Transaction costs and transparency of public procurement

RADEK JURČÍK
Department of Law and Social Science Faculty of Business and Economics
Mendel University in Brno
Zemědělská 1, 613 00 Brno
THE CZECH REPUBLIC
jurcik@mendelu.cz    http://www.mendelu.cz

Abstract: This paper concerns transaction costs and transparency of public procurement especially in relation to the new procurement directives. Public procurement is important economic area for each state. Public expenditure spend by public contracts are approximately 15% of Gross Domestic Products. This paper analyses factors influencing the transaction costs and transparency of public procurements in relation to the Public Procurement in the Czech Republic and in the European Union. From among a set of factors influencing the transparency of public procurement, we are dealing with relation and corruption, using of award procedure and also criterion who are using in public tender and have influence on transparency of public contract. It is analyses influence of administrative burden and transaction cost on transparency of public contracts.

Key-Words: Public procurement, factors of transparency, new European procurement directives, Anova model, public expenditure

1 Introduction
The legal and economic significance of public procurement in Europe is considerable, with yearly purchasing valued at 3.5% of the region’s GDP. The aim of this study is to analyse an effectiveness of the public procurement through defining transaction costs. The study is prepared in the context of a comprehensive evaluation of transparency of public procurement procedure and to help possible improvement of future procurement policy.

In the first part of the report, there is presented a definition of a transaction cost and are described circumstances of public procurement transaction costs. Furthermore, in the paper there would be recognized various procedures and techniques (across countries, over time, and in sectors), that can influence the costs and effectiveness of administration and participation in selected tender procedures foreseen by Czech legislation in comparison to European Union procurement legislation.

2 Problem Solution
The economic significance of public procurement in Europe is considerable, with yearly purchasing valued at 3.5% of the region’s GDP. The aim of this study is to analyze an effectiveness of the public procurement through defining transaction costs. The study is prepared in the context of a comprehensive evaluation of transparency of public procurement procedure and to help possible improvement of future procurement policy. In the first part of the report, there is presented a definition of a transaction cost and are described circumstances of public procurement transaction costs. Furthermore, in the paper there would be recognized various procedures and techniques (across countries, over time, and in sectors), that can influence the costs and effectiveness of administration and participation in selected tender procedures foreseen by Czech legislation in comparison to European Union procurement legislation.

2.1 Effectiveness and relation to the transaction cost
Effectiveness is the main objective of the institute of public procurement and should be managed by providing better services to the public at a lower price than it is possible to achieve by the public sector.

The effectiveness is dependent on the type of production. Many economists then raise the question about institutions, i.e. corporations,
markets, franchises, etc., minimize the transaction costs of producing and distributing a particular good or service, and the response tend to specific of a contract involved.

2.2 Transaction cost evaluated by Anova model

Pavel in 2005 suggests analyzing questions of transaction costs in procurement by institutional economics theory. It is based on three main assumptions; first of all “bounded rationality”, which means that imperfect contracts are due to the limited rationality of individuals, and these agreements suffer from necessity of additional costs (ex-ante and ex post). “Existence of opportunism” means that benefits extension may be carried out by using methods that are not entirely moral, and in some cases even not legal. Protection against the practice brings additional costs (ex-ante and ex post). The “existence of specific assets” is mentioned as the last one.

Comparably, Williamson said, that the amount of transaction costs which is relevant when deciding on ways how to ensure certain activities is influenced by three factors: specific activities, measurability of output and input frequencies.

The above described assumptions have serious implications for the analysis of the relationship between government and market actors in the implementation of public procurement.

The key assumption for the “rational” decision-making of public entities is the ability to realize the contracted goods and further quantify or at least estimate the size of the transaction costs associated with the implementation of the contract.

The question of measuring the amount of transaction costs is tricky. The problem is that these costs are not in most cases evident, mostly are not defined separately (in many cases there is a period of savings of scale).

In measuring the value of transaction cost in public procurement it is necessary to realize that there have not been only the public authorities with their costs but also the private sector. It is therefore important to recognize that in order to achieve maximum effectiveness, it is necessary to ensure minimizing both types of transaction costs, not only the public sector transaction costs.

Pavel gives examples of transaction costs related to procurement. Transaction costs in public sector are connected with organization and administration of public, competitions, compensation of independent experts, legal knowhow of contracts, public tender reestablishing, costs arising from the delay in the implementation of public contracts, and lawsuit. In private sector, we can define processing applications, obtaining a qualification requirement, security deposit, and lawsuit.

Transaction costs regarding to the public procurement in public sector are estimated around 1.8% of the contract value. For example Walsh – Davis estimate that these costs are limited to the ex-ante cost and do not cover monitoring and eventual bargaining activities. Conversely, the costs associated with monitoring were quantified by Audit Commission and is estimated at 3-4 % of the contract value.

In the Czech Republic, there has not been made any underlying attempt to measure the transaction costs in the area of public procurement; and it is the intention of the authors to research the issue as a part of the thesis.

Though, one of the kinds of measurements of transaction costs connected to tax system presented Pudil et al. The methods used in this study may obviously be used after appropriate adjustments, even in the case of public procurement. However, this approach will not be useful for estimating the ex post transactional costs arising due to non-compliance with the concluded contracts, because there will not be periodic tasks.

The largest positive economic work published until now focusing on transaction cost of public procurement in European Union is a study prepared for the European Commission in March 2011. Especially the second part of this paper introduces transaction cost analysis based on data from more than half a million of purchases published during TED for 30 countries in the years 2006 - 2010. Another source of data was a survey between 5500 and 1800 to the contracting authority suppliers. The study shows that there are significant differences among EU countries. Transaction costs in the Czech Republic are below average. The most important factor will be the labour cost, which is not still as high as in Western Europe.

Total cost of public procurement in Europe is estimated at about 1,4 percent of purchasing volume. This equates to about 5.3 billion euro in 2009 term. Businesses account for 75 percent of these costs. Although the unit costs for developing a request and managing the process are higher for authorities, the fact that several bids are prepared and submitted for each tender explains the higher total costs for suppliers. The average competition uses the equivalent of 123 person days of resources; in monetary terms this equates to 28.000 euro.

There is much difference in cost effectiveness between countries. For example, in Germany and Norway the process cost of procurement reaches...
above 4 percent of total procurement volume, while in the UK and Italy the share is less than 1 percent.

2.3 Factors related to transparency

Working on the assumption that a sufficient extent of competition on the offering side is a condition for an efficiently working public procurement system and being able to estimate the average number of submitted offers of such a procurement procedure then a sufficient number of offers makes it possible, due to the existence of a competition effect (inversely proportional relation between the number of submitted offers and the tendered price), to achieve favorable prices for the contracting authority.

In order to be able to describe the possible dependency of selected parameters influencing the intensity of tenders, we have carried out a quantitative analysis of secondary data acquired from the Journal of procurement containing 197 procurement procedures. Individual data have been selected randomly and acquired from published Contract notices and Contract award notices, by selecting following tenders conditions, Open procedure and Restricted procedure.

The reason to narrow the selection to two types of procurement procedures was their high share of the total number and of the total financial value of public procedures in the Czech Republic (Table No. 1). Data from negotiated procedures without publication have intentionally not been used, even though their share on the total number is higher than in the case of restricted procedures, because it is the character of such procedure to only have one offer.

Table 1. Structure of procurement procedures in the Czech Republic (selection)

<table>
<thead>
<tr>
<th>Year</th>
<th>% from total procurement procedures</th>
<th>% from total financial value of public contracts</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>Public procedure 43,8</td>
<td>65,1</td>
</tr>
<tr>
<td></td>
<td>Restricted procedure 4,9</td>
<td>14,3</td>
</tr>
</tbody>
</table>

MMR, Annual report on the state of public contracts in the Czech Republic, May 2012

By using a regression function, the authors have attempted to estimate the regression level coefficient expressed by a linear regression function (Marek, L. and coll. 2013) \( Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \epsilon \), where \( Y \) … is the explained value (dependent variable) \( X_1 \) … \( X_n \) are values explaining the variables \( \epsilon \) … is an unsystematic (random) element.

Because we are interested in the possible influence of explaining variables, specifically the type of procurement procedure (\( X_1 \) … as open and restricted), number of offers in procurement procedure (\( X_2 \)) and the estimated value of the public procurement (\( X_3 \), on the explained variable defined as the difference between the estimated value of the public procurement and the tendered price offered by the winning candidate (\( Y \)), we have included the before mentioned variables into the model (model No. 1). We have calculated the following values:

Table 2. Regression statistics of model No. 1

<table>
<thead>
<tr>
<th>Regression Statistics</th>
<th>Multiple R</th>
<th>Reliability value R</th>
<th>Given reliability R</th>
<th>Standard error</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0,931354275</td>
<td>0,867420786</td>
<td>0,865359969</td>
<td>11868694,78</td>
</tr>
</tbody>
</table>

Own calculation

Table 3. Regression of variance (Anova model) No. 1

<table>
<thead>
<tr>
<th>Difference</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>Import ance F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>3</td>
<td>6E+17</td>
<td>11569</td>
<td>E-84</td>
</tr>
<tr>
<td>Residue</td>
<td>193</td>
<td>1E+16</td>
<td>6E+14</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>196</td>
<td>3E+17</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Own Calculation

The adjusted coefficient of determination \( R^2 = 86,7 \) implies that it is possible to explain 87% of the variability of values of the explained variable thanks to this regression model.

We used the \( F \)-test for a complex evaluation of the mode. The tested hypothesis contains a claim that all regression parameters \( \beta_j \) \((j=1 \ldots , k)\) are, except for the \( \beta_0 \) constant, equal to zero, i.e. the model does not contain any explaining \( X_j \) variable, which is statistically important.

\( H_0: \beta_0 = c; \beta_1 = \beta_2 = \ldots \beta_k = 0 \)

\( H_1: \) non \( H_0 \)

It is obvious from Table 3 that the \( P \)-value of the \( F \)-test is \( 2,1614E-84 < \alpha = 0,05 \), so we can dismiss the zero hypothesis about an improper model.
We continued with partial t-tests, mainly the hypothesis test regarding the $\beta_0$ parameter and parameters $\beta_1$, $\beta_2$ and $\beta_3$. Based on the calculated reliability intervals, we reject the tested hypothesis for $\beta_0$, $\beta_1$ and $\beta_2$. However, the reliability interval for the partial $\beta_3$ t-test contains zero. We do not reject the zero hypothesis ($H_0: \beta_3 = 0; H_1: \beta_3 \neq 0$).

We will try to improve the described model in the next step and we will exclude the explaining $X_2$ variable. In this case we will receive the following parameters (model No. 2).

Table 4. Regression statistics of model No. 2.

<table>
<thead>
<tr>
<th>Regression Statistics</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiple R</td>
<td>0.930829354</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reliability value R</td>
<td>0.866443287</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Given reliability R</td>
<td>0.865066414</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard error</td>
<td>11881626.37</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Observation</td>
<td>203</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Own calculation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 5. Anova model No. 2.

<table>
<thead>
<tr>
<th>Differance</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>Importance F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regressio</td>
<td>1,7767</td>
<td>8,8837</td>
<td>629,28</td>
<td>1,5473</td>
</tr>
<tr>
<td>nce</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resid</td>
<td>2,7387</td>
<td>1,4117</td>
<td></td>
<td>E-85</td>
</tr>
<tr>
<td>uce</td>
<td>194</td>
<td>6E+16</td>
<td>3E+14</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>196</td>
<td>3E+17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Own calculation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Thanks to the adjusted coefficient of determination $R^2 = 86.5,$ we are able to see that it is possible to explain 86% of the variability of values of the explained variable thanks to this regression model. In comparison with model No. 1 this value has changed minimally, thus we can continue considering the use of such model.

As well as for the P-value of the F-test being $1.5473 \times 10^{-84} < \alpha = 0.05,$ we can dismiss the zero hypothesis about an improper model.

After finishing partial t-tests (hypothesis test of parameter $\beta_0$ and parameters $\beta_1$ and $\beta_2$), it is possible to state that the constant as well as both explaining variables of the procurement procedure type ($X_1$) and the estimated value ($X_2$) contribute to explain the model.

The regression level has the following form: Price difference $=-9178287.082+8900448.76*\text{type of procedure}+0.394208136*\text{estimated value}$. If the procedure is restricted then the equation implies that the price difference will decrease, meaning a higher achieved tendered price in comparison to its estimated value (in this case $\beta_1$ is equal to 0).

3 Conclusion

The authors have pursued to determine the level of dependency of selected variables. Pearson’s correlation coefficient ($r$) has been used to determine the relation’s dependency intensity.

A positive correlation of $r = 0.171582$ was measured from secondary data for the dependence of the number of submitted offers in a procurement procedure and the price difference (defined as the difference between the expected value of a public procurement and the winning bid of a candidate). Due to the positive value and the amount of $r$, we can talk about a weak dependency ($r$ has an interval of $<-1,1>$ and, in this case, does not reach limit values). A possible interpretation could be: the increase of the number of offers has a weak positive influence on the price difference.

The public procurement is the issue of professional economic debates; it is difficult to understand the prevailing neoclassical microeconomic apparatus, and therefore it is necessary to start supplementing economic instruments of transaction costs.

The above mentioned theoretical aspects are introduction to the next paper – the research how to determine these costs and identify factors that interact. This would allow dividing the goods and services in terms of whether they are suitable or unsuitable for outsourcing. The next step and also more problematic would be the quantification of these costs. It is necessary to focus on their decomposition and determine which aspects of the institutional setting the transaction costs increase. On the basis of results will be relevant to formulate economic policy recommendations for reform of formal and informal institutions. This should have a positive impact on the effectiveness of public procurement as well as for the overall efficiency.

Also, the above stated findings gained from the study of the given issue and conducted analysis represents a fundamental platform for further scientific work. Measuring has discovered the dependence of the price difference on the type of procurement procedure, and the positive dependency between the number of submitted offers in a procurement procedure and the price difference. However, due to the fact that the analysis is based on a relatively small sample of data, the authors of this article consider to verify and expand their conclusions through further and more extensive measuring.
References: