COMPARISON OF EFFICIENCY OF PUBLIC PROCUREMENT ORGANIZED BY PUBLIC SECTOR AND LOCAL MONOPOLIES

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Abstract

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The aim of this paper is to identify the difference between the prices achieved in public procurement by public and private bodies. The analysis exploits the fact that European legislation forced to follow the Public Procurement Act not only public sector but also private companies working in the position of local monopolies (gas supply, water supply, public transport, etc.).
The analysis is based on data from the Information System of Public Procurement in the Czech Republic. The data set is created by more than 500 observations containing information about the large construction contracts from the years 2006–2011. Details of these contracts were analysed using regressions. As a dependent variable were used price achieved (in the first model) and the number of bids (in second model). As explained variables were the numbers of bids (only in the first model), type of tender, the contract size, etc. The methodology is based on foreign papers, which are dealing with the issue of competitive effects.
The results show that the public sector bodies obtain in their tenders on average more bids than private firms, but their realized prices are higher. Another finding is the influence of the type of procurement procedure. In the public sector are the best rates achieved with open procedures, while in the case of private entities was not identified the influence of procurement procedures.

construction work, Czech Republic, efficiency gap, public procurement

To quantify the extent of inefficiency in public procurement is very problematic task as well as the quantification of tax evasion and of the shadow economy. One of the ways to deal with this problem is to compare the results of tender procedures of two types of entities: public and sectoral. In the first case, we speak about the classical public sector entities that are not subject to market pressures and which are financed from budgetary resources. In the second case they are local monopolies which are often owned by private entities[1]. It can be assumed that the incentives for inefficient behaviour will be weaker in the case of sectoral authorities, because the savings can be transformed into profit. This simple mechanism for public authorities is missing.

The aim of this paper is to compare the results of tendering procedures of construction works organised by public and sectoral entities. The analysis is based on the hypothesis that the efficiency of the sectoral entities is higher than in the case of public because of the existence of a profit motive. The analysis exploits the fact that European legislation forced to follow the Public Procurement Act not only public sector but also private companies working in the position of local monopolies (gas supply, water supply, public transport, etc.).

Current State of Knowledge

The issue of comparisons of efficiency of procurement organised by private and public

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1   See Rističová (2012).

organizations have not been studied. There are studies that are devoted to analyzing the impact of ownership (private versus public) on the efficiency of enterprises. It is possible to mention e.g. Foreman-Peck, Waterson (1985) or Dewenter and Malatesta (2001). The results of these analyzes confirm that the type of ownership has impact on the efficiency.

The presented analysis is based on an estimation of the regression equation, which is designed in the logic of the theory of competitive effect (inversely proportional relationship between the number of submitted bids tendered and the price). This relationship has been confirmed in a number of foreign (see e.g. Kuhlman – Johnson (1983), Iimi (2006) or (Pavel (2010)).

METHODS AND RESOURCES

The presented analysis is based on a comparison of results (prices tendered) of contracts of construction works, part of which was awarded by the public and part by the sectoral purchasers. The advantage of the construction works submitted for analysis is the method of determining the expected/ estimated price. That usually based on project documentation, which does not handle authority, but the external designer, who is using uniform pricing norms. This mechanism is the same for both type of authorities, and therefore there should be no more significant distortion due to a different way of pricing calculation.
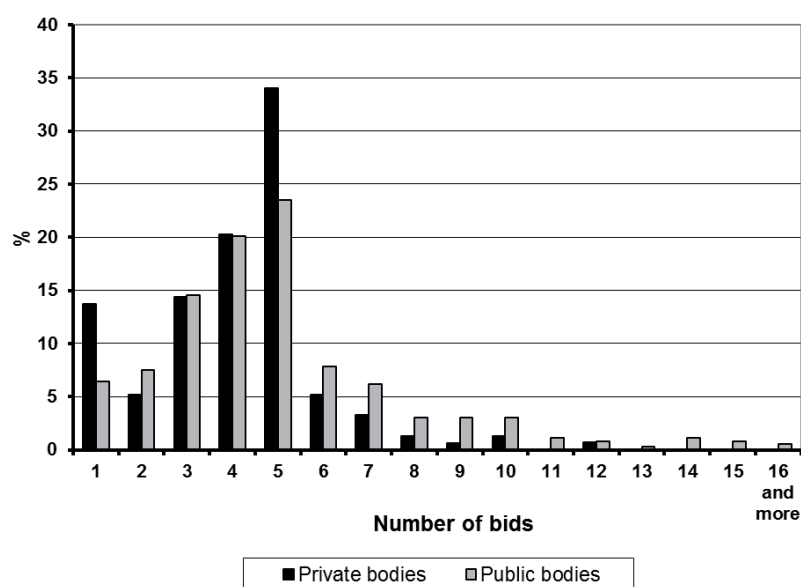
The analysis used two sets of data. The first included 154 contracts awarded by the sectoral authorities and the other 358 contracts awarded by public authorities. In both cases these contracts were administrated during time period of 2006–2011. These are all above threshold contracts, for which were available complete data. From files were excluded outliers. Summary variable statistics are presented in Tab. I.

When comparing these two files, we can note that public authorities awarded on average bigger contracts than sectoral (707 million vs. CZK 180 million). Moreover, the sectoral entities obtain on average lower number of bids (4.1 to 5), while in terms of distribution the sectoral authorities show a higher percentage of contracts with only

I: *Model A, Summary Variable Statistics*

Variable	Mean Value	Median	Minimum	Maximum	Std. Deviation
Public authorities					
Price ratio	100.0	99.9	40.1	168.0	20.1
Number of bids	5.0	5.0	1.0	21.0	2.9
Log (price)	8.5	8.4	8.1	10.3	0.4
Sectoral authorities					
Price ratio	95.9	99.9	45.1	190.2	18.8
Number of bids	4.1	4.0	1.0	12.0	1.9
Log (price)	7.4	7.3	4.7	9.9	0.8

Source: own calculation

1: *Percentage distribution of public contracts by the number of submitted bids*
Source: own calculation

one bidder but also with five bidders (see Fig. 1). In contrast, the average price ratio (price tendered divided by price estimated) is expected in the sectoral entities by about 4% lower (95.9% vs. 100%), which indicates their higher efficiency.

The above described data sets were analyzed using regression analysis. The dependent variable was price ratio and the explanatory variables were the number of bids, number of bids^2, the size of the contract, the type of award procedures and evaluation criteria. Size of the contract was expressed as the logarithm of the estimated price. In the case of the type of procurement procedures (open, restricted, negotiated procedure) and evaluation criteria (lowest price and economic advantage) were used dummy variables.

For estimates of regression coefficients was used Weighted Least Squares Regression (WLS). The reason was the identification of heteroscedasticity.

RESULTS

The results of the estimated regression coefficients are presented in Tab. II. In both cases the existence of competitive effect were confirmed (indirectly-proportional relationship between the number of submitted bids and tendered price). The sectoral authorities, however, leads to its gradual evaporation, each additional offer yields smaller and smaller drop of tendered prices (this is reflected in the statistical significance of the square of number of bids). In contrast, in the case of public authorities additional bid still delivers the same reduction of price.

Differences were also identified in the case of influence of procurement method. In the case of sectoral entities it does not play any role, while in the case of public authorities the restricted procedure increases tendered prices by around 7.8% of the price estimated.

In both cases, statistical insignificant were the coefficients of other types of procurement procedures, as well as the type of evaluation criteria and the estimated value of a contract.
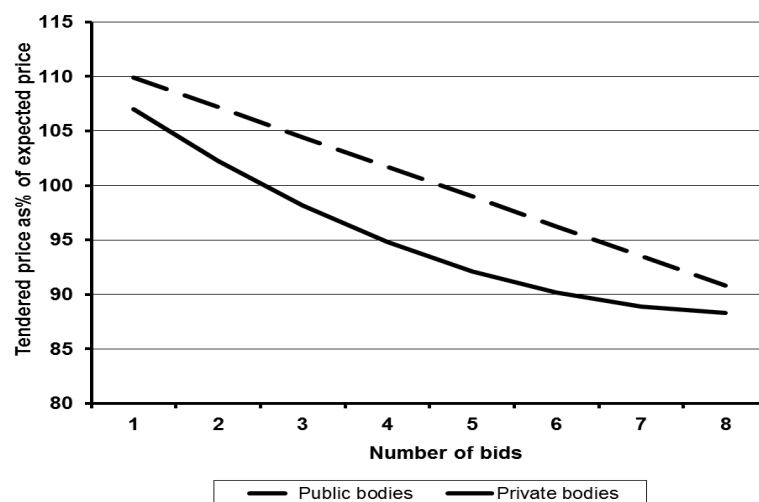
Tab. II shows that the strength of the competitive effect is larger for sectoral entities. On the other hand, the initial price level is in this case lower,

II: *Model A, dependent variable price ratio*

	Public authorities	Sectoral authorities
const	112.63*** (2.06)	112.48*** (5.17)
Number of bids	−2.73*** (0.33)	−5.82*** (1.95)
Number of bids^2	x	0.35** (0.17)
Restricted	7.79*** (2.25)	x
F test (p-value)	4.48e-29	0.02
Adj R2	0.31	0.04

Notes: *** significance at the 1% level of significance, ** 5% level of significance, * 10% level of significance, Robust (HAC) standard deviations in parentheses. Data weighted using the variable "number of bids"
Source: ISVZ, own calculations

2: *Estimated relationship between the number of submitted bids and the price tendered*
Source: own calculation

which is evident from the Fig. 2. The graph is reflecting theoretical relationship between the number of submitted bids and the price ratio for both types of entities (constructed on the basis of the estimated econometric models). It is obvious that the price level of sectoral authorities is placed below, i.e. sectoral entities are capable of the same number of submitted bids to achieve lower prices.

Based on the regression analyzes it can be stated that the sectoral authorities are (when awarding contracts) on average more efficient than public authorities. This level of inefficiency is partially reduced, because the public authorities obtain in average higher number of bids.

In order to estimate the overall level of inefficiency was the model of behaviour of sectoral authorities applied to 358 contracts of public authorities with the total value of 258.4 billion CZK (without VAT). For each contract was estimated the price, that would be achieved by the sectoral authorities. The calculated values were compared with the actual results achieved.

Executed estimate shows that the total tendered value of 358 contracts would fall by about 15 billion CZK (without VAT), which is 5.8% in relative terms. This value can be regarded as estimation of the inefficiency of public authorities.

Another object of the analysis is the question, which factors affect the number of bids. The problem was solved again using regression analysis; the dependent variable was the number of submitted bids and explanatory variables were the size of the contract, the evaluation criteria and the type of the procedure. In the case of public authorities there was identified statistical significance of three of these variables. In contrast, in the case of sectoral authorities, there was no statistical significant regression coefficient. The results are summarized in Tab. III.

It can be concluded that the number of bids for public authorities is negatively affected by the size of the contract. It is quite predictable, as large construction projects requiring the existence of large firms, which number is in the Czech Republic limited. Furthermore, the results show that the use of restricted procedure slightly reduces the number of submitted bids compared to the open procedure.

III: *Model B, dependent variable number of bids*

	Public authorities
const	14.90*** (2.27)
Open	4.71*** (0.26)
Restricted	3.55*** (0.16)
Log (price)	–1.66*** (0.27)
F test (p-value)	7.00e-11
Adj R2	0.12

Notes: *** significance at the 1% level of significance, ** 5% level of significance, * 10% level of significance, Robust (HAC) standard deviations in parentheses.
Source: own calculation

DISCUSSION

Comparison of the results of public tenders of public and sectoral authorities showed that public authorities are less effective than the sectoral (the difference is about 5.8 %). The interpretation of this number, however, must be caution, as the determination coefficients of regression models are particularly at sectoral authorities relatively low. However, this does not diminish the results of the analyses because the important thing is the economic logic of the model and not only its overall explanatory power (see Wooldridge, 2009).

The above mentioned rate of inefficiency may not be final. Also sectoral authorities generally tend to inefficiency, because they have the character of local monopolies. It is also indeed the reason why they have to follow the Public Procurement Act. The calculated rate of inefficiency affects only the absence of a one incentive (profit motive) and not the absence of competition. According to some publications (e.g. Gómez-Lobo, A, Szymanski, S. (2001)) is the absence of competitive pressure dominant generator of inefficiency. Therefore, 5.8% can be considered as an estimate of the lower limit of inefficiency of public authorities.

SUMMARY

The aim of this paper is to identify the difference between the prices achieved in public procurement by public and private bodies. The data set is created by more than 500 observations containing information about the large construction contracts from the years 2006–2011. Details of these contracts were analysed using regressions (WLS). The methodology is based on foreign papers, which are dealing with the issue of competitive effects. The results show, that public authorities are less effective than the sectoral (the difference is about 5.8%). However, the mentioned rate of inefficiency may not be final. Also sectoral authorities generally tend to inefficiency, because they have the character of local monopolies. The calculated rate of inefficiency affects only the absence of a one incentive (profit motive) and not the absence of competition.

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