Sub-national Evaluation of the Corruption Variability

VERONIKA LINHARTOVA
Institute of Economic Sciences
University of Pardubice
Studentska 84, 532 10 Pardubice
CZECH REPUBLIC
Veronika.Linhartova@upce.cz

Abstract: - Quantification of the corruption rate in smaller regional areas is still a considerably unexplored territory worldwide. Also the definition of the potential impacts of corruption or their precise quantification is an area that was investigated only in general level of state. Detailed analysis of corruption still lacks regional dimension. Subnational distinction of a territory in terms of the corruption rate could provide a completely new extension of theories of reasons and consequences of regional disparities. There are several reasons why to focus on this issue. Perhaps the strongest reason is that if corruption is one of the variables that have an effect of reducing economic performance, the elimination of corruption in certain regions may be the key to the elimination of regional economic disparities and thus increase the economic performance of the state. The main goal of the paper is formulated in this connection. A newly proposed Regional corruption index was used to verify corruption variability within the NUTS II regions in European countries. The high level of variability in corruption was confirmed for NUTS II regions, particularly in Italy, but also in other countries. Because of this variability, it could be in many cases very misleading to evaluate the country as a whole from the viewpoint of the level of corruption.

Key-Words: - corruption, regions, regional disparities, European Commission, regional policy, economic performance.

1 Introduction

Corruption and its potential reduction is a constant topic not only of economic or socio-scientific research, but it is also a problem which intensively troubles governments of individual countries as well as citizens. The definition of the concept itself is still not explicit and various authors define corruption with minor distinctions. [6, 20]

Neither the question of whether nor that of how corruption can influence the economic level of a country is answered by the literature without controversies. One may read the opinion that corruption is "sand in wheels" of economics and complicates economic transactions because it reduces the security of property rights and contributes to inefficient allocation of sources. [14, 15, 17, 19, 21] On the other hand, there are authors who state that corruption is something that "greases the wheels" of economics because it enables individuals to avoid administrative delays and bureaucratic blocks. [7, 10, 11, 12]

All the studies mentioned above are similar in that they explore the issue of corruption at the national level. The regional view of the consequences of corruption, especially in economic terms, is still quite an unexplored territory worldwide. Only a few studies have been written focused on quantifying the extent of corruption and its impact on the regional level abroad. [2, 5] These studies depict the level of corruption in a variety of sub-national divisions as being very diverse and its analysis can help explain differences in the economic performance of the different regions.

The issue of quantifying the degree of corruption also raises fierce debate. Considering the fact that bribery and other forms of corruption are illegal in most countries, the people involved make every effort to carefully conceal their actions and revealing corruption is often almost impossible. Even so, there are currently a number of exact procedures that attempt to quantify the level of corruption in a country. Among the best known current indicators of corruption is one example, the CPI (Corruption Perception Index), published annually by Transparency International and the Control of Corruption of the World Bank [18, 9]. A common feature of all currently existing indices of corruption, however, is the fact that all without exception quantify the level of corruption in a country and are therefore not applicable for quantification of corruption at a sub-national level.

The author of this paper argues that the socio-economic development in a country is not homogeneous, and that it can be assumed that a difference exists in the extent of corruption in different regions within the same country. Under this assumption, more corrupt sub-national regions are detrimental to the national evaluation of corruption in a country as a whole. The fact that the distribution of corruption in a country is not homogenous was confirmed by authors Del Monte and Papagni [2] Fiorno, Galli and Petrarca [5] in their studies of Italian regions. The level of corruption in the sub national breakdown as reported by these authors was very diverse and its analysis can help explain the differences in the different economic performance of the regions. The regions with higher levels of corruption were identified as regions in the south of Italy. In contrast, the regions in the north of the country were ranked as those with much lower levels of corruption. It can be noted, however, that the study of the Italian authors is unique and finding another study on the quantification of regional levels of corruption, or its impact on the region, is virtually impossible. From this it is clear that the issue of quantifying corruption and its consequences at the regional level is a topic that deserves more attention. There are several reasons to consider these issues. Perhaps the strongest is that if corruption is indeed one of the variables that are degrading the performance of economies, the elimination of corruption in certain regions may just be the key to removing regional economic disparities and thereby increasing the economic performance of the country. Analysing regional corruption may also lead to the creation of direct regional anti-corruption initiatives that can bring about reductions in the national level of corruption. In general terms, a sub-national resolution in terms of the degree of corruption could bring a new dimension to traditional theories of regional disparities.

The main objective of this paper is formulated in the context of the above considerations. In this paper, the hypothesis of whether or not the level of corruption in NUTS II regions is heterogeneous will be verified. Verification of this hypothesis consists of a proposal of a methodology for quantifying the regional corruption rates, comparing the individual regions and at the same time defining the rate of deviation of a region from the "surface" corruption rate in a country. The definition of these regional disparities in corruption will be a benefit mainly for anti-corruption policies of a country.

2 Quantifying Corruption

As mentioned above, no unified definition of corruption concept exists today either at the theoretical or practical-application level. But all existing approaches agree that corruption represents unfair practices with the goal of gaining a certain artificial advantage at the expense of others. Authors of this report build on the traditional definition according to Nye who describes corruption as *"behaviour that deviates from the formal duties of a public role (elective or appointive) because of private regarding wealth or status gains*. [16]

The European Commission carries out regular evaluations to determine how the individual Member States make use of EU funds. According to the latest report of the European Commission, when drawing from EU funds in the period of 2007 – 2013, the worst offender in the entire EU was the Czech Republic. One key problem at present in drawing on European funds is corruption. According to the European Commission, the bureaucratic burden particularly, and related fraudulent methods, of obtaining grants in the Czech Republic represent an obstacle in drawing resources from European funds. These resources therefore paradoxically often do not help remove the undesirable regional disparities, but the distribution of these resources demonstrably increases the opportunities for corruption. This in turn brings to the region additional negative economic consequences, which may cause an increase in the disparities within the country as a whole. [3] Cases of corruption dealing with the disbursement of funds are not exceptional even in other countries. Even so, due consideration is not given to corruption at the sub-national level.

2.1 Indicators of Corruption Measurement

The indicators of corruption measurement which are currently used are to a larger extent based on so-called "soft data". These various approaches can be divided into the four following basic groups according to the method of data collection and evaluation [21]:

1. Group 1, including *public opinion researches*, is represented mainly by studies which focus on wider problems regarding the possibility of the long-term economic growth of a country and a complex quality classification of the corporate environment. This group of indices include e.g., *the Growth Competitiveness Index, Global Corruption Barometer, Bribe Payers Index*, etc.

2. Group 2, studies and analyses based on *combined indices* – consists of a combination of several already existing corruption indicators. This group of indices includes e.g., *the Corruption Perception Index (CPI)*.
3. Group 3, studies and analyses based on *objective data* – is represented by such indices as *Neumann´s index* which is based on results of interviews with exporters.
4. Group 4, representing studies and analyses based on *specialists' evaluations - Control of Corruption* (one of the Worldwide Governance Indicators).

The methodologies of all the approaches mentioned above focus on assessing corruption at the country level and it is necessary to remark that an extensive professional as well as non-professional polemic exists regarding the rate of their predicative ability.

In the following text we will further work with the most known index from the index group based on experts´ evaluation (group 4). It regards the general index **Worldwide Governance Indicators (WGI)** which is annually edited by World Bank. The primary goal of this index construction is to evaluate the quality of government. During 1996-2004 the indicator WGI was regularly published in 2-years intervals, since 2005 it has been published annually. The index is based on several hundreds of various individual measurements which concentrate on perception of government quality. In last published research from 2011, altogether 215 countries and data resulting from altogether 30 different resources produced by independent organizations (research institutions and teams, nongovernmental and international organizations) were included in the final comparison. Experts of the World Bank classify this data into six groups and compile then six aggregated key indicators of government quality with a use of statistic methods [9]:

- Voice and Accountability,
- Political Stability,
- Government Effectiveness,
- Regulatory Quality,
- Rule of Law,
- Control of Corruption.

These six indicators reach the value in interval <-2,5 ; 2,5>. The higher the value of indicator is, the better we perceive government quality in a given sphere. In terms of investigation of the indicator *Control of Corruption*, respondents answer questions related to relevance rate of corruption in a given country, public confidence in financial honesty of politicians, necessity and frequency of companies to provide bribes, perception of anti-corruption steps, etc. With each new measurement if methodology is changed or if new resources of information are gained, indicators from previous years will be recalculated which ensures comparability of indicators in time. Thanks to this, experts consider the indicator WGI as one of the most quality.

3 Cross-Regional Comparison of the Level of Corruption

Due to the absence of any method for determining corruption in a more or less affected sub-national region, the next section will present a method for quantifying corruption at a sub-national level. The design of this method is based on the construction of the European Quality of Government Index developed by the European Commission together with The Quality of Government Institute.

3.1 The European Quality of Government Index

The European Quality of Government Index (EQI) was created to quantify the quality of public administration at a regional level. This index has so far been worked out twice; in 2010 and 2013. 27 EU Member States were included in the EQI in 2010. In 2013, 28 EU Member States were included as well as the Candidate States, Turkey and Serbia; 30 countries in total. In 2013, the European Commission recalculated the RIC 2010 also for countries which had been newly included in the RIC 2013. The European Commission plans to construct an EQI regularly every three years. The next EQI calculation will be published in 2016.

In addition to the national evaluation of the quality of governance, the resulting EQI also takes note of the evaluation of regional administration using regional data which the European Commission has drawn up for the purpose of constructing the EQI. The EQI is a combined index and consists of two major parts

The first part of the EQI takes into account the national government level, which is represented by the Worldwide Governance Indicators (WGI) of the World Bank (see chapter 2.1). Of the six pillars of the quality of governance, the European Commission chose four for the construction of the EQI: Voice and Accountability

(GM1), Government Effectiveness (GM3), Rule of Law (GM5) Control of Corruption (GM6). [4, 9]

The second part of the EQI, which takes into account the regional level of governance, was compiled by the European Commission on the basis of a unique regional survey, conducted for the sole purpose of creating a Regional indicator of government quality, which would take into account regional aspects in the final construction of the EQI.

This unique research registered in the first construction of the EQI was executed in 172 NUTS II regions in 18 countries of the European Union in 2010 (from the remaining 9 countries of the European Union only data at the national level was included). The research includes altogether 181 regional units. Data was obtained by means of surveying more than 33 000 inhabitants. The all-European regional research was conducted from 15th December 2009 to 1st February 2010 by means of telephone interviews with respondents older than 18 years and in the local language.

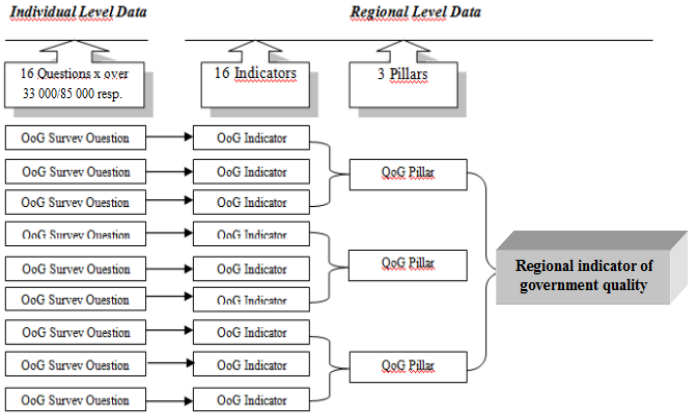
In the second construction of EQI, it was executed in 206 NUTS regions in 24 countries of the European Union in 2013 (from the remaining 7 countries of the European Union only data at the national level was included). The research includes altogether 213 regional units. Data was obtained by means of research of more than 85 000 inhabitants. [8]

A list of survey questions is contained in the European Commission's document *Measuring Quality of Government and Sub-National Variation.* [4]

3.1.1 Composition of regional indicator of government quality

The resulting regional quality of administration indicator reflects the actual experience of respondents with the use of individual public services, thus the quality of governance in the region is evaluated as it is perceived by its inhabitants; i.e., the recipients of public administration. The Regional indicator of government quality is composed of 16 separate indicators relating to the quality of administration in a particular region. These 16 indicators were developed based on 16 questions developed in accordance with the pillars arising from the methodology of the WGI: Voice and Accountability, Government Effectiveness, Rule of Law and Control of Corruption. In order to capture the most important sub-national differences, questions were focused on three public services that are often funded or administered at sub-national levels. Each of the four pillars mentioned thus involves issues relating to education, health care and law enforcement in the region. With a focus on these three services, respondents were asked to assess these public services with regard to the three fundamental concepts of quality administration - quality, impartiality and corruption. These three concepts are the pillars of the resulting regional indicator of quality government. Data is aggregated three times using a simple average. First is the creation of the average values of responses to the questions. This will create 16 indicators for each region. Then these 16 values are aggregated into three defined pillars - quality, impartiality and corruption. Finally, these three pillars are aggregated into a single numerical Regional indicator of Government quality. A simple diagram of the formation of the Regional indicator of government quality is shown in Figure 1.

Figure 1: Approach to creating a Regional Indicator of Government Quality



Source: own processing according to [4]

The final index of government quality EQI upgrades in this way national evaluation of government quality created by the World Bank by regional extent.

For the purpose of findings to what extent e.g. demographic changes will display in the final value of "Regional indicator of government quality" was made a sensitivity test. It resulted from 62 executed simulations that though some investigated topics could be dependent on demographic conditions of a region; a change of these conditions would not expressively influence the final score of Regional indicator of government quality.

The final form of the index construction is as follows:

$$EQI_{regionXincountryY} = WGI_{countryY} + (R_{qogregionXincountryY} - CR_{qogcountryY}), \quad (1)$$

where $EQI_{regionXincountryY}$ is the final European Quality of Government Index in the region of a given country,

$WGI_{countryY}$ is the national average of the above four *Worldwide Governance Indicators* for each country,

$R_{qogregionXincountryY}$ is the score from a regional survey; thus the *Regional indicator of government quality*,

$CR_{qogcountryY}$ is the regional survey of all regions in the country weighted by the proportion of the population of each region to the national population of the country.

3.2 Regional Corruption Measurement

The above mentioned methodology of calculating the EQI construction is today a unique approach which enables a view not only of a national but also a regional level when assessing government quality. We can assume that today it is an original approach which could be used not only for the purposes of evaluating the government quality in the future. In the context of the subject of our interest, the fact that the EQI represents the approach which allows the consideration of regional corruption is determinative in this way. Therefore from our point of view, it is possible to apply the modified form of the EQI only for the purpose of quantifying a regional rate of corruption based on the above mentioned methodology of composition of the EQI.

The resulting Regional Index of Corruption (RIC) is then calculated based on the formula: [13]

$$RIC_{regionXincountryY} = CC_{countryY} + (PC_{qogregionXincountryY} - CPC_{qogcountryY}), \quad (2)$$

where $RIC_{regionXincountryY}$ is the resulting *Regional Index of Corruption* for each region of a given country,

$CC_{countryY}$ is the national indicator value of *Control of Corruption (GM6)* from the Worldwide Governance Indicators,

$PC_{qogregionXincountryY}$ is the score from a regional survey focused on corruption, thus *Pillar of Corruption*,

$CPC_{qogcountryY}$ is the value for the Pillar of Corruption from the regional survey of all regions in a country weighted by the proportion of the population in each region on the national population of the country.

4 Applying the Proposed Regional Index of Corruption

The *Regional Index of Corruption* (hereinafter *RIC*) is applied and tested first at the national level, then at the level of the cohesion regions. From the resulting values, the individual regions can be mutually compared and regions can be identified which are more or less affected by corruption. Table 1 shows the resulting ranking of countries in the newly created *RIC* for the years 2010 and 2013. The higher the value of the RIC, the better is the evaluation of the country's *RIC*. In the evaluation of the *RIC* between 2010 and 2013, it was found that the new Member States and candidate States of the European Union are at the very bottom of the list of countries evaluated. Conversely, the Nordic countries were evaluated as the least affected by corruption.

Table 1: Regional Index of Corruption for 2010 and 2013

NUTS I	RIC 2010	Ranking	NUTS I	RIC 2013	Ranking
DK	1.811919	1	DK	1.841393	1
FI	1.740486	2	SE	1.559288	2
SE	1.516722	3	FI	1.555572	3
NL	1.438868	4	LU	1.493145	4
LU	1.261475	5	NL	1.479409	5
AT	1.142543	6	DE	0.932501	6
IE	0.948732	7	UK	0.779821	7
DE	0.917613	8	BE	0.749709	8
UK	0.830591	9	IE	0.726454	9
FR	0.488344	10	FR	0.703595	10
BE	0.415918	11	AT	0.609217	11
CY	0.322032	12	PT	0.168304	12
ES	0.157165	13	ES	0.131936	13
MT	0.083101	14	EE	-0.0212	14
PT	0.029269	15	SI	-0.05617	15
SI	-0.07815	16	CY	-0.07266	16
EE	-0.12856	17	MT	-0.1372	17
LV	-0.67118	18	PL	-0.56423	18
LT	-0.70428	19	HU	-0.76712	19
HU	-0.71697	20	CZ	-0.7947	20
PL	-0.76271	21	SK	-0.85981	21
SK	-0.81496	22	LT	-0.86415	22
CZ	-0.85541	23	LV	-0.92744	23
IT	-0.87991	24	IT	-1.05754	24
GR	-1.06275	25	TR	-1.08985	25

TR	-1.08395	26	HR	-1.14626	26
HR	-1.23592	27	GR	-1.38318	27
RO	-1.37328	28	RO	-1.39001	28
RS	-1.55004	29	BG	-1.43259	29
BG	-1.55089	30	RS	-1.46287	30

Source: own processing

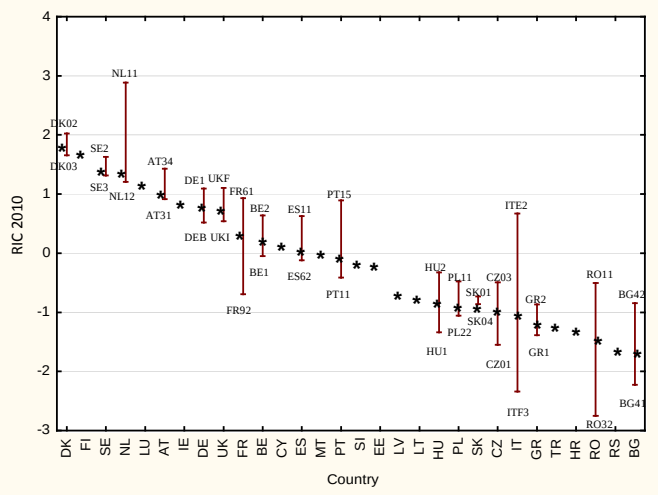
By using Statistica 12, graphic models were created of the variability of RIC values in individual countries for the years 2010 and 2013. The following two figures show a graphic model of RIC variability in 30 countries evaluated for the years 2010 and 2013. Box plots use the method of min-max comparison and show the range of RIC values labelled the best and the worst evaluated NUTS II region. Countries are plotted on the x-axis; the y-axis shows RIC values. The range of RIC values is complemented by the final value of RIC of the country which is represented by an asterisk. The higher the RIC value, the better the rating. A higher index value means therefore a lower level of corruption in an area.

Figure 2 shows the range of RIC values for 2010 in the thirty countries evaluated. Definitely the greatest variability in the assessment of corruption is to be found in the Italian regions. Italian respondents answered questions regarding the impact of corruption on their area with great differences, and perceived corruption very differently depending on which region they live. The most corrupt Italian region, based on the results of the RIC from 2010, is the Campania region (ITF3), while the best ratings were achieved in the Umbria region (ITE2). A high variability was also observed in Romania, France and the Netherlands. Rating corruption at the national level can be particularly misleading for these countries.

In the evaluation of RIC in 2010, the NUTS II regions which placed best were the Dutch region of Groningen (NL11) with a value of 2.8867. The best ratings in 2010 were achieved generally by Dutch, Danish, Finnish and Swedish regions. In contrast, at the other end of the ranking were Romanian, Italian and Bulgarian regions. Definitely the worst ranking among the NUTS II regions was the Romanian region of Bucharest (RO32) with a value of -2.7491.

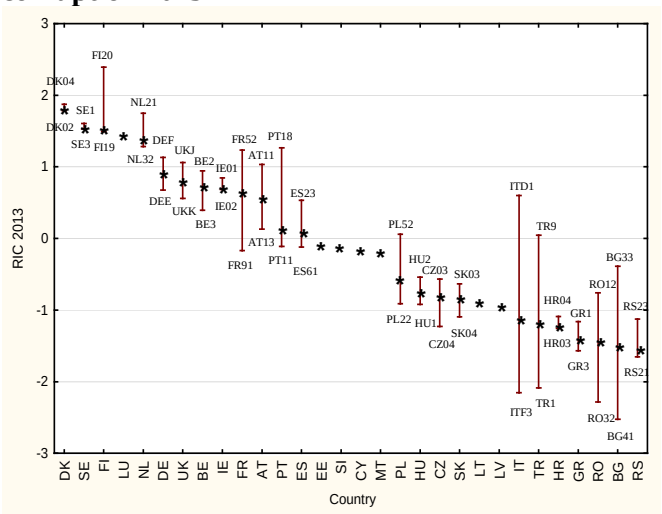
Figure 3 shows the range of values of RIC for 2013. In 2013, the region with the lowest level of corruption was the Finnish region of Aland (FI20) with a value of 2.3932. On the other hand, the most corrupt region of the European Union was the Bulgarian region of Yugozapaden (BG41) with a value of -2.5237. A high variability of data in 2013 was found again in Italy, as well as Bulgaria, Turkey and Romania. In these countries, the inhabitants of regions had different opinions on the impact of corruption in their area and the corruption assessment may not reflect the current situation in some regions. In contrast, in Danish, Swedish, Irish and Croatian regions only very small deviations, were detected in the values of RIC of 2013 and evaluation of the national level of corruption relevantly reflects the evaluation of the regions.

Figure 2: Box plot of the Regional index of corruption 2010



Source: own processing

Figure 3: Box plot of the Regional index of corruption 2013



Source: own processing

The resulting RIC values demonstrate that some European Union countries show a very high degree of variability in the regional level of corruption. This confirms the assumption that existing indices evaluating the national level of corruption can ultimately overestimate the regions more affected by corruption and underestimate the less corrupt. Definitely the greatest variability of the data evaluated in both years was demonstrated in the

Italian regions in both regional indices of corruption. Several studies have been written up in Italy focusing on the topic of regional corruption. Del Monte and Papagni, Fiorno, Galli and Petrarca state in their studies that the variability in the level of corruption in Italian regions is very high. [2,5] Italian regions can be found with very high level of corruption and regions with very low levels of corruption as well. According to the authors Fiorno, Galli and Petrarca the most corrupt regions are Campania and Sicilia. The RIC ratings for the years 2010 and 2013 in principle agree with the conclusions of these authors.

Corruption in Italian society is not perceived more strongly than in other countries but specific historical and geopolitical conditions appeared which created presumptions for an explosive course of its investigation. For decades, the Italians have been living with the awareness that politicians are corrupt, that some of them are connected with the Mafia and that those who were elected by the citizens have no power in the country. Political machinations, occult-like power, intrigues and unexplained political murders seem to belong to political folklore, mainly in the south.

It is obvious that corruption behaviour has its own specifics which are determined even by a given method of coordinating economic activities. We can say that the nature of the economic order of the society, or its economic organisation, determines individual spheres of the occurrence and forms of corruption behaviour.

4.1 Verification of the Proposed Regional Index of Corruption

This method was by author of this paper subsequently verified for the following use at national and sub-national level as well. The time period from 2008 - 2013 was analysed. Kendall's coefficient of concordance was used for mathematical verification. This is a non-parametric statistical method and is mainly used for the assessment of conformity assessment of individual evaluators. Its value ranges between 0 (no agreement) and 1 (complete agreement). [1]

Rankings of countries according to the Regional index of corruption are compared with rankings of the existing index measuring the level of corruption at the national level. The selected indicator is the Corruption Perception Index (CPI) of Transparency.

Given that data from the Regional indicator of government quality, which was used for the construction of the RIC, has been collected among respondents since 2009 and the data of the World Bank to evaluate the situation at the national level was drawn upon in 2008, it is appropriate, in assessing conformity of the ratings, to take into account not only data for 2010. To compare the resulting values of RIC for 2010, a time range of existing indices were selected for the years 2008-2010, which take into account the entire time period during which the data was collected for the RIC. To verify the agreement of the assessment of RIC for 2013, the time range 2011 to 2013 was chosen.

Table 2 presents the resulting calculation of Kendall's coefficient of concordance ranking countries according to the RIC in 2010 and the CPI from 2008 to 2010 and to the RIC 2013 and the CPI from 2011 to 2013 as evaluated by the program Statistica 12. Kendall's coefficient of concordance assessing the order of the selected indices reaches around 98%.

Table 2: Kendall's Coefficients of Concordance for Regional Index of Corruption 2010 and 2013

Variable	Kendall´s coefficient for RIC 2010 Avg. value r = 0.97501			Kendall´s coefficient for RIC 2013 Avg. value r = 0.98355		
	Average (ranking)	Total (ranking)	Deviation	Average (ranking)	Total (ranking)	Deviation
AT	6.85714	48.0	0.89974	10.33333	62.0	1.602082
BE	10.28571	72.0	0.48795	8.08333	48.5	0.632456
BG	28.71429	201.0	1.13389	28.58333	171.5	0.836660
CY	13.57143	95.0	1.39728	13.66667	82.0	1.861899
CZ	20.50000	143.5	1.51186	21.25000	127.5	1.095445
DE	7.35714	51.5	0.95119	6.00000	36.0	
DK	1.14286	8.0		1.16667	7.0	
EE	14.71429	103.0	2.22539	13.33333	80.0	1.032796
ES	13.85714	97.0	0.89974	13.66667	82.0	1.211060
FI	2.42857	17.0	0.75593	2.41667	14.5	0.983192
FR	10.71429	75.0	0.48795	10.00000	60.0	0.632456
GR	26.07143	182.5	2.03540	28.33333	170.0	1.366260
HR	26.42857	185.0	0.78679	25.08333	150.5	1.329160
HU	19.28571	135.0	1.11269	19.50000	117.0	0.547723
IE	6.85714	48.0	0.75593	9.33333	56.0	0.408248
IT	23.85714	167.0	1.57359	25.41667	152.5	1.211060
LT	21.78571	152.5	2.99205	19.91667	119.5	1.940790
LU	5.0	35.0		4.66667	28.0	0.516398
LV	21.78571	152.5	1.90238	22.41667	134.5	0.983192
MT	16.00000	112.0	1.41421	17.16667	103.0	1.329160
NL	3.92857	27.5	0.37796	4.33333	26.0	0.516398
PL	19.71429	138.0	2.22539	17.33333	104.0	1.211060
PT	14.57143	102.0	1.81265	14.00000	84.0	1.673320
RO	28.14286	197.0	0.81649	27.41667	164.5	1.211060
RS	29.64286	207.5	0.53452	29.41667	176.5	0.816497
SE	2.50000	17.5	0.78680	2.41667	14.5	0.516398
SI	14.28571	100.0	2.11570	16.08333	96.5	0.894427
SK	21.64286	151.5	1.13389	23.33333	140.0	1.722401
TR	24.42857	171.0	1.25357	23.08333	138.5	1.722401
UK	8.92857	62.5	0.37796	7.25000	43.5	0.408248

Source: own processing

High values of the coefficients of concordance in both years indicate that the proposed RIC ranks countries in terms of their corruption very similarly to the currently used indices of corruption. These conclusions of Kendall's coefficient of concordance verify the possibility of using the RIC.

At present, virtually the only possible way to verify the proposed method at the regional level is to compare RIC with statistics of corruption offences in the regions. For verification at regional level are used corruption offenses in NUTS II regions published statistics of the Police of the Czech Republic. According to official statistics of the Ministry of the Interior and the of the Czech National Police, however, only recorded cases of corruption can be traced, whose number is based on the activity of the state bodies. The strategy of the government in the fight against corruption for the period 2013 - 2014 indicates that corruption in the Czech Republic has a high degree of latency and only a few cases have been uncovered. [13] According to the Government Programme for Combating Corruption of the Czech Republic, only one percent of corruption offences have been uncovered. [21] The actual number of these crimes that have occurred in recent years is likely to be much higher. For the purposes of distinguishing the regions on the basis of corruption, without the need for a precise quantification, this tool is usable.

In order to verify the RIC, the following corruption offences are used, related to corruption in public administration, which is defined by the Criminal Code: accepting bribes (§ 331), bribery (§ 332) and indirect bribery (§ 333), abuse of power of officials (§ 329), obstruction of official duties of a person by negligence (§ 330). Given that the most risky area is currently regarded to be the redistribution of public funds through procurement and auction sales, the analysis also includes the offences of manipulation of public procurement and public tenders (§ 257) and actions against public auctions (§ 258).

The following Table 3 shows the results of Kendall's coefficient of concordance for the RIC of 2010 and the evaluation of the regions on the basis of crimes recorded in 2008 - 2010. The value of Kendall's coefficient in all the years in question has a value of at least about 74%, which indicates a statistically significant concordance between the assessment of the regions based on the RIC in 2010 and rated based on police statistics. Verification of conformity conclusions of RIC for 2013 and statistics of corruption offences recorded in the years 2011 to 2013 is shown in Table 4. The evaluation of RIC from 2013 coincides with police statistics of this period by at least 40%.

Verification of data at the regional level is not as clear as with national data; however, the assessment of the regions on the basis of corruption offences and under the proposed Regional Corruption Index has also been shown to coincide. The observed values of the assessed coefficients of concordance rank the regions based on the evaluation of police statistics and the proposed RIC confirms the predicted use of this index as a tool for defining more and less corrupt areas at the regional level.

Table 3: Kendall's Coefficients of Concordance for the Regional Index of Corruption 2010 and corruption crimes in 2008-2010

Variable	Corruption Crimes 2008 Avg. value r = 0.73810			
	Average (ranking)	Total (ranking)	Average	Deviation
Prague	1.0000	2.0000	1.0000	
Severozápad	2.5000	5.0000	2.5000	0.707107
Střední Čechy	4.5000	9.0000	4.5000	0.707107
Jihovýchod	2.5000	5.0000	2.5000	0.707107
Severovýchod	5.5000	11.0000	5.5000	2.121320
MorSlez.	6.5000	13.0000	6.5000	2.121320
Jihozápad	7.5000	15.0000	7.5000	0.707107
Střední Morava	6.0000	12.0000	6.0000	
Variable	Corruption Crimes 2009 Avg. value r = 0.85714			
	Average (ranking)	Total (ranking)	Average	Deviation
Prague	1.0000	2.0000	1.0000	
Severozápad	3.0000	6.0000	3.0000	
Střední Čechy	4.5000	9.0000	4.5000	0.707107
Jihovýchod	2.0000	4.0000	2.0000	
Severovýchod	5.5000	11.0000	5.5000	2.121320
MorSlez.	5.5000	11.0000	5.5000	0.707107
Jihozápad	8.0000	16.0000	8.0000	
Střední Morava	6.5000	13.0000	6.5000	0.707107
Variable	Corruption Crimes 2010 Avg. value r = 0. 76190			
	Average (ranking)	Total (ranking)	Average	Deviation
Prague	1.0000	2.0000	1.0000	
Severozápad	2.5000	5.0000	2.5000	0.707107
Střední Čechy	4.0000	8.0000	4.0000	
Jihovýchod	3.5000	7.0000	3.5000	2.121320
Severovýchod	6.5000	13.0000	6.5000	0.707107
MorSlez.	4.0000	8.0000	4.0000	1.414214
Jihozápad	7.5000	15.0000	7.5000	0.707107
Střední Morava	7.0000	14.0000	7.0000	1.414214

Source: own processing

Table 4: Kendall's Coefficients of Concordance for the Regional Index of Corruption 2013 and corruption crimes in 2011-2013

Variable	Corruption Crimes 2011 Avg. value r = 0.40476			
	Average (ranking)	Total (ranking)	Average	Deviation
Prague	2.0000	4.0000	2.0000	1.414214
Severozápad	2.0000	4.0000	2.0000	1.414214
Střední Čechy	3.0000	6.0000	3.0000	1.414214
Jihovýchod	5.0000	10.0000	5.0000	1.414214
Severovýchod	7.0000	14.0000	7.0000	
MorSlez.	4.0000	8.0000	4.0000	2.828427
Jihozápad	6.5000	13.0000	6.5000	2.121320
Střední Morava	6.5000	13.0000	6.5000	2.121320
Variable	Corruption Crimes 2012 Avg. value r = 0.71429			
	Average (ranking)	Total (ranking)	Average	Deviation
Prague	2.0000	4.0000	2.0000	1.414214
Severozápad	1.5000	3.0000	1.5000	0.707107
Střední Čechy	3.5000	7.0000	3.5000	0.707107
Jihovýchod	5.0000	10.0000	5.0000	1.414214
Severovýchod	6.5000	13.0000	6.5000	0.707107
MorSlez.	3.5000	7.0000	3.5000	2.121320
Jihozápad	8.0000	16.0000	8.0000	
Střední Morava	6.0000	12.0000	6.0000	1.414214
Variable	Corruption Crimes 2013 Avg. value r = 0.64286			
	Average (ranking)	Total (ranking)	Average	Deviation
Prague	2.0000	4.0000	2.0000	1.414214
Severozápad	1.5000	3.0000	1.5000	0.707107
Střední Čechy	3.5000	7.0000	3.5000	0.707107
Jihovýchod	5.0000	10.0000	5.0000	1.414214
Severovýchod	6.5000	13.0000	6.5000	0.707107
MorSlez.	3.5000	7.0000	3.5000	2.121320
Jihozápad	7.5000	15.0000	7.5000	0.707107
Střední Morava	6.5000	13.0000	6.5000	2.121320

Source: own processing

5 Conclusion

Although the issue of corruption has been current for some time, this topic is very much neglected at the regional level. The main reason is a lack of data. There has been no method of quantifying the phenomenon of corruption at the regional level until now. Due to the different socio-economic development of regions it can be assumed that even corrupt environments in these regions differ. If corruption is one of the variables that are degrading economic performance, as many studies claim, the elimination of corruption itself in certain regions may be the key to eliminating regional economic disparities and may thus increase the economic performance of the country.

The European Commission highlights the increasing corruption in some regions in connection with the misuse of European funds. These resources paradoxically often do not help remove the undesirable regional disparities, but the distribution of these resources demonstrably increases the opportunities for corruption. This in turn brings to the region additional negative economic consequences, which may cause an increase in the disparities within the country as a whole. The goal of regional politics is to sustain positive disparities and restrain or eventually completely remove the negative ones.

From the viewpoint of the corruption rate, a sub-national distinction of regions would pose a completely new development of the theory of cause and effect of regional disparities. The possibility of defining regions more affected by corruption would allow the tools of anti-corruption policies to be concentrated primarily on regions which are most heavily affected by corruption and this would create a new tool for eliminating regional disparities. The diversification of individual regions would also be a valuable benefit for current anti-corrupt policies in a country.

Based on the values of the Regional Index of Corruption, it was found that the level of corruption is heterogeneous in the NUTS II regions and areas more affected and less affected have been identified. The stated hypothesis has been confirmed.

Confirmation of this hypothesis is consistent with the claim of authors Del Monte and Papagni as well as Fiorno, Galli and Petrarca. Based on an analysis of Italian regions, it was found that the level of corruption in various regions is not homogeneous. The construction of the Regional Corruption Index offers the possibility to also verify these conclusions on NUTS II regions in other EU countries.

At the current level of knowledge, the ability to quantify the extent of corruption at a sub-national level fills a gap that, within the general issue of corruption still exists, both in the Czech Republic and worldwide. Exposing corruption in today's globalised environment is becoming more complex and it is an issue even for countries that generally achieve relatively good results. It is therefore necessary to continue charting corruption and prevent its further expansion. The present article only opens another direction of scientific research in this field. It can be assumed that extending the time scale will allow the Regional Corruption Index, RIC, further research in this area, especially with regard to the need for a practical application of the proposed methodology at the level of authentic regions.

References:

[1] Corder, G. W., Foreman, D. I.. *Nonparametric Statistics for Non-Statisticians: A Step-by-Step Approach*, New York: Wiley, 2009. ISBN 978-0-470-45461-9

[2] Del Monte, A., Papagni, E. The Determinants of Corruption in Italy: Regional Panel Data Analysis, *European Journal of Political Economy*, vol. 23, June 2007. pp. 379-396. ISSN 0176-2680.

[3] European Commission. *Anti-corruption report 2014*. [online]. 2014 [cit. 2014-06-20]. Available at WWW:<http://ec.europa.eu/dgs/home-affairs/what-we-do/policies/organized-crime-and-human-trafficking/corruption/anti-corruption-report/index_en.htm>.

[4] European Commission. Measuring Quality of Government and Sub-National Variation. *Regional Policy*. [online]. 2013 [cit. 2015-09-09]. Available from WWW: <http://ec.europa.eu/regional_policy/sources/docgener/studies/pdf/2010_government_1.pdf>.

[5] Fiorino, N., Galli, E., Petrarca, I. Corruption and Growth: Evidence from the Italian regions, *European Journal of Government and Economics*, 2012, Vol. 1, No. 2, pp. 126-144. ISSN 2254-7088

[6] Golden, M., Picci, L. Proposal for a New Measure of Corruption, Illustrated with Italian Data, *Economics & Politics*, 2005, Vol. 17, No. 1, pp. 37-75. ISSN 1468-034.

[7] Huntington, S. P. *Political Order in Changing Societies*. New Haven: Yale University Press, 1968. ISBN 0-300-01171-7.

[8] Charron, N., Lewis D., Lapuente, V. Mapping the Regional Divide in Europe: A Measure for Assessing Quality of Government in 206 European Regions'. *Social Indicators Research***,** 2015, Vol 122 (2): 315-346.

[9] Kaufmann, D., Kraay, A. and Mastruzzi, M. *Governance Matters IV: Governance Indicators for 1996-2004*. Available from WWW: <http://siteresources.worldbank.org/INTRES/Resources/469232-1107449512766/GovMattersIV_main.pdf>.

[10] Leff, N. H. Economic Development through Bureaucratic Corruption. *Political Corruption-A Handbook. Iss.* 5. New Brunswick: Transaction Publisher, 1989. ISBN 0-88738-163-4.

[11] Leite, C., Weidmann, J. Does Mother Nature Corrupt – Natural Resources, Corruption and Economic Growth. *IMF Working Paper No. 85*, 1999. Washington: International Monetary Fund, Available from WWW: <http://www.imf.org/external/pubs/ft/wp/1999/wp9985.pdf>.

[12] Linhartová, V., Volejníková, J. Quantifying Corruption at the Subnational Level, *E+M Ekonomie a Management*, 2015, no. 2, pp. 25-39. ISSN: 1212-3609.

[13] Liu, F. T. An Equilibrium Queuing Model of Grubery Games. *Journal of Political Economy Vol. 93*. 1985. pp. 760 – 781. ISSN 0022-3808

[14] Mauro, P. Corruption and Growth. *Quarterly Journal of Economics*, Vol. 110, No. 3, 1995. pp. 681 – 712. ISSN 0033-5533

[15] Nye, J. S. Corruption and Political Development: A Cost-Benefit Analysis. *American Political Science Review* 67:2, 1967, p. 963. ISSN 0003-0554.

[16] Tanzi, V., Davoodi, H. Corruption, Public Investment, and Growth. *IMF Working Paper 97/139*, Washington: International Monetary Fund, October 1997, Available from WWW: <http://www.imf.org/external/pubs/ft/wp/wp97139>.

[17] Transparency International. *Corruption Perceptions Index 2013*, [online]. 2014 [cit. 2015-09-09]. Available from WWW: < http://www.transparency.org/cpi2013/>.

[18] Treisman, D. The causes of corruption: a cross-national study, *Journal of Public Economics*, 2000, Vol. 76, No. 3, pp. 399-457. ISSN 00472727.pdf>.

[19] Volejníková, J., Linhartová, V. Impact of Accession to the EU on Corruption in the Czech Republic. In *Proceedings of the 2nd International Conference on European Integration 2014 (ICEI 2014)*. Ostrava: VŠB - TUO, 2014. pp. 763-770. ISBN 978-80-248-3388-0.

[20] Volejníková, J., Linhartová, V. *Macroeconomic aspects of corruption*. Saarbrücken: LAP Lambert Academic Publishing AG & Co. KG, 2014. 72 p. ISBN 978-3-659-52992-4.