Master's Thesis

What drives corruption and how corruption impacts business formation? A case study of Ukraine in a prospect of cross-country analysis

Under the supervision of:

Prof. Mark Schelker, ass. Simon Berset
Chair of Public Finance, University of Fribourg

Prof. Hannu Laurila
School of Management, University of Tampere

SIVULA Inna

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Champ des Fontaines 15   inna.sivula@unifr.ch
1700 Fribourg   +41765368773

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Abstract

As a citizen of Ukraine I am concerned about the prosperity of my home country. In this thesis I define the biggest obstacles for Ukraine's development in a prospect of a cross-country analysis. My main concern is that corruption is the biggest problem in Ukraine. I believe that corruption prevents the development of the country through its negative impact on private sector activity.

With this thesis I want to point out what Ukraine should take into consideration in order to eliminate corruption based on the experience of other countries. For this reason I primarily observe what drives corruption among countries. Secondly, I examine whether corruption affects business equally in all countries and what other factors are important for business development worldwide. Therefore, this thesis is based on the corruption facts observed in Ukraine and the results are obtained using the fixed effects method in the panel data.

The main findings indicate that the most significant drivers of corruption in all countries are lack of judicial autonomy and weak competition among political parties. Corruption did not show any significant impact on business formation until 2SLS estimator was applied. Hence, there is a weak causal effect that runs from corruption to business formation, meaning that in countries with lower corruption business activity is higher. In addition, availability of financial resources, less complex tax systems and more years of compulsory education are found to be positively associated with business activity.

Key words: corruption, business, causality, Ukraine.

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CC   Control of Corruption index
CPI   Corruption Perception Index
FE   Fixed effects
FDI   Foreign direct investment
IMF   The International Monetary Fund
IV   Instrumental variable
OECD   The Organisation for Economic Co-operation and Development
RE   Random effects
R&D   Research and Development
SMB   Small and medium-sized business
TI   Transparency International
UCM   Unobserved components model
WB   The World Bank
WGI   Worldwide Governance Indicators
2SLS   Two-Stage Least Squares estimator

1. Introduction

The topic of this thesis is related to the situation in Ukraine, my home country. Ukraine's level of development places it to the group of "Lower middle income" countries (The World Bank) in spite of its huge potential for better development. In accordance with economic literature, one of countries' economic growth engines is business, thereby countries may be poor if conditions for doing business are hostile (Djankov et al., 2000).

As often mentioned in various publications (The Global Competitiveness Report 2013–2014; PWC, 2013b) Ukraine has good opportunities for private sector development due to its large domestic market size, highly educated human capital, big variety of natural resources, physical size of the country and its convenient geographic location. Successfully running business at some point makes country's level of economic development higher. So what is the problem with business in Ukraine? A number of publications state that the biggest obstacle for doing business is corruption and there is recent evidence of it from Ukraine.

The events that happened on Maidan square in Kiev, the capital of Ukraine, in the end of 2013 are known world-wide. The primal reason of protests was people's dissatisfaction in the fact that Ukrainian ex-president Yanukovych refused to sign up Association Agreement between Ukraine and the European Union. Further, violent government attempts to stop the activists have led to another more important reason to continue the protests – the struggle against highly corrupted Ukrainian government.

Ukrainian entrepreneurs, who are affected by corruption the most, joined the protests as well. They complain that conditions for small and medium-sized businesses (SMBs) have been worsening within the last years, especially because of the government policies. In contrast, big businesses in Ukraine owned by politicians or oligarchs continue successful development.

The effect of corruption on business activity is observed through bribing and extortion. In the first case the entrepreneurs prefer to rather bribe public officials due to a complexity in business legislation as following all the rules may end up in bankruptcy. As a consequence, bribing in a long run leads to extortion from the officials and applies to even those entrepreneurs who do not want to violate any law. Moreover, corrupt practices in the form of patronage or nepotism offers a number of benefits for definite entrepreneurs forcing others out of competition. In addition, corrupt actions are considered to be also

those that take place inside a company without any involvement of public officials. This type of corruption is called embezzlement or theft of company's assets. All in all, the first three forms of corruption are the ones Ukrainian entrepreneurs have been extensively fighting with. However, the conflict has arisen mostly because of economic, legal and political uncertainties in the country that cause corruption.

Knowledge of the sources of corruption and the impact of corruption on the business life has a great importance for Ukraine's development. The topic of corruption in Ukrainian business is of current importance but as far as I know there are not many empirical studies that observe this issue from such a perspective. For the reason that the analysis of only one country would not provide decisive results, my goal is to make a general cross-country analysis over the period of 2005-2013 in order to find whether the factors observed in Ukraine are common for other countries as well. In particular, I am focusing on the following questions:

1) What are the drivers of corruption among countries?
2) Does corruption harm business and what other factors have impact on business worldwide?

However, before answering these questions I suggest to observe the theoretical aspects of corruption – its official definitions, forms of corruption in business and the ways to measure corruption. The third chapter of this thesis reviews the literature on the causes of corruption and the relationship between corruption and business. The expected outcomes of the influencing factors are presented in a number of hypotheses. The forth chapter describes two econometric models, data and methodological approach. The fifth chapter provides the econometric results for the panel data analysis. The final chapter concludes about the lessons Ukraine can take from the cross-country findings.

2. What is corruption, how it is related to business activity and how it can be measured?

2.1. Definitions of corruption

An etymology dictionary explains that the noun "corruption" was first used in the 14th century. The origin of this word comes from Latin "corruptus" (past participle of "corrumpere") meaning "to destroy, to spoil" whereas "rumpere" is "to break".

Various definitions of corruption are used in the literature. The most popular one belongs to Nye who explains corruption as "behavior that deviates from the formal duties of a public role (elective or appointive) because of private-regarding (personal, close family, private clique) wealth or status gains" (Andvig, 2006).

Nowadays Transparency International, The World Bank and The International Monetary Fund use a standard definition of corruption as "the abuse of public office for private gains". Furthermore, the World Bank identified corruption as "the only significant obstacle in the economic and social development" because it undermines the rule of law and weakens the institutional foundations on which sustainable development depends. Moreover, Transparency International states that corruption hurts everyone who depends on the integrity of people in a position of authority.

In the Civil Law Convention on Corruption (article 2) Council of Europe defines corruption as "requesting, offering, giving or accepting, directly or indirectly, a bribe or any other undue advantage or prospect thereof, which distorts the proper performance of any duty or behaviour required of the recipient of the bribe, the undue advantage or the prospect thereof".

In contrast, Macrae (1982) identifies corruption as "an arrangement that involves an exchange between two parties (the demander and the supplier) which (i) has an influence on the allocation of resources either immediately or in the future; and (ii) involves the use or abuse of public or collective responsibility for private ends". Besides, Osoba (1996) states: "corruption as an anti-social behaviour conferring improper benefits contrary to legal and normal norms and which undermines the authorities' capacity to secure the welfare of all citizens". And finally, a narrower definition that is especially suitable for the topic of this thesis is suggested by Ahlin (2001). He explains corruption as the extra fees or bribes that must be paid by entrepreneurs in order to operate an official business.

2.2. Forms of corruption in business

Corruption in business is quite a common element. Some forms of corruption are usual and involuntary accepted, so they are even dealt as the price of doing business. Segraves comments in her article that the cost of corruption is often passed to consumers, and it stifles competition and subverts the free market.

Additionally, Gray et al. (2004) admit that it is not easy to estimate the levels of corruption experienced by all firms in the country as a whole. For this reason, the only analysis that could be conducted is a comparison of the types and levels of corruption encountered by different types of firms across countries (e.g. small or large, private or state-owned, new or old).

In line with OECD (2013), there are several categories of different actions of abusing public office for corruption and they help to understand how corruption is related to business. The concept includes four broad categories of human action: bribery, extortion, patronage and theft of public assets. In accordance with The Global Infrastructure Anti-Corruption Centre, all types of corruption are considered as criminal offence in most jurisdictions.

2.2.1. Bribery

Bribery is by far the most widespread form of corruption in business. Bribery occurs in the private sector and it consists of payments by individuals or firms to public officials in order to influence administrative decisions under their responsibility (OECD, 2013).

From an ethical point of view bribes are considered to be as "evil" in most cultures, empasizes Verhezen (2009 : 119-172) in his book. Bribers and bribees either try to explain bribes as "gifts" or hide them from public, as they are illegal and immoral in most of the countries. The bribee tries to make public believe that the "gift" is offered only as a sign of appreciation.

Verhezen (2009) states: "a bribe is a "gift" or a payment presented by a briber who expects a special consideration in return, one that is specifically incompatible with the duties of the bribee's role". In comparison to a gift, the bribe is a payment for a definite service which remains secret. For instance, many multinational companies limit the monetary value of sincere gifts at a value less than USD100 to distinguish them from possible bribes. Anything exceeding that value limit is automatically considered as an

internal offense against the ethical procedure.

Bribery is understood as dishonest behavior due to its violation of trust in politicians, business relations and bureaucrats. The temptation to sell something which is forbidden provides a base for the bribery; hence, everything has its price. Bribes sometimes referred to as "grease" money. Moreover, Segraves explains in her article that small businesses may bribe larger companies to get contracts, and in newly developed countries small businesses may have to provide additional payments to local utilities in order to receive phone service and electricity.

Bribery usually takes place when a bribee has some monopoly power on imperfect market and there no appropriate rules on it. Bribers tend to offer bribes in order to obtain unfair or undeserved benefits or to solicit reductions in socio-economic costs. While giving and receiving bribes three possible kinds of thresholds may be ignored (Griffin, 1997; Verhezen, 2009):

    a)   An entrusted reputation of integrity;

    b)   Social norms of accountability and moral responsibility;

    c)   Legal rules of an institutionalized judicial system.

Bribery is based on reciprocal relationship in which trust is a mandatory element. In this case trust does not mean that a person is trustworthy, trust is just a way to deal with uncertainty (Verhezen, 2009). Nonetheless, the trust between the corruptor and the corruptee does not build a warm alliance. In countries where legal enforcement or efficient institutions are absent deals are often facilitated by personalized relations. Hence, informal trust and its related networking become more important, though the sides of this kind of relationship do not wish to be socially recognized. After the materialization of the service both will exit the relationship, but later a similar exchange may be repeated under the same circumstances. The money invested into a bribe usually gives a return immediately.

In accordance with Van Rijckeghem and Weder (2002), bribery becomes more obvious in the economies of transition because institutions are not functioning well, and also modernization has caused a degradation of strong traditional social rules and moral norms. Defenders of bribery hold the position that bribery has appeared in conditions where government does not work efficiently, so public officials remain underpaid and unmotivated. From this point of view the incentives for bribes are high and the short term benefits seem obvious (Verhezen, 2009).

What is more, Olson et al. (1998) point out that low-level official corruption could improve overall efficiency, but yet not many bribes have positive effects because of

possible tax evasion, violation of environmental rules, certification of unqualified people, organized crime etc. Rose-Ackerman (1978) argues that if bribes have a valid resource allocation function, they should be legalized and the fees must be public, otherwise, illegal payments make market inefficient.

Nowadays bribery has become an instrument of money exchange that satisfies the greed or desire of people who are multiplying their wealth or socio-political power. They do not try to create a "common good", instead, gift objects are used only for private benefit which shows the real character of the bribe. Furthermore, corrupt officials benefiting from bribes may redesign their activity by creating scarcity, delays or red tapes in order to encourage bribery (Verhezen, 2009). Due to bribery unfair competition undermines the morality of "fair players" and destroys the market system. Bribery weakens the social contract between agent and principal, and thus, jeopardizes the functions of public office. As a consequence, bribery destructs any form of good reputation.

Furthermore, Verhezen (2009) indicates that bribery and corruption are the diseases of cooperative social order. They lead to a loss of enormous amounts of public revenues from taxes, custom duties and privatization programs. Moreover, income inequality caused by illegal redistribution of funds or state activities is also a result of bribery and corruption. In spite of it, the level of bribery is not a critical variable as long as the economic growth rate is able to absorb the inefficient cost of corruption.

However, bribery should be distinguished from extortion, as the latter one includes harm to another person, when the former represents a desire to influence (Verhezen, 2009). Nevertheless, bribery and extortion are the opposite ends of the same problem (OECD, 2000). Some could argue that there is nothing immoral when giving a bribe for more efficient job of public servant, it could be even considered as "tips". Yet, in Verhezen's (2009) opinion such system of "tips" could easily lead to extortion.

2.2.2. *Extortion*

Extortion is defined as an act of threatening harm to another person in order to obtain benefits to which one has no prior rights (Verhezen, 2009). Legal dictionary defines extortion as "the obtaining of property from another induced by wrongful use of actual or threatened force, violence, or fear, or under colour of official right". Under the Common Law, extortion is "a misdemeanour consisting of an unlawful taking of money by a government officer".

There are four basic ways in which a public officer commits extortion (Legal dictionary):

a) Extortion usually appears when an official demands a payment or a gift for services of his duty which have no official fees;

b) A government officer takes a fee that is higher than allowed by law;

c) A public officer asks to receive a fee before it is due;

d) An official takes a fee for services that are not performed.

The Global Infrastructure Anti-Corruption Centre states that extortion may constitute, for example, refusal to provide customs clearance for equipment or materials, or refusal to make payments or issue certificates that are due. If the victim of extortion provides the payment or other benefit, it will normally become liable for the offence of bribery.

Some types of extortion threats are aimed to harm the victim's business. Extortion is a real problem and a current-day crime for many small business owners, emphasizes Davis in his article. Internet-related extortion may occur as a number of small entrepreneurs are doing more and more businesses online, consequently the cyber-criminals are following the trail. Davis additionally notes that sometimes extortion is reported as an attempt against business people who receive e-mails with their customer information attached. The extortionists demand money in exchange of not exposing commercial information to competitors and customers themselves. The crimes can be committed by hacker-cyber-criminals or even by a dishonest employee.

In fact, the concepts of extortion and facilitation payments can overlap, and the terms are sometimes used to describe the same occurrence. Nevertheless, the literature on law enforcement has identified extortion possibilities as the key obstacle to successful control of corruption (Mishra and Mookherjee, 2012).

2.2.3. Patronage

Patronage is usually a financial support that is given to an organization or activity by a provider of patronage, namely patron. According to OECD (2013), "corruption in the form of patronage (sometimes called favouritism, nepotism, clientelism) consists of the preferential treatment of firms and/or individuals by public officials regarding the compliance with government rules for the allocation of government contracts or transfer payments".

Green and Ward (2004) define that in business conditions public officials do a favour to a private company by "bending" the rules, and the latter one gives a gift to the official in return. As Rose-Ackerman (1999 : 105) comments, in clientelistic states it is unclear to separate whether the government or private sector dominates, because they both work for mutual gain.

In some countries patronage groups have formed a hierarchy where payoffs are shared from lower to higher ranks and otherwise (Rose-Ackerman, 1999 : 106). In addition, personal connections play an important role in patronage and many private business relations rely on trust and reputation to assure qualitative performance.

Rose-Ackerman further asserts that a close personal link between private entities and public officials often undermines the transparency and effectiveness of both public and private institutions. Moreover, personalized ties will limit the entry to the market for new competitors.

Quite often patronage is focused on big business interests, like in state-owned enterprises where a state is the main customer. In this case government procurement contracts are given away to a specified company without any competition.

In many developing countries credit and banking services are a common source of patronage and corruption. The elite groups who control financial resources usually have close links to the government, so they can influence upcoming reforms or rules (Rose-Ackerman, 1999 : 110). Moreover, clientelism is provided to businesses also in exchange of political votes. Moreover, in the developed countries patronage is common among municipal parties and constituencies (Jamal, 2007 : 15). As a result, the long-run consequences of patronage are so profound that it complicates the creation of effective state and private institutions.

2.2.4. Embezzlement

Investopedia defines embezzlement as "a form of white-collar crime where a person misappropriates the assets entrusted to him or her". In this type of fraud the assets are attained lawfully and the embezzler has the right to possess them, but the assets are then used for unintended purposes. Similarly, Rose-Ackerman (1978 : 6-7) explains embezzlement as an act when a member of a company uses his or her rights to make decisions concerning access to information or some tangible assets of the company for personal advantages in ways that are either illegal or against the company's aims or rules.

A business journalist Ray in her article presents an argument to emphasize the difference between embezzlement and stealing. She explains that embezzlement is done from the inside, and it involves stealing resources that were meant to be protected by the hired person. As a result, the most commonly embezzlement is done by employees or others with fiduciary responsibility. Embezzlement challenges the property rights of the organization, including the proper internal allocation of decision making rights (Andvig, 2006 : 282). A company owner can lose a great amount of money before even suspecting that embezzlement is going on.

In accordance with Legal Information Institute, embezzlement can involve not only taking large amounts of goods or money from a company at once but also taking small amounts of money over time. Sometimes company managers under-report the income to their supervisors and keep the difference. Undoubtedly, income reported to tax officials does not illustrate the real picture; as a consequence, embezzlement involves income tax evasion.

Embezzlement is a common problem, and it can have serious negative effects on the businesses that fall victim to it. The way how embezzlement affects business is explained by Ray and listed below:

a) Business suffers direct losses due to a shortage of money or other assets. In particular, new or small businesses are affected the most;

b) Overcharging customers in order to get the resources of the company makes the business appear incompetent;

c) The secrecy required for embezzlement prevents honest and open working business relationships.

Some ways how to protect business from embezzlement are mentioned in Bianco's article. In his opinion, companies need to develop a program to recognize signs of employee fraud, for instance examination of source documents. Besides, internal controls may prevent embezzlement, for example, segregating duties, regular or programmed transfers of employees from department to department, and mandatory vacations. Finally, a usual sign of embezzlement includes anything out of the ordinary, such as unexplained inventory shortages, larger than usual purchases, significantly higher or lower account balances, excessive cash shortages or surpluses etc.

2.3.   Measuring corruption

According to Rotberg (2009 : 50-51), academic literature on corruption dates back several decades, but the specific topic of how to measure corruption came into focus in the late 70's. Rotberg adds that the methodologies in corruption measurement field were developed without a clear sense of what they were actually measuring.

The illegal nature of corruption makes it a covert activity. For this reason accurate data on corruption is hard to obtain and many of those who are involved may distort or falsify the information they provide. In this case biases or errors are unavoidable (Sampford et al., 2006 : 16).

In the mid 90's economists began to use business firm surveys of the victims of corruption and other opinion polls as proxies for corruption measurement to explore the correlations and the causality between corruption and various dependent variables, states Rotberg (2009). Some of the first measures of corruption were provided by Transparency International and the World Bank in 1995 and 1996 consequently.

The most established and widely-used corruption indices are Corruption Perception Index and Control of Corruption. They rely on subjective data, where experience based instruments are devoted to survey peoples' or experts' perception of corruption in the public or private sector (Malito, 2014).

However, a measurement system or a perfect index that could accurately account for actual levels of corruption for cross-national comparisons still does not exist (Rohwer, 2009; Aidt, 2010). Accordingly, no single indicator can capture the full complexity of the corruption phenomenon. As a result, it is more valuable to use a combination of tools rather than single indicators, suggests Rohwer (2009).

2.3.1.   Corruption Perception Index (CPI)

Corruption Perception Index is an annual corruption survey-based index compiled since 1995 by Transparency International (TI). CPI is the most widely used indicator of corruption for a cross section of countries. The number of countries nowadays covered by CPI is around 170 which was much smaller in the earlier periods. In accordance with TI, CPI is a "combination of surveys and assessments of corruption, collected by a variety of reputable institutions". In some studies CPI is explained as "an ad-hoc measure of corruption aiming to provide data on extensive perceptions of corruption within countries"

(Lambsdorff, 2007; Malito, 2014).

TI defines that the aim of CPI is to raise the public awareness of corruption not only in order to press governments to care about corruption, but also to help civil society to demand accountability from their leaders. CPI focuses on the corruption in the public sector and its main idea is to spread the understanding of real levels of corruption and show how it differs from one country to another (Lambsdorff, 2007 : 20-22).

CPI uses data sources from independent institutions specializing in governance and business climate analysis. A list of sources that enter the index must meet two essential conditions[1]. In addition, the data from sources must cover the last two years from surveys. As a rule, countries are included in the CPI when they have at least three sources available.

To rescale the data from each source and to standardize it into averaged CPI is the most challenging tasks. Until 2012 CPI standardization method employed a two-step standardization model based on the techniques of matching percentiles and applying a beta-transformation (Rohwer, 2009).

A matching percentiles technique was used for placing the sources into a common scale. This technique processed country ranks on each source and it was useful for combining sources that had different distributions. It also allowed all reported scores to remain within the CPI bounds [0, 10] (Saisana and Saltelli, 2012). As a result, the largest value in the CPI was taken as the standardized value for the country ranked best by the new source; the second largest value was given to the country ranked second best and so on (Malito, 2014).

Next step was to apply a beta-transformation to the normalized scores. This increased the standard deviation among all countries to the value of the previous year and made it possible to differentiate more precisely between countries that appeared to have similar scores (Saisana and Saltelli, 2012). In this old methodology TI ranked the countries on a scale from 0 to 10. The higher the score is, the cleaner the country's public sector is perceived to be (Karama, 2014 : 18).

Furthermore, Saisana and Saltelli (2012) point out that the old approach caused information loss, because in a given source of information only country ranks are considered but not the relative distance between them. In addition, the old methodology did not allow comparing CPI scores in a country over time.

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[1] 1) The source must provide a ranking of nations and conduct surveys in a variety of countries with same methodologies. It makes a comparison from one country to another possible and thus, a ranking can be produced. 2) The sources must measure the overall extent of corruption. The aspects of corruption cannot be mixed with issues other than corruption (e.g. political instability or nationalism). Additionally, the levels of corruption should be measured, not the changes. *Source:* Lambsdorff (2007 : 238).

Due to the limitations mentioned above Transparency International implemented a new methodology for CPI starting from 2012. Nowadays CPI is calculated using a simple average of standardized scores, where "all data sources are standardized (by subtracting the mean of the data and dividing by the standard deviation) and then rescaled to have a mean 45 and standard deviation 20", explain Saisana and Saltelli (2012). The standardization formula is presented below:

$$\frac{x_i - mean(x)}{std(x)} \times sign \times 20 + 45 \qquad (1)$$

The values beyond the bounds [0, 100] are capped after the standardization. To make the normalized scores comparable between the available sources, the mean and standard deviation need to be defined as global parameters. For this reason CPI uses the statistical software package STATA in order to impute scores for countries where data is missing. The imputed values are used only during the calculation of the global mean and standard deviation but not for the calculation of CPI country scores. In the end, for each source across all available countries the mean and standard deviation are calculated and used as the parameters to standardize the sources during the normalization (Saisana and Saltelli, 2012).

Based on the new CPI methodology, countries are nowadays ranked from zero (highly corrupt) to a hundred (very clean), but none of the countries score a perfect one hundred. CPI ranks countries in terms of the degree to which corruption is perceived to exist among public officials and politicians (Rohwer, 2009). Since actual levels of corruption cannot be determined directly, perceptions may be the only available information (Lambsdorff, 2007 : 20-22). For this reason, various survey questions are presented to business people and groups of analysts about the misuse of public power for private benefit.

Overall, CPI has assumed a central place in the researches on the causes and consequences of corruption, but it is still limited in scope. CPI does not give full information about corruption in a country because it is capturing corruption perceptions only in the public sector from business people's and country experts' point of view. A year-to-year comparisons of CPI can be difficult because a country's rank can easily change due to changes in the list of analyzed countries (Rohwer, 2009). Moreover, the rank of a country provided by CPI is hard to transform into a real distance between countries which hinders the cross-country analysis from year to year (Malito, 2014).

2.3.2. Worldwide Governance Indicators: Control of Corruption (CC)

The basic approach of Corruption Perception Index was improved by the researchers at the World Bank in their Worldwide Governance Indicators (WGI) project (Rohwer, 2009). The aim of the WGI, in accordance to WB, is to create instruments useful to establish more effective instruments of government assistance (Malito, 2014). WGI project reports aggregate and individual governance indicators for over 200 countries and territories since 1996 for six dimensions of governance[2] (Kaufmann et al., 2010). Between 1996 and 2002 the Worldwide Governance Indicators were updated every two years. After 2002, they are updated on a yearly basis.

One of the six indicators I am going to use in this thesis as the main corruption measure is the Control of Corruption (CC). The World Bank defines CC as the indicator that "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".

The information on perceptions for every of the six indicators World Bank summarizes from available data sources, such as: surveys of households and firms, commercial business information providers, non-governmental and public sector organizations. There are small changes from year to year in the set of the sources on which the WGI scores are based (Kaufmann et al., 2010).

The process of constructing the aggregate indicators is the same for each of the six indicators. First, the data is collected and rescaled from zero to one, with higher values indicating better outcomes. Then it is constructed into a weighted average of the individual indicators using a statistical methodology called "unobserved components model (UCM)". Rohwer (2009) remarks that this type of model is used because corruption is unobservable, so it can be only approximated by aggregating the scores from given indicators.

In comparison to the matching percentiles technique used in CPI, UCM has the advantage of maintaining some of the important information in the underlying data that enables to observe the size of the gaps between countries (Kaufmann et al., 2010). In addition to that, UCM methodology appropriately formalizes the issue of aggregation as a signal extraction problem. Kaufmann et al. (2010) in their working paper give an example of this UCM advantage. They demonstrate that all individual indicators of corruption are

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[2] 1) Voice and Accountability; 2) Political Stability and Absence of Violence/Terrorism; 3) Government Effectiveness; 4) Regulatory Quality; 5) Rule of Law; 6) Control of Corruption.
Source: Kaufmann et al. (2010).

imperfect proxies. When these indicators are aggregated they can result in a more informative signal. In spite of that, these imperfect aggregate measures can be successfully summarized by the standard errors and confidence intervals generated by the UCM (Kaufmann et al., 2010).

Based on the official WGI measures, Malito (2014) provides an example of the compound of corruption. A linear function of unobserved corruption (or any of other indicator from WGI) can be presented as follows:

$$y_{jk} = \alpha_k + \beta_k(g_j + \varepsilon_{jk}), \qquad (2)$$

where y is the observed outcome of the index (k defines one of the six indicators of government) in a country j, which depends on the value of the unobserved corruption (or governance) g and a disturbance term ε. The data from various sources may have different measurement scales, so α and β parameters rescale the data from each source into single units (Kaufmann et al., 2010).

Moreover, Kaufmann et al. (2010) state that the estimation of corruption allows for unavoidable uncertainty. For correct interpretation of corruption it is important to pay attention to the standard errors as they reflect the number of sources available for a country (the more sources the smaller standard errors) and capture the inherent uncertainty in measuring corruption.

It is important to mention that the statistical methodology of UCM generates margins of error for each governance estimate. Kaufmann et al. (2010) describe that the margins of error are computed because corruption (as a part of governance) is difficult to measure using any kind of data. Under these circumstances the margins of error reported by WGI must be taken into account when making comparisons across countries and over time (Malito, 2014).

The World Bank reports the six aggregate indicators in two ways (higher values corresponding to better outcomes):

  a) In standard normal units, ranging from -2.5 to 2.5;
  b) In percentile rank, from 0 to 100.

In comparison to CPI, CC measures corruption in both public and private sectors with much broader data source. The authors of both indices are motivated to reduce measurement errors by using data from various sources. However, Rohwer (2009) criticizes that the large number of countries covered by WGI has reduced the validity of

the indicator because WB includes also "problematic" data sources.

Furthermore, both perception-based indicators CPI and CC are not completely reliable and they have been often criticized which may affect the estimation in this thesis. The main critics are listed below (Lambsdorff, 2007; Rohwer, 2009; Malito, 2014):

a) It is unclear what exactly CPI and CC are measuring as the sources of corruption are averaged together.

b) Due to the fact that the sources used in constructing these indices change over time, naturally, the definitions of both indices change also.

c) The perception indices do not take into consideration the experience of poor and disenfranchised people. As well as the fact that most people are biased towards either a government or its opposition is ignored.

CPI and CC indices are advised to be used rather as complementary information. The scales of the aggregate estimates cannot be reliable for monitoring the changes in levels of governance over time, but they rather illustrate the changes in the relative positions of individual countries (Rohwer, 2009). Nevertheless, the aggregate sources are more informative compared to using only one source. The aggregation of independent sources can increase the reliability of the measures of corruption (Malito, 2014).

3. Hypothesized assumptions of corruption drivers and business influencing factors based on the evidence from Ukraine and observations in the econometric studies

The main idea of this chapter is to set the hypotheses for the econometric part of this thesis. First of all, I observe the causes of corruption as they are the reason why corruption exists. Next, I discuss how corruption affects business activity and what other factors may impact private sector development.

3.1. Causes of corruption

According to Transparency International corruption is a problem all over the globe and it is threatening economic growth for both developed and developing countries. In general, economic literature observes several groups of factors that influence corruption directly: political, legal, historical, social, cultural and economic (Andrei et al., 2009). Various studies have extensively analyzed all the possible drivers of corruption (Rose-Ackerman, 1999; Ades and Di Tella, 1997 and 1999; Lambsdorff, 1999; Tanzi, 1998; Treisman, 2000; Gurgur and Shah, 2005; Billger and Goel, 2009). However, in this chapter I take into consideration the causes of corruption observed in Ukraine and compare them to the results from economic literature. The outcome of the comparison is presented in a form of a hypothesis in the end of every sub-chapter.

A survey conducted by Kyiv International Institute for Sociology in 2011 emphasizes that in Ukraine on average 25.8% of respondents faced with a bribery-extortion in the preceding year. Furthermore, 47.1% of respondents complained that officials demanded payments explicitly when dealing with government permits, and 40.2% testified bribe extortion in business regulation and inspection. Moreover, 36.1% reported bribing when dealing with customs and 30.2% - with judiciary (Fedirko, 2013). As a result, corruption in Ukraine is well spread.

3.1.1. Judicial system

Ukrainian entrepreneurs claim that they cannot trust Ukrainian judiciary because judgment of court is usually done in the favor of public officials. This makes it impossible

for any company to prove its right in court even if the company's actions have been consistent with the legislation (Savitskii, 2012). Moreover, high dependency of Ukrainian judicial system on politicians leads to insecurity in business decision making. In addition, The Business Anti-Corruption Portal determines other judicial drawbacks in Ukraine: contracts are not well enforced, the risk of expropriation is high and enforcement of arbitration decisions is poor. Furthermore, vague laws and regulations provide officials with opportunities for rent-seeking (The Business Anti-Corruption Portal).

Existing empirical studies show twofold results concerning judicial systems. Ades and Di Tella (1997, 1999) found out that judicial autonomy may result in higher corruption. However, Lambsdorff (1999) states that the independence of the judiciary are important factors that may reduce corruption. Additionally, weaker measure of law and order leads to a more corrupt society (Brown and Shackmana, 2007 : 231).

Based on the studies mentioned above I will rather hypothesize that:

H1. The more independent judicial system is, the lower corruption level there is in a country.

3.1.2. *Salaries and GDP*

Corruption in Ukraine spreads easily also due to low salaries of the public officials in local administrative bodies such as traffic police, health system, tax administration and education system (Investment Climate Statement, 2013). As stated in the paper of Gorodnichenko and Sabirianova Peter (2007), wages of Ukrainian public sector employees are 24-32% lower than of the counterparts in private sector. Their results also show that the wage gap is particularly large at the top of the wage distribution and increases with worker productivity; therefore unofficial compensation in a form of bribes is common in public sector. However, as reported in the article of Stelmakh (2012), high salaries of public officials do not guarantee total elimination of corruption, but at least it lowers the bribe taking motivation.

There is also another point to be considered. Apart from low salaries of public officials, the total wealth of top Ukrainian oligarchs reaches 85% of Ukrainian GDP (Kuzio, 2008; Holoyda, 2013). These businessmen took control over major state industries in the 90's after Ukraine's independence. It was the time when Soviet corrupt connections collapsed and new ones appeared. Concentration of the country's wealth among oligarchs

could be one of the reasons why Ukraine's GDP is so low.

If the biggest share of GDP reflects the wealth of the richest citizens then it may not be the best measure of country's performance. However, GDP is the most common measure for comparing one country to another (Investopedia). Many scholars tried to analyze the relationship between growth in real GDP per capita and cross-national measures of perceived corruption (Aidt, 2009). Several researches (Mauro, 1995; Mo, 2001) found the evidence that corruption reduces growth of GDP per capita. In particular, Mauro (1995) finds that one-standard-deviation improvement in the corruption index is associated with a 1.3% point increase in the annual growth rate of GDP per capita. In comparison, results of Mo (2001) suggest that 1% increase in corruption level reduces the growth rate by about 0.72%.

This point is also sustained by the work of Mustapha (2014) who tests the hypothesis about negative impact of corruption on GDP per capita. Based on the tests and data from 20 countries, strong statistically significant negative impact of corruption on the GDP per capita was indeed found. The results of Mustapha (2014) show that a country's 10 points increase in the corruption index will lead to a decrease of USD2849 in GDP per capita.

Another essential point is discussed by Bai et al. (2014). Their paper examines the relationship between higher growth and lower corruption, using firm level data from Vietnam for a five-year-period. Their empirical estimations show two results:

1) Economic growth reduces the amounts of bribes paid to government officials;
2) The reduction in corruption caused by economic growth is larger for firms with higher ability to relocate.

Furthermore, it is also reasonable to look at the study of Aidt (2010). He defines that recent researches rarely find robust evidence that corruption has a sizable negative effect on growth in real GDP per capita. In his earlier paper Aidt (2009) did not find any negative effect of corruption on economic growth as the correlation between these variables is close to zero. In spite of it, Aidt (2009) notifies that corruption is a "significant hindrance for sustainable development".

As the data on salaries of public officials is not available for a number of countries, my analysis will rather use the data on GDP per capita. Taking into consideration that the relationship between corruption and GDP per capita is unclear as the causality can run in both ways, I expect however that:

H2. Higher level of GDP per capita is associated with lower corruption.

3.1.3. Centralized governance

Another key point that drives corruption in Ukraine is centralized governance which limits a decision-making process in local governments. The government located in the capital is not able to solve a number of local issues and thus, due to disturbances concerning regional problems, does not work efficiently on a national level (Moldovan, 2014). A vast amount of fiscal revenues collected locally is transferred to the central budget, consequently local governments are completely dependent on funding allocated by the Ukrainian national parliament (European Committee of the Regions, 2011 : 15). Centralized financial flows provide a lot of power to the decision makers who are usually involved in corruption schemes. As a result, there is no funding left to stimulate local development, and hence governors are rather irrelevant to local development which harms the country in general (European Committee of the Regions, 2011 : 15; Moldovan, 2014).

It is important to note that in order to deal with this problem current Ukrainian president Poroshenko is focused on decentralization. Ukrainian decentralization is intended to eliminate a number of departments, allocate resources at local levels and reduce tiers of the administrative and territorial structures (Reform of Decentralization of Power in Ukraine).

In line with economic literature on decentralization, Treisman (2000 b) states that the more tiers there are, the more decentralized the system is. In addition, perceived corruption is higher in countries with a larger number of tiers in governments where reported bribery is more frequent (Fan et al. 2008).

Moreover, another paper of Treisman (1998) points out that federal states are perceived to be more corrupt because the division of power in federal structure leads to a greater burden of venality for firms doing business. However, Ali and Isse (2003) found that federalism with a decentralized government reduces corruption. In contrast, Teobaldelli (2011) determines that federalism is rather a process of governmental decentralization with stronger subnational governments.

An equally significant aspect is suggested by Shleifer and Vishny (1993) who note that both very centralized and decentralized states may suffer less from corruption compared to states with an intermediate level of institutional centralization. Correspondingly, weakness of a central government leads to higher corruption (Vishny and Schleifer, 1993). Fjeldstad (2004) additionally advocates that some researchers argue about decentralized political systems being more corrupt, because it is harder to monitor corrupt

activities. Nevertheless, Gurgur and Shah (2005) hold the position that centralized decision making is correlated with higher corruption.

Moreover, in accordance with Ahlin (2001), bureaucratic decentralization is more resistant to reduce corruption, whereas corruption decreases in the case of regional decentralization. The author adds that decentralization creates competition between regions resulting in higher efficiency in governance. For instance, when businesses can move freely between regions or localities, corruption is expected to be lower (Treisman, 1998). Indeed, Bai et al. (2014) explain that it is especially beneficial for larger firms to move to areas with lower bribe rates. This causes competition among country's areas in order to attract more firms, and thus corruption level usually drops.

H3. Corruption level is lower in a decentralized (non-federal) state compared to a centralized (federal) state.

3.1.4. *Competition among local governments*

Decentralization of political power is also a way to eliminate corruption and to promote better development. The control over Ukraine as a whole has always been centralized among some politicians and their relatives. The history of Ukrainian political competition has never been clear. According to Way (2005 : 193-194) some politicians were using physical force against political opponents, others used "extra-legal and anti-democratic means" to keep staying in power when their positions were weakening. Moreover, several cases of media censorship took place in the past. Furthermore, recent monopolized political control has closely moved Ukraine to an autocratic regime (Shevchenko, 2014).

In the line with Teobaldelli (2011), economic literature notes that decentralization indeed has a positive impact also on competition among local governments. He explains that competition induces politicians to adopt more socially optimal fiscal policies in comparison to those implemented in a centralized economy. Furthermore, Vishny and Schleifer (1993) remark that in countries with more political competition, public pressure against corruption is stronger. That is to say, political competition between the ruling parties opposition keeps corruption down.

H4. More competition among politicians leads to lower corruption levels.

3.1.5. Taxation system

Another driver of corruption in Ukraine is taxation system which is one of the most complicated in the world, point out Burlaka and Sologoub (2014). First of all, the norms of Tax Code are too general and are not well clarified that makes it a source of unofficial benefits for tax inspectors. Next, very often tax inspectors receive a "plan" from higher-level tax authorities with an amount of additional taxes and fines to be collected to the central budget. Furthermore, due to high social contributions a vast amount of real salaries are paid in cash lowering budget revenues (Burlaka and Sologoub, 2014).

According to various economic studies, the more complex tax system is, the more excessive discretion tax officials get, and thus it leads to higher institutional corruption. In this case the taxpayer evades taxes and preferably chooses to bribe the auditor (Imam and Jacobs, 2007; Purohit, 2007). However, Chetwynd et al. (2003) describe a survey where respondents from several middle income level countries indicate that they are willing to pay more taxes if corruption could be controlled. As a result, corruption can create distortions leading to excessive tax rates (Attila, 2008).

A number of studies evaluate the relationship between corruption and total tax rate as inverse. Tanzi and Davoodi (2000) empirically analyze a link between these two variables and find that corruption has a larger impact on direct taxes in developing countries compared to developed ones which can be explained by the prevalence of tax evasion. Their results show that 4 points reduction in corruption can increase direct taxes in developing countries, as a group, by 7.2% of GDP.

Moreover, according to Tanzi (2000 : 142) if there is corruption in tax administration, the tax burden for a taxpayer will be higher because of included bribe. In this case the official burden measured by government is much lower without the bribe share. Consequently, corruption explains why taxpayers may complain about heavy taxes in countries where amounts of government tax revenue differ considerably from real tax burdens.

Evidence in support of this position, can be found in a paper of Ivanyna et al. (2010). They remark that corruption makes tax rates go up because corrupt officials gain a part of government revenue for private use. According to the paper, the presence of corruption and tax evasion increases the tax rate by more than 50%.

H5. More complex tax system leads to higher corruption level.

In short, all the hypotheses between corruption and its drivers starting from H1 to H5 are summarized in the Figure 1. The sign in the parenthesis reflects whether a relationship is negative (-) or positive (+). For instance, independent judicial system negatively affects the level of corruption (H1) or complex tax system increases corruption level (H5). Moreover, an additional arrow between corruption level and GDP per capita shows that the causality can run in both directions – higher GDP per capita may lower corruption as well as higher corruption may reduce GDP growth (OECD, 2015 : 123).
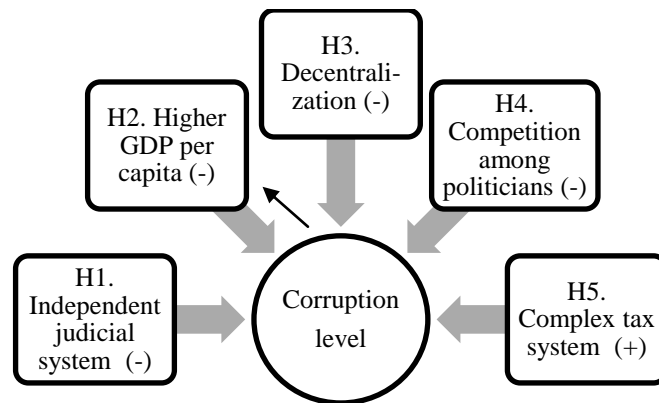

Figure 1. Summary of the hypotheses from H1 to H5

(*Source*: Compiled by author)

3.2.   Relationship between business and corruption

Business is the main driver of economic efficiency and innovation. Business prosperity usually leads to growth in the output of economy, and consequently creates new jobs and improves country's standard of living. With favorable business environment countries get more productive and competitive economies. Otherwise, in the case of hostile business conditions, entrepreneurship is less attractive due to reduced overall rewards. Moreover, hostile business environment creates barriers to entry and benefits only the firms that are already in existence. These firms become extremely profitable because "partially reformed economy offers entrepreneurs lucrative unfilled niches" (Johnson et al., 2002).

Legal SMB contribute only about 5% to Ukraine's GDP making the government irrelevant to such a small fraction of the benefit. However, non-official estimates account for about 30% of population employed in SMB (Polishuk and Tsimbal, 2011). For many years Ukrainian government considered entrepreneurs as entities who do not pay taxes or

other fees to social security funds, and thus lots of regulations were not in favor of SMB.

Apart from the severe conditions created by the government, Ukrainian entrepreneurs are additionally affected by corruption prevalent in tax administration, traffic police, customs, judicial system and land administration. The biggest amount of corruption is observed in public procurement. A research of Institute of Applied Humanitarian Research (2012 b : 23) indicates that about 72% of Ukrainian SMB respondents spend annually 10-30% of their budgets for paying bribes or other types of unofficial fees.

In Ukrainian business cash-bribes and personal ties in state departments are common. They are used not only in order to avoid a number of burdensome government regulations, but also when one wants to obtain undeserved benefits. Basically, in a long run corruption diminishes competitiveness of businesses, giving some firms a lot of illegal advantages and forcing others out of the market. Consequently, the companies that follow the rules and obey the laws are not able to survive (Institute of Applied Humanitarian Research, 2012 a; 2012b).

In accordance with economic literature, one of the major obstacles for doing business is corruption as it raises costs of business activity and tends to drive legitimate entrepreneurship underground (Mueller, 2003 : 544). Additionally, as has been noted by World Bank, evidence from private sector assessments suggests that corruption in the form of bribing can prevent firms from growing.

Historical evidence provided by Baumol (1990) proves that in corrupt environments entrepreneurs will put more effort to non-innovative rent-seeking activities, like lobbying and bribing public officers, rather than improving productive capacity. Moreover, corrupt conditions will simply result in lower total outputs and wages (Ahlin, 2001).

An interesting point presents the working paper of Djankov et al. (2000) who analyze a relationship between corruption and regulations of entry of start-up firms. Their arguments emphasize that heavier regulations are correlated with higher corruption. Furthermore, less democratic governments tend to regulate entry more heavily and the main beneficiaries in this case are obviously politicians and bureaucrats. Moreover, start-ups are more affected by corruption compared to established businesses. As a result, this is likely to reduce the number of people opting for the business career path or who are eager to implement a business idea (OECD, 2013).

Moreover, it is also important to describe the way how corruption can directly affect efficiency of firms. Considering the countries in Latin America, Dal Bó and Rossi (2007) define that extra input of labor causes inefficiency if capital input and produced output do

not change. The results suggest that in less corrupt countries firms produce the same outputs with fewer employees compared to more corrupt countries. That is to say, excessive employees in countries with higher corruption are involved in not very productive work which hurts economies of their countries.

Moreover, the study conducted by Tonoyan et al. (2010) explains why entrepreneurs and small business owners become involved in corrupt deals in form of bribe-payers. They point out that the likelihood of engaging in corruption depends on country-specific formal and informal institutional make-up, low efficiency of financial and legal institutions and the lack of their enforcements. Authors emphasize that these reasons can explain significantly higher corruption levels in transition economies compared to those in mature market economies. Likewise, a study of Ahlin (2001) indicates that according to businessmen's opinion corruption is a serious obstacle especially in developing and transition economies.

Corruption and business is studied also by Avnimelech and Zelekha (2011) who use a dataset on entrepreneurship collected from LinkedIn. They find strong supportive evidence that corruption has a significant negative impact on "productive" entrepreneurship and thus on economic growth.

Based on the studies mentioned above, I set my next hypothesis:

H6. Corruption negatively affects business.

3.3. Other factors that have impact on business

This part of the thesis is focused on the other factors apart from corruption that have an impact on business life. Similarly to the chapter 3.1., in this part the components defining business activity are also taken from the example of Ukraine. As previously, the impact of these factors is compared to the results obtained from various economic studies.

As country's development is closely related to business climate, which unfortunately remains adverse in Ukraine, the country's performance leaves a lot to be desired. Nevertheless, analysis of a number of international sources shows that Ukraine has got a big potential for development after it achieved its independence. For instance, by the area Ukraine is the biggest country in Europe with a number of natural resources, very fertile soils and access to the Black Sea. Advantageous geographical location between European Union and Russia gives an easy access to foreign trade. In addition, Ukraine's population

of about 45 Million people provides a big number of consumers in the domestic market. Moreover, solid educational system in Ukraine offers access to all levels of education resulting in a relatively high level of human development. And finally, a well-developed transport infrastructure makes Ukraine accessible by land, water and air (PWC, 2013b; The Global Competitiveness Report 2013–2014; World Bank, 2014).

Obviously, all those factors may favor SMB growth. For this reason in the following subchapters I focus on the empirical evidence in order to check whether all of them are indeed favorable for business also in other countries.

3.3.1. Compulsory education

A meta-analysis of van der Sluis et al. (2005) compares several empirical studies of the impact of schooling in entrepreneurship selection and performance. According to their results, there is a lack of relationship between years of schooling and probability of choosing entrepreneurial activity in industrial countries. They add that the effect of education on entrepreneurship is disappointing because many unobserved factors are not taken into account.

Education is also observed in the study of Kolstad et al. (2014) who check the relationship between schooling years and entrepreneurship in Bangladesh. They take into account the endogeneity of education and use education of father as the main instrument in the study. Kolstad et al. (2014 : 56-57) believe that education can improve profits of firms and they find that an added year of education indeed increases entrepreneurial profits by 11.1%. This result is similar to the meta-analysis of van der Sluis et al. (2005) who find that an added year of schooling in developing economies increases profits by an average of 5.5%. Furthermore, Kolstad et al. (2014) test whether education makes entrepreneurs successful in pursuing larger markets and whether education increases innovation activities. However, the results they get are rather insignificant.

The results provided in various reports about business in Ukraine (PWC, 2013; The Global Competitiveness Report 2013–2014; World Bank, 2014) and econometric studies differ in their conclusions. However, as education definitely does not have any negative impact on business, there is no reason not to believe that:

H7. Increase in years of education could foster business intentions.

3.3.2. Tertiary graduates

Human capital in a relationship with new firm concentration is observed in the study of Armington and Acs (2002). Their findings show that a share of college graduates is positively correlated with new firm concentration in US regions. Consequently, the regions with higher amount of college graduates tend to have higher start-ups rates. However, these results do not concern firms involved in business services or manufacturing (Armington and Acs, 2002). Evidence in support of the previously mentioned results can be found in the work of Lee et al. (2004), though in contrast, they find a positive impact of post-secondary education also in services.

The article of Wu and Wu (2008) investigates the relationship between Chinese people with higher educational background and their entrepreneurial intentions. The authors affirm that entrepreneurial intentions are rather explained by personal behavior and attitude than educational background. At the same time entrepreneurship seems less attractive to postgraduate students compared to those with undergraduate degree. Moreover, entrepreneurial intention is affected by academic major. Wu and Wu (2008) find that students majoring in Engineering are more willing to start business than others.

The findings of Guerrero et al. (2008) from Catalonia also show that the probability to start business is higher when the students are from engineering courses. However, the descriptive analysis in the study presents that students with entrepreneurship related majors represent the biggest share among all majors who desire to create a new firm. Despite this, when Guerrero et al. (2008) test the model including all types of students, results are not significant. For this reason, the model was divided into sub samples and provided consistent results.

In addition to previously mentioned results, it is also reasonable to look at the research of Turker and Selcuk (2009). They demonstrate that entrepreneurial career depends on the educational quality of universities. If a university provides sufficient business knowledge and encouragement, the possibility of choosing an entrepreneurial career might increase.

Based on the studies above, the impact of university degree on business activity is positive or insignificant. For this reason the following hypothesis is similar to the previous one, so:

H8. Tertiary education could foster business activity.

3.3.3. Population

After having considered the impact of education on business, the next step is to demonstrate how the size of domestic market (represented by country's population) influences business. The most common indicators used in economic literature are population growth and population density.

The findings of Wennekers et al. (2005) establish that population growth has positive effect of on entrepreneurship. They explain that growing population requires bigger consumer markets which creates new economic activities. This point is also sustained by the work of Armington and Acs (2002 : 43), where population growth is strongly and positively correlated with firm birth rates for all industries in USA.

In contrast, population density is used in the article of Fritsch and Mueller (2007) who investigate the factors determining the level of regional business formation-activity in West Germany. Fritsch and Mueller (2007) find a negative impact of population density on start-ups in the pooled OLS regression and explain it in a way that agglomerated areas provide relatively unfavorable conditions for start-ups. Further, they compare OLS results to the fixed-effects model and conclude that the population density is non-significant in the latter one, meaning that its importance in business formation-activity is minor.

Similar results are obtained by Di Addario and Vuri (2010) who analyze market size and young college graduates as entrepreneurs in Italy. The authors show that densest markets do not encourage young college graduates to start entrepreneurial activities. They explain that these markets have larger public sectors that can provide a number of job opportunities. As a result, "doubling the province of work's population density reduces the chances of being an entrepreneur by 2–3 percentage points", state Di Addario and Vuri (2010).

On the contrary, a study from Japan finds that higher population density leads to a higher incentive for individuals to become entrepreneurs. It is stated that, if population density rises by 10%, the share of people willing to start a venture increases by 1% (Sato et al., 2012).

The arguments shown above help to hypothesize that:

H9. More population has rather negative impact on business activity.

3.3.4. *Foreign trade*

As was stated previously Ukraine has good access to foreign markets, in this case the amount of trade might be a good measure to check whether the statement applies to other countries as well.

The Global Poverty Report (2001) emphasizes that trade openness creates new and better paid jobs, improves productivity, lowers a cost of capital, accordingly, foreign direct investment (FDI) inflows increase, which facilitates establishing new businesses. With growing trade already existing firms gain access to needed inputs and larger markets (OECD, 2012). However, the amount of trade is closely correlated with trade liberalization[3]. Hence, improper business climate can block the benefits of trade opportunities.

An interesting point of view has a report of De Clercq et al. (2006) that presents arguments to emphasize the idea of knowledge spillovers in the creation of economic growth. The researchers test data from 34 countries over a four-year period and find that a country's outward FDI, export and import positively influence entrepreneurs' export orientation. De Clercq et al. (2006) present also an empirical evidence for the spillover effect from export-oriented entrepreneurship to a country's overall level of entrepreneurial activity. The report has a valuable statement that an increased level of international trade (both export and import), in combination with outward FDI, may stimulate entrepreneurs' involvement in export activities, and this may ultimately foster a country's economic prosperity.

Other papers (Martens, 2008 and Yanikkaya, 2002) also emphasize that trade is a complement to FDI. The researches show that these two variables have bi-directional causality, in other words, FDI is explained by trade openness in some countries and in others is just the opposite. It is hard to define the exact impact of trade openness on business conditions, but the clear fact is that country's amount of export and import is a result of national trade regulations and reforms.

An interesting point is observed from the study of Yanikkaya (2002) who conducts an empirical investigation in order to find how a foreign trade with highly innovative countries can influence their trading partners. The findings suggest that countries that have more trade with a developed and technologically innovative country are likely to grow

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[3] Removal or reduction of obstacles on free exchange of goods between nations. This includes tariff (duties and surcharges) and non-tariff obstacles (like licensing rules, quotas and other requirements). *Source*: Investopedia.

faster compared to countries that have less trade with a developed country.

As a result, in my next hypothesis is as follows:

H10. Foreign trade might favor business formation.

Having observed the positive factors, there is also, a further point to be considered. According to Ukrainian entrepreneurs there are a number of economical, legislative and political obstacles that disturb the development of SMBs. The most influential ones are: lack of financial aid, complex tax system and insecurity of property rights (Institute of Applied Humanitarian Research, 2012; European Investment Bank, 2013; Petrovska and Nedilko, 2014). The magnitude of their impacts is discussed in the subchapters below.

3.3.5. *Financial aid*

External finances is an important factor in business development especially at the start-ups, as most of the beginning entrepreneurs do not own enough funds for conducting business activity. The problem in Ukraine rises on one hand, due to a lack of financial support from the government. On the other hand, financial institutions like banks require collateral and offer mostly short-term loans with lending rates up to 20% (Polishuk and Tsimbal, 2011). It follows that, Ukrainian firms get less bank loans than firms of Western neighbors. Furthermore, an alternative source of credit received from other firms remains too low in Ukraine, whereas in neighboring Poland and Slovakia it is one of the most important sources of external finances in business (Johnson et al., 2002). As a result, a lot of arising business ideas can never be fulfilled in Ukraine.

Concerning economic studies, Kuzilwa (2005) focuses on businesses that received credits from the government in Tanzania. It has been shown in his study that access to credit is associated with increases in businesses' output. Additionally, limited accesses to credit, as well as inadequate credit amount tend to hinder the development of business. Moreover, Kuzilwa's (2005) findings indicate that the credit is mostly used for business expansion not for start-ups. Accordingly, demand of credit increases simultaneously with the size of business.

By the same token, Ginevičius et al. (2008) analyze the effect of financial aid in a form of government subsidies on business in Lithuania. They find that not the absolute amount of aid but the aid intensity has greater positive effect on business. Consequently, higher aid intensity results in greater effect. Besides, the authors conclude that the aid gives

the best results in business activities involved in production, R&D and education.

Obviously, financial aid in the form of bank credit has the same effect. Johnson et al. (2002) state that if needed bank credit is not available, entrepreneurs cannot take advantage of new growth opportunities.

The evidence from the economic literature suggests that:

H11.More financial aid in business is correlated with better business prosperity.

3.3.6. Taxes

Complicated tax system in Ukraine drives corruption and directly affects private sector. As an example, the Tax Code that came into effect in 2011 "expanded the powers of the internal revenue service and reduced the rights of taxpayers by adding a lot more red tape", states Volkov (2011). As a result, the entrepreneurs are now paying much higher taxes and spending more time doing paper work than before. Burlaka and Sologoub (2014) additionally advocate that it is costly and time consuming for enterprises to provide all the reports with supplements. Moreover, every mistake in a report is fined. As can be expected, due to corruption and personal connections some companies consistently avoid paying taxes, and for others tax controls become repressive. Constantly increasing tax burden, unplanned tax inspections, unofficial tax payments and extremely high fines make it very difficult to conduct business in Ukraine (Petrovska and Nedilko, 2014).

The results of the surveys showed by Ahlin (2001 : 2) note that tax regulations is indeed a serious obstacle in doing business. Taxes have strong impact on business conditions by influencing incentives and behavior of economic actors. A financial journalist Fontinelle demonstrates how high corporate tax rate in USA has a negative impact on domestic corporations. In her article Fontinelle provides several facts:

a) High corporate tax is a competitive disadvantage when a company tries to attract new corporate investment and jobs. As a result, domestic corporations relocate to foreign countries with lower tax rates.

b) Due to high tax burden companies start lobbying politicians in order to change tax regulations. Consequently, companies spend less on developing issues.

c) Even the amount of total tax to be paid is already an obstacle for business owners. Tax itself lowers the amount of possible future investment or saving for sustaining the business through hard times.

Likewise, a negative correlation is observed also by PwC Senior Economic Adviser, Sentence (2013). His team conducts a regression analysis to look at the relationship between the Paying Taxes indicators and the average economic growth rate across 166 countries over eight-year period. Their results indicate that economies with lower tax rates on business and less complex tax systems experience stronger growth and attract more foreign direct investment. In addition, Sentence (2013) remarks that each 10% point cut in the total tax rate is associated with an increase in the annual economic growth rate by just under 0.1%. Since the impact on overall economic growth is slightly dependent on initial tax rate, other components like number of tax payments or administrative complexity of tax system cause much more influence. According to Sentence (2013), changes in the tax system may well be correlated with other policy developments which improve the business climate in an economy and hence raise growth (PwC, 2013a).

Another example is introduced in a publication of UK government in 2013. In April 2011 Corporation Tax was reduced from 28 per cent to 26 per cent. At that period of time the economy of UK was affected by external shocks which created uncertainty for business and hence business investment fell by 30 per cent. However, according to the publication till the end of 2013 business confidence has improved. As a result, growth across all industrial sectors of the economy contributed into the growth of GDP. As business confidence grows, business investment is expected to grow strongly. The modelling work in the publication suggests that a long term effect from Corporation Tax reduction might cause a strong positive impact on business investment and thus increase in GDP.

H12.More complex tax systems worsen business conditions.

3.3.7. *Property rights*

Another negative aspect in Ukrainian business development is insecure property rights. Property rights describe a legal right to own a property protected by clear laws of the state (The Heritage Foundation). In Ukraine imperfect system of registration, drawbacks in property laws and weak legal protection cause uncertainty in state's capability to ensure stable property rights (Ukrainian Helsinki Human Rights Union, 2009-2010). As reported by a number of Ukrainian businessmen, it is quite risky to invest in business activities because the likelihood that private property will be expropriated is high (Duhliy, 2015).

Especially insecure property rights are in the construction industry which becomes an obstacle for business development. Moreover, about 5-10% of property in Ukraine has got formal legal registration, whereas the rest of it is considered to be "sub-property". Close ties of politics and business allow influential businessmen to control their own "sub-property" and seize for competitors' one (Ukrainian Helsinki Human Rights Union, 2009-2010).

A theoretical research of Acemoglu and Verdier (1998) indicates that a marginal improvement in enforcement of property rights is estimated to increase the expected return to entrepreneurship. They underline that higher returns in entrepreneurship activity attract more agents to become entrepreneurs rather than public servants.

Similarly, a working paper of Johnson et al. (2002) establishes that firm's growth depends a lot on secure property rights. The authors explain that effective protection of property rights is positively correlated with the use of external finances. Countries with secure property rights offer better protection for foreign investors and thus, receive more financial inflows. Moreover, with secure property rights the entrepreneurs feel confident to reinvest their profits and receive additional benefits.

Taking into account the results provided above, my final hypothesis is:

H13. Secure property rights facilitate private-sector development.

To visually summarize the hypotheses concerning the factors influencing business, Figure 2 illustrates the relationships from H6 to H13. Likewise in the Figure 1, the sign in the parenthesis reflects positive (+) or negative (-) correlation.
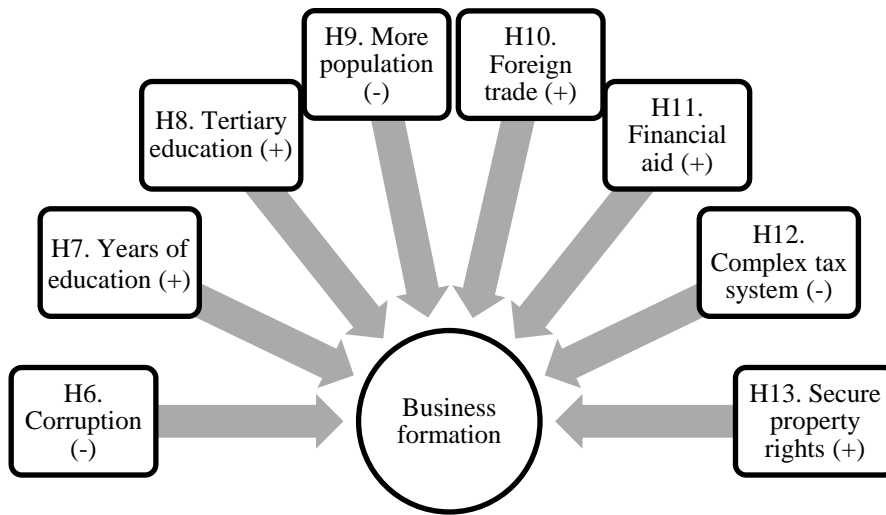
Figure 2. Summary of the hypotheses from H6 to H13

(Source: Compiled by author)

4. Econometric research on corruption and business formation

After the problematic drivers of corruption and business formation are defined and discussed, the aim of this chapter is to present the regression models based on the hypotheses. Data and the methodology used for estimation in this thesis are presented in this chapter as well.

4.1. The models of corruption and business formation and their data sources

4.1.1. Corruption model

The corruption model observes the drivers of corruption and is based on the hypotheses from H1 to H5. A review of the economic studies suggests that causes of corruption have legal, political and economic roots (Brown and Shackman, 2007). Following the example of Brown and Shackman (2007 : 322-323) the baseline form of the corruption model is as follows (3):

$$C_{it} = \alpha_0 + \alpha_1 RL_{it} + \alpha_2 DF_{it} + \alpha_3 GDP_{it} + e_{it}, \qquad (3)$$

where *C* is corruption level;

RL is Rule of Law indicator that denotes the judicial autonomy and thus the legal root;

DF is Dummy Federal or the measure for decentralization which reflects the political root;

GDP is GDP per capita, reflects the economic root;

i is a country in the dataset;

t is time period (year).

The main measure of corruption in my thesis is Control of Corruption index as it is more comparable over the years in comparison to Corruption Perception Index. Nevertheless, CPI will be used for the robustness checks. Another reason to employ these indices is that the data on CC and CPI can be obtained free of charge. Both of these indices are discussed in the chapters 2.3.1. and 2.3.2..

Likewise Control of Corruption, Rule of Law is another WB's indicator of WGI

group but it reflects the legal root in the corruption equation (3). RL measures perceptions of agents about functioning and independence of the judiciary, in particular, the degree of judicial independence from state, fairness and speediness of judicial process, trust in judiciary and judicial accountability. The indicator provides percentile ranks to countries where 0 determines the lowest rank and 100 consequently the highest. The Rule of Law indicator is rather an aggregate measure which will be used also later on for defining the business activity in the business model.

The next variable is Dummy Federal which I composed using the information of an international governance organization called The Forum of Federations. The web page of this organization provides information on federalism by countries and accounts for roughly 25 federal states. Thereby, dummy variable takes a value of one if a country is federal and zero otherwise. This approach is similar to the study of Teobaldelli (2011) where federalism is proxied by a dummy variable reflecting whether or not a country has a federalist constitution.

The measure of GDP per capita is taken from the World Bank database. The values are shown in current USD and calculated by dividing gross domestic product of each country by their midyear populations. A rise in GDP per capita displays growth in the economy which implies higher standards of living. In this thesis I use natural logarithm of GDP per capita to simplify the interpretation of the coefficients.

After analyzing the baseline corruption model (3), I find it important to broaden it by including more explanatory variables. This might reduce the omitted variable bias. Taking into consideration the example of Ukraine, I am interested in examining whether the same corruption causing factors are prevalent in other countries. In order to find it out, the corruption model (3) will be extended by three other factors of impact: tax complexity, political competition and culture. The final extended version of the corruption model is presented below (3a):

$$C_{it} = \beta_0 + \beta_1 RL_{it} + \beta_2 DF_{it} + \beta_3 GDP_{it} + \beta_4 TP_{it} + \beta_5 PP_{it} + \beta_6 DC_{it} + e_{it}, \quad (3a)$$

where *TP* is Tax payments (number);

   PP is Political pluralism - a measure for political competition;

   DC is Cultural dummy variable.

As has been hypothesized in the subchapter 3.1.5., corruption in tax administration is

caused by tax complexity. For the measure of tax complexity I use "Tax payments (number)" indicator produced by the World Bank. This indicator covers all mandatory taxes and contributions payable by businesses to the government. Countries with smaller number of mandatory taxes are supposed to have less complex tax systems.

Political pluralism in the regression (3a) defines free competition among political groups and freedom of expression of different opinions. According to Dahl (1978) pluralism is a synonym to "diversity". Political pluralism is thus a constitutive feature of a democratic regime. The indicator of Political pluralism belongs to the category "Electoral process and pluralism" of the Democracy Index produced by Economist Intelligence Unit. Their methodology rates separately categories on a scale from zero to ten and then provides explanation on the overall Democracy Index. The index categorizes countries in four regime types[4]. For this reason, I believe that the higher the scores of the "Electoral process and pluralism" category moves countries closer to democratic states, resulting in higher level of political freedom and political diversification.

To finalize the extended corruption model (3a) I will additionally include cultural dummies. Cultural differences are often analyzed in a relationship with corruption and government performance (Treisman, 2000; Paldam, 2002; Teobaldelli, 2011).

Moreover, referring to an article of Woronowycz (2003 : 1) a big share of Ukrainian population accepts bribes and corruption as a normal part of everyday life. In people's opinion, additional payment for a government service is tolerable. Moreover, the article underlines that many Ukrainians are so used to bribe-giving so they no longer distinguish what is a bribe when paying for free services. For this reason I will also control for cultural differences among countries in order to see whether corruption is dependent on the culture.

To create cultural dummies I used the classification of countries made by the World Bank namely "List of countries by region". In fact, this list takes into consideration not only the geographical location of countries but also levels of their income. As a result, many countries in Western Europe, Northern America, Middle East and Asia are attached to the list of High-income economies without any geographical belonging. In order to get cultural diversification, I have made several changes. As most of the citizens of Western Europe, Northern America, Australia and New Zealand have similar European origin and consequently cultural aspects, I put them in one group. The high-income countries from the remaining parts of the world I put into the groups of their geographical location (i.e.

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[4] "Full democracies" (8.0 to 10), "flawed democracies" (6.0 to 7.9), "hybrid regimes" (4.0 to 5.9), and "authoritarian regimes" (0 to 3.9).
Source: https://graphics.eiu.com/PDF/Democracy_Index_2010_web.pdf

Singapore and United Arab Emirates will go consequently to "South-East Asia and Pacific" and "Middle East and North Africa" groups).

4.1.2. Business model

Considering the statements of several reports about business condition in Ukraine, I want to check whether the factors like good educational system and big domestic market indeed have a positive impact on business development. Moreover, since corruption is defined as the biggest obstacle for doing business, it will be also included in the baseline regression of the business model (4):

$$ND_{it} = \gamma_0 + \gamma_1 C_{it} + \gamma_2 CE_{it} + \gamma_3 TG_{it} + \gamma_4 PD_{it} + u_{it}, \qquad (4)$$

where *ND* is New business density or the number of newly registered companies;

C is corruption level as previously;

CE is Compulsory education in years;

TG is Tertiary graduates;

PD is Population density.

The dependent variable of the business model (4) is "New business density" indicator produced by the World Bank. This indicator reflects the number of newly registered companies each year across countries with limited liability per 1000 working-age people. Moreover, "New business density" assesses how regulatory, political and macroeconomic institutional changes affect new business registration (World DataBank).

A similar dependent variable is used also in other studies. For instance, Fritsch and Mueller (2007) use data on start-up rates in order to investigate the determinants of regional start-up formation in West Germany within a certain time period. Their dependent variable is calculated by dividing the number of start-ups per period by the number of persons in the regional workforce at the beginning of the respective period including unemployed individuals (Fritsch and Mueller, 2007).

Another study, conducted by Wennekers et al. (2005), describes the relationship between the rate of entrepreneurial dynamics and the level of economic development among countries. Wennekers et al. apply a rate of "nascent entrepreneurship" namely the percentage of working age population who are actively involved in starting a business. In comparison to "New business density" that counts firms, "Nascent entrepreneurship rate"

counts entrepreneurs, so I assume that it is a good alternative measure for business formation which will be later applied for robustness check in the business model.

For the corruption variable I use again Control of Corruption index. Educational system in the business model (4) is explained with an indicator of duration of compulsory education and yearly number of tertiary graduates. In accordance with the United Nations, tertiary graduates are people who have successfully completed an education program in higher educational institutions. Data on both indicators is taken from UNESCO Institute for Statistics.

The next variable - Population density - is suitable to apply when controlling for country's domestic market size. The indicator of Population density is taken from the database of the World Bank and it shows a yearly amount of people living in a square kilometer of a country's land area.

After regressing the baseline business model (4), the next step is to add one by one control variables and analyze the cross-country results. In this manner, the final version of extended business model (4a) is shown below:

$$ND_{it} = \eta_0 + \eta_1 C_{it} + \eta_2 CE_{it} + \eta_3 TG_{it} + \eta_4 PD_{it} + \eta_5 DC_{it} + \eta_6 T_{it} + \eta_7 TP_{it} + \eta_8 RL_{it} + u_{it},\hspace{2cm}(4a)$$

where *DC* is Domestic credit to private sector (% of GDP);

  T is Trade (% of GDP);

  TP is Tax payments;

  RL is Rule of Law indicator that reflects the level of property rights protection.

The indicator of "Domestic credit to private sector" supplied by the World Bank is used in order to analyze how essential external finances are in business activity. The indicator reflects the amount of diverse repayable financial resources provided to private sector by various financial corporations. The amount of domestic credit is reported as a share of GDP.

Next indicator of the extended business model (4a) is Trade which is also obtained from the World Bank database. The indicator includes total amount of exports and imports of goods and services in each country and presents the result in a percentage of GDP. This ratio is often called "trade openness" ratio and its aggregate value reflects countries' integration into the world economy (OECD, 2011).

As one may notice, two latter indicators are already used in the corruption model (3a). Nevertheless, I include them in the business model also because they both are expected to influence business activity. In this regression (4a) Rule of Law indicator is supposed to reflect the perceptions about private and intellectual property rights protection, quality of contract enforcement and likelihood of property confiscation. The number of tax payments in this specification works as the measure of tax complexity and shows its impact on business.

The data for the corruption model is collected from approximately 160 countries over the time period 2005-2013. In contrast, the business model analyzes about 80 countries over the period of 2005-2012. Both models are performed on the unbalanced datasets because each country from the dataset is not observed in all time periods. The number of countries and years depends on the data availability. Accordingly, countries with missing data are removed from the analysis.

Table 1 reports summary statistics of the unbalanced panel data. Moreover, all the indicators that are used in both models are briefly summarized in Table 2.

Table 1. Summary statistics

Variable	Number of observations	Missing values	Minimum	Mean	Maximum	Standard deviation
Year	1934	0	2005	2009	2013	2.5811
Country	1934	0	0	106.99	214	62.077
CC	1857	77	0	50.472	100	28.821
RL	1879	55	0	50.428	100	28.768
DF	1619	315	0	0.14268	1	0.3498
GDP	1698	236	1	945.98	1891	545.9
TP	1607	327	3	30.714	147	20.425
PP	830	1104	0.86	5.5084	9.93	2.22
CPI	1186	318	1	4.0351	9.7	2.1177
ND	899	1024	0.002	3.685	65.848	6.1288
CE	1571	352	4	9.2973	16	2.0605
TG	755	1168	11	252520	9135720	822960
PD	1824	99	0.137	392.01	18942	1880.8
T	1480	443	22.118	94.451	458.33	53.155
DC	1517	406	0	758	1516	437.92
NE	457	1466	1.1	6.3142	32.3	4.749

Source: Author's own calculations

Table 2. Summary of the indicators' description

Index	Value description	Source / Producer
Control of Corruption index	Rating on a 0-100 scale, where higher values are corresponding to better outcomes.	The World Bank
Corruption Perception Index (old approach used before 2012)	Among zero (highly corrupt) and ten (very clean).	Transparency International
Rule of Law	Percentile rank: 0 is the lowest rank and 100 is the highest. Higher values are associated with more judicial autonomy and better protection of property rights.	The World Bank
Dummy Federal	Takes the value of one if a country is federal and zero otherwise. Moreover, federal state is expected to be less decentralized.	The Forum of Federations
GDP per capita	Higher values are corresponding to higher level of development.	The World Bank
Tax payments (number)	Countries with smaller number of mandatory taxes are supposed to have less complex tax systems.	The World Bank
Political pluralism	Rating on a 0-10 scale, where a value of 10 characterizes high political pluralism.	Economist Intelligence Unit
New business density	The higher the density of newly registered companies, the more favorable business climate there is in the country.	The World Bank
Compulsory education (duration)	Longer duration of compulsory education is related to better educational system.	UNESCO Institute for Statistics
Graduates from tertiary education (number)	The higher the amount of graduates in a country, the higher the level of human capital there is.	UNESCO Institute for Statistics
Population density (people per km^2 of land)	The higher the density of population, the bigger the domestic market there is in the country.	The World Bank
Domestic credit (% of GDP)	Higher amount of domestic credit is supposed to stimulate business activity.	The World Bank
Trade (% of GDP)	Higher amounts of export and import are expected to facilitate the access of domestic companies to foreign markets.	The World Bank
Nascent Entrepreneurship Rate	Higher rate reflects bigger amount of starting entrepreneurs.	Global Entrepreneurship Monitor

4.2. Methodological approach used in the models

The dataset of my thesis covers both cross-sectional and time-series variations, consequently panel data analysis is applicable. Basic panel data analysis observes the

relationship of the same individuals at two or more points in time (BurkeyAcademy). Even though panel data is often difficult to obtain, it allows to observe individual countries over time much better and to get consistent estimators in the presence of omitted variables (Wooldridge, 2010 : 281). In comparison to cross-section or time-series, using panel data has more benefits (Baltagi, 2003 : 5-9):

1) It provides more informative data, more variability and less collinearity which produces more reliable parameter estimates.

2) It suggests that countries are heterogeneous. In other words, panel data controls for country- and time-invariant variables which prevents the risk of obtaining biased results.

3) It has higher speed of adjustments to economic policy changes.

4) It allows creating and testing more complicated behavioral models and thus enables to measure effects that are not detectible in cross-section or time-series models separately.

Panel data is often analyzed with one of basic models - random effects (RE) or fixed effects (FE). According to Wooldridge (2010 : 285-286) a selection of the estimation method depends on the nature of unobserved effects and certain features of the observed explanatory variable. Moreover, another important issue to consider is whether or not unobserved component is uncorrelated with the observed explanatory variables. Nevertheless, the easiest way for making the choice is to conduct Hausman test that is based on the difference between the FE and RE estimators (Baltagi, 2003 : 20).

4.2.1. Hausman test

Hausman test examines a model with both FE and RE methods and provides a solution on which method to use. Null-hypothesis of the test tells to run RE model, alternative hypothesis tells that the results from the RE model are likely to be biased. In this case, FE model should be used. Null-hypothesis is rejected when p-value is lower than critical, and thus fixed effects model is applied.

Consequently, for both baseline models I conducted the Hausman test using R statistical software. The p-value for both models resulted in significant level, lower than critical value of 0.05. Hence, the null-hypothesis is rejected because RE is inconsistent so fixed effects is applicable. For this reason I will not discuss random effects method but focus rather on the FE.

4.2.2. Fixed effects

A FE framework allows for an arbitrary dependence between the unobserved component and the observed explanatory variables (Wooldridge, 2010 : 286). The FE estimator is based on time variation within each individual category (Aslaksen, 2011). Because each category, like countries, has its own individual characteristics, it is assumed that something within a country can bias the outcome, and hence it has to be controlled for.

A benefit of FE model is that it may eliminate unobserved characteristics if they are time-invariant, so it allows assessing the net effect of the explanatory variables on the outcome (Torres-Reyna, 2007). As a result, FE method is especially suitable in this thesis for estimating corruption that depends on time invariant heterogeneity differences among countries. For this reason omitted variable problem is unavoidable (Swaleheen, 2011 : 24). In contrast, using OLS estimation in this case will result in omitted variable bias, because if unobserved effects are not treated properly, they cause correlation between coefficients and error term (N'zue, 2006). However, FE model does not eliminate omitted variable bias if unobservable factors change over time within categories (Blumenstock).

Another reason to use FE method for my analysis is due to endogeneity of corruption. According to Barreto (2001) corruption is "endogenous result of a country's institutional development". Moreover, Swaleheen (2011 : 24) also points out that corruption is endogenously determined because it usually correlates with exogenous shocks. For this reason FE estimator is a good choice because it could resolve endogeneity problem (Frèchette, 2006).

Elimination of both the endogeneity problem and the source of omitted variable bias in the FE model can be performed using deviations-from-means estimator, or so-called "within estimator" (Angrist and Pischke, 2008 : 167). The within transformation is accomplished in several steps. First, the original equations are averaged over time and thus a cross sectional equation is obtained. Second, the averaged equation is subtracted from the original one. Finally, a new transformed equation does not contain any unobserved effect (Wooldridge, 2010 : 302). As a result, the explanation of Blumenstock provides an important argument, he states: "the fixed effect coefficients soak up all the across-group action. What is left over is the within-group action and it greatly reduces the threat of omitted variable bias".

It follows that FE regression holds constant average effects of each data category, i.e. country in the case of this thesis. Consequently, coefficients in FE model tell how much

each observation differs from the average; namely, FE regression reports the average within-group effect. Additionally, FE regressions are particularly important to use when data is categorized, because it can be tricky to control for all characteristics of the categories (Blumenstock).

However, FE method has a significant drawback. If observed explanatory variables do not vary over time for a country, they are identical to zero for all time periods and hence they are dropped from the observation (Wooldridge, 2010 : 304-307; Poprawe, 2014). Consequently, variables like population density tend to be rather time-invariant. However, in contrast, pooled OLS estimator neglects country specific characteristics (Aslaksen, 2011 : 13) and ignores the panel structure of the data (Schmidheiny, 2014b). Thereby, FE is better to use when it is important to obtain an impact of variables that vary over time.

In a number of panel data studies about corruption some authors include year- and country-fixed effects. Year-fixed effects account for factors that change over time but are still common for all countries (Urga, 2001). According to Aslaksen (2011) and Dal Bó and Rossi (2006), year-fixed effects allow to control for unobserved shocks and measure the efficiency impact of sector-level shifts over time that are suspected to affect all countries in the same way.

In contrast, country-fixed effects allow controlling for the average observable and unobservable differences across countries (Blumenstock). In the study of Dal Bó and Rossi (2006) country fixed-effects are included in order to control for potential biases caused by any omitted variables that are country specific and time-invariant. Aslaksen (2011) and Cameron and Miller (2013) include country-fixed effects for controlling for a within-country correlation.

It is particularly important to remark that transformations used in order to control for fixed effects may eliminate much of useful information in the variable of interest (Angrist and Pischke, 2008 : 168). In other words, including country- and/or year-fixed effects can mess up the results because they can absorb too much variation in the data leaving too little variation for explaining the variables (BurkeyAcademy).

All the procedures mentioned above I accomplish in R software. The package plm is especially designed for linear panel data and it also supports unbalanced panels. The fixed effects estimator is calculated with a model option "within" which also allows using "twoway" effect for taking into consideration both country- and year-fixed effects. The Hausman test is conducted using pht syntax (Croissant et al., 2015).

4.2.3. Instrumental variable and 2SLS estimator

Since both models (3 and 4) in this thesis include corruption, they become interdependent. Consequently, corruption in the right hand side of the model (4) is endogenous, thus it must be instrumented. The most common way to correct for endogeneity problem apart from FE is instrumental variable technic (IV). Although, in panel data the endogeneity can be eliminated without applying IV (Zivot, 2012), there is an evidence from Frèchette (2006) where both methods are used. The reason is that FE can solve endogeneity problem only in the case if it results from time-invariant factors (Frèchette, 2006). Otherwise, instrumental variable technic should be used. Another reason to use IV in this thesis is to find a causal effect of corruption on business, in other words, to be confident whether it is actually corruption influencing business.

As maintained in econometric literature, the choice of a proper instrumental variable is fundamental. First of all, IV should be correlated with the endogenous variable. Secondly, IV cannot have any direct impact on dependent variable and thirdly, it should not correlate with the error term in the equation of interest (Treisman, 1998). According to Kolstad (2014 : 56) and Stephenson (2015), a valid IV should not affect the outcome variable in any way except through its impact on the endogenous explanatory variable. Stephenson (2015) adds that this effect cannot be tested statistically and the best way to make the IV choice is to be confident about the correlations based on "substantive knowledge of the area and general common sense".

It can be seen from the researches of Gupta et al. (2001 : 750) and Attila (2008 : 15) that there are several instruments for corruption that were used in a number of cross-section studies. For instance, the most common instruments are: ethno-linguistic fractionalization, French and British legal origin, distance from equator and the mortality rate among settlers etc. However, these variables are time-invariant and in FE model their effects are not estimated.

Having considered instruments for corruption in cross-section data, it is reasonable to look at time series data. According to Wadsworth, in the latter one lagged values of endogenous variables can be used as possible instruments because lagged values are unlikely to be affected by current shocks. Moreover, in the panel data of Gupta et al. (2001 : 762) lagged values of a corruption index are indeed used as the instrument. For this reason, my IV choice is also a lagged value of the main corruption index. I assume that CC value lagged by one period is the exogenous instrument and it does not have any impact on

present business formation other than through the impact on current corruption level.

According to Wooldridge, the most efficient IV estimator is the Two-Stage Least Squares (2SLS) estimator. 2SLS requires at least as many instruments as there are endogenous variables (Murray, 2006). For the endogenous corruption in this thesis I use only one IV, thus the equation of interest is exactly identified. The equation of interest is the business model (4a) which is used for performing two stages for 2SLS estimation:

1) Estimating corruption by regressing it on the instrumental variable (Z) and the exogenous variables (W_{it}) from the extended business model (4a):

$$\hat{C}_{it} = \mu_0 + \mu_1 W_{it} + \mu_2 Z + u_{it} \tag{5}$$

2) Substituting the endogenous corruption with its predicted value ($\hat{C}_{it}$) in the business regression (4a):

$$ND_{it} = \varphi_0 + \varphi_1 \hat{C}_{it} + \varphi_2 W_{it} + e_{it} \tag{6}$$

As a result, the indicator of lagged corruption (Z) is assumed to correlate with corruption ($\hat{C}_{it}$) at the first stage and moreover, Z is assumed to be uncorrelated with e_{it} at the second stage. If IV is good enough it is possible to estimate the causal effect of the regressor on the dependent variable (Schmidheiny, 2014a).

In R software instrumental variable estimation for panel data is obtained with "bvk" method using two-part formulas (Croissant, 2015 : 41). This method is based on Balestra-Varadharajan-Krishnakumar's (1987) study who offer an alternative specifications of 2SLS, namely "generalized" 2SLS estimator. In R software the outcome of "bvk" method provides the result of the second stage, whereas the first stage is not reported. For this reason I cannot be completely confident about the validity of the lagged corruption as the instrument. In case if it is weak, 2SLS estimates can be biased.

4.2.4. Cluster-robust standard errors

In comparison to cross-section or time-series data, the problems like heteroscedasticity or serial correlation are rare in panel data and do not usually lead to dramatic changes. However, an important issue that has to be considered is standard errors. The standard errors of FE estimator are often underestimated in the presence of serial correlation (Schmidheiny, 2014b : 9). For this reason, in order to allow for

heteroscedasticity and serial correlation, cluster-robust standard errors are recommended to use (Schmidheiny, 2014b : 11). It is important to distinguish that clustered standard errors method helps to deal with autocorrelation, whereas robust standard errors (White-Huber standard errors) deals with heteroscedasticity.

Evidence in support of clustering can be found in the study of Bertrand et al. (2004). They use Differences-in-Differences estimator and notice that standard errors often understate the standard deviation of the estimator. This leads to serious overestimation of t-statistics, so resulting standard errors are inconsistent. Hence, some variables may look significant when they are actually insignificant. Thereby, Bertrand et al. (2004 : 254) deal with this problem by clustering standard errors. They explain that after clustering findings may not be as significant as previously thought if the outcome variables in a study are serially correlated.

Additionally, Angrist and Pischke (2008 : 231-233) clarify that clustering has a big impact on standard errors with variable group sizes and in case when a generic measure of the correlation of regressors within groups is large. Clustering is essential when the regressor of interest is fixed within groups. Moreover, according to Dal Bó and Rossi (2007), it is important to cluster because the shocks affecting business activity in a country in the same year may be correlated. Consequently, they use country-year clustered standard errors.

An equally significant aspect of cluster-robust standard errors is a question what to cluster over. Cameron and Miller (2013 : 21) advocate that larger and fewer clusters have more bias but less variability. The solution is to avoid bias and to use bigger and more aggregate clusters if possible. The example provided by the authors analyzes a dataset on countries and states. In this case, clustering at the country level is not recommended because it can lead to incorrect inference if there is a within-state cross-country correlation of the regressors and errors. Hence, clustering at a broader level, like states, is suggested.

There is also, however, a further point to be considered, clustered standard errors have two disadvantages (Cameron and Miller, 2013 : 6). First, they may reduce the precision of estimate of parameter value. Second, the standard estimator for the variance of parameter is usually biased downward from the true variance. The latter issue can be fixed after computing cluster-robust standard errors.

It is essential to emphasize that cluster-robust standard errors in panel data are usually way much larger than default standard errors, although it is possible for cluster-robust errors to be slightly smaller compared to the default standard errors (Cameron and

Miller, 2013 : 9-20). Cameron and Miller (2013 : 21) note that cluster-robust standard errors must be always compared to default ones and if there is a considerable difference then the former ones are recommended to use.

Taking into consideration the example in Angrist's and Pischke's book (2008 : 231), I assume that corruption outcome in some countries can be correlated because those countries share similar background characteristics. In addition, corruption level varies more across countries than over time (Aslacksen : 16), consequently, standard errors may increase. Hence, in order to obtain properly estimated t-statistics, I use "Cluster-robust Huber/White standard errors" reported with the lmtest package in R software. In this thesis clustering is done over a group (country) level because the number of country-clusters is bigger than the number of year-clusters. Moreover, I apply HC_0 heteroskedasticity-consistent estimator because other estimators are suggested to improve the performance in small samples (Zeileis : 4-5).

5. Results of the hypothesized assumptions

In this chapter I examine empirically the models and provide the results first, on the relationship between corruption and its drivers (Table 3) and second, on the relationship between business activity and corruption including other influencing factors (Table 4). One may notice, that both tables do not display any constant term (intercept). The reason is due to FE methodology that uses deviations from the individual means where the intercepts vanishes (Hauser, 2014/2015). In addition, in both tables the initial number of countries is shown in the first columns, although this number steadily declines as the set of variables is broadened. Furthermore, country- and year-fixed effects are included in in all specifications in both tables though not reported.

Table 3 presents the FE estimator results concerning the corruption drivers. In the first four columns I use Control of Corruption index as the dependent variable and in the sixth column I apply Corruption Perception Index instead. Additionally, following the advice of Cameron and Miller (2013 : 21), I compared the default standard errors to the cluster-robust standard errors and the difference between them is indeed noticeable. This implies that it is better to use the cluster-robust standard errors.

The first column of the Table 3 shows the baseline corruption model (3). As can be seen, the regressors of Rule of Law and GDP per capita are both highly significant. In this case, when Rule of Law indicator increases by a point, Control of Corruption index also increases on average across countries by 0.406 points over time period 2005-2013, meaning that with more judicial autonomy corruption level is lower. This result is in the line with the hypothesis H1.

However, the other two coefficients in the column (1) do not reflect previously hypothesized results. An increase of 1% in GDP per capita correlates with higher corruption level as CC index decreases by 0.157 points. Moreover, the baseline model shows that in the federal countries CC index is 0.278 points higher in comparison to other countries, but there is no support for it because the relationship is insignificant. The outcome of the first column can be driven by omitted variable bias.

In order to minimize possible omitted variable bias, the next step is to add control variables and check the changes in the significance levels. The following columns of the Table 3 display the extended version of the corruption model (3a). Thereby, the column (2) controls for the complexity of tax systems which is represented with the number of tax payments. The coefficients β_1 and β_2 do not change much, but the significance of GDP per

capita slightly declines and its coefficient doubles. What is more, an increase of total number of tax payments by one extra payment raises CC index by 0.040 on average among countries. The statistical significance of the coefficient β_4 is rather high, implying that on average more tax payments lead to lower corruption level which conflicts with the hypothesis H5. In this case the assumption that the number of tax payments and the corruption level have a linear relationship must be wrong. For this reason I include a quadratic version of the number of tax payments in order to indicate a non-linear relationship.

Certainly the relationship is non-linear as the quadratic coefficient is significant. After adding tax-squared in the next specification two tax coefficients cannot be interpreted separately. The form of the relationship is revealed from the signs of their coefficients. The column (3) shows that the coefficient for the number of tax payments is positive, whereas the squared coefficient is negative. This result could be also represented with a concave curve. This suggests that having relatively few tax payments has a positive effect on the corruption index until a turning point is reached. After this point the number of tax payments has a negative impact on CC as the function starts to decrease. Consequently, the countries with more tax payments have lower corruption index. In other words, more complex tax system is associated with higher corruption level which is in the line with the hypothesis H5.

In the next column (4) I control for impact of political decentralization on corruption across countries. The numbers of years and observations have considerably shrunk due to a shortage of data on each country. Nevertheless, one point increase in Political pluralism measure is associated with 0.394 points increase in CC index on average overtime. As a result, countries with more diversified political systems have lower corruption – just like expected in H4. Including the measure of Political pluralism does not change much the result for Rule of Law, but the impacts of GDP per capita and tax complexity on corruption become non-significant.

In order to check whether corruption can be driven by cultural differences I include cultural dummies in the column (5). The "Africa" group is used as the reference category because by default R sorts the levels of a factor alphabetically. As the intercept term is absent, it is impossible to define any group-specific mean value. Thereby, the coefficient for Asian countries is not the effect of the group, it is the difference between the effect of Asian and African countries. The same pattern applies to all other dummy groups. Accordingly, the CC index in all other countries is lower in comparison to Africa's.

However, this may not be true as the result is insignificant.

Table 3. Corruption drivers

Dependent variable		*Corruption*				
	CC	CC	CC	CC	CC	CPI
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Rule of Law	0.406***	0.408***	0.405***	0.519***	0.524***	0.027**
	(0.027)	(0.022)	(0.215)	(0.057)	(0.058)	(0.008)
Dummy federal	0.278	0.257	0.230	1.642	1.498	0.241[#]
	(3.231)	(3.093)	(3.069)	(2.552)	(2.508)	(0.130)
Log (GDP per capita)	-0.157***	-0.080*	-0.103*	0.052	0.107	0.012*
	(0.042)	(0.040)	(0.047)	(0.124)	(0.097)	(0.006)
Tax payments (number)		0.040**	0.040**	0.025	0.023	-0.001
		(0.013)	(0.013)	(0.024)	(0.025)	(0.001)
Tax payments (number) - squared			-0.000[#]	-0.000	0.000	0.000
			(0.000)	(0.000)	(0.000)	(0.000)
Political pluralism				0.394**	0.398**	-0.075*
				(0.143)	(0.143)	(0.031)
Africa					reference category	reference category
North America, Western Europe, Australia, New Zealand					-0.204 (0.515)	-0.048 (0.051)
South-East Asia and Pacific					-0.134 (0.469)	-0.019 (0.052)
Latin America and Carribean					-0.369 (0.387)	0.051 (0.053)
Central and Eastern Europe and Central Asia					-0.650 (0.613)	0.031 (0.058)
Middle East and North Africa					-0.636 (0.773)	0.027 (0.044)
Twoway effects	yes	yes	yes	yes	yes	yes
R-Squared	0.106	0.104	0.105	0.170	0.172	0.100
Adj. R-Squared	0.094	0.091	0.092	0.132	0.133	0.072
Number of years	2005-2013	2005-2013	2005-2013	2006, 2008, 2010-2012	2006, 2008, 2010-2012	2006, 2008, 2010-2011
Number of countries	179	179	179	160	160	157
Observations	1568	1534	1534	768	768	603

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '[#]' 0.1 ' ' 1
Unbalanced Panel data. High rank of corruption indices indicates low level of corruption.
Fixed effects (within) models.
Twoway effects include year- and country-fixed effects.
Cluster robust standard errors in parentheses. Disturbance terms are clustered at the country level.
Column (6) uses CPI as dependent variable.
Source: Author's own calculations.

The robustness of the results is tested using another corruption index – CPI. Due to the changes of CPI methodology in 2012, the newer index values cannot be compared to the old ones. For this reason I exclude the data for the periods starting from 2012. The final column (6) of the Table 3 indicates that the strongest correlation with corruption still has the judicial autonomy. Political pluralism is less significant as before and its coefficient is close to zero on the negative side. This indicates that more political competition results in slightly higher corruption levels which now conflicts with the hypothesis H4. Moreover, the robustness check shows a significant correlation between GDP per capita and CPI that is in line with the hypothesized expectation H2. It follows that a percentage change in GDP per capita is associated with an increase in CPI by 0.012 points. Furthermore, a weakly significant correlation is observed between corruption and federal dummy. Although the outcome still does not support the hypothesis H3, it indicates that in the federal states CC is 0.241 point higher, thus corruption level is slightly lower compared to other countries. Moreover, the relationship between culture and corruption still remains insignificant.

After all control variables are added and robustness check is done I conclude that the most significant driver of corruption among countries is lack of judicial autonomy. Columns (1) to (6) indicate that an increase in Rule of Law indicator by one point is associated with a rise in the corruption rank (lower corruption level) of about 0.027 to 0.524 on average among countries. This result fully conforms to the first hypothesis H1.

The impact of GPD per capita on corruption is rather unclear. Even though in the columns (4) and (5) the coefficients are insignificant, the final specification (6) supports a significant positive relationship between GDP per capita and the corruption index. However, it is hard to define from these findings whether low GDP per capita is a corruption driver or otherwise.

It is important to summarize that the competition between politicians has rather a positive correlation with the corruption index as was found in the columns (4) and (5). The dissimilarity in the outcome of the final specification could be explained due to the differences in the methodologies between two corruption indices. CPI measures corruption perceptions only in public sector – among public officials and politicians, whereas CC analyzes broader data sources in both public and private sectors.

Finally, it appears to be that on average among countries decentralization and tax complexity do not have any impact on corruption. However, the insignificance of federal dummy could be caused by one of FE drawbacks. As there is almost no change in dummy values across years, they are probably not taken into consideration. The cultural difference

also does not support the expectation that one culture is more corrupt than another.

Having considered the drivers of corruption, it is also reasonable to look at the second question of my thesis. In order to answer whether corruption harms business, I first of all check for the association between corruption and business activity (Figure 3).
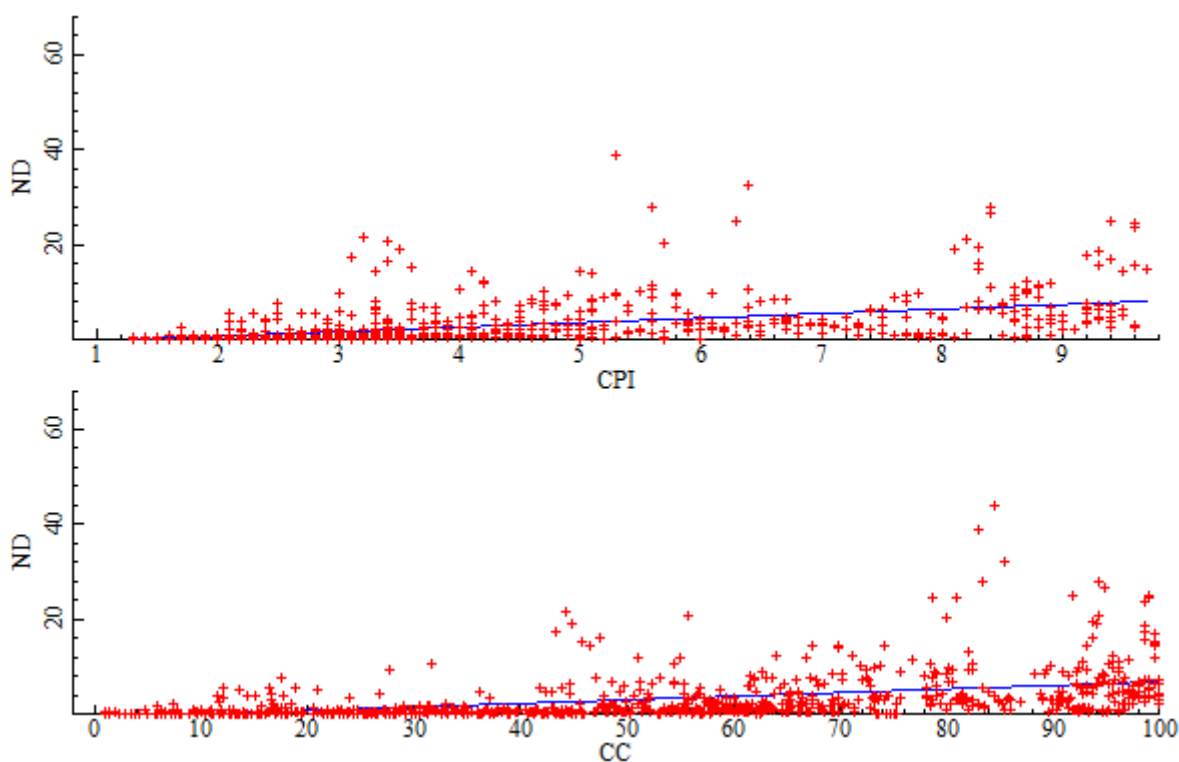

Figure 3. Corruption and New business density
Source: Compiled by author

Figure 3 plots both corruption indices against the indicator of New business density for all countries in the sample. The upward-sloping trend lines illustrate that countries with higher corruption index (less corruption) tend to have higher density of newly registered businesses per 1000 working age people. Whereas more corrupt economies have lower new business densities. However, this result cannot be realistic without additional controls. For this reason, Table 4 provides the answer about the impact of corruption on business activity and shows how other factors influence the amount of new business registration worldwide.

Table 4 shows the results of the business model. The first column demonstrates the baseline (4) regression and the columns from (2) to (8) represent the extended regression (4a). As before, the main corruption measure is CC index, CPI is used only for the robustness check in the column (6).

The construction of the first column (1) represents the factors that are expected to facilitate the private business development and as corruption is the variable of interest, it is also included in this specification. As observed from this column, one point change in CC index increases the density of new businesses by 0.012 points on average among countries over 2005-2012. However, this result is insignificant. Moreover, neither the amount of tertiary graduates nor trade has significant impact on New business density. At the same time, years of compulsory education and population density are weakly correlated with newly registered businesses across 92 countries. In other words, an additional compulsory year of schooling is associated with an increase in the density of registered businesses by 0.277. And what is more, in countries where population density is 1% higher, the density of newly registered firms is 0.104 lower. Both of these results are in line with the hypotheses H7 and H9. It is important however not to overemphasis the strengths of these results as this association is rather driven by omitted factors.

Starting from the second column I modify the baseline specification by adding control variables. After controlling for financial aid in starting business activity, one percentage point change in the amount of domestic credit results in a slight 0.020 increase in New business density across countries over 2005-2012 period. To put it differently, countries with higher amount of financial resources provided to private sector have on average higher density of newly registered businesses. This outcome supports the hypothesis H11 and is the only one statistically significant in this specification.

The next column (3) demonstrates additionally the impact of tax complexity which has the same level of statistical significance as the domestic credit. Basically, if the amount of tax payments in business increases by one extra payment, the density of newly registered firms decreases by 0.009, just as expected in the hypothesis H12. The correlation between domestic credit and business is similar to the previous result. Moreover, the correlation of schooling years and business density is again weakly significant and it remains positive.

Controlling for the legal aspect almost does not change the results. The column (4) shows that better property rights protection is negatively associated with New business density, but the relationship is not statistically significant. The rest of the coefficients in this specification remain almost unchanged.

As can be seen so far the corruption index does not show any significant impact on the business formation. This could be caused if all the correlation is absorbed by the controls. For this reason I suggest to exclude corruption from the business regression and

check the outcome. Hence, the column (5) shows that excluding corruption does not change the result. As before, only compulsory education, domestic credit and tax complexity have significant impact on the density of new businesses across countries.

Table 4. Factors influencing business formation

Dependent variable	New Business Density						Nascent Entrepre-neurship Rate	New Business Density
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
Corruption	0.012 (0.019)	0.017 (0.020)	0.015 (0.021)	0.024 (0.024)		0.046 (0.075)	0.095* (0.044)	0.577# (0.339)
Compulsory education (years)	0.277# (0.162)	0.275 (0.170)	0.288# (0.160)	0.313# (0.160)	0.319* (0.160)	0.0289 (0.064)	0.298** (0.104)	0.382 (0.306)
Log (Tertiary graduates)	-0.031 (0.083)	0.003 (0.043)	-0.035 (0.044)	-0.034 (0.044)	-0.030 (0.043)	0.002 (0.067)	-0.041 (0.053)	0.081 (0.139)
Log (Population density)	-0.104# (0.053)	0.049 (0.046)	0.039 (0.052)	0.033 (0.048)	0.040 (0.053)	0.014 (0.053)	-0.172* (0.086)	0.134 (0.135)
Trade (% of GDP)	0.007 (0.008)	0.009 (0.006)	0.003 (0.007)	0.003 (0.008)	0.004 (0.007)	0.009 (0.009)	0.044* (0.017)	0.047 (0.033)
Domestic credit (% of GDP)		0.020** (0.008)	0.017* (0.007)	0.018** (0.007)	0.018* (0.007)	0.018* (0.009)	0.005# (0.003)	0.013 (0.014)
Tax payments (number)			-0.009* (0.004)	-0.010* (0.005)	-0.010* (0.004)	-0.015 (0.010)	-0.047* (0.021)	0.024 (0.022)
Rule of Law				-0.030 (0.026)	-0.022 (0.022)	-0.021 (0.022)	-0.056 (0.035)	0.296 (0.193)
Corruption index used	CC	CC	CC	CC	CC	CPI	CC	CC
Twoway effects	yes	yes	yes	yes	yes	yes	yes	yes
R-Squared	0.024	0.053	0.062	0.066	0.063	0.056	0.100	0.001
Adj. R-Squared	0.019	0.041	0.047	0.050	0.048	0.042	0.071	0.000
Number of countries	92	90	90	90	90	84	62	90
Number of years	2005-2012	2005-2012	2005-2012	2005-2012	2005-2012	2005-2011	2005-2013	2005-2012
Observations	489	462	455	455	455	401	266	455

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '#' 0.1 ' ' 1
Unbalanced Panel data. High rank of corruption indices indicates low level of corruption.
Fixed effects (within) models.
Twoway effects include year- and country-fixed effects.
Cluster robust standard errors in parentheses. Disturbance terms are clustered at the country level.
Column (5) excludes the corruption index.
Column (6) uses CPI corruption index.
Column (7) uses Nascent Entrepreneurship Rate as the dependent variable.
Column (8) uses 2SLS estimator where one period lagged value of CC index is the instrumental variable.
Source: Author's own calculations.

In order to validate the previous findings, the next steps are the robustness checks using another corruption index and another dependent variable. Applying CPI as an alternative corruption index in the column (6) provides similar to the column's (2) results. The only significant factor that determines new business registration activity in this specification is domestic credit which has similar correlation with business formation as previously. Furthermore, corruption still does not have any statistically significant influence on new business formation across countries.

The further point to be considered is robustness check with a new dependent variable Nascent Entrepreneurship Rate. The corruption variable in this regression is as before - Control of Corruption index. After applying Nascent Entrepreneurship Rate, the results change considerably. Column (7) shows that one point change in CC index is correlated with a 0.095 higher rate of nascent entrepreneurs. This means that the share of starting entrepreneurs is on average higher in the countries with lower corruption levels. Statistically significant outcome of the corruption coefficient could be due to the fact that the amount of countries in this specification has considerably diminished and the impact of corruption is stronger in the countries which are in this shorter set.

Moreover, in this specification trade has also shown a statistically significant impact on Nascent Entrepreneurship Rate. One percentage point change in the trade coefficient is associated with 0.044 point increase in the rate of starting entrepreneurs. This gives a chance to believe that better access to foreign markets may facilitate domestic business activity. In addition, other variables become more or less significant in comparison to the previous columns. However, the amount of tertiary graduates as before does not seem like having any significant impact of business.

Noting the compelling nature of the evidence in columns from (1) to (7), the analysis is subject to endogeneity and possibility of measurement errors. To correct for these, I use the instrumental variable in the final regression. Taking into consideration the study of Gupta et al. (2001 : 762) where corruption is instrumented with its lagged values, it is worth mentioning that this instrument is not perfect. Due to the reason that corruption level does not change much over a short time period, its previous values however might influence a present-day business formation. Nevertheless, as a valid instrument is not easy to find, I proceed in a similar way as Gupta et al. (2001). Since the main corruption index in this thesis is Control of Corruption, I assume that one period lagged value of this index is a valid instrument, thus 2SLS estimation is expected to yield consistent estimates.

In the column (8) I re-estimate the extended business model (4a) treating the values

of corruption as endogenous. Obviously, the dependent variable is once again New business density. After Control of Corruption index has been instrumented, the 2SLS results conclude that one point increase in CC raises New business density by 0.577 firms per 1000 working-age people. That is to say, there is a weakly significant evidence that causality runs from corruption to business formation. As a result, on average in countries with lower corruption, the density of newly registered firms is higher. This result supports the H6 hypothesis which states that corruption negatively affects business.

Weak significance of the causal relationship between corruption and the density of new businesses can be due to the reason that FE model reports the averaged result across countries. Apparently, corruption does not affect all the countries in the same way, and thus it is not an obstacle for doing business in countries where corruption level is low (high corruption indices). Nevertheless, weakly significant but positive relationship between corruption and new business formation demonstrates that in less corrupt countries business start-ups are more common.

The results of Table 4 are rather non-robust because the variables which were significant become insignificant in the final modification. For instance, neither of the coefficients such as the share of domestic credit, the number of tax payments or the years of compulsory education is significant.

In general, based on the analysis of 90 countries I cannot state that higher amount of university graduates or better property rights protection may facilitate business activity. These two variables did not show any significant impact on business in any specification. Such an outcome for Tertiary graduates could be due to the reason explained by Guerrero et al. (2008). The aggregate amount of graduates could not result in any statistically significant outcome probably because they were not grouped by their majors. Moreover, graduation from tertiary institutions itself is often found to be insignificant also in other studies (subchapter 3.3.2.) if personal qualities and knowledge are not taken into account.

In addition, foreign trade and population density rather do not have robust significant correlation with business activity. However, the insignificance at any of the usual confidence levels of population density could be explained in a way that the variability of the values over the observed period is quite rare. Thus, the coefficient is most likely neglected in FE estimation.

It could be said also that the results of both tables could be affected by the limitation of FE model. Including twoway effects may have changed the outcome as country- and year-fixed effects can absorb a lot of data variation leaving not enough of it to explain the

variables (BurkeyAcademy).

Referring to the tables 3 and 4, it is important to mention also that low values of R-squared could be explained by the nature of panel data, namely cross-sectional data cannot be compared to time-series data without adjustments (Stata services). Although in panel data models R-squared is usually low, but excluded explanatory effects of the intercepts in FE model can reduce R-squared even more.

Finally, the results from Table 3 and Table 4 are briefly summarized in Table 5. All the findings are compared to the previously hypothesized expectations and presented below.

Table 5. Summary of the findings

Hypotheses	Is the expectation met?	Findings
H1	Yes; highly significant relationship	Higher judicial autonomy is associated with lower corruption.
H2	Unclear; rather insignificant relationship	At first, higher GDP per capita is associated with higher corruption level and the relationship is highly significant. After the control variables are added, the relationship becomes rather insignificant and an increase in GDP per capita starts to correlate with lower corruption level.
H3	No, the relationship is insignificant	Centralized (federal) countries have lower corruption level, but this outcome is rather non-significant.
H4	Rather yes; statistically significant relationship	Stronger competition among political parties is strongly correlated with lower corruption level. However, the last specification shows the opposite.
H5	Rather yes, but the relationship is insignificant	The relationship is non-linear but concave. At the beginning less complex tax systems are correlated with lower corruption level until a turning point is reached. After this point, more complex tax systems correlate with higher corruption level.
H6	Yes, but often insignificant relationship	At first, corruption does not show any significant impact on business activity, even though lower corruption is associated with higher business formation. Finally, weakly significant evidence that causality runs from corruption to business formation is found.
H7	Yes; rather significant relationship	More years of education are correlated with higher density of business registrations.
H8	No, the relationship is insignificant	Mostly negative correlation between the amount of tertiary graduates and business formation.
H9	Rather yes; weakly significant relationship	Negative significant correlation between population and density of newly registered businesses.
H10	Yes, but rather non-significant relationship	Positive but mostly insignificant correlation between the amount of foreign trade and newly registered businesses.
H11	Yes; significant relationship	Positively and statistically significant relationship between the amount of domestic credit and business start-ups.
H12	Yes; significant relationship	More complex tax systems are associated with lower density of business formations in most of the specifications.
H13	No; insignificant relationship	Negative association between property rights protection and new business formation.

6. Conclusion

The aim of this thesis is to observe corruption and its impact on business in Ukraine and in a cross-country perspective in order to find out whether these problems are general for all countries. To achieve the goal I first of all defined what corruption is and how it affects business in a form of bribery, extortion, patronage and embezzlement. Secondly, I observed the features of two main measures of corruption such as Corruption Perception Index and Control of Corruption. Thirdly, I provided the facts about the state of corruption and business conditions in Ukraine and compared them to the findings in the economic literature. At this point a number of hypotheses was set and based on them I constructed corruption and business models and thus conducted the econometric analysis. The methodological approach of this thesis is based on the panel data where the fixed effects model was applied. Moreover, as corruption was stated to be endogenous, its variable was instrumented with one period lagged corruption index using 2SLS estimator.

The findings of this thesis are applicable for a number of countries, however as the main idea is driven from the experience of my home country, the conclusion is obviously dedicated to the case of Ukraine.

Based on the cross-country findings of this thesis a lesson for Ukraine can be crucial. It has been identified that the most significant drivers of corruption among all the countries in the data set are lack of judicial autonomy and weak competition among political parties. These two factors have to be taken into consideration by current Ukrainian government that is actively trying to eliminate corruption.

On one hand, Ukrainian president Poroshenko emphasizes complete independence for the judicial system, but on the other hand, his new draft legislation has been widely criticized because judicial system remains totally dependent on the president. Nevertheless, it is important to underline that more independent judicial system is associated with lower corruption level.

The results show that in a number of countries more competition among politicians strongly correlates with lower level of corruption. The past of Ukrainian political competition is hard to describe as strong, but recently overthrown regime of Yanukovych and the election of a completely new government signify rather strengthening of political competition.

Another important lesson Ukraine must consider is that it cannot perform better without improving conditions for private sector development. Based on the analysis of 90

countries the development of business depends on several factors. One of them is corruption and it is found that corruption causes negative impact on business prosperity. It is necessary to point out that countries with lower corruption level on average have better business activity.

In addition to corruption, business start-ups are dependent on the availability of financial resources and complexity of tax systems. Higher amount of domestic credit offered to businesses and less complex tax systems are associated with higher business densities in a number of countries.

In my opinion in order to provide essential amount of financial resources to Ukrainian business the National Bank of Ukraine must stabilize the national currency and improve the transparency of banking organizations. Concerning the tax system, changes in Ukrainian Tax Code should offer less burdensome tax procedures. This might take the entrepreneurs out of the shadow activity and facilitate the development of private sector and the country in general.

After all, the final important factor in business formation, even though weakly significant, is the years of compulsory education. Not surprising that the more educated the nation is, the more probably they will implement new ideas. Luckily in Ukraine eleven years of compulsory education is available for everyone completely free of charge. However, I believe that the role of education in fighting corruption is also crucial. The younger generation is easier to teach how not to be corrupt. Although, educating citizens without giving them opportunities for professional development does not favor Ukraine as a whole.

As a result, there are a lot of problems for Ukrainian government to work on and the findings made in this thesis are only a small part of them. To eliminate corruption in Ukraine in a short run is close to impossible. The conditions for business development also need time for improving. This thesis does not give any instructions on those issues. However, based on the cross-country analysis I conclude that concentrating at least on these findings may somehow improve the prosperity of Ukraine.

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