

The Competitive Effect on Public Procurement for Public Service Contracts: The Case of the Czech Republic¹

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Abstract

The article focuses on a previously neglected public procurement research field regarding competitive effects on public service contracts. Current studies analysing the competitive effect primarily focus on the examination of public works contracts, or on examining the competitive effect of public procurement as a heterogeneous whole. The subject of this examination is a separate analysis of public service contracts. Below and above-threshold public service contracts awarded in the Czech Republic in 2014 were examined. The results of the examination of its own sample of 790 public contracts in open procedure show that, with each additional tenderer, the average price drops by 3.04%. This finding is in line with the studies that have dealt with the examination of the competitive effect in public procurement for public works contracts. The analysis also indicates a stronger existence of a competitive effect in open procedure types compared to other procedure types. The report also highlights some of the phenomena that may affect the resulting public contract price, where the higher final price does not necessarily mean inefficiency nor overpricing of the public contract (such as the difficulties with the anticipated price for IT service contracts).

Keywords: public contracts, public service contracts, competitive effect

JEL Classification: H44, H57

Introduction

The provision of goods and services through the public sector can be solved in two ways – either through in-house production or by outsourcing. Outsourcing is such a form of provision of goods and services, where the public authority

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(contracting authority) responsible for securing goods and services concludes a contract with a private company who implements the public contract. Public procurement is allocated a significant amount of public resources, and, according to the Ministry of Finance of the Czech Republic (MF ČR, 2017) approximately 13% of GDP was spent on this in 2015. This is a total of CZK 556 billion. This is a considerable amount of public resources. It is therefore sensible to seek rational savings in the public sector (Půček and Ochrana, 2014; Matějová et al., 2014; Soukopová et al., 2016). One way to achieve rational savings is to find ways to increase the efficiency of public procurement by means of a competitive effect. In this paper, we focus on examining the competitive effect in public procurement in the area of public services. The aim of this paper is: to check whether a competitive effect can be demonstrated even when awarding public service contracts, to discuss the empirical results, and to seek recommendations for streamlining public procurement. The report is divided into parts. The first part deals with the creation of a theoretical-conceptual framework for examination. It clarifies the concept of “competitive effect in public procurement” and, on the basis of the discussion of this problem, points to a “blind spot” in scientific research, where the analysis of the competitive effect of public service contracts is missing. The second part describes a data file and deals with an empirical data analysis. The third part contains the results and relevant discussion. The conclusion summarizes the results of the research and formulates the recommendations resulting from the research results.

1. Theoretical-Conceptual Research Framework

One of the reasons for securing public goods by private entities is the claim that the private sector achieves greater efficiency compared to the public sector. An argument for this claim is the assumption that the private sector, while operating in a competitive (market) environment, has a higher incentive to act efficiently (e.g. reduce costs) and effectively (have quality services) than the public sector. In comparison, the public sector is rather seeking to maximize the budget (Niskanen, 1971) and increase its influence (McGuire, 1981) rather than focus on efficiency. The higher efficiency of the private sector is confirmed in this sense by many studies (Picot and Kaulmann, 1989; Stevens, 1984; McDavid, 1985; Christoffersen, Paldam and Wurtz, 2004). However, it cannot be unambiguously argued that the private sector itself guarantees the presence of competition and therefore greater efficiency than the public sector. In principle, several public authorities may compete in a competitive “struggle” to secure a public good, and such a competition may lead to an efficient provision of public goods. On the other hand, a private entity in a monopolistic or oligopolistic position can

afford an increase in the price of services and become so inefficient just due to the absence of competition (Hart, Shleifer and Vishny, 1997). This is corroborated by real instances such as Air Canada's state-owned airlines which was operating in the 1980s in a market environment in the North American market. By contrast, at the same time, (state-owned) British Airways had significant inefficiencies doing business as their routes were heavily regulated and not exposed to competition. Kay and Thompson (1986) suggest that the presence of competition is the key to efficiency rather than ownership. Our theoretical-conceptual framework rests on this idea. It is based on the fact that the public authority (the contracting authority) is demanding the implementation of a public contract during the selection process. Suppliers (private companies) sign up for a tender and seek a contract. The rational objective of the contracting authority is to efficiently outsource the public contract. Based on the hypothesis (assumption) that there will also be a competitive effect in the field of public service contracts, i.e. that with higher bidders, the price of the final service for the contracting authority will be lower due to the presence of a competitive effect. The public authority can thus save public funds while maintaining the same quality of service by reaching a higher number of applicants in the tender. Our assumption (hypothesis) is based on analogous research results (see Domberger and Rimmer, 1994; Boyne, 1998; Gómez-Lobo and Szymanski, 2001; Gupta, 2002; Singer et al., 2009; Onur, Özcan and Taş, 2012). Competition between tenderers has a positive effect on the final price of a public contract. Iimi (2006), in his analysis, concludes that an increase in the number of candidates by 1% reduces the final contract price by 0.2%. Janke and Packová (2016), on the example of Slovakia, show that the increase in the number of bidders per tender will reduce the final price by 2.85%. Ochrana and Stehlík (2015) show a 2.19% drop in the price of public works contracts in the Czech Republic with each additional offer. Hanák and Muchová (2015), Grega and Nemeč (2015) or Gavurová, Tkáčová, and Tuček (2017) also came to similar conclusions. The competition effect on other data samples of public works contracts in the Czech Republic (under the conditions of the "old" Public Procurement Act, in effect until 2012) has been also demonstrated by Pavel (2010) and Nikolovová et al. (2012). In analysing the literature, we have found that the greatest attention is paid to the examination of public works contracts, regarding both the competitive effect and the analysis of other factors influencing the effectiveness of public contracts (see Schmidt et al., 2016; Plaček et al., 2016; Plaček et al., 2017a). We have not found a study which deals with empirical exploration of public service contracts. Therefore, we will try to demonstrate whether there is a competitive effect regarding the data for 2014 public service contracts.

2. Data

The subjects of the analysis are public service contracts from 2014.² The choice of the year was influenced by the availability of data and the fact that the procurement of services in 2014 was made on the basis of the analogous conditions of the Public Procurement Act like in the case of the previously mentioned public procurement studies. In our sample, these are below-threshold and above-threshold contracts (their estimated cost being more than CZK 2 million), which were published in the Public Procurement Information System (ISVZ). Data on public procurement in ISVZ contains a number of inaccuracies. Some orders, for example, lack the anticipated price or other characteristics. Such orders were removed from the analysis. The sample obtained (with the missing data) contains a total of 1136 public contracts. To analyse the competitive effect, we need information on the type of award procedure (Table 1) and the distribution of the number of bids submitted (Figure 1).

Table 1

Type of Award Procedure

Type of Procedure	Number of public contracts	Total share (%)
Open	790	69.54
Negotiated without publication of a contract notice	234	20.60
Negotiated with a call for participants	55	4.84
Restricted	26	2.29
Award of contract without prior publication of a contract notice in the Official Journal of the European Union	24	2.11
Accelerated and Restricted	3	0.26
Accelerated and Negotiated	2	0.18
Competitive dialogue	2	0.18

Source: Author's work based on data from the Public Procurement Information System.

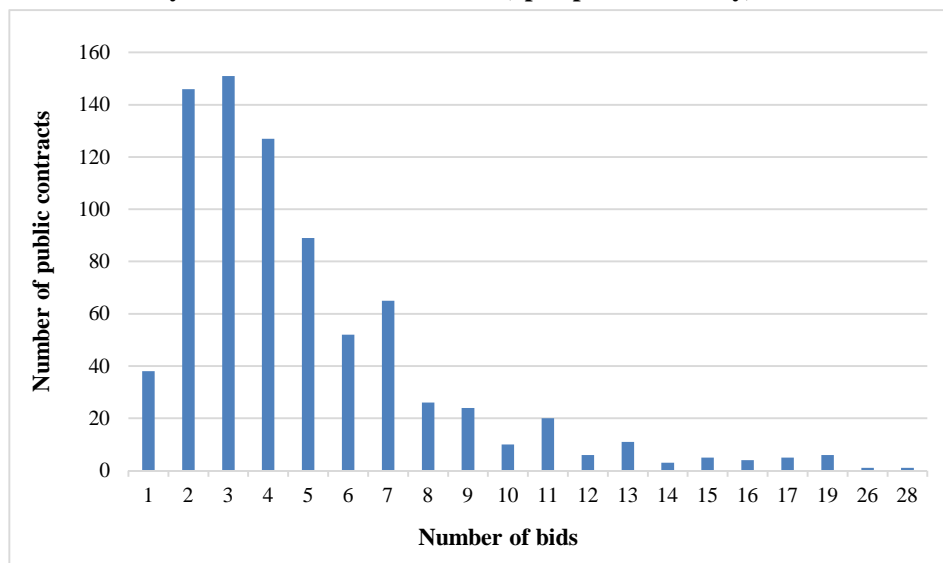
The share of open procedure from the total number of public contracts is approximately 70%, while other types of procedures are represented to a limited extent. It should be emphasized that there are significant differences between the different types of management, which may not be the result of a lack of transparency. Some public contracts cannot be applied for via an open procedure by multiple vendors (e.g. defense contracts, emergency situations, etc.). These engagements may, by their very nature, be very different from standard orders and interfere with research results. The analysis of the competitive effect will only focus on contracts awarded under the open tender procedure, while preserving the homogeneity of the sample. Comparison with other types of award procedures

² Data incl. description of monitored quantities can be obtained from the Public Procurement Information System: <http://www.isvz.cz/ISVZ/Podpora/ISVZ_open_data_vz.aspx>.

will be done later. Most of the public procurement in open procedure, in terms of the type of contracting authority, was awarded by regional or local authorities (agencies) – a total of 44%. The distribution in terms of the number of offers is given in Figure 1.

Figure 1

Distribution by Number of Bids Submitted (open procedure only)



Source: Author's work based on data from the Public Procurement Information System.

As regards to the distribution of the number of tenders submitted by individual suppliers, contracts with fewer bidders tend to predominate. A maximum of 10 offers was submitted in 92% of all cases.

3. Results and Discussion

We will investigate the competitive effect using the so-called price ratio. For this, we need two pieces of information about a given public contract, namely an indication of the estimated price and the final (winning) price of the public contract. Both pieces of information can be found in the Public Procurement Information System. The estimated price is determined by an educated estimate from the contracting authority or based on the knowledge of similar public procurement already carried out. After determining the estimated price of the public contract, a tender procedure is launched, at the end of which the winning contractor (supplier) is selected and the final price of the public contract is set. For

each public contract, therefore, we have information on the original estimated price of the public contract (PC) and the final price of the public contract (KC) in the data file. Now we define the price ratio (PR) as:

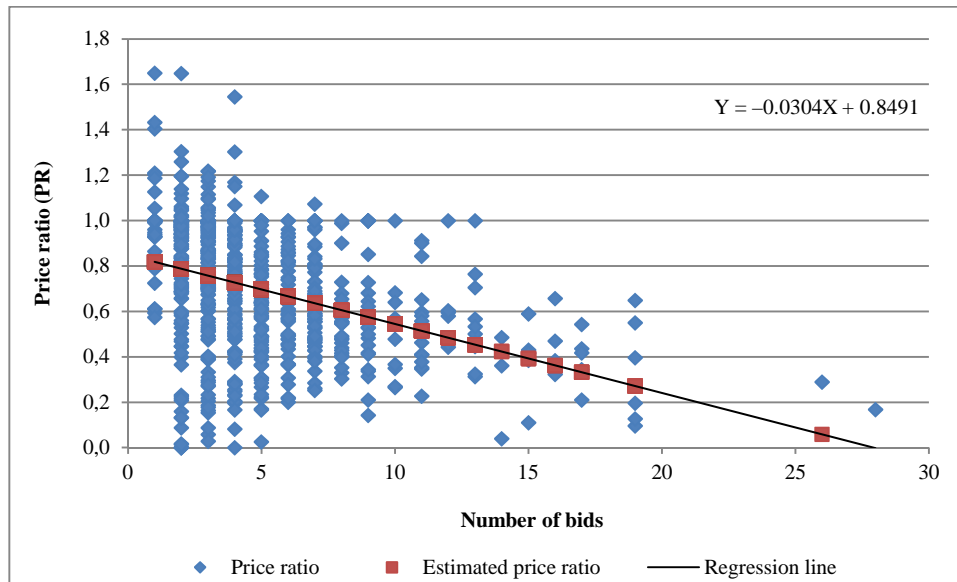
$$PR = \frac{KC}{PC} \quad (1)$$

where (PR) is the price ratio (the ratio between the final and the expected price of the public contract), (KC) is the final price of the public contract and (PC) is the original estimated price of the public contract. The price ratio shows how much the price of a public contract has dropped compared to the original estimate. For example, at a price ratio of 0.8, we can state that the final price of a public contract is 80% of the original estimated price, i.e. the funds invested in a public contract are 20% lower than in the original estimate.

The competitive effect can be characterized in general terms by the fact that the resulting price decreases with the increasing number of tenderers of public procurement entities. In the Public Procurement Information System, we have (for the sake of completeness of the data) the information on the number of tenderers in each tender at the same time. We will therefore monitor the dependence of the price ratio on the number of bids submitted (see Figure 2) and use a standard linear regression model for analysis.

Figure 2

Dependence of the Price Ratio on the Number of Submitted Bids – Linear Model



Source: Author's work based on data from the Public Procurement Information System.

Regression Statistics

Multiple R	0.387403751474793
Confidence value R	0.150081666656743
Set confidence value R	0.149003090091587
Error of the mean	0.252959581757586
Observation	790

ANOVA

	Difference	SS	MS	F	Significance F
Regression	1	8.90387251275185	8.90387251275185	139.147902434704	1.09E-29
Residue	788	50.4229774023426	0.0639885500029728		
Total	789	59.3268499150944			

	Coefficient	Error of the mean	t Stat.	Value P	Lower 95%	Upper 95%
Limit Number of bids	0.849143227	0.015570234	54.53631899	1.0261E-269	0.818579185	0.879707269
	-0.03039093	0.002576355	-11.7960969	1.08876E-29	-0.03544826	-0.0253336

Lower 95.0%	Upper 95.0%
0.818579185	0.879707269
-0.03544826	-0.0253336

Source: Author's work based on data from the Public Procurement Information System.

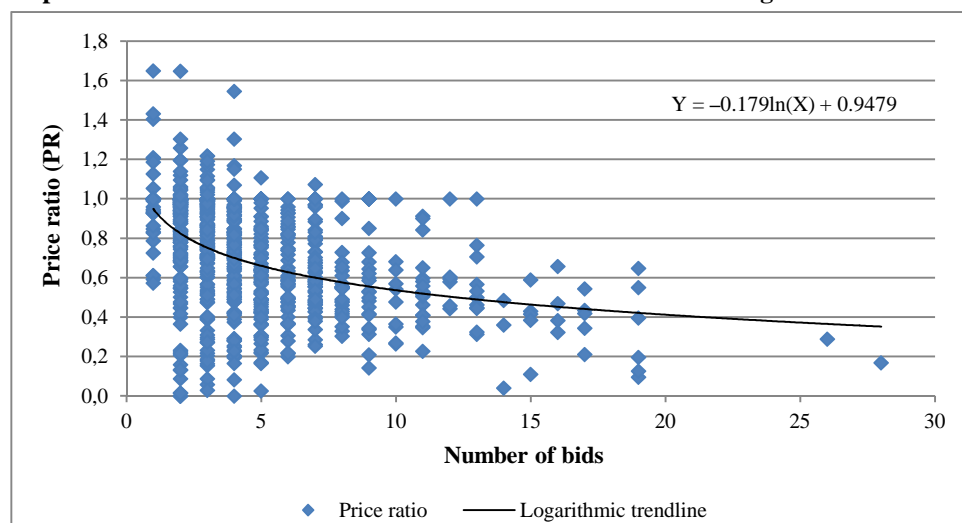
It can be seen from the chart that in most cases, the price ratio is less than 1, meaning that contracting authorities have achieved savings compared to the estimated (original) price. The average price ratio is at the level of 0.70 – on average, thus the final contract price is 30% lower than the original estimated price. The slightly higher median of the price ratio of 0.72 can be interpreted in such a way that half of the public contracts in open procedure have achieved savings of more than 28%. With an increasing number of offers, we can observe a tendency towards a falling price ratio, in other words, the relative final price of a public contract declines with increased numbers of offers. The linear relation represents a regression line with the equation $Y = -0.0304X + 0.8491$. This equation can be interpreted in such a way that, if the number of bids increases by 1, the resulting price of the public contract will be reduced by 3.04%. This fact supports the existence of a competitive effect in the sample under investigation.

On the other hand, we have to state that the model used shows a relatively low coefficient of determination (0.15), and the correlation coefficient (-0.39) indicates a weaker negative dependence. There are some observations in the sample under examination (for example, in two bids, the final price was 65% higher than the original one, or in another 13 bids, the price ratio was 1, i.e. no savings were had.) The linear model may also not be the most appropriate option

to analyse the sample under study (using a regression linear line predicts that if a large number of bids are available, the price ratio becomes negative, which is not realistic). At the same time, we can say that the price of a public contract drops disproportionately when the number of offers increases. In other words, the drop in the price will be greater when changing participants in the tender from one to two rather than the drop in the price of changing the bidders from 15 to 16. Let's respond to these considerations with a logarithmic transformation, replacing the variable number of bids with the natural logarithm of the number of bids $\ln(\text{number of offers})$. This will ensure that the difference between the individual numbers of candidates is greater with fewer candidates. The logarithmic dependence of the number of bids on price ratios is illustrated in Figure 3.

Figure 3

Dependence of Price Ratio on the Number of Submitted Bids – Logarithmic Model



Source: Author's work based on data from the Public Procurement Information System.

Regression Statistics

Multiple R	0.416855998
Confidence value R	0.173768923
Set confidence value R	0.172720407
Error of the mean	0.249409676
Observation	790

ANOVA

	Difference	SS	MS	F	Significance F
Regression	1	10.30916283	10.30916283	165.7283481	1.48E-34
Residue	788	49.01768709	0.062205187		
Total	789	59.32684992			

	Coefficient	Error of the mean	t Stat.	Value P	Lower 95%	Upper 95%
Limit Number of bids	0.94789444	0.021254117	44.59815642	9.74E-218	0.906173053	0.989615826
	-0.1788983	0.013896583	-12.873552	1.48E-34	-0.2061770	-0.1516197

Lower 95.0%	Upper 95.0%
0.906173053	0.989615826
-0.206177092	-0.151619689

Source: Author's work based on data from the Public Procurement Information System.

The use of logarithmic transformation shows a slightly higher determination coefficient. The logarithmic model can therefore be considered as a more appropriate interpretation of the relationship between the price ratio and the number of bids. The analysis of the competitive effect was limited to open tenders only in the context of maintaining the homogeneity of the sample. Now, however, the type of tendering procedure as a further factor will be included in the analysis of the competitive effect. We have divided the original sample into contracts competing through an open procedure and a group of contracts competing under other types of procedures (some types of procedures are represented in individual cases, therefore, they are not analysed individually). The competitive effect will be analysed depending on the type of procedure. The comparison is illustrated in Table 2.

Table 2

Competitive Effect Depending on the Type of Award Procedure

Type of procedure	Open	Other
Number of contracts	790	346
Number of bids per contract – average	4.93	1.85
Number of bids per contract – median	4	1
Price ratio (PR) – average	0.70	0.90
Price ratio (PR) – median	0.72	1.00
Regression line	$Y = -0.0304X + 0.8491$	$Y = -0.0452X + 0.9862$
Multiple R	0.387403751	0.243124751
Confidence value R	0.150081667	0.059109645

Source: Author's work based on data from the Public Procurement Information System.

Public contracts awarded in open procedures show a higher average number of bidders per contract (4.93), while other types of award procedures (less than open ones) see a much smaller bidder participation rate (1.85). The average price ratio is lower in an open procedure, indicating a higher average savings when executing a public contract through an open procedure compared to other types of management. The analysis suggests a stronger existence of a competitive effect in open procedures against other types of procedures. The reasons can be found

both in the lower number of tenderers, but also in the considerable specificity of the contracts, which are, for various reasons, assigned to one of the closed types of procedure. However, it is worth noting that the ratio between the final and the expected price of a public contract is affected by a number of other factors not included in the model. Even the method of determining the expected price may vary at different levels of government (ministry vs. small municipality). The choice and manner of the award procedure, its actual development and final contract implementation may also influence the final price. For some public procurement, it may also be difficult to accurately determine the price in advance, although it is a legal obligation (for example, IT system management, management consulting, etc.) The fact that the final price of the contract may ultimately be higher does not necessarily mean inefficiency or overpricing, where the number of participants in the award procedure does not have to play such an important role. Domberger and Jensen (1997) draw attention to this problem. They point to the fact that a reduced price may mean a reduced level of the quality of service (quality-shading hypothesis.) Consequently, the resulting price may not be the only and unambiguous indicator that the best bid has been selected. For public contract suppliers, it may be beneficial to offer a very low cost for the procurement in order to win the tender. However, when the contract is executed, the price may be increased (extra work, extension of the contract length, etc.) In the event of insufficient controls by the contracting authority, an ex-post price increase may occur. Transparency and corruption in public procurement are also linked to procurement issues (see Ochrana and Maaytová, 2012; Langr and Ochrana, 2015). Individual bidders may act in concert with the aim of raising the price of the contract (bid rigging.) These are all issues that pose questions to be answered in further research.

Conclusion

An empirical analysis of public service contracts awarded in the Czech Republic has demonstrated the original assumption (hypothesis) that, even in this segment of public procurement, there is a competitive effect. The results of the regression analysis show that the increase in the number of bidders has an impact on the final price of public contracts, with each additional bidder lowering the final price by an average of 3.04% compared to the original price. It follows that it is appropriate to choose open award procedures that enhance the competitive effect. This finding is in line with previous studies. At the same time, it should be emphasized that this is only partial research and cannot be generalized in this sense as many other factors influence the final price of a public contract. The

resulting price may not be the only indicator of the efficiency and appropriateness of the offer. Indirectly, it may indicate a relatively low determinant. This can also be interpreted in such a way that changes in the price of a public contract are also caused by factors other than a competitive effect as we have indicated at the conclusion of the discussion. Revealing them requires further investigation. The findings are also an impetus for analysing less (or neglected) factors influencing (in) efficiency in public procurement. These include, for example, the phenomenon of risk-avoidance by the contracting authority (see Plaček et al., 2017b).

The results of empirical research are also beneficial for practice in public procurement. Theoretical conclusions can be utilized by public administration actors to streamline public procurement, for example, by amending the Public Procurement Act, selecting open procurement procedures, enhancing the transparency of procurement procedures, or improving the control activities of the regulator.

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