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IES Working Paper: 11/2010



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Measuring transparency in public spending: Case of Czech Public e-Procurement Information System

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Abstract:

The objective of this paper is to analyze the potential of e-Government tools to enable the general public to oversee spending of public institutions. The paper illustrates the “watchdog” potential of reducing corruption by means of providing information to the public on the example of the Czech Public e-Procurement Information System (further called System). The System is an Internet portal, where public authorities announce their intention to purchase goods and services. Such announcements are monitored by private entities that can compete for the respective public contract.

For our paper we used a web robot to collect data about public procurements from the System and utilized them for construction of an original Transparency Index, which rates institutions that award public contracts (so called contracting authorities). The composite Index is constructed as a weighted sum of ten various transparency indicators, computed separately for each contracting authority. This Index could serve as an efficient benchmark for continuous control and comparison of public institutions in the area of public procurement and demonstrates how an e-

Government tool can contribute to greater openness and accountability of these public institutions and to enhancement of the civic engagement in the control of governmental activities.

The results of our research suggest that although the System is good step forward, its current structure does not enable the public to effectively exercise public control over procurements spending of contracting authorities, because of serious difficulties related to viewing (and extraction) of aggregate data. On the other hand, on example of our Transparency Index, we demonstrate that if the System allowed for easier access to data on public procurements, it would serve as an efficient tool of public control and facilitate open government initiatives.

Keywords: public procurement, Transparency Index, efficient public control, open government, corruption

JEL: H57, C43

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Public procurement is the government activity most vulnerable to corruption. Lack of transparency and accountability were recognized as a major threat to integrity in public procurement. (OECD 2007)

1 Introduction

The implementation of e-Government tools has many substantial benefits for both public as well as private institutions. Among the most frequently analyzed benefits of e-Government in the academic literature are the following: facilitation of the stakeholder relation between the public authority and citizens (Scholl 2001), reduction of administrative costs (Davila, Gupta and Palmer 2003), improvement of services to citizens (Sawhney and Bikshapathi 2008), and increase in accessibility of public services (Aichholzer in Remenyi 2007: 1), provision of information about public authorities, public efficiency and accountability, and improvement opportunities for participation in democratic institutions (Naidoo 2008:323). In this case study, we focus on the last named benefit – on the role of e-Government tools in promotion of greater participation of public on activities of state and municipal administrations. On the example of the Czech Public e-Procurement Information System (accessible on www.centralni-adresa.cz) we demonstrate, how adding of a statistical feature can help to strengthen the role of public as a watchdog of activities of public administration – such as is, in this particular case, the public procurement (further denoted as PP).

1.1 Public procurement and transparency

According to OECD (2007: 9) corruption and bribery are in most countries in the world more frequent in PP than in other governmental activities such as are tax collection or judicial system (see Figure 1). As a corruption hotspot, PP's therefore require more control than any other field of public administration.

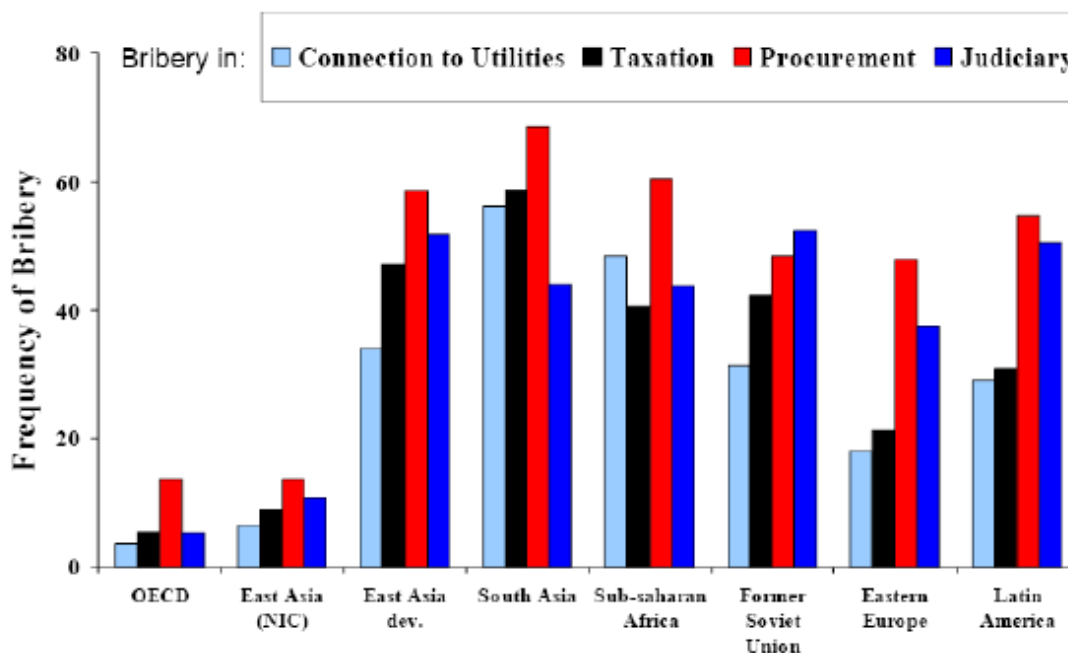


Figure 1: The frequency of bribery in procurement (source: OECD 2007:9)

In the Czech Republic, there were more than 35,000 PP's registered in the System between the years 2006 – 2009. As could be seen in Figure 2, the total value of the PP's registered in the System¹ accounts for 3.43% of Czech GDP² in 2006, 3.86% in 2007 and 6.29% in 2008, respectively. The estimate of the share for the year 2009 is 5.8%, which is a result of a joint fall in both PP volume in 2009 and by the estimated decline in GDP. In absolute numbers, the total volume of the public funds spent by means of public procurements registered in the System amounted to USD 5.9 bn in 2006, USD 7.3 bn in 2007, USD 12.5 bn in 2008 and USD 11.3 bn in 2009, respectively³ (for absolute total volumes in CZK see Figure 2 – right axis), These billions of USD, are awarded by hundreds of contracting authorities in a very de-centralized manner.

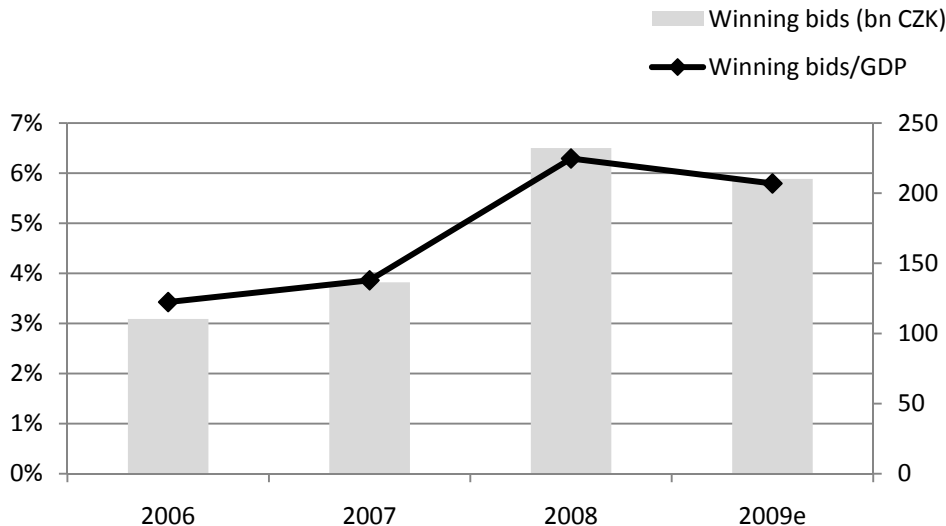


Figure 2: Share of the total annual volume of winning bids registered in the Czech Public e-Procurement Information System relative to GDP (left axis), total annual volume of registered winning bids (right axis, bn GDP)

It is obvious that monitoring and controlling of such a huge number of transactions is a difficult task to perform, especially if it is from major part effectuated by a single institution - the Czech Office for the Protection of Competition (OPC). The lack of control is thus one of the major causes of the widespread corruption in the PP in the Czech Republic (Transparency International – Czech Republic 2005).

1.2 Electronic public procurement systems

The literature shows that certain types of e-Government tools can help to expand the public control over specific activities of public institutions. The article of Gamble (in Remenyi 2007: 101) describes, how can citizens via an interactive platform politicalsheepdog.com act against corruption in the legislative process. One of the findings of Auriol (2006:882) suggests that public control effectuated by means of electronic publication of a list of debarred suppliers for public tenders may lead to reduction of corruption in PP's. Ultimately, Ohashi (2008:3) estimates that a mere improvement of the transparency of public work procurements helped to save about USD 0.5 mil in Mie district in Japan.

The Czech Public e-Procurement Information System was designed and in 2006 implemented as an instrument for achievement of greater transparency in Czech PP's. In comparison with similar PP portals and platforms in other EU Member States, the Czech System provides directly and free of

¹ This excludes PP's under price threshold given by law, which need not to be registered in System. Therefore the reported share of PP's on GDP most likely *undershoots* the true value.

² GDP values adopted from Czech Statistical Office (GDP income method).

³ Due to the high volatility of CZK/USD exchange rate between the years 2006 – 2009 and for the sake of comparability, we used average exchange rate as 18.562 CZK/USD computed as 4-years average from annual average exchange rate from years 2006 - 2009 published by the Czech National Bank (www.cnb.cz).

charge a broad range of information and multiple search options (see **Chyba! Nenalezen zdroj odkazů.**) that could be used in order to find a specific PP.

| | Number of search parameters | Payment for downloads | System of information delivery | Language variants | Provider |
|----|-----------------------------|------------------------|--------------------------------|-------------------------|--|
| AT | n.a. | EUR 29 ⁽¹⁾ | Email | D | Wiener Zeitung |
| BE | 22 | EUR 0 | Directly | EN, FR, NL,D | European Dynamics |
| BG | 9 ⁽²⁾ | EUR 0 | Directly and email | EN, BG | Public Procurement Agency |
| CY | 17 | EUR 0 | Directly | EN, GR | Government |
| CZ | 24 | EUR 0 | Directly | CZ, EN | Czech Post |
| DK | n.a. | EUR 0.3 ⁽³⁾ | Directly | DK | Gatetrade.net |
| EE | 9 | EUR 0 | Directly | EE, EN ⁽⁴⁾ | Government |
| FI | 11 | EUR 0 | Directly | FI, SE | Hansel Ltd |
| F | 13 | EUR 0 | Directly and email | EN, F, ES | Government |
| D | 12 | EUR 0 | Directly | D | Ministry of Interior |
| GR | n.a. | n.a. | n.a. | GR | Ministry of Development |
| HU | n.a. | EUR 0 | Email | EN, HU | Council for Public Procurement |
| IE | 6 | EUR 0 | Directly | EN | Millstream Associates |
| I | 3 | n.a. ⁽⁵⁾ | Directly | I | Consip |
| LA | 2 | n.a. ⁽⁶⁾ | Directly | LA, EN ⁽⁷⁾ | Government |
| LI | 3 | EUR 0 | Directly | LI | Government |
| LU | 9 | EUR 0 | Directly | F | Ministry of Development |
| MA | n.a. ⁽⁸⁾ | n.a. ⁽⁹⁾ | n.a. | EN | Malta Information Technology Agency |
| NL | n.a. | n.a. | n.a. | NL | PIANOO |
| PL | 13 | EUR 0 | Directly | PL | Government |
| PT | 2 | EUR 0 | Directly | EN ⁽¹⁰⁾ , PT | National Agency for Public Procurement |
| RO | 20 | EUR 0 | Directly | EN, RO | eLicitate |
| SK | 5 | EUR 0 | Directly | EN, SK | Public Procurement Agency |
| SI | 10 | EUR 0 | Directly | SI | National Gazette |
| ES | n.a. ⁽¹¹⁾ | n.a. | n.a. | S | Government |
| SE | 2 | n.a. | Directly | EN ⁽¹²⁾ , SE | Government |
| UK | 4 | n.a. | Directly | EN | OGC.Buying. solutions |

1 Basic fee, 2 more features only for registered users, 3 price per order, 4 only English guidelines in pdf, 5 only for registered users, 6 only for registered users, 7 information in English very insufficient, 8 only registered users, 9 the webpage not functioning, 10 only limited content, 11 only for registered users, 12 only limited content

Table 1: Comparison of Public e-Procurement systems in the EU 27 (source: Chvalkovska, Markova, Mejstrik 2010:21)

Yet it seems that the volume of information contained in the System by itself does not result in a sufficient improvement of transparency (ergo reduction in corruption) of the Czech PP's. According to Grodeland (OECD 2005:59), the major problem of Czech PP's, identified in the year 2004, was the influence of informal networks on the PP procedure and its results. Currently, in the year 2010, several mainly private initiatives are also criticizing the influence of informal networks and the general lack of transparency in Czech PP (see for example Chynoweth 2010 or Johnstone 2010). This only verifies the validity of one of the conclusion from a study of Lizal and Kocenda (2001:21) stating that "the overall impression favors the persistent presence of corruption within the society and economy of the Czech Republic".

In our research we use a web robot to collect data about PP's from the Czech Public e-Procurement Information System and utilize them to construct an original composite Transparency Index (TI), which rates how each contracting authority performs from the point of PP best practice. In public policy TI might serve as a benchmark for continuous control and comparison of public institutions, in this research it however demonstrates how an e-Government tool could contribute to greater

openness and accountability of these public institutions and to enhancement of the civic engagement in the control of governmental activities.

It is important to note in advance, that use of TI for cross-institutional comparison will be limited. As the structure of each institution's purchases differs, so do their budgets and options for transparent behavior - one obviously cannot expect the same level of transparency from a public library and from the Ministry of Defense. This first version of the TI can thus be used for comparison between similar institutions, administering comparable types of PP. The TI is also capable of tracing the development of each institution's transparency in time.

2 Transparency Index

There is a significant number of studies that deploy indexation in order to evaluate institutions that distribute public funds. Our research was to some extent inspired by the indexation of development aid institutions published by Easterly and Pfitze (2008). In their article, these authors use publicly available data to benchmark institutions that provide development aid in order to identify the best practices in this sector. In case that necessary data were not available, the authors were asking for them via e-mail (Easterly, Pfitze 2008:6), which is a method that we would also presently use in our research. In the PP sector, useful analytical frameworks for indexation are developed by OECD (e.g. OECD 2010 or OECD 2005). In the Czech Republic, Pavel (Transparency International – Czech Republic 2005) constructs an index of public procurement market transparency, which is, however, constructed only on limited data sample and on a highly aggregated level – it evaluates only the Czech PP market as a whole.

Compared with the above mentioned studies, the TI differs in two aspects. Firstly, it utilizes very detailed data concerning individual tenders, individual contracting authorities and individual winners of public contracts. Neither OECD, nor Easterly and Pfitze (2008), nor Pavel (Transparency International – Czech Republic 2005) form their indices based on such in-depth data. Secondly, the TI highlights the vast potential for improvements in the transparency of PP's resulting from the further extension of e-Government tools in this sector. As we shall see later on, such improvement would directly follow the PP best practice recommendations defined by renowned international institutions. Moreover, our index is constructed in a way that it can serve both as measure and motivation tool for the improvement.

2.1 Data harvesting

For construction of the TI, many different pieces of information were needed, including data on PP's themselves, but also data concerning contracting authorities, winning bidders and objections against the PP procedure. As illustrated by Table 2: Web sites containing data relevant for the TI harvested by authors

, in order to obtain inputs for index computation, it was necessary to collect and combine data from four different entities (Ministry of Regional Development, which is in charge of the Czech Public e-Procurement Information System, Office for the Protection of Competition, Ministry of Finance and Czech Information Agency). These were disseminated over approx. 300,000 web pages or xml data files. Despite the fact that we were using a web crawler (web robot) to harvest the data for us, the collection was still very time-consuming, since our robot needed to be carefully programmed for collection of various data from each specific page type. Additionally, in order to bypass security mechanisms of some of the harvested servers, the robot needed to behave more human-like, therefore mining typically took weeks, or in one case even a month (the System).

| Website | Page type | Data type | Example – link (Czech language) |
|--|--|---|---|
| Isvzus.cz – Czech Public e-Procurement Information System | -PP pre-announcement -PP announcement -PP winner announcement (various types of each according to the chosen PP regime) | All PP details – prices, dates, identification of winners, and contracting authority etc. | http://www.isvzus.cz/usisvz/usisvz01007Prepare.do?znackaForm=6003062003001 |
| Compet.cz (OPC) – Office for Protection of Competition, Czech bureau responsible for PP review process and supervision | Objection details | Result, contracting authority, winning bidder, objecting party, date etc. | http://www.compet.cz/verejne-zakazky/sbirky-rozhodnuti/8319/ |
| ARES – Czech finance ministry's database of economic subjects | Economic information subject | Basic contracting authority and winner information – existence, name, legal form, foundation date | http://www.info.mfcr.cz/cgi-bin/ares/darv_res.cgi?ico=00006947 (XML format – may not display properly) |
| Ipoinet.financninoviny.cz – Public part of commercial database of Czech Information | Economic information | subject Winners budget, property structure | http://ipoinet.financninoviny.cz/ministerstvo-financi-ceske-republiky.12600.html |

Table 2: Web sites containing data relevant for the TI harvested by authors

Even though web crawlers generally do perform reliably in harvesting data from standardized web forms, this was quite not the case, since the structure of System forms slightly changes according to type of PP, its result etc. Since we needed to make sure of getting reliable data (avoid crawler errors), separate crawler instance have been created for each of the 12 page types in System, and for many more pages outside of it. Additionally, we manually checked all data in 100 randomly chosen full observations (compiled from all sources) against original sources and found no errors.

At the beginning of our research, we were also considering to skip the time-consuming data mining part of our work and simply ask the public authorities that govern the above stated databases to give us the data we need. We however opted not to choose such approach for three reasons. Firstly, there was obvious risk of not getting the data – at least not in a usable format. Secondly, PP is currently in the pre-election time a highly politicized topic and we did not want put our academic research in danger of being abused as a tool in political campaign. Lastly, and most importantly, the main goal of our index is to evaluate the contracting authorities based on data that is directly (and transparently) available to the public.

On the other hand, inspired by Easterly and Pfitze (2008:6) we plan to use a pre-programmed script to send to the contracting authorities a simple request regarding the PP's they executed in the last four years in order to verify our data and also to test, how the authorities fulfill their information duties. This experiment will be launched after the Czech parliamentary elections in May 29, 2010.

2.2 TI components

The TI is a composite index designed to measure the distance between the existing PP practices of contracting authorities and identified best practices in PP (e.g. OECD 2010, OECD 2008). The value of the TI is set as a single numerical value between 0 and 100, where 100 indicates the best practice. Once computed, the TI shall be made available to general public in order to enable public monitoring of the quality of PP practices of contracting authorities in the Czech Republic. This way, we try to induce pressure on the contracting authorities to behave in line with the identified best practices in PP, which would be an important step towards an open, citizen-friendly government.

The structure of composite TI is fairly simple:

$$TI_A = \sum_{k=1}^n w_k i_{A,k}$$

where A stands for some institution (contracting authority), $i_{A,k}$ is k 'th partial index for that institution and $w_k \in (0,1)$ is a weight, assigned to k 'th partial index.

All partial indices will, for the sake of simplicity, be also scaled between 0 and 100. Furthermore, we apply a general rule (unless mentioned otherwise) that if the data for computing a given partial index were not available at the time of harvesting (the robot was programmed to re-attempt unsuccessful harvesting several times, with some delay – to eliminate risk of communication error), the index was automatically set to 0, punishing the absolute lack of transparency.

Table 3: Components of the TI (version 1)

| Name | Weight | Description |
|------------------------------|--------|---|
| Successful objections to OPC | 0.20 | Number of successful objections to administrative authority |
| PP rules violations | 0.20 | Serious departures from the PP law, such as a winning bid above maximum or failure to announce PP within given deadlines, or at all. |
| PP share on purchases | 0.15 | Volume of goods and services purchases made through PP (rest is considered as non-transparent) |
| Supplier rating | 0.10 | Company creation date, legal structure, ownership structure, subcontractor share, share of PP's on turnover. |
| Winner concentration | 0.10 | Share of contracts awarded to 1, 3 and 5 largest suppliers. |
| Data correctness | 0.05 | Existence of stated winner, valid ICO (ID), and other data necessary to correctly identify the contracting authority, the contract and the winner, valid dates and contact address. |
| Savings | 0.05 | Announced maximum price minus winning bid. This indicator will be in further stages refined for comparable institutions or types of PP. |
| E-mail response rate | 0.05 | Time and quality of information provided on email request. |
| Procedure | 0.05 | Chosen legal PP regime |
| Deadlines | 0.05 | Time given to bidders after PP pre-announcement and PP announcement above legal quota. |

below provides an overview of the partial indices used for computation of our first version of the TI, more details to the individual indices are provided later in this chapter. In future, we are planning to improve the TI – through introduction of new partial indices, re-formulating current ones or new calibration of their weights. While doing this, we will however also keep publishing this first version of TI, in order to provide results comparable in time.

Table 3: Components of the TI (version 1)

| Name | Weight | Description |
|------------------------------|--------|---|
| Successful objections to OPC | 0.20 | Number of successful objections to administrative authority |

| | | |
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| Savings | 0.05 | Announced maximum price minus winning bid. This indicator will be in further stages refined for comparable institutions or types of PP. |
| E-mail response rate | 0.05 | Time and quality of information provided on email request. |
| Procedure | 0.05 | Chosen legal PP regime |
| Deadlines | 0.05 | Time given to bidders after PP pre-announcement and PP announcement above legal quota. |

Both the choice of the partial indices and the size of their weights have been motivated by the aim to construct an index that not only measures transparency per se, but - more importantly - indicates the space for corruption. Therefore whereas the partial indices cover various stages and aspects of the contracting authority's behavior, the weights emphasize only those, which have been identified by PP theory (see indices details below) as crucial for detection of corruption in PP. Additionally, the weights are scaled according to the relevance of the used information, i.e. how strongly it indicates misbehavior, and how well it justifies a suspicion of corruption or other identified types of serious PP misconducts.

We will now one-by-one define all 10 components of TI.

2.2.1 Successful objection to OPC

It is clear, that a well-defined and transparent PP's should not be subject to justified objections to the controlling authority (the OPC). Thus, our index uses o_A , the number of successful objections to the OPC against contracting authority A, together with n – the number of PP's awarded by A.

$$i_{A,1} = 100 - 100 \left(\frac{o_A}{n_A} \right)^{\frac{1}{4}}$$

By including this partial indicator to TI, an additional incentive for non-winning bidders to object is introduced (we will discuss his weak motivation to do so in 2.2.2) as they might feel that such objection matters. Consequently, increasing the number of such rightful objections might motivate the contracting authorities to perform better. This is perhaps the most straightforward case, where mere publication of TI might actually contribute to improving general PP practice.

The weight assigned to this indicator is 20% of the TI. This reflects the fact that a successful objection to the OPC is an important evidence of a failure in the PP procedure.

2.2.2 PP rules violation

This partial indicator awards the contracting authority A with no points if documentation if *any* of its PP's indicates violation of the PP law. Number of such violations is denoted v , and counts violations such as:

- Winning bid higher than maximum
- Failure to announce or pre-announce PP within legal deadlines

$$i_{A,2} = 100 I(v = 0)$$

Note that this is something qualitatively different than indicator of OPC objections. The objections only seldom deal with issues, which can be seen from the System. Thus whereas many PP's which obviously violated the law, were not subject to any OPC objections⁴, practically all the objections do not aim at problems reflected in the System.

The weight of this indicator is 20% (analogously to OPC objections index), because it directly reflects failure to comply with binding rules of PP.

2.2.3 PP purchases share

This index is a time-demanding one. We manually obtained budgets of the 101 largest contracting authorities in terms of volume of PP's awarded (for time reasons, others were not included and received a full rank of this index). Then, directly from the budget of each contracting authority A, we extracted sum of all items that represented some purchase of goods or services s_a . From our data on PP we then computed the sum s_m representing money spent transparently through PP's registered in the Czech Public e-Procurement Information System.

$$i_{A,3} = 100 \frac{s_m}{s_a}$$

The idea behind this index comes from the normative prescription that public money should be spent in a transparent manner and the PP's, realized through the System are currently the most transparent public spending channel. This index severely punishes *portioning* – a well known practice in the Czech PP, which means that a large contract is divided into multiple smaller PP's (so called small-scale contracts with value below CZK 2,000,000) that are not required by law to be registered in the System. Thus the small-scale PP's represent public funds spent completely out of public control, which creates an enormous space for corruption, inefficient use of public funds and for moral hazard in general. The higher is the value of this index, the higher share of the PP's of the contracting entity A was awarded transparently through the System.

The individual weight of the PP purchases share is 15% of TI due to the fact that it directly points out to one of the major identified problem of PP's in the Czech Republic, which is the *portioning*.

2.2.4 Supplier rating

Based on transparency of k -th PP winning bidder ownership structure t_k , d_k is time from company creation date in months⁵, fraction of its turnover coming from PP's f_k and subcontractor share s_k we computed simple indicators of chosen supplier transparency (as a function of t_k, s_k) and quality⁶ (as

⁴ This is possibly caused by the motivation of non-winning bidders not to object, as such act decreases their chance of winning future PP's, while the chances of winning present PP are still mild. This motivation of non-winning bidders was expressed by several of them during the PP public debate in the Czech Republic as well as on the EU level (see e.g. European Parliament (2007)).

⁵ Newly founded company means among others that there are may not be any information about the company's assets and liabilities in public registers (first financial statement is required by law to be published in the Commercial Register after 18 months from the establishment of the company)

⁶ The logic of using f_k as supplier quality indicator follows from idea, that suppliers which are capable of obtaining business contracts as well deliver higher quality services.

a function of f_k, d_k). Then the index of authority A is defined as plain average of all its supplier's indices.

$$i_{A,4} = \frac{100}{4n} \sum_{k=1}^n [t_k + (1 - s_k) + (1 - f_k) + I(d_k > 18)]$$

The value of the supplier rating index is 10%, because it is designed to detect several problems of PP's in the Czech Republic – such as awarding of PP's to companies with non-transparent ownership structure, to new or ad hoc created companies. The PP's with high share of deliveries by subcontractors are also considered as non-transparent due to the fact that the information about subcontracted companies is not published in the System.

2.2.5 Winner concentration

Measures the share of PP's awarded to groups of one, three and five most frequent suppliers:

$$i_{A,5} = 100 - \frac{100}{3} \left(\frac{s_1 - 1}{s_n} + \frac{s_3 - 3}{s_n} + \frac{s_5 - 5}{s_n} \right)$$

s_1 stands for the volume of contracts awarded by the contracting authority A to the most frequent (in terms of volume of contracts won) supplier, s_3 to the three most frequent suppliers s_5 to five and s_n for total volume of contracts awarded by the contracting authority A. All these numbers are aggregate counts for the last three years.

The idea of this partial index is analogous to the concept presented in OECD (2007:24), which identifies the *risk of familiarity with bidders over the years as leading to unfair awarding* (check also with informal networks described in OECD 2004: 59). In practice this manifests as a strong tendency of the contracting authority to award a high number of the PP's to a limited group of bidders regardless of the quality of the services or goods provided.

There are several supporting arguments, why to deploy the winner concentration index for evaluation of contracting entities. Firstly, such index favors institutions that use PP more frequently (they do not avoid PP by *portioning* which practically reduces spending transparency to zero). Secondly this index prefers institutions that award greater number of smaller PP's (registered in the System) to institutions that award only few large contracts. This is a positive feature, because it extends the number of potential bidders and thus enables also SME's to participate on PP. According to the European Commission (2008) the SME's participation enhances the overall competitiveness of PP tenders

Thirdly and possibly most importantly (this argument applies to several other partial indices as well), reader should recall that we earlier claimed limited informative value of TI for comparison of different types of institutions. This is the case here, as this partial index prefers supplier plurality. One could easily object, that some institutions need to buy services on very concentrated markets, thus their concentration index is necessarily high. However, since we know that index should compare institutions which are supposed to have roughly same budget structure, or even trace development of a single institution, then mentioned "disadvantage" of index is hardly a problem.⁷

Based on the above stated arguments, the weight of the winner concentration index is set as 10% of the total TI.

2.2.6 Data correctness

This index measures the number of factual errors committed by the contracting authority in PP documentation. This reflects only mistakes, which can affect the PP process, or which can decrease the transparency of the PP to public (e.g. preventing users of the System to find certain PP by authority identification number). This index also shows that the lack of control of the data inserted in

⁷ Pavel evaluates the macroeconomic transparency of the whole PP market, where use of such aggregate is plausible. Our TI on the other hand should be used for concrete institution rating, where measuring of savings without paying respect to market specifics has only moderate informative value, which is also a reason of assigning only minor weight to this partial index.

the System, which leads to decrease of the overall transparency of PP's in the Czech Republic. Main mistakes, which have been considered:

- Erroneous ID code (ICO) of contracting authority and of the winning bidder
- Missing prices and important dates
- Unreachable e-mail address

$$i_{A,6} = 100 - 100 \left(\frac{m}{m_{max}} \right)^{\frac{1}{4}}$$

Here m stands for number of errors made by the contracting authority A, and m_{max} for number of columns in the PP form (which is basically the total number of errors that the contracting authority could have done). The purpose of $\frac{1}{4}$ power in formula is to decrease the index considerably even for small fraction of mistakes. This index is in line with the best practices described in European Commission (2008), which highlights the importance of providing reliable ex-post information to the public.

The data correctness index is a controversial component of the TI (therefore it has an assigned weight only 5% of TI), because one may argue that typos and omissions in form filling are not factors that may influence the PP procedure or its results. Yet in our opinion, this index has its solid foundations. Firstly, it demonstrates the professionalism of the contracting authority, which shall be able to provide correct and reliable data concerning the PP's (again, it is necessary to bear in mind that that only such errors and omissions are taken into account that have a potential to hinder an effective control of the PP). Secondly, it may – in some cases – detect some willful errors and omissions committed in order to conceal some non-standard features of the PP procedure.

2.2.7 Savings

If we denote s_k the percentage of savings, made on k -th PP of authority A, we can compute index measuring average savings, again with $\frac{1}{4}$ power magnification.

$$i_{A,7} = 100 \left(\frac{1}{n} \sum_{k=1}^n \frac{s_k}{100} \right)^{\frac{1}{4}}$$

The savings themselves are computed as difference between price maximum (set by the contracting authority A) and the winning bid. They are a good proxy for competition between the bidders, and punish collusion or bid rigging (OECD 2008:1).

In the next phases of our research we may divide the PP's into groups according to the type of goods or services purchased and within these groups compare the savings again. Therefore, we by now assigned to the savings index a relatively small weight (only 5% of the TI), which is a substantial difference from former studies of the Czech PP's conducted by Pavel in Transparency International – Czech Republic (2005)⁸.

2.2.8 E-mail responses

This fairly straightforward “experiment” focuses on how contracting authorities fulfill their duty in providing information on demand. As was previously explained in this study, this part of our research will take part after the Czech parliamentary election at the end of May 2010. The experiment consists from sending of an e-mailed to each authority with a simple information request regarding data on the PP's they executed in the last four years. Based on the response we will directly award points as follows:

⁸ Pavel evaluates the macroeconomic transparency of the whole PP market, where use of such aggregate is plausible. Our TI on the other hand should be used for concrete institution rating, where measuring of savings without paying respect to market specifics has only moderate informative value, which is also a reason of assigning only minor weight to this partial index.

$$i_{A,8} = \begin{matrix} 0 & \text{no response} \\ 33 & \text{if negative response} \\ 100 & \text{positive response} \end{matrix}$$

The idea of checking for providing information is closely connected to the very idea of transparency, emphasized for example in (Transparency International 2008 or in Easterly and Pfitze 2008). The email response index is used as auxiliary information concerning the transparency of the contracting authority as such and of its individual PP's, thus it forms only a 5% of the TI.

2.2.9 PP procedure

Based on the legal analysis (see e.g. Pavel in Transparency International – Czech Republic 2008), we rated various PP procedures offered by the Czech law according to their transparency. Risk of failure to choose appropriate legal procedure is described also e.g. in OECD (2007), with clearly defined cases when less transparent procedure might be appropriate. Apart from several cases that received special treatment here (such as some ministry of defense PP's, with increased confidentiality requirement) we considered as best practice the most transparent procedures. Consequently the rating of procedures looks as follows:

The deployment of electronic auction of electronic market place received the highest rating (100), provided it was registered in the System. This was followed by registered open procedure (75), competitive dialogue (75) and negotiated procedure with publication (75), because in these three procedures can participate any supplier that fulfills the legal qualification requirements and the contracting authority shall to some extent announce the launch of such procedure in advance. The restricted procedure consists of two rounds, where the contracting authority firstly announces the tender openly, but in the second round requests bids only from limited, pre-selected number of suppliers that participated in the first round. Therefore we assigned the value of 50 to the restricted procedure. The negotiated procedure without publication means that only participants directly asked by the contracting authority can participate on the tender and thus receives (25), similarly to the simplified below-the-threshold procedure, in which the contracting authority is obliged to ask directly five or more suppliers to submit their bid, but is not required to open the tender for any supplier. Implicitly, the PP's not registered in the System would receive a value 0 – but as was said in 0, there are no reliable data on these PP's in the Czech Republic – it is only possible to estimate their aggregate volumes for individual contracting authorities as done by $i_{A,5}$.

The index for authority A was then computed as sum of procedure ratings over all PP's awarded by A, weighted by volume of those contracts.

$$i_{A,9} = \frac{1}{nv} \sum_{k=1}^n t_k v_k$$

where n is the total number of the PP's, v is their total value, t_k is the value assigned to the PP procedure, by means of which the k^{th} PP was awarded and v_k is the value of the k^{th} contract. In the literature (Pavel in Transparency International – Czech Republic 2008), it was already identified that the type of procedure influences both transparency as well as the efficiency of the PP. Therefore this index provides a good complementary information about the transparency of individual contracting entities and it is included to the TI with a weight set as 5% of TI.

2.2.10 PP Deadline

In line with European Commission (2008), this index is designed to support such institutions that give bidders more time to prepare their bids than required by the law. Given that such time is defined as $t_k = t_{A,k} - t_{min,k}$, we decided to simply reward PP's with t_k above threshold T (minimum set by Czech law as one month for below-the-threshold and two months for large-scale PP's). The index for authority A was then computed as sum of procedure ratings over all PP's awarded by A, weighted by volume of those contracts.

$$i_{A,10} = 100 \frac{\sum_{k=1}^n I(t_k > T)}{n}$$

The weight of this index on the total TI is set as 5%, which reflects the fact that it is constructed rather as a support to good practices in terms of greater transparency and openness of the PP procedure.

2.3 Future areas of research interest

The above stated partial indices are based on the data on PP procedures that are currently publicly available from public or reliable private registers. Yet OECD (2008) identifies following other malpractice risks in PP:

- failure of contracting authority to estimate a realistic PP budget (pre-bidding risk)
- too strict technical specifications tailored to fit to a one company, or in contrary very vague selection criteria
- prolongation of existing contracts without PP
- collusive bidding
- non transparent choice of sub-contractors
- lack of contractor and/or partner accountability

The above stated malpractices cannot be identified by means of our index due to either lack of data or difficulty to obtain such data (e.g. for identification of PP's with too strict technical specification, it would be necessary to go through details of all more than 30,000 PP documentations). In our further research, we however intend to investigate new ways, how to include some proxy variables for these malpractices into our index.

In the further phase of the research, it will also be necessary to investigate the groups of comparable contracting authorities and of PP's on similar goods and services in order to test the TI and its components on sub-segments of the PP market.

3 Conclusions

The tools of e-Government, such as are public registers, databases and electronic services to citizens are praised for their positive impact on cost reduction, accessibility, quality and transparency of the public administration. In our study, we focused only on the transparency feature of e-Government tools in the area of public procurement in the Czech Republic. We have analyzed the Czech Public e-Procurement Information System and discovered that despite the fact that it contains a plethora of information and provides multiple search options, it does not enable the public to effectively exercise control over procurements of Czech contracting authorities. This is caused by the fact that it is very difficult to extract from the System aggregate data on public procurements and the System itself does not contain any statistical feature that would facilitate the public control over e.g. total sum of public spending effectuated by certain public institution in one year, etc.

In line with (OECD 2008) we agree that transparency in PP should be considered public good and therefore provided by government. We constructed a composite index of transparency in PP's (Transparency Index) that shall demonstrate the drawbacks of the current tools for PP monitoring (with focus on the System) and show a way, how the transparency can be improved only by means of a slight modification of the existing e-Government tools. We showed that a several malpractices in the PP's could be detected from the existing data and in combination with public control; this may lead to substantial improvement of the PP procedure in the Czech Republic. On the other hand, we also demonstrated that without facilitation of the access to PP data in a downloadable, aggregate form, the public control would be extremely time-consuming and thus in fact, non-existent.

The next steps in our research shall include the confrontation of the TI and its individual components with the harvested data and collection of a set of Czech cases of best practices and malpractices, which will be used for cross-testing of the quantitative results of the TI. Where no example of Czech PP best practice in certain area will be available, we will use the best practices described in the OECD studies (e.g. OECD 2005 or 2007). Once the quantitative TI will be constructed, we would like to publish it together with the description of calculation methods on the web (similarly to e.g. <http://www.financialsecrecyindex.com/>) in order to obtain suggestions and recommendations from any interested party. As was already discussed, we believe that the TI will not only help to improve the

situation in PP's in the Czech Republic, but also highlight the importance of the public as watchdog of public authorities and of the general requirement on an open and accountable public spending.

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