Determinants of Corruption in Ukrainian Regions: Spatial Analysis[*]

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Abstract

This study investigates the determinants of corruption in Ukrainian regions and applies spatial analysis to examine the relationship between corruption perception index and economic, political and cultural factors. The results of the study show that economic growth decreases corruption in the regions. The paper also challenges the existing academic studies, as it shows positive impact of the number of civil organizations in Ukrainian regions on corruption. The implications of the empirical research are, therefore, a valuable asset to the existing literature on corruption. They indicate that dealing with corruption in Ukraine requires consideration of the influence of region-specific corruption determinants.

Acknowledgements

1. Introduction

Transparency International (2009) defines corruption as abuse of entrusted power for the private gain. While this definition is vague and general, corruption has been an issue of public debate and academic research for many years. Some authors openly blame corruption for undermining operation of markets and therefore resulting in slower economic development (Barro 1997; Bai *et al.* 2013). Others are less convinced whether corruption is entirely a negative phenomenon and point out that corruption may help to avoid bureaucracy and even stimulate some economic growth (Leff 1964).

Since its independence Ukraine has been challenged by widespread corruption activities which put in danger its economic and political future. According to report published by the European Research Association, USAID, and Kyiv International Institute of Sociologyin 2011, 10% of Ukrainian population is reported to be forced into corruptive activities, with courts and universities ranked with the highest perceived corruption – widespread values of 60.5% and 47.1%, respectively (European Research Association [ERA] *et al.* 2011).

Country's Soviet past and geographic location often become the green light for corruption in Ukraine. Moreover, current economic and political situation in the country fuelled by the military conflict in the East of the country leave little room for anticorruption measures. In fact, local population seems to be used to corruption being part of their lives while people also do not believe in future without corruption. In 2011 low trust levels in both local and state government were registered with only 20.1% of population trusting local authorities, 14% having trust in the President and only 7% in judicial system (ERA *et al.* 2011).

The motivation for this study lies in the importance of corruption issue for Ukraine's further development, economically, politically and culturally. The aim of the paper is to determine which factors influence corruption perception index in Ukrainian regions and developing policy suggestions that may be used for the bottom-up anti-corruption reforms. The goal of this paper is, therefore, to apply spatial analysis techniques in order to investigate economic, political and cultural determinants of corruption perception in Ukrainian regions. Hence, the added value of the given paper is in empirical analysis of CPI (Corruption Perception Index) determinants in spatial regional dimension. Today there is a lack of a similar studies on the Ukrainian regions; this work drives methodological and empirical experience from other studies to come up with suggestions and recommendations that may be utilized to decrease corruption in Ukraine.

Mainly, this research strives to verify three hypotheses: First one states that increase in GRP (Gross Regional Product) growth per capita and increase in real income per capita have a negative effect on CPI. Second hypothesis predicts that increase in number of civil organizations in a region and higher regional integration

index decrease values of CPI, while third hypothesis suggests that higher number of MPs (Member of Parliament) originating from a given region has a positive impact on CPI. The paper uses regional data and spatial analysis and Two-Stage Least Squares technique with instrumental variables to capture the impact of various determinants on CPI.

The paper is divided into three parts. The first one features literature review, then the second one proceeds with data description and methodology, while the third presents the estimation of empirical model and its results. The final section of the paper provides concluding remarks and suggests further steps to advance in fighting corruption in Ukraine.

2. Literature review

This section extensively covers existing literature on the matter of corruption analysis. Particularly, my interest here is in covering the literature on defining corruption and determinants of corruption, as those areas of study which are critical for my research. I firstly define certain groups of determinants as economic, political and cultural and then focus on the very determinants supported by the relevant literature. Although academic literature includes a considerable amount of studies concerning the determinants of corruption, not all of them are applicable to the regional dimension research that is conducted in this paper. For this reason, only determinants relevant to regional dimension will be reviewed.

2.1. Defining corruption

As mentioned earlier, it is difficult to define and measure corruption as it is both illegal and hidden. Majority of empirical studies use CPI that is annually published by Transparency International (Bernalez 2008; Alam 1995; Husted 1999; and others). The index is based on ten international surveys of the perceptions of business people and country experts regarding corruption around the world and is published annually. However, the popular critique of such approach claims that due to its intrinsic nature, corruption is unique in its form and appearance in each country and therefore adopting a general index evaluating many countries at the same time may result in biased results (Fiorino and Galli 2010, 2012). As the argument goes, each country has specific and peculiar features meaning that investigation of corruption should take into account cultural and legal differences of the country.

The abovementioned debate results in widespread doubts regarding the measure that should be chosen when examining corruption. For instance, Fiorino and Galli (2010) use number of crimes committed by the public officials as dependent

variable. This approach, however, has some significant drawbacks that are also admitted by the authors. Mainly, the problem lies in the fact that registered persecutions for the crimes committed by the public officials only captures 'revealed' corruption, while omitting the 'hidden' one. Moran further specifies that corruption captures state-society relations, political systems, development trajectories and types of external linkages (Moran 1999). Indeed, the determinants influencing corruption are largely agreed to be broadly divided into economic, political and cultural.

2.2. Determinants of corruption

It is important to define determinants of corruption in order to proceed with the investigation of CPI. Hence, a closer look at the economic, political and cultural determinants of corruption is taken as well as on the literature that uses those determinants to study corruption. First, the relevance of the group of determinants is described and the determinants themselves are discussed.

Economic determinants

Corruption determinants referred to as economic are grouped by assumption that state intervention is conducted not through the bureaucratic system and legal ways of impact but using administrative mechanisms for private purposes causing corruption (Del Monte and Papagni 2007). Shabbir and Anwar (2007) also find that economic factors have more effect on corruption than non-economic ones when investigating this issue for 41 developing countries. This argument is generally supported by the liberal economists who believe that corruption may be fought only when minimising the role of the government in the economic life of the country. Otherwise, corruption is largely used as an instrument of control and influence on the government by the interest groups.

The role of interest groups is associated with two-way causality between corruption and economic activity. On the one hand, interest groups often possess certain economic power, which allows them to influence the ruling party, as they get to avoid taxation, win tenders, or buy land cheaper than market prices. On the other hand, autocratic elite controls interest groups by giving them access to corruption rent. This issue is commented by Hollyer (2011), who proves empirically that elites may systematically manipulate access to rent to provide incentive for higher performance for both local and state officials. The author explains that autocratic elite controls the interest groups by granting career opportunities to best performers and punishing the inefficient officials. At the same time, according to Hollyer

(2011) if elite is supported by interest groups acting in the name of their ideological empathy, there may be lower corruption in the country. Economic development is therefore claimed as both the tool for interest groups and aim for autocratic elite which interact under corruption.

Some studies state that economic development serves as a determining factor for the level of corruption in the country. Huntington (1968) and Myrdal (1968) advocate the idea that at the early stages of development, societies face higher levels of corruption, which decreases after certain development level is reached and then decreases along with the pace of economic development. This phenomenon, as the argument goes, causes the inverted U-shaped relationship of economic development and corruption (Treisman 2000). The finding of the U-shaped relation between corruption and economic growth gives useful interpretation of this relationship for developing countries. It also allows us to speculate on the level of economic potential of a given country by looking at the correlation sign of the corruption and economic growth. Hollyer (2011) challenges this idea and emphasizes that in less developed countries where elites built their power on ideological affinity, corruption could be relatively low and well controlled by the elite, as it was in the Soviet Union.

Bai *et al.* (2013) examine corruption dependence on economic growth in Vietnam. They build a model to examine whether in poor countries firms have an opportunity to avoid corruption and bribes while stimulating economic growth. Empirical study discovers that firms operating in multiple provinces and/or transferable land property rights experience less corruption as they are more flexible (Bai *et al.* 2013). As the study shows, operating in various provinces not only differentiates the risks of business expropriation as a result of avoiding bribes but also redistributes the wealth between regions leading to lower income inequality.

Income inequality is another important economic determinant of corruption and is used in many studies as corruption explanatory variable. Shabbir and Anwar (2007) argue that income inequality makes population preoccupied with income redistribution rather that honesty monitoring. As a result more people are prompt to pay bribes, making corruption more socially acceptable. The authors also find income inequality to be positively correlated with the level of corruption (Shabbir and Anwar 2007). Gupta and Davoodi (1998) conclude that corruption is positively correlated with income inequality, whereas policy aimed at decreasing corruption also decreases income inequality and poverty. Alam (1995) and Johnston (1989) study the mutual causality relation between income inequality and corruption that corruption causes greater income inequality, while the inequality in income distribution promotes higher levels of corruption.

Dzhumashev (2013) has conducted a study regarding two-way relationship between governmental expenditures and corruption and their impact on economic growth. His conclusions are that governmental expenditures trigger corruption,

which in turn, leads to distortions in the structure of governmental expenditures. Fiorino and Galli (2010) agree with the statement and claim that lower government expenditures with fewer regulations are generally associated with lower corruption.

Sandholtz and Koetzle (2000) look at the way unemployment impacts the level of corruption. They conclude that high marginal value of money in poor countries makes bribing beneficial for both givers and takers of bribes. Unemployment is one of the reasons why people are ready to pay bribes in order to open higher income gain opportunities and employment. Buying and selling positions, as the case of corruption, is claimed to be positively correlated with corruption. Alongside with unemployment such economic determinant as inflation is also thought to increase corruption, as it serves as another destabilising factor. Among others, Bai *et al.* (2013) and Jung (1985) take inflation into account when investigating corruption.

Political determinants

Political factors influencing corruption are grounded in the costs which corrupted officials face in pursue of personal benefit. Putnam (1993) defines political attention as being a luxury good. Such characterization allows him to determine factors influencing the 'price' that a politician faces when acquiring political attention by means of corruption. Elections are perfect example of the corruption encouraging environment (North 1971). Moreover, local elections are even more corruption-prone as corrupt official can focus on specific sector rather than the whole government, making corruption less risky. Whether an official has to pay a high price for political attention depends on civic participation of his electorate. Balancing between political representation of different interest groups in turn provokes more corrupt activities.

The level of civic and political participation of the population highly depends on the level of education. This concept is central in research by Lipset (1960) and Glaeser *et al.* (2004) who examine the way education, political and civic engagement influence corruption. The authors come to conclusion that more highly educated people, as well as those active both politically and civically, have a tendency to monitor honesty, hence decreasing the level of corruption. Higher political awareness also leads to stronger civic community (Del Monte and Papagni, 2007).

This idea is challenged by results of empirical study by Fiorino and Galli (2010) who examine corruption in Italian regions. One of the interesting findings of the authors is a positive correlation between corruption and education, which they explain as the ability to bypass and evade regulation and that is only increased with higher levels of education. Their study focuses on the impact of corruption on economic growth. It has been found that economic growth is highly correlated with public expenditures, effect of which is undermined by corruption (Fiorino and Galli 2012).

Higher level of democracy and political plurality is also claimed to decrease corruption. As Del Monte and Papagni (2007) explain, higher political competition influences corruption in two ways: First of all, it stimulates creation of new political parties and therefore raises political awareness and secondly, it fragmentizes electorate's choice, therefore giving all political forces more equal chances and decreasing need of corruptive activities at the same time.

Cultural determinants

This group of corruption determinants suggests that corruption largely depends on social capital, which is associated with strong civil society (Mauro 1995; Fearon and Laitin 1996; Wines and Napier 1992). They claim that corruption patterns tend to correspond to the rules of the 'legal culture' (Fiorino and Galli 2010). Wines and Napier (1992) conclude that dominant cultural norms influence social acceptance of corruption. Corruption tends to increase when the state laws are in dissonance with strongly integrated culture and well defined moral and cultural norms. On the other hand, as Bernaldez (2008) and Shkurpat (2006) argue such dissonance increases the risk of corrupted activities for officials when public opinion has a strong vision of honesty resulting in protests and revolutions – hypothesis which has been empirically proved by recent events in Ukraine (especially after the Revolution of Dignity of 2013, see Koshkina 2015).

According to cultural approach to corruption determinants, trust in government is seen as a public good which impacts the perceived quality of life of the population. Apart from integration level mentioned above, civil organizations are believed to influence the revival of public 'legal culture' (Coleman 1990; Huntington 1968). Academic research also suggests that higher integration level of the population – meaning lower religious, language and ethnic fragmentation – leads to more active participation and stronger moral norms, therefore decreasing corruption (Coleman 1990).

Senior (2006) puts together a thorough study of corruption in many countries assessing their corruption level and comes to interesting conclusions regarding the role of integration of population. The author uses CPI provided by Transparency International as dependent variable, extensively analysing the determinants of corruption in his book *The Big C: Cases, Causes, Consequences, Cures.* Senior indicates inverse relationship between corruption and social integration and observes direct relationship of the dependent variable and government's economic interventions. He uses causality tests to discover complex interdependencies between corruption and economic variables and well as political ones.

Kappor and Ravi (2009) distinguish between corruption norms and government effectiveness instead of investigating the use of corruption index. They find

that corrupt behaviour of UN officials cannot be explained by corruption norms alone and is largely dependent on government effectiveness. Kapoor and Ravi (2009) suggest that cultural norms are not best explanation for corrupt behaviour unless supported by data on government effectiveness, which they define as composite indicator showing level of office organization, official's education level, quality of civil service and other factors influencing a given official.

The abovementioned determinants are not self-exclusive, moreover, it is necessary to apply each of them to the country-case study of corruption. Such approach allows us to explain as many interrelations between the variables as possible and tailor the model to a specific country based on peculiar features and data availability. This argument is used by Bernaldez (2014) who gathers into one study economic, political, cultural and organizational determinants. As he distinguishes between cultural and organizational determinants his classification is different from the one mentioned previously with some of them only relevant for international and not country-level regional analysis. Bernaldez's (2014) work thus serves as a summary platform of the interrelationships between corruption and its determinants which may come useful for interpretation of empirical results.

It is important to note that while the abovementioned studies are relevant for the given work, they do not take into account the distribution of spatial dimension of corruption across the regions. This might be due to insignificance of spatial autocorrelation in the model, or it may also relate to the fact that majority of studies examine rather the international aspect of corruption and do not focus on an in-country regional level determinants.

2.3. Studies on Ukraine

There is little literature that would examine corruption in Ukrainian regions, while there are no studies that take into account spatial dimension of corruption in Ukraine.

Neutze and Karatnycky (2007) put together an empirical study that provides a thorough insight into the corruption in Ukraine. It gives a generalised report on the corruption in economic sector, judicial sector, executive and legislative sectors, political corruption, as well as the role of private sector and media. The main conclusion of Neutze and Karatnycky (2007) is that Ukraine needs to ensure thorough implementation of current anti-corruption laws, unite all political forces in passing more corruption-fighting legislation, establish constructive dialogue between civil society and the government, and also initiate anti-corruption programme in judiciary and health sectors as the first priority. Neutze and Karatnycky (2007) also name governmental expenditures watchdogs, civic education, increase MPs' accountability and empower civil organizations with ability to exercise pressure on the government.

The paper by ERA *et al*. (2011) features an extensive analysis of corruption perception in Ukraine. The study based on the regional surveys indicates the leading causes of corruption that are perceived as such by the population. According to the survey, officials' desire to use their position in public office for personal gain is the main reason for corruption, which echoes political theory of corruption determinants. The subsequent factors – inadequate control of the law enforcement over officials and absence of strong political will of the highest levels of the government – also point at political reasons for corruption in Ukraine.

However, if one wants to investigate regional level of corruption perception, it is important to look at the areas in which people interact with corruption the most. According to the ERA, USAID and Kyiv International Institute of Sociology (2011) paper, top areas where population faces corruption are: healthcare, universities, business regulation and inspection, state auto inspection, state subsidised housing and governmental jobs. The study, however, concludes that extortion to bribery in not equal across the regions – it is higher in eastern and southern regions and lower in western and central regions.

Vyshnyak (2009) explains the differences between corruption spread across Ukraine by looking at regional cultural, ethnical and language differences across the regions. She conducts an empirical study examining the amount of people speaking Ukrainian, Russian and other languages in different life spheres like job, home or university. Generally, the author concludes that Ukrainian speaking regions report higher level of social integration and political participation (Vyshnyak 2009).

USAID (2006) report suggests that the cleft between East and West of the country fuels political crisis in Ukraine, as politicians use and reinforce the difference between the regions to acquire larger electorate. This argument brings us back to the cultural determinants of corruption, once more pointing out at the need of taking into account the spatial dimension of corruption in Ukraine.

Having analysed the literature concerning the definition of corruption as well as the determinants of corruption, the following part proceeds with data description and methodology used for the empirical research. The consequent section features estimation of the model and its results. Finally, the paper also presents conclusions on the conducted research.

3. Data description and methodology

The study presented in the paper investigates the determinants of corruption in Ukrainian regions and looks at economic, political and cultural factors influencing CPI at the regional level. Ukraine is divided into 25 administrative units: 24 regions ('*oblasts*' in Ukrainian) and Autonomous Republic of Crimea. The given

research focuses on the time period of 2004−2011 and uses annual data for 25 regions of Ukraine. After Orange Revolution in 2004 Ukraine started taking its first steps towards stronger civil society and lower corruption (Koshkina 2015). As a part of this process Ukrainian Statistical Bureau (USB) reformed its statistical methods and made the information available to the wide public on its website (Koshkina 2015). Furthermore, statistical data became even more influenced by external forces with beginning of the military conflict with Russia. Studying corruption determinants during 2004−2011 is therefore the most suitable time period for both unbiased results with the largest possible data sample.

The following equation is estimated:

$$Corruption\ Perception\ Index_{it} = f(X_{it},\ \epsilon_{it}) \tag{1}$$

for $i = 1,...,\ 25$ and $t = 2004,...,\ 2011$, where X is a vector of explanatory variables and ϵ is the error term.

More specifically, the following spatial model was constructed:

$$y_i = \propto + \beta X + \ \rho W y + \epsilon \tag{2}$$

$$\epsilon = \ \lambda W \epsilon + \ u \tag{3}$$

Where X is the vector of explanatory variables; ρ is the coefficient estimated for the spatial lag; W is the spatial weights matrix; λ is the coefficient estimated for the spatial error; u is the unobserved non-spatial error for every observation.

3.1. Dependent variable

Corruption perception index (variable: *corruptind*) is used as dependent variable for this study. The concept of this determinant has been developed by Transparency International in 1995 and uses international surveys to create a score for each country on the scale of 0 to 100 showing how corrupt its public sectors are perceived to be (Transparency International, 2014). Transparency International uses empirical data submitted by the supporting national and international institutions to produce the index with 0 standing for the country perceived as highly corrupt to 100 which means no corruption.

Following the guidelines of Transparency International, Ukrainian statistical institutions took the approach of corruption perception index to regional level to assess the perception of corruption and its dynamics in every oblast in Ukraine. Kyiv International Institute of Sociology and in the framework of USAID funded project called "The Ukraine National Initiatives to Enhance Reforms" gathered the index data for the years 2007–2011 (ERA *et al*. 2011) and produced regional CPI for Ukrainian *oblasts* and Autonomous Republic of Crimea. The index varies from

0 to 100, with 0 standing for no corruption and 100 for very corrupted region as perceived by the population. This CPI measure is used in the given paper to investigate corruption determinants in Ukrainian regions.

The choice of CPI as dependent variable to measure level of corruption in a region has a number of reasons. First of all, although the index is a subjective indicator, it reflects everyday realities of the Ukrainian population and therefore can be considered a good proxy for the real level of corruption in the country. Secondly, the index has been created taking into account both Ukrainian realities and Transparency International methodology. On the one hand, corruption perception might to some extent be higher than actual corruption interaction (ERA *et al*. 2011), but on the other hand, the index indicates to what extent corruption is accepted as a part of social reality in Ukraine, potentially complicating the process of fighting it.

3.2. Explanatory variables

The study presented in this paper uses the following explanatory variables:

Gross regional product growth per capita (variable: *grpgr*) has been included as an explanatory variable for the study. USB Yearbooks provide measurements of GRP with the Gross Value Added (GVA) that is further defined as the difference between output and intermediate consumption, which includes the primary income generated and distributed by producers.

Using **real income per capita** (variable: *realincomepc*) as an explanatory variable is a good method of capturing the way real income of the population influences perception of corruption. This variable shows real average salary in the region. The variable primarily affects the perception part of the CPI as lower salaries are believed to make people blame corruption.

Another important variable that will be used to explain corruption is **unemployment rate** (variable: *unem*). The level of unemployment is an important determinant of CPI as it reflects the willingness and need to pay bribes. The analysis by Sandholtz and Koetzle (2000) suggests that higher unemployment rate encourages population to look for illegal employment and pay bribes to obtain employment. Variable is presented in percentage of unemployment growth rate compared to the base year 2003.

The money allocated to each region is captured by using **governmental expenditures** (variable: *govspend*) as an explanatory variable. This variable shows the amount of money allocated to a given region from central government budget.

Crime rate (variable: *crime*) is also used to investigate CPI. The variable shows overall number of registered crimes in the region and is assumed to correlate with the amount of crimes committed by governmental officials, as those are not explicitly recorded. As Dzhumashev (2013) shows it, there is positive relationship between governmental spending and CPI.

Another variable suggested by the analysed academic literature is the **number of MPs in the current parliament** (variable: *mp*). Fiorino and Galli (2010, 2012) use number of legislators from a given region to control for region's interests representation in the parliament. It is assumed that in a relatively corrupted country, legislators have strong connections in their home regions, and once they get to the parliament those connections gain momentum using the legislator's power.

Same logic is used to apply **number of political parties** (variable: *parties*) as an explanatory variable for the empirical study. This variable is a proxy for political plurality in the region. Del Monte and Papagni (2007) argue that political plurality is an important determinant of corruption as the higher is competition for electorate between political parties, the lower their incentive to use corruption to acquire voters. The authors claim this relationship is directly related to the number of political parties available in the analysed territory (Del Monte and Papagni 2007).

Number of civil organizations (variable: *civilorg*) is very useful when capturing the impact of civil society on corruption perception. The variable shows the number of registered civil organizations in the region and is used as a proxy for civil participation in the region.

Integration index (variable: *integration*) is also used to evaluate the influence of civil society on CPI. Since the regional data is spatially autocorrelated, it is logical to take into account the peculiarities of each region. It is shown by Husted (1999) that these peculiarities are correlated with corruption index. Integration index is a complex indicator produced by USB and composed of such indicators as social wellbeing, appropriate workplace, linguistic and ethnic coherence and population growth. The data used for the index includes both state-level statistics and data from surveys. Integration index supports the hypothesis of cultural theory of corruption by providing the insight of the region's unity and coherence.

3.3. Preliminary analysis

Descriptive statistics of variables used in the model have been presented below and the correlations between the variables have been looked into.

The sign of the correlation between CPI and GRP growth per capita and real income is negative, as expected and mentioned in the literature. There is also relatively strong positive correlation between real income and civil organizations as well as between number of civil organizations and integration. The most unexpected sign of the correlation matrix is positive correlation between CPI and civil organizations variable. The analysed literature predicts that civil organizations should decrease corruption via increasing the political and civil participation as well as educate people about the ways of fighting corruption. This relationship is particularly interesting to investigate as the correlation matrix also shows that the number of civil

organizations rises as real income increases. This may indicate that civil organizations are inefficient in fighting against corruption, but it is important to estimate the model to prove this suggestion. Such statement is also supported by strong positive correlation between number of civil organizations and number of crimes.

The analysed literature indicate an endogeneity problem in the sample. The most commonly used method of dealing with this problem is using instrumental variables. This study uses three instrumental variables: number of student graduates, fixed capital investment and level of urbanization. The choice of the variables is based on the analysed academic literature (Pigliaru 2009; Olsen 1996; Tanzi and Davoodi 1996; Lipset 1960; Glaeser *et al*. 2004; Fiorino and Galli 2012). In particular, the following instrumental variables will be used:

Number of student graduates from higher education institutions (variable: *stud*) is used as one of the instrumental variables. Fiorino and Galli (2010, 2012) and Lipset (1960) and Glaeseret al. (2004) argue that well educated people show higher rate of civil and political participation. On the other hand, in corrupted environment clever minds might fall into corrupt activities. Somewhat controversial, but number of graduates might be a convenient instrument for such indicators as civic organizations and level of crime in the regions when used as a proxy for human capital.

Fixed capital investment (variable: *inv*) is another instrumental variable that is used in the model. This variable is used as a proxy for capital. It is defined by Statistical Yearbook of Ukraine as including: "expenditures for capital construction (new construction, including the expansion of the operating enterprises, buildings and installations; their technical re-equipment and reconstruction; maintenance of production capacities); expenditures for the purchase of machinery and equipment without capital construction". The influence of the fixed capital investment on corruption is complex, as on the one hand, corrupted activities may be attracted by investments in the region, while on the other hand, investment rich region might attract new corruption.

Urbanization level (variable: *urbanization*) has been used as an instrument in the model**.** Urbanization level shows proportion between urban and rural population in the region. The measure of urbanization level is a ratio between urban population and rural population in a region for the given period of time. Level of urbanization of a given region is determinant of the level of corruption as corruption is more widespread in cities, as it is argued by Glaeser *et al*. (2004).

4. Estimation and results

This model for spatial autocorrelation was tested both globally and locally and then a choice has been made between spatial lag and spatial error model specification. Having finalized the model, the author has estimated and performed post-

estimation, under-identification, homoscedasticity, normal distribution of residuals test and Sargan test of overidentifying restrictions.

4.1. Final model specification

The data are strongly balanced without gaps, that is, there are 200 observations for 25 regions for the years 2004−2011. Next step is to specify a weighting matrix in a way to capture spatial effect most efficiently. The simplest method is just to capture the effect of common border. However, this specification does not take into account the information on how far one region is from another. Therefore, the farther two regions are from each other, the smaller the weight that shows the common variation in their variables. As in Ukrainian administrative centres which also play the role of economic centres, distance between them in kilometres was used as a proxy for distance. The best weights are the inverses of the distance squared (Kamarianakis and Le Gallo 2003).

In order to apply spatial analysis the first step is to test whether the variables in the model are globally spatially autocorrelated. According to Moran I test, variable is positively spatially correlated when $I>E(I)$ and negatively spatially autocorrelated when $I<E(I)$, where I stands for Moran's global index of spatial autocorrelation and $E(I)$ stands for the expected value of I (Pisati 2012). Table 1 shows that indeed all of the analysed variables show positive global spatial autocorrelation, meaning that there is overall degree of similarity between spatially close regions. The p-values for all variables are lower than 5% significance level; therefore the null hypothesis of no global spatial correlation can be rejected and it can be concluded that all variables show significant global spatial autocorrelation.

Table 1. Measures of global spatial autocorrelation

Variable	I	E (I)	p-value
Corruptind	0.001	-0.006	0.005[*]
Grpgr	0.000	-0.006	0.027[**]
Realincomepc	0.016	-0.006	0.002[*]
Unem	0.075	-0.006	0.000[*]
Govspend	-0.003	-0.016	0.017[**]
Crime	0.253	-0.006	0.000[*]
Mp	-0.040	-0.006	0.000[*]
Parties	0.009	-0.006	0.023[**]
Civilorg	0.059	-0.006	0.000[*]
Integration	-0.033	-0.006	0.000[*]

[*]significant at *p*=0.01, [**] significant at *p*=0.05

Source: own calculations.

After it has been proven that all variables in the model show positive global spatial autocorrelation, it is important to perform local spatial autocorrelation test to see which regions have stronger spatial patterns (Table 2).The result of the test will show whether region r_i is surrounded by regions that, on average, are similar to region r_i.

Table 2. Local spatial autocorrelation test for corruption perception index

Region	Corrup-ind	Grpgr	Real inco-mepc	Unem	Govs-pend	Crime	Mp	Par-ties	Civi-lorg	Integra-tion
A.R. Crimea										
Vinnytsya				+		+			+	
Volyn				+		+		+	+	
Dnipro-petrivsk			+	+	+	+				
Donetsk	+	+	+	+		+	+	+	+	
Zhytomyr	+	+	+	+	+	+				
Zakarpatya	+	+		+		+		+		
Zaporizhya	+		+			+		+	+	
Iv.Frankivsk	+	+	+		+	+				+
Kyiv	+	+	+	+			+	+	+	
Kirovograd					+					
Luhansk				+	+	+		+	+	
Lviv		+	+				+	+		+
Mykolaiv										
Odessa	+	+	+	+					+	
Poltava	+	+	+	+						
Rivne	+	+		+		+		+	+	
Sumy					+	+		+	+	
Ternopil	+	+	+	+	+	+			+	+
Kharkiv	+		+	+	+	+		+	+	
Kherson										
Khmelnyt-skyy				+		+		+		
Cherkasy										
Chernivtsi	+	+		+	+	+		+	+	+
Chernihiv							+			

Source: own calculations.

Local spatial autocorrelation test has been performed (Table 2). Similarly, global spatial autocorrelation test, Moran local spatial autocorrelation index *I* and

its expected value *E (I)* are calculated to determine whether a region is a 'hot spot' (*I>E (I))* or a 'cold spot' (*I<E (I))* in terms of similarity of the neighbouring regions (Pisati 2012). As the test calculates index for each region for each year of the sample, it is more reasonable to indicate which regions perform as 'hot spots' for each variable. Statistically significant (*p<0.10*) 'hot spot' regions are marked with a "+" in Table 2. Regions which are not marked with "+" do not perform as 'hot spots' for a given variable. The regions are listed in alphabetical order.

There are several regions that perform as hotspots for almost all of the analysed variables (Table 2). It is possible to draw several clusters of regions with the 'hot spots': Western cluster with Lviv, Zakarpatya, Ivano-Frankivsk, Ternopil and Chernivtsi as the most influential regions, Eastern cluster with Donetsk, Kharkiv and Luhansk regions as the 'hot spot', and Southern cluster featuring Odessa as the leading region. Central region is led by Kyiv and Northern part of Ukraine seems to be rather fractured with no distinctly seen cluster.

The next step in estimating the model is choosing between spatial lag and spatial error model. The spatial diagnosis test determines whether spatial patterns area result of spatial lag (when the outcome in one region is affected by the outcome in the neighbouring ones) or they result from spatial error (the outcome in one region is affected by unknown characteristics of the neighbouring regions). Results of the test indicate that it is better to use spatial lag model, which means that change in one variable in a given region is influenced by the change in that variable in the neighbouring regions.

4.2. Model estimation and testing

Two-Stage Least Squares estimation with Instrumental Variables (*2SLS (IV)*) was used. This estimation method is widely used in spatial models (Linderhof *et al.* 2011). As can be seen the impact of *grpgr*, *realincomepc*, *civilorg* and *govspend* is positive and statistically significant at *p<0.01* (Table 3). The influence of *parties* is positive and *integration* affects CPI negatively at *p<0.05*. The variables *crime*, *mp* and *unem* did not show significant impact on CPI.

Table 3. Estimation results of spatial model with 2SLS (IV) estimator

Variable	2SLS (IV)
Grpgr	-0.916
	0.001*
Realincomepc	0.551
	0.001*
Unem	-0.014
	0.655

Variable	2SLS (IV)
Govspend	0.164
	0.000*
Crime	-0.192
	0.178
Mp	0.015
	0.725
Parties	0.198
	0.023**
Civilorg	0.452
	0.013*
Integration	-0.439
	0.048**
R2	0.608

* $p<0.01$, ** $p<0.05$

Source: own calculations.

The post-estimation test results imply rejection of under-identification of equation at 1% which means that the instrumental variables were chosen correctly. The author has also performed Sargan test, homoscedasticity test and Ramsey/Pesaran-Taylor RESET test. Weak identification test was passed and results of Sargan test of over-identifying restrictions do not give reason to reject the null hypothesis that instruments are valid. There is no reason to reject homoscedasticity hypothesis and residuals are normally distributed. Ramsey/Pesaran-Taylor RESET is also passed, so there is no reason to reject the null that there are no neglected nonlinearities.

Estimation results imply that GRP growth per capita has a strong negative effect on CPI and is statistically significant. Real income per capita also performs the way it was expected and has a significant strong negative effect on CPI. Thus, outcome completely supports Hypothesis no. 1. Such outcome is overall predicted by academic literature analysing economic determinants of corruption.

According to Table 3, neither the level of crime nor the number of MPs originating from a given region appeared to have statistically significant impact on CPI. Therefore, Hypothesis no. 2 is not supported by empirical study. It is possible to speculate about two reasons for this outcome. First, it is likely that number of MPs is relative even across the country, which is also supported by Table 2 indicating that there is no clear 'hot spot' region for this variable. Secondly, the level of crime might have appeared insignificant, as official statistics only represent a part of crime that is involved in corruption, therefore causing biased results.

Hypothesis no.3 is not confirmed by estimation results as well. In fact, this result proves that there exists a certain dissonance in the way civil organizations influence corruption situation in Ukraine. The U-shaped relationship, predicted by the literature (Treisman 2000), seems to indicate the country has passed the

time when economic growth was encouraging corruption, but civil organizations that are supposed to decrease corruption even further appear to be positively correlated with it. One reason why civil organizations may be associated with corruption is because they were established before the peak point of the U-shaped relationship between corruption and economic growth was reached. In a sense, increased number of civil organizations is triggered by the economic growth (as it is also proved by the correlation matrix). However, it also might have happened that in a corrupted country like Ukraine, which is actively encouraged by the European community to build on its civil society, was not yet ready for the increasing amount of civil organizations. As a result civil organizations became new sources and breeding grounds for corrupt practices. While, on the one hand, they might indeed have some positive influence on civil society, on the other hand, they may also serve as a tool for money laundering.

It was also discovered that governmental spending has significant positive influence on CPI. This result is rather controversial, since I am looking at perception of corruption rather than registered corruption activities. However, the estimation results clearly indicate that regions which are allocated higher governmental spending are associated with higher values of CPI. The explanation for this outcome may lie in the fact that money allocated to a given region does not reach its aim and ends up supporting corrupted activities and used for personal benefit of the responsible for the distribution local officials.

Number of MPs born in a specific region and present in the current parliament was found to be insignificant, as well as the crime rate. Insignificance of the first variable is rather hard to explain as there is clearly unequal representation of the regions in the parliament. However, it might be the case that although an MP was born in a given region it does not necessarily mean his presence in the parliament would benefit corrupted structures in that region, as it was proved by the estimation. As for the second variable, crime rate appeared to be insignificant most likely because the crimes associated with corruption are not registered in official statistics. On the contrary, the relation between crime rate and corruption might be opposite, following this logic: As more bribes are paid, fewer crimes are registered. Therefore, it seems that official crime rate statistics are not the best proxy for the crimes involving corruption.

Another vital discovery of the paper is that integration index has significant negative impact on CPI. This result is in line with the academic literature examining cultural corruption determinants and means that more integrated regions exhibit lower values of CPI. However, this is a complex relationship. This is because highly integrated society may, on the one hand, decrease corruption in its region resulting in naturally low CPI values; while on the other hand, people may misleadingly undermine the level of corruption in their region due to their moral and cultural values.

More attention should be paid to the interpretation of spatial analysis conducted. Global autocorrelation analysis indicated that crime rate has the strongest spatial pattern in the variable list. As the local spatial autocorrelation analysis showed cluster-like pattern of the regional interrelationship, it is possible that some regions might get higher corruption rate values as a result of spillover from neighbouring regions. Therefore, the Ukrainian government should pay more attention to solving crime issues in the 'hot points' of those clusters, mainly Lviv, Zakarpatya, Ivano-Frankivsk, Donetsk, Odessa and Mykolaiv regions in order to address the issue more effectively on a larger scale.

Moreover, as GRP growth per capita and real income per capita show the most influence on CPI, state government might need to pay more attention to the well-being of the 'hot-spot' regions, rather than apply universal policy to all 25 regions. Indeed, Ukrainian government applies differentiated policy by special development policies aimed at less developed regions. However, bearing in mind the spillover effect, once corruption is decreased, the government may rethink its strategy and target the 'hot-spot' regions more.

Finally, the spatial dimension of the model allows us to see that integration and civil organizations have similar global spatial autocorrelation values, and having significant impact on CPI, pull it in opposite directions with similar magnitude. While civil organizations are supposed to help fighting against corruption (as predicted by theory), it seems that they do the opposite. Main outcome of the study is that there is vital necessity to influence the way civil organizations in Ukraine operate and ensure they are not used for corrupted activities. As civil organization variable showed one of the highest results in global spatial autocorrelation tests, it is important to pay more attention to monitoring activities of civil organizations in the regions where they are mostly clustered. While integration index showed a significant negative impact on corruption, its influence might be lagged as change in mentality is a lengthy process which is even more complicated in the corrupted environment.

5. Conclusions

In this research the issue of relationship between corruption perception index and economic, political and social factors for Ukraine was analysed. The question for the study was selected because of its relevance in today's development path of Ukraine and because of the lack of research of spatial dimension in academic literature. While Coleman (1990) and others find that civil organizations have significant negative impact on corruption perception index, this study on Ukrainian regions challenged this statement. It was shown that civil organizations are an inefficient tool for fighting corruption in Ukraine, at least the way they are operating right now.

The paper paid special attention to spatial analysis of CPI therefore adding a new perspective to academic literature. It has been empirically proven that many of the major economic, political and social variables have spatial dimension in the case of Ukraine. It should be noted that corruption perception index was used as ae measure of corruption. This method has brought some limitations to the model as it is important to bear in mind the subjectivity factor underlying the index. However, this choice also resulted in more relevant interpretation as it includes real-life experience of the population.

As a result of the model estimation, the paper verified the originally stated research hypotheses. It was confirmed that economic growth and real per capita income have negative influence on CPI. The analysed influence of level of crime and number of MPs originating from a given region did not appear to be statistically significant. It was further explained that this outcome may result from data imperfections. The third hypothesis concerning the impact of civil organizations on CPI was not supported either. As the paper explains, civil organizations in Ukraine may serve as tools for money laundering and not strengthening civil society in the country.

The paper provided solid ground for further analysis in the field. First of all, when there are more objective statistics available on bribery and corruption crimes, it would be possible to run the model again and see how the results change. Secondly, further studies might want to have a closer look at the way population trusts the government (local and national) as well as examine different spheres where the population faces corruption the most (universities, healthcare, police etc., see ERA *et al*. 2011). This statistics are for now limited and not available for significant time period as well as not aggregated for the purposes of empirical study but constitute fruitful soil for further research.

Finally, the paper has come up with some general recommendations that may be used as guidelines for direction of further development of anti-corruption policies. While the recommendations majorly address spatial dimension of corruption problem, they also touch upon the importance of rethinking the role civil organizations play in fighting corruption.

References

Alam, M. 1995. "A Theory of Limits on Corruption and Some Applications." *Kyklos* 48 (3): 419−435.

Alatas, Syed Hussain. 1986. *The Problem of Corruption.* Singapore: Times Books International.

Anselin, Luc and Raymond Florax (eds). 1995. *New Directions in Spatial Econometrics.* Berlin: Springer.

Bai, Jai, Seema Jayachandran, Edmund J. Malesky and Benjamin Olken. 2013. *Does Economic Growth Reduce Corruption? Theory and Evidence from Vietnam*. National Bureau of Economic Research Working Paper.

Barro, Robert and Xavier Sala-i-Martin. 1998. *Economic Growth.* Cambridge: The MIT Press.

Barro, Robert. 1997. *Determinants of Economic Growth: A Cross-Country Empirical Study*. Cambridge: The MIT Press.

Basile, Roberto, Sergio de Nardis and Marianna Mantuano. 2003. *Multiple Regimes in Cross-Region Growth Regressions with Spatial Dependence: A Parametric and a Semi-parametric Approach*. The 43rd European Congress of the Regional Science Association, Finland. http://www.jyu.fi/ersa2003/cdrom/papers/4.pdf (accessed 20.01.2014).

Benito, Juan and Roberto Ezcurra. 2005. "Spatial Disparities in Productivity and Industry Mix: the Case of the European Regions." *European Urban and Regional Studies* 12(2): 177−195.

Bernaldez, Pedro. 2014. "Determinants of Political Corruption: A ConceptualFramework." *GRAFT and Corruption Research* 3(4): 53−79.

Bivard, Roger Gianfranco Piras. 2015. Comparing Implementation of Estimation Methods for Spatial Econometrics. *Journal of Statistical Software* 63(18).

Bliss, Christopher and Rafael Di Tella. 1997. "Does Competition Kill Corruption? " *Journal of Political Economy* 105(5): 1001−1023.

Breton, Albert. 1996. *Competitive Governments: An Economic Theory of Politics and Public Finance.* Cambridge : Cambridge University Press.

Chenery, Hollis. 1975. "The Structuralist Approach to Development Policy." *The American Economic Review* 65(2): 310−316.

Cliff, Andrew J.K. Ord. 1981. *Spatial Processes: Models and Applications.* London : Pion.

Cliff, Andrew and Keith Ord. 1972. "Testing for Spatial Autocorrelation among regression residuals." *Geographical Analysis* 4(3): 267−284.

Coleman, James. 1990. *Foundations of Social Theory.* Cambridge : Harvard University Press.

Del Monte, Alfredo and Erasmo Papagni. 2007. "The Determinants of Corruption in Italy: Regional panel data analysis." *European Journal of Political Economy* 23(2): 379−396.

Diamond, Peter A. 1965. "National Debt in the Neoclassical Growth Model." *The American Economic Review* 55(5): 1126−1150.

Drukker, David M., Ingmar R. Prucha and Rafal Raciborski. 2013. "Maximum Likelihood and Generalized Two-Stage Least-Squared Estimators for a Spatial-Autoregressive Model with Spatial-Autoregressive Disturbances." *The Stata Journal* 13(2): 221−241.

Drukker, David M. 2009. *Analysing Spatial Autoregressive Models Using Stata*. Italian Stata Users Group meeting.

Dzhumashev, Ratbek. 2014. "The Two-Way Relationship Between Government Spending and Corruption and Its Effect on Economic Growth." *Contemporary Economic Policy* 32(2): 403−419.

European Research Association, USAID, Kyiv International Institute of Sociology. 2011. *Corruption in Ukraine. Comparative Analysis of National Surveys: 2007–2009, 2011*. Kiev: Institute of Sociology.

Fare, Rolf, Shawna Grospkoff, May Norris M. and Zhongyang Zhang. 1994. "Productivity Growth, Technical Progress, and Efficiency Change in the Industrialised Countries." *The American Economic Review* 84(1): 66−83.

Fearon, James. and David D. Laitin. 1996. "Explaining Interethnic Cooperation." *The American Political Science Review* 90(4): 715−735.

Fiorino, Nadia and Emma Galli. 2010. *An Analysis of the Determinants of Corruption: Evidence from the Italian Regions*. POLIS Working Papers, No. 148/171.

Fiorino, Nadia, Emma Galli and Iliaria Petrarca. 2012. "Corruption and Growth: Evidence from the Italian Regions." *European Journal of Governmentand Economics* 1(2): 127−144.

Glaeser, Edward, Rafael La Porta, Florencio Lopes-de-Silanes and Andrei Shleifer. 2004. "Do Institutions Cause Growth? " *Journal of Economic Growth* 9(3): 271– 303.

Gupta, Sanjeev, Hamid Davoodi and Rosa Alonso-Terme. 1998. *Does Corruption Affect Income Inequalty and Poverty?* International Monetary Fund Working Paper, No. 98/76.

Harberger, Arnold. 1983. "The Cost-Benefit Approach to the Development Economics." *World Development* 11(10): 863−873.

Hollyer, James R and Leonard Wantchekon. 2011. *Corruption in Autocracies*. Social Science Research network. http://dx.doi.org/10.2139/ssrn.1861464.

Huntington, Samuel P. 1968. *Political Order in Changing Societies*. New Haven: Yale University Press.

Husted, Bryan. 1999. "Wealth, Culture, and Corruption." *Journal of International Business Studies* 30(2): 339−359.

Jain, A. 2011. *Corruption: Theory, Evidence and Policy*. Montreal: CESifo DICE Report.

Johnston, Michael. 1989. "Corruption, Inequality, and Change." In: *Corruption, Development, and Inequality: Soft touch or Hard Graft*, ed. Peter M. Ward, 13−37. London−New York: Routledge.

Jung, Woo S. and Peyton Marshall. 1985. "Inflation and Economic Growth: Some International Evidence on Structuralist and Distortionist." *Journal of Money, Credit and Banking* 18(2): 227−232.

Kamarianakis, Yiannis and Julie Le Gallo. 2003. *The Evolution of Regional Productivity Disparities in the European Union 1975−2000*. Groupement de Recherches Economiques et Sociales, No. 15.

Kapoor, Mudit and Shamika Ravi. 2009. *Determinants of Corruption: Government Effectiveness vs. Cultural Norms*. Social Science Research Network. http://ssrn.com/abstract=1443617 (accessed 8.06.2015).

Kelejian, Harry and Ingmar R. Prucha. 1999. "A Generalized Moments Estimator for the Autoregressive Parameter in a Spatial Model." *International Economic Review* 40(2): 509−533.

Koshkina, S. 2015. *Майдан. Нерассказанная История, [Maidan. The Untold Story]*. Kyiv: Bright Star Publishing.

Leff, Nathaniel. 1964. "Economic Development Through Bureaucratic Corruption." *American Behavioral Scientist* 8(3): 8−14.

Leibenstein, Harvey. 1968. "Entrepreneurship and Development." *The American Economic Review* 58(2): 72−83.

Linderhof, Vincent, Stijn Reinhard, Eveline van Leeuwen, Martijn Smit, Peter Nowicki and Rolf Michels. 2013. *Spatial Econometric Models for Evaluating RDP Measures: Analyses for the EU27.* Spatial Analysis of Rural DevelopmentMeasures, Work Package No. 4.

Lipset, Seymour M. 1960. *Political Man: The Social Bases of Politics*. Doubleday: Garden City, NY.

Mankiw, Gregory, David Romer and David N. Weil. 1992. "A Contribution to the Empirics of Economic Growth." *Quarterly Journal of Economics* 107(2): 407−437.

Mauro, Paolo. 1995. "Corruption and Growth." *The Quarterly Journal of Economics* 110(3): 681−712.

Melgar, Natalia, Maximo Rossi and Tom. W. Smith. 2009. "The Perception of Corruption." *International Journal of Public Opinion Research* 22(1): 120−131.

Moran, Jon. 1999. "Bribery and Corruption: The OECD Convention on Combating the Bribery of Foreign Public Officials in International Business Transactions." *Business Ethics: A European Review* 8(3): 141−150.

Myrdal, Gunnar. 1968. *The Asian Drama.* Harmondsworth: The Penguin Press.

Neutze, Jand and Adrian Karatnycky. 2007. *Corruption, Democracy and Investment in Ukraine.* Washington: The Atlantic Council of the United States.

North, Douglass C. 1971. "Institutional Change and Economic Growth." *Journal of Economic History* 31(1): 118−125.

Olson, Mancur. 1996. "Big Bills Left on the Sidewalk: Why Some Nations Are Rich, And Others Poor." *Journal of Economic Perspectives* 10(2): 3−24.

Ord, Keith. 1975. "Estimation Methods for Models of Spatial Interaction." *Journal of the American Statistical Association* 70(349): 120−126.

Pigliaru, Francesco. 2009. *Persistent regional Gaps and the Role of Social Capital: Hints from the Italian Mezzogiorno's Case*. Centre for North South Economic Research Working Papers No. 04.

Pisati, Maurizio. 2012. *Exploratory Spatial Data Analysis Using Stata*. Social Science Research Center. http://www.stata.com/meeting/germany12/abstracts/desug12_pisati.pdf (accessed 1.12.2015).

Putnam, Robert. 1993. *Making Democracy Work*: *Civic Traditions in Modern Italy*. Princeton : Princeton University Press.

Romer, David. 2001. *Advanced Macroeconomics*. New York : McGraw-Hill.

Sandholtz, Wayne and William Koetzle. 2000. „Accounting for Corruption: Economic Structure, Democracy and Trade." *International Studies Quarterly* 44(1): 31−50.

Senior, Ian. 2006. *The World's Big C: Cases, Causes, Consequences, Cures*. London: Institute of Economic Affaires.

Serra, Danila. 2004. "Empirical Determinants of Corruption: A Sensivity Analysis." *Public Choice* 126(1/2): 225−256.

Shabbir, Ghulam and Mumtaz Anwar. 2007. "Determinants of Corruption in Developing Countries." *The Pakistan Development Review* 46(4): 751−764.

Shkurpat, Oleksandr. 2006. *Regional Labor Productivity Disparities inUkraine: Main Causes and Spatial Patterns*. Kyiv: Kyiv School of Economics.

Solow, Robert M. 1956. "A Contribution to the Theory of Economic Growth." *Quaterly Journal of Economics* 70(1): 65−94.

Sonin, Konstantin. 2000. *Inequality, Property Rights Protection and Economic Growth in Transition Economies*. EERC Working Paper No. 2K/02E.

Spector, Betram, Svetlana Winbourne, Jerry O'Brien and Eric Rudenshiold. 2006. *Corruption Assessment: Ukraine*. Washington, D.C.: Management Systems International Corporate Offices.

Tanzi, Vito and Hamid Davoodi. 1998. "Corruption, Public Investment and Growth." In: *The Welfare State, Public Investment and Growth*, eds. Hirofumi Shibata, Toshihiro Ihori, 41−60. Tokyo: Springer

Tokarchuk, T. 2006. *Determinants of Economic Growth in Ukraine.*Working Paper, No. 12 (1).

Transparency International. 2014. *Corruption Perception* Index. Transparency International. Annual.

Treisman, Daniel. 2000. "The Causes of Corruption: A Cross-National Study." *Journal of Public Economics* 76(3): 399−457.

Tsyrennikov, V. 2002. *Determinants of Regional Growth*. Kyiv: Kyiv School of Economics.

Vyshnyak, Oleksandr. 2009. **Мовна Ситуація в Україні: Динаміка, Проблеми, Перспективи (Соціологічний аналіз) [***Linguistic Situation and Status in Ukriane: Dynamics, Problems, Perspectives (Sociological Analysis)]*. Kyiv: Institute of Sociology of Ukraine. In Ukrainian.

Wines, William and Nancy K. Napier. 1992. "Toward an understanding of Cross-Cultural Ethics: A Tentative Model." *Journal of Business Ethics* 11(11): 831–841.

Комітет Державного Бюджету України [Ukrainian Public Bugdet Committee]. 2013. *Висновки щодо Державного Бюджету України, [Conclusions Regarding Allocation of Public Budget].* Kyiv: Ukrainian Public Bugdet Committee. In Ukrainian.

Статистичний Комітет України [Ukrainian Statistical Bureau]. 2005−2011. *Освіта та Інновації в Україні, [Educational and Innovational Activity in Ukraine].* Kyiv: Ukrainian Statistical Bureau. In Ukrainian.

—. 2005–2011. *Регіональний Людський Розвиток, [Regional Human Development].* Kyiv: Ukrainian Statistical Bureau, 2005−2011. In Ukrainian.

—. 2005–2011. *Статистичний Щорічник України, [Annual Statistical Yearbook of Ukraine].* Kyiv: Ukrainian Statistical Bureau, 2005−2011. In Ukrainian.

—. 2005–2011. *Щорічник Регіонів України, [Annual Yearbook of Ukrainian Regions].* Kyiv: Ukrainian Statistical Bureau. In Ukrainian.

Index of abbreviations
CPI – Corruption Perception Index
GRP – Gross Regional Product
MP – Member of Parliament
UAH – Ukrainian Hryvnia
USB – Ukrainian Statistical Bureau
ERA – European Research Association
2SLS (IV) – Two-Stage Least Squares estimation with Instrumental Variables