The Impact of Corruption on FDI: The Case of Post-Socialist Europe

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Abstract

Analyzing cross-sectional time-series, the present study evaluates whether the experience of post-Socialist states in Central and Eastern Europe, the Balkans and the Baltics confirms the oft-mentioned assumption that corruption lowers a country's attractiveness for foreign direct investment. It is found that corruption, as measured by various perception-based indices, has indeed played an important role in the region as a determinant of attractiveness for foreign investors. At the same time, the study evaluates the changing marginal effect of corruption before and after EU accession, yet fails to find strong evidence pointing towards significant differences. Finally, the present study suggests that the scientific community should consider, in quantitative studies, the use of corruption indices in the form of a lagged variable.

Key words: corruption, foreign direct investment, post-Socialism, EU integration, cross-sectional time-series, interaction

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Introduction

Corruption, defined by the World Bank as “the abuse of public office for private gain” (World Bank 2011a) is a topic that, for a long time, has only been discussed using formal models. Many of these portrayed our world as being dominated by self-interested bureaucrats and entrepreneurs, whose interaction leads to large gains for individuals, yet sizeable losses for society as a whole. Empirical testing was impossible due to insufficient data availability. As the study of this social phenomenon developed further, a number of more or less successful attempts to quantify corruption saw the light of the day, out of which Transparency International’s (TI) Corruption Perception Index (CPI), the Control of Corruption indicator of the Worldwide Governance Indicators (WGI) and the Nations in Transit measure of corruption offered by the New York-based international non-governmental organization Freedom House have probably gained the most attention. These indicators, as well as many others, have been seen by the scientific community as an opportunity for testing the earlier established theories about the causes and consequences of corruption.

The body of literature devoted to corruption is indeed vast: for example, a literature review by Kolombaev, Campos and Garrity (2006), sponsored by the World Bank, lists as many as 54 books and edited volumes and more than 230 journal articles and working papers on the topic of corruption published from 2000 to early 2006. If the topic of corruption is important for the global scientific community, it should be more so for researchers and the greater public in the transition economies of post-Socialist Eastern Europe and Central Asia. This is the region which, alongside Southeast Asia, has undergone the most turbulent development in the past twenty years, a development that, in many ways, has been conducive to corruption.

As will be discussed in greater detail in the following chapter, a large segment of the scientific community is interested in the study of the impact of corruption on foreign direct investment (FDI). This particular topic has attracted the attention of scholars for several reasons: first, foreign direct investments are seen as a possible way out of the poverty trap for developing countries; second, one of the best known approaches to corruption is that it is an excess tax[1] on economic activity, and, as taxes are a powerful determinant of foreign direct investment inflow, there is a theoretical reason why the salience of corruption should deter investors from moving into a country (Bardhan 1997); finally, the aforementioned ideas could easily be tested thanks to rather good data availability.

As Al-Sadiq (2009) notes, the “commonly expected conclusion” (269) that corruption represents an obstacle to foreign direct investment has not been reached at the current stage of the literature as the empirical studies conducted so far often fail to find enough evidence in favor of the theory. This may be true, yet most of the literature still seems to take side with those who consider corruption to be a hindrance for FDI. On the other hand, as will be discussed in more detail in the next chapter, that post-Socialist countries in Central and Eastern Europe, the Baltics and the Balkans do not appear to behave according to the high corruption-low FDI scheme. Despite a rather slow improvement in the area of corruption and corruption control[2], FDI stock seems to have grown at an astonishing rate. It is therefore considered justified to devote special attention to the European post-Socialist states, many of which have already become members of the EU and investigate, whether the aforementioned assumption on the negative relationship between the salience of corruption and the presence of FDI holds in the region.

In addition to this, the majority of the studies conducted on the relationship between these two variables only use cross-sectional data rather than time-series cross-sections and fail to account for country-specific effects. They also ignore the idea that, given the dynamics of firm-level decision-making about the allocation of investments, a lagged version of the corruption indices should be used, as investors might base their choices not only on their recent direct experience with the administration of a country, but also on the past experience of their peers or the past issues of country assessments and reports done by specialized agencies and non-governmental organizations (NGOs).

[1] In this respect, Shleifer and Vishny (1993) also provide valuable insight into the functioning of corruption as a cost to business. They argue that, due to a specific need for secrecy, corruption is even costlier for economic agents than a comparable level of taxation.

[2] Although the terms *corruption* and *corruption control* are often used together, it is necessary to distinguish between the two concepts. Corruption is a social phenomenon, while corruption control is a policy area dealing with the social bad of corruption (Bátory forthcoming).

Using time-series cross-sectional data, the present thesis investigates, whether the experience of the post-Socialist European states conforms to the prevalent idea that corruption deters foreign investors. Secondly, it aims to analyze the impact of EU accession, as a specific condition, on the relationship between FDI and corruption. The research topic of the proposed thesis can therefore be summarized in two questions:

1) What is the impact of corruption on foreign direct investment in European post-Socialist transition economies?
2) Does the impact of corruption on foreign direct investment change once a transition economy enters the EU?

Finally, the dataset used allows me to compare the behavior of corruption indices as time-lagged response variables against the explanatory variable, thus enhancing the methodology of the quantitative research of corruption. The present thesis will demonstrate that the experience of the CEECs, the Baltics and the Balkans in the past decade or so seems to point strongly towards the conclusion that corruption, despite my original skepticism, is indeed an important determinant of FDI. This finding will be corroborated by several perception-based corruption indices used in the study. At the same time, the regressions show some evidence that the effect of corruption should be, in the future, considered more seriously as an ex ante constraint on investment decisions rather than a simple contemporaneous variable. On the other hand, the present thesis could provide little evidence pointing towards the conclusion that EU accession as such made a sizeable difference in the importance of corruption as a factor deterring FDI. It appears that the quantitative enquiry into this subject requires a longer period of EU membership and more country-years to examine.

1. Literature review and Theoretical Overview

1.1 The Definition and Effects of Corruption

The definition of corruption as well as its typology often do not receive enough attention quantitative empirical studies of this phenomenon. One of the rather disturbing side-effects of this is that many of the analyses suffer from a superficial and insufficient definition of what is intended to be operationalized and measured.

Heidenheimer, Johnston and LeVine (1993) identify three main lines of contemporary social science definitions of corruption:

> The largest group […] relate their definitions of *corruption* essentially to concepts concerning the duties of the public office. A smaller group develop definitions that are primarily related to demand, supply, and exchange concepts derived from economic theory, while a third group discuss corruption more with regard to the concept of public interest. (8)

The first, most common group of definitions considers corruption to be exclusively related to public offices. The misuse of public office for earning benefits of monetary or other kind is considered an act of corruption. The second approach understands corruption as the natural outcome of the interaction between a self-seeking rational bureaucrat and an entrepreneur. The bureaucrat, once appointed, will strive to maximize her own benefits stemming from the possession of a public office, while the entrepreneur weighs her chances of succeeding without having to corrupt the official. Although it is not said explicitly, the examples Heidenheimer, Johnston and LeVine (1993) give to illustrate this approach once again concentrate on corruption among public officials. At the same time, it appears that this definition of corruption is essentially the same as the previous one, except it allows us to generalize corruption to any field where there is a principal-agent relationship, certain private businesses included. In the case of the third group of definitions, it appears that corruption occurs whenever illicit means and action that decreases public welfare meet. The question, nevertheless, is whether the end or the result of the corrupt action really matter if the process of attaining the goal is illegal. Considering the above three groups of definitions, it seems useful to follow, as close as possible, the most common approach to corruption, which invites researchers to investigate corruption happening in the public sphere. This would also alleviate the burden of distinguishing between cases when undue influence leaves, despite its illicit nature, a desirable impact on society[3] and thus might not necessarily be considered corruption.

Even if we narrow down corruption to acts happening in the public sphere or at the point of interaction between the public and the private, there remain certain issues to be specified concerning the exact type of corruption we focus on. Corruption in the public sphere can be further divided into political and administrative. Political corruption occurs when high-ranking politicians misuse their power. This might happen for the purpose of enriching oneself or a group of people or for preserving one's political power. Administrative or bureaucratic corruption happens in the lower strata of state administration where the decisions made by the political elite are executed (U4-Anti-Corruption Resource Centre 2011). The process of execution, obviously, gives many possibilities for the disloyal bureaucrat to enrich herself and "abuse […] public office for private gain" (World Bank 2011a).

Apart from the definition and the aforementioned categorization of corruption, the scientific literature on the topic takes note of various forms of corruption. According to Amundsen (1999), these include bribery, embezzlement, fraud, extortion and favoritism (for a detailed description see Amundsen 1999 or Andvig *et al.* 2000). Nevertheless, given the nature of the corruption indices, which often do not differentiate between these basic corruption-related concepts, it is not possible to explore differences among the impact of the various forms and types of corruption on the economy.

[3] It would be possible to hypothesize that there are many criminal regimes all over the world where non-compliance with the rules set up by the illegitimate central power leads to positive outcomes for society. However, the present thesis will concentrate on a group of countries that are democratic and in which it is unlikely that corruption is a lesser evil.

1.2 Corruption and Economic Development

The relationship between corruption and economic development is an issue that has gained more and more attention from social scientists since the 1960s. One of the key authors of the field is Susan Rose-Ackerman, whose *Corruption: A study of Political Economy* (1978) is often cited as the first example "of how economic thinking could be applied to the problem of corruption" (Hopkin 2002, 576). One of Rose-Ackerman's (1997) main concerns about corruption is its efficiency-decreasing effect. When corruption is present in society, public procurement will not allocate the resources of the state in the most efficient manner, neither will privatization be conducted in a way that would ensure that state property is passed over to the most promising privatizer.

Another efficiency-reducing effect of corruption stems from the possibility of misusing the state's regulatory capacity in market competition. According to Rose-Ackerman (1997), this is a particularly serious issue in certain branches of the economy, such as the construction industry, where long hold-ups can result in financial losses for the entrepreneur, which gives the corrupt bureaucrat an excellent opportunity to blackmail the private sector. Taking all the above into account, the efficiency-and growth-reducing effects of corruption seem to have a firm theoretical grounding.

Nevertheless, one should also note that, alongside this literature, there is another line of thought represented by authors such as Huntington (1960), who considers corruption a natural side-effect of the emergence of modernizing tendencies in a society and Leff (1964), who, as Hopkin (2002) points out, believes corruption contributes to faster economic development by allowing entrepreneurs to avoid inefficient state regulation. Mauro (1995) summarizes the arguments of this stream in the literature by explaining the two main channels through which corruption might eventually be beneficial for economic growth. First, corruption in the form of "speed money" (Mauro 1995, 681) helps avoid administrative delay. Second, bribes would actually function as a "piece rate" (Mauro 1995, 681) which would motivate bureaucrats to work harder. Moreover, Harrison and Kim (2001) argue that, in the Soviet command economy, the toleration of petty corruption among firm managers enhanced productivity, also because they used the available stock of the company they directed to motivate workers to perform better at work. These ideas, however, do not belong to the mainstream literature on the relationship between corruption and economics.

One of the main counterarguments raised against them is that corrupt politicians and bureaucrats will be able, if they see the opportunity, to introduce more and more regulation with the aim of collecting more bribes from the private sector that is trying to avoid these regulations (Myrdal 1968). This line of argument separates the short-term consequences of corruption, which can be good for the economy, and the long-term consequences which are detrimental. Everything taken into account, it can be concluded, that there is a relatively wide consensus that corruption indeed represents a public bad that also has its repercussions for the national and global economy.

Having mentioned the consequences of corruption emphasized by Rose-Ackerman and other authors, I would now like to devote some attention to the discussion of various empirical studies that have attempted to find a relationship between certain economic phenomena and the level of corruption. Empirical research on corruption was, for several decades, practically impossible as there were no quantitative measures of the phenomenon. On the other hand, the social sciences community still published a number of papers on this topic, many of which presented formal models of corrupt behavior (for example Lui 1985, Beck and Maher 1986 and Shleifer and Vishny 1993). Empirical analyses began to develop only in the mid-1990s. Since then, a rather large number of quantitative studies have been published that test the conclusions theory had reached earlier.

First, Mauro (1995) presents in his seminal article an empirical analysis that corruption lowers economic growth. Later on, Leite and Weidmann (1999) have found evidence of how natural resources increase the salience of corruption that, in turn has a negative impact on economic growth. On the other hand, the results of Barreto's (2001) empirical research suggest that the relationship between corruption and growth is a positive one, which means that, as Leff (1964) has hypothesized, corruption "can be efficiency enhancing" (Barreto 2001, 2).

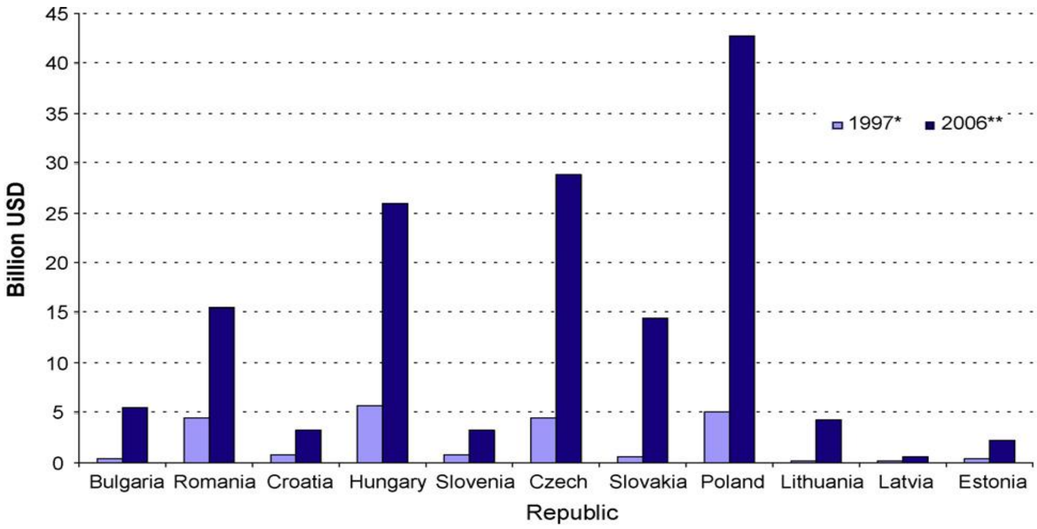
According to Johnson, Kaufmann and Zoido-Lobatón (1999), corruption also produces decreased tax income as entrepreneurs escape from the official sector where they have to deal with corrupt bureaucrats to the shadow economy. In addition, in a recent article on the relationship between corruption and public finance, Kaufmann (2010) adds that it is not only petty corruption, but also the deliberate mismanagement of public finances and public debt that results in losses for the state and undue benefits for high-level private lenders.

1.3 Corruption and Its Impact on FDI

Another oft-discussed negative effect of corruption is its impact on investment, mainly in the form of decreased foreign direct investment stock and inflow. This has been proven by several studies (Wei 2000a, Wei 2000b, Habib and Zurawiczki 2002, Smarzynska and Wei 2000, Asiedu and Freeman 2009). On the other hand, as Al-Sadiq points out (2009), there are a number of empirical analyses that have failed to corroborate the negative impact of corruption on FDI (see for example Mody and Wheeler 1992). Yet, despite the presence of some influential pieces of scientific work questioning the negative impact of corruption on FDI, it seems that the consensus in development is more in favor of those who perceive corruption as an important impediment to a country's economic well-being. The question, however, is whether the past experience of countries in Central Europe, the Baltics and the Balkans also corroborates this assumption. At first sight, it seems that, despite the prevalence of corruption signaled by most perception-based corruption indices, these countries did not have much difficulty attracting FDI. For example, in the years between 2000 and 2009, the per capita stock of FDI in the Slovak republic increased from 1 313 USD to 6 472 USD[4]. This is almost a five-fold increase while, during the same period, the Control of Corruption indicator showed no sizeable improvement. In fact, the score attributed to Slovakia in 2000 was 0.36, while in 2009 it received a slightly lower score of 0.325[5]. This unfavorable development has not yet proven to be a major impediment to attracting FDI.

The example of the Slovak Republic can, to some extent, be used to describe the experience of the whole region. As Figure 1 (Lefilleur and Maurel 2010, 311) shows, the presence of FDI in manufacturing in the CEECs grew at an astonishing rate between 1997 and 2006. Yet, the level of perceived corruption in these countries did not go through considerable changes in the period. One of the possible explanations for this phenomenon is the accelerating accession process to the European Union in the late 1990s and early 2000s. Therefore, in the present study, I am going to analyze the interaction between EU accession and corruption.

Figure 1 – Development of FDI in manufacturing in chosen CEECs



* 1997 data are not available for Romania and Hungary, and have been replaced by 2002 (Romania) and 1998 (Hungary) data; ** 2006 data are not available for Croatia and have been replaced by 2005 data.

Source: Lefilleur and Maurel 2010, 311.

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4 Calculated by the author using data on FDI stock from the United Nations Conerence on Trade and Development (2011a), data on population from the World Bank (2011b) and data on the average exchange rates between the Slovak koruna, the euro and the U.S. dollar from Oanda Corp. (OANDA 2011)

5 Data retrieved from the WGI website (Worldwide Governance Indicators 2011b).

Moreover, little attention has been devoted so far to the study of corruption as a lagged variable. The reason for this may be that the vast majority of the empirical studies on the impact of corruption on FDI stock and inflow have used cross-sectional data. The exceptions include Abed and Davoodi's (2000) and Habib and Zurawiczki's (2002) paper, which present a time-series cross-sectional analysis, yet the extremely short time-series per country they use, four and three years respectively, makes it difficult to account for country-specific effects and nearly impossible to include lagged variables. Yet, it is considered relevant to ask whether corruption, be it measured by perception-based indices or otherwise, should rather be perceived as an ex-ante constraint. If this is indeed the case, then corruption, as a lagged variable, should have an even larger effect on FDI than it has in its contemporaneous version.

The present thesis seeks to fill these gaps by providing a cross-sectional time-series analysis on the impact on corruption on FDI stock in sixteen transition economies (see Appendix A) for the period 2000-2009. The dataset compiled for this quantitative analysis will provide an opportunity to investigate the relationship between corruption and FDI by including country-specific fixed effects as well as the lagged form of the main explanatory variable corruption, as proxied by chosen perception-based corruption indices. In addition to the above, the dataset used also contains data gathered in post-Socialist EU member states, which will allow us to investigate the interaction of corruption and EU accession.

1.4 The Determinants of Foreign Direct Investments

The amount of FDI present in a country depends on a number of factors that should be controlled for in order to increase the validity of the research proposed. The market size hypothesis, confirmed by Wang and Swain (1995) and Ang (2008), but questioned by Chakrabarti (2001) claims that absolute market size, measurable, for example by the aggregate gross domestic product (GDP) has a positive influence on FDI inflow into a country. Indeed, it is a rather plausible assumption that states with a sizeable internal market, even if the purchasing power of the inhabitants is low, attract more FDI in absolute terms.

Therefore, the influence of market size on the amount of FDI present in the economy is, in this particular study, accounted for by dividing FDI stock with the number of inhabitants.

As shown by a number of empirical studies (Edwards 1990, Janicki and Wunnava 2004), another important factor that influences FDI inflow is a country's openness to trade. As many of the investors seek to produce for other markets as well as import indispensable raw material for their production from abroad, having little or no trade barriers is definitely an advantage. Trade openness, from a macroeconomist's perspective, is generally measured by comparing the price of import and export to the gross domestic product. Nevertheless, it is argued that the main factor behind an investor's motivation to settle in a given country is not the amount of trade the national economy of the state has already conducted, but rather the presence or absence of institutional barriers to trade. These can take the form of tariffs or non-tariff barriers, such as import quotas. It is important to note that, according to economic theory FDI can function both as a substitute or complement to trade. In those cases where FDI is of horizontal nature (between similar countries), trade liberalization discourages mutual FDI flows (Markusen 2000). However, as Markusen further notes, in countries with differing comparative advantages, trade liberalization will enhance FDI flows. It is easy to see that the interaction between West European source countries and eastern host countries falls under this second case.

Another oft-mentioned determinant of the level of FDI stock and inflow in a country is the tax system and the position of corporate entities in it. Examples of empirical research supporting this assumption include Porcano and Price (1996) and Banga (2003). The same theory is evaluated and found justified by Gropp and Kostial (2000). It is, nevertheless, worth considering the impact of a number of other factors, not just corporate tax level *per se*, but also the tax base and specific tax exemptions offered by several governments to prospective foreign direct investors, accounting for which might be extremely challenging in country-level analyses.

FDI stock and flows are also influenced by the specific country risks present in a given destination. These include the probability of serious problems threatening free profit repatriation, the quality of the judiciary, whether contract enforcement is reliable enough as well as the overall political and economic stability of the country. These institutional features of the internal environment of a state can be proxied by composite country risk indices used both by the scientific and the business community to assess the quality of the business environment in a country.

Moreover, one of the key factors investors take into account is the quality, price and availability of labor force. The positive impact of the quality of human capital has been corroborated by a number of studies (Noorbakhsh, Paloni and Youssef 2001 and Checchi, DeSimone and Faini 2007). Human capital can be evaluated from a number of different perspectives, such as the overall health of the population, but most importantly, the overall educational level, which might be a very important factor for investment decisions in the region analyzed. Bergheim (2005) also concludes that human capital seems to be a key factor behind economic growth, adding that the best possible measure of its quality is average year of education.

Secondly, cheap labor is generally considered one of the most important comparative advantages of the region (see for example The Economist 2005, Meyer 2006 and Gál 2010) This could be measured either in absolute terms or using relative measures, for example by comparing labor costs in the region to those in Western Europe. In this particular study, a relative measure will be used, namely the difference between the average gross wage in Germany and the host countries of Central and Eastern Europe.

Global GDP growth may also be considered a general determinant of fluctuations in the level of FDI in the countries analyzed. Global economic conjuncture might influence the behavior of foreign investors in several ways. First, it can encourage or decrease FDI inflow or, in the case of FDI already present in the country, have a considerable influence on attempts to withdraw profit instead of reinvesting it. Finally, EU membership is a region-specific factor the effect of which is discussed in greater depth in the following sub-section.

1.5 Transition Economies, Corruption and EU Accession

Apart from the relationship between different macroeconomic indicators and corruption, investigating the specific corruption-prone environment of post-Socialist transition economies is also worthy of scholarly effort. In his analysis of the post-Socialist transition process, Sajó (2002) perceives corruption as being "part and parcel of the region's evolving clientelistic social structure" (1). This clientelistic structure occurs as an aftermath and natural consequence of the abrupt social change these countries have undergone and it serves a role in providing an alternative form of social organization in the vacuum that followed the 1989 regime change. In this sense, Sajó seems to ascribe a specific function to clientelism and, alongside it, corruption. But most importantly, he argues that the bad reputation of the geographic region is fabricated as a consequence of foreign investors encountering a clientelistic system from which they are, to a large extent, excluded. This then led to the gradual establishment of a stereotype about inherently corrupt transition economies.

If this were the reason why post-Socialist Europe is perceived as relatively more corrupt, then they should have experienced an improvement in their international perception after EU accession, part of which is also the liberalization of capital movement and growing possibilities for legal entities from other member states to establish operations in a given EU-country. The corruption ratings, however, have not yet improved. On the contrary, the region received an additional dosage of criticism for "post-accession malaise" (Bátory 2010, 164) stemming from the relaxation of external pressure after the new EU member states entered the Union.

In fact, introducing anti-corruption measures was an integral part of the accession process to the European Union. Corruption and corruption control was evaluated in the annual reports on the candidate state's progress in fulfilling the Copenhagen criteria and it is often argued that insufficient results in this area were one of the main reasons why Romania and Bulgaria could not enter the EU in 2004 (Bátory 2010). Nevertheless, once the countries joined the Union, the external pressure decreased, which might have caused a reversal of the achievements of the pre-accession period[6].

Yet, even if the accession itself did not provide a long-lasting incentive to rid society of corruption, it could, on the other hand, function as a condition mitigating its possible negative effects on FDI inflow. However, even this idea might provoke scholarly debate. First, as Barry (2002) argues, EU accession is a key component of the region's attractiveness for foreign direct investments. At the same time, as Bevan, Estrin and Grabbe (2001) point out, instead of having a uniform effect on FDI inflow, EU accession strongly favors the front-runners, while it has little effect on the laggards of the region. This, in turn might mean, somewhat counter-intuitively, that corruption or other institutional features of an economy will have an even greater impact on the amount of FDI, as in those states where EU accession and good governance meet, there will be a synergic effect between the two, while in those member states where the latter is missing, EU accession will have little effect on FDI inflow and FDI stock. According to this theory, EU accession might at the end be a necessary, but not sufficient condition for attracting FDI, and as Bevan Estrin and Grabbe (2001) argue, additional factors such as well-developed domestic institutions are also required.

[6] A good example for illustrating this tendency in the new member states is Slovenia, which established its independent anti-corruption agency in the second half of 2004. Practically from the first moment, this institution had to cope with attempts directed at dismantling it and hindering its work, for example, by decreasing its budget (Bátory forthcoming).

2. Methodology

2.1 The Models

The thesis hereby aims to provide an analysis of the effect of corruption on the presence of foreign direct investment in Central and Eastern European countries, the Baltics and the Balkans. It proposes to tackle this task by using quantitative methods belonging to the analytical apparatus of economics and political economy, otherwise known as econometrics. While the choice of method can be characterized as rather conventional, the study introduces, as is discussed in more detail below, certain aspects not yet implemented by previous authors.

One of the first problems with the statistical enquiry into topics described by country-level data is the relatively small number of cases one can analyze. As of March 2011, the Federal Foreign Office of Germany listed in its note on the official country names 197 countries (Federal Foreign Office of Germany 2011). Obviously, the inclusion of all of the 197 countries in one analysis crudely violates the assumption of unit homogeneity by supposing, for example, that San Marino is comparable to the Russian Federation. For this reason, it is questionable whether the outcome of statistical analyses pooling together a large number of sovereign nation regardless of their cultural, geopolitical or other background can provide any useful information, at least in a descriptive if not inferential sense.

Cross-sectional time-series, also known as panel data[7], provide a possible solution to this issue by allowing researchers to concentrate on a smaller, less heterogeneous group of states, for example a distinct region, where countries are followed over more than one time period. Thus, it is possible to work with datasets with a sufficiently large number of cases and, at the same time, keep in mind the requirement of unit-homogeneity. For instance, a

[7] A panel dataset contains information on several units (such as countries or individuals) observed over more than one time period. In this way, it differs from traditional time-series which normally follow just one individual or country for a given period, or traditional cross-sectional analyses that observe several units for a given point in time. In fact, panel data can be thought of as the combination of cross-sections and time-series. Hence the name cross-sectional time-series (Wooldridge 2009).

dataset gathered in the fifteen countries of the EU-15 over twenty years would already yield as many as three hundred country-years from a set of states far better comparable than the aforementioned cases of Russia and San Marino. Moreover, as Kennedy (2003) notes, panel data are able to deal better with the omitted variable problem, which is much harder to detect and remedy in simple cross-sectional studies, as those do not offer researchers the possibility of including country-fixed effects in their regression analyses. In addition, panel data show more variability in a number of socio-economic and institutional factors that are often constant for a given country and a given year, but might change across countries and over time.

Nevertheless, the statistical analysis of cross-sectional time-series is not devoid of difficulties either. Most of the complications in dealing with these data are related to their specific structure. Cross-sectional time-series represent a considerable challenge, especially because of the common violations of traditional assumptions associated with the ordinary least squares approach to parameter estimation in linear regression models. Given that panel data are time-series, they often fail to comply with the assumption of stationarity, which means that the observations in time t are not independent of the observation in time t-1 or t-2. Generally speaking, this is a common issue in all types of time-series. However, in the case of cross-sectional time-series, one should also consider the probability of contemporaneous correlation which can be defined as "correlation between the experimental units" (Frees 1990, 1), such as countries or companies.

Moreover, parameters estimated by ordinary least squares are the best linear unbiased estimations of a given relationship only if, among others, the distribution of error terms meets the homoskedasticity[8] assumption. This, once again, is a rather strict assumption, that most panel data do not comply with. These obstacles represent considerable difficulties for those

[8] The homoskedasticity assumption is met when the variance of the error terms is the same in the case of every single country-year. The opposite of homoskedasticity is heteroskedasticity, i.e. the non-constant nature of the error terms (Fox 1991).

researchers who aim to explore a new, not yet tested relationship between variables and, subsequently, infer towards a population. A failure to meet the aforementioned assumptions would seriously harm the inferential power of their studies.

The present analysis begins with the violation of one of the key assumptions indispensable for statistical inference from a sample towards the population. The group of country-years I am to investigate is not selected using the random sampling procedure. In other terms, the sixteen countries covered in this study rather represent a population than a sample. Therefore, the tests of statistical significance for the regression parameters are irrelevant, as the slopes and the intercept in the regression equations should rather be thought of as the values of parameters of the equation indicating the best fitting straight line for describing the relationship between the response variable and the explanatory variable in the given countries during the given time period. It is also for this reason that the differences between the values of the response variable the model would give us for a given combination of explanatory variables and the actual value measured in real life are sometimes referred to as imprecision instead of error terms or disturbances[9]. This property of the study also determines its main objective, which is to investigate whether the experience of the Central and Eastern European countries in the past twelve years corroborates the oft-mentioned idea that corruption deters foreign direct investment.

At the same time, however, one might assume the existence of a superpopulation of states and draw inference towards it. In this case, however, the data as well as the imprecision - or error terms, as there is an inference being based on them - need to observe the assumptions associated with the ordinary least squares approach to the estimation of

[9] In those cases, when the results are discussed without attributing inferential power to them, the difference between the real value of Y and the value on the best fitting line described by the regression equation ($\hat{Y}$) will be referred to as the imprecision of the model. If the results of the analysis put forward are discussed assuming they also have an inferential power towards a superpopulation of states, then the expression ‘disturbances’ or ‘error terms’ will be used.

parameters and standard errors. In order to alleviate this burden, I will use the White period[10] standard errors[11] that are robust to certain violations of the OLS assumptions, such as "arbitrary serial correlation and time varying variances in the disturbances" (Quantitative Micro Software 2004, 854), otherwise known as autocorrelation and heteroskedasticity. In addition, I use the natural logarithm of the original response and explanatory variables, which is a data transformation particularly helpful in achieving a model complying with the traditional assumptions of the OLS approach, thus increasing the inferential power of the quantitative analysis included in this study.

The general pooled cross-sectional time-series regression model can be written in a form "estimable by Ordinary Least Squares (OLS) [*sic!*] procedure [as]

$$y_{it} = ß_1 + \sum_{k=2}^{k} ß_k (x_{kit}) + e_{it} \qquad (1)$$

[w]here i=1, 2…; N; refers to a cross-sectional unit [for example, a country]; t=1,2…; T; refers to a time period and k=1,2…; K; refers to a specific explanatory variable. […] y_{it} and x_{it} refer respectively to dependent and independent variables for unit i and time t; and e_{it} is a random error and $ß_1$ and $ß_k$ refer […] to the intercept and the slope […]" (Podestà 2002, 6-7). In the simplest form, the entire dataset shares one single intercept. If the model is specified in this way, it is assumed that there are no country-specific effects. This is the so-called pooled panel model.

10 For the mathematical background of the calculation of this specific standard error see Arellano (1987).

11 Those who prefer not to assign inferential power to a study relying on non-random selection of cases may disregard any information related to the standard errors and the probability levels reported in this thesis. Nevertheless, the coefficients of the explanatory variables may still be informative as they indicate whether the experience of the countries chosen for the analysis corroborates or contradicts the idea about the harmfulness of corruption for the country's attractiveness for foreign investors.

Apart from this type of specification, regression models with fixed effect that identify a country-specific intercept for every single state included in the analysis will also be run. The general model of this type of regression can be described as follows (Yaffe 2003):

$$y_{it} = ß_i + ß_1 + \sum_{k=2}^{k} ß_k (x_{kit}) + e_{it} \tag{2}$$

where $ß_i$ represents the country-specific intercept. The meaning of the other signs is identical with the aforementioned pooled regression model. The advantage of this model is that, as Brüderl (2005) points out, the country-specific intercepts include any “time-constant unobserved heterogeneity” (8) that is not accounted for by the independent variables. The fixed-effects model “time-demean[s] the data” (Brüderl 2005, 8) for every single unit, which in other terms means drawing the difference of the average of a given variable for a given country over the period observed and the actual values of the variables in the given years in the same country[12]. Thus, it is not only the form of the model that changes, but also the interpretation of the regression coefficients. While in the case of the pooled OLS procedure, the coefficient can be interpreted as the effect of a one-unit change in the explanatory variable on the response variable, the fixed-effects model tells us the effect of a one-unit growth in the deviation from the country-specific mean of the explanatory variable on the deviation of the response variable from its country-specific mean (Kennedy 2003).

There is, nevertheless, one disadvantage to the fixed-effects model that cannot be resolved. This is the omission of those variables that are time-invariant for a given country. In such cases, the effect of the time-invariant explanatory variable will be cancelled out and included in the country-specific intercept (Brüderl 2005).

[12] It is considered important to note, that the statistical software used does not directly time-demean our data. It only includes country specific dummies by which it reaches a model in which the regression coefficients, disturbances and the most important statistics are exactly the same as the ones the time-demeaned fixed-effects model would give (Wooldridge 2009).

Finally, one last form of equation will be included in the analysis. In this, third case, the first differences[13] of the response variable will be regressed against the first differences of the explanatory variables. The so-called first-differencing equation takes the following general form (Wooldridge 2009):

$$\Delta y_{iu} = ß_1 + \sum_{k=2}^{k} ß_k (\Delta x_{kiu}) + e_{iu} \tag{3}$$

where Δy_{iu} is the first difference of the response variable (y_{it} - $y_{i,t-1}$), Δx_{kiu} is the first difference of the explanatory variable ($x_{it} - x_{i,t-1}$) and e_{iu} are the disturbances.

As mentioned earlier, the reader will encounter, in the models presented, the natural logarithm of the response variable FDI stock, as well as the natural logarithms of several explanatory variables. This transformation of the variables is one of the most common ways of including nonlinearities in a linear regression model (Wooldridge 2009). Also, it proved helpful in overcoming assumption violations, such as the correlation of error terms with the explanatory variables. This transformation, however, causes substantial changes in the correct interpretation of the regression coefficients. After taking the logarithm of the response and explanatory variables, the regression coefficient shows the percentage change in the response variables after a one-percent growth in the value of the explanatory variable (see Wooldridge 2009). This interpretation of the regression coefficient is nothing else than the elasticity of the explanatory variable with respect to the response variable (*The Sage Encyclopedia of Social Science Methods*, s.v. “Elasticity”).

[13] The term first differences denotes the difference of the value of a given variable in time t and time t-1.

A typical regression equation included in this thesis thus takes the following three shapes:

$$ln(y_{it}) = ß_1 + \sum_{k=2}^{k} ß_k \, ln(x_{kit}) + e_{it} \quad (4)$$

in its general form,

$$ln(y_{it}) = ß_i + ß_1 + \sum_{k=2}^{k} ß_k \, ln(x_{kit}) + e_{it} \quad (5)$$

in the case of the fixed-effects models, and

$$\Delta(ln(y_{iu})) = ß_1 + \sum_{k=2}^{k} ß_k \, \Delta(ln(x_{kiu})) + e_{iu} \quad (6)$$

in the case of the first-differencing model.

Finally, the several of the equations presented in the thesis contain the explanatory variables lagged by one or two time periods. The logic behind this approach is the assumption that the investment decisions can be influenced by past experience or information related to the past. If this is true, corruption perception as a lagged variables should still have an impact on the dependent variable. In addition, the inclusion of explanatory variables in their lagged form will allow us to weaken the threat of reverse causality leading from the presence of FDI in a given country to the level of corruption and subsequently on perception-based measures of corruption used in this analysis.

2.2 Interactions: Assessing the Effect of European Union Membership

A specific part of the present thesis is the assessment of the impact of EU accession on the relationship between investment and corruption. EU membership is present in every single equation as a control variable. This means that, when assessing the marginal effect of corruption on FDI, the country's accession to the European Union is controlled for. The regression equations, as specified above, also provide information on the impact of EU accession on FDI, all the other variables being equal.

Nevertheless, in addition to these relations, it is considered useful to investigate the joint effect of corruption and EU accession. As explained earlier, it is assumed that being an EU-member state and having a certain degree of corruption do not only have an additive effect, but also a specific joint effect that unfolds as a result of the interaction of the two variables.

The interaction effect of two variables can be quantitatively analyzed by including a so-called interaction term in the regression models. In the present case, this task is rather simple due to the positive nature of the corruption indices and also the fact that EU-membership is a dummy variable. The procedure of designing and including interaction terms with these types of variables is simple and well-known to the scientific community.

As Brambor, Clark and Golder (2006, 65) note, the most general form of an equation including interaction terms between a continuous and a dummy variable is

$$Y = ß_1 + ß_2X + ß_3Z + ß_4XZ + e \qquad (7)$$

where Y is the response variable, *X* represents the continuous explanatory variable and *Z* is the dichotomous explanatory variable. $ß_1$, $ß_2$, $ß_3$, and $ß_4$ are the regression coefficients and e is the error term or imprecision of the model. The variable *XZ* is a simple multiplication of the two variables. Now, if *Z* is zero, i.e. the country is not an EU-member, $ß_3Z$ and $ß_4XZ$ will be zero, while $ß_2$ will show the effect of *X* on the dependent variable. When *X* equals zero, $ß_2X$ and $ß_4XZ$ will be zero and $ß_3Z$ will capture the effect of the dichotomous explanatory variable on the response variable (Brambor, Clark and Golder 2006). Yet, the condition of crucial interest in our case is the impact of joining the EU on the effect of corruption on FDI. This will be explained by adding up the coefficients $ß_2$ and $ß_4$ $(ß_2 + ß_4)$. Secondly, the standard errors of the interaction terms also require specific calculations as the software tool used does not offer this type of information in its output. As Aiken and West (1991) specify, the standard errors for the multiplicative interaction terms can be calculated using the following equation:

$$\hat{\delta}^2_{\frac{\partial y}{\partial x}} = var(\hat{\beta}_1) + Z^2 var(\hat{\beta}_3) + 2Z\ cov\ (\hat{\beta}_1 \hat{\beta}_3) \qquad (8)$$

where $\hat{\beta}_1$ is the coefficient of the corruption indices and $\hat{\beta}_3$ is the coefficient of the interaction term, $\hat{\delta}^2_{\frac{\partial y}{\partial x}}$ denotes the variance of the marginal effect and Z indicates the dummy variable. Comparing the values of the marginal effects against the standard errors will indicate the level of statistical significance, an information indispensable for statistical inference towards a superpopulation.

3. Data

The empirical part of the present thesis relies on country-level data for 16 post-Socialist countries situated in Central and Eastern Europe, the Baltics and the Balkans[14]. Data were gathered mostly in the online databases of national and international organizations, such as the United Nations Conference on Trade and Development (UNCTAD), the World Bank, the Worldwide Governance Indicators, Freedom House and the national banks and national statistical offices of the countries included in the present analysis. Some of the data are transformed or calculated by the author, in which case the exact mathematical operations conducted are explained either in the thesis proper or the appendices.

3.1 Response Variable

As response variable, I use data on foreign direct investment stock present in the given national economy as reported by the United Nations Conference on Trade and Development. These data are publicly available for the countries analyzed, with certain exceptions[15], and can be easily accessed via the UNCTADstat online database (United Nations Conference on Trade and Development 2010a). The UNCTAD defines foreign direct investments as

> an investment involving a long-term relationship and reflecting a lasting interest in and control by a resident entity in one economy (foreign direct investor or parent enterprise) of an enterprise resident in a different economy (FDI enterprise or affiliate enterprise or foreign affiliate). Such investment involves both the initial transaction between the two entities and all subsequent transactions between them and among foreign affiliates. FDI stock is the value of the share of their capital and reserves (including retained profits) attributable to the parent

[14] Despite my best efforts, the overwhelming majority of the regressions are based on unbalanced panel datasets. The reason for this is that the sources which provided the data for the control variables had a decent, yet not complete coverage of the whole region. Due to this, data from Bosnia and Herzegovina, Serbia and Montenegro are missing for the entire period, which inevitably affects the quality of regression models with control variables included.

[15] Data are missing for the Republic of Montenegro and the Republic of Serbia for the entire period except the years 2008 and 2009. Data for Serbia and Montenegro are reported by the source from 1997 to 2007. After a careful evaluation of pros and cons, it was decided that data on the Federation of Serbia and Montenegro would be attributed to Serbia, thus increasing the number of country-years. Given the difference in the size and population of the two entities, it is justified to consider federal data on Serbia and Montenegro a good approximation of FDI stock in Serbia and treat them as such.

enterprise, plus the net indebtedness of affiliates to the parent enterprises. (United Nations Conference Trade and Development 2010b)

The above sources provide data on FDI stock present in a country in a given year expressed in current U.S. dollars. However, in order to avoid large year-to-year changes caused by currency exchange rate fluctuations, which, in the case of the U.S. dollar, have been rather large in the past ten years, I transformed the value of FDI into constant 2005 U.S. dollars based on historical data on the annual average midpoint exchange rate between the national currencies of the countries analyzed and the U.S. dollar as provided by OANDA Corporation (OANDA 2011). Finally, in order to account for the size of the economy, which is likely to be the most influential factor in determining the absolute amount of foreign investment within a country, FDI stock is divided by the population expressed in millions of inhabitants. Thus, the final form of the response variable is FDI stock expressed in millions of constant U.S. dollars of the year 2005 per one million inhabitants. In the regression equations, the abbreviation FDI is used to denote this measure.

3.2 Main Explanatory Variable

The principal explanatory variable the effect of which is investigated on the response variable is corruption present in a given country. For operationalizing this rather elusive notion, several perception-based corruption indicators are used in the present thesis.

There are a number of perception-based measures that might be applied to represent corruption in the regression equations designed. Nevertheless, the wide offer of measures of corruption also requires that social scientists devote more attention to the selection of proxies used in their analyses, as not all of the corruption indicators are suitable for every type of quantitative analysis. For this reason, the following sub-section of the thesis is devoted to the criteria upon which a suitable corruption indicator shall be chosen.

3.2.1 Which Corruption Indicator to Choose?

One of the key problems researchers of corruption and corruption control have to resolve is the quantification of this evasive and obscure phenomenon. Indeed, there are a number of important limitations to the degree to which corruption can be reliably measured and expressed in numbers. The list of reasons for concern include the comparability of perceptions of corruption across different cultures, the secretiveness of the activity that often means that both the bribe-giver and the bribe-taker are interested in hiding their activities and the existence of dictatorships where corruption is most likely wide-spread across all strata of society, yet non-governmental organizations analyzing this phenomenon are not allowed to gather and evaluate data. Moreover, as Sík (2002) points out, perception-based indices always include a considerable degree of inflexibility in themselves that stems from the stereotypes and "rigid prejudices" (110) the respondents might have about the state of affairs in the country they are to evaluate. Another problem in Sík's (2002) view is the probability that expert reviewers' opinions will converge, simply because the respondents are all members of a closed and homogeneous academic or business community which, once again, distorts the picture these indices are able to offer about the real situation in the country. For example, Alidedeoglu-Buchner and Roca (2010) argue that perception based indices of corruption, such as Transparency International's Corruption Perception Index penalize young democracies where corruption perception, yet not necessarily corruption as such, increases in the first years of political freedom due to growing public sensitivity and better media coverage. The aforementioned issues are potential weaknesses of practically all perception-based indicators of corruption[16] and they have certainly influenced the indices used in this study too.

[16] Corruption indicators are generally elaborated using rather clear and succinct definitions of corruption. For example, TI's CPI "intend[s] to measure the prevalence of corruption, generally defined as the misuse of

Nevertheless, there are other issues related to the methodology of quantitative research that limit the choice of scholars who want to analyze corruption, trends in corruption and causal mechanisms between corruption and other, mostly macroeconomic indicators. These limitations are primarily related to the methodology used to calculate the exact value of the index representing corruption in a given research.

A large number of studies use TI's CPI for empirical time-series analysis. Examples of such scientific endeavors include Budak and Goel (2010), who concentrate on the relationship between the salience of corruption, the size of government and the geographic size of the country, Habib and Zurawiczki (2002) on the impact of corruption measured by the CPI and the absolute differences in the corruption level between the host country and country of origin of foreign direct investments and Kazimov (2008) who analyzes the impact of corruption on economic growth in transition economies.

Despite the relative popularity of the CPI, its use in time-series raises a number of methodological questions. As Galtung (2005) summarizes in his excellent critique of this indicator, the CPI is, in many ways, a great contribution to the fight against corruption. It popularizes the subject, spreads awareness among the public about the relative position of their country and forces politicians to consider anti-corruption measures with greater responsibility. At the same time, however, the same indicator is far from being an ideal measure of corruption for scholars interested in the systematic quantitative study of the phenomenon. Most importantly, as TI itself explains on the organization's website (Transparency International 2011), the CPI is not a useful tool for capturing trends in the development of countries over time. "The CPI's principal flaw is that it is a defective and misleading benchmark of trends. Initially set up to encourage reforms, the CPI cannot answer the basic questions: After four years, are these reforms making any difference?" (Galtung

public power for private benefit" (Transparency International 2010, 2). The understanding of what can be perceived as misuse of public power for private, unduly earned benefits will, despite TI's best efforts, remain in the eye of the beholder.

2005, 12). There are three main reasons for this. First, the CPI is a composite indicator in which case the final score of a country in a given year is based on a number of expert assessments from a wide range of sources. Some of these sources may not be updated each year or they just do not cover every single country included in TI's ranking, which means that the final result of a given country in year 2008 and 2009 will be different not only because of the change the country has undergone, but also because of the changing range of sources and survey questions used. Second, as Endre Sík (2002) points out in his critique, TI often uses in its calculations of the CPI for a given year source data from previous years, which is by definition a violation of the no-autocorrelation assumption of OLS regression. Third, and most importantly, as is explained in greater detail by Lambsdorff (2003), the CPI scores are far more determined by the country's relative position in comparison to other nations than the actual salience of corruption within the country itself. In order to explain this point, one needs to devote some time to the fine-grained analysis of TI's methodology. The way in which TI determines the value of the CPI is the following.

> Each of the sources uses its own scaling system, requiring that the data be standardized before each country's mean value can be determined. This standardization is carried out in two steps. For step 1 each source is standardized using matching percentiles. The ranks (and not the scores) of countries is the only information processed from our sources. For this technique the common sub-samples of a new source and the previous year's CPI are determined. Then, the largest value in the CPI is taken as the standardized value for the country ranked best by the new source. The second largest value is given to the country ranked second best, etc. Imagine that a new source ranks only four countries: UK is best, followed by Singapore, Venezuela and Argentina respectively. In the 2002 CPI these countries obtained the scores 8.7, 9.3, 2.5 and 2.8. Matching percentiles would now assign UK the best score of 9.3, Singapore 8.7, Venezuela 2.8 and Argentina 2.5. (Lambsdorff 2003, 7)

The technique described above might, for example, be helpful in keeping values within the zero-ten range (Lambsdorff 2003), but it inevitably corrupts the CPI and makes it an unreliable measure of changes over time as the rank of a given country will to a large extent depend upon what other countries it is compared with. As Galtung (2005) puts it, "for Bangladesh's CPI score to improve […] other countries in the region and beyond would actually need to deteriorate […]" (14). Finally, as Lambsdorff (2003) further specifies, calculating scores in the manner explained above would inherently lead, due to mathematical reasons, to an ever decreasing diversion of the scores. This, in the case of the CPI, needs to be mitigated by including a beta-transformation which is a mathematical process that, once again, alters the scores of a given country solely for organizational reasons by increasing those that are in the range between five and ten and decreasing those between zero and five points.

Given these problems with TI's CPI, it is considered useful to evaluate other possible proxies for corruption. One of them is the aggregate measure of Control of Corruption, which is one of the Worldwide Governance Indicators reported within the framework of the Worldwide Governance Indicators project. The Control of Corruption measure is in many ways similar to the CPI. First, just as the CPI, the Control of Corruption measure concentrates on corruption in the public sector. It "captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as 'capture' of the state by elites and private interests" (Worldwide Governance Indicators 2011a). Second, it is a composite indicator that includes a number of various sources describing the perception of corruption in a given country. The set of sources entering the final score of a given country changes from year to year. For example, in the case of the Slovak Republic, there are only four sources entering the Control of Corruption index throughout the entire period 1996-2009 and another eight used in just certain years.

Concerning the calculation of the WGI Control of Corruption measure, it is based on rescaled source indicators taking values from zero to one, where the higher result means less perceived corruption. After aggregation, the final scores of the Control of Corruption measure are standardized to run from -2.5 to 2.5 (Kaufmann, Kraay and Mastruzzi 2003). The concrete value of a country does not appear to depend on the countries it is compared with for the initial rescaling process of the source data. Nevertheless, if the WGI's final score is standardized so that the mean value of the population equals zero for each year, then this measure, just as CPI, fails to convey information on the temporal trend a country undertakes in terms of corruption. As the authors of the WGI always set the global mean of the Control of Corruption index to zero, the final value a country is assigned in a given year will unavoidably depend not only on the country itself, but the group of countries it is compared with.

Also, a more careful review of the Control of Corruption measure might unveil large differences between the annual scores of a given country. Slovakia, for instance, experienced an unprecedented deterioration of its score between the years 1996 and 1998. While in the year 1996, the value assigned to the country on the standardized scale from -2.5 to 2.5 was 0.55, two years later, it decreased to 0.1 (Worldwide Governance Indicators 2011b). The difference between the two values might have been partly the result of the decrease in the quality of governance under Vladimír Mečiar's semi-authoritative regime, but it is necessary to note that the 1998 index was calculated on the basis of seven sources, out of which the lowest score was given by Freedom House (0.33 after standardization), which was not included in the 1996 calculation of Slovakia's Control of Corruption score. As Kaufmann, Kraay and Mastruzzi (2010) themselves admit, it is "documented that the large majority of statistically significant changes over time in the WGI are largely due to changes in the underlying source data, rather than to changes in the composite of data sources in the two periods" (18). Based on these facts, it seems that the Control of Corruption measure of the WGI will not be a good measure for time-series analysis. In fact, it has almost the exact same drawbacks as the CPI.

Nevertheless, the source data used for calculating the Control of Corruption index could still serve as a useful tool for operationalizing corruption in a way that is methodologically consistent both across the units of analysis, i.e. countries and in time. The

Worldwide Governance Indicators list as many as thirty-one source data for calculating the Control of Corruption measure, out of which fourteen cover at least some of the countries in Central and Eastern Europe, the Baltics and the Balkans. Taking into account that for the present study, data needed to be gathered for each of the sixteen states mentioned earlier and for a time period of 10 years from 2000 to 2009, my range of choice out of the fourteen indices remained rather limited. The main criteria upon which the indicators are selected for the study were the extent to which the source covers the region during the period 2000-2009 and the clarity of the concept measured. Preference was given to those sources that listed the questions posed to their respondents. These three criteria left me with three indices that measure the extent and salience of corruption within a country and could be used in the present study. These are the Nations in Transit (hereinafter NIT) measure of corruption from the international NGO Freedom House (www.freedomhouse.org) the Global Risk Service (hereinafter GRS) corruption measure produced by the consultancy firm IHS Global Insight and the Global Insight Business Risk and Conditions corruption measure (hereinafter GIC) also produced by IHS Global Insight. In the final version of the study, only the regressions run with GIC and NIT are presented, while GRS was left out. The reason for this is that GRS and GIC proved to lead to very similar conclusions, while the concept GIC measures is considered more useful for the present study. The GRS corruption index is defined as a numeric expression of the probability that the risk of enduring losses and costs due to corruption in the given country will grow in the next year (Worldwide Governance Indicators 2011c)[17]. On the other hand, the GIC corruption index has a more traditional definition of the concept measured, which is "[a]n assessment of the intrusiveness of the country's bureaucracy[;] the amount of red tape likely to countered is assessed, as is the likelihood of encountering corrupt officials and other groups" (Worldwide Governance Indicators 2011d).

[17] The measure is a quantitative expression of the probability that there will be a "one point increase on a scale from '0' to '10' in corruption with respect to the level at the time of the assessment"(IHS Global Insight 2011). No further specification is given on the concept of corruption measured.

A slight disadvantage of this measure is that it behaves as a discrete interval-scale ratio taking fourteen different values, out of which six appear to dominate the population. Although it would be more advantageous to work with continuous variables, discrete variables, if there is enough variance in their values can still be employed as traditional continuous variables (Fox 1990). The original source of the GIC corruption measure is not publicly available. For this reason, the rescaled version of the GIC corruption measures is used, that is published as WGI source data will be used. The discrete nature of the variable can also be detected in its rescaled form, but this, in itself, should not be an impediment to its use in the present analysis. Although data from secondary sources are sometimes risky to use, Kaufmann, Kraay and Mastruzzi (1999) provide a rather precise explanation of how the rescaling is done, which renders the procedure somewhat more transparent:

> We re-orient data from each source so that higher values correspond to better outcomes […]. In addition, we rescale each indicator by subtracting the minimum possible scores and dividing by the difference between the maximum and minimum scores, so that each indicator is on a possible scale from zero to one. (7)

For the GIC corruption measure, data have been gathered covering the years 2000 and 2009. The 2001 gap year in the time-series, for which the WGI do not provide data has been, where possible, estimated by linear interpolation, i.e. drawing the average of the two values listed directly before and after the missing country-year. This procedure has only been used in those cases, where both the previous and the following years have the same value, thus avoiding situations when the interpolation would have lead to values that are outside the scope this discrete variable can take. Finally, the values of GIC ranging from zero to one have been multiplied by one hundred in order to obtain better interpretable regression parameters. In its final form, the GIC corruption measure runs from zero to one hundred with the higher values denoting better results in terms of a lower risk of corruption for international business. In the regression equations, the abbreviation GIC is used for the Global Insight Business Risk and Conditions corruption index.

The Nations in Transit corruption measure from Freedom House is publicly available in its original form and covers most of the countries of interest from 1999 onwards (Freedom House 2003, 2011c). The measure is scaled from one to seven, one being the best possible score, while seven being the worst possible result (Freedom House 2003). Just as GIC, NIT is also a discrete, interval-scale variable where each value is at a distance of 0.25 points from its closest neighbor (Freedom House 2003). For reasons of better comparability with the other corruption index used, the Nations in Transit corruption measure has been rescaled so that one represents the worst possible score and seven the best possible score. The exact mathematical formula used is based on Kazimov (2008) and is included in Appendix B. In the regression equations, the abbreviation NIT denotes the Nations in Transit index.

Nevertheless, the greatest difference in the two indices used is not in their scale, which is a mere technicality, but rather the purpose of their creation and the definition of corruption they use. Freedom House is an international non-governmental organization the main role of which is to analyze human rights and democracy-related topics, advocate for them and support human rights activists in their home countries (Freedom House 2011a). According to the methodology of the 2010 Freedom House Nations in Transit indices (Freedom House 2011b), the Corruption measure issued by this institution seeks to assess "public perceptions of corruption, the business interests of top policy makers, laws on financial disclosure and conflict of interest, and the efficacy of anticorruption initiatives" (12). Just as GIC, the NIT corruption measure also addresses issues like the intrusiveness of bureaucracy in private businesses, but its principal purpose is to offer a picture about the state of corruption and anti-corruption policies and not to provide foreign investors with advice on the degree of corruption they can expect in a given field[18]. The corruption measures offered

[18] Appendix C includes the exhaustive list of questions Freedom House gave its academic advisers in 2010. These might give the reader a better understanding of the scope of corruption Freedom House intends to measure.

by IHS Global Insight are aiming to advise a specific business audience. In this sense, GIC reveals less about the actual threat of corruption for the local population and more about the business environment and specific risks business-people might encounter.

By using two separate indices, it will be possible to provide stronger evidence in favor of the findings stemming from the empirical analyses proposed and decrease the chances of committing a type I error, which "occurs when a researcher rejects the null hypothesis that is actually true" (Gravetter and Wallnau 2005, 188).

3.3 Control Variables

The size of the national economy is accounted for by dividing FDI stock by the number of inhabitants. Data on population are based on information retrieved from the World Bank online database (World Bank 2011b). The transformation of FDI into constant 2005 U.S. dollars and FDI stock per capita were calculated by the author.

The presence or lack of institutional barriers to trade is accounted for using the Trade Freedom measure of the Washington-based think-tank Heritage Foundation (Heritage Foundation 2011a). The advantage of this measure is that it takes into account the differences in the impact of a given tariff on a country's economy by weighing them on the basis of the share of the product targeted by the tariff on the country's import. Second, it accounts for non-tariff barriers to trade by subtracting a penalty of 5, 10, 15 or 20 points from the score of the country on a 0-100 scale, where the higher value means less interference from the state in terms of tariff and non-tariff trade barriers (Heritage Foundation 2011b). The exact formula used to calculate this measure is discussed in greater depth in Appendix D. In the regression models, trade openness is abbreviated as TRADE.

Furthermore, it is considered necessary to control for tax pressure. Unfortunately, to my best knowledge, there is no ideal proxy for tax pressure on corporate entities. Apart from poor data availability, corporate tax rates are not suitable because the tax pressure on a given company is highly dependent on the legal regulations on write-offs, the way in which the tax base is defined in national law and the specific tax exemptions offered by the host country. Moreover, an investment decision can, to some degree, be influenced also by personal income taxes as the excessive taxation of managers, who are likely to be among the top earners in the given country, might complicate the company's ability to find suitable experts for setting up their foreign operations. For these reason, instead of simply using the tax rate on corporate income, the degree of tax pressure on companies will be approximated by the index of Fiscal Freedom produced by The Heritage Foundation (Heritage Foundation 2011c). The Fiscal Freedom measure assigns values from zero to one hundred, where higher values mean more fiscal freedom. The measure reflects three main areas:

- The top tax rate on individual income,
- The top tax rate on corporate income, and
- Total tax revenue as a percentage of GDP. (Heritage Foundation 2011d)

As the Heritage Foundation (2011b) further specifies, the equally weighted three components are then inserted into the equation

$$\text{Fiscal Freedom}_{ij} = 100 - \alpha(\text{Factor}_{ij})^2 \qquad (9)$$

"where Fiscal Freedom_{ij} represents the fiscal freedom in country i for factor j; Factor_{ij} represents the value (based on a scale of 0 to 100) in country i for factor j; and α is a coefficient set equal to 0.03" (Heritage Foundation 2011d). This means that all three components are attributed roughly the same weight. Given its quadratic specification, this function should also "reflect the diminishing revenue returns from very high rates of taxation" (Heritage Foundation 2011d). It is also important to note that the 'total tax revenue as a percentage of GDP' component of the Fiscal Freedom measure might, at least partially, reflect the specific tax exemptions agreed by the nation states to major foreign investors. These investors, during their presence in the country, increase GDP, yet their profit is not taxed which lowers the ratio of tax revenue to GDP and thus increases the final value of the

Fiscal Freedom index. This information could in no way be derived if, instead of the Fiscal Freedom measure, the nominal corporate tax rate were used to proxy tax pressure. In the regression models, the abbreviation TAX is used to denote tax freedom.

Risk for foreign investments is proxied by the rescaled version of the Investment Profile measure originally produced by the consultancy firm Political Risk Service. Just as the GIC corruption index used in this study, the PRS Investment Profile measure is made available to the public in its rescaled form running from zero to one as source data for the Worldwide Governance Indicators (2011e), with the higher values meaning a less risky business environment. Data for 2001 are approximated by linear interpolation.

The PRS Investment Risk measure aims to quantify the risk of suffering losses due to problems with "[…]Contract Viability/Expropriation, Profit Repatriation [and] Payment Delays" (Political Risk Service 2011). Given that all these phenomena are closely related to corruption proper, it is considered useful to take a look at the correlation between the corruption perception indices used and the PRS Investment Profile measure. This simple analysis shows that there indeed is a certain degree of connection between the two measures, yet the size of the correlation coefficients is not as large as to point towards the conclusion that these measures are describing the same concept[19]. In the regression equations, investment risk is denoted as RISK.

Taking into account the current state of the literature, as well as scientific intuition, it appears indispensable to include measures of both educational level and health as proxies for the quality of human capital. It seems that the quality of human resources can be better grasped by including two separate measures, one of which is the mean year of schooling and the other life expectancy. The first provides information about the nation's qualification, while the second proxies average health level. Time series for mean year of schooling are

[19] The Pearson correlation coefficient between GIC and RISK is 0.678, while between NIT and RISK, it reaches 0.549.

provided by Barro and Lee (2010) and are available on the Human Development Report website (hdr.undp.org), while life expectancy can be found in the online databank of the World Bank (2011c). In the regression equations, mean year of schooling and life expectancy are denoted as MYSC and LEXP respectively.

The price of the labor force is accounted for using a relative measure: the difference between the monthly average gross wage in Germany and in the chosen economies of the CEECs, the Balkans and the Baltics. Data on the average gross wage in Germany are retrieved from the Federal Statistical Office of Germany (2011). Data on average gross wages in the countries analyzed are provided by the United Nations Economic Commission for Europe (2011a) and are complementedwith data of the same character from national statistical sources (see Appendix F). In the regressions, the abbreviation DIFFW is used to denote differences in nominal wages between Germany and the sixteen countries analyzed.

Unemployment expressed as a percentage of the total labor force is used as a proxy for labor force availability. Although data on unemployed persons broken down by level of education would be even more useful, due to the low availability of time series of this type, it was only possible to work with aggregate unemployment rates. Data on this macroeconomic measure were retrieved from the online database of the United Nations Economic Commission for Europe (2011b).

Finally, control measures for the overall growth of the global economy and EU membership will be included. Data on global GDP growth are retrieved from the database of the World Bank (2011d), while information on EU accession is coded as zero prior to the signing of the accession treaty and one starting from the year when the country signed its accession treaty[20]. This, in the case of the Czech Republic, Estonia, Hungary, Latvia,

[20] It appears that setting the boundary between the two categories for EU accession is most accurate at the point of signing the treaties. These made it absolutely clear for everyone that the states had successfully completed their accession process and also set the date of joining the EU. Furthermore, one could reasonably argue that

Lithuania, Poland, Slovakia and Slovenia was in 2003, while Bulgaria and Romania signed their accession treaties in 2005. In the regression models, the abbreviations GLGDP and EU are used to denote global GDP growth and the EU dummy variable.

Table 1 – Description of variables used

VARIABLE	DESCRIPTION
FDI	Foreign direct investment stock per capita measured in constant U.S. dollar of the year 2005
GIC	The rescaled version of the IHS Global Insight Business Risk and Conditions corruption measure
NIT	The Freedom House Nations in Transit corruption measure
TAX	The Fiscal Freedom measure of the Heritage Foundation quantifying tax pressure as a function of the maximum corporate tax rate, the maximum personal income tax rate and the ratio of tax revenue and the total GDP
TRADE	The Trade Freedom measure of the Heritage Foundation quantifying freedom of trade as a function of tariff and non-tariff barriers to trade
DIFFW	The difference in the gross average monthly gross wage in Germany and the states analyzed.
MYSC	Mean year of schooling of adults aged 25 years and above
LEXP	Life expectancy at birth
RISK	The Investment Profile measure of the Political Risk Group evaluating internal risk for foreign investors
EU	EU accession, 0=accession treaty not yet signed, 1=accession treaty signed
UNEMP	Average annual unemployment rate expressed in percentages of total workforce
GLGDP	Annual growth rate of the global GDP

investors would already react favorably to the act of signing and would not wait with their investment until these treaties formally enter into force.

4. Empirical Model

The parameters of the regression models are determined using the Ordinary-Least-Squares approach. The calculations have been done by the statistical software tool Eviews7. As has been discussed in Chapter 3, the response variable in the regression models is the ratio of foreign direct investment stock and the population. The general form of the empirical model is

Foreign Direct Investment/Population = f(Corruption, Control Variables) (10)

or

FDI = f (GIC/NIT, TAX, TRADE, LEXP, MYSC, DIFFW, EU, GLGDP, UNEMP) (11)

if expressed using the abbreviations of the variables summarized in Table 1. More precisely, twenty four regression equations will be estimated, twelve for each measure of corruption perception.

As a first step, the natural logarithm of FDI per capita is regressed against the natural logarithm of the chosen corruption index without any control variables included. These simplified equations give us a first impression about the relationship between the two variables.

In a second step, regression models with control variables are estimated, in which all variables are included in their logarithmic form, except the dummy variable EU and the variables GLGDP and UNEMP given in percentages, whose interpretation would become rather complicated if they were used in their logarithmic form. Using natural logarithms instead of the original variables is done in order to decrease the probability of OLS assumption violations. More importantly, as discussed earlier, this data transformation allows us to account for nonlinearities in the relationship between the response and explanatory variables.

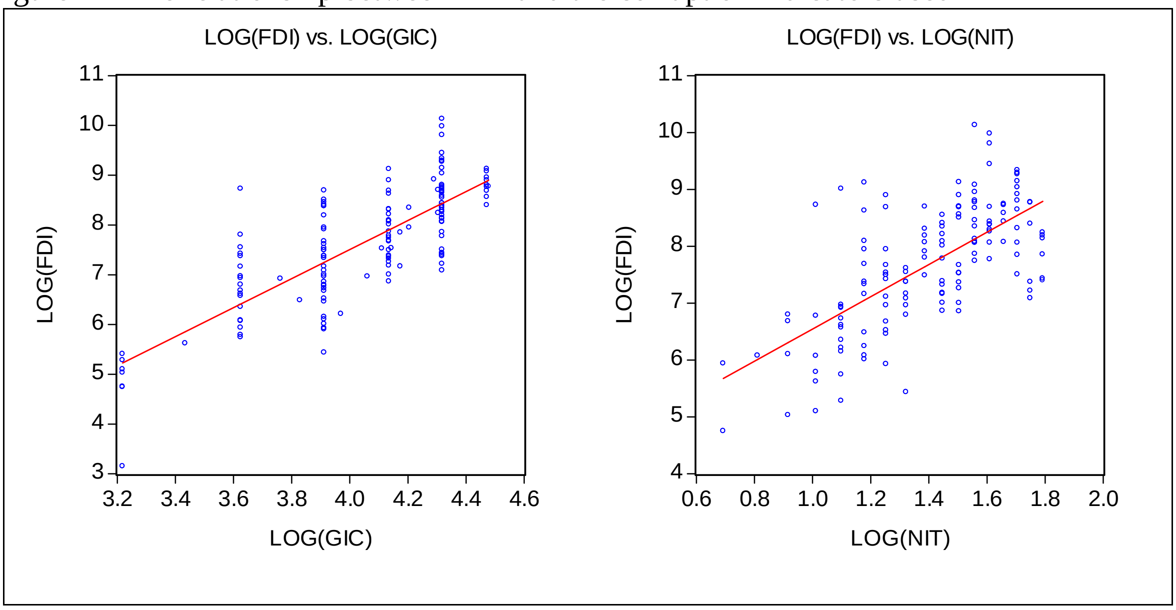
Third, regression models with control variables are estimated with all the explanatory variables lagged against the response variable by one and two time periods. However, EU and GLGDP are always included in their contemporaneous version as it is considered unlikely that an investor would allocate investment in year t based on a country's position in the accession process or global economic growth in year t-2. The very same equations will be estimated including country-specific fixed-effects. Finally, first-differencing models will be run to see how annual investment flows react to year-to-year fluctuations in the value of the explanatory variables.

In order to provide an analysis of the relationship between EU accession, corruption and FDI, regression models with multiplicative interaction terms between EU and the corruption indices are run. This allows us to quantify the change in the importance of the level of perceived corruption after signing the accession treaties for FDI stock. For scarcity of space, as far as interaction terms are concerned, only regressions with the simplest pooled specification are presented in the thesis.

5. Results

Prior to any regression models, it is considered useful to conduct a visual analysis of the relationship between log(FDI), log(GIC) and log(NIT). Figure 2 shows log(FDI) plotted against log(GIC) and log(NIT). In both cases, the visual analysis suggests a certain degree of linearity in the relationship between the two variables, which means that the use of linear regression as a method of mapping this relationship is justified. It can also be predicted, based on Figure 2, that in both cases, FDI stock seems to reach higher values with better results of corruption indices.

Figure 2 – The relationship between FDI and the corruption indicators used



Source: Own calculations based on Freedom House (2003, 2011c), United Nations Conference on Trade and Development (2010a), Worldwide Governance Indicators (2011d).

Given the key purpose of the present thesis, which is the analysis of the impact of corruption on foreign direct investment, and the large number of equations, the main body of the thesis contains information only on the coefficients and significance levels of the corruption indices in the regression models, as well as the number of observations, R-squares, F-statistics and the number by which the reader can identify the original outputs from the statistical software for the regression models, parts of which are included in Appendix E.1.3[21].

Altogether, twenty-four regressions have been estimated, twelve with each of the two corruption indices. As noted in Chapter 4, the first step in each case is the calculation of coefficients in models that include the log of one of the corruption indices without any control variables. These models have been run in pooled, fixed-effects[22] and first-differencing specification with the explanatory variable log(GIC) or log(NIT) in their contemporaneous form. The results and the characteristics of the regression equations estimated are listed in Table 2.

Table 2 – The impact of corruption on FDI, no control variables used

POOLED	log(GIC)	2.92*** (0.31)	nr	1
			n	148
			Adj R^2	0.61
			F-stat	232.73***
	log(NIT)	2.83*** (0.59)	nr	2
			n	148
			Adj R^2	0.45
			F-stat	118.98***
FIXED-EFFECTS	log(GIC)	3.11*** (0.47)	nr	3
			n	148
			Adj R^2	0.71
			F-stat	23.41***
	log(NIT)	3.27*** (0.89)	nr	4
			n	148
			Adj R^2	0.70
			F-stat	22.57***
FIRST DIFFERENCES	log(GIC)	0.09 (0.09)	nr	5
			n	129
			Adj R^2	-0.01
			F-stat	0.27
	log(NIT)	-0.07 (0.21)	nr	6
			n	132
			Adj R^2	-0.01
			F-stat	0.08

*Response variable is log(FDI). ***p<.01, **p<.05, *p<0.1. White period standard errors in the parentheses.*

[21] The regression outputs attached to the thesis include all the regression parameters, their standard errors and statistical significance, the number of observations as well as the major statistics describing the fit of the regression model. At the same time, less important information, such as the number of cross-sections, have been, omitted.

[22] In the case of fixed-effects models, as specified in Chapter 4, country-specific dummies for every single state are also included in the model.

As can be seen, regression models 1-6 indicate that corruption indices influence FDI stock in a statistically and substantively significant degree. The results presented in Table 2 are convincing enough to continue with the second step of the present study. This consists of the inclusion of various control variables discussed earlier into the regression equations.

Table 3 – The impact of corruption on FDI, control variables included

	CONTEMPORANEOUS				**LAGGED BY ONE TIME PERIOD**				**LAGGED BY TWO TIME PERIODS**			
POOLED	log (GIC)	*** 2.09 (0.32)	nr	7	log (GIC) (-1)	*** 2.05 (0.32)	nr	8	log (GIC) (-2)	*** 2.04 (0.34)	nr	9
			n	115			n	108			n	96
			R^2	0.80			R^2	0.79			R^2	0.79
			F	47.48***			F	43.63***			F	36.03***
	log (NIT)	1.04 (1.07)	nr	10	log (NIT) (-1)	1.05 (0.95)	nr	11	log (NIT) (-2)	1.15 (0.83)	nr	12
			n	115			n	108			n	96
			R^2	0.73			R^2	0.71			R^2	0.68
			F	32.09***			F	27.15***			F	21.03***
FIXED-EFFECTS	log (GIC)	-0.09 (0.34)	nr	13	log (GIC) (-1)	0.19 (0.33)	nr	14	log (GIC) (-2)	0.33 (0.34)	nr	15
			n	115			n	108			n	96
			R^2	0.95			R^2	0.94			R^2	0.94
			F	100.81***			F	73.25***			F	67.21***
	log (NIT)	0.64 (0.56)	nr	16	log (NIT) (-1)	* 0.90 (0.49)	nr	17	log (NIT) (-2)	*** 1.07 (0.33)	nr	18
			n	115			n	108			n	96
			R^2	0.95			R^2	0.94			R^2	0.94
			F	106.5***			F	78.58***			F	73.72***
FIRST DIFFERENCES	log (GIC)	0.08 (0.17)	nr	19	log (GIC) (-1)	0.07 (0.08)	nr	20	log (GIC) (-2)	0.11 (0.12)	nr	21
			n	100			n	93			n	81
			R^2	0.15			R^2	0.19			R^2	0.23
			F	2.73***			F	3.29***			F	3.39***
	log (NIT)	0.14 (0.32)	nr	22	log (NIT) (-1)	0.39 (0.39)	nr	23	log (NIT) (-2)	0.23 (0.25)	nr	24
			n	103			n	96			n	84
			R^2	0.14			R^2	0.21			R^2	0.21
			F	2.72***			F	3.54***			F	3.15***

*Response variable log(FDI). ***p<.01, **p<.05, *p<.1. White period standard errors in parentheses.* R^2 *stands for adjusted R-square.*

Table 3 contains the results of models which incorporate the corruption perception indices and the control variables DIFFW, EU, GLGDP, LEXP, MYSC, RISK, TAX, TRADE and UNEMP. Again, the body of the thesis only lists the coefficients and the White period standard errors of the main explanatory variables, while the coefficients of the control variables are presented in Appendix E.1.3.

As mentioned earlier, all of these variables are used in the equations in their natural logarithmic form, except EU, which is a dummy variable and thus is not coded on an interval scale and the variables UNEMP and GLGDP, in case of which it was chosen not to use logarithms as it would have complicated the interpretation of the regression coefficients[23].

EU accession and the effect of corruption

The interaction between EU accession and corruption is analyzed using the so-called multiplicative interaction terms, which should be understood, in this very case, as the product of the dummy variable EU and the interval-scale variables GIC and NIT. For scarcity of space, only four regressions with interaction terms are calculated. Firstly, regression models with pooled specification including the main explanatory variables EU, log(GIC) and log(NIT) are presented. These are followed by models containing both corruption and EU accession, as well as the control variables DIFFW, GLGDP, LEXP, MYSC, RISK, TAX, TRADE and UNEMP. Previous experience has shown that the corruption indices, generally speaking, perform better if they are lagged against the response variable. For this reason, the second pair of regression models is estimated with explanatory variables lagged against the response variable with two time-periods as this was the specification in which the corruption indices showed the largest impact on the response variable.

[23] As it has already been explained earlier, in the case of logarithms, the coefficients measure the elasticity of the response variable. So, if both the response and the explanatory variables are included in their logarithmic form, the regression coefficient shows us the percentage change in the value of the response variable if the explanatory variable increases by one percent. But, as UNEMP and GLGDP are already given in percentages, it is considered more convenient to refrain from using their natural logarithms. Thus the correct interpretation of the regression coefficient of UNEMP and GLGDP is the following: a one-unit increase in the explanatory variable yields $100 * ß_{unemp/glgdp}$ percent change in the value of the response variable (Wooldridge 2009).

Table 4– The interaction between EU-accession, log(GIC) and log(NIT), no control variables included

	log(FDI)	
log(GIC)	2.55*** (0.39)	-
log(NIT)	-	1.92 *** (0.64)
EU	4.43** (1.92)	0.54 (1.47)
EU*log(GIC)	-0.90* (0.47)	-
EU*log(NIT)	-	0.15 (0.94)
C	-2.94* (1.54)	4.66*** (0.93)
Nr	25	26
n	148	148
R^2	0.68	0.52
F-stat	104.96***	54.55***
Marginal Effect of corruption on FDI + st.errors.	1.65*** (0.38)	2.07** (0.91)

*Response variable is log(FDI). ***p<.01, **p<.05, *p<0.1. White period standard errors in the parentheses.*

Table 4 lists the regression parameters and their standard errors for the first pair of the aforementioned regression models. In order to get the correct marginal effect of corruption as well as the standard error with which it should be compared, it is necessary to perform a number of simple calculations. First, as explained in Subchapter 2.1, the interaction effect between EU and log(GIC) or log(NIT) is to be calculated as the sum of the coefficients of EU*log(GIC) and log(GIC) or EU*log(NIT) and log(NIT). Thus, the marginal effect of log(GIC) on log(FDI) when EU equals one is the sum of 2.55 and -0.90, which gives us 1.65. Similarly, the marginal effect of log(NIT) on log(FDI) when EU equals one is the sum of 1.92 and 0.15, which is 2.07. Standard errors for the interaction effects are to be calculated following equation (8). Using this formula, the standard error of the marginal effect of log(GIC) and log(NIT) on log(FDI) when EU equals one is 0.375 and 0.91 respectively.

In the next pair of equations, I included, alongside EU, the corruption indices and their multiplicative interaction terms, also the control variables listed in Table 1.

Table 5 - The interaction between EU accession, log(GIC) and log(NIT), control variables included

	log(FDI)	
log(GIC(-2))	2.37*** (0.45)	-
log(NIT(-2))	-	1.14 (1.05)
log(TAX(-2))	0.75 (1.19)	-0.48 (1.25)
log(TRADE(-2))	0.55 (0.41)	1.71 (1.29)
log(DIFFW(-2))	0.28 (0.53)	0.51 (0.51)
log(MYSC(-2))	1.27* (0.65)	1.24 (1.03)
log(LEXP(-2))	4.27 (4.48)	2.83 (5.02)
log(RISK(-2))	1.39*** (0.38)	2.19*** (0.59)
GLGDP	-0.01 (0.03)	0.01 (0.03)
UNEMP(-2)	-0.04*** (0.01)	-0.05*** (0.02)
EU	4.90 (3.01)	-0.27 (1.74)
EU*log(GIC(-2))	-1.22* (0.74)	-
EU*log(NIT(-2))	-	0.03 (1.08)
C	-36.26 (21.16)	-26.98 (21.40)
Nr n Adj.-R^2 F-stat	27 96 0.80 35.09***	28 96 0.67 18.89***
Marginal Effect of corruption on FDI + st.errors.	1.15** (0.51)	1.17 (0.92)

*Response variable is log(FDI). ***p<.01, **p<.05, *p<0.1. White period standard errors in the parentheses.*

As can be seen in Table 5, the coefficient describing the marginal effect of corruption at the presence of EU accession is 1.15 in the case of GIC and 1.17 in the case of NIT, which is a sizeable decrease in comparison with the previous two regressions. The standard error of these marginal effects is 0.51and 0.92 in the case of GIC and NIT respectively. This, in turn, means that the level of statistical significance in the case of the marginal effect of NIT dropped below the traditionally accepted levels. Nevertheless, the marginal effect of GIC still retained statistical significance at p<.05.

6. Discussion

The results presented in Chapter 5 suggest a number of interesting findings that are going to be discussed in greater depth in the following paragraphs. It is necessary to note that statistical significance is of little importance in the present study, yet it is still reported in the results and will be discussed briefly.

- First, the models reported in Tables 2 and 3 provide strong evidence that, in the population of country-years analyzed, decreasing corruption increased foreign direct investment stock. This hypothesis is supported by each of the pooled and fixed-effects regressions. The results also indicate that FDI stock shows relatively high elasticity to changes in the level of corruption, as measured by GIC and NIT. This conclusion can be derived from the fact that the parameters of the main explanatory variables exceed one in the case of each pooled model and several of the fixed-effects regressions, which means that a one-percent increase in GIC or NIT leads to a change in FDI exceeding one percent. The strength of these findings is further underpinned by the relatively large adjusted R-square values that also point towards the conclusion that corruption, despite the skepticism motivating this study, plays a significant role in explaining FDI allocations in the countries analyzed. At the same time, it is considered necessary to caution the reader before expressing too much enthusiasm about the high overall fit of the fixed-effects models. These models incorporate, alongside the explanatory variables, constants designed to account for country-specific effects, which naturally increases the R-square, but they yield little useful information for social scientists.
- Second, regression models with first-differencing specification perform rather poorly in explaining the year-to-year fluctuations in the value of FDI stock. This is primarily reflected in the extremely low R-squares and the statistically insignificant F-statistics

of these models which confirm their low explanatory power. There are several reasons why this result is logical and, indeed, in line with expectations. After all, corruption indicators rarely change from one year to another and even if they do, the business community requires some time, maybe several years, to take note of this change.

- Third, the regression coefficients listed in Table 3 show some evidence that the use of corruption measures in their time-lagged form is indeed justified. Apart from the notable exception of pooled regressions run with GIC, practically all other specifications indicate a growing effect on FDI stock in the current year if the corruption index is used in its lagged form. One should, nevertheless, note that the equations listed do not only differ in the inclusion of corruption as a lagged variable, but other explanatory variables have also been included in their lagged form. This approach to specification stems from the idea that investors considering past levels of corruption are also likely to consider past levels of other variables, such as mean year of schooling or wage levels. Nevertheless, differences in specifications inevitably weaken any evidence based on the comparison of coefficients of just one explanatory variable among several regression models.
- Furthermore, it is difficult to draw a definite conclusion on the relationship between EU accession, corruption and FDI stock. It appears that NIT and GIC behave in a completely different fashion. It might be argued that the growth in the importance of the corruption index detected in the case of regressions run with NIT (model nr. 28) is negligible in comparison to the change seen in the case of GIC, but the fact that the mathematical sign of the coefficients of the multiplicative interaction terms differ in the case of NIT and GIC is considered a very strong argument against drawing any conclusion from the results. It appears that the decision to include more than just one measure of corruption has indeed been a wise one, as it allowed me to detect

inconsistencies that could have led to the incorrect acceptance of a hypothesis on the impact of EU accession. In conclusion to the issue of EU accession, the quantitative study of the interaction of EU accession and corruption will possibly require longer time-series and more experience with actual membership. So far, it can only be said that if several corruption indices are used, the results on this particular topic are inconsistent, which, at this point, impedes the forming of any significant conclusion.

Finally, it is considered necessary to draw the readers' attention to a number of caveats that should be taken into account when evaluating the results of the present study. First and foremost, alongside the body of literature analyzing the influence of corruption on FDI, there are authors who describe a causal effect leading from the presence of FDI in a country towards the degree of corruption (see for example Pinto and Zhu 2008, Larraín and Tavares 2004). In fact, some authors argue that the magnitude of the impact of FDI on corruption is comparable to that of GDP per capita (Larraín and Tavares 2004). A possible, yet often contested remedy to the reverse causality problem hereby described may be the inclusion of lagged explanatory variables. Another, widely used approach to this problem is the use of instrumental variables in two-stage least-squares models. However, this latter method also seems to be controversial to some degree. "Experience has shown that research fields, where these methods have been used abundantly, are full of contradictory studies" (Brüderl 2005, 14). This taken into account, including lagged variables seems the most straightforward answer to the problem of reverse causality between FDI stock and corruption levels.

Another equally pressing problem of the current study is the possibility of model misspecifications. Having examined the coefficients of the control variables in various regression models presented, it appears that the models may be, to some degree, overspecified. An argument pointing towards this possible problem is the frequent and large changes in the coefficients of the control variables. It should be, nevertheless noted that the main purpose of the present study is to analyze the impact of corruption on FDI stock and not the determinants of FDI stock in general. The coefficients of the corruption indices used, as well as their mathematical sign seem to be remarkably stable in the different regression models specified. Finding an explanation for the unexpected behavior of the control variables is outside the scope of the present thesis.

In addition to the aforementioned limitations, one should also notice that in the majority of the models, the regression coefficients of the corruption indices are statistically insignificant. This means that inference towards a superpopulation of states can be made with very little certainty. This, obviously, is a weakness of the study. Nevertheless, low statistical significance does not affect the validity of the conclusions drawn about the set of country-years directly included in the analysis.

Conclusion

The impact of corruption on the economy is indeed a timely topic in the post-Socialist transition economies of Eastern Europe. Historical experience has shown that, despite many reforms, the degree of corruption, or at least its perception-based measures do not reflect the success these countries might have experienced in other areas in the past twenty years.

Attracting foreign direct investments has been one of the fields where many of the CEECs and countries in the Baltics and the Balkans have reached remarkable success. Geographic proximity to the wealthy Western markets, rapid political integration, a well-trained and cheap labor force are just a few of the many factors behind the large-scale FDI inflow experienced in the past years. My original idea was that the cumulative presence of the aforementioned comparative advantages might cause the effect of corruption on FDI inflow and stock to be very low or none at all in this region. It is this skepticism concerning the effect of corruption on FDI in the CEECs, the Baltics and the Balkans that was the primary motivation behind engaging in a rigorous quantitative study of the subject discussed.

Using standard tools of econometrics, the current thesis provided a cross-sectional time-series analysis of the impact of corruption on FDI stock in sixteen countries situated in Central and Eastern European, the Baltics and the Balkans. The validity of the results presented is strengthened by using two different corruption indices, namely the Business Risk and Conditions corruption measure offered by IHS Global Insight and the Nations in Transit corruption measure of the international NGO Freedom House.

Contrary to my prior expectations, the regression models demonstrated that, in the 2000-2009 period, corruption indeed influenced FDI stock in the countries analyzed. The evidence is strongest in pooled and fixed-effects models, while it is weaker in the case of yearly fluctuations in FDI stock analyzed in first-differencing models.

Another issue the relevance of which was demonstrated by the regression models presented is the inclusion of corruption measures as lagged variables in quantitative studies. It was shown, on several examples of pooled, fixed-effects and first-differences models that the influence of corruption on FDI is larger if it is lagged against the response variable. The results of the thesis should serve as an inspiration for researchers of corruption and FDI flows in their future studies of the subject.

On the other hand, the present study could not provide a definite answer to the question whether the impact of corruption on FDI decreased or increased after EU accession. It is believed that the problem raised is still relevant, yet, its quantitative analysis may require more country-years. For the time being, it must be admitted that there is theoretical underpinning for both a decrease and an increase in the marginal effect of corruption on FDI after EU accession. Future studies of the problem raised may lead to better interpretable results.

Apart from the findings of the present study, I consider it important to note that one of the major strengths of the analysis conducted is its careful choice of corruption indices used. There is a large number studies employing aggregate corruption indices, such as the CPI for approximating the level of corruption in a country. Nevertheless, the CPI as has been discussed in greater detail in Sub-section 3.2.1 is not suitable for time-series analysis and was never meant to serve this purpose. Therefore, for the present study, two separate corruption indices were chosen whose underlying methodology is reasonably consistent over time and thus can be used for mapping trends.

The literature review and empirical research conducted for the present thesis also unveiled certain additional topics that may be the objective of future research. Apart from the relationship between corruption and international integration, more effort should be devoted to the study of how corruption indices are formed and their systematic classification based on the concepts they attempt to measure or the target audience they are aimed at. Secondly, the possible existence of reverse causality between the presence of FDI in a given country and corruption also deserves more scholarly attention. The study of this latter topic may indeed lead to some surprising findings questioning the prevalent idea that FDI might lower the level of corruption in host countries.

Appendices

Appendix A – List of countries included in the quantitative analysis

Albania	Czech Republic	Lithuania	Romania
Bosnia and Herzegovina	Estonia	Macedonia	Serbia
Bulgaria	Hungary	Montenegro	Slovakia
Croatia	Latvia	Poland	Slovenia

Appendix B – Methodological notes

Data transformations applied in the empirical analysis

Nations in Transit (Kazimov 2008):

NIT = (Nations in Transit raw data – 8) x (-1)

Appendix C – Nations in Transit checklist of questions for 2010

(Freedom House 2011b)

1. Has the government implemented effective anticorruption initiatives?
2. Is the country's economy free of excessive state involvement?
3. Is the government free from excessive bureaucratic regulations, registration requirements, and other controls that increase opportunities for corruption?
4. Are there significant limitations on the participation of government officials in economic life?
5. Are there adequate laws requiring financial disclosure and disallowing conflict of interest?
6. Does the government advertise jobs and contracts?
7. Does the state enforce an effective legislative or administrative process—particularly one that is free of prejudice against one's political opponents—to prevent, investigate, and prosecute the corruption of government officials and civil servants?
8. Do whistle-blowers, anticorruption activists, investigators, and journalists enjoy legal protections that make them feel secure about reporting cases of bribery and corruption?
9. Are allegations of corruption given wide and extensive airing in the media?
10. Does the public display a high intolerance for official corruption? (19-20)

Appendix D – Description and formulae for the control variable TRADE (Heritage Foundation 2011a)

Trade freedom is a composite measure of the absence of tariff and non-tariff barriers that affect imports and exports of goods and services. The trade freedom score is based on two inputs:

- The trade-weighted average tariff rate and
- Non-tariff barriers (NTBs).

Different imports entering a country can, and often do, face different tariffs. The weighted average tariff uses weights for each tariff based on the share of imports for each good. Weighted average tariffs are a purely quantitative measure and account for the basic calculation of the score using the following equation:

$$\text{Trade Freedom}_i = (((\text{Tariff}_{max} - \text{Tariff}_i)/(\text{Tariff}_{max} - \text{Tariff}_{min}))*100) - \text{NTB}_i$$

where Trade Freedomi represents the trade freedom in country *i*, Tariffmax and Tariffmin represent the upper and lower bounds for tariff rates (%), and Tariffi represents the weighted average tariff rate (%) in country *i*. The minimum tariff is naturally zero percent, and the upper bound was set as 50 percent. An NTB penalty is then subtracted from the base score. The penalty of 5, 10, 15, or 20 points is assigned according to the following scale:

- **20**—NTBs are used extensively across many goods and services and/or act to effectively impede a significant amount of international trade.
- **15**—NTBs are widespread across many goods and services and/or act to impede a majority of potential international trade.
- **10**—NTBs are used to protect certain goods and services and impede some international trade.
- **5**—NTBs are uncommon, protecting few goods and services, and/or have very limited impact on international trade.
- **0**—NTBs are not used to limit international trade.

Appendix E – Statistical annex

Appendix E 1.1 – Descriptive statistics

	LOG (DIFFW)	EU	LOG (FDI)	LOG (GIC)	GLGDP	LOG (LEXP)	LOG (MYSC)	LOG (NIT)	LOG (RISK)	LOG (TAX)	LOG (TRADE)	UNEMP	LOG (GIC)
Mean	7.969	0.413	7.618	4.043	2.574	4.301	2.297	1.394	4.380	4.296	4.329	13.528	4.043
Median	8.015	0.000	7.761	4.135	3.123	4.302	2.298	1.447	4.454	4.292	4.366	12.150	4.135
Max.	8.456	1.000	10.131	4.477	4.285	4.369	2.572	1.792	4.605	4.530	4.482	37.300	4.477
Min.	7.332	0.000	3.154	3.219	-1.926	4.252	1.943	0.693	3.584	3.947	3.908	4.300	3.219
Std. Dev.	0.241	0.494	1.164	0.312	1.816	0.025	0.137	0.258	0.194	0.141	0.126	7.957	0.312
Skew	-0.273	0.355	-0.677	-0.876	-1.323	0.245	-0.179	-0.424	-1.183	-0.476	-0.918	1.323	-0.876
Kurtosis	2.392	1.126	3.690	3.271	4.050	2.638	2.591	2.395	4.391	2.418	3.096	4.248	3.271
J-B*	4.309	26.773	14.624	19.371	54.003	2.469	1.844	6.870	40.798	7.469	20.284	53.498	19.371
Prob.	0.116	0.000	0.001	0.000	0.000	0.291	0.398	0.032	0.000	0.024	0.000	0.000	0.000
Obs.	155	160	152	148	160	160	150	152	130	144	144	150	148

**J-B stands for jarque-Bera statistic and related probability level.*

AppendixE 1.2 – Correlation among variables

	LOG (DIFFW)	EU	LOG (FDI)	LOG (GIC)	GLGDP	LOG (LEXP)	LOG (MYSC)	LOG (NIT)	LOG (RISK)	LOG (TAX)	LOG (TRADE)	UNEMP
LOG (DIFFW)	1.00	0.54	0.22	-0.19	-0.13	0.01	0.18	-0.20	0.17	0.71	0.24	-0.23
EU	0.54	1.00	0.61	0.42	0.00	0.06	0.31	0.49	0.58	0.25	0.47	-0.39
LOG (FDI)	0.22	0.61	1.00	0.78	-0.13	0.13	0.43	0.66	0.68	-0.01	0.65	-0.47
LOG (GIC)	-0.19	0.42	0.78	1.00	0.01	0.15	0.31	0.79	0.66	-0.40	0.49	-0.34
GLGDP	-0.13	0.00	-0.13	0.01	1.00	-0.12	-0.12	-0.06	-0.07	-0.12	-0.25	-0.02
LOG (LEXP)	0.01	0.06	0.13	0.15	-0.12	1.00	-0.08	0.00	0.07	-0.29	-0.09	-0.01
LOG (MYSC)	0.18	0.31	0.43	0.31	-0.12	-0.08	1.00	0.25	0.21	0.23	0.38	-0.15
LOG (NIT)	-0.20	0.49	0.66	0.79	-0.06	0.00	0.25	1.00	0.61	-0.32	0.51	-0.28
LOG (RISK)	0.17	0.58	0.68	0.66	-0.07	0.07	0.21	0.61	1.00	-0.05	0.39	-0.30
LOG (TAX)	0.71	0.25	-0.01	-0.40	-0.12	-0.29	0.23	-0.32	-0.05	1.00	0.21	0.01
LOG (TRADE)	0.24	0.47	0.65	0.49	-0.25	-0.09	0.38	0.51	0.39	0.21	1.00	-0.32
UNEMP	-0.23	-0.39	-0.47	-0.34	-0.02	-0.01	-0.15	-0.28	-0.30	0.01	-0.32	1.00

Appendix E 1.3 – Original output provided by the statistical software

Regression model 1

Dependent Variable: LOG(FDI)
Method: Panel Least Squares
Total panel (unbalanced) observations: 148
White period standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(GIC)	2.917478	0.306886	9.506709	0.0000
C	-4.164047	1.227903	-3.391186	0.0009

R-squared	0.614497	F-statistic	232.7264
Adjusted R-squared	0.611857	Prob(F-statistic)	0.000000
Durbin-Watson stat	0.319065		

Regression model 2

Dependent Variable: LOG(FDI)
Method: Panel Least Squares
Total panel (unbalanced) observations: 148
White period standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(NIT)	2.834540	0.594152	4.770730	0.0000
C	3.712300	0.859919	4.317033	0.0000

R-squared	0.449020	F-statistic	118.9823
Adjusted R-squared	0.445246	Prob(F-statistic)	0.000000
Durbin-Watson stat	0.139645		

Regression model 3

Dependent Variable: LOG(FDI)
Method: Panel Least Squares
Total panel (unbalanced) observations: 148
White period standard errors & covariance (d.f. corrected)
WARNING: estimated coefficient covariance matrix is of reduced rank

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(GIC)	3.109413	0.467872	6.645865	0.0000
C	-4.940036	1.891602	-2.611562	0.0101

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.740848	F-statistic	23.40590
Adjusted R-squared	0.709196	Prob(F-statistic)	0.000000
Durbin-Watson stat	0.506546		

Regression model 4

Dependent Variable: LOG(FDI)
Method: Panel Least Squares
Total panel (unbalanced) observations: 148
White period standard errors & covariance (d.f. corrected)
WARNING: estimated coefficient covariance matrix is of reduced rank

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(NIT)	3.272673	0.894044	3.660528	0.0004
C	3.096895	1.255781	2.466111	0.0150

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.733779	F-statistic	22.56706
Adjusted R-squared	0.701264	Prob(F-statistic)	0.000000
Durbin-Watson stat	0.315150		

Regression model 5

Dependent Variable: D(LOG(FDI))
Method: Panel Least Squares
Total panel (unbalanced) observations: 129
White period standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LOG(GIC))	0.096455	0.098560	0.978637	0.3296
C	0.217540	0.025526	8.522444	0.0000

R-squared	0.002090	F-statistic	0.266013
Adjusted R-squared	-0.005767	Prob(F-statistic)	0.606916
Durbin-Watson stat	1.514921		

Regression model 6

Dependent Variable: D(LOG(FDI))
Method: Panel Least Squares
Total panel (unbalanced) observations: 132
White period standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LOG(NIT))	-0.070650	0.207710	-0.340136	0.7343
C	0.203910	0.015499	13.15643	0.0000

R-squared	0.000586	F-statistic	0.076165
Adjusted R-squared	-0.007102	Prob(F-statistic)	0.783002
Durbin-Watson stat	2.035225		

Regression model 7

Dependent Variable: LOG(FDI)
Method: Panel Least Squares
Total panel (unbalanced) observations: 115
White period standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(GIC)	2.085899	0.320916	6.499822	0.0000
LOG(TAX)	0.402539	1.260858	0.319258	0.7502
LOG(TRADE)	1.600338	0.580817	2.755322	0.0069
LOG(DIFFW)	0.639519	0.572576	1.116916	0.2666
LOG(MYSC)	0.902663	0.884273	1.020796	0.3097
LOG(LEXP)	2.923355	3.697275	0.790678	0.4309
LOG(RISK)	0.859430	0.462929	1.856506	0.0662
EU	0.115141	0.222702	0.517020	0.6062
GLGDP	-0.022994	0.034886	-0.659103	0.5113
UNEMP	-0.031305	0.012279	-2.549382	0.0123
C	-32.64221	19.30993	-1.690436	0.0939

R-squared	0.820303	F-statistic	47.47509
Adjusted R-squared	0.803024	Prob(F-statistic)	0.000000
Durbin-Watson stat	0.415586		

Regression model 8

Dependent Variable: LOG(FDI)
Method: Panel Least Squares
Total panel (unbalanced) observations: 108
White period standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(GIC(-1))	2.048299	0.322449	6.352317	0.0000
LOG(TAX(-1))	0.618125	1.108075	0.557837	0.5782
LOG(TRADE(-1))	1.049728	0.444346	2.362413	0.0202
LOG(DIFFW(-1))	0.532469	0.498977	1.067122	0.2886
LOG(MYSC(-1))	0.783220	0.851543	0.919766	0.3600
LOG(LEXP(-1))	2.155706	3.250131	0.663268	0.5087
LOG(RISK(-1))	1.262449	0.390860	3.229928	0.0017
EU	-0.054341	0.220414	-0.246539	0.8058
GLGDP	-0.015348	0.028822	-0.532516	0.5956
UNEMP(-1)	-0.038843	0.012298	-3.158613	0.0021
C	-28.05017	16.23283	-1.727990	0.0872

R-squared	0.818105	F-statistic	43.62734
Adjusted R-squared	0.799352	Prob(F-statistic)	0.000000
Durbin-Watson stat	0.457815		

Regression model 9

Dependent Variable: LOG(FDI)
Method: Panel Least Squares
Total panel (unbalanced) observations: 96
White period standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(GIC(-2))	2.043692	0.343060	5.957235	0.0000
LOG(TAX(-2))	0.513254	1.089510	0.471087	0.6388
LOG(TRADE(-2))	0.594954	0.347276	1.713203	0.0903
LOG(DIFFW(-2))	0.448177	0.440118	1.018312	0.3114
LOG(MYSC(-2))	0.805375	0.794561	1.013610	0.3136
LOG(LEXP(-2))	0.950890	3.028824	0.313947	0.7543
LOG(RISK(-2))	1.366351	0.314417	4.345664	0.0000
EU	-0.126237	0.237744	-0.530978	0.5968
GLGDP	-0.016615	0.027162	-0.611675	0.5424
UNEMP(-2)	-0.035578	0.014439	-2.464013	0.0158
C	-20.07412	14.01242	-1.432594	0.1556

R-squared	0.809124	F-statistic	36.03151
Adjusted R-squared	0.786668	Prob(F-statistic)	0.000000
Durbin-Watson stat	0.605313		

Regression model 10

Dependent Variable: LOG(FDI)
Method: Panel Least Squares
Total panel (unbalanced) observations: 115
White period standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(NIT)	1.039069	1.068750	0.972228	0.3332
LOG(TAX)	-0.498839	1.327401	-0.375801	0.7078
LOG(TRADE)	2.615198	1.446140	1.808398	0.0734
LOG(DIFFW)	0.434544	0.628885	0.690976	0.4911
LOG(MYSC)	1.518103	1.025453	1.480422	0.1418
LOG(LEXP)	5.058568	4.591439	1.101739	0.2731
LOG(RISK)	1.811818	0.636420	2.846890	0.0053
EU	0.072775	0.150460	0.483686	0.6296
GLGDP	0.008029	0.037360	0.214901	0.8303
UNEMP	-0.039198	0.011983	-3.271053	0.0015
C	-39.26730	21.24683	-1.848149	0.0674

R-squared	0.755229	F-statistic	32.08863
Adjusted R-squared	0.731693	Prob(F-statistic)	0.000000
Durbin-Watson stat	0.439076		

Regression model 11

Dependent Variable: LOG(FDI)
Method: Panel Least Squares
Total panel (balanced) observations: 108
White period standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(NIT(-1))	1.050573	0.947990	1.108212	0.2705
LOG(TAX(-1))	-0.390567	1.179707	-0.331071	0.7413
LOG(TRADE(-1))	2.244094	1.394419	1.609340	0.1108
LOG(DIFFW(-1))	0.467968	0.544090	0.860092	0.3919
LOG(MYSC(-1))	1.301233	1.020224	1.275438	0.2052
LOG(LEXP(-1))	4.258657	4.450524	0.956889	0.3410
LOG(RISK(-1))	2.081366	0.479512	4.340588	0.0000
EU	-0.137797	0.186163	-0.740198	0.4610
GLGDP	0.024592	0.032902	0.747428	0.4566
UNEMP(-1)	-0.048364	0.013911	-3.476684	0.0008
C	-35.28801	19.97102	-1.766961	0.0804

R-squared	0.736756	F-statistic	27.14797
Adjusted R-squared	0.709618	Prob(F-statistic)	0.000000
Durbin-Watson stat	0.460878		

Regression model 12

Dependent Variable: LOG(FDI)
Method: Panel Least Squares
Total panel (balanced) observations: 96
White period standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(NIT(-2))	1.148498	0.830523	1.382860	0.1703
LOG(TAX(-2))	-0.474696	1.144623	-0.414719	0.6794
LOG(TRADE(-2))	1.712861	1.268324	1.350492	0.1804
LOG(DIFFW(-2))	0.505065	0.464994	1.086175	0.2805
LOG(MYSC(-2))	1.242105	1.011882	1.227519	0.2230
LOG(LEXP(-2))	2.872568	4.320872	0.664812	0.5080
LOG(RISK(-2))	2.191540	0.590536	3.711104	0.0004
EU	-0.228629	0.250148	-0.913974	0.3633
GLGDP	0.005671	0.031637	0.179244	0.8582
UNEMP(-2)	-0.046104	0.016068	-2.869389	0.0052
C	-27.17096	18.58840	-1.461716	0.1475

R-squared	0.712130	F-statistic	21.02727
Adjusted R-squared	0.678263	Prob(F-statistic)	0.000000
Durbin-Watson stat	0.471181		

Regression model 13

Dependent Variable: LOG(FDI)
Method: Panel Least Squares
Total panel (unbalanced) observations: 115
White period standard errors & covariance (d.f. corrected)
WARNING: estimated coefficient covariance matrix is of reduced rank

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(GIC)	-0.089713	0.341023	-0.263071	0.7931
LOG(TAX)	1.036043	0.632826	1.637170	0.1050
LOG(TRADE)	0.878598	0.474848	1.850271	0.0675
LOG(DIFFW)	1.883047	0.440939	4.270537	0.0000
LOG(MYSC)	5.275469	3.454422	1.527164	0.1302
LOG(LEXP)	6.778232	4.133214	1.639942	0.1044
LOG(RISK)	-0.014596	0.195734	-0.074570	0.9407
EU	-0.164821	0.139512	-1.181411	0.2405
GLGDP	-0.008655	0.016618	-0.520826	0.6037
UNEMP	-0.000631	0.019607	-0.032174	0.9744
C	-56.30249	20.80908	-2.705670	0.0081

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.960170	F-statistic	100.8110
Adjusted R-squared	0.950646	Prob(F-statistic)	0.000000
Durbin-Watson stat	1.005479		

Regression model 14

Dependent Variable: LOG(FDI)
Method: Panel Least Squares
Total panel (unbalanced) observations: 108
White period standard errors & covariance (d.f. corrected)
WARNING: estimated coefficient covariance matrix is of reduced rank

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(GIC(-1))	0.188317	0.329457	0.571598	0.5691
LOG(TAX(-1))	0.729804	0.715305	1.020269	0.3105
LOG(TRADE(-1))	0.881751	0.495879	1.778156	0.0790
LOG(DIFFW(-1))	1.377940	0.469472	2.935081	0.0043
LOG(MYSC(-1))	4.584712	6.065577	0.755858	0.4518
LOG(LEXP(-1))	7.005468	5.445999	1.286351	0.2018
LOG(RISK(-1))	0.112631	0.283122	0.397819	0.6918
EU	0.020524	0.104911	0.195631	0.8454
GLGDP	0.015209	0.017345	0.876869	0.3830
UNEMP(-1)	-0.003191	0.028534	-0.111836	0.9112
C	-51.99133	28.87619	-1.800491	0.0753

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.949895	F-statistic	73.24718
Adjusted R-squared	0.936927	Prob(F-statistic)	0.000000
Durbin-Watson stat	0.978407		

Regression model 15

Dependent Variable: LOG(FDI)
Method: Panel Least Squares
Total panel (unbalanced) observations: 96
White period standard errors & covariance (d.f. corrected)
WARNING: estimated coefficient covariance matrix is of reduced rank

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(GIC(-2))	0.332323	0.339801	0.977994	0.3313
LOG(TAX(-2))	-0.045594	0.771013	-0.059135	0.9530
LOG(TRADE(-2))	0.738836	0.440025	1.679077	0.0974
LOG(DIFFW(-2))	1.723147	0.461487	3.733903	0.0004
LOG(MYSC(-2))	2.060908	6.750981	0.305275	0.7610
LOG(LEXP(-2))	3.192106	5.037058	0.633724	0.5282
LOG(RISK(-2))	0.037245	0.278321	0.133820	0.8939
EU	0.233332	0.064049	3.643020	0.0005
GLGDP	-0.001146	0.015111	-0.075843	0.9398
UNEMP(-2)	0.004981	0.032766	0.152014	0.8796
C	-28.79217	28.32766	-1.016397	0.3128

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.952954	F-statistic	67.21222
Adjusted R-squared	0.938776	Prob(F-statistic)	0.000000
Durbin-Watson stat	1.079912		

Regression model 16

Dependent Variable: LOG(FDI)
Method: Panel Least Squares
Total panel (unbalanced) observations: 115
White period standard errors & covariance (d.f. corrected)
WARNING: estimated coefficient covariance matrix is of reduced rank

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(NIT)	0.634964	0.561789	1.130253	0.2613
LOG(TRADE)	0.922913	0.474286	1.945901	0.0547
LOG(TAX)	0.976908	0.634308	1.540115	0.1269
LOG(DIFFW)	1.801938	0.339399	5.309207	0.0000
LOG(MYSC)	5.444650	2.928358	1.859284	0.0661
LOG(LEXP)	6.038621	3.353784	1.800540	0.0750
LOG(RISK)	-0.047014	0.177602	-0.264713	0.7918
EU	-0.147180	0.126906	-1.159754	0.2491
GLGDP	-0.007714	0.017166	-0.449366	0.6542
UNEMP	0.000897	0.017756	0.050495	0.9598
C	-53.95628	17.78813	-3.033275	0.0031

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.960083	F-statistic	106.5150
Adjusted R-squared	0.951069	Prob(F-statistic)	0.000000
Durbin-Watson stat	1.009733		

Regression model 17

Dependent Variable: LOG(FDI)
Method: Panel Least Squares
Total panel (balanced) observations: 108
White period standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(NIT(-1))	0.900425	0.492747	1.827358	0.0711
LOG(TAX(-1))	0.644442	0.679554	0.948330	0.3456
LOG(TRADE(-1))	0.840625	0.428954	1.959709	0.0533
LOG(DIFFW(-1))	1.443245	0.352582	4.093362	0.0001
LOG(MYSC(-1))	4.131386	5.108701	0.808696	0.4209
LOG(LEXP(-1))	5.935289	4.284159	1.385403	0.1695
LOG(RISK(-1))	0.096400	0.284624	0.338691	0.7357
EU	0.017149	0.085919	0.199597	0.8423
GLGDP	0.016781	0.016014	1.047869	0.2976
UNEMP(-1)	-0.003958	0.025767	-0.153590	0.8783
C	-46.29837	24.93944	-1.856432	0.0668

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.950467	F-statistic	78.58101
Adjusted R-squared	0.938371	Prob(F-statistic)	0.000000
Durbin-Watson stat	1.062100		

Regression model 18

Dependent Variable: LOG(FDI)
Method: Panel Least Squares
Total panel (balanced) observations: 96
White period standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(NIT(-2))	1.067181	0.326236	3.271195	0.0016
LOG(TAX(-2))	-0.192739	0.770932	-0.250007	0.8033
LOG(TRADE(-2))	0.759893	0.349175	2.176252	0.0327
LOG(DIFFW(-2))	1.865838	0.359905	5.184245	0.0000
LOG(MYSC(-2))	1.606441	5.795995	0.277164	0.7824
LOG(LEXP(-2))	1.454633	3.415013	0.425952	0.6714
LOG(RISK(-2))	0.004626	0.293554	0.015758	0.9875
EU	0.241929	0.057971	4.173259	0.0001
GLGDP	-0.000508	0.013282	-0.038225	0.9696
UNEMP(-2)	0.004895	0.028176	0.173739	0.8625
C	-20.86673	22.77763	-0.916106	0.3626

Effects Specification

Cross-section fixed (dummy variables)

R-squared	0.954382	F-statistic	73.72279
Adjusted R-squared	0.941437	Prob(F-statistic)	0.000000
Durbin-Watson stat	1.220126		

Regression model 19

Dependent Variable: D(LOG(FDI))
Method: Panel Least Squares
Total panel (unbalanced) observations: 100
White period standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LOG(GIC))	0.082612	0.168517	0.490231	0.6252
D(LOG(TAX))	0.060550	0.298129	0.203101	0.8395
D(LOG(TRADE))	0.116402	0.323629	0.359678	0.7199
D(LOG(DIFFW))	-0.451968	0.238504	-1.895010	0.0613
D(LOG(MYSC))	-1.535222	1.615047	-0.950574	0.3444
D(LOG(LEXP))	-4.171064	2.853531	-1.461720	0.1473
D(LOG(RISK))	-0.116427	0.183113	-0.635818	0.5265
EU	-0.090848	0.032130	-2.827484	0.0058
D(GLGDP)	0.060797	0.014076	4.319087	0.0000
D(UNEMP)	0.004962	0.005528	0.897738	0.3717
C	0.341317	0.035616	9.583256	0.0000

R-squared	0.234573	F-statistic	2.727504
Adjusted R-squared	0.148570	Prob(F-statistic)	0.005686
Durbin-Watson stat	2.045086		

Regression model 20

Dependent Variable: D(LOG(FDI))
Method: Panel Least Squares
Total panel (unbalanced) observations: 93
White period standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LOG(GIC(-1)))	0.070572	0.083730	0.842848	0.4018
D(LOG(TAX(-1)))	0.207555	0.087839	2.362895	0.0205
D(LOG(TRADE(-1)))	-0.188132	0.253463	-0.742243	0.4601
D(LOG(DIFFW(-1)))	-0.669526	0.316699	-2.114079	0.0375
D(LOG(MYSC(-1)))	-1.908798	1.423796	-1.340640	0.1837
D(LOG(LEXP(-1)))	-4.420523	3.008037	-1.469571	0.1455
D(LOG(RISK(-1)))	-0.136443	0.156935	-0.869425	0.3872
EU	-0.035477	0.025018	-1.418088	0.1600
D(GLGDP)	0.049558	0.011757	4.215393	0.0001
D(UNEMP(-1))	0.018479	0.012628	1.463288	0.1472
C	0.330353	0.039073	8.454757	0.0000

R-squared	0.286392	F-statistic	3.290900
Adjusted R-squared	0.199366	Prob(F-statistic)	0.001263
Durbin-Watson stat	2.159135		

Regression model 21

Dependent Variable: D(LOG(FDI))
Method: Panel Least Squares
Total panel (unbalanced) observations: 81
White period standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LOG(GIC(-2)))	0.105120	0.124814	0.842214	0.4025
D(LOG(TAX(-2)))	-0.725043	0.507681	-1.428148	0.1577
D(LOG(TRADE(-2)))	0.304358	0.273350	1.113437	0.2693
D(LOG(DIFFW(-2)))	0.050481	0.217014	0.232618	0.8167
D(LOG(MYSC(-2)))	0.887327	3.351783	0.264733	0.7920
D(LOG(LEXP(-2)))	-0.613091	3.316267	-0.184874	0.8539
D(LOG(RISK(-2)))	-0.355652	0.176988	-2.009472	0.0483
EU	-0.080326	0.045703	-1.757553	0.0832
D((GLGDP))	0.053687	0.009193	5.839921	0.0000
D(UNEMP(-2))	0.025611	0.019900	1.286983	0.2023
C	0.327384	0.041627	7.864616	0.0000

R-squared	0.326783	F-statistic	3.397838
Adjusted R-squared	0.230609	Prob(F-statistic)	0.001153
Durbin-Watson stat	2.102676		

Regression model 22

Dependent Variable: D(LOG(FDI))
Method: Panel Least Squares
Total panel (unbalanced) observations: 103
White period standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LOG(NIT))	0.137296	0.324022	0.423726	0.6728
D(LOG(TAX))	0.147027	0.267007	0.550647	0.5832
D(LOG(TRADE))	0.151252	0.316469	0.477936	0.6338
D(LOG(DIFFW))	-0.530839	0.264740	-2.005135	0.0479
D(LOG(MYSC))	-0.890767	1.436310	-0.620177	0.5367
D(LOG(LEXP))	-1.859182	3.661927	-0.507706	0.6129
D(LOG(RISK))	-0.111030	0.177737	-0.624686	0.5337
EU	-0.090428	0.028573	-3.164850	0.0021
D(GLGDP)	0.059336	0.013037	4.551490	0.0000
D(UNEMP)	0.001472	0.006583	0.223583	0.8236
C	0.329617	0.034932	9.435965	0.0000

R-squared	0.228130	F-statistic	2.719110
Adjusted R-squared	0.144231	Prob(F-statistic)	0.005687
Durbin-Watson stat	2.041923		

Regression model 23

Dependent Variable: D(LOG(FDI))
Method: Panel Least Squares
Total panel (balanced) observations: 96
White period standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LOG(NIT(-1)))	0.391113	0.394643	0.991054	0.3245
D(LOG(TAX(-1)))	0.214496	0.082443	2.601763	0.0109
D(LOG(TRADE(-1)))	-0.220368	0.234746	-0.938752	0.3505
D(LOG(DIFFW(-1)))	-0.728911	0.313463	-2.325351	0.0224
D(LOG(MYSC(-1)))	-1.696399	1.210484	-1.401423	0.1647
D(LOG(LEXP(-1)))	-3.602562	2.821861	-1.276662	0.2052
D(LOG(RISK(-1)))	-0.148904	0.163701	-0.909605	0.3656
EU	-0.036200	0.025283	-1.431780	0.1559
D(GLGDP)	0.051546	0.011591	4.447006	0.0000
D(UNEMP(-1))	0.016944	0.011356	1.492160	0.1394
C	0.330010	0.035961	9.176811	0.0000

R-squared	0.293975	F-statistic	3.539240
Adjusted R-squared	0.210914	Prob(F-statistic)	0.000604
Durbin-Watson stat	2.114918		

Regression model 24

Dependent Variable: D(LOG(FDI))
Method: Panel Least Squares
Total panel (balanced) observations: 84
White period standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LOG(NIT(-2)))	0.229537	0.251002	0.914482	0.3635
D(LOG(TAX(-2)))	-0.457570	0.546833	-0.836764	0.4055
D(LOG(TRADE(-2)))	0.308064	0.265856	1.158762	0.2503
D(LOG(DIFFW(-2)))	0.090920	0.213748	0.425362	0.6718
D(LOG(MYSC(-2)))	0.416539	3.050090	0.136566	0.8917
D(LOG(LEXP(-2)))	-1.737157	3.485337	-0.498419	0.6197
D(LOG(RISK(-2)))	-0.363069	0.186314	-1.948699	0.0552
EU	-0.066722	0.038142	-1.749314	0.0844
D(GLGDP)	0.056539	0.007824	7.226173	0.0000
D(UNEMP(-2))	0.019367	0.018541	1.044575	0.2997
C	0.305771	0.039762	7.690129	0.0000

R-squared	0.301758	F-statistic	3.154826
Adjusted R-squared	0.206108	Prob(F-statistic)	0.002094
Durbin-Watson stat	2.179559		

Regression model 25

Dependent Variable: LOG(FDI)
Method: Panel Least Squares
Total panel (unbalanced) observations: 148
White period standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(GIC)	2.545264	0.391427	6.502529	0.0000
EU	4.429067	1.916970	2.310452	0.0223
EU*LOG(GIC)	-0.900717	0.471776	-1.909206	0.0582
C	-2.937346	1.536037	-1.912289	0.0578

R-squared	0.686185	F-statistic	104.9562
Adjusted R-squared	0.679647	Prob(F-statistic)	0.000000
Durbin-Watson stat	0.349021		

Regression model 26

Dependent Variable: LOG(FDI)
Method: Panel Least Squares
Total panel (unbalanced) observations: 148
White period standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(NIT)	1.916495	0.635579	3.015353	0.0030
EU	0.537572	1.470682	0.365525	0.7153
EU*LOG(NIT)	0.149060	0.936826	0.159112	0.8738
C	4.657658	0.925032	5.035131	0.0000

R-squared	0.531951	F-statistic	54.55343
Adjusted R-squared	0.522200	Prob(F-statistic)	0.000000
Durbin-Watson stat	0.200125		

Regression model 27

Dependent Variable: LOG(FDI)
Method: Panel Least Squares
Total panel (unbalanced) observations: 96
White period standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(GIC(-2))	2.367241	0.449822	5.262617	0.0000
LOG(TAX(-2))	0.753277	1.183928	0.636252	0.5263
LOG(TRADE(-2))	0.548199	0.406743	1.347779	0.1814
LOG(DIFFW(-2))	0.275179	0.532802	0.516476	0.6069
LOG(MYSC(-2))	1.266770	0.652311	1.941972	0.0555
LOG(LEXP(-2))	4.269970	4.482218	0.952647	0.3435
LOG(RISK(-2))	1.396546	0.382171	3.654241	0.0004
EU	4.902446	3.011016	1.628170	0.1072
GLGDP	-0.009290	0.025741	-0.360892	0.7191
EU*LOG(GIC(-2))	-1.223677	0.738514	-1.656945	0.1013
UNEMP(-2)	-0.035374	0.012878	-2.746809	0.0074
C	-36.26121	21.15671	-1.713934	0.0902

R-squared	0.821265	F-statistic	35.08804
Adjusted R-squared	0.797859	Prob(F-statistic)	0.000000
Durbin-Watson stat	0.581782		

Regression model 28

Dependent Variable: LOG(FDI)
Method: Panel Least Squares
Total panel (balanced) observations: 96
White period standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(NIT(-2))	1.137321	1.045919	1.087389	0.2800
LOG(TAX(-2))	-0.480039	1.245612	-0.385384	0.7009
LOG(TRADE(-2))	1.713730	1.289451	1.329039	0.1874
LOG(DIFFW(-2))	0.507698	0.511446	0.992673	0.3237
LOG(MYSC(-2))	1.243274	1.030167	1.206866	0.2309
LOG(LEXP(-2))	2.829133	5.021816	0.563368	0.5747
LOG(RISK(-2))	2.192185	0.591430	3.706587	0.0004
EU	-0.265756	1.747094	-0.152113	0.8795
GLGDP	0.005619	0.031063	0.180877	0.8569
EU*LOG(NIT(-2))	0.025479	1.078848	0.023617	0.9812
UNEMP(-2)	-0.046149	0.016862	-2.736884	0.0076
C	-26.97646	21.40406	-1.260343	0.2110

R-squared	0.712135	F-statistic	18.89119
Adjusted R-squared	0.674438	Prob(F-statistic)	0.000000
Durbin-Watson stat	0.470756		

Appendix F – Additional sources for DIFFW

Apart from the database of the the United Nations Economic Commission for Europe (2011a), the following sources have been used for the gross average monthly wage:

country	year(s)	source
Albania	2008	Institute of Statistics of Albania (2011)
Bulgaria	2009	National Statistical Institute of Bulgaria (2011)
Croatia	2008, 2009	Croatian Bureau of Statistics (2010, 11)
Czech Republic	2009	Czech Statistical Office (2011)
Estonia	2009	Statistics Estonia (2011)
Hungary	2009	Hungarian Central Statistical Office (2011)
Latvia	2009	Central Statistical Bureau of Latvia (2011)
Montenegro	2001-2009	Statistical Office of Montenegro (2010)
Poland	2009	Central Statistical Office of Poland (2011)
Romania	2009	National Institute of Statistics of Romania (2010)
Slovakia	2000	Statistical Office of the Slovak Republic (2011)
Slovenia	2007, 2008	Statistical Office of the Republic of Slovenia (2011)

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