

MEASURING PRIVATE TRANSACTION COST OF PUBLIC PROCUREMENT: CASE OF THE CZECH REPUBLIC

Luboš Dufek

Received: January 11, 2013

Abstract

DUFEK LUBOŠ: *Measuring private transaction costs of public procurement: Case of the Czech Republic*. Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis, 2013, LXI, No. 2, pp. 317–325

In the Czech Republic ca. 13% of the GDP, is spent every year on public procurement. More money each year has to be spent by the contracting authorities and private subjects for the public procurement to even work. This paper focuses on measuring private transaction cost of public procurement in the Czech Republic. In the first section of this paper, we present data used for our analysis and methods used for achieving our goals. In the second section, we summarise the results. Average transaction cost of one proposal is CZK 22 489. Weighted average relative transaction cost is 0.25% of the contract value. We estimate the total transaction cost of public procurement in the Czech Republic to be almost six billion CZK, further we estimate possible cost reductions of these cost in the case of increased effectiveness to be between 500 million and CZK 1.84 billion. The market sector, contract prices, size of the firm and different types of contracting authorities have all a significant influence on the transaction cost. A comparison of our results to other empirical studies have been made and some interesting facts found out during research have been explained at the end of the second section.

transaction costs, public procurement, Czech Republic

There is a statement that I think most people, even people who have never studied economics have heard: *You need money to make money*. Well, let us leave polemics to the polemicists. I propose to slightly change the statement to: *What is the minimum amount of money firms need to compete for public contracts? (and thus have a chance to make money)*. This leads us to the question this paper focuses on.

In 2011, according to MMR (2012), the Czech Republic have spent ca. CZK 496 bn., that is ca. 13% of its GDP, on all kinds of public procurement contracts. Firms, which wanted to get some part of this lump sum, had to spend some money to have a chance to be successful. Due to big amount of money spent on procurement contracts could total private transaction cost reach billions of CZK.

What actually are transaction costs? The Pioneer of the transaction cost economy is Coase (1937), who wrote in his famous paper: "The nature of firm" that *there is a cost of using price mechanism (discovering*

of relevant prices, negotiating and concluding a separate contract). Pavel (2005) understands the transaction cost as *all cost connected to contract realization besides cost of production* and compares it to friction. For a better grasp of analyzed topic one may use the work of Holubářová (2012). The importance of transaction cost quantification is mainly in its influence on willingness of firms to participate in procurement tenders. Higher cost would lead to decrease in number of proposals. As shown in Kuhlman, Johnson (1983), Bajari (2001), Pavel (2010), there is an indirect dependency between final price and competition level.

The main goal of this paper is to measure private transaction cost of public procurement of selected respondents, identify factors which have the biggest influence on quantity of these cost, estimate total private transaction costs in the Czech Republic and quantify possible savings in case of improvement of public procurement contracting system.

DATA AND METHODS

Due to the fact, that quantitative analysis of public procurement transaction cost are very scarce – EC (2011), we can use methods used for measuring of taxation administrative cost in Pudil *et al.* (2004) and modify them for purposes of this paper. Modifications mainly consist of using only the first type of the “classical” administrative cost and leaving out the taxation specific types of cost. For primary data collection we have used a questionnaire survey with broad spectre of addressed firms.

Selection of potential respondents was based on information provided by ISVZ (Czech Information system about public procurement contracts) and its winners of procurement contracts section. We have even tried to improve the expected low return rate of questionnaires by contacting firms, which profile themselves as transparent ones¹, but the improvement against the random selection was only marginal. Finally, the questionnaires return rate was near to 12%. For our analysis we had data from 48 firms of different sizes (Tab. I) and different market sectors (Tab. II).

If we multiply the average number of proposals in one tender by the number of contracts published in the ISVZ, we will get around 80 thousand proposals in 2010 and 2011. Researched firms have sent more than 4 thousand of those proposals. That means our sample size is about 5%. The average contract value was almost CZK 23 million. Total value of

analysed contracts in our paper is therefore CZK 99 bn. in 2 years, which is ca. 8% of all realised public procurement contracts. More info about tenders is shown in Tab. III.

For calculation of transaction costs from collected data it is useful to divide the procurement process into more parts, then make separate calculations for each part and finally to add the results together to get total transaction costs of public procurement. Possible procurement phases are (EC 2011):

- Pre-proposal
- Proposal
- Post award
- Litigation and complaint.

Our calculations are focused only on the first two phases. In the first part, they are based on the size of load contracts given to keep track of public procurements. In the second part, our calculation is based on the person-days needed to prepare the final proposal and on other non- wage costs (payments for procurement documentation, external law services...).

For calculations of each type of cost we have used following equations:

$$C_T = E_C \times W_{MA} \times 1.34 \times 12, \quad (1)$$

where

C_Tcost of public procurement tracking,
 E_Cnumber of employee contracts for tracking,
 W_{MA}monthly average wage in economy.

I: *Size of firms*

Employees	10 or less	11–50	51–250	250 or more
%	18.75	25	20.83	35.42
Sales (mil €)	2 or less	2–10	10–50	50 or more
%	27.66	29.79	21.28	21.28

Source: Own research

II: *Market sector of firms*

Market sector	Building industry	Educational services	Consulting	IT
%	25.00	12.50	8.33	8.33
Market sector	Financial services	Office aids	Special vehicles	Waste disposal
%	8.33	6.25	4.17	4.17

Source: Own research

III: *Description of public procurement tenders*

	Contract value (Thousands CZK)	Tender participation	Tender wins	Success rate (%)
Total	99 039 124	4308	1367	31.73
Average	22 990	89.75	28.48	34.81
Median	3 850	35.5	10	30
Minimum	100	2	0	0
Maximum	300 000	700	260	84.62

Source: Own research

1 Platform for transparent public procurement contract (<http://www.transparentnizakazky.cz/>)

$$C_{PP} = \frac{D_{PP} \times W_{MA}}{20} \times 1.34, \quad (2)$$

where

C_{PP} cost of proposal preparation,
 D_{PP} days needed for proposal preparation.

$$C_O = P_D + P_O, \quad (3)$$

where

C_O other (non-wage) cost,
 P_D payment for documentation,
 P_O other payments.

If we connect previous figures into one, we will get final equation applicable for calculation of transaction cost of one single proposal:

$$TC = \frac{C_T}{T} + C_{PP} + C_O, \quad (4)$$

where

TC transaction cost,
 T number of tenders firm competed in.

We can calculate the cost either in absolute prices (CZK) or in relative prices (percent of contract price). The second method is useful also for achieving our other goal, estimation of the total private transaction cost of public procurement for the Czech Republic. We use the following equation:

$$TC_{PP} = (P_A \times TC_{\%}) \times M_{PP}, \quad (5)$$

where

TC_{PP}private transaction cost of public procurement,
 P_Aaverage number of proposals in one tender,
 $TC_{\%}$relative transaction cost of one proposal,
 M_{PP}money spent on public procurement.

Based on the total transaction cost estimation, we can further estimate possible savings from improvement in effectiveness of procurement processes (if those were more like market allocation). Possible savings estimation is based on the equation:

$$S = TC_{PP} \times R_T, \quad (6)$$

where

Spossible saving of cost,
 R_Ttime reduction if procurement were as effective as market (%).

The last remaining goal is to identify the factors, which can influence the transaction cost.

Dependence on market sector of firms can be seen in graphical analysis. Following methods have been used to find out the role of other factors:

1. calculation of correlation coefficients
 - correlation between relative cost (% of proposal price) and each factor
 - correlation between absolute cost (CZK) and each factor
2. econometric modelling
 - model explaining relative cost (% of proposal price)
 - model explaining person-days needed for proposal preparation.

Both econometric testing were done as estimation of heteroscedasticity corrected linear model. A large number of tested factors (every mathematically quantifiable, including dummy variables) was reduced by using sequential elimination of statistical insignificant ones. Final results of econometric testing are models presented in following part of this paper.

RESULTS AND DISCUSSION

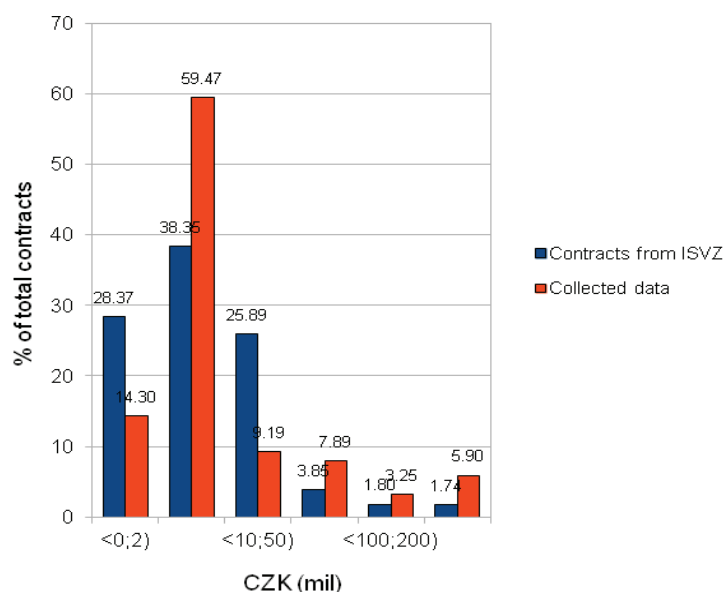
If we use equations (1), (2) and (3) on collected data, we'll get cost of each type of activities undergone in procurement process. Then with application of equation (4) we get total transaction cost of one proposal. Results are shown in Tab. IV. We can see here, that some firms are not actively tracing public procurement tenders and react only when they are directly approached by a submitter. Or in some cases, they may outsource the tracing to other firms and therefore the cost of these services would fall under category of other (non-wage) expenditures. The biggest part of costs were wages for proposal preparation. Only in some extreme cases have those been exceeded by other costs and this was primarily caused by significant payments for documentation.

In Fig. 1 we can see distribution of public contracts in 2010 and 2011 based on their values. There are some differences between data from ISVZ and our collected data. These can be explained for instance by the fact, that most of the respondents were larger firms (see Tab. I), which would be more interested in bigger contract values. One interesting and rather promising surprise was the fact, that although contracting authorities were not forced by law to put informations about contracts with value under 2 mil CZK into ISVZ, they still chose to do so.

IV: Cost of public procurement

Cost (CZK)	Average	Minimum	Median	Maximum
Tracing (per year)	170 488	0	77 184	964 800
Proposal preparation	13 879	482	8 040	72 360
Non-wage	5 171	0	425	150 500
Transaction cost	22 489	2 576	14 734	166 580

Source: Own research



1: Histogram of contract values 2010–2011
Source: Data from ISVZ, Own research

V: Transaction cost of one proposal (% of contract value)

Average	Weighted average number of tenders	Weighted average contract value	Weighted average ISVZ histogram	Weighted average data histogram
0.79	0.09	0.44	0.25	0.25

Source: Own research

Some weighted averages shown in following table were counted based on the preceding histogram. In Tab. V you can see relative transaction cost of one proposal.

Now that we know everything we need to estimate the total private transaction cost for the Czech Republic in 2011. CZK 496 bn. were spent on public procurement in 2011, from which CZK 435 bn. were spent by the state contracting authorities and remaining CZK 61 bn. by contracting authorities operating in the water, energy, transport and postal services sectors. Average number of proposals was 4.9 for state contracting authorities and 2.7 for the contracting authorities in utilities (MMR 2012). Weighted average number of proposals is therefore 4.63. Weighted average created from histograms seems as most acceptable value for average transaction cost of one proposal. Luckily for us, both of those weighted average have same value, so we can save ourselves the inconvenience of picking the most suitable one.

If we use previously mentioned values in equation (5) we get:

$$TC_{pp} = (4.63 \times 0.25\%) \times 496$$

$$TC_{pp} = \text{CZK } 5.74 \text{ bn.}$$

So the total estimate of private transaction cost of public procurement for the Czech Republic in 2011 is almost CZK 6 bn.

Now let us focus on possible savings. From questionnaires we have found, that for most firms it is less time demanding to prepare equivalent proposal for private sector than for public sector. This is caused mainly by requirements to prove different types of capabilities (most criticized one was proving economy and finance capability) and in some cases by special demand from contracting authorities on formal structure of proposal. Average estimate of time saving for proposal preparation was 14.13%.

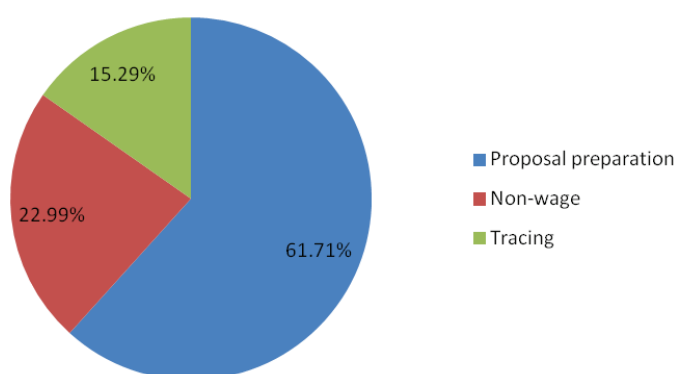
In Fig. 2 we see average cost structure of one proposal. If we assume, that there are only time reductions in proposal preparation for private sector and other cost remain the same, then the possible savings will be 14.13% from 61.71%, which is 8.72% from total transaction cost. If we put this value into equation (6) we'll get:

$$S = 5.74 \times 0.0872$$

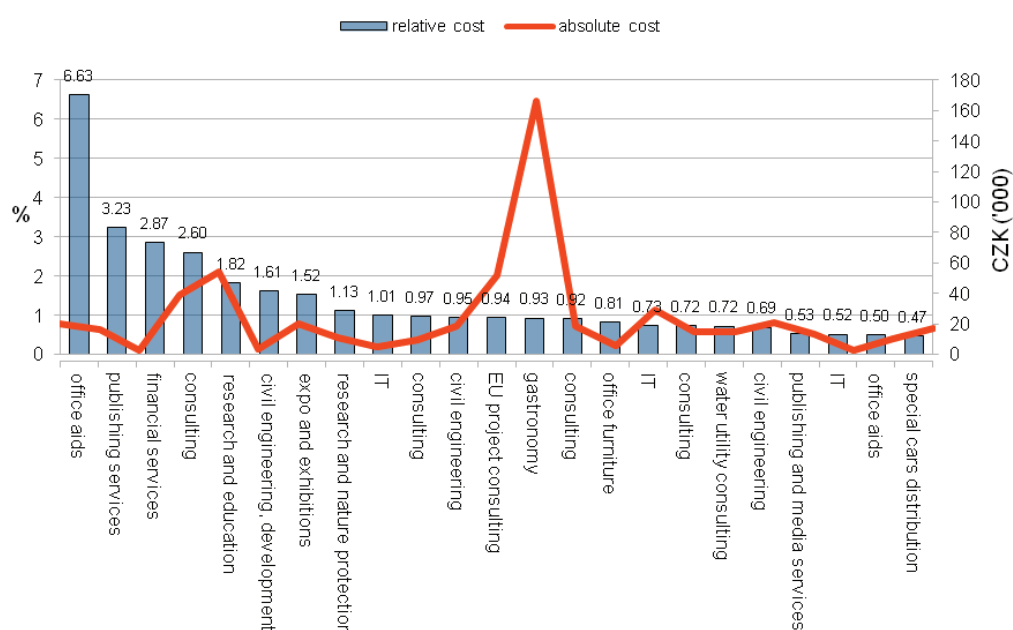
$$S = \text{CZK } 500.53 \text{ mil.}$$

Minimal estimation of possible savings is CZK 500 million.

We can also assume, that in the private sector contracting are not only proposal preparation time reductions, but also non-wage cost (no payments for procurement documentation, no signatures validation etc.) are approaching zero. In this case the cost of one proposal for private sector (including the



2: Average cost structure of proposal
Source: Own research



3: Transaction cost of one proposal for each firm by market sector
Source: Own research

time savings) could be almost 32% lower than the proposal for public procurement. After substitution in equation (6):

$$S = 5.74 \times 0.32$$

$$S = \text{CZK } 1.84 \text{ bn.}$$

Maximal estimation of possible savings is CZK 1.84 bn. Real savings of transaction cost will be somewhere between previously mentioned limits.

The goal of this paper was identification of factors, which may influence total transaction cost. First researched factor was the market sector of the firms. Results can be seen in Fig. 3. Due to the limited extent of this paper, that figure shows only first 50% of transaction cost. Other half of firms have transaction cost between 0.004% (respectively minimum cost in CZK from Tab. IV) and least shown value.

After that we have counted correlation coefficients between transaction cost and all tested factors. For both absolute and relative cost we have chosen the five highest direct and the five highest indirect dependencies. Results are shown in Tabs. VI and VII.

Strongest direct dependencies were between documentation payments and person-days needed for proposal preparation. That is to be expected also because of formula (4) used for our calculation, nevertheless it should have not been left out. It is also logical, that with growth of contract value there will be an increase of absolute cost. The strongest indirect dependency was shown in cases, when the contracting authority (CA) was municipality. The same explanation as in cases when CA was province or when the proposal was prepared without an assistance of a lawyer can be used: Value of these contracts probably will not be as high as in other cases and absolute cost will be lower in smaller

VI: Correlation between factors and price (CZK)

Factor	Payment for documentation	Person-days needed	Contract value	Price for outsourcing	Other expenditure
CC _{CZK}	0.82	0.54	0.22	0.20	0.18
Factor	Number of tenders	Success rate	Province	w/o lawyer	Municipality
CC _{CZK}	-0.16	-0.16	-0.20	-0.22	-0.28

Source: Own research

VII: Correlation between factors and relative price (% of contract value)

Factor	Certified supplier	Less than 10 empl.	Sales less then 2 mil €	w/o lawyer	Services
CC _%	0.38	0.34	0.25	0.24	0.11
Factor	Own lawyer	Subsidised CA	Utilities CA	Municipality	Central government
CC _%	-0.19	-0.19	-0.23	-0.27	-0.28

Source: Own research

contracts. We explain indirect dependencies between absolute cost and number of tenders and firms success rate in it by being more experienced and therefore more effective.

The strongest direct dependency of relative cost was the fact the firm was a certified supplier. One possible explanation originates from Williamson (1981), who says that transaction cost are influenced also by specificity of assets, which could probably be our situation. Other three strongest dependencies could be explained by size of firm: smaller firms (contracts) will have higher relative transaction cost than bigger ones (economy of scale and due to specialization). When talking about indirect dependencies of relative cost, we can sometimes use the argumentation about contract size again. Best examples are utilities CA², because they have to use public procurement only when the contract size exceeds limit (almost 12 mil CZK). The hardest situations to explain are the situations, when the municipalities are the CA. Size of their contracts would suggest, there should be direct dependency of relative cost. The results show indirect one, forementioned effect was probably exceeded by simplicity of tenders (less specific and easily available goods) causing it to be less costly.

Last method we have used for identification of possible factor influence on transaction cost was econometric analysis, which resulted in two following models:

$$TC_{\%} = \beta_0 + \beta_1 \cdot S_2 + \beta_2 \cdot S_4 + \beta_3 \cdot CA_{CG} + \beta_4 \cdot CA_{WE} + \beta_5 \cdot \ln T + \beta_6 \cdot \ln P,$$

Mean dependent var = 0.67 S.D. of dependent var = 0.74
R² = 0.58 adjusted R² = 0.51

where

TC_%.....relative transaction cost (%),

S₂.....sales between 2 and 10 mil € (dummy),

S₄.....sales more than 50 mil € (dummy),

CA_{CG}...contracting authority is central government (dummy),

CA_{UT}...contracting authority is from water, energy... (dummy).

T.....number of tenders,

P.....price of public contract.

Tab.VIII shows detailed information about first model.³

All of the dummy variables in the model have positive coefficients, which means higher relative transaction cost, when the contract fits into one of these categories. We can explain higher cost in

VIII: Characteristics of first model

	Coefficient	Std. error	t – value	p – value	significance
constant	3.744360	0.7644670	4.8980	0.00002	***
S ₂	0.283812	0.0999261	2.8402	0.00720	***
S ₄	0.720611	0.2527350	2.8513	0.00700	***
CA _{CG}	0.539079	0.1272530	4.2363	0.00014	***
CA _{WE}	0.429623	0.1083410	3.9655	0.00031	***
lnT	-0.188805	0.0371837	-5.0776	0.00001	***
lnP	-0.208692	0.0490495	-4.2547	0.00013	***

Source: Own research

² CAs operating in the water, energy, transport and postal services sectors – Directive 2004/17/EC

³ *** means statistical significance at level of 1%

cases of mentioned CAs by specificity of goods, but how should we explain dependency of cost on sales? Highest value of coefficient S_4 may suggest a possibility, that the biggest firms show some similarities to expensive state bureaucracy in formalized decision making processes.

Negative coefficient for number of tenders again shows on forementioned higher effectiveness in frequent activities, negative value of coefficient for price is only a logical outfall of an indirect dependency of relative transaction cost (as a % of contract price) and price.

Second constructed model tested person-days dependency on different factors:

$$D_{pp} = \beta_0 + \beta_1 \cdot E_1 + \beta_2 \cdot S_1 + \beta_3 \cdot serv + \beta_4 \cdot \ln P,$$

Mean dependent var = 6.24 S.D. of dependent var = 4.36
 $R^2 = 0.47$ adjusted $R^2 = 0.41$

where

D_{pp} ... person-days needed for proposal preparation,
 E_1 less than 10 employees (dummy),
 S_1 sales less then 2 mil € (dummy),
 $serv$.. services public contract (dummy),
 P price of public contract.

Detailed information about second model is shown in Tab. IX.⁴

The positive coefficient for E_1 may mean, that microenterprises do not have employees, that may focus solely on proposal preparation, and therefore it takes them longer to finish creation of proposal. Negative coefficient for S_1 could probably relate to smaller tenders, in which these low sales enterprises compete. Why does our model suggest that contracts on services need more time for proposal preparation then the other types of public contracts? Probably again higher specificity of services and maybe also more criterias being rated than just the price.

It's possible to compare our results to other empirical studies (more precisely study), but there are some problems. EC (2011) quantifies the transaction cost (private and public) of one public procurement tender in member states of EU. In the Czech Republic, the result was 8 500 Euros, from which 6 900 Euros were the private transaction cost (average proposal cost multiplied by average number of proposals). Average cost of one proposal in the Czech Republic according to this research is 1 815 Euros, that's more than 45 thousand CZK⁵. In our paper (see Tab. IV), we have estimated the average cost of one proposal as less than half of the forementioned value. The main reason for such unequal result is a different data base, more precisely the fact, that research of EC is based on contracts published in Tenders Electronic Daily (TED), where only the biggest contracts have to be published, and our research is based on contracts from ISVZ, where besides the biggest contracts are also data about much smaller contracts. And as it could be seen in Table VI, there is correlation between price and absolute transaction cost. It is also better to quantify the transaction cost as a relative number, not as an absolute cost provided by EC, because it can be used for better international comparison or easier estimation of total transaction cost on state level. Main differences between those two researches are summarized in Tab. X.

CONCLUSIONS

Based on the data from questionnaire survey we have measured the transaction cost of one proposal for each respondent. In absolute numbers, these costs were between 2 500 CZK and 167 000 CZK, with average at CZK 22 489 and median at CZK 14 734. Using the histograms, we were able to count

IX: Characteristics of second model

	Coefficient	Std. error	t – value	p – value	significance
constant	-17.47930	3.938340	-4.4382	0.00008	***
E_1	5.53737	2.060390	2.6875	0.01062	**
S_1	-3.41394	1.252920	-2.7248	0.00967	***
serv	2.92188	1.140180	2.5626	0.01447	**
$\ln P$	1.43792	0.255599	5.6257	<0.00001	***

Source: Own research

X: Comparing differences

	EC (2011)	this paper
Primary data based on	TED	ISVZ
Cost calculation based on	mainly wage cost	wage + nonwage cost
Average number of proposal	3.8	4.63
Final result as	absolute cost	relative cost

Source: EC (2011), own research

4 *** means statistical significance at level of 1%** at level of 5%

5 At exchange rate of 25 CZK/EUR

weighted average of relative cost of single proposal – 0.25% of contract value.

Based on the previous numbers, we have estimated the total private transaction cost of public procurement in the Czech Republic in 2011. Estimated cost is CZK 5.74 bn. We have also quantified possible cost reductions from improved effectiveness in public procurement. Depending on premises, reductions could be between CZK 500 million and CZK 1.84 bn.

We have also researched possible influence of different factors on transaction cost. From graphic analysis it was obvious, that the cost of one proposal differs in various market sectors. For instance firms from civil engineering had the highest absolute cost. Relative cost were higher for smaller contracts of firms in office aids supplies or publishing services.

Besides graphic analysis we have used correlation coefficients for identification of dependencies between cost and researched factors. Most interesting were indirect dependencies between absolute cost and number of participation in tenders and success rate in tenders. Indirect dependency between relative cost and different types of contracting authorities.

The last method used for research of factor influence was econometric modelling. Models explained relative cost of one proposal and person-

days needed for one proposal. Contract price was statistically significant in both models. Also different characteristics of firm size (sales, number of employees) were statistically significant in both cases.

We believe that most of the transaction cost reductions can be made during the process of proving of capability. With consistent usage of blacklists one can imagine only minimal capability claims. Capability claims may also be reduced, if the state would effectively use all the data collected in different types of central databases. Some of the complaints from the firms were about uncertainty, more precisely that in some cases it is not obvious, what contracting authority really wants, and therefore it is more costly to prepare the adequate proposal. This could be solved by better education of civil servants in charge of public procurement. Current trend of electronization in the state administration is good for transaction cost minimalization and should continue.

One logical possibility for following research is measuring administrative cost of contracting authorities, which would cover total transaction cost of public procurement. Because of the frequent changes of legislation it is also possible to repeat our research after some time and see, whether the situation is improving.

SUMMARY

The goal of this paper was to measure private transaction cost of public procurement, identify factors, that may influence those cost, estimate total yearly private transaction cost of public procurement in the Czech Republic and quantify possible cost reductions from increased effectiveness.

Research was based on our own primary data collected by questionnaire survey between firms, which competed for contracts published in ISVZ. We have analysed data from 48 different firms, which in 2010 and 2011 took part in more than 4 000 tenders and total value of analysed contracts was almost CZK 100 bn.

The methods of measuring transaction cost of one proposal have used information about number of work contracts for tracing public procurement, person-days needed for proposal preparation and other (non-wage) cost. We have also taken into account number of tenders and average contract value. In absolute numbers, cost of one proposal was between 2 500 CZK and 167 000 CZK. Average cost of proposal was 22 489 CZK, and the median cost was 14 734 CZK. Based on the histogram we have estimated weighted average of relative cost to be 0.25 % from contract price.

Estimation of the yearly private transaction cost was based on average number of proposals in one tender, relative cost of the single proposal and the lump sum spent on public procurement. Possible cost reduction were calculated from respondents estimations of time reductions between public and private procurement. Estimation of total transaction cost in the Czech Republic in 2011 is CZK 5.74 bn, possible cost reduction is somewhere between 500 million CZK and CZK 1.84 bn.

For identification of influencing factors we have used graphic analysis, correlation coefficients calculations and econometric modelling. Among factors with the highest influence were the market sector of the firm, contract price, size of the firm and different types of the contracting authorities.

Acknowledgement

This paper is processed as an output of a research project *Analysis of the Effectiveness of Public Procurement* registered by the GA ČR under the reg. number P403/11/0458.

REFERENCES

BAJARI, P., 2001: Comparing Competition and Collusion in Procurement Auctions: A Numerical

Approach. *Economic Theory*. 18, 1: 187–205. ISSN 1432–0479.

COASE, R. H., 1937: The nature of the firm. *Economica, New Series*. 4, 16: 386–405.

- EC, 2011: *Public procurement in Europe: Cost and Effectiveness*. Brussels: European Commission.
- HOLUBÁŘOVÁ, J., 2012: *Transaction cost economics and examination of transaction cost of public procurement*. In: *Teoretické a praktické aspekty veřejných financí*. Praha: Oeconomica. ISBN 978-80-245-1764-3.
- ISVZ: *Informační systém o veřejných zakázkách*. [cit. 2012-12-12]. Cited from <http://www.isvzus.cz/>.
- KUHLMAN, J. R., JOHNSON, S. R., 1983: The Number of Competitors and Bid Prices. *Southern Economic Journal*. 50, 1: 213–220. ISSN 0038-4038.
- MMR, 2012: *Výroční zpráva o stavu veřejných zakázek v České republice*. [cit. 2012-12-12]. Cited from <http://www.portal-vz.cz/CMSPages/GetFile.aspx?guid=48ab476b-8289-4109-957a-e9b081064a46>.
- PAVEL, J., 2005: *Transakční náklady a veřejné zakázky?* [cit. 2012-12-12]. Cited from http://kvf.vse.cz/storage/1168943124_sb_pavel.pdf.
- PAVEL, J., 2010: Analýza vlivu míry konkurence na cenu rozsáhlých staveb dopravní infrastruktury. *Politická ekonomie*. 3: 343–356. ISSN 0032-3233.
- PUDIL, P., VYBÍHAL, V., VÍTEK, L., PAVEL, J., 2004: *Zdanění a efektivnost*. 1. vyd. Praha: Eurolex Bohemia. ISBN 80-86861-07-4.
- WILLIAMSON, O. E., 1981: The Economics of Organization: The Transaction cost Approach. *The American Journal of Sociology*. 87, 3: 548–577. ISSN 1536-7150.

Address

Ing. Luboš Dufek, Department of Public Finance, University of Economics, nám. W. Churchilla 4, 130 67 Praha 3, Czech Republic, e-mail: lub.dufek@post.cz