ranges from +10 (strongly democratic) to -10 (strongly autocratic) Min. Year: 1946 Max. Year: 2012 N: 182 n: 8728 T: 66 //	Polity IV – QoG: p_polity2
	<i>Quality of Government and State Institutions</i>	Combines into a single grouping responses on the quality of public service provision, the quality of the bureaucracy, the competence of civil servants, the independence of the civil service from political pressures, and the	World Governance indicators – QoG: wbgi_g

	<p>credibility of the government's commitment to policies. - 2.5(bad) – +2.5(good).  Min. Year: 1996  Max. Year: 2012  N: 193 n: 2629  T: 16</p>	
<i>Quality of Rule of Law</i>	<p>Rule of Law includes several indicators which measure the extent to which agents have confidence in and abide by the rules of society. These include perceptions of the incidence of crime, the effectiveness and predictability of the judiciary, and the enforceability of contracts.  min. Year :1996  Max. Year: 2012  N: 195 n: 2686  T: 16</p>	<p>World Governance indicators – QoG:  wbgi_rle</p>
<i>International condemnation and pressure</i>	<p>A time dummy, separating the sample from 1996 - 2012 into two. All country-years up and to 1999 is coded 0, all country years from and beyond 2000 is coded 1.</p>	<p>Year – QoG.</p>
<i>Level of development</i>	<p>The Human Development Index (HDI) is a composite index that measures the average achievements in a country in three basic dimensions of human development: a long and healthy life, as measured by life expectancy at birth; knowledge, as measured by the adult literacy rate and the combined gross enrolment ratio for primary, secondary and tertiary schools; and a decent standard of living, as measured by GDP per capita in purchasing power parity (PPP) US dollars.  Min. Year:1980  Max. Year: 2013  N: 186 n: 1481  T: 33</p>	<p>Human Development Report – QoG:  undp_hpi</p>

**Control variables**

<i>Market size</i>	<p>PPP GDP is gross domestic product converted to international dollars using purchasing power parity rates. An international dollar has the same purchasing power over GDP as the U.S. dollar has in the United States. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products.</p> <p>Min. Year :1990  Max. Year : 2012  N: 183 n: 3965  T: 22</p>	World development indicators – QoG: wdi_gdppppcon
<i>Economic stability</i>	<p>Inflation, average consumer prices. Percentage change.</p> <p>Min. Year:1980  Max. Year: 2013  N: 188. n: 5472  T: 33</p>	IMF – QoG: imf_inflch
<i>Level of taxes</i>	<p>Taxes on income, profits, and capital gains are levied on the actual or presumptive net income of individuals, on the profits of corporations and enterprises, and on capital gains, whether realized or not, on land, securities, and other assets. Intragovernmental payments are eliminated in consolidation</p> <p>Min. Year:1990  Max. Year: 2012  N: 157. n: 2125  T: 22</p>	World Development Indicators – QoG: wdi_taxipcgr
<i>Openness to trade</i>	<p>Trade is the sum of exports and imports of goods and services measured as a share of gross domestic product.</p> <p>Min. Year:1960  Max. Year: 2012  N: 189. n: 7179  T: 52</p>	World Development Indicators – QoG: wdi_trade.
<i>Market growth and potential</i>	<p>GDP growth rate  Annual percentage growth rate of GDP at market prices based</p>	World development indicators – QoG: wdi_gdpgr



on constant local currency.  
Aggregates are based on  
constant 2005 U.S. dollars. GDP  
is the sum of gross value added  
by all resident producers  
in the economy plus any pro  
duct taxes and minus any  
subsidies not included in the  
value of the products.  
Min. Year: 1961  
Max. Year: 2012  
N: 196  
n: 7377  
T: 51

### 4.2.1. Corruption

Several organizations try to measure the extent of corruption in different countries. However, only a few are consistently used throughout the literature, and to the degree that they match the definition of corruption in section 2.2, I consider them for use in this thesis. The three indices presented here were selected by validity (they fit my conceptualization of corruption), previous use in literature and availability.<sup>34</sup>

*Corruption perception index (CPI) – Transparency International:*

The CPI is in many ways a poll of polls. It is based on surveys from a manifold of reliable and high quality sources which are aggregated, thus creating a score between 0 (completely corrupt), and 100 (no corruption). This index ranks countries “in terms of the degree to which corruption is perceived to exist amongst public officials and politicians”. Transparency International define corruption as “the abuse of entrusted power for private gain”, and as such, they are quite in line with the definition I have employed for corruption. In addition, they specify that it is the different *types* of “political corruption” they are interested in (Transparency International, B 2016). Several methodological criteria need to be fulfilled to be a part of the CPI. The surveys must be focused on measuring the “overall extent of corruption”, a country must have at least three independent surveys that rate them, and each of those surveys must be

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<sup>34</sup> Some articles use the ICRG risk data, because it has a very wide coverage, good conceptualization of corruption that argues to measure both political and bureaucratic corruption. However, because of availability issues I do not discuss this measure in my thesis.

done in more than one country, with the same methodology (Transparency International, C 2016). The CPI has encountered some critique, particularly as a panel data variable. Lambsdorff (2007) points out that the methodology of the CPI has been tweaked twice, and as such, one must question the comparability of before and after these tweaks. Several scholars have chosen to use the CPI in spite of this critique however, and Lambsdorff's critique has been criticized for being personally motivated.

*Control of Corruption (CoC) – Worldwide governance indicators:*

The CoC is an index that is part of the Worldwide governance dataset, created by the World Bank. This corruption measure is partly made from a critique against the CPI. Supposedly, this index is aggregated from more sub-indices, such as commercial risk companies and non-governmental organizations (NGO's). Much like the CPI, this index can also be characterized as a poll of polls, and the CPI and CoC actually use many of the same sub-indexes. Still, the CoC claims to be of higher quality, measuring more variation of corruption. The CoC aims to measure the “perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption” (Kaufmann, Kraay, and Mastruzzi 2010, 4), thus also fitting my definition of corruption. It is the increased focus on petty corruption that supposedly makes this a superior measure of corruption. The CPI supposedly focuses too much on political corruption.<sup>35</sup> One key feature of its aggregation methodology is the use of an unobserved components model, to create weighted averages in the aggregated indicators, with error margins (WGI 2016)

*The Global Corruption Barometer (GCB) – Transparency International:*

The GCB is a direct survey conducted by Transparency International, with a more diversified focus than the CPI. It asks questions around people's perception of corruption in the present and past, their view of trends, propensity of bribes, and it does this by institutions. This is not a poll of polls, it is a more direct survey conducted by different Transparency International chapters. It employs the same understanding of corruption as the CPI, since they are both under Transparency International, and as such, its measurements fits my definition of corruption (Transparency International, D 2016). Unfortunately, there has been massive changes in the GCB since its start in 2003, up to its latest release in 2013. This makes time comparisons difficult.

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<sup>35</sup> Petty corruption is sometimes used as a synonym for bureaucratic corruption, while grand corruption is sometimes used as a synonym for political corruption.

*Political and Bureaucratic corruption – International Profiles Database:*

Institutional profiles is a development research organization created by the French Ministry of Economics and Finance. Initially, a research project to help develop policy for the French state, it became a project in which its results were to be accessible by all. Its database is created from a survey in which experts and people are asked to grade the institutions of their country. They have had four rounds of their survey, with published databases from 2001, 2006, 2009 and 2012, covering 51 base countries, and 80% of world GDP (Institutional Profiles Database 2016). Transparency International, further consolidating the quality of this database, has used their data. The reason for using this specific database is that they gather perceptions on distinctly two different *types* of corruption, which fit with my conceptualization of corruption, political and bureaucratic corruption and it potentially allows me to test an important hypothesis in this thesis, namely the effect of different *types* of corruption. I have gathered the data from these four publications manually, added them together to create panel data, and merged it with the two other datasets.

*Choosing one:*

Only one of these corruption measures can be specified for each regression model. This is because they measure the same thing, and as such can be expected to have an extremely high degree of multicollinearity.<sup>36</sup> Three factors were given weight when choosing one measurement over the others. The first is validity. Transparency International and the World Bank measure are very similar, and score well considering the definition of corruption in this thesis. The Global Corruption Barometers measurement uses the same definition of corruption, but it is more oriented towards sector specific corruption. The second is reliability. Again, Transparency International and the World Bank is equal, while the Global Corruption Barometer has changed fundamentally several times since its start. The third factor is coverage. The Global Corruption Barometer goes only from 2004 to 2012, with 504 observations. This makes it an inferior measure to the other two. The World Bank measure goes from 1996 to 2012, with 2629 observations. Transparency International's measure is slightly superior in this regard, starting in 1995 with 2429 observations. When the variables are lagged (see method chapter), this will cause the World Bank measure to lose more observations than Transparency's. In addition, Transparency International's measure is more used by the literature than any others are.

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<sup>36</sup> The corruption variables CPI and CoC have a 0.97 value of collinearity in a correlations matrix!

For robustness and extra assurance, I ran two separate regressions with the World Bank measure and the Transparency International measure. The coefficients have the same sign, significance and almost the same size, which is expected due to their extremely high collinearity value.<sup>37</sup>

#### **4.2.1.1. Perception-based measures**

The dominant way to measure corruption since the 90s has been with perception-based surveys and expert interviews. Most of the major indices, as mentioned above, such as, the CPI, GCB, IPD and the CoC are all perception-based measures. These ways of measuring corruption however, has faced much critique because of their inherent systematic bias, and relative poorness as good proxies for actual levels of corruption (Heywood 2015a, 137). Several scholars point out that the very bias the aggregation methods in the CPI and CoC was supposed to counter, is worsened, due to the errors not being random such as Kaufmann argued and assumed, but systematic (Heywood 2015a, 143). In addition, perceptions of corruption has been argued to instead of representing current levels of corruption, they represent a more general record of corruption in the country due to people's inherent memory bias, often creating cynicism. This is a large problem if the point of the measure is to help the formulation of policies against corruption, or as in this thesis, analyze effects at a given place, time, or over time (Rose 2015, 172). The bias created for this measurement also translates into measurement bias, which is a type of specification bias in the linear regression (see section 5.1).

Because I am forced to use perceptions based data, I reflected long on this issue, and one argument came to mind. One could argue that MNC's do not have a different ability than we do to observe reality. As such, their decisions might in turn be affected by corruption as it is measured by these flawed measures, not as corruption truly is. If employing a post-positivistic ontological view this is not a very un-realistic assumption (Guba and Lincoln 1994). We view the world imperfectly, and reality as we see it is affected by what we do, in this case the measures and results we publish on corruption. In terms of using perceptions-based data for estimating effects on other peoples' decisions (MNC's in my case), perception data might not be so flawed after all. It is important however to keep in mind that the measures of corruption might have a systematic bias, and one needs to be aware of this when interpreting results.

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<sup>37</sup> It has been noted in the literature that the corruption variables are counterintuitively measured, as low values indicate higher corruption and vice versa. Some few decide to rescale the corruption variable (Kolstad and Wiig 2013; Cuervo-Cazurra 2008), while many others do not (Habib and Zurawicki 2002; Egger and Winner 2005; Reiter and Steensma 2010; Teixeira and Guimarães 2015). I chose not to rescale.

The only solutions to the critique above on perceptions based corruption data is; to create more sensitive indices (which is extremely difficult and opens up to new criticism of choices). To create an index of actual cases of corruption (of course this will be biased by the fact that corruption is largely a hidden phenomenon and not universally criminalized), and to conduct qualitative studies instead, and sacrifice generalizability for validity (Heywood 2015a, 146–150). As such, there is no universal solution to measuring corruption, although consensus on the concept would definitely help.

#### **4.2.2. Natural resources and Extractive sectors**

Natural resources is seen in the literature as a large motivator for FDI. This makes sense, as it taps into and represents an entire motive for FDI nearly by itself, namely resource seeking FDI (see section 2.1.3). Theoretically, I see this as meaning that even though the market and efficiency motivations for a foreign direct investment might be low, negative or of no consequence, available natural resources can, on its own, attract FDI, thus countering the predicted FDI flow based on market seeking and efficiency seeking variables. Natural resources is therefore an important control variable. As a proxy for available natural resources I use the sum of oil rents, natural gas rents, coal rents (hard and soft), mineral rents, and forest rents, divided by GDP, so we get the extractive sectors percentage of total value added to the nation's economy. This follows the operationalization of Warner and Sachs, which many have based their operationalization on (Kolstad and Wiig 2011; Sachs and Warner 1995) This variable is measured by the World Development Indicators project of the World Bank. Since I am interested in the effect of large natural resources, because the smaller size of the natural resources, the lesser the attraction of MNC investment, I create a dummy variable. All countries that have an extractive sector of 30 percent or larger of total GDP is treated as a country with a large natural resources. This also effectively removes countries that are not very dependent on their extractive resources.<sup>38</sup> If countries are highly diversified and can rely on rents from all sorts of sectors, they may not have the same incentive to demand anything in return from multinational companies, or require anything in return from multinational companies. By using this natural resource dummy and an interaction to corruption, it becomes a theoretically interesting independent variable, potentially affecting the effect of corruption on FDI inflows. Because natural resources are potentially important for FDI inflow, I use the original natural

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<sup>38</sup> I also ran a regression with 20 percent as the cut off, but the results did not change much. The coefficient became somewhat smaller in the fifth estimation.

resource variable as a control variable in all regressions, except for the regression that measures the effect of corruption on FDI in countries with large natural resources.

### **4.2.3. Democracy and non-democracy**

Polity IV measures autocratic and democratic countries on a continuous quality scale between -10 (completely autocratic) and 10 (full democracy). It does this by measuring several sub-indicators such as civil liberties, political institutions and checks and balances. Because the theoretical interest is whether democracy or non-democracy affects the effect of corruption on FDI inflow, I create a dummy from this variable.<sup>39</sup> Based on Polity IV's own categorization, I create a dummy called democracy that contains all countries with a score of six or higher. This is in accordance with Polity IV and their technical note, that states that all countries with a score of six or higher are democratic countries (Polity IV 2016). This dummy variable is interacted with the corruption variable, to estimate the effect of corruption in democratic countries.

### **4.2.4. Quality of Institutions**

Much of the literature that argues that corruption is a deterrent for FDI does so by arguing that corruption decays the quality of political institutions, such as the bureaucracy and the rule of law (see section 3.2 and 3.3.). This is extremely difficult to model, as corruption is potentially endogenous to the quality of institutions, which would make the collinearity values high (see correlations matrix, appendix 9.1). To see if the effect of corruption upon FDI inflows is different in countries with a relatively high quality in relevant institutions I add two variables from the World Bank's Worldwide Governance Indicators (WGI), namely the quality of governmental and state institutions and the quality of the rule of law. Because of theoretical interest and due to collinearity issues I create a dummy variable for both of them. The countries that score higher than zero on the measurement is coded as one (high quality), and those who score zero or less are coded zero (low quality).<sup>40</sup> This allows me to test whether corruption's effect on FDI, to the degree that we can separate the effect from the quality of institutions, is affected by the quality in these institutions. While this test is theoretically valid because corruption and quality of political institutions are two different things, though potentially endogenous, it rests on the premise that there can be high corruption in countries with high quality in political institutions, and vice versa. In my opinion, it is clear that corruption does

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<sup>39</sup> I could have selected the ACLP democracy variable which is a dichotomous variable originally, but it had shorter coverage than Polity IV.

<sup>40</sup> The cut off for the dummy is chosen based on the methodology of the WGI, (WGI 2016)

exist in countries that have high quality in political institutions. As the introduction presented, several corruption scandals surface on a yearly basis in countries such as Norway, Denmark, Sweden, the United States, France, Germany, and so on. Italy, for example, is a country that scores well on the quality of institutions measurements (top 70 percentile), but poor on corruption (score 44 of 100).

The WGI is a dataset that measures the perceptions of people on the quality of governance by employing many business, citizen and expert surveys in all types of countries. The data is not gathered directly, but by different research institutes, NGO's and private firms. The variables in the index are all measured from -2.5 (poor quality) to 2.5 (good quality). They also have a control of corruption variable, which I have presented earlier in this chapter.

The rule of law variable is measured as “the extent to which agents have confidence in and abide by the rules of society; and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence” (WGI 2016)

The quality of governmental and state institutions is measured as: “perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies” (WGI 2016).

#### **4.2.5. International condemnation and pressure**

Another external factor that could affect the effect of corruption on FDI is how corruption is viewed by the public, degree of criminalization and degree of reputational damage through media coverage. There is no doubt that both the accessibility of information through the media and internet has changed drastically, but also in the formulation of laws against corruption for multinational corporations has there been huge changes, and one can argue that the moral view on corruption has changed in the public. Based on the enactment of the conventions and laws presented in section 3.6, I create a time dummy variable from the descriptive variable in the Quality of Government dataset, year. By interacting this with corruption, one can measure whether corruption has different effects on FDI inflows after the year of 2000 than before. As this is a descriptive and sorting variable in the dataset, it is available for all countries at all times in the sample. All years before 2000 takes the value zero, while all the years on and after 2000 takes the value one.

#### **4.2.6. Developing countries.**

To see if corruption's effect on FDI inflow is affected by the level of development in a country, I add the United Nations Developments Program's variable on human development. This is an often used proxy for a country's level of development, even though it does not claim to measure the entirety of development. The level of human development is also highly correlated to the level of infrastructure, urbanization and economic prosperity in a country. As such, a high score on the Human Development Index (HDI) also usually indicates the maturity of the state, its institutions, and its effectiveness.<sup>41</sup> I created one dummy variable from the HDI variable. All countries that score 0.7 or higher is classified as developed countries and coded 0, while the countries that score 0.69 or lower is classified as less developed countries and coded 1. The values for the dichotomization is chosen from the technical note and the ranging scheme of the UNDP itself (UNDP 2016).

### **4.3. Control variables**

In addition to the independent variables listed here, which are of theoretical interest to this thesis, I add the following control variables that are not of theoretical interest, but are potentially important determinants of FDI inflow: GDP, GDP growth, taxes, volatility of inflation, export/import and natural resources. All these variables have proven important determinants in the foreign direct investment literature, and to exclude them would probably cause my models to be underspecified, causing a specification bias. As was touched upon in section 2.1.2, the control variables also represent the three different motivations of FDI, resource seeking, market seeking and efficiency seeking.

I have chosen to measure market size as absolute GDP. It has been pointed out though that this measure has some weaknesses. It could measure the size of the population, as opposed to the actual size of a market. The alternative is to use GDP per capita. However, GDP per capita will underestimate strong economies with large populations, such as the USA for example (Blonigen 2005). In addition, even though absolute GDP may reflect larger population, not larger markets due to low income levels in the population, this might not be a real issue anyway. People do not need to have the living and income standard of for example Norwegians to purchase goods. It is not only the most affluent countries that have populations that can buy goods that are not

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<sup>41</sup> Note that there is a discussion in academia as to the validity of the UN, IMF and World Bank measures for developed / less developed countries. For more detail, see (Nielsen 2011).



strictly necessary. I therefore chose to use absolute GDP as the measure of market size.<sup>42</sup> The variable is measured in the World Development Indicators at the World Bank. It is available in the QoG dataset and is measured in millions of power parity purchasing US dollars.

Economic stability is expected to be important for multinational corporations when deciding to invest in a country or not. A steady level of inflation is preferable, as it makes budgeting, planning and investing easier, and it implies a stable and foreseeable economy. High inflation or volatile inflation indicates an unstable economy where growth, employment and trust in financial markets is dynamic. Thus, the conditions for an investment might change relatively quickly (Asiedu 2002). Due to some extreme values, this variable has been logarithmically transformed.

The effect of tax levels on FDI inflow is somewhat contested. Several scholars find that higher taxes decrease FDI inflow, some find that taxes are not that important, while some find that higher taxes increases FDI inflow (Blonigen 2005). It is considered an important determinant though, and as such I include it in my models. Level of taxes is measured as the total average level of taxes on income, profits, and capital gains and are levied on the actual or presumptive net income of individuals, on the profits of corporations and enterprises, and on capital gains, whether realized or not, on land, securities, and other assets. The variable is measured by the World Development Indicators at the World Bank.

Openness to trade is supposed to reflect the attitude of a country towards foreigners in their economy. The more trade, the more open and positive the country is expected to be. This is important because it is conducive to market friendly policies and good investment climates (Blonigen 2005). Openness to trade is measured as the sum of export and imports, divided by GDP. This tells us how large part of the economy trade with other nations is. The variable is measured by the World Development Indicators of the World Bank. Due to some extreme values, this variable has been logarithmically transformed.

Market growth is potentially an important variable of FDI inflow. It is closely tied to market size and follows the same logic. If an economy is swiftly growing, there are many opportunities to “get in on the action”. As such, the higher growth, the more potential, and the more likely it is that FDI flows will increase. The higher the growth, the larger the market becomes as well,

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<sup>42</sup> I also ran a regression with GDP per capita as the control variable. While the coefficient size changed some, significance levels and the sign was the same. In addition, there were no substantial change in significance for all the other variables in the regression.

which will attract market seeking FDI (Alon 2010). Market growth and potential is measured as GDP percentage growth, and is measured by the World Development Indicators at the World Bank.

#### 4.4. Descriptive characteristics of the data

The descriptive statistics for my variables are presented in table 5 below. Instead of only using the regular summary command in STATA, I first use a special summary command that reports the within and between standard deviations of the variables (xtsum). This will allow us to see the ratio of within and between variance the independent variables have.

*Table 6: Within and Between variation*

Variable	Between st. deviation	Within st. deviation
FDI inflow	2.490	1.379
Corruption (TI)	2.041	0.430
Bureaucratic corruption	1.028	0.545
Political corruption	0.930	0.459
Democracy	6.225	2.020
Human Development Index	0.161	0.022
Bureaucratic Quality	0.981	0.185
Political Stability	0.968	0.304
Quality of Rule of Law	0.979	0.175
<b>GDP growth</b>	4.666	4.968
<b>GDP</b>	1.28	3.27
Extractive sector/GDP	14.252	5.476
Taxes	11.816	4.576
Export and Import/GDP	43.755	16.84
<b>Inflation rate volatility (%)</b>	16.400	33.391

This table clearly shows that for the majority of the variables, the majority of the variance is between countries. If one were to run a fixed effects model to test the effects of these variables upon FDI, the between variation would be controlled out and we would estimate only the within variance. Some of the independent variables do reveal a large amount of variance over time. Market potential measured as GDP growth and market size measured as GDP naturally has the

most variance over time. What is interesting however is that they do have surprisingly large between variation as well. The reason for the majority of within variance is from the nature of the variables, the size of an economy does grow over time, and that is reflected in the within variance. Economic stability, measured as the change in inflation rates, also has its majority of variance from the within component, which indicates that inflation rates have been unstable over time.

**Table 7: Regular characteristics**

Variable	Obs	Mean	Std. Dev	Min	Max
FDI(log)	3300	6.148	2.748	-11.512	12.657
Corruption, CPI (TI)	2429	4.284	2.216	0.4	10
Bureaucratic Corruption, IPD	200	1.695	1.157	0	4
Political corruption, IPD	200	1.957	1.031	0	4
Polity IV	2901	3.294	6.547	-10	10
HDI	1238	0.667	0.163	0.262	0.943
Bureaucratic quality	2629	-0.060	.997	-2.450	2.429
Political stability	2646	-0.645	0.999	-3.32	1.668
Quality of Rule of Law	2686	-0.068	0.992	-2.668	1.999
Market potential	3288	4.129	5.672	-47.552	106.278
Market size	3174	3.92	1.34	2.33	1.60
Natural resources	3305	9.955	15.186	0	94.640
Taxes	1849	22.569	12.642	0.348	75.237
Trade(log)	3136	4.338	0.546	-1.175	6.331
Economic stability(log)	3133	1.542	1.157	-5.115	6.900

From the regular summary table above we can observe that there are large differences in amounts of observations on the different variables. FDI inflow for example, has 3300 observations, while HDI has 1208.<sup>43</sup> This can cause a high number of missing observations in the regression. There is also large variation in FDI inflow. This is good, because little variation would make it difficult to measure impacts of the independent variables. As mentioned above,

<sup>43</sup> Initially the observations for the independent variables were slightly higher. However, as will be discussed in section 5.1 and 5.6 I lag the independent variables to attempt to remedy the issue of reverse causality and simultaneity, as well as the theoretical expectation that changes take time to make their effect, and are not instantaneous.

FDI has been logged, and the negative values dropped. However, values between zero and one that are transformed will become negatives, and this is ok. The problem is when you have values that are negative before the transformation. As such, the minimum value is still a negative, -11.5, while the maximum is 12.6. In addition, corruption shows much variation with observations all over the zero to ten scale with a total of 2429 observations. In general, this dataset has many observations, which is one of the benefits of panel data. The exception is the two variables from IPD, which will only be used for one model with 200 observations each. Further, the Polity IV measure of democracy has much variation, and so does the Human Development Index, with observations covering nearly the entire scale and relatively large standard deviations from the mean. However, the Human Development Index does have relatively few observations, compared to the other variables. This is also reflected in the regression model with the HDI as an explanatory variable, where the total n drops to 1025. The quality of political institutions variables also displays solid variation with over 2600 observations. These have very similar coverage due to being from the same dataset. The fact that variables such as these, which do not have much variation over time (within), display such variation reflects the fact that the data sample is highly diversified in regards to country coverage. This is a good quality to have in a dataset.

One of the downsides of my dataset is that of missing observations. As such, when ordering the dataset by country and year in STATA, I am notified that the dataset is unbalanced. This is mostly due to the fact that I have merged several datasets together, and the raw datasets have varying coverage. Missing observations are not usually an issue, as long as the missing observations are not systematic. If the missing observations are systematic, then the reason they are missing is somehow correlated to the dependent variable (Verbeek 2004, 381). I do not see any correlation between foreign direct investment, and the fact that for example the values for foreign direct investment inflow is missing from Afghanistan in 1997 and 1998. Because my time series starts in 1995 (96 with lag) and ends in 2012 I avoid the most common repercussion of missing observations, namely that of heavily underrepresented low developed and/or non-democratic countries. If the time series had started in 1970, developed and democratic countries would have been heavily overrepresented, giving us misleading coefficients for a general relationship. Values can be imputed manually to decrease the number of missing values. However, this requires that we have some data to justify our guess. The large majority of the missing values in my dataset are from countries that simply have no coverage in one of the raw

datasets, and as such we have no origin or point to estimate from.<sup>44</sup> In addition, many missing observations come from countries that are covered later than others, such as Afghanistan. Of the control variables that are included in every regression, taxes has relatively low observations and causes many missing observations. In fact, over 600 observations are lost when adding the taxes variable to the regression. I therefore run my baseline regressions without that variable, but I add regression results with it in a column because it has proved significant in other studies.

Because the missing observations are not systematic, there is no particular danger in employing the unbalanced dataset.

## 4.5. Country sample

Because I am most interested in global trends, I do not narrow my sample of countries to for example African countries or Western countries. In addition, several of the interactions I run requires that I have a good spread and coverage of country types (i.e less/highly developed, highly corrupt/little corruption, highly institutionalized/lowly institutionalized). As such I include all the countries I can to approximate a world sample. Initially the Quality of Government dataset contains 211 countries. However, the UNCTAD dataset contains only 179 countries between 1995 and 2012. The majority of these “missing countries” is due to the fact that the countries do not exist anymore in the time period I study. Only a few countries are left out due to non-coverage.<sup>45</sup> The coverage of countries is very broad and relatively balanced for my time period. All the regions of the world is represented by several countries. In the majority of the regression models, the number of countries is 171. The only variables that has a significantly lower coverage of countries is the political and bureaucratic corruption variables, and the economic control variable, taxes. In these regression models the number of countries is 47 and 140.

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<sup>44</sup> For example, Andorra is simply not covered in the UNCTAD database, but it is covered in the Quality of Government database, thus generating missing observations.

<sup>45</sup> Countries such as the Soviet Union exist in the Quality of Government dataset, because it starts in 1946. In the time period I am studying however, the Soviet Union no longer exists, and as such has no data on the variables, and becomes a “missing country”. The full list of countries that are dropped for different reasons is available in appendix 9.3 and the complete list of the 171 countries in the majority of the regressions is also available there.

## 5.0. Method

This chapter will describe and discuss my choice of method, the linear regression, my choice of data, panel data, my choice of estimation technique, within and between random effects estimation and GEE estimation, the method of multiplicative interactions and in the end summarize my choices and attempts to fix econometric issues. With this chapter, I hope to make the differences in estimations clear, and clarify why it is so important to choose the correct one in regards to what our research question is.

### 5.1. The nature and assumptions of linear regression.

Linear regression models attempt to create a best possible fitted line to describe changes in some variable of interest (dependent variable, D.V.) by using a certain amount of variables to explain the changes that happen (independent variables, I.V.). However, simply finding a best fitted linear line based on our data is usually not enough. We want to be able to say more, we want to be able to infer our findings from our sample into a larger universe or population. We want to establish that there is a fundamental relationship between our variables of interest, not a historical or context specific coincidence. As such, the method of regression is based on statistical theory, so that if our results hold, we can generalize our findings. The basis of a linear regression model is usually

$$1) \gamma = \beta_1 + \beta_2 X_2 + \dots + \beta_K X_K + \varepsilon$$

In equation 1,  $\gamma$  is our dependent variable,  $\beta_1$  is the constant value of our dependent variable, also called the intercept term, and the other  $\beta$ 's are the coefficients of the independent variables that are  $X$ , which we believe explains the changes or variation in  $\gamma$ .  $\varepsilon$  is the error term, which contains all of the variation in  $\gamma$  that we don't explain with the independent variables we have included. Now, for this model to have any actual meaning beyond the sample on which we base the values of our dependent and independent variables we need to make certain statistical theory assumptions, which, if they hold, will allow us to extend our results to a greater population from which our sample has been collected. The degree to which they hold will also create certain attractive characteristics in our regression model, namely: Best Linear Unbiased Estimates or BLUE (Gujarati and Porter 2010, 60). In econometrics books, they distinguish between parameters, often using the symbol  $\beta$ , and the estimator, often symbolized by  $b$ . In this thesis,

when I write equations or use symbols for the equation, they always represent the estimator, if not specified as the parameter.

1. The first assumption is that our model is indeed linear in its parameters. If the actual relation between Y and X in the population is not linear, then we cannot hope to fit a good linear line on the relationship between Y and X with our coefficients ( $\beta$ ). It follows from this logic, that our model needs to be correctly specified (Gujarati and Porter 2010, 97). A model can be misspecified a number of different ways; omitting a relevant variable, including an irrelevant variable, using the incorrect functional form and errors can be made in the measurement process.

As for my model, there are some clear issues that are important to be aware of and control for if possible. While I have added the most used variables to explain FDI in my estimation there is good reason to think that some relevant variables are left out. This can cause our included estimators ( $\beta$ ) to be biased, if they are correlated to the relevant variables left out (omitted variable bias and unobserved heterogeneity, see discussion below). If the variable that was left out is not correlated to the other independent variables it can still affect the variance in the estimation, causing unnecessarily high standard errors, increasing our chance of committing a type two error (Gujarati and Porter 2010, 223).<sup>46</sup> The variables selected for my estimation have, as described in chapter 4, a good theoretical and empirical reason to be there. They are of theoretical importance in the field of FDI, and they have been used previously by other studies and found to be significant. I therefore do not suspect that my model suffers from inclusion of irrelevant variables. In addition, almost all the control variables are continuously significant in nearly all my models.

With regards to errors in measurement there are certainly issues with my model, due to a few variables. This has been discussed in chapter 4 for the variables in question. It is particularly in the variables that are aggregated from perception (corruption), expert interviews and surveys (the quality of institutions) that might be measured wrongly or contain a certain systematic bias. In addition, it could be that the error in measurement is caught up by the error term, causing the issue of a correlation with the independent variable and the error term. This is a constant issue with social science data, and it is important to consider this while interpreting our coefficients and drawing inferences. In effect, these sort of measurement errors can cause biased variables,

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<sup>46</sup> There are two types of errors in regards to hypothesis testing. A type one error is to reject the null hypothesis when we should not have. A type two error is to keep the null hypothesis, when it should have been discarded (Gujarati and Porter 2010, 500)

as they do not reflect the real universe or population.<sup>47</sup> There are also many missing observations on several variables in my dataset. This is a normal problem when working with large datasets and particularly with merged datasets. This has been discussed in the descriptive statistics section (4.4).

As for the functional form of my model, scatterplot and histogram has been used to see if a linear model is the right estimation to estimate FDI inflow. The results showed that while following a linear form to a certain degree, there are some serious spikes and outliers, which will not fit well on a linear function. This has been pointed out in previous literature as well, and the recommended fix for this is to log FDI inflows. Once this had been done, new histogram and scatterplot revealed a much better fit for a linear regression (See appendix 9.4). This also ties into the assumption of normality, which is discussed below.

2. The second assumption is that our independent variables ( $X$ ) are uncorrelated to the error term,  $\varepsilon$ . If our independent variables are correlated to the error term, we cannot estimate unbiased coefficients.

$$E(X_k, \varepsilon) = 0^{48}$$

When the independent variables are not correlated to the error term, they are often described as being exogenous. As such, when they are correlated to the error term, they are described as endogenous. Endogeneity is in the econometric literature a term for a group of phenomena that correlates the independent variables to the error term, and thus to the dependent variable (Woolridge, 2002, p. 50). However, many political scientists relates endogeneity directly to reverse causality and simultaneity (Bell and Jones 2015, 138). As such, for all the other chapters of this thesis, econometric issues are referred to by their most direct name (i.e unobserved heterogeneity, reverse causality), and not as a form of endogeneity. Most notable and relevant for my analysis are unobserved heterogeneity, measurement error, simultaneity and reverse causality.

#### *Unobserved heterogeneity:*

As mentioned above, any relevant variable not included into our model will become a part of the error term (because  $\varepsilon$  equals the parameter  $\gamma$  minus the estimated  $\gamma$ ). This can cause the issue known as unobserved heterogeneity, which causes biased estimators. The issue of

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<sup>47</sup> However, see argument in section 4.2.1.1 on perception based measures, MNC decisions and ontological view.

<sup>48</sup> This is simply a mathematical expression of the assumption, to make it perfectly clear what assumption I am writing about.



unobserved heterogeneity is a source of much discussion because it has large implications for the estimation method. The issue of unobserved heterogeneity will be discussed to great length below (see section 5.2 and 5.3). The common fix for this issue is to employ a fixed effects model, or use instrumental variables (Woolridge 2002, 51).<sup>49</sup>

*Measurement error:*

When the measurement error of a variable causes information that is relevant for explaining our dependent variable to drop out of our model, this information will become a part of the error term. If this information has a correlation to the variable we have measured wrongly, there will be a correlation between the included independent variable and the error term (Woolridge 2002, 68). This has been discussed above.

*Simultaneity and reversed causality:*

If  $\gamma$  has an impact on  $X_2$ , meaning that the causality does not run the way we hypothesize, or it runs both ways, we cannot assume that  $X_2$  is independent from the error term. For example, if corruption not only affects the level of FDI inflow, but somehow the level of FDI inflow affects corruption as well, our estimation will be biased, if we do not take this into account (Verbeek, 2008, p. 138).

The most common situation this happens in, is if  $\gamma$  and  $X_2$  are simultaneously determined. In economics, this refers to systems where several closely related variables are determined in common equations (Verbeek 2008, 138; Woolridge 2002, 68). Take Verbeek's own example of the Keynesian consumption function. We want to determine the function of aggregate income on aggregate consumption. However, aggregate income is not an exogenous variable to consumption, because aggregate income is calculated from aggregate consumption and aggregate total investment in the economy. Thus,  $\gamma$  and  $X_2$  are jointly or simultaneously determined. Because  $\gamma$  affects  $X_2$  the assumption that  $E(X_k, \varepsilon) = 0$  does not hold (Verbeek 2008, 139).

The issue of reverse causality and simultaneity between FDI and corruption, which are the main variables of interest in this thesis, is a known issue in the literature (see section 3.8.2). This is also nicely illustrated by the fact that there is a literature, albeit far smaller, on the effect FDI has on the levels of corruption in a country (Kwok and Tadesse 2006). As such, I see a clear

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<sup>49</sup> Note that a fixed effects model only controls for the between variation unobserved heterogeneity (the group level). If there is unobserved heterogeneity bias in the within variance of a variable, this will not be controlled for.

potential issue with reverse causality and simultaneity in my models. The problem of omitted variables causing heterogeneity bias is certainly a concern (see section 5.2 and 5.3), and I am well aware of the potential measurement errors on perception based variables. However, I do not see it as likely that the error in measuring corruption is correlated to the error term (Woolridge 2002, 68). A reason for this is the argument that MNC's FDI decisions would also be based on flawed information (see section 4.2.1.1.).

There are several ways to handle the subcategories of endogeneity. For reverse causality, lagging the independent variables in question is a treatment that has been very common in political science (Bellemare, Masaki, and Pepinsky 2015, 1), although it has lately been argued that it does not solve the issue. The most recommended fix is to use an external instrumental variable to correct for the bias (Verbeek 2008, 140–141). As for simultaneity, one can perform simultaneous equations, use external instruments or employ other estimators such as GMM. One can also lag the independent variable as with reverse causality, although again according to new literature, this does not really solve the issue (Al-sadig 2009, 273; Bellemare, Masaki, and Pepinsky 2015, 29; Freckleton, Wright, and Craigwell 2012, 644). For the unobserved heterogeneity bias, one must either employ a certain estimation technique (fixed, random and within and between will be discussed), or use external instruments. It is important to keep in mind that remedies for econometric issues do not produce perfect models, they however alleviate the problem to a degree so that hopefully, our models are not so wrong as to not be of use.

3. The third assumption is that the error term,  $\varepsilon$ , follows a normal distribution (normally a t-distribution), and as such has an expected average value of zero. This is key for generating standard errors and performing hypothesis testing (Gujarati and Porter 2010, 97). When the error term is normally distributed it is also independently and identically distributed (IID).

$$E(\varepsilon) = 0$$

This assumption is often referred to the normality assumption. Breaking this assumption would lead to issues when calculating the standard errors and thus t values of our independent variables. It would not cause bias or ineffectiveness in the estimators. While several of my variables depict skewedness to a certain degree (which could cause a break in the normality assumption) in histograms, it will not be a problem in most of my models. The Central Limit Theorem ensures that with a large sample size (usually >200) the disturbance term will

approximate a normal distribution. However, the variables on political and bureaucratic corruption only have 200 observations, and as such, they might be affected if normality was an issue. To be sure of this, I run the shapiro-francia test of normality (see appendix 9.5). The test is significant for most variables which indicates that the variables do not follow a normal distribution.<sup>50</sup> However, these tests are susceptible to creating significant results for large sample sizes. My variables usually have over 1500 observations each. I thus choose to rely on the central limit theorem. For the political corruption model this caveat will be kept in mind as a potential weakness.

4. The fourth assumption is that the variance of the error term is homoscedastic. This means that on average, the spread of the variance is equal on both sides of the mean value for all of the observations, and is constant. If this is true, the variance of our independent variables will also be homoscedastic (Gujarati and Porter 2010, 97).

$$\text{var}(\varepsilon_i) = \sigma^2$$

It is commonly known in the field of econometrics that heteroscedasticity is very usual in cross-sectional data. A simple example illustrates this. If we want to measure the effect of personal disposable income on the degree of savings people do, it is illogical to believe that people that are rich and people that are poor will have the same degree of variance in their degree of saving due to increased income. Rich people can afford to save more, and thus will have a higher level of variance than the poor, who will find it difficult to save money (Gujarati and Porter 2010, 275). When countries are the unit of measurement, we often also get issues with heteroscedasticity due to issues of scale. GDP measured in the US will have a much larger variance than GDP measured in Norway, simply because the US is a much larger country and has a much larger absolute scale of GDP. I run a residual scatterplot to see if there are any indications of heteroscedasticity. As suspected, the residuals follow an upwards funnel shape, indicating heteroscedasticity (see appendix 9.6 for result). This can cause my model to be either positively or negatively biased in its estimation of the standard errors, removing the BLUE traits of our estimators. This makes our hypothesis testing, and therefore our ability to infer or generalize, compromised. We can no longer trust our standard errors and t values (Gujarati and Porter 2010, 280). The issue of heteroscedasticity can be countered in several ways. One can estimate with special techniques that allow us to conduct a variance stabilizing transformation,

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<sup>50</sup> Democracy, high quality judicial institutions, and bureaucratic corruption is not significant, indicating normality.

such as weighted least squares. Another possibility is to logarithmically transform the variable in question. One can also employ robust standard errors that cluster variance around the unit of analysis (countries).

5. Assumption number five states that there can be no autocorrelation between the error terms of different observations. This means that there can be no dependency or structural relation between the values taken on a given variable across time and space.

$cov(\varepsilon_i, \varepsilon_j) = 0$ . Where “i” and “j” indicate two different observations on the same unit.

While heteroscedasticity is common in cross sectional data, autocorrelation is common in time series data. This is logical given the nature of how we measure our data in a time series. If there is no dependency between two observations of, let us say GDP, then that means that GDP could just as likely take any other value as opposed to some percentage increase of the last observation. Since observations of GDP usually are based on the observation preceding it, with a given percentage growth, there is clear correlation between the values in these two time observations, and thus also in our error terms. This type of effect dependency is often referred to as inertia or sluggishness (Gujarati and Porter 2010, 312 – 315). The consequence of autocorrelation is, like heteroscedasticity, that our estimators will no longer be efficient. They will be either negatively or positively biased, producing standard errors and T scores that are unreliable (Gujarati and Porter 2010, 316). In my dataset, which is a panel, all of my variables are likely to suffer from autocorrelation. Variables such as GDP, trade, and GDP growth will probably be affected by inertia, measures of corruption are usually based on the previous year measure, and the same is true for most of my quality of institutions variables such as quality of rule of law and bureaucracy. I have run a Wooldridge test, which conducts an autoregressive 1 year lag scheme to see if there is high correlation between the residual and its corresponding one-year lag of the independent variables. It is highly significant for nearly all the variables,<sup>51</sup> indicating that my independent variables are affected by autocorrelation (see appendix 9.7). The suggested way of dealing with autocorrelation is to transform the variables so that the values are no longer auto-correlated. These transformations usually calculate the degree to which a value is dependent on the value preceding it, and subtracts this. These transformations are often referred to as generalized difference models. Another suggestion is the use of robust standard

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<sup>51</sup> Market potential and trade show signs of no autocorrelation. However, when logarithmically transformed, trade is significant for autocorrelation.

errors, which attempts to correct for both heteroscedasticity and autocorrelation (Gujarati and Porter 2010, 325).

I also ran the Wooldridge test on the dependent variable, FDI inflow. It reveals that FDI inflow is very dependent on last year's value (up to 82 percent). This is known as an AR 1 issue (Autoregressive 1).<sup>52</sup> A common procedure to account for this is to add the one year lagged version of the dependent variable as an independent variable. This is not an unproblematic treatment though. By adding the lagged dependent variable on the right hand side of the equation, we expose the model to very high multicollinearity and make it difficult to achieve any significant coefficients, as well as theoretical and logical issues in the interpretation. Another solution is, as with autocorrelation in the independent variables, to use a transformation. The Prais-Winsten transformation is a known treatment in the field, and is a form of generalized difference model. It essentially calculates the degree to which a model relies on the previous year's variance, and then subtracts this. However, through mathematical manipulation it allows us to keep the first year observations, thus not transforming the values into pure yearly change values (Gujarati and Porter 2010, 326). The Prais-Winsten transformation is not directly accessible for panel data in STATA. However, the STATA forums and Jeffrey Woolridge himself, recommends the "xtgee" command, which utilizes generalized estimation equations (STATA Forum 2015). This command allows us to specify that we have an AR 1 issue, and it uses a Prais-Winsten transformation to control for this. The generalized estimation equations is somewhat technically different from random effects estimation, but not substantially different and the results they produce are extremely similar (Gardiner, Luo, and Roman 2009, 235). Another issue that relates to autocorrelation is the issue of stationarity.

#### *Stationarity:*

When using a time dimension as one does in panel data, the issue of non-stationarity can be a problem. Stationarity is present in a given variable if its mean, variance and covariance/autocorrelation is constant across all  $t$ . Essentially, it states that you may have data that violates the assumptions of linear regression, but those flaws need to be constant. This assumption can be broken by for example trends in data, which is quite usual in economic variables such as GDP and GDP growth. If there is non-stationarity in our data, it can lead to a

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<sup>52</sup> This is also obvious from Model 1 where I report the rho value for the fixed and random effects estimations. The larger the rho value, the larger amount of the variance of the dependent variable is explained by the previous value of the dependent variable itself.

spurious regression. This will cause us to make a type one mistake (Gujarati and Porter 2010, 380). I have run the test “xtfisher” in STATA, which checks if there is any unit roots in the variables, signifying stationarity. Most of my variables are significant in the test, which rejects non-stationarity (see appendix 9.8). However, as expected GDP shows non-stationarity and somewhat surprisingly democracy also shows signs of non-stationarity, though not as strongly as GDP. The proposed fix for this is to transform the non-stationary variables by differencing them (Gujarati and Porter 2010, 382–384). However, by using the Prais-Winsten transformation in the generalized equations estimation I do employ a differenced estimator. This will then alleviate the non-stationarity issue.

6. The final assumption is that there can be no multicollinearity. Collinearity is the degree to which certain variables measure the same variation. If the degree of collinearity is high, and the higher it gets, it will affect the collinear estimators in question and produce high standard errors. In addition, if two variables are affecting each other are both on the right hand side of the regression equation it will cause high multicollinearity.

When the level of multicollinearity becomes high, we increase the likelihood of committing a type two error (Gujarati and Porter 2010, 248). As such, we might include an important variable that increases our substantively explained variance of the dependent variable, but because the variable is so highly collinear with another independent variable, one of these variables might become insignificant, even though they are both substantively important to have in the model. An example from my data could be corruption and level of development. These two variables measure different theoretical things, but they are highly collinear, measuring up to 72 percent of the same variance (see correlations matrix, appendix 9.1). Thus, they might inflate each other’s standard errors. Dropping level of development however, would be to commit a misspecification error (which as explained above can cause estimator bias), because level of development has a theoretical and proved importance of explaining FDI inflows (Reiter and Steensma 2010). In my correlations matrix it is quite clear that several of my variables might suffer due to multicollinearity. Most notably is corruption and the level of development, corruption and governmental and state institutional quality and quality of judicial institutions. To see if the multicollinearity is a problem, I run a VIF test on my models and reports this in the results. No econometric law defines a tolerance limit for the values on a VIF test, however, it is common to worry about multicollinearity when the VIF value comes close to 10 or higher. However, if there is high multicollinearity, measured by the VIF test, and the result is still significant, these results should still be trusted. In fact, O’Brien argues that if the VIF is very

high (>20) and the results still come out as significant, the small difference in variation between the two variables in question must be very important, and should *not* be viewed with skepticism at all (O'brien 2007, 683). If the VIF values for any of the regression models is high, this will be discussed in the results.

Due to high multicollinearity in several variables of theoretical interest, I run hypothesis specific models to answer the individual hypotheses. This is also in line with one of the most common fixes for dealing with multicollinearity, which I criticized above, namely dropping one of the variables. However, with hypothesis specific models, at least we do not discard a potentially important variable completely; we simply estimate two different models. For example, the quality of governmental and state institutions is only added for the model that attempts to answer the hypothesis relevant for that variable. The same goes for the variable on the quality of judicial institutions. If I had used these highly collinear variables together in all my models, they would have drastically increased the multicollinearity of all my models, and highly increased the standard errors. To do these hypothesis specific models is a valid solution. Firstly, the multicollinearity in several of my independent variables is not there because I actually theoretically measure the same things. It is there because the measurements are flawed. Secondly, this method is much better than to simply drop several of the independent variables and reduce the scope of this thesis, because it achieves the same while still keeping the ability to use all of the independent variables of interest, only in different models. This is particularly so if we adhere to O'brien's argument that multicollinearity is not an issue at all, as long as the variables come out significant.

If all these assumptions of the linear regression hold, or holds to a certain degree when using other, but similar estimators to the OLS estimation (such as GLS), we can generate standard errors for our estimators ( $\beta_2 \beta_3, ..$ ), our estimators will be BLUE, and as such perform valid hypothesis testing. By performing hypothesis testing we get results that tell us whether we can, with a reasonable level of probability, extend our sample-based results to the wider population (Gujarati and Porter 2010, 103–105).

## **5.2. Panel data**

Because I am interested in seeing what effect corruption has on FDI inflow, it is natural that I study as many countries as possible since FDI is a global phenomenon, using cross sectional data. To be able to say anything substantial about corruptions effect on FDI inflow it is also very beneficial to add a time dimension. This will allow us to observe what effect changes in

variables have. This leaves me with employing time series cross sectional data, or panel data. Panel data is built on observations of different units repeatedly over time. As such, it enables for more sophisticated, and most importantly, more realistic models than either cross-sectional data or time series data separately (Verbeek 2004, 341). It is also the most commonly used type of data in comparative political economy, and quickly growing in political science (Beck and Katz 2011, 332). There are several advantages in using panel data, such as explanatory power and number of observations, but there are also some particular issues concerning the key assumptions described above. In my data, the cross-sectional unit of observation is country and the time series observation is country-year.

Observations increase drastically with panel data, because the unit observed is counted (1, 2, 3 ...n) over time (1, 2, 3 ...T), which means that the total number of observations will be  $n * T$ . If there are one hundred countries in the analysis over a period of ten years that means we have one thousand unit observations, instead of simply one hundred or ten. In the world of regression, a higher number of observations is very useful in both increasing the degrees of freedom we have for modeling, and the general robustness of the analysis. Panel data also allows us to observe the effect of our variables at several points in time, which is useful in minimizing the risk of effect preceding cause, giving us results that are more robust and decreasing the likelihood of a spurious correlation. Further, there is simply more information to be collected from panel data, as it covers two dimensions (time and space), as such giving a more realistic picture of the reality which we try to estimate. However, the most coveted feature of panel data is that it creates possibilities of controlling for unobserved heterogeneity. Unobserved heterogeneity, if present, will break a key assumption described above, namely that our independent variables are not correlated to the error term. (Verbeek 2004, -345) (also see section 5.1, assumption 2).

How we approach and handle the possibility of controlling for unobserved heterogeneity is essential in panel data analysis, because it ultimately produces different estimation techniques, such as fixed or random effects. To explain the issue of unobserved heterogeneity and how panel data estimation can control for it, let us break down a standard panel data regression equation shown above (1)), but now differentiating between two components of the error term.

$$2) \quad \gamma_{it} = \beta_1 + \beta_2 X_{2it} + \dots + \beta_K X_{Kit} + \varepsilon_{it} \quad \varepsilon_{it} = (\mu_{it} + \alpha_i)$$

Equation 2 is the same as equation 1 above, except we here distinguish two components of  $\varepsilon$ , and we use  $i$  to denote cross sectional observation and  $t$  to denote time series observation. The



error component  $\mu_{it}$  is the random error term that captures all unobserved variation that varies over time (the typical within effects produced from the time dimension). The error component  $\alpha_i$  captures all the unit specific unobserved variance, which does not vary over time (the typical between effects from the cross-sectional dimension). Now, our independent or explanatory variables are often correlated to some degree to other independent variables. When the omitted independent variable is correlated to another independent variable specified in our model, the problem of unobserved heterogeneity surfaces. The reason for this is that the variation explained by the omitted variable is absorbed into the error term, which our included independent variable is not supposed to be correlated to. Our estimation is unable to differentiate the effect coming from the error term and the effect coming from our correlated independent variable, making it biased and inconsistent. Fixed and random effects can, through exploiting the unobserved heterogeneity effect over time and groups, control for this effect, but in very different ways, restoring the assumptions we need to fulfill to extend our results (Bell and Jones 2015, 141).

### 5.3. Fixed effects and random effects.

The fixed effect model estimates intercept terms for each individual group unit (countries in my case). It is usually seen as the golden standard for researchers employing econometrics, because of its simplicity, and because of the efficient controls it provides. Producing individual group unit intercepts means, if countries is the group unit, that Norway would have its own intercept, Sweden its own, Germany its own, and so on. These individual intercepts will capture all the group specific variation that is constant, as such controlling for any unobserved group specific variables and effects that affect the dependent variable and our included independent variables, should they be present in the error term. Thus, the equation becomes:

$$3) \gamma_{it} = \alpha_i + \beta_2 X_{2it} + \dots + \beta_K X_{Kit} + \varepsilon_{it} \quad \varepsilon_{it} = (\mu_{it})$$

Then, the fixed effects estimation eliminates or controls away the group specific intercept term,  $\alpha_i$ . As such, we end up with a “within effects” estimator, because the only effects allowed are the ones that are not group-specific and constant, but those who are within a group, changing over time (Woolridge 2002, chap. 10). Thus, if there is any unobserved heterogeneity between any country specific effects variables (between effect) and our included independent variables, we effectively remove this bias. If considering the within and between variation summary table in section 4.5, all that between variation would be eliminated from the regression. As such, if we run a fixed effect regression and we include a time-invariant variable (only has between variation) that is of theoretical importance for our analysis, it will be omitted by the model

because it is group specific and does not vary over time. So there are some clear trade-offs with this method. In addition, if there is any unobserved heterogeneity bias between any omitted within effects variables that are absorbed in the error term and our specified independent variables, we do not remove the problem by using fixed effects (Bell and Jones 2015, 139). However, due to the nature of hierarchical data and homogenizing effects there is almost always some form of unobserved heterogeneity bias from group specific, time invariant variables that we do not include for whatever reason and our specified independent variables (Arceneaux and Nickerson 2009; Bell and Jones 2015; Christophersen 2013, 108).

In a random effects model the group specific effects are included ( $\alpha_i$ ), because they are assumed to be on average independently and identically distributed just as  $\mu_{it}$ , and the intercepts are allowed to vary for each group unit (Woolridge 2002, chap. 10). By not removing the country specific and constant variables we include more information into our model, our ability to generalize increases, making our model and coefficients more effective, precise and of course allowing us to use a larger variety of variables to explain phenomena (Bell and Jones 2015, 2). However RE is *realistically* not able to control for unobserved heterogeneity between the country specific effects and the within country effects. Random effects assumes that the country specific effects are on average equal and random, while realistically we know this is not the case. Particularly countries are seen to be unique and special. Thus, unobserved heterogeneity is argued to be a large problem when using the random effects estimation. In addition, the combined error terms will suffer from a particular form of autocorrelation, or dependency. To account for this, and maintain the assumptions of linear regression described above, the error term is transformed and estimated using generalized least squares (GLS). To estimate the GLS however, we need to know the true variance in the population, which we do not based on our sample alone. Therefore, we estimate the feasible generalized least squares instead, by adding some assumptions. Now, if the assumptions hold in our sample and by statistical test, the population, we will have unbiased and efficient random effects coefficients that allow us to say something about all of the variation of a variable (Verbeek 2004, 348). Note that the RE estimator will use both the within and the between variance, and as such the coefficient it produces for a variable can be seen as a “net” effect of that variable. The between and within components *can* be very different, as I will clearly show in my regression models. That is yet another reason why it is important to separate the within and between effect of our variables of interest, unless we are specifically interested in a “net” effect of a variable. If that is the case,

regular random effects estimates this very nicely, but would still be exposed to group level unobserved heterogeneity effects from variables that are not included in the estimation.

#### 5.4. Which estimation technique should I use?

To see whether we should use a fixed effects or random effects estimation Hausman suggested a test to see whether  $X_{2it}$  and  $\alpha_i$  is uncorrelated. Essentially, this test tries to see if the assumption we made above, that  $\alpha_i$  is not correlated to our independent variables, creating heterogeneity bias, holds. If not, the test suggests that a fixed effects estimation is superior because it will not be biased by the correlation between  $X_{2it}$  and  $\alpha_i$ . Therefore, the test has a null and alternative hypothesis as follows:

$$H_0: Cov(\alpha_i | X_{2it}) = 0 \quad H_1: Cov(\alpha_i | X_{2it}) \neq 0$$

If the null hypothesis is true, and there is no heterogeneity bias due to  $\alpha_i$ , the estimators for the random and fixed effects estimation will be similar. If there is heterogeneity bias, they will, to a degree, be different and we need to reject the null hypothesis. Note, however, that other misspecification issues that are described above can also cause a rejection of the null hypothesis, such as reverse causality, simultaneity and measurement error (Verbeek 2004, 352).

Bell and Jones however, argue that the Hausman test does not tell us whether we should use fixed effects or random effects, and that if using a within and between estimation, it is redundant (Bell and Jones 2015, 138).<sup>53</sup> What it actually does tell us, is whether the variation in the “within effects” and the “between effects” components are similar, and if they are we can use random effects. This is a crucial difference, because it is precisely when there is large variation (and thus possible valuable information) in the group specific variables and variation that we are told not to estimate this variation by using fixed effects instead. Thus, we give up a lot of information, and possibly important information. This is *particularly* so when we are interested in group specific variables or variation to explain our dependent variable (Bell and Jones 2015, 139). Further, when much of the variation in a variable is due to between effects we eliminate much of that variable’s ability to explain the variation in our dependent variable even if the

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<sup>53</sup> The Hausman test was run for the fixed effects estimation and the within and between random effects estimation to see if this was true. It was. In every estimation, the within and between random effects estimation proved superior to the fixed effects estimation. As such, I do not report Hausman results in the results chapter except for Model 1, as an example.

variable displays some variation over time so that it is not dropped in a fixed effects estimation. For example, the corruption variable has 4/5 of its variation from between effects. Using fixed effects would not drop the variable, but would remove 4/5 of its variation.

Their suggestion, which has been covered extensively by other authors as well (Verbeek 2004, 354), is that of a within and between technique, which relies on the basis of the random effects model (meaning we do not exclude  $\alpha_i$ ). This technique transforms the variable into two components, a within variance component and a between variance component. As such, we get a much more precise estimation, *if* we are not specifically interested in only the within, between or net effect. For example, in some instances one could imagine that the between effect and the within effect are very different. By trying to create one coefficient for these two effects, we would probably attain insignificant results. Bell and Jones argue that this technique directly models and corrects for unobserved heterogeneity:

*“the RE model we propose in this article solves the problem of heterogeneity bias”*(Bell and Jones 2015, 138)

Now, Verbeek refers to this same method of a within and between estimation as a type of internal instrumental approach:

*“Finally, in many cases panel data will provide “internal” instruments for regressors that are endogenous... transformations of the original variables can often be argued to be uncorrelated with the models error term and correlated with the explanatory variables themselves and no external instruments are needed.”*<sup>54</sup> (Verbeek 2004, 345).

Verbeek and Wooldridge (2004, 2002) write that the instrumental variables approach is very efficient for correcting bias, but that it is very hard to find an exogenous variable that we can use as an instrument. However, the approach suggested here creates group specific means ( $\bar{X}$ ) on the independent variables as instruments, which are uncorrelated to the error term, even if the independent variables themselves might be, just as quoted from Verbeek above.<sup>55</sup> As such, our estimation would be:

$$4) \quad \gamma_{it} = \beta_1 + \beta_2(X_{it} - \bar{X}_i) + \beta_3\bar{X}_i + \varepsilon_{it}$$

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<sup>54</sup> Note that Verbeek uses endogeneity as an umbrella term for reverse causality, simultaneity, unobserved heterogeneity and measurement error. Essentially, all errors that will cause our independent variables to be correlated to the error term.

<sup>55</sup> Note however, this approach deals with unobserved heterogeneity bias only, it does not help with the issue of reverse causality or simultaneity.

In equation 4,  $\beta_2(X_{it} - \bar{X}_i)$  represents a variable with within effects that vary over time (easily seen by  $it$ ), and  $\beta_3\bar{X}_i$  represents a variable with “between” or constant unit specific effects (easily seen by only  $i$ ). Our variables here will not be biased by unobserved heterogeneity from the group specific effects, because we use the group means of the variables themselves as instruments, allowing us to safely estimate without excluding group specific variation (Verbeek 2004, -354). Bell and Jones refers to this as explicitly modeling the heterogeneity (Bell and Jones 2015, 134).

In light of the argumentation above on the potential benefits of random effects estimation, so long as we can control for unobserved heterogeneity from group specific effects, and ability to do so by using a within and between transformation, I chose to use within and between effects transformation, and the random effects estimator.<sup>56</sup> Another factor that heavily influences this choice is, as shown in section 4.5, that the majority of the variation in my independent variables is between variation. By separating the within and between component, I can observe more efficient and reliable results, as these two components will not be competing with each other in the calculation of the coefficient. I will also be able to distinguish whether it is the cross sectional country differences that matter the most or the change over time. This is also in line with my theoretical focus. I am interested in all aspects of corruption. Not simply the effect over time, between countries or an overall effect, but all of it, as precisely as possible.

## 5.5. Interaction terms

Conditional hypothesis are quite common in political science, because of the importance of the contextual factors on what we study. As I argue in this thesis, it is illogical to assume that corruption will have the same effect in different contexts. If a country is highly developed, has a strong rule of law and highly efficient bureaucracy, I do not believe corruption would have the same effect as it could in a less developed country with a weak rule of law and a highly inefficient bureaucracy. In more technical terms, variable  $Z$  magnifies, decreases or changes the effect that  $X$  has on  $Y$ . A technical example from this thesis could then be that in a country that is less developed ( $Z$ ), corruption ( $X$ ) has different effect on FDI inflow ( $Y$ ) than in a country that is highly developed (Not  $Z$ ).

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<sup>56</sup> Because the random effects command does not allow us to control for AR 1 structure, I also use the GEE estimation. While the technicality of this method has not been covered in detail here, it is not substantively different from the random effects estimation. Results from both are reported to increase robustness and reliability of the results (Gardiner, Luo, and Roman 2009).

From my discussion on corruption and its effects on FDI inflow, I suggest several hypothesis that are conditional in nature, and as such, I will use multiplicative interaction to try to answer these. Interaction effects are essentially that  $X_2$ 's effect upon  $\gamma$  is conditional on  $X_3$ . An estimation with an interaction effect will look like this:

$$5) \gamma = \beta_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 (X_2 * X_3) + \varepsilon$$

Some have argued that to avoid issues of multicollinearity between the constitutive variables ( $X_3$  and  $X_2$ ) and the interaction term ( $(X_2 * X_3)$ ) one can use means of the independent variables. This has been criticized by several, amongst them Golder et.al, who argue that you change nothing substantive by creating the means, and as such you do not fix any potential issue of multicollinearity (Golder, Clark, and Brambor 2006). Further, I follow the advice of Golder et.al to include all the constitutive terms in the estimation. The key argument for adding the constitutive terms is that omitting them forces the model to estimate one intercept, as opposed to two. This also makes the substantive interpretation more difficult (Golder, Clark, and Brambor 2006).

When running the models with interaction variables, the following procedure has been followed: First, the interaction term has been created by multiplying the original constitutive variables. The constitutive variables have not been transformed to within and between variables before this. These are the original variables, lagged by one year. Then the product variable (or interaction variable) has been transformed into a within and between component, which is seen in the regression results. To be able to determine both substantive and statistical significance of the interaction terms in a more informative and detailed manner, I use the command “grinter” to graphically illustrate the marginal effect of the interaction term. This is done for all interaction terms that have a statistically significant coefficient on the fourth estimation.

## **5.6. The fixed and remaining issues.**

All independent variables have been lagged by one year. This is common in the literature, and it helps with several issues. There is also a theoretical reason to do this. Information takes time to travel, be analyzed, and be of consequence for decisions. I therefore see it as more likely that corruption measures in 1995 effects FDI decisions in 1996, than in 1995. It is also, as mentioned, argued that lagging can help with issues of reverse causality and simultaneity. Reverse causality is less likely to happen when the independent variable is lagged; so too is simultaneity less likely. What causes the dependent and independent variable in one time-period

is less likely to do this simultaneously across time. Even though this has been criticized lately, there is no other real alternative. I do however admit that my solution for reverse causality and simultaneity is not nearly enough to state that the issue is fixed. This will also be kept in mind during the interpretations of the coefficients.<sup>57</sup> The lag structure is the following: All independent variables have been lagged by  $t - 1$ . This means that the values for the independent variables that is registered for 1995 is now registered for 1996, and so on. To decrease the issue of autocorrelation and heteroscedasticity, I estimate all models with robust standard errors, clustered by country.

From the variables that have been lagged one year I then create the within and between variables. This is done, as described above, by creating a constant mean for each country for each independent variable and then subtracting the original variable to create a time varying deviation variable. This is not done for the economic control variables, as they are not of theoretical interest in this thesis. This will effectively control for unobserved heterogeneity from group specific effects in my independent variable of interest. Three variables have been logarithmically transformed, namely, economic stability, trade and the dependent variable, FDI inflow.<sup>58</sup>

For robustness of the results, several estimations are run and reported. First, fixed effects estimation is run with robust standard errors. Fixed effects is superb for showing the effect of a variable over time. However, I am interested in the entire effect of corruption, not just the change within a country over time. Next, standard random effects with robust standard errors is run. This will produce coefficients with a net effect of corruption on FDI, because we estimate the within variance and the between variance into the same coefficient. This is a very interesting result in its own right, but I am also interested in seeing whether it is the within or the between component that is significant, if they both are, and if they differ. In addition as random effects without the within and between transformation is likely to be affected by group level unobserved heterogeneity, I run random effects with the within and between transformation, with robust standard errors to correct for this potential bias. This will allow me to precisely discern the possibly different effects of corruption, based on the between country variance and the within country variance. As discussed above though, the estimation is likely to be affected by autocorrelation, AR 1 and possibly non-stationarity for some variables. I therefore also run

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<sup>57</sup> I do not argue that my coefficients indicate causality. I rely completely on theory to argue the way of causality between FDI inflow and corruption.

<sup>58</sup> This was presented in chapter four while discussing the variables in question.

a fourth model, which is a GEE model with the Prais-Winsten transformation and robust standard errors. All four estimations will be reported for each hypothesis. I also report a fifth estimation with results when taxes is added as an independent variable. This is because taxes is a significant determinant of FDI inflow, however over 600 observations are dropped when it is included.



## 6.0. Results, analysis and discussion

This chapter will first in short manner present the hypotheses generated, and the expected effects from the independent variables of interest. I will then present the regression tables with the results for each of the hypotheses specific models. All regression models will be presented on the first next page after it is introduced by text.<sup>59</sup> The coefficients will be commented in regards to sign, size, significance, sample size, multicollinearity and any other post-estimation results of interest. After this, a discussion of these results will be presented in regards to analysis in light of the existing literature and the expectations of the author. In the end, a summary of the most interesting findings and their implication for theory and policy recommendations will be presented.

Chapter three produced several hypotheses on the effect of corruption on FDI, and how differences in internal and external factors might in turn affect this relationship.

*Table 8, hypothesis and expected effect*

Hypothesis	Expected effect on FDI inflow
H1a: Corruption	Decrease
H1b: Corruption	Increase
H2: Bureaucratic Corruption	Increase
H3: Political corruption	Decrease
H4 Corruption and gov/state institutions	Decrease
H5: Corruption and judicial institutions	Decrease
H6: Corruption and democracy	Increase
H7: Corruption and natural resources	Increase
H8: Corruption after year 2000	Decrease
H9: Corruption and less developed countries	Increase

### 6.1. What is reported in the models

The models report the constant term of FDI (although I do not interpret this term). It also reports, of course, the coefficients for all the independent variables with standard errors in parenthesis. I will also make direct interpretations of the coefficients in terms of the size of the effect. This

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<sup>59</sup> The models take up to one page in space. To avoid large empty spaces I fill in text, even though it is text analyzing regression results that are not seen until the next page.

is not normal in the literature using a logarithmic dependent variable; as such, I will focus on the sign, significance and general magnitude of the effect. Because I have very many observations (>500) for most of my models, the official significance threshold is at the five percent level to minimize the likelihood of committing a type one mistake. I will however be dynamic in my interpretation of significance, and I will not simply state that a coefficient with a p-value of 0.08 is not significant, and just ignore it. It will however be seen as a much less robust finding, and be interpreted with care. The average VIF for the model is also reported, and when this is high, the cause of this will be discussed, except for the interaction models, where the VIF value is expected to be high. For these models I run a background estimation without the interaction term, and if the collinearity is high without the interaction, this will be discussed. R.sq is reported for the fixed effects and the random effects estimations, but it is not available for the general estimated equations estimations. The total amount of observations (n) is reported, along with the total amount of groups (countries).

As estimation four employs both the within and between transformation, controls for AR 1, autocorrelation and non-stationarity and employs the largest sample of countries, this is the main estimation of all the models.<sup>60</sup>

Because this thesis presents several models, in which only the independent variable of theoretical interest, corruption, is changed in some way with an interaction of a contextual variable or using a type specific corruption variable, I will spend less space commenting on systematic results and changes as I go through the models. For example, I will not explain in detail what estimation four does, as opposed to estimation three, except for in the first model. Because the results of the control variables are so systematic and non-changing, I will only discuss these in the first model, and summarize them at the end of the chapter. As this thesis emphasizes the importance of different estimation methods and econometric caveats, the differences between the estimations in each model will be a focus for the interpretations and discussions.

## **6.2. Corruption and foreign direct investment**

The first model analyses the relationship of corruption on foreign direct investment, controlled for all the standard economic variables, market size, market potential, trade openness, level of

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<sup>60</sup> Thus, if the results are not significant in estimation four, I will not consider the results as significant. If they are significant in this estimation, but not in estimation three and/or five, it will be interpreted as lower robustness in the results.

taxes and economic stability. This is the baseline model, as I do not differentiate corruption by type, or add any non-economic contextual variable, thus estimating in the most general way the effect of corruption on FDI inflow. From the literature review and hypothesis generation, this effect could go either way. This is also shown in hypothesis 1a and 1b. My proposed theoretical model for corruption's effect also allows for this relation to go either way, as the potential benefits can easily overcome the potential risk and uncertainty.

Model 1, which presents the regression results, presents five estimations. The first estimation is a fixed effects model (1). As was made clear in the method section, fixed effects estimation only calculates coefficients based on the within variation of a given group (change within a country over time). In the descriptive statistics section, I showed how the large majority of corruption's variance is between variance, and in the methodological review, I also show how the majority of newer studies employ fixed effects estimation while their research question is, without refinement, the effect of corruption on FDI. Now, as anticipated, the corruption coefficient is not significant in this model. This is expected because 4/5 of the variation in the corruption variable is between variance, which is controlled out. The result of the corruption coefficient here clearly demonstrates an important point, regardless of theoretical interpretations. If one runs a fixed effects estimation on variables that are highly characterized by the between country variance, we will most likely not get significant results.

Of the economic control variables, market size is barely significant at the ten percent level, market potential is significant at the five percent level, while trade openness is significant at the one percent level. All the significant coefficients have the expected positive sign. Not only is the variance of the independent variable of interest, corruption, mainly situated between countries, so is also the variance of the dependent variable, FDI inflow. We can also observe from the sigma U and E that the majority of the variance in the dependent variable, FDI inflow, is due to between country differences (because sigma U is much larger than sigma E). The high rho value also confirms that the dependent variable is highly dependent on its previous values (AR 1).<sup>61</sup>

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<sup>61</sup> This is very static throughout all of the models. I will therefore not spend more space to report or comment on these numbers.

<b>Model 1</b>	Fixed Effects without within (W) and between (B) effects (1)	Random Effects without W and B effects (2)	Random Effects with W and B effects (3)	Generalized estimating equations with W and B effects (4)	Generalized estimating equations with W and B effects and taxes (5)
Constant	1.7701 (1.1613)	1.9785** (0.9220)	1.0918 (0.9609)	4.3428*** (0.8070)	4.4887*** (0.9490)
Corruption (CPI)	0.0622 (0.0894)	<b>0.1856***</b> <b>(0.0656)</b>	-	-	-
Between effect	-	-	<b>0.4077***</b> <b>(0.0807)</b>	<b>0.3875***</b> <b>(0.0647)</b>	<b>0.3121***</b> <b>(0.0685)</b>
Within effect	-	-	0.0651 (0.0902)	-0.0100 (0.0598)	-0.0063 (0.0790)
Market size	2.35e* (1.34e)	3.64e** (1.57e)	3.60e** (1.52e)	5.60e*** (1.47e)	4.97e*** (1.44e)
Market potential	0.0197** (0.0085)	0.0205** (0.0085)	0.0210** (0.0084)	0.0118** (0.0062)	0.0159*** (0.0053)
Natural resources	0.0135 (0.0102)	0.0150* (0.0082)	0.0167*** (0.0082)	0.0117*** (0.0039)	0.0138*** (0.0050)
Trade	1.1328*** (0.2869)	0.8244*** (0.2227)	0.8117*** (0.2207)	0.1090 (0.1797)	0.1412 (0.2028)
Taxes	-	-	-	-	0.0155*** (0.0048)
Economic stability	-0.0553 (0.0385)	-0.0552 (0.0375)	-0.0486 (0.0372)	-0.0154 (0.0237)	-0.0566** (0.0264)
Sigma U	1.9982	1.6769	1.6784	-	-
Sigma E	0.8683	0.8683	0.8683	-	-
Rho	0.8411	0.7885	0.7888	-	-
N and group N	1891 (171)	1891(171)	1891(171)	1888(168)	1298(135)
Adjusted R <sup>2</sup>	0.12	0.30	0.38	-	-
VIF	4.85	4.85	4.45	4.45	4.95

Standard errors in parenthesis

\*= p < 0.10 \*\*= p<0.05 \*\*\*= p<0.01

In the second estimation (2) standard random effects is used. This estimation thus uses the between variance as well, and as expected, corruption now becomes significant, even at the one percent level, and the coefficient is very different in size from the previous estimation. The coefficient is positive, meaning that the less corruption, the more foreign direct investment, and vice versa.<sup>62</sup> The coefficient size tells us that for each unit increase in the corruption variable (meaning less corruption), FDI increases with 18.56 percent.<sup>63</sup> Here the point made from the fixed effects estimation (1) becomes even clearer. Because the random effects coefficient combines the effect of both the within and the between variance, corruption becomes significant, as we now add five times as much variation into the estimation of the coefficient. However, as stated in the methods section, this coefficient is potentially biased by group level unobserved heterogeneity because there are country characteristics that I have probably not included into my model that probably affects corruption and FDI inflow in some way, and the country level effects are probably not random.<sup>64</sup> The coefficient is also a net effect of corruption. This means that within and between components of corruption are estimated together, but they could be counteracting each other. As such, if we are not *explicitly* interested in the net effect of corruption, we need to use a different technique. If the research question is focused towards a net effect however, the random effects estimation does this very well.<sup>65</sup>

Further, the previously significant control variables are all significant, market size is now significant at the five percent level, and natural resources becomes significant at the ten percent level. The increase in significance of the economic control variables here also show another important point in terms of estimation technique. Even the economic variables have a large part of their variance in the between component. As such, if we estimate the effect of market size on foreign direct investment using fixed effects, the coefficient does *not* tell us the total effect of market size, only the effect of market size within a country over time as it changes. Clearly, as the coefficient for market size substantively increases *and* becomes more significant, there is important between country variance we are not able to estimate using fixed effects.

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<sup>62</sup> Remember that the corruption variable, CPI, is measured counterintuitively. Low values indicate high corruption, while high values indicate less corruption.

<sup>63</sup> Note that to get completely precise coefficient sizes we need to exponentiate the coefficient. However, there is no substantive difference, and so to save space, I simply report the unexponentiated coefficients (Noymer 2011)

<sup>64</sup> Countries are often seen as unique and specific, which is exactly why the assumption of standard random effects does not hold when we study these political and economic phenomena. Had the country level effects been random, the random effects estimation would not be any more exposed to unobserved heterogeneity than a fixed effects estimation

<sup>65</sup> Note that some have called this net effect that the random effects model estimates an “uninterpretable weighted average” that suffers from unobserved heterogeneity as opposed to simply a different, “net” effect estimate (Bell and Jones 2015, 137)

In the third estimation (3) random effects is also used as the estimation technique, but on *within and between* transformed components of the corruption variable. As explained in detail in the methods section, this controls for unobserved heterogeneity produced from group (country) level variables. This is done by creating means that are theoretically not correlated to the error term, even though the original variable might be (Bell and Jones 2015).<sup>66</sup> Further, we now also separate the “net” effect of random effects, into a within effect and a between effect. By observing the large differences between the within and between effect, and the corruption coefficient in estimation two (2), we can clearly see how important it is to be aware of *what* we actually measure using the different estimations. In addition, the large differences in the coefficients of the within effects component and the between effects component illustrates that we can get very different coefficients because the random effects estimation estimates a net effect in which the within and between variance could end up “competing” with each other. This is a very interesting and exciting observation. Clearly, it is the between effect of corruption that is significant. This is the component that makes corruption significant in estimation two, *however* the size of the coefficients are very different. The between effect coefficient tells us that for each unit increase in the CPI which means less corruption, FDI inflow increases with about 40.77 percent all else held constant at their means,<sup>67</sup> compared to a 18.56 percent in the standard random effects estimation (2). This is mainly because the between component and within component are estimated as a net effect into a single coefficient in estimation two (2). The between component of corruption is highly significant at the one percent level, relatively large, and positive. The within component is, as expected, not significant, because it was not significant in the fixed effects estimation (1). The same control variables are significant with market size and market potential at the five percent level, and natural resources and trade at the 1 percent level.

These results would not be possible to estimate had I not performed the within and between transformation. I would be left with either an insignificant fixed effects coefficient or a significant and positive random effects coefficient. If my research question is oriented, as mine is, towards analyzing the entirety of the effect corruption has on FDI inflow, and not specifically the within effect or a net effect, I would not really be estimating the theoretical interest of my thesis. For the fixed effects, I would conclude wrong on the relationship between corruption

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<sup>66</sup> Remember that there are other forms of bias that can still cause our independent variables to be correlated to the error term as explained in the methods chapter.

<sup>67</sup> While these percentage numbers might seem very large, remember that the log-scale for FDI goes from -11 to + 12. As such, 100 percent does not represent the largest amounts of FDI in the sample, simply a one point increase on the scale. However, these sizes are substantial.

and FDI, stating that corruption does not have an effect on FDI inflow. For the random effects estimation I would have made an unprecise and somewhat misleading interpretation, underestimating the effect of corruption on FDI inflow.<sup>68</sup> This is why I argue that within and between estimation is an extremely valuable and interesting contribution in this thesis. For this estimation, I also ran the Hausman test to check that the within and between transformation RE model is superior to the fixed effects model in terms of efficiency and bias. The test is insignificant, and we thus reject the null hypothesis and find that the RE estimation with within and between transformation is efficient and unbiased (see appendix 9.9).<sup>69</sup>

The fourth estimation uses a different estimation technique. This is done to mainly control for AR 1 issues in the dependent variable. In the methods section I analyzed the characteristics of my variables to see if I would have any issues with the assumptions of the linear regression. I found that my dependent variable, FDI inflow, is a slow-changing variable and that the value of year two is highly dependent on the value of year one, and so on. This is the AR 1 issue, and it must be dealt with, or else the coefficients will be biased. Using a Prais-Winsten differencing transformation I treat the AR 1 issue, however, it is not accessible for the regular random effects estimation. As such, the generalized estimating equations technique is used, which allows for the treatment of AR 1.<sup>70</sup> This also effectively deals with autocorrelation, non-stationarity and AR 1 issues in the independent variables. If my results were sensitive to this, one could expect large changes in the results of estimation four, as opposed to estimation three. With the exception of the control variable trade, nothing substantial changes in this estimation. This is good, as it increases the robustness of the results. The coefficient of trade loses 87 percent of its size, and becomes insignificant.<sup>71</sup> The between effect of corruption is still highly significant at the one percent level. Even though the coefficient loses some of its size, it is still substantial. Market size goes from the five percent level to the one percent level and all else stays the same. Note that three observations are lost when using the GEE estimation as opposed to the RE estimation. This is because for three of the countries there are less than two observations (n),

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<sup>68</sup> Had the differences between the within and the between effect been larger, the coefficient for corruption in model two would not have been significant either.

<sup>69</sup> This is done merely as an example, and will not be done for other estimations. Further, by logic it is apparent that by utilizing this transformation the Hausman test is redundant. This is because we now include both the within and the between components.

<sup>70</sup> Remember that the GEE technique is *not* substantively different from the random effects estimation. It is simply used because technicalities dictate it must be so. Also, the very small change from the random effects estimation to the GEE estimation assures us to a degree that indeed, there are no substantive differences between the methods and of course, that the results are not very affected by AR 1, non-stationarity or autocorrelation.

<sup>71</sup> Thus, it is quite plausible that trade is somehow affected by autocorrelation, non-stationarity and/or AR 1 issues, and its strong effect on FDI in estimation one, two and three is actually a spurious one.

which makes it impossible to employ a differencing transformation on them. Since there are only three of these countries, it does not have any substantive effects on my estimation.

In the fifth estimation the taxes variable is added. Once again, nothing substantive changes in this estimation from the previous. Market potential becomes more significant, from the five percent level to the one percent level. Economic stability has a very similar coefficient that it has been having for every estimation, but is now significant at the five percent level, with the expected negative effect. Trade remains insignificant after we controlled for autocorrelation, AR1 and non-stationarity. Taxes is highly significant at the one percent level, but with a surprising positive coefficient.<sup>72</sup> The between effect of corruption is still highly significant, but the coefficient loses some of its size (0.0700 decrease). This estimation has 590 less observations than the previous one.<sup>73</sup> The fact that nothing of interest really changes is an additional reassurance of the robustness of the results.

Except for in the reduced sample size models of political and bureaucratic corruption, the economic control variables produce very similar results across estimations. I will therefore not spend much more space commenting on them.

### **Theoretical interpretation:**

In terms of relevance for theory and hypothesis 1a and 1b, there are several interesting findings here. First of all, the studies that do not find a significant relationship of corruption on FDI, such as Busse and Hefeker (2007), Al-Sadig (2009) and Goswami and Haider (2014), get these findings *not because corruption is irrelevant for multinational corporations when making their decisions to invest, but because of their estimation method*. The separation of the between and within component clearly shows that the between variation is highly significant, with a substantive size to the coefficient, while the within variation is simply not significant. That means that because levels of corruption do not change that much over time, researchers using fixed effects estimation will find this variable to not matter. This is not a problem if they are only interested in the within effect. Estimation 3 through 5 reports significant and positive coefficients for the between effect of corruption, which means that the less corrupt a country is on Transparency International's CPI, the more FDI that country receives. This supports hypothesis 1a, and strengthens the argument from the sand logic, that corruption is a phenomena

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<sup>72</sup> This is also the only reason for adding taxes, even though it decreases the amount of observations drastically. It is simply significant, and as such, important to include.

<sup>73</sup> For an overview of the countries in this sample, see appendix 9.3.



that increases risk and/or uncertainty, which is translated into higher cost in the cost-benefit equation, making the MNC less likely to invest in general. This is an important finding, because it indicates that countries are *not* better off by allowing corruption to be a part of their system. Less corruption, or at least the perception of less corruption, will attract more foreign direct investment. All the control variables have the expected signs, except for taxes, which indicates that the higher taxes, the more FDI. There is some new literature on taxes that argue that to the degree to which higher taxes imply better state institutions, infrastructure and development, higher taxes can increase investments (Kimel 2011). Trade seems to be insignificant when accounting for AR 1, and economic stability is only significant in the last estimation with a reduced sample.

### **6.3. Political and Bureaucratic corruption and FDI.**

The attempt to measure and estimate different types of corruption is an ambitious attempt, and that is reflected in the poor quality of the data. As I stated at the end of section 2.2.2 the data is indeed very poor, and sadly this was realized too late in the process to turn away from it. As such, results in this model will be interpreted with extreme care and critical view. Even though political corruption and bureaucratic corruption are two separate variables in the IPD dataset, their extremely high multicollinearity value (83 percent, see correlations matrix, appendix 9.1) makes it impossible to fit them into the same model. I therefore need to sacrifice comparability for ability to estimate the coefficients. I therefore run two different models, knowing that this reduces the ability to compare the coefficients directly against one another. The first model estimates bureaucratic corruptions effect on FDI.

The first estimation (1) uses fixed effects, and surprisingly corruption is significant in this estimation, with a negative coefficient. This tells us that for one unit increase of bureaucratic corruption measured by IPD (meaning less corruption), FDI inflow *decreases* with 26.11 percent. As thoroughly discussed in the previous model this coefficient is only calculated on the basis of the within variance, and as such does not represent the entire effect of corruption, but the within country effect which changes over time. Of the control variables, only market size is significant, and only at the ten percent level. This estimation is, because of its limited cross sectional and longitudinal coverage, not very reliable in contrast to the estimations in

<b>Model 2</b>	Fixed Effects without W and B effects (1)	Random Effects without W and B effects (2)	Random Effects with W and B effects (3)	Generalized estimating equations with W and B effects (4)	Generalized estimating equations with W and B effects and taxes (5)
Constant	7.5306** (3.1463)	6.4767*** (1.544)	6.6209*** (1.3796)	5.8504*** (1.3236)	6.1808*** (1.4305)
Bureaucratic corruption (IPD)	<b>-0.2611**</b> <b>(0.1156)</b>	0.0166 (0.1009)	-	-	-
Between effect	-	-	<b>0.4145**</b> <b>(0.1771)</b>	<b>0.4628***</b> <b>(0.1650)</b>	<b>0.3723**</b> <b>(0.1504)</b>
Within effect	-	-	<b>-0.2390**</b> <b>(0.1088)</b>	<b>-0.1976**</b> <b>(0.1019)</b>	<b>-0.2824***</b> <b>(0.1044)</b>
Market size	2.05e* (1.17e)	3.55e*** (7.49e)	3.11e*** (7.02)	3.29e*** (7.05e)	3.39e*** (1.01e)
Market potential	0.0323 (0.0201)	0.2886 (0.0191)	0.0330* (0.0200)	0.0570*** (0.0167)	0.0414** (0.0170)
Natural resources	0.0067 (0.0228)	0.0059 (0.0094)	0.0113 (0.0091)	0.0105 (0.0079)	0.0111 (0.0142)
Trade	0.3185 (0.7482)	0.4129 (0.3214)	0.1741 (0.2869)	0.2582 (0.2864)	0.2388 (0.3096)
Taxes	-	-	-	-	0.0021 (0.0117)
Economic stability	-0.1788 (0.1209)	-0.2520** (0.1075)	-0.1863* (0.1089)	-0.1017 (0.1092)	-0.0464 (0.1287)
N and group N	168(47)	168(47)	168(47)	167(46)	127(38)
Adjusted R <sup>2</sup>	0.17	0.35	0.40	-	-
VIF	3.87	3.87	4.19	4.18	5.36

Standard errors in parenthesis

\*= p < 0.10 \*\*= p<0.05 \*\*\*= p<0.01

other models. There are only 168 observations for this estimation. This is confirmed by the deviating results in the economic control variables, which are to a large degree continuously significant in models with more observations,<sup>74</sup> and is found to be significant in other studies.

The second estimation is with standard random effects, and at first glance, surprisingly, corruption is not significant here. This is the opposite of what was observed in model 1, and what one could expect from the inclusion of more variance. Because fixed effects and random effects measure very different things (within effect and net effect), it may not be so surprising that corruption is not significant in the random effects estimation after all. This also illustrates that it is extremely important that we think about what our theoretical interest is (RQ) and what we actually measure and estimate. As we will see in estimation three, the fact that corruption is insignificant in the random effects estimation allows me to point out yet another key point of within and between estimation advantages. This estimation tells us that there is no significant net effect of bureaucratic corruption on FDI inflow. Market size increases in significance to the one percent level, and the coefficient increases significantly in size, from 2.05 to 3.55. Economic stability becomes significant at the five percent level, with the expected negative coefficient.

The third estimation is very interesting for two reasons. The first is that both the between and the within effect of corruption is significant at the five percent level. The between component is positive with a coefficient of 0.4145, while the within component is negative with a coefficient of -0.2390. This means that the less bureaucratic corruption a country has the *more* foreign direct investment it will attract. However, if a country becomes less corrupt in the bureaucracy over time, it actually receives *less* FDI inflow. The second is that this nicely describes another situation in which utilizing a within and between transformation of a variable can provide us with much more information and efficient coefficients. I stated it could be puzzling that corruption was not significant in estimation two (2), while it was significant in the fixed effects estimation (1). This is because the corruption variable here contains two contradicting and competing components, as was also touched upon in the previous section. As such, when trying to estimate the net effect of the two of them (0.4145 and -0.2390), the coefficient comes out insignificant. While these results must be interpreted with extreme care due to the very small sample, this point is not reduced because of this. Just as in the previous

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<sup>74</sup> Note that very many observations (>500) can also create significant results that are not of *substantive* significance. However, due to previous literature and the theoretical reasoning on the economic control variables, I do not believe that this is what makes them significant in the other models, while insignificant in these relatively reduced ones.

section, this highlights both the importance of estimating a within and between component, *and* the potential contribution of these estimations.

Had a researcher employed fixed or standard random effects here, we can now directly see how the results could have led the researcher to conclude a negative or an insignificant effect, unless the researcher was *explicitly* interested *only* in the within or net effect, this would have been misleading. Economic stability loses some significance and is only significant at the ten percent level, and market potential becomes significant at the ten percent level. This estimation also illustrates that the fixed effects estimation indeed does a very good job at estimating the within effect of a variable, as the coefficients of the fixed effects estimation and the within effect is nearly identical.

Estimating the GEE estimation allows us to deal with AR 1, non-stationarity and autocorrelation. When doing this in estimation four the results still hold, and do not change substantively. This increases the reliability and robustness of the results, even though the sample size is small. Now market potential and market size is highly significant at the one percent level, with coefficients that are similar to the other models (see for example Model 1). Economic stability is not significant.

When adding taxes, the sample is further reduced, but this does not change any results either, further boosting the reliability of the results. The between component of corruption is still significant, though now only at the five percent level, with a positive coefficient. The within component is now significant at the one percent level, and is still negative. The size of the coefficient has increased with about thirty percent. Market potential is reduced to being significant at the five percent level.

### **Theoretical interpretation:**

I hypothesized that bureaucratic corruption, because of its systematic nature, would not produce much uncertainty, but primarily risk, which should have a smaller negative effect than uncertainty. The fixed effects estimation and the within effect in the other estimations finds support for this, with a negative coefficient which means that the less bureaucratic corruption, the less foreign direct investment. As such, if a country has a given level of bureaucratic corruption, and it decreases this corruption over time, multinational corporations will invest less in the country. This reinforces the grease logic, and the arguments of Huntington (1968) and Leff (1964), the argument of Egger and Winner (2005) and hypothesis 2 in this thesis. A positive and significant between component of corruption however, indicates that in terms of

different bureaucratic corruption levels across countries, lower levels of bureaucratic corruption is associated with more foreign direct investment. This does not support hypothesis 2. This is very interesting, and could potentially indicate that MNCs prefer non-corrupt bureaucracies, but that they do not like change in the bureaucracy either. This possibly leads to uncertainty as to how to handle corruption in the given country, where as a steady situation of corruption is easier to navigate and causes more predictable risk that can be calculated. This only highlights the multidimensionality and complexity of corruption and how multinational corporations view it, and it lends credibility to my argumentation in section 2.5, on the three effects of corruption and how they work relative to each other. Of course, due to the small sample size, these results must only be read as indications, and they are not generalizable to the world, only to the sample and the countries highly similar to the countries in the sample.<sup>75</sup>

### **Political corruption:**

Model 3 presents the results when using the political corruption variable. As this variable is from the same source as the bureaucratic corruption variable, the same critique of the quality applies here. The observations are very few, because of a very small time sample (4 years), and a limited geographic sample (52 countries).

The first estimation (1) employs fixed effects estimation. As expected, corruption is not significant here. However, it is interesting that this coefficient was significant for the bureaucratic corruption variable, but not for the political corruption variable. Market size is significant at the five percent level, and market potential is significant at the ten percent level. Both have the expected positive sign. Natural resources is insignificant, this makes sense as this changes very little within a country over time, as is seen with its majority of between variance.

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<sup>75</sup> See appendix 9.3 for the IPD country sample.

<b>Model 3</b>	Fixed Effects without W and B effects (1)	Random Effects without W and B effects (2)	Random Effects with W and B effects (3)	Generalized estimating equations with W and B effects (4)	Generalized estimating equations with W and B effects and taxes (5)
Constant	6.6070** (3.2103)	6.4604*** (1.5305)	6.2859*** (1.4021)	5.5846*** (1.3735)	5.9569*** (1.5248)
Political corruption (IPD)	-0.1852 (0.1592)	0.0427 (0.1156)	-	-	-
Between effect	-	-	<b>0.4660**</b> <b>(0.1892)</b>	<b>0.5152***</b> <b>(0.1698)</b>	<b>0.3390**</b> <b>(0.1643)</b>
Within effect	-	-	-0.2178 (0.1593)	-0.1807 (0.1496)	-0.1998 (0.1753)
Market size	2.46e** (1.17e)	3.53e*** (7.41e)	3.32e*** (6.88e)	3.43e*** (6.76e)	3.47e*** (1.03e)
Market potential	0.0336* (0.0198)	0.0286 (0.0191)	0.0326* (0.0196)	0.0582*** (0.0156)	0.0451*** (0.0156)
Natural resources	-0.0009 (0.0223)	0.0066 (0.0096)	0.0136 (0.0097)	0.0126 (0.0085)	0.0090 (0.0141)
Trade	0.5033 (0.7558)	0.4035 (0.3155)	0.2136 (0.2888)	0.2801 (0.2922)	0.2880 (0.3230)
Taxes	-	-	-	-	0.0045 (0.0119)
Economic stability	-0.1761 (0.1191)	-0.2519** (0.1077)	-0.1762 (0.1066)	-0.0857 (0.1059)	-0.0469 (0.1170)
N and group N	168 (47)	168 (47)	168 (47)	167 (46)	127 (38)
Adjusted R <sup>2</sup>	0.26	0.36	0.40	-	-
VIF	4.22	4.22	4.68	4.68	5.83

Standard errors in parenthesis

\*= p < 0.10 \*\*= p<0.05 \*\*\*= p<0.01

The second estimation (2) employs the standard random effects technique. Surprisingly corruption is not significant here, even though we now use the entire spectrum of political corruption's variance. This is yet another situation, as I touched upon with the bureaucratic corruption coefficient, where the issue is not only whether we employ all of the variance of the variable, but also that it is possible for the within and the between effect to have different effects on the dependent variable. This can be clearly seen from the third estimation (3), using the within and between components. However, this estimation (2) does tell us that there is no net effect of political corruption on FDI inflow. Market size becomes more significant, and as in the other models, its coefficient increases by about fifty percent. Market potential becomes insignificant, implying we might have competing components here as well.<sup>76</sup> Economic stability becomes significant at the five percent level, with an expected negative coefficient.

In the third estimation (3) I employ the within and between transformation. Now we can observe that the between effect of political corruption is very significant, at the five percent level, with a relatively large and positive coefficient. This implies that each higher unit of the political corruption variable a country has (meaning less political corruption), it increases FDI inflow by 46.60 percent. The within effect is not significant, which is also why the net effect coefficient is not significant in the second estimation. The negative and insignificant within effect caused the net effect to become insignificant (2), which is what the random effects estimator estimates. This point cannot be stressed enough, because its implications for regression analysis is fundamental. When operating with variables that have both within and between variance (which nearly all variables do), it is *vital* to control that their effects are not counteracting each other, unless we are *specifically* interested in only the within or net effect. This is rarely the case though. Market size does not change from the second estimation, market potential is significant at the ten percent level again, and economic stability loses its significance.

As explained in the method section, the third estimation (3) does not effectively deal with non-stationarity, autocorrelation and AR 1 issues and this can seriously bias our coefficients. The GEE technique allows us to alleviate these issues through the Prais-Winsten transformation (4). With the exception of the significance level of market potential, which increases to the one percent level, and the increase of significance in the between effect of political corruption from five percent to the one percent level, there are no substantive changes. The between effect coefficient of political corruption increases some in size, but not enough to argue that it is of

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<sup>76</sup> Because the economic determinants, or control variables, are not the ones of theoretical interest in this thesis, I do not transform them into within and between components. This could be fruitful future work.

substantive meaning. The within effect remains insignificant. One observation is lost, due to one country not having more than one observations.

In the fifth and final estimation (5) of the model, I add taxes. Even though forty observations are lost, there is very little change to the results, when compared to the fourth estimation (4). This is good, as it increases the robustness of the results. There is a reduction in the size of the between effect coefficient of political corruption, but it is still relatively large. There is also a return to the five percent level of significance. Taxes does not come out as significant in this estimation. The results of these estimations are only interpreted as indications of correlations, because of the weaknesses in the data, and somewhat conflicting results from the larger sample regressions on the control variables. The results are also only generalizable to the sample and highly similar countries.

### **Theoretical interpretation:**

From my conceptualization of types of corruption, and the effect through risk, uncertainty and potential benefits, I hypothesized that political corruption would have a different effect than bureaucratic corruption. Indeed, I argued that because of the nature of political corruption, political corruption would have a much stronger negative effect on FDI inflows. As explained previously, I had to sacrifice direct comparability within one model because of multicollinearity between bureaucratic and political corruption, but there is one interesting finding that could indicate that this is an interesting line of research to pursue. There is no effect of more political corruption that increased FDI inflow.<sup>77</sup> For the bureaucratic corruption variable, there was a negative within effect, which meant that less bureaucratic corruption over time is associated with *less* FDI inflow and vice versa. Now, to interpret anything from this in comparison of these two variables must be done with extreme care and skepticism, but this could indicate that indeed there is a difference of effects from political and bureaucratic corruption. If political corruption produces the same effect of its bureaucratic twin, then it should also have had a within effect that decreased FDI as the level of political corruption becomes smaller. The one thing we can say, for the sample of the model, is that less political corruption is associated with higher levels of FDI inflow, but I am unable to confirm the hypothesis that political corruption has a more negative effect than bureaucratic corruption. Thus, hypothesis 3 is not supported by the results.

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<sup>77</sup> Because the political corruption variable is measured as low values equals high corruption, and high values equal low corruption, a *negative* coefficient for the political corruption variable would indicate that *more* corruption increases FDI.



## **6.4. Institutional framework**

From the political risk literature and the literature on FDI we can observe that the investment climate is very important for the attraction of FDI. Indeed, investment climate is in many ways all the locational advantages or disadvantages a country has. The institutional framework has been shown to be a very important part of this investment climate, and I have hypothesized on the conditional effect these institutions could have on the effect corruption has on FDI inflow. I estimate using two groupings of institutions, namely governmental/state institutions, and the judicial institution, as measured by the World Bank.

### **6.4.1. Corruption, high quality of governmental/state institutions and FDI**

Model 4 estimates the relationship of corruption as measured by Transparency International (thus not making any internal or type differentiations) on FDI inflow, but examining whether having high quality governmental/state institutions affects the effect corruption has upon FDI inflow. This is done by interacting corruption and a dummy variable that gives the score one to all countries that are measured as having a high quality in their governmental/state institutions, and zero to the ones that does not. The within and between transformation is done for the interaction variable, because that is the one of interest and interpretation, not the constitutive variables.

The first estimation (1), which is the fixed effects estimation, displays expected results, and similar results to the ones in model one. Corruption is not significant, and neither is having high quality governmental/state institutions. However, these variables are not of interest. They are only included because the method of interactions require them to be. Therefore, the variable of interest is the interaction of corruption and high quality of governmental/state institutions. This is also not significant, as expected (due to the low amount of within variance for both of the constitutive variables). Multicollinearity could seem to be an issue in this model. The average is at 10.66, which is very high for an average. Upon closer inspection, it is revealed that indeed, the constitutive terms and the interaction term is multicollinear at about sixty percent, and that quality of governmental and state institutions and the interaction term has VIF values of 29 and 21, respectively. However, as was explained in section 4.5, high multicollinearity between constitutive terms is to be expected, it is natural, and should not be attempted to be circumvented

<b>Model 4</b>	Fixed Effects without W and B effects (1)	Random Effects without W and B effects (2)	Random Effects with W and B effects (3)	Generalized estimating equations with W and B effects (4)	Generalized estimating equations with W and B effects and taxes (5)
Constant	2.8289** (1.3291)	2.7397*** (1.0173)	4.0368*** (1.1072)	6.4096*** (0.9389)	5.7332*** (1.0269)
Corruption (CPI)	-0.0148 (0.1182)	0.1645** (0.0828)	0.0673 (0.0899)	0.0768 (0.0685)	0.1178 (0.0764)
High quality governmental/state institutions	-0.7181 (0.6418)	-0.3900 (0.5819)	-0.4749 (0.5786)	-0.4343 (0.3709)	-0.1425 (0.4442)
Corruption * High quality political institutions	0.1794 (0.1761)	0.0593 (0.1580)	-	-	-
Between effect			<b>-0.4575** (0.2027)</b>	<b>-0.4367*** (0.1498)</b>	<b>-0.3104** (0.1632)</b>
Within effect			0.1333 (0.1588)	0.1047 (0.0974)	0.0133 (0.1231)
Market size	2.47e* (1.37e)	3.91e** (1.59e)	3.95e*** (1.51e)	5.46e*** (1.38e)	4.82e*** (1.35e)
Market potential	0.0180** (0.0088)	0.0184** (0.0084)	0.0191** (0.0088)	0.0108* (0.0066)	0.0149*** (0.0056)
Natural resources	0.0097 (0.0096)	0.0123 (0.0077)	0.01290* (0.077)	0.0096** (0.0039)	0.0101** (0.0050)
Trade	0.9777*** (0.2916)	0.7098*** (0.2220)	0.6680*** (0.2189)	0.1163 (0.1971)	0.1494 (0.2141)
Taxes	-	-	-	-	0.0169*** (0.0053)
Economic stability	-0.0315 (0.0354)	-0.0350 (0.0342)	-0.0295 (0.0344)	-0.0134 (0.0234)	-0.0403 (0.0264)
N and group N	1643 (171)	1643 (171)	1643(171)	1640 (168)	1145 (135)
Adjusted R <sup>2</sup>	0.15	0.34	0.34	-	-
Mean VIF	11.77	11.77	10.94	10.97	10.33

Standard errors in parenthesis

\*= p < 0.10 \*\*= p<0.05 \*\*\*= p<0.01

by technicalities or by dropping one of the constitutive terms.<sup>78</sup> The economic control variables show no sign of multicollinearity, except for trade.<sup>79</sup>

In estimation two (2), I employ the standard random effects technique. As expected, corruption becomes significant, but it does not matter as it is one of the constitutive terms. The interaction term remains insignificant, and when looking at estimation three (3), the reason is obvious. Based on what we now know of the different estimations we know that we cannot interpret an insignificant FE and RE estimation as evidence that the interaction term is not significant. We have simply estimated whether there is a within effect (estimation one) or a net effect (estimation two). The between effect is still hidden from us. Nothing changes in regards to multicollinearity, because we only changed the estimation technique, not the variables of the estimation.

In estimation three (3), we can observe some very interesting results. First, the between component of the interaction is highly significant at the one percent level, and in contradiction to my expectations, the coefficient is negative. It is also a relatively large coefficient. The within component is not significant, and this was expected as the fixed effects estimator does a very good job at estimating the within effect, and that coefficient was not significant either (1). This result is yet another example of two contradicting sub-components of a single variable. Without the within and between estimation, it would have been impossible to distinguish these different effects in one estimation, and we could have mistakenly concluded that there is no significantly different effect of corruption in countries with high quality governmental/state institutions on foreign direct investment inflow. These results tell us that in countries with a high quality of political institutions the less corruption between countries, the *less* FDI inflow can be expected. Precisely, each unit increase (meaning less corruption) of the CPI in countries with high quality governmental/state institutions between different countries is associated with 45.75 percent less FDI inflow, all else held constant at their mean. Changes over time (within effect) is not significant. This can of course simply be because it is not important for MNCs, or that corruption does not change much over time and neither does the quality of the

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<sup>78</sup> I ran the regression without the interaction term. The individual VIF values of corruption and high quality of governmental / state institutions were 11 and 4, respectively. A value of 11 might indicate that corruption is affected by multicollinearity, but as was also discussed in section 4.1 on multicollinearity, the fact that the interaction term is still able to become significant actually only adds to its significance and importance (O'Brien 2007). The Collin multicollinearity test showed no issues with large VIF values (see appendix 9.2).

<sup>79</sup> Trade continuously generates high VIF values. This is strange, as it is not more than 0.25 collinear with any other variable, according to the correlations matrix. It could be that different components of trade's variance is correlated to different independent variables, but this is speculation. As it is deemed an important determinant, and because the other controls are significant in most estimations, I chose to *not* drop it.

governmental/state institutions, thus not providing enough variance to estimate a significant effect.<sup>80</sup>

In estimation four (4) I use the GEE estimation with the Prais-Winsten transformation. Now that the results are effectively controlled for non-stationarity, autocorrelation and AR 1 issues we can observe nearly no differences. The fact that the results of the between effect does not change that much is very good, because it increases the robustness of the finding. AR 1, non-stationary or autocorrelation issues did not induce the coefficient in estimation three (3). The size of the market size coefficient increases substantially, with over fifty percent. To further interpret the interaction term, I produce a graphical plot of the interaction. This is done using the command “grinter” in STATA. It shows the marginal effect of the interaction term on FDI inflow with the values of the conditioning variable on the horizontal axis.<sup>81</sup> The magnitude of the tilt indicates that indeed, the effect is very substantially significant. It also shows that the effect is *not* significant for the countries that do not have high quality in their institutions, only for the countries that do (and are coded 1), because the confidence intervals cross zero, except at the end of the X-axis (Golder, Berry, and Milton 2012)(see appendix 9.10).

In the fifth estimation (5), taxes is added to see if its effect is significant, even though it reduces the sample size both in terms on total observations and countries. The between effect coefficient of the interaction variable is reduced by about 25 percent. It is still a relatively strong and negative relation. Otherwise, nearly nothing changes, which is good in terms of robustness. Taxes is significant at the one percent level, justifying its inclusion.

### **Theoretical interpretation:**

From the literature on corruption, and my proposed framework and causal model, I would expect any potential positive effect of corruption in terms of increasing efficiency, being able to gain the upper hand in procurements, or functioning as an informal business sector in lieu of non-functioning governmental/state institutions, to be reduced if the country has a high quality in these institutions. These regression results tell the opposite story, and do not support hypothesis 4. If a country has high quality governmental/state institutions, then having less

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<sup>80</sup> Note however, that in the descriptive statistics section both quality of political institutions and corruption does show a fair amount of within variance, which should be enough to estimate a significant effect, if the effect is relevant for FDI inflows. Also, note the significant fixed effects coefficient of corruption in model two.

<sup>81</sup> Because I have a dummy conditioning variable (high quality of governmental/state institutions) I am not able to read out the marginal effect over different values of the conditioning variable. However, this graph will allow us to observe in more detail the degree of both the substantial and statistical significance of the coefficient (Golder, Berry, and Milton 2012).

corruption is actually correlated with *less* FDI inflow. This is a very counter-intuitive finding. However, it might be that the potential benefits from corruption in countries that have a high quality in governmental and state institutions are larger. Take the example of Denmark. It is common knowledge that corruption is not systemic in Danish institutions, and as such, if there is a possibility of engaging in corruption one could gain a very large competitive advantage and/or lower costs. If there is a country that is perceived to have a very low quality of these institutions, corruption might be the normal way to get things done, and as such that would decrease the relative and potential benefits from corruption, because most companies would be doing it. This explanation would fit my proposed framework, as the relative benefits could become larger in countries with a high quality in governmental and state institutions, and when the country is less corrupt then, these very beneficial benefits could become less frequent and disappear. This negative effect on FDI inflow could not be directly compared between for example Denmark and Angola though, as the marginal effect is only significant for the countries that have a high quality in their governmental and state institutions, and *not* for the countries that are coded as not having a high quality. Therefore, this between effect, which indicates the differences are between countries, is only between countries that have a high quality in the institutions. As such, a valid example could be Norway and Denmark. Both Norway and Denmark have high quality in their governmental and state institutions, however, Norway has more corruption than Denmark, which then means that Denmark would attract *less* FDI inflow than Norway, due to Denmark having less corruption.

#### **6.4.2. Quality of the rule of law**

An institution that has received special focus in the political risk and foreign direct investment literature is the rule of law. I hypothesized, based on previous literature and the framework I employ that in countries with a high quality in the rule of law, the negative effects of corruption (risk and uncertainty) would increase. To answer this hypothesis I have interacted corruption as measured by Transparency International and a dummy variable of the rule of law (high quality).

The first estimation (1) is the fixed effects estimation. As expected, and as in most of the other models, the interaction variable of interest is not significant in the fixed effects estimation, and

<b>Model 5</b>	Fixed Effects without W and B effects (1)	Random Effects without W and B effects (2)	Random Effects with W and B effects (3)	Generalized estimating equations with W and B effects (4)	Generalized estimating equations with W and B effects and taxes (5)
Constant	2.1457* (1.2543)	2.3742** (0.9826)	2.2520** (0.9643)	4.5842*** (0.8863)	4.7050*** (0.9947)
Corruption (CPI)	0.1405 (0.1408)	0.2007 (0.1311)	0.1491 (0.1345)	0.1649** (0.0836)	0.1197 (0.1121)
High quality rule of law	0.4686 (0.6412)	0.1391 (0.5995)	0.3326 (0.5883)	0.4929** (0.2440)	0.6650 (0.4726)
Corruption * High quality rule of law	-0.1321 (0.1721)	-0.0111 (0.1554)	-	-	-
Between effect	-	-	0.1261 (0.1605)	0.0616 (0.1040)	0.0523 (0.1319)
Within effect	-	-	-0.1085 (0.1590)	<b>-0.2362**</b> <b>(0.1009)</b>	-0.1810 (0.1275)
Market size	2.57e* (1.42e)	4.04e** (1.59e)	4.01e*** (1.53)	5.56e*** (1.41e)	4.86e*** (1.38e)
Market potential	0.0178** (0.0088)	0.0184** (0.0089)	0.0189** (0.0088)	0.0102 (0.0066)	0.0145*** (0.0056)
Natural resources	0.0098 (0.0096)	0.0122 (0.0077)	0.0134* (0.0077)	0.0105*** (0.0038)	0.0121** (0.0049)
Trade	0.9878*** (0.2924)	0.7207*** (0.2219)	0.6838*** (0.2181)	0.1477 (0.1944)	0.1617 (0.2112)
Taxes	-	-	-	-	0.0165*** (0.0053)
Economic stability	-0.0315 (0.0349)	-0.0337 (0.0337)	-0.0283 (0.0339)	-0.0095 (0.0232)	-0.0364** (0.0262)
N and group N	1643(171)	1643(171)	1643(171)	1640(168)	1145(135)
Adjusted R <sup>2</sup>	0.15	0.34	0.35	-	-
Mean VIF	25.44	25.44	24.45	24.62	26.87

Standard errors in parenthesis

\*= p < 0.10 \*\*= p<0.05 \*\*\*= p<0.01

that might reflect the low within variance of both the constitutive terms. Neither is any of the two constitutive terms significant, but these are not of interpretive interest. This estimation tells us that there is no significant within effect of the interaction variable on foreign direct investment inflow. The average VIF value of the estimation is very high, 27.78. This is due to the interaction term and its constitutive terms whom score high VIF values due to their collinearity, thus dragging up the average, which is unavoidable and natural according to the interaction literature (Golder, Clark, and Brambor 2006). Once I exclude the interaction term, the average VIF falls to five, with the trade variable once again pulling up the average with a VIF value of 14. The Collin test shows no issues of multicollinearity for this model without the interaction either (appendix 9.2).

In the standard random effects estimation (2) nothing of substantive meaning changes. The interaction term does not become significant once we add the between variance. There can be two reasons for this. Corruption is simply not a significant determinant for FDI inflow. This would be a logical interpretation to make when we find no significance in either a fixed effects or a random effects estimation. However, we might yet again be facing competing subcomponents in the variable, and this will be revealed in the third estimation. From this estimation then, we can conclude that there is no net effect of corruption on FDI inflow.

In the third estimation (3) I add the within and between effect variables of the interaction term. As suspected, the within and the between effect has very different coefficients. However, to my surprise, neither the between, nor the within effect is significant.

In estimation four (4), there are some interesting changes. Once I control for AR1, autocorrelation and non-stationarity, the within effect becomes significant. The within effect has a negative coefficient which indicates that in countries with high quality judicial institutions, becoming less corrupt decreases FDI inflow, just as with bureaucratic corruption in model 2. Specifically, the coefficient tells us that for each unit increase in the CPI (meaning less corruption) FDI inflow decreases by 23.63 percent. I am somewhat perplexed that accounting for AR 1, non-stationarity and autocorrelation made the within effect significant, as the rule of law variable showed little to no issues with these phenomena. However, this does illustrate how important it is to be careful with the assumptions of linear regression and any issues one has in the data. That said, the fact that the significance levels are not stable over the different estimations (as several other results are), brings the robustness of the findings in question. Further, the grinter graph illustrates that the within effect coefficient is substantially

significant, but *not* statistically significant, because the confidence intervals cross the zero line of the vertical axis (Golder, Berry, and Milton 2012)(see appendix 9.10).

In the fifth estimation I add taxes to control for its effect, and it does have a significant effect on FDI inflow which is constant across nearly all my models. This also serves, as mentioned, as an additional robustness test, because the total observations and the country sample is reduced with this variable, and to the degree to which the results are similar in this estimation, the robustness of the results is increased. Unfortunately, this estimation does not increase the robustness of the interaction, which is already relatively low due to differing findings from estimation three to four and the results from the gprinter graph. Both the between and the within effect comes out as insignificant in this estimation, drawing the significance of the interaction between corruption and a high quality in the rule of law further into question.

### **Theoretical interpretation:**

Because the results from the variable of theoretical interest, the interaction of corruption and the dummy for having high quality in the rule of law, differs in significance from estimation to estimation, I am reluctant to say that I have found any solid results. However, if taking the findings of estimation four (4) to be correct, where the within effect is significant, the following is a possible interpretation.

The negative within effect, while at first seeming counter intuitive, actually makes sense. As with the bureaucratic corruption model (Model 2), it is possible that *change* itself is the issue. To use the example of Sweden; if a corporation has established its connections and “business as usual” structure, and these connections are based on corruption, the very change in this established “system” between the corporation and the country could increase risk and *particularly* uncertainty. Suddenly you are dealing with a situation that is more or less unprecedented in the investment relationship, and you have less historical context to rely on. As such, one could argue, based on the framework employed in this thesis and the empirical findings that as factors change, the change itself increases the relative risk and uncertainty effects of corruption, and this affects the cost – benefit equation any multinational corporation makes before investing in a foreign country. Even so, the results do not support hypothesis 5.

## **6.5. Corruption, democracies and foreign direct investment.**

I hypothesized, based on previous literature, that corruption would have a more negative effect on FDI inflow in democratic countries than in non-democratic countries. This is because the



argumentation for why democracies would attract more FDI inflow than non-democracies was very similar to the mechanisms described by scholars for as to why corruption would have a positive or negative effect on FDI inflow. Unfortunately, my model for this hypothesis does not generate significant results after controlling for some methodological caveats. Particularly, it does not generate significant results once I control for AR-1, autocorrelation and non-stationarity in estimation four, but it was significant in estimation three, two and one, which does not control for this. The democracy variable was one of three variables that showed significant signs of non-stationarity, and as such when the results of the interaction variable becomes insignificant when controlling for non-stationarity by the differencing method, I cannot put any real faith in the robustness and validity of the coefficient. I therefore do not include the model here, but in the appendix (see appendix 9.11). Because the results are not significant in estimation four, the results do not support hypothesis 6.

## **6.6. Corruption and natural resources**

Because of the special nature of natural resources in the OLI framework for foreign direct investment, and previous literature on the subject, I hypothesized that in countries with large natural resources, corruption could increase FDI, because it's potential benefits can increase exponentially, thus far overshadowing the potential risk and uncertainty. Unfortunately, also in this model I encounter significance and robustness issues. The interaction term of large natural resources and corruption is as expected not significant in the fixed effects estimation. It is not significant in the random effects estimation either. Surprisingly, neither the between or the within effect components is significant in the third estimation, employing the within and between transformation, and finally they are not significant in the fourth estimation either, which controls for AR-1, autocorrelation and non-stationarity. However, in the fifth estimation which controls for taxes, both the within and the between component of the interaction term is highly significant, negative and relatively large in size (W -0.3937, B -0.4457). Since this estimation employs a smaller country sample and less total observations the robustness of this finding is in doubt. Apparently, the estimation is very sensitive to some of the countries that are dropped when adding taxes.<sup>82</sup> I actually find this very counter intuitive, because the countries that are dropped are mainly very small island states, and authoritarian and closed states, some

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<sup>82</sup> The entire model was also estimated with different percentages of GDP as the cut off point for the dummy variable on a large extractive sector. To see if the thirty percent threshold was too strict, I also estimated using a twenty percent cut off point. There were no substantive changes, and in addition, thirty percent is already a modest threshold for defining large extractive sectors.

of who have very large natural resources, such as Iran and Saudi-Arabia. As such, this model is presented in the appendix (9.11).

To the degree to which these results can be trusted, they are very interesting. The negative between effect indicates that in countries with large natural resources, countries with *less* corruption attract *less* FDI inflow, which supports hypothesis 7. The negative within effect indicates that in countries with large natural resources, the less corrupt you become over time, the less foreign direct investment you attract. Therefore, it seems to confirm the hypothesis and the theoretical framework of corruption within the OLI paradigm. The potential benefits of corruption from winning a tender, increasing speed and effectiveness in the business process, getting more lucrative deals (lower taxes, larger share of ownership, etc.) outweighs the negative aspects of risk and uncertainty when there are large natural resources in the country. If a country is less corrupt or is becoming less corrupt, these benefits become smaller and less available, thus decreasing FDI inflow. Of course, as mentioned, this is not robust over different estimations, particularly, estimation four, and as such must not be given much weight, but it does fit and confirm previous findings by Kolstad and Wiig (Kolstad and Wiig 2012; Kolstad and Wiig 2013), who use very different estimation techniques and in one instance, a different measurement of natural resources. Since estimation four (4) is not significant, the results do not support hypothesis 7 in this thesis.

## **6.7. Corruption and increasing moral and reputational costs.**

As corruption has gained more and more attention in general, and as its effects upon people have been explored and found to be very negative, the moral view of corruption has become more negative over time, and the tolerance for it much lower. This is reflected in the different laws and conventions that have been made against it. As such, I hypothesized that corruption would have a more negative effect as the public opinion of corruption has changed. I interact corruption with a time dummy (all country-years on and after 2000 coded 1, all before coded 0), to see if there is a significantly different effect after the year 2000, which should capture any change in the effect over time.<sup>83</sup>

Much to my surprise the coefficient for the interaction term in estimation one (1) is not significant. As we understand by now, the fixed effects estimation estimates the within country

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<sup>83</sup> The use of a dummy variable here is justified on theoretical grounds. The conventions and laws are enacted right before and right after 2000, and as such, it is a natural cut off point. A continuous year variable would not have been able to capture the variance in accordance to the theoretical argument.

<b>Model 6</b>	Fixed Effects without W and B effects (1)	Random Effects without W and B effects (2)	Random Effects with W and B effects (3)	Generalized estimating equations with W and B effects (4)	Generalized estimating equations with W and B effects and taxes (5)
Constant	3.2073*** (1.1768)	3.2111*** (0.9438)	3.0871*** (0.9922)	4.8006*** (0.8801)	5.2428*** (1.0142)
Corruption (CPI)	0.0737 (0.0823)	0.2142*** (0.0638)	0.1927** (0.0800)	0.2077*** (0.0603)	0.2631*** (0.0749)
Year 2000 (dummy)	0.5463*** (0.1780)	0.3422** (0.1722)	0.3370* (0.1751)	-0.5526 (0.1711)	-0.7760*** (0.2480)
Corruption * Year 2000 (dummy)	-0.0097 (0.0320)	0.0182 (0.0324)	-	-	-
Between effect	-	-	0.1287 (0.1367)	0.0760 (0.1120)	-0.0989 (0.1219)
Within effect	-	-	0.0183 (0.0332)	<b>0.0529*</b> <b>(0.0290)</b>	<b>0.0822**</b> <b>(0.0379)</b>
Market size	1.66e (1.05e)	3.34e** (1.40e)	3.56e** (1.41e)	5.91e*** (1.47e)	5.04e*** (1.39e)
Market potential	0.0211** (0.0085)	0.0223*** (0.0086)	0.0226*** (0.0086)	0.0118** (0.0062)	0.0161*** (0.0054)
Natural resources	0.0091 (0.0092)	0.0122* (0.0071)	0.0129* (0.0069)	0.0113** (0.0039)	0.0117** (0.0046)
Trade	0.7016** (0.2935)	0.4361** (0.2255)	0.3945* (0.2197)	0.2209 (0.2011)	0.2556 (0.2189)
Taxes	-	-	-	-	0.0171*** (0.0053)
Economic stability	-0.0150 (0.0349)	-0.0269 (0.0342)	-0.0253 (0.0340)	-0.0177 (0.0246)	-0.0668** (0.0275)
N and group N	1861 (170)	1861 (170)	1861 (170)	1858 (167)	1282 (134)
Adjusted R <sup>2</sup>	0.10	0.33	0.32	-	-
Mean VIF	14.83	14.83	23.40	23.39	26.73

Standard errors in parenthesis

\*= p < 0.10 \*\*= p<0.05 \*\*\*= p<0.01

variance over time. Seeing as for this hypothesis time is of interest, I would have expected this to be significant, if there is any effect. The dummy variable for year is highly significant, but it is a constitutive term, and as such is not to be directly interpreted. Market potential and trade is significant at the five percent level, with the expected positive signs. The high mean VIF score arises from the collinearity between constitutive terms and the interaction variable. This could easily be fixed by removing the constitutive terms, but this is a serious error in interaction models, according to the interaction literature. Once the interaction is dropped, the VIF values drop, and only trade remains above the “threshold” of 10.

In estimation two, using random effects, there is no real change. The interaction term is insignificant. Given that it was not significant in the fixed effects estimation this comes as no surprise. There is no between variation in the year variable (naturally), so for there to be a significantly different effect once adding the between variance was not expected

In estimation three, using the within and between transformation on the interaction variable, neither the within nor the between component is significant. This tells us that the insignificant result in the previous estimations is not due to competing coefficients, which I discussed in previous models, but simply that neither the within effect nor the between effect is significant for FDI inflows. This once again also nicely illustrates that indeed, the fixed effects estimator is very good if you want to measure the *within* effect of a variable. The findings in this model would imply that there is no significant change in the effect of corruption after the year 2000 upon FDI inflows. Interestingly, the VIF value increases significantly here. This is because once the within and the between components are separated, they are individually much more collinear with the corruption variable and the year dummy variable respectively. As stated above, there is no technical or easy solution to this, and it is recommended to simply leave the multicollinearity as it is because it does reflect reality.<sup>84</sup> Once again, when the interaction term is dropped, the only variable that is above the “threshold” of 10 is trade.<sup>85</sup>

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<sup>84</sup> The fact that the between component of the interaction is highly collinear with corruption only reflects that corruption has relatively little variation over time within countries, but much between countries. The within component of the interaction is highly collinear with the variable for year, which is natural because one the constitutive part is a dummy of that variable.

<sup>85</sup> In addition, the Collin command in STATA shows no issues of multicollinearity once the interaction term is excluded (appendix 9.2).

In the fourth estimation, using the Prais-Winsten approximated transformation, the results change in an interesting way. Now the within component is significant, albeit at the ten percent level, and positive.<sup>86</sup> This would indicate that after the year 2000 becoming less corrupt increases FDI *more* than becoming less corrupt before the year 2000. Specifically, in countries after the year 2000, a one unit increase in the CPI (meaning less corruption) increases FDI inflow with 5.29 percent. This supports hypothesis 8, however, the significance level is low, and technically below the limit for this thesis, the five percent level. However, the grinter graph of the marginal effect indicates that the effect is substantial, and that it is also statistically significant (using 95 percent confidence intervals) (see appendix 9.10). The results also indicate that AR-1, autocorrelation or non-stationarity issues caused the within effect of corruption to be non-significant, which is interesting in itself, and very believable as these are issues that occur in predominantly longitudinal data. This shows us clearly how important it is to account for econometric issues.

In the fifth estimation the significance level for the within effect of the interaction term increases to the five percent level. The size of the coefficient also increases some in size. This increases the robustness of the results.

### **Theoretical interpretation:**

A significant positive coefficient for the within effect of the interaction term indicates that after the year 2000, the effect of corruption is different from before the year 2000. Becoming less corrupt attracts more FDI inflow now, than it did for the time period before 2000 and vice versa. This then, in light of the theory and framework, can be explained as hypothesized. As the knowledge of the costs and unfairness of corruption has spread through the populations of the world, and governments have become less tolerant and more judgmental towards corruption by implementing laws and conventions, the potential costs in terms of risk and uncertainty has increased over time. The cost-benefit calculation of investing in a corrupt country and engaging

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<sup>86</sup> Due to the high amount of observations in this model (1858), significance at the 10 percent level must be interpreted with much caution and skepticism.

in corruption is then potentially very different today, than it were in 1995, and then presumably, before that as well.<sup>87</sup> This supports hypothesis 8.

## **6.8. Corruption and less developed countries.**

In section 3.7, I hypothesized that the effect of corruption could be very different in developing countries, as opposed to developed countries. This because the potential benefits of corruption could be more important, and thus relatively larger in these countries, and that would make the risk and/or uncertainty effect of corruption relatively smaller. I therefore expect, as stated in hypothesis 8, that corruption increases FDI inflow in less developed countries.

In the first estimation (1), using fixed effects, the interaction variable is surprisingly significant and positive. This was not expected, because, as stated before, corruption simply does not vary that much over time, giving us little variation to estimate on. Still though, unless our research question is only interested in the within effect, stating that this is the effect corruption has on FDI inflow would be incorrect. As is consistent with all of the previous models, even the control variables have relatively low significance, except for trade, which is significant at the one percent level with a large, positive coefficient. Surprisingly, economic stability is highly significant, with the expected negative sign. The average VIF value is high, as expected. Once again, when removing the interaction term, and rerunning the regression, the average falls below four. Only the variable trade has a high VIF value as in all of the other models. Note that there are much fewer observations for this interaction than the others.<sup>88</sup>

In the second estimation (2), employing the standard random effects estimation, the interaction term is still significant. A situation like this has already been discussed in a previous model. This situation allows me to point out a final point as to why within and between estimation is very interesting, *if* we are interested in the entirety of the effect and not only the within, the between or the net effect. We have now observed both a significant and positive fixed effect and random effect coefficient. I could now conclude that, yes, corruption does have a significant effect on FDI inflow into less developed countries, namely, less corruption increases FDI

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<sup>87</sup> Because the time sample is limited to 1995 – 2012 (96 with lag), I do not have a lot of data to estimate the effect corruption had upon FDI inflow before the year 2000. The fact that the within coefficient comes out as significant shows that it is sufficient to estimate a significant difference, but I can only really speak for the five years before 2000. However, it is a relatively fair assumption that the public opinion and governments stances on corruption has not varied back and forth before 1995.

<sup>88</sup> It is due to large gaps in time coverage. Only six countries are actually dropped out from the maximum.

<b>Model 7</b>	Fixed Effects without W and B effects (1)	Random Effects without W and B effects (2)	Random Effects with W and B effects (3)	Generalized estimating equations with W and B effects (4)	Generalized estimating equations with W and B effects and taxes (5)
Constant	4.2823*** (1.6661)	4.9705*** (1.2109)	5.9625*** (1.1487)	6.1909*** (1.1615)	6.1799*** (1.2956)
Corruption (CPI)	-0.0293 (0.1358)	0.1907*** (0.0759)	0.0754 (0.0764)	0.1558*** (0.0599)	0.1699*** (0.0687)
Low development (dummy)	-1.9050*** (0.5664)	-1.5169*** (0.4522)	-1.5387 (0.4438)	-1.0431** (0.4665)	-0.5631 (0.2043)
Corruption * Low development (dummy)	<b>0.4347***</b> <b>(0.1664)</b>	<b>0.2592**</b> <b>(0.1301)</b>	-	-	-
Between effect	-	-	<b>-0.6260***</b> <b>(0.2041)</b>	<b>-0.8902***</b> <b>(0.1775)</b>	<b>-0.7319***</b> <b>(0.2168)</b>
Within effect	-	-	<b>0.4069***</b> <b>(0.1314)</b>	<b>0.3811***</b> <b>(0.1453)</b>	0.2272 (0.1485)
Market size	1.58e* (9.05e)	3.75e*** (1.23e)	3.90e*** (1.09e)	4.78e*** (1.16e)	4.06e*** (1.11e)
Market potential	0.0186 (0.0131)	0.0219* (0.0127)	0.0224* (0.0128)	0.0220* (0.0127)	0.0254 (0.0170)
Natural resources	0.0086 (0.0103)	0.0171*** (0.0063)	0.0168*** (0.0062)	0.0177*** (0.0053)	0.0153** (0.0078)
Trade	0.7744** (0.3619)	0.3228 (0.2539)	0.3262 (0.2365)	0.1618 (0.2443)	0.0693 (0.2607)
Taxes	-	-	-	-	0.0225*** (0.0071)
Economic stability	-0.1596*** (0.0517)	-0.1545*** (0.0510)	-0.1448*** (0.0496)	-0.1264*** (0.0464)	-0.1839*** (0.0659)
N and group N	763 (165)	763 (165)	763 (165)	758 (160)	526 (120)
R <sup>2</sup>	0.25	0.42	0.48	-	-
Mean VIF	9.54	9.54	8.42	8.48	8.42

Standard errors in parenthesis

\*= p < 0.10 \*\*= p<0.05 \*\*\*= p<0.01

inflow. As we will see in estimation three (3), that would have been a mistake. As for the control variables, except for the usual changes, trade becomes insignificant already in this estimation.

In the third estimation (3), I transform the interaction variable into between and within effects. Now we can observe a *very* interesting change in result. The between effect of the interaction variable is highly significant, *negative* and with a very large coefficient size. What this tells us is that less developed countries attract *less* FDI the *less* corruption they have, and vice versa. Specifically this coefficient tells us that for each higher unit of the CPI for less developed countries, meaning less corruption, FDI is estimated to be 62.60 percent smaller, all else held constant at their means. This supports hypothesis 8, and is in contradiction to the traditional stance of corruption as a hinder for FDI inflow and investments in general. It also confirms the finding of Egger and Winner (2005). The within effect is also significant, and the coefficient is vastly different from the between effect coefficient. The coefficient is positive, and relatively large. This indicates that as developing countries become less corrupt and more transparent, they also attract more FDI inflow. Specifically, it tells us that for each unit increase in the CPI in less developed countries, meaning less corruption, FDI inflow increases with 40.69 percent, all else held constant at their means. I have made this point apparent before, but I will do so again due to its importance. Without the between and within transformation, these important nuances in the results would have been hidden from us, and we would most likely have concluded very wrong about the entire relationship between corruption in less developed countries and foreign direct investment inflow. If you are not for some theoretical reason, only interested in a particular part of the relationship between your independent and dependent variable, running only a fixed effects, random effects or between effects estimation does not tell you what you are interested in knowing. As is clear from the results here, the effects these different estimations can produce can be *very* different.

In the fourth estimation (4), I employ the first differencing transformation of Prais-Winsten. Essentially, nothing serious changes, which is good, because it increases the robustness of the findings. The between and within effect of the interaction is still highly significant, and the between effect increases its coefficient size with forty percent. In addition, the grinter graph for the between effect shows a strong substantive effect that is highly statistically significant for less developed countries (coded 1). It also shows an opposite effect for the countries coded as zero (developed countries) (appendix 9.10). For the within effect, grinter illustrates that the effect is both substantially and statistically significant. It also shows that there is a similar effect for developed countries, that is also statistically significant, albeit much weaker than for the



less developed countries. In all simplicity, this estimation tells us that the between and within effect of the interaction term and the effects of the control variables, are not affected by AR 1, autocorrelation or non-stationarity issues.

In the fifth estimation (5), taxes is added, because it is clearly a significant control variable. Once again the between effect is robust to the changes in this estimation, and it seems that it is not that susceptible to changes in the sample. It does decrease some in coefficient size, but it is still very large and of substantial significance. The within effect becomes insignificant in this estimation, indicating that this result is susceptible to changes in the sample.<sup>89</sup> Economic stability, in counter to all previous models, has maintained its significance throughout all the five estimations.

### **Theoretical interpretation:**

A negative, highly significant and large coefficient on the between effect of the interaction term, *across several* estimations indicates that, indeed, less developed countries with higher levels of corruption does receive more FDI inflow, and very much more, than those with lower levels of corruption.<sup>90</sup> Thus, one can theorize that in less developed countries, the market institutions are unable to perform their main function, at least properly, and corruption works as a grease in this regard. Any potential risk from corruption, in terms of getting caught or not receiving the service agreed upon are negated by the fact that corruption is nearly an institution in which the interaction between the host-country and the multinational company occurs regularly in less developed countries. The uncertainty corruption can create is negated by the same logic, this is the way the system probably works, and it would induce little to no more uncertainty than the formal institutions such as those in Sweden, France, or Spain. For those less developed countries that are also less corrupt than the others then, the effect of the corruption they do have might be more risky and uncertain, because corruption is not “institutionalized” in the same manner. Thus one could suddenly not receive the service one bribed for, one could potentially be caught if unlucky and face prosecution, fines, and bad publicity. If neither formal, legitimate market institutions have been established, nor informal corrupt institutions that can imitate that process informally, the uncertainty and risks of participating in corruption becomes higher. You simply know less about the potential outcomes, leaders and elites might be in it for the short

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<sup>89</sup> Of course, losing 40 countries and over 200 observations of 758 in total is a very large change in the sample, and it would be unfair to say that the within effect of the interaction is susceptible to small alternations. It is a very large alteration.

<sup>90</sup> Because being less corrupt than other less developed countries dramatically reduces the amount of FDI inflow.

run and then get out (with the investment or bribe in pocket) to enrich themselves quickly. An “institutionalized” system where corruption is business as usual would not be very prone to those sorts of situations.

The significant and positive within effect states that as less developed countries *become* less corrupt, they increase the amount of FDI inflow. This I find very counterintuitive, both because it contradicts the between effect, *and* because it contradicts the explanation of change, which I have used to explain results several times in the other models. This correlation is difficult to explain using the framework I employed. One interpretation, ignoring the between effect and the effect of change argued earlier, is simply that as levels of corruption becomes smaller; FDI inflow increases because the uncertainty and risk corruption creates then also becomes smaller, thus increasing the stability and attractiveness of investment. However, this is in complete contrast to the between effect. If the effect of corruption in less developed countries was high risk and high uncertainty, the between effect of the CPI variable should have increased FDI inflow as well. This finding contradicts hypothesis 9. It is very possible that I am missing some variable, and that there is some effect at play here that I am not able to see. Because the within effect is not significant in estimation five (5) while the between effect is, the between effect is a more robust finding. One possible explanation could also be that because levels of corruption changes very slowly and not that much, then the between effect might reflect the effects of status quo. Then higher level of corruption is probably associated with higher level of institutionalization of corruption, which probably reduces uncertainty and risk, as argued in previous models. The within effect then reflects that as there is any change towards less corruption, this is taken as a good sign by MNCs, who might be tired of the corrupt status quo. This would need to be more closely researched and analyzed.

## **6.9. Summary: What does the models contribute to theory?**

The models attempt to discern different effects of corruption by employing types of corruption and different contextual factors. The spread of significant findings of the models do seem to support that corruption *does* have different effects depending on context, but unable to confirm in a solid manner different effects of types of corruption. To the degree to which the results from the different models can be discussed against each other, there are some very interesting nuances.

The first model used an aggregated measure for corruption in general. The between coefficient for corruption in this model was highly significant and positive, which tells us that countries

with less corruption is associated with higher FDI inflow. Thus, within the proposed framework and theory, the risk and uncertainty created by corruption seems to be greater than the potential benefits on average. On the other hand, I also find that over time, after the year of 2000, the effect of corruption has changed. Over time, corruption has had an increasing negative effect on FDI, because becoming less corrupt increases FDI inflows *more* after the year 2000, than before. This could mean that the risks and uncertainties have grown relative to the potential benefits. It is possible then, that in earlier time periods (60s, 70s, 80s) that the effect of corruption could have been positive.<sup>91</sup> This lends credibility to the sand logic and the researchers that promote this (Habib and Zurawicki 2002; Shapiro and Globerman 2002; Wei 2000). However, it also indicates that the effect of corruption has changed over time. As such, it could be that in previous decades, corruption worked more according to the grease logic. If we believe developing countries are following the industrialized countries historically, we have further evidence for this, as I find that corruption actually increases FDI inflow to less developed countries, based on the between effect.

To the degree to which the results from bureaucratic and political corruption can be relied on, they also show very interesting findings. The between effect of both indicate that countries with lower levels of corruption have higher levels of FDI inflow. That discredits my argument that political corruption and bureaucratic corruption should have very different effects, due to political corruption causing more uncertainty than bureaucratic corruption. It could also indicate that the framework I employ for understanding the effects of corruption is flawed. This may also be due to the quality of the data though, and more research should be done on this before any conclusions are drawn. The negative within effect of bureaucratic corruption increases the credibility of the framework in this thesis though and lends some support to the idea that political and bureaucratic corruption has different effects. As bureaucratic corruption within a country *decreases*, it is actually associated with *less* FDI inflow.<sup>92</sup> I argue that this indicates that, indeed, it is uncertainty that is the most negative aspect for multinational corporations. Because what is really the only thing that change brings with it? Uncertainty. Something new. So while being relatively corruption free in the bureaucracy might on average be associated with more FDI inflow than those who have more corruption, change in the level of corruption

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<sup>91</sup> This is of course a great deal of speculation, but it would make for a very interesting further study, if one could find data going longer back in time.

<sup>92</sup> Remember that this variable is also measured as 0 (high corruption) – 4 (low corruption).

in terms of becoming less corrupt actually decreases FDI inflow.<sup>93</sup> This is very interesting. It could also be that this uncertainty has nothing to do with corruption in and of itself, but is only a statement of change in general. All changes could be seen as potentially dangerous to an investment, and could at first have a negative effect on the level of FDI inflow. An interesting topic for future research could then be to distinguish corruption types between corruption *levels* between countries and corruption *change* within countries and focus more closely on this distinction.

One very counter-intuitive finding in my models is that of corruption in countries with high quality governmental/state institutions. Because most of the other institutional interactions were not robust over different estimations, I do not put much theoretical weight on them. However, the between effect of the interaction with corruption and high quality governmental/state institutions was significant across all three relevant estimations, and it indicates that in countries with high quality in these institutions higher levels of corruption is associated with *more* FDI inflow and that a lower level of corruption between these countries is associated with *less* FDI inflow. The only argument I can fall back on that fits with my proposed causal model and framework for FDI is the competitive advantage argument. However, this argument in itself is flawed, because if one out of twenty companies benefits from a corrupt channel, the other nineteen do not and as such would not increase their FDI into the country. That one company would then have to invest incredibly large amounts into the country for this effect to come out as statistically and substantively significant in terms of *increasing* FDI inflow. It may be, dismal as it is, that the benefits of corruption in terms of gaining access to sectors, or paying lower taxes, breaking regulations and taking short-cuts are so potentially lucrative, that these are the driving force for the benefits of corruption even in countries with high quality in their governmental and state institutions. Not the somewhat more legitimate and understandable effect of increasing efficiency, working in lieu of formal market institutions (of which the governmental and state institutions are a large part) because there is little other choice. This lends credibility to corruption as a grease, and also discredits those who view corruption only as a characteristic of institutional quality (Busse and Hefeker 2007; Shapiro and Globerman 2002).

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<sup>93</sup> It would be interesting to estimate the short and long run effects of this. If my tentative interpretation is correct, this negative within effect should only be a short run effect, as the new “corruption situation” is adapted to by the MNCs.

The fact that the between effect of the interaction with less developed countries and corruption is highly significant, robust over estimations, large in size and *negative*, increases the credibility of my proposed causal model and the OLI framework for understanding corruption and FDI. Less developed countries embody many of the factors that would increase the relative benefits of corruption as opposed to the relative costs (risk and uncertainty). The market institutions are usually underdeveloped, the bureaucracy is inefficient and slow, corruption is often business as usual, and institutions such as the rule of law are often weak. All these factors would increase the potential benefits of corruption *and* they would decrease the degree of risk and any uncertainty. This is logical, because risk comes primarily from the service bribed or colluded for not being delivered, being caught by the authorities that can induce large fines and possibly reputational costs. Uncertainty comes primarily from changes in a known system, lack of knowledge of the system and history, large skewness in power between two parties (i.e political elite and MNC). The abovementioned characteristics of less developed countries would mitigate all of these aspects, creating an environment where the risk and uncertainty corruption produces is relatively low, and the potential benefits relatively large. The regression result of the between effect seems to confirm this expectation. In less developed countries, lesser levels of corruption decrease FDI inflows. This is in complete contrast to the results of the first model, which estimates the general and average relationship between corruption and FDI inflow for all countries of the sample, as such indicates that the effect of corruption is *strongly* dependent on contextual factors. As such, this finding nicely illustrates the point that it might not be either the sand logic or the grease logic that explains corruption, but that the degree to which corruption produces benefits, risk and uncertainty, it can fit into any or both of these logics (Egger and Winner 2005; Habib and Zurawicki 2002; Huntington 1968; Leff 1964; Wei 2000)

The positive and significant within effect is very interesting, but also very contradicting. If less developed countries receive less FDI inflow because the relative benefits outweigh the relative costs in regards to corruption, it is confusing to see a positive coefficient for the within effect. This implies that as you become less corrupt (higher value on the CPI) you receive *more* FDI inflow. This cannot be explained by the “change is a negative factor in itself” argument, because it directly opposes this. This does strengthen the view of corruption as sand in the machinery, but in light of the opposite between effect I am unable to fully theoretically understand it. It would seem that, even in less developed countries, corruption creates risk and uncertainty around foreign direct investments, and these are reduced as a country becomes less corrupt, leading to more foreign direct investment. Also, it could be that the MNCs are tired of the status

quo, in which relatively high levels of corruption might be stable in terms of uncertainty and risk, but is still costing them potentially large monetary sums. As such, a country moving towards less corruption and more formal institutionalization might be very attractive amongst less developed countries. This puzzling finding in light of the between effect and the framework employed for this thesis is very interesting, and only exemplifies the multidimensionality of corruption and its effects upon foreign direct investment.

For summary purposes, what all of the models tell us is that corruption is a multidimensional phenomenon. Its effects are very nuanced, potentially depending on the type of corruption and particularly the contextual factors. As such, when studying corruption in an econometric analysis, it is fundamentally important to be aware of what you want to study about corruption, conceptualization of corruption, measurement *and* estimation techniques and what they actually estimate.

#### **The economic control variables:**

Throughout nearly all of the models, the economic control variables act the same away across different estimations, following and confirming the previous determinants literature.<sup>94</sup> Only two results are unexpected from the control variables, namely the effects from trade and taxes. The effect of trade seems to be susceptible to autocorrelation, because it becomes insignificant once I employ the Prais-Winsten transformation. Taxes has a surprising sign, positive. Higher taxes is associated with higher levels of FDI inflow. Higher taxes could potentially increase the reliability of a country and increase trust for MNCs because it could reflect more governmental responsibility, better infrastructure and such. This is also discussed in newer economics literature (Kimmel 2011).

#### **Consequences for policies:**

In terms of policy recommendations, these results are quite interesting and nuanced. Corruption in general does decrease FDI inflow, at least in terms of differences between countries, and this supports the one-sided focus which policies have been focused on so far, to remove corruption in order to increase societal development and decrease injustices. However, in certain contexts, and *particularly* in less developed countries, removing corruption outright *might* be a mistake, depending on which effect we put most faith in. These results suggests that corruption works as a grease in these countries, and thus maybe the focus should not be on corruption and

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<sup>94</sup> This is discussed in model 1.

governance, but on infrastructure, health and education, as Sachs and McArthur famously argued for (McArthur and Sachs 2001). In addition, the results indicate that *changes* in the degree of corruption is associated with less FDI inflow. Therefore, if one does make it a priority to remove corruption, it should be done in a controlled and paced manner, not by a quick change in laws, police crack downs, and such. To the degree to which corruption works as an informal market institution, this should be put to particular weight.

## 7.0. Conclusion

This thesis has focused on the themes of foreign direct investment and corruption. It has argued that although the relationship between foreign direct investment and corruption has been studied by several scholars, there is still work to be done. Primarily, a formal framework is lacking, and this thesis suggests a fusion of the OLI framework and political risk theory to understand how corruption affects FDI. Further, the literature is lacking in its conceptualization of corruption as a multidimensional phenomenon. The separate corruption literature is very adamant in its argumentation that corruption must be seen as a multidimensional phenomenon that manifests empirically in different ways, and has different effects. As such, this thesis proposed the following research question: “*What effect does corruption have upon the level of foreign direct investment inflow to a country? Moreover, do internal types of corruption (e.g. bureaucratic corruption), and external contexts (e.g. level of development) affect the manner in which corruption affects foreign direct investment inflow to a country?*” To answer this research question, the quantitative method of regression analysis was chosen. Further, the thesis argued that the existing literature has not been critical or transparent enough with its use of methods and the implications of these choices, as such this thesis employs a relatively unused method, the within and between transformation. Therefore, the endeavor of the thesis has been threefold: first, suggesting a theoretical framework for understanding the effects of corruption upon foreign direct investment; second, revitalizing the view of corruption as a multidimensional phenomenon; third, making it clear what different estimation techniques estimate and how this is relevant for our research question and findings.

In order to answer the research question, I performed a hypotheses-generating literature review, focusing on the FDI-Corruption literature. In the table below, I present the hypotheses, the effects interpreted from the analysis, and the results for the hypotheses.

**Table 9, Summary of hypotheses results.**

<b>Hypothesis</b>	<b>Analysis interpretation</b>	<b>Result</b>
<i>H1a: Corruption decreases the amount of FDI inflow to a country.</i>	The between effect coefficient for the CPI variable on corruption is positive, meaning less corruption attracts more FDI inflow, and vice versa.	Supported.



<b>H1b:</b> <i>Corruption increases the amount of FDI inflow to a country.</i>	The between effect coefficient for the CPI variable on corruption is positive, meaning less corruption attracts more FDI inflow, and vice versa.	Discarded.
<b>H2:</b> <i>Bureaucratic corruption increases the amount of FDI into a country.</i>	The between effect coefficient for the IPD bureaucratic corruption variable is positive, meaning lower levels of bureaucratic corruption is correlated to more FDI inflow and vice versa. The within effect is opposite, but I argue that it could be change in corruption levels itself that is causing the negative effect on FDI inflow, not necessarily the removal of corruptions potential benefits	Between effect: Discarded. Within effect: Supported.
<b>H3a:</b> <i>Political corruption decreases the amount of FDI into a country more than bureaucratic corruption.</i>	The between effect coefficient of the IPD political corruption variable is positive, meaning lower levels of political corruption is correlated to more FDI inflow and vice versa. The within effect is not significant	Discarded.
<b>H4:</b> <i>In countries that have high quality governmental and state institutions, corruption decreases the inflow of foreign direct investment.</i>	The between effect coefficient of the interaction term is negative. This means that in countries with high quality governmental/state institutions, less corruption is associated with less FDI inflow	Discarded. Opposite between effect observed.
<b>H5:</b> <i>In countries that have high quality juridical institutions, corruption will decrease the inflow of foreign direct investment.</i>	The within effect coefficient of the interaction term is negative. This means that in countries with high quality judicial institutions, lesser corruption is associated with lesser FDI inflows. This finding is not robust across estimations. Also theorizing on a general negative effect of change.	Discarded. Opposite within effect observed.
<b>H6:</b> <i>In highly democratized countries, corruption</i>	Non-significant findings in estimation four.	Discarded.

<i>increases FDI inflow to the country.</i>		
<i>H7: In countries with large natural resources, corruption increases FDI inflow to the country.</i>	Non-significant findings in estimation four.	Discarded.
<i>H8: The effect which corruption has upon the inflow of FDI has become more strongly negative since the year 2000</i>	The within effect of the interaction term is positive. This means that in countries after the year 2000, less corruption is associated with more FDI inflows over time.	Supported.
<i>H9: In less developed countries, corruption increases FDI inflow</i>	The between effect of the interaction term is negative. This means that in less developed countries, lower levels of corruption is associated with lower levels of FDI inflow. The within effect is the opposite. This means that lesser corruption over time increases FDI inflow.	Between effect: Supported Within effect: Discarded

Based on the results of the hypotheses, the answer to the research question of this thesis is clear. *The effect corruption has upon the level of foreign direct investment inflows to a country is in the most general of terms, negative.* In a world sample without any interaction effects or specification of types, less corruption is associated with more FDI inflow. As for the second part of the research question, the results also cumulate to a clear answer. *Yes, the effect corruption has upon foreign direct investment inflows into a country is potentially dependent on the internal types of corruption but particularly the external contextual factors are important.* The effect can go from negative to positive and stronger to weaker. As such, we should not try to understand corruption by employing either the sand logic or the grease logic. Both are applicable under different circumstances.

## 7.1. Recommendations for future research

Throughout the process of writing this thesis there have been several interesting aspects that I have simply had to drop due to resources, capacity and space. Some of these aspects have been

mentioned in footnotes and the text of the thesis, and I will briefly summarize what I think deserves more research here:

First is the need for collecting better quantitative data on different types of corruption. The quality of the data I had for bureaucratic and political corruption was not optimal, and I had to spend a lot of time and work to create these panel variables manually. Thus, there should be larger and more focused data collection and creation of measures for *types* of corruption. This would greatly increase the quality of this data, both in terms of validity and reliability. Then better studies on different types of corruption could be conducted.

In terms of contextual factors and interaction effects, there are several other variables of interest to look at. An example could be political stability, which I simply did not have time to prioritize in this thesis. Further, this thesis is broad in its scope, and as such focusing more intently on single interactions, by using better conceptualizations, better measures, better estimations and post-estimation techniques is something that deserves more research. Also, the two contextual factors found to be insignificant in this thesis, namely democracy and natural resources should be more closely studied, as at least natural resources has been found to be significant by other scholars, and it makes intuitive sense that democracy should matter also.

Lastly, to conduct these same estimations with better data and data that covers a longer time dimension would be very interesting. This would allow for a much more precise test of hypothesis 8 on the changing effect of corruption over time, as well as allow us to see if the grease and sand camps are dependent on time periods. In addition, the contradicting within and between effect of corruption in less developed countries deserves more attention and focused analysis.

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# Appendix

## 9.1. Correlations matrix

	FDI	Corruption (CPI)	Democracy	Large natural res.	Judicial instit.	Gov/State instit.	Less developed	Bur. Corruption (IPD)	Pol. Corruption (IPD)	Market size	Market potential	Natural res.	Taxes	Trade	Econ. stability
FDI	1.00														
Corruption (CPI)	0.45	1.00													
Democracy	0.14	0.36	1.00												
Large natural res.	-0.03	-0.23	-0.30	1.00											
Judicial instit.	0.20	0.76	0.38	-0.21	1.00										
Gov/State instit.	-0.12	-0.63	-0.53	0.26	-0.66	1.00									
Less developed	-0.44	-0.49	-0.38	0.33	-0.47	0.44	1.00								
Bur. Corruption (IPD)	0.38	0.87	0.35	-0.22	0.57	-0.69	-0.43	1.00							
Pol. Corruption (IPD)	0.41	0.90	0.32	-0.28	0.66	-0.60	-0.44	0.87	1.00						
Market size	0.49	0.23	0.16	-0.04	0.09	-0.02	-0.05	0.23	0.30	1.00					
Market potential	0.04	-0.23	-0.24	0.27	-0.47	0.24	0.41	-0.12	-0.10	0.05	1.00				
Natural res.	0.07	-0.36	-0.41	0.65	-0.42	0.43	0.31	-0.37	-0.37	-0.12	0.55	1.00			
Taxes	0.10	0.23	0.08	-0.00	0.13	-0.19	0.30	0.21	0.29	0.40	0.40	-0.02	1.00		
Trade	0.20	0.34	-0.24	-0.11	0.23	-0.28	-0.24	0.31	0.35	-0.27	-0.13	-0.27	0.03	1.00	
Econ. stability	-0.16	-0.46	-0.36	0.42	-0.40	0.50	0.63	-0.48	-0.54	-0.02	0.30	0.42	0.01	-0.18	1.00

## 9.2. Collin – Individual VIF values (Model specific calculation, grouped together, excluded interactions)

Variable	VIF
Corruption (CPI)	1.47 – 2.88 (Differing models)
Democracy	1.44
Large natural res.	1.12
Judicial instit.	2.56
Gov/State instit.	2.43
Less developed	1.79
Bur. Corruption (IPD)	1.42
Pol. Corruption (IPD)	1.41

Market size	<b>1.16</b>
Market potential	<b>1.14</b>
Natural res.	<b>1.23</b>
Taxes	<b>1.23</b>
Trade	<b>1.16</b>
Econ. stability	<b>1.09</b>

### 9.3. Country coverage

<b>Total country sample (majority of regressions), by country name</b>
Afghanistan, Albania, Algeria, Angola, Antigua and Barbuda, Argentina, Armenia, Australia, Austria, Azerbaijan, Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belgium, Belize, Benin, Bhutan, Bolivia (Plurinational State of), Bosnia and Herzegovina, Botswana, Brazil, Brunei Darussalam, Bulgaria, Burkina Faso, Burundi, Cambodia, Cameroon, Canada, Central African Republic, Chad, Chile, China, Colombia, Comoros, Congo, Costa Rica, Croatia, Cyprus, Czech Republic, Côte d'Ivoire, Dem. Rep. of the Congo, Denmark, Djibouti, Dominica, Dominican Republic, Ecuador, Egypt, El Salvador, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Falkland Islands (Malvinas), Fiji, Finland, France, Gabon, Gambia, Georgia, Germany, Ghana, Greece, Grenada, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, Hungary, Iceland, India, Indonesia, Iran (Islamic Republic of), Iraq, Ireland, Israel, Italy, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kiribati, Korea Dem. People's Rep. of, Korea Republic of, Kuwait, Kyrgyzstan, Lao People's Dem. Rep., Latvia, Lebanon, Lesotho, Liberia, Lithuania, Libya, Luxembourg, Madagascar, Malawi, Malaysia, Maldives, Mali, Malta, Marshall Islands, Mauritius, Mexico, Micronesia (Federated States of), Mongolia, Montenegro, Morocco, Mozambique, Myanmar, Namibia, Nauru, Nepal, Netherlands, New Zealand, Nicaragua, Niger, Nigeria, Norway, Oman, Pakistan, Panama, Papua New Guinea, Palau, Paraguay, Peru, Philippines, Poland, Portugal, Qatar, Republic of Moldova, Romania, Russian Federation, Rwanda, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Samoa, Sao Tome and Principe, Saudi Arabia, Senegal, Seychelles, Sierra Leone, Singapore, Serbia, Serbia and Montenegro, Slovakia, Slovenia, Solomon Islands, Somalia, South Africa, Spain, Sri Lanka, Sudan, Sudan (...2011), Suriname, Swaziland, Sweden, Switzerland, Syrian Arab Republic, TFYR of Macedonia, Tajikistan, Thailand, Timor-Leste, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkey, Turkmenistan, Uganda, Ukraine, United Arab Emirates, United Kingdom, United Republic of Tanzania, United States, Uruguay, Uzbekistan, Vanuatu, Venezuela (Bolivarian Rep. of), Vietnam, Yemen, Zambia, Zimbabwe

<b>Countries not covered by UNCTAD by country name (total)</b>
Andorra, Cape Verde, Cuba, Cyprus (-1974), Czechoslovakia, Ethiopia (...1991), Germany Democratic Republic of, Germany Federal Republic of, Hong Kong Liechtenstein, Malaysia (-1965), Mauritania, Monaco, Pakistan (-1970), San Marino, Socialist Federal Republic of Yugoslavia, South Sudan, Taiwan, Tibet, Tuvalu, Union of Soviet Socialist Republics, Vietnam North, Vietnam South, Yemen Arab Republic, Yemen Democratic,

<b>Country-years dropped due to negative FDI values and log transformation (155 total)</b>
Afghanistan 1997, Afghanistan 1998, Angola 2005, Angola 2006, Angola 2007, Angola 2010, Angola 2011, Angola 2012, Angola 2013, Angola 2014, Australia 2005, Azerbaijan 2006, Azerbaijan 2007, Bahrain 1998, Belgium 2008, Belgium 2014, Belize 2003, Bhutan

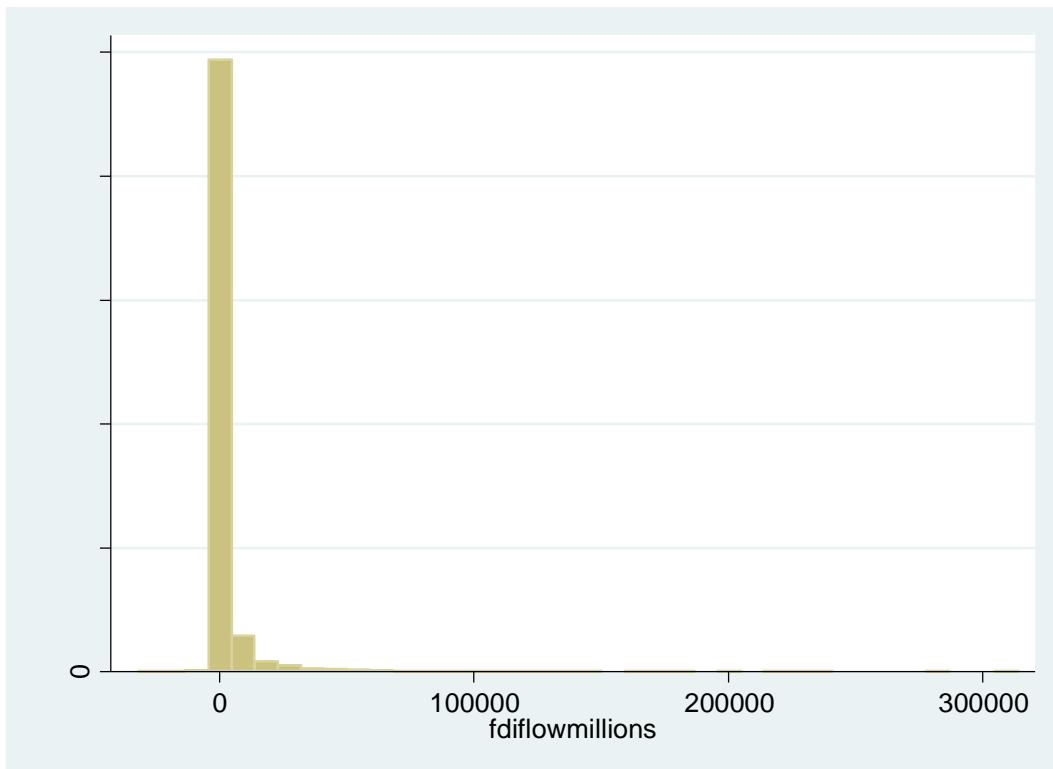
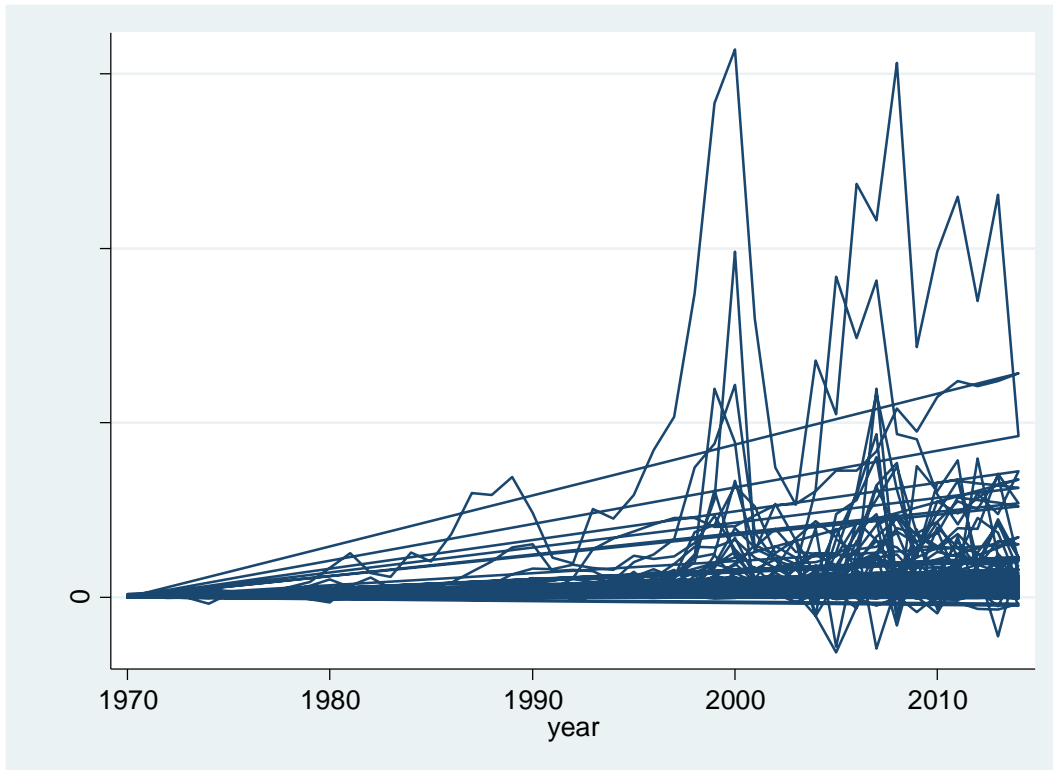
1997, Bolivia (Plurinational State of) 2005, Burundi 1999, Cameroon 1999, Canada 2004, Chad 2005, Chad 2006, Chad 2007, Congo 2004, Dem. Rep. of the Congo 1997, Denmark 2004, Denmark 2008, Denmark 2010, Denmark 2013, Ecuador 2000, Egypt 2011, El Salvador 2010, Equatorial Guinea 2008, Falkland Islands (Malvinas) 1997, Falkland Islands (Malvinas) 1998, Falkland Islands (Malvinas) 2006, Finland 2008, Finland 2013, France 2004, Gabon 1996, Gabon 1997, Gabon 1999, Gabon 2000, Gabon 2001, Germany 2004, Indonesia 2003, Iraq 1996, Iraq 2000, Iraq 2001, Iraq 2002, Ireland 2004, Ireland 2005, Ireland 2006, Ireland 2008, Italy 2008, Japan 2006, Japan 2010, Japan 2011, Kiribati 2001, Kiribati 2010, Korea, Dem. People's Rep. of 1999, Korea, Dem. People's Rep. of 2001, Korea, Dem. People's Rep. of 2002, Korea, Dem. People's Rep. of 2006, Kuwait 2001, Kuwait 2003, Kuwait 2008, Kyrgyzstan 2000, Liberia 1996, Libya 1996, Libya 1997, Libya 1998, Libya 1999, Libya 2001, Lithuania 2009, Luxembourg 2007, Malta 2002, Malta 2009, Marshall Islands 2009, Mauritania 1996, Mauritania 1997, Mauritania 1998, Mauritania 2009, Mauritius 2001, Micronesia (Federated States of) 1996, Micronesia (Federated States of) 1998, Micronesia (Federated States of) 1999, Micronesia (Federated States of) 2001, Micronesia (Federated States of) 2008, Nepal 2000, Nepal 2002, Nepal 2004, Nepal 2006, Netherlands 2010, New Zealand 2001, New Zealand 2003, Niger 1998, Palau 2001, Palau 2002, Palau 2009, Palau 2010, Papua New Guinea 2006, Papua New Guinea 2008, Papua New Guinea 2011, Papua New Guinea, 2014, Qatar 2013, Samoa 1999, Samoa 2000, Slovakia 2009, Slovenia 2009, Slovenia 2013, Solomon Islands, 2001, Solomon Islands 2002, Solomon Islands 2003, Somalia 1999, Somalia 2003, Somalia 2004, South Sudan 2013, South Sudan 2014, Suriname 1997, Suriname 1999, Suriname 2000, Suriname 2001, Suriname 2002, Suriname 2003, Suriname 2004, Suriname 2006, Suriname 2007, Suriname 2008, Suriname 2009, Suriname 2010, Swaziland 1997, Swaziland 2003, Swaziland 2005, Switzerland 2005, Switzerland 2013, Tonga 1997, United Arab Emirates 1999, United Arab Emirates 2000, Vanuatu 2013, Vanuatu 2014, Venezuela (Bolivarian Rep. of) 2006, Venezuela (Bolivarian Rep. of) 2009, Yemen 1996, Yemen 1997, Yemen 1998, Yemen 1999, Yemen 2003, Yemen 2005, Yemen 2011, Yemen 2012, Yemen 2013, Yemen 2014

**Countries not covered by Taxes that is covered by UNCTAD by country name**

Albania, Bahamas, Brunei Darussalam, Chad, Comoros, Djibouti, Ecuador, Eritrea, Ethiopia, Finland, Gabon, Guinea-Bissau, Guyana, Haiti, Iraq, North Korea, Libya, Malawi, Marhsall Islands, Mauritania, Mauritius, Micronesia, Montenegro, Nauru, Saudi Arabia, Serbia and Montenegro, Solomon Islands, Somalia, Sudan, Swaziland, Timor-Leste, Tonga, Turkmenistan, United Arab Emirates, Uzbekistan, Vanatu, Vietnam

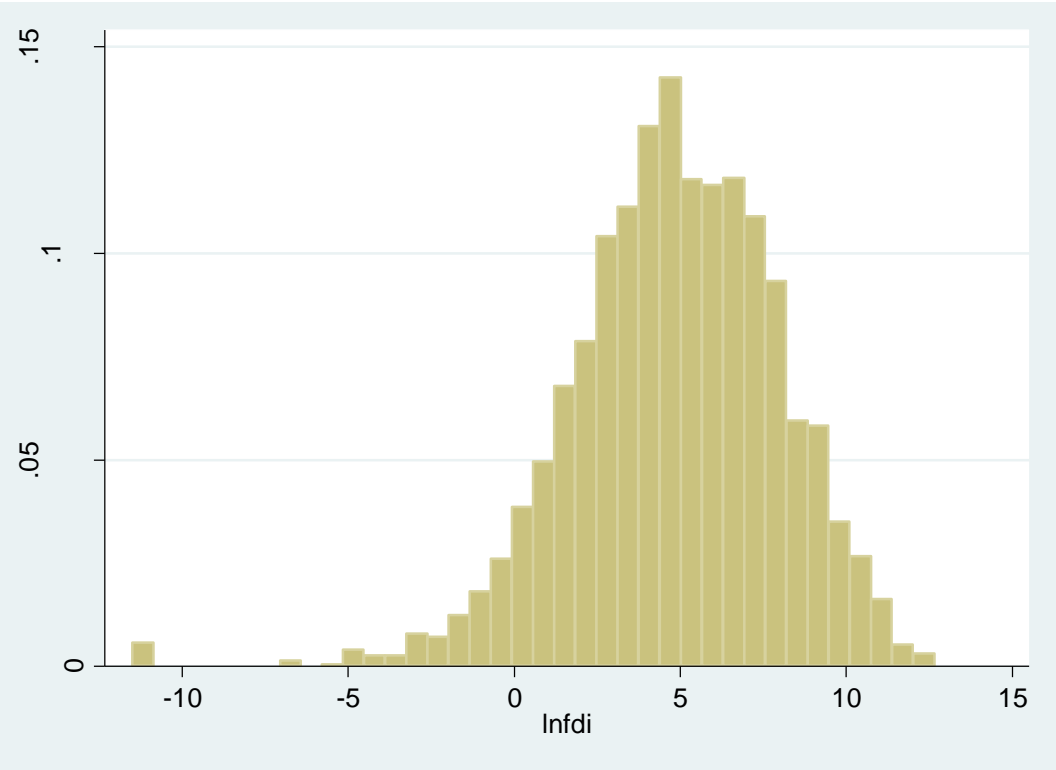
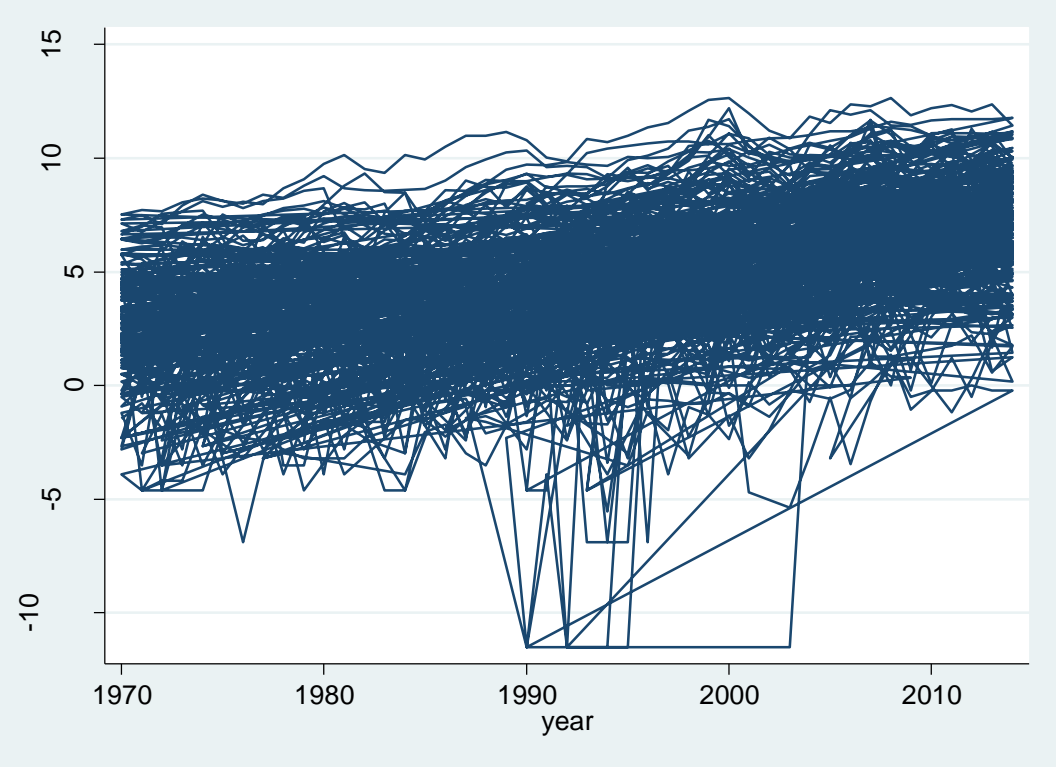
## 9.4. Scatterplots and histograms of dependent variable, FDI inflow.<sup>95</sup>

Before logarithmic transformation:



<sup>95</sup> These plots and histograms are available for all the variables of the regression models upon request.

After logarithmic transformation:

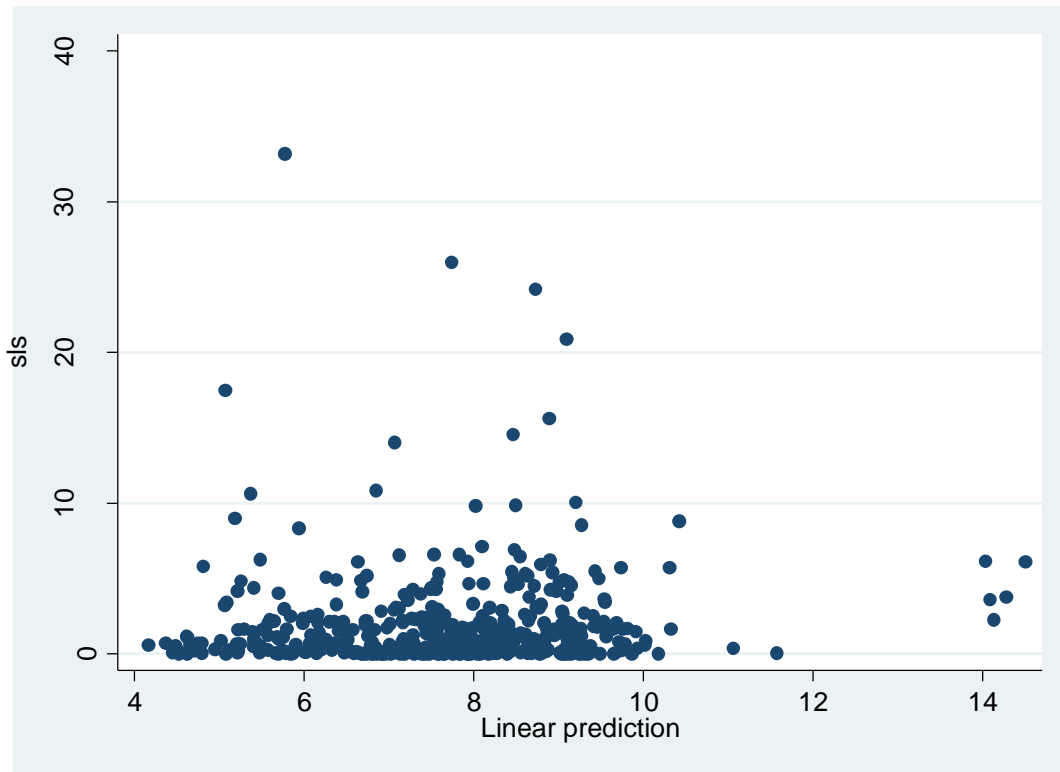


## 9.5. Normality tests

Shapiro-Francia W' test for normal data

Variable	Obs	W'	V'	z	Prob>z
fdi	3,300	0.95712	85.272	10.979	0.00001
laglcorrup~i	2,429	0.89293	160.623	12.308	0.00001
democracy	2,901	1.00000	0.000	-54.634	1.00000
highextrac~e	3,305	1.00000	0.000	.	0.00001
highruleof~w	2,686	1.00000	0.000	-56.004	1.00000
highburqua~y	2,629	1.00000	-0.000	.	0.00001
lowdev	1,238	1.00000	-0.000	.	0.00001
laglburcor~n	200	0.98965	1.685	1.079	0.14020
laglpolcor~n	200	0.97673	3.789	2.754	0.00294
laglmarket~e	3,174	0.28375	1374.155	17.801	0.00001
laglmarket~l	3,288	0.74117	512.984	15.407	0.00001
laglnatura~s	3,305	0.70049	596.456	15.784	0.00001
lagltaxes	1,849	0.95300	54.938	9.545	0.00001
laglIntrade	3,136	0.90640	177.598	12.751	0.00001
lagllnecon~y	3,133	0.96840	59.909	10.075	0.00001

## 9.6. Heteroscedasticity residuals result:



## 9.7. Autocorrelation test result:

```
. xtserial corruptionti

Wooldridge test for autocorrelation in panel data
H0: no first-order autocorrelation
      F( 1, 180) = 472.810
      Prob > F = 0.0000

. xtserial levelofdev

Wooldridge test for autocorrelation in panel data
H0: no first-order autocorrelation
      F( 1, 183) = 14.631
      Prob > F = 0.0002

. xtserial bureauqual

Wooldridge test for autocorrelation in panel data
H0: no first-order autocorrelation
      F( 1, 190) = 230.572
      Prob > F = 0.0000

. xtserial ruleoflawqual

Wooldridge test for autocorrelation in panel data
H0: no first-order autocorrelation
      F( 1, 192) = 223.568
      Prob > F = 0.0000

. xtserial marketpotential

Wooldridge test for autocorrelation in panel data
H0: no first-order autocorrelation
      F( 1, 188) = 3.642
      Prob > F = 0.0579

. xtserial marketsize

Wooldridge test for autocorrelation in panel data
H0: no first-order autocorrelation
      F( 1, 179) = 275.522
      Prob > F = 0.0000

. xtserial naturalres

Wooldridge test for autocorrelation in panel data
H0: no first-order autocorrelation
      F( 1, 187) = 17.079
      Prob > F = 0.0001

. xtserial taxes

Wooldridge test for autocorrelation in panel data
H0: no first-order autocorrelation
      F( 1, 150) = 7.640
      Prob > F = 0.0064

. xtserial trade

Wooldridge test for autocorrelation in panel data
H0: no first-order autocorrelation
      F( 1, 181) = 1.262
      Prob > F = 0.2628
```



```
. xtserial econstability
```

```
Wooldridge test for autocorrelation in panel data
```

```
H0: no first-order autocorrelation
```

```
F( 1, 185) = 48.815  
Prob > F = 0.0000
```

### **For the dependent variable (AR 1):**

```
. xtserial fdi
```

```
Wooldridge test for autocorrelation in panel data
```

```
H0: no first-order autocorrelation
```

```
F( 1, 187) = 32.824  
Prob > F = 0.0000
```

## **9.8. Stationarity results:<sup>96</sup>**

Variable	Unit Root (non-stationarity), significance
Corruption, CPI	No
Less developed, HDI	No
Democracy	Yes
Gov/state institutions	No
Judicial institutions	No
Large natural resources	No
Bureaucratic corruption, IPD	No
Political corruption, IPD	No
Market size	Yes
Market growth	Yes
Trade	No
Taxes	No
Economic stability	No

---

<sup>96</sup> The tests needed to be run individually per variable and taking enormous space. Raw results are available per request.

## 9.9. Hausman test of Model 1, estimation three (RE) and estimation one (FE)

	— Coefficients —		(b-B) Difference	sqrt(diag(V_b-V_B)) S.E.
	(b) FE	(B) RE		
corruption~W	.0896612	.0893774	.0002838	.
marketpote~W	.0190574	.0187916	.0002659	.0003586
marketsizeW	2.68e-13	2.70e-13	-1.42e-15	.
naturalresW	.022456	.02245	6.04e-06	.0003524
tradeW	.0069177	.0068859	.0000317	.0000738

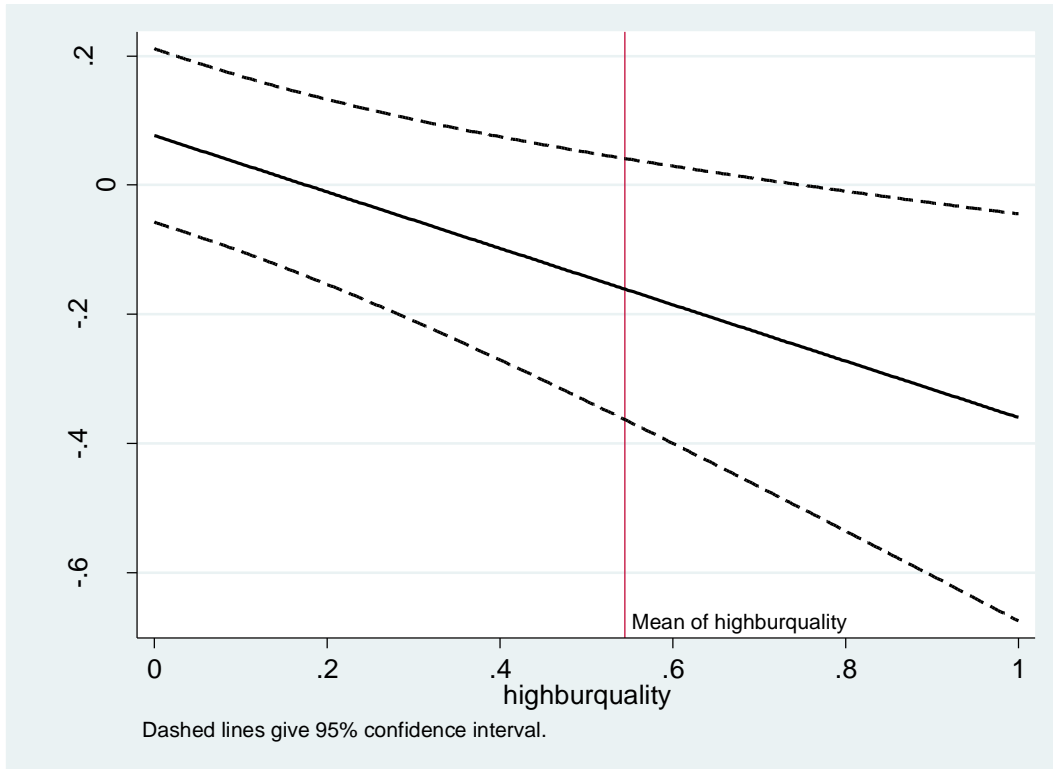
b = consistent under Ho and Ha; obtained from xtreg  
 B = inconsistent under Ha, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

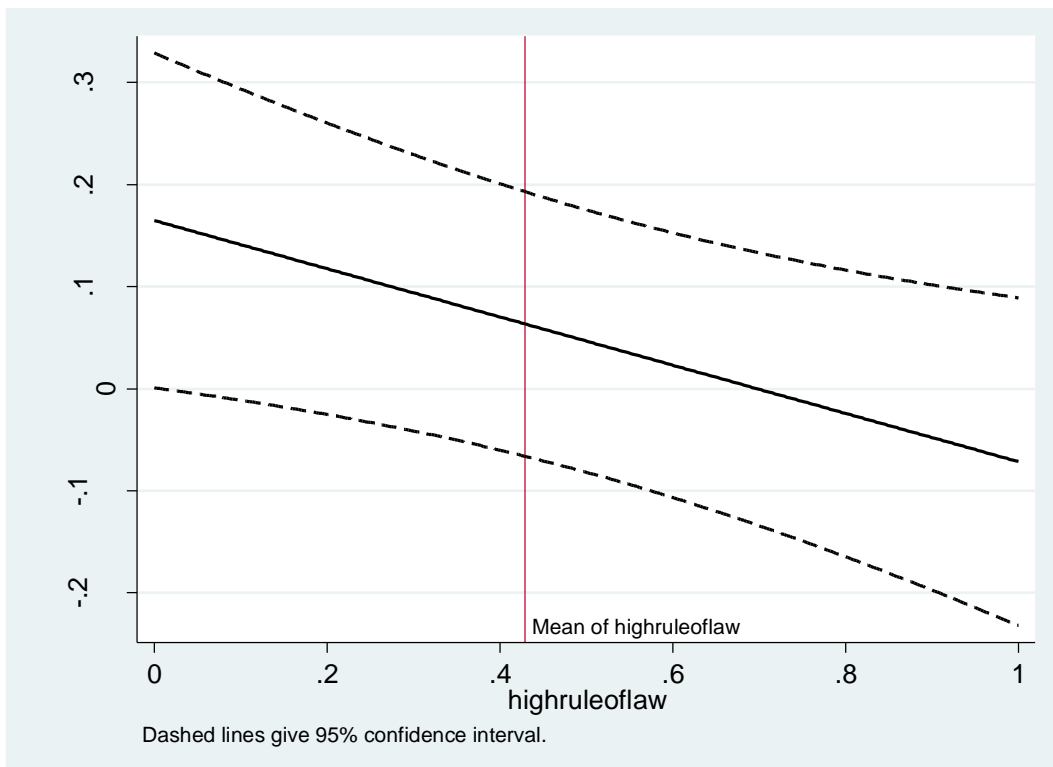
chi2(4) = (b-B)'[(V\_b-V\_B)^(-1)](b-B)  
 = 0.70  
 Prob>chi2 = 0.9510  
 (V\_b-V\_B is not positive definite)

### 9.10. Graphical illustrations of interactions (grinter)

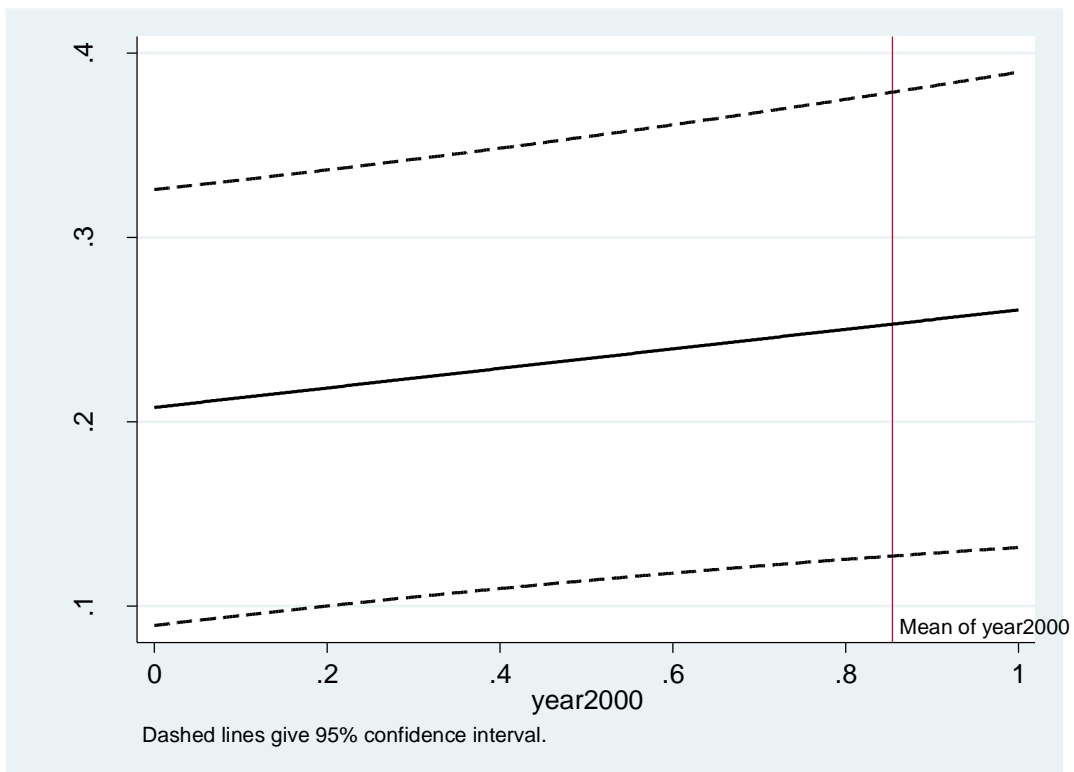
Interaction of corruption and high quality governmental and state institutions:



Corruption and high quality judicial institutions:

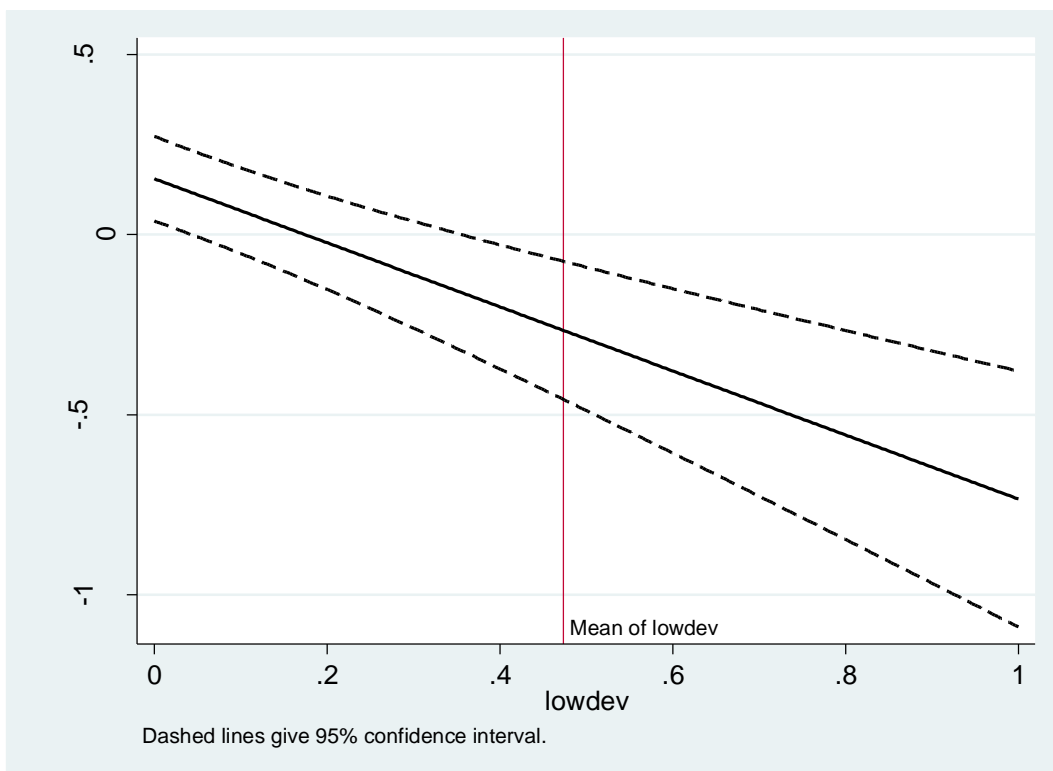


Corruption and after year 2000 dummy:

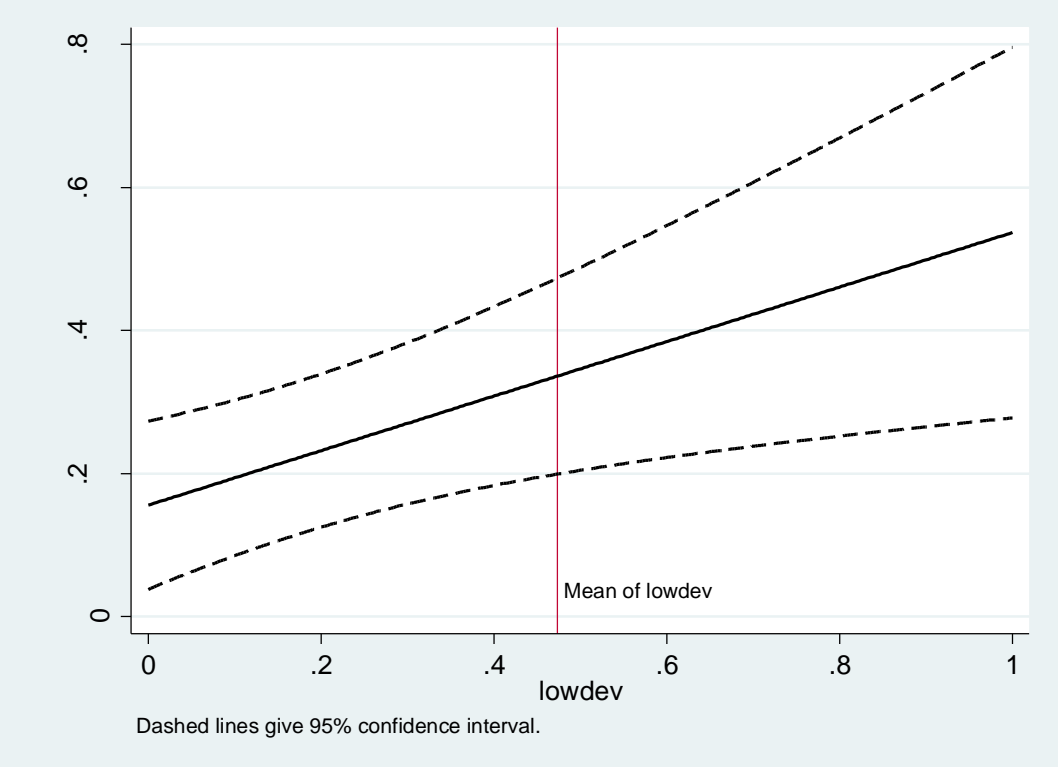


Corruption and less developed countries:

Between effect:



Within effect:



## 9.11. Other regression models:

Corruption and Democracy	Fixed Effects (1)	Random Effects (2)	Random Effects (3)	Generalized estimating equations (4)	Generalized estimating equations with taxes (5)
Constant	1.9791* (1.2030)	2.2298** (0.9639)	1.9579** (0.9854)	4.1915*** (0.9540)	4.2443*** (1.1628)
Corruption	-0.1036 (0.1431)	-0.0213 (0.1211)	-0.0287 (0.1213)	0.1180 (0.1069)	0.0813 (0.1442)
Democracy (dummy)	-0.2054 (0.4711)	-0.1938 (0.4114)	-0.0915 (0.4194)	0.2474 (0.3555)	0.2268 (0.4522)
Corruption * democracy (dummy)	<b>0.2760*</b> <b>(0.1520)</b>	<b>0.2924**</b> <b>(0.1260)</b>	-	-	-
B	-	-	<b>0.3675***</b> <b>(0.1302)</b>	0.1965 (0.1171)	0.1878 (0.1526)
W	-	-	<b>0.2323*</b> <b>(0.1353)</b>	0.0042 (0.1109)	0.0546 (0.1395)
Market size	2.38e* (1.26e)	3.52e*** (1.37e)	3.48e*** (1.35e)	5.33e*** (1.35e)	4.68e*** (1.36e)
Market potential	0.0180** (0.0087)	0.0190*** (0.0087)	0.0194** (0.0087)	0.0116** (0.0065)	0.0186*** (0.0056)
Natural resources	0.0142 (0.0101)	0.0156* (0.0082)	0.0172** (0.0086)	0.0122*** (0.0044)	0.0148*** (0.0053)
Trade	1.1112*** (0.2922)	0.8599*** (0.2267)	0.8644*** (0.2274)	0.2854 (0.2029)	0.2964 (0.2318)
Taxes	-	-	-	-	0.0161 (0.0048)
Economic stability	-0.0442 (0.0404)	-0.0439 (0.0391)	-0.0431 (0.0391)	-0.0200 (0.0266)	-0.0162** (0.0051)
N and group N	1775(152)	1775(152)	1775(152)	1772(149)	1214(122)
R <sup>2</sup>	0.26	0.37	0.32	-	-
Mean VIF	14.46	14.46	13.85	13.19	14.47

Standard errors in parenthesis

\*= p < 0.10 \*\*= p<0.05 \*\*\*= p<0.01

<b>Corruption and large natural resources.</b>	Fixed Effects (no within and between)	Random Effects (no within and between)	Random Effects	Generalized estimating equations	Generalized estimating equations (with taxes)
Constant	1.3904 (1.1501)	1.7137* (0.9264)	1.6947* (0.9247)	4.7003*** (0.8418)	4.7782*** (0.9711)
Corruption	0.0481 (0.0877)	0.1675*** (0.0633)	0.1690*** (0.0632)	0.2413*** (0.0497)	0.2292*** (0.0563)
Natural resources (dummy)	-0.0580 (0.4701)	0.2117 (0.4360)	0.2213 (0.4388)	0.5154 (0.3528)	1.4367*** (0.4709)
Corruption * High natural resources (dummy)	0.0221 (0.1690)	-0.0377 (0.1545)	-	-	-
B	-	-	0.0220 (0.1579)	-0.0930 (0.1325)	<b>-0.4457**</b> <b>(0.1845)</b>
W	-	-	-0.0475 (0.1614)	-0.1187 (0.1428)	<b>-0.3937***</b> <b>(0.1499)</b>
Market size	2.34e* (1.32e)	3.68e** (1.57e)	3.70e** (1.57e)	5.87e*** (1.46e)	4.98e*** (1.41e)
Market potential	0.0213** (0.0086)	0.0224*** (0.0086)	0.0224** (0.0086)	0.0126** (0.0062)	0.0175*** (0.0052)
Natural resources (excluded)	-	-	-	-	-
Trade	1.2613*** (0.2729)	0.9330*** (0.2138)	0.9255*** (0.2140)	0.1811 (0.1917)	0.1746 (0.2143)
Taxes	-	-	-	-	0.0183*** (0.0046)
Economic stability	-0.0529 (0.0387)	-0.0517 (0.0376)	-0.0513 (0.0377)	-0.0171 (0.0244)	-0.0595** (0.0271)
N	1891(171)	1891(171)	1891(171)	1888(168)	1298 (134)
R <sup>2</sup>	0.11	0.30	0.31	-	-
Mean VIF	5.81	5.81	5.53	5.88	5.95

Standard errors in parenthesis

\*= p < 0.10 \*\*= p<0.05 \*\*\*= p<0.01

