IMPACT OF E-GOVERNMENT AT THE LEVEL OF CORRUPTION

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Abstract

Fighting corruption is a very challenging and difficult. Due to the fact that bribery and other forms of corruption are illegal practices in most countries, the actors of corruption are trying to hide their behavior and revelation of corruption is almost impossible. Negative effects on development of gross domestic product, unemployment rate or credibility of the country discouraging foreign investors have been shown as a result of corruption. For this reason countries spend considerable financial and other resources to build an effective anti-corruption policy.

E-government methods could be use as a possible way to reduce corruption by reducing the interaction between officials and the public. The literature focused on e-government methods in relation to corruption suggests that electronic service delivery can reduce corruption by minimizing the interactions with officials, accelerating decisions and reducing human errors. This paper is focused on the potential role of e-government in reducing the level of corruption in the country. Specifically, this paper examines the impact of the use of e-government on corruption in 117 countries all over the world, regardless of their geographic location or political regime. The selected variables are the Corruption perception Index and the E-Government Development Index.

Key words: Corruption, e-Government, Corruption Perception Index, E-Government Development Index

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Introduction

Corruption can lead to increase in public spending, reduction the amount of collected taxes, increase fiscal deficits and creation of a macroeconomic instability. (Bhargava & Bolongaita, 2004; Mauro, 1995) The studies focused on corruption have shown that corruption discourages investments, reduces economic growth, changes the composition of government spending, undermines government efforts to reduce poverty and hampers the quality of life in

rural and poor parts of the developing countries (Bhargava & Bolongaita, 2004; Jain, 2001), (Mauro, 1995; Tanzi, 1998). These are the reasons why governments of countries all over the world spend considerable financial and other resources to build an effective anti-corruption policy. A possible way to reduce corruption, especially in the public sector, is by reducing number of interactions between officials and the public. This can be achieved by using e-government methods. E-government can ensure not only providing more information to the public, but also can remove the discretion of public officials. (Hopper et al, 2009)

The aim of this paper is to explore the relationship between e-government and corruption. The extent of changes in the use of e-government and changes in level of corruption will be tested. To estimate the strength and development of the relationship between e-government and corruption will be examined variables from two different time periods.

1   E-government and its possible effect on the level of corruption

The issue of corruption has become a highly debated topic which troubles governments of countries but their citizens as well. Although corruption is not a new phenomenon, unambiguously and universally accepted definition of corruption does not exist yet. Different perceptions and understanding of corruption may be a possible barrier to prevent the establishment of a clear definition. A gift that someone considers as an expressing of gratitude, someone else considers as a bribe.

The different perception of this concept led to create a lot of definitions. The World Bank created the most known definition. It defines corruption *as an abuse of public office for private gain* (Hellmann, Jones & Kaufmann, 2009). Transparency International, an international nonprofit organization fighting against corruption, defines corruption as *an abuse of entrusted power for personal gain of undeserved benefits* (Transparency International, 2003).

Most of definitions of corruption are focused just on the abuse of public power. Somewhat the corruption in the private sector is neglected, but it also exists of course. However, most studies are focused on corruption in the public sector for one simple reason - the consequences of such abuse of public power hit the broad mass of taxpayers and the state in general. For this reason efforts to reduce corruption are focused mainly on public administration.

E-government has become a term encompassing all uses of information technology in public administration and it includes sharing information and conducting transactions between government and government (G2G), between government and business (G2B) and between government and citizens (G2C) on IT background. (Torres, Pina & Acerate, 2006)

Some studies identified the potential role of e-government in reducing corruption. E-government eliminates the scope for bribing by elimination of intermediary services and it allows to citizens to arrange their transactions by themselves. (Singh, Pathak, Naz & Belwal, 2010)

ICT has a big potential to reduce human interventions in the public process, it reduces the need for corrupt behavior. Easy access to information for all citizens through the use of e-government approaches can result in greater transparency, which limits the public official to accept or even demand a bribe. E-government can bring not only providing more information to the public, but also it can remove the competences of public officials. (Shim & Eom, 2008)

2 Analysis of relationship between e-government and level of corruption in the country

2.1 Data and methodology

Established indexes will be used in order to verify the relationship between e-government and level of corruption. Specifically, the Corruption Perception Index and the E-government Development Index will be used.

The Corruption Perception Index (CPI) has been published by Transparency International (TI) since 1995. It is an index that is based on corruption perceptions of respondents, which are domestic and foreign entrepreneurs, analysts and representatives of the professional public in the evaluated countries. The index is published annually. The surveys contain questions aimed at public officials, bribery or kickbacks in public procurements. As a result, the CPI takes values in the interval from 0 to 10, where 0 is highly corrupt country and value of 10 indicates a country without corruption.[1] The sample of examined countries is changed over time. For example the index of 1995 included 41 countries, and in the last survey in 2011, there were already 183 countries evaluated. Changing the number of evaluated countries is the reason why the order of ranking is not important for assessing of individual country but the actual value of the CPI is important for it. (Volejníková, 2007)

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[1] TI changed the methodology in 2012 and CPI 2012 takes values in the interval from 0 to 100. TI has not published the ways how would be possible to compare CPI in 2012 with previous years.

The CPI is a composite index, thus contains the results of surveys carried out by several different institutions. They use different samples of respondents, but also a different methodology. Every year, the CPI is compiled from a different number of sources. The CPI in the last year, in 2011, was compiled from 17 sources provided by 13 independent institutions. All sources measure the overall extent of corruption (frequency or the amount of bribes) in the public and political sectors and all sources include the ranking of countries.

The extent of corruption is evaluated by two groups in each country. The first group is consisted of experts in the country, residents and foreign experts; the other group is consisted of the business leaders. The CPI 2011 used the following seven expert assessment sources: African Development Bank, Asian Development Bank, Bertelsmann Foundation, Economist Intelligence Unit, Freedom House, Global Insight, Political Risk Services, the World Bank and the World Justice Project. The other four data sources for the CPI 2011 score reflected top managers who are residents in rated countries: IMD, Political and Economic Risk Consultancy, Transparency International's Bribe Payers Survey and World Economic Forum. (Transparency International, 2012)

The E-Government Development Index (EGDI) is used to estimate of the level of e-government in the country. This measurement is based on a survey compiled in cooperation between United Nation´s Department of Economic and Social Affairs and Civic Resource Group, consulting firm providing technology solutions in the field of e-government. The EGDI reflects how country uses an information technology to promote access and inclusion of its inhabitants. The EGDI is composed of three different indices: (United Nations, 2012)

- The Web Measure Index,
- The Telecommunication Infrastructure Index,
- The Human Capital Index.

The Web Measure Index shows a general ability of governments to use e-government methods as a tool for information, communication, data transfer etc. The Telecommunication Infrastructure Index defines the IT capacity of the country. Finally, the Human Capital Index is based on measuring of the level of human capital development in the country.

Verify the relationship between e-government and corruption will be carried out by using a ***simple linear regression analysis*** and ***correlation coefficient***. Correlations between defined variables will be verified by the value of the Spearman correlation coefficient ("the correlation coefficient"). The calculation of the correlation coefficient will be conducted by using statistical software STATISTICA, version 1.10. The significance level established for the correlation analysis is 0,05.

The null hypothesis defines that the *monitored variables are not in correlative relationship*. Verification of this hypothesis is based on the subsequent comparison of the level of significance with a value (called p-value) which statistical software generates. Then we can also determine how tight the mutual correlation between the variables is. The correlation coefficient takes values between -1 and 1, inclusive. Values of the correlation coefficient close to value of -1, respectively 1, can describe a very strong mutual correlation relationship between the observed variables. It is also possible to distinguish the positive correlation relationship (or direct relationship) that occurs when the value of the correlation coefficient becomes positive. Or otherwise, we can specify a negative correlation relationship (or indirect relationship). The analysis is performed on 117 countries and studied period is between years 2003 and 2011. Eight-year interval would allow us to capture effects of changes in ICT on level of corruption. The CPI acts as the dependent variable and the EGDI as the independent variable in all analyzes.

2.2 Relationship between Corruption and e-Government

Firstly, there is examined the relationship between the EGDI and the CPI in two time periods (2003 and 2011). Then there is examined whether there is a relationship between the change in the EGDI during this period and the change in the CPI during the same period. Analysis includes a total of 117 countries around the world, regardless of their geographic location or political establishment. List of states is in attachment.

Spearman correlation coefficients for the variables are shown in the following table 1. The values, that program Statistica identified as statistically significant, are highlighted in bold. A positive correlation relationship was found among the variables CPI and EGDI in both years. This led to the rejection of the null hypothesis. There is a relationship between corruption and using e-government methods in the analyzing countries. Improve in the level of e-government in the country led to improve in the level of corruption.

Tab. 1: Correlation matrix

	CPI 2003	CPI 2011	% change CPI	EGDI 2003	EGDI 2011	% change EGDI
CPI 2003	1	**0,906263**	**0,401589**	**0,703665**	**0,782011**	0,177983
CPI 2011	**0,906263**	1	0,033709	**0,696158**	**0,760025**	0,182046
% change CPI	**0,401589**	0,33709	1	0,116636	0,187643	0,224155
EGDI 2003	**0,703665**	**0,696158**	0,116636	1	**0,828407**	**0,542522**
EGDI 2011	**0,782011**	**0,760025**	0,187643	**0,828407**	1	0,072948
% change EGDI	0,177983	0,182046	0,224155	**0,542522**	0,072948	1

Source: own calculation based on (Transparency International, 2003; Transparency International, 2012; United Nations, 2003; United Nations, 2012)

We used the following regression function to verify the relationship between the CPI and the EGDI. The function is based on the least squares method: (Mistry & Jalal, 2012)

$$\text{Corruption} = \alpha + \beta * \text{e-government} + \varepsilon \qquad (1)$$

Where corruption is represented by the CPI and e-government is represented by the EGDI. The parameter α determines the distance of intersection of the regression line with the y-axis (the value of the regression function for x = 0). The parameter β is called the regression coefficient and shows the variation of the dependent variable value when the value of the independent variable changes. The symbol ε is the residual variance, which is a graphical representation of the distance of points from the regression line.

We can use the following model to estimate changes in the rates of induced change in e-governmet in the country: (Mistry & Jalal, 2012)

$$\Delta\text{Corruption} = \alpha + \beta * \Delta\text{e-government} + \varepsilon \qquad (2)$$

Where ΔCorruption is the change of the Corruption Perception Index between 2003 and 2011, and Δe-government is the change of the E-government Development Index in the same period.

Figure 1 shows a simple regression model. On the x-axis there is the EGDI in 2003 and on the y-axis there is the CPI in 2003. As mentioned earlier, higher values of the EGDI indicate better readiness to use IT technology in the field of public administration and higher CPI values indicate less corruption in the country. This positive relationship is illustrated in the following scatter plot, which is complemented by linear regression line.

Figure 2 shows the same scatter plot using data of 2011. The EGDI values in 2011 are again plotted on the horizontal x-axis and the CPI in 2011 on the vertical y- axis. As expected, in 2011 we observed a positive relationship between selected variables.

Fig. 1: Linear regression model (2003)
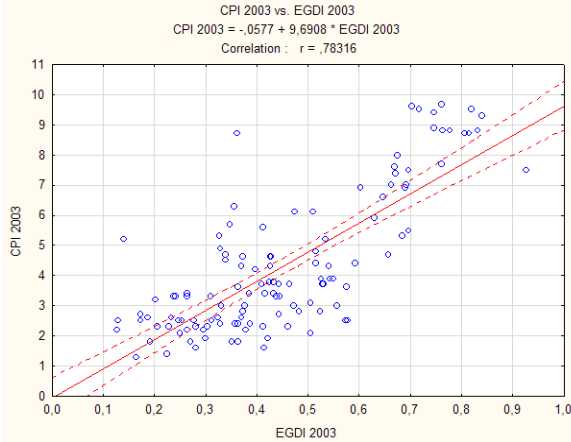
Source: own calculation based on (Transparency International, 2003; Transparency International, 2012; United Nations, 2003; United Nations, 2012)
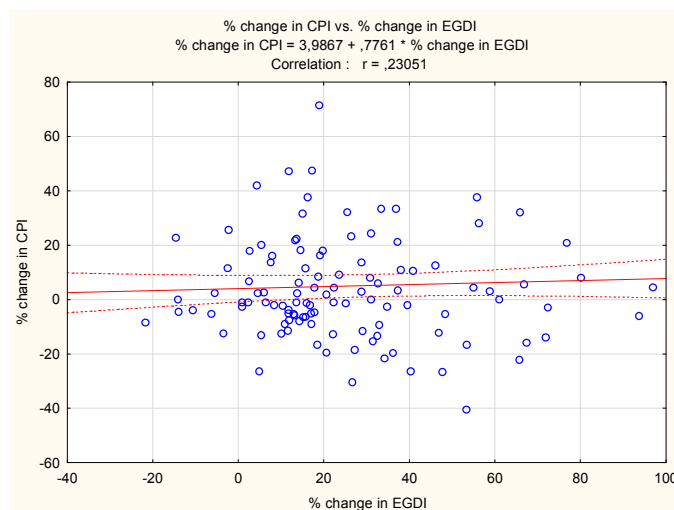
Fig. 2: Linear regression model (2011)
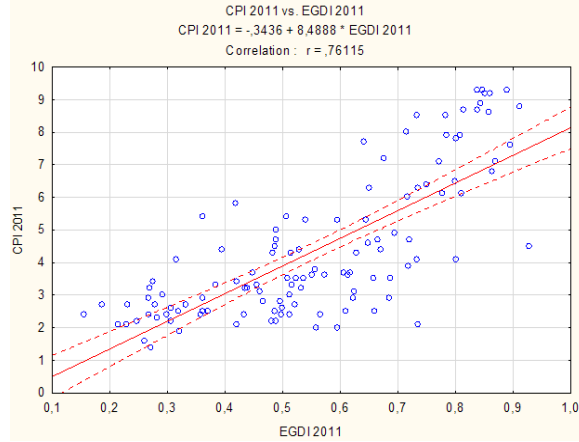
Source: own calculation based on (Transparency International, 2003; Transparency International, 2012; United Nations, 2003; United Nations, 2012)

Figure 3 is focused on how changes in the EGDI may affect changes in the CPI. Figure 3 shows the percentage change in the EGDI between 2003 and 2011 on the horizontal axis and the percentage change in the CPI between 2003 and 2011 on the vertical axis. This graph basically shows the evolution of the CPI and the EGDI during the sampling period. The linear regression line shows that not all countries with raised value of the EGDI recorded also simultaneously decrease of corruption. Among these countries belongs for example Zimbabwe, Ethiopia, Tunisia or Russia. However, the linear regression line still has a slightly positive slope.

Fig. 3: Linear regression model (% change between 2003 and 2011)

Source: own calculation based on (Transparency International, 2003; Transparency International, 2012; United Nations, 2003; United Nations, 2012)

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The equation of the regression line shows a graphical representation of the regression function. Coefficient of %change in the EGDI is 0,7761. This means, that with constant conditions, one percent change in the index EGDI leads to almost 0,8% change in the CPI. In other words, if there is an improvement in e-government in the country by 1%, there is also improvement in level of corruption in the country by 0,8%.

Conclusion

This paper examines the existence of relationship between corruption and e-government and tries to find an answer for the question, if changes in the exploitation of information technology lead to changes in the level of corruption in the country. In order to examine these relationships were defined hypothesis which truth was confirmed by empirical models. It was found that the use of information technology and the development of e-government contribute to reducing the level of corruption in the country. Specifically, one percent increase in the index of e-government (EGDI) caused a reduction of 0,8% in the index of corruption (CPI) in the sampling period.

Identified outcomes suggest that efficient implementation of e-government brings a real reduction of the level of corruption in the country. With regard to the identified outcomes of this paper it is suitable for further research on the impact the use of e-government at the level of corruption in the country.

Attachement

117 countries included in the sample:

Albania, Algeria, Angola, Argentina, Armenia, Australia, Austria, Azerbaijan, Bahrain, Bangladesh, Belarus, Belgium, Bolivia, Bosnia & Herzegovina, Botswana, Brazil, Bulgaria, Cameroon, Canada, Colombia, Republic of Congo, Costa Rica, Croatia, Cuba, Cyprus, Czech Republic, Denmark, Dominican Republic, Ecuador, Egypt, El Salvador, Estonia, Ethiopia, Finland, France, Gambia, Georgia, Germany, Ghana, Greece, Guatemala, Honduras, Hungary, Chile, China, Iceland, India, Indonesia, Iran, Ireland, Israel, Italy, Jamaica, Japan, Jordan, Kazakhstan, Kenya, Kuwait, Kyrgyzstan, Latvia, Lebanon, Lithuania, Luxembourg, Macedonia, Madagascar, Malawi, Malaysia, Mali, Mauritius, Mexico, Morocco, Mozambique, Namibia, Netherlands, New Zealand, Nicaragua, Nigeria, Norway, Oman,

Pakistan, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Poland, Portugal, Qatar, Romania, Russia, Saudi Arabia, Senegal, Sierra Leone, Singapore, Slovakia, Slovenia, South Africa, Spain, Sri Lanka, Sudan, Sweden, Switzerland, Syria, Tanzania, Thailand, Trinidad and Tobago, Tunisia, Turkey, Uganda, Ukraine, United Arab Emirates, United Kingdom, USA, Venezuela, Vietnam, Yemen, Zambia, Zimbabwe.

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