

Efficiency of Public Tendering: Level of Transparency versus Private Transaction Costs

Jan Pavel¹

Abstract

The public tenders are very important instrument, which the public sector uses to the allocation of great part of public expenditure. They are used for example in the public procurement market and in the frame of many public expenditure programmes (e.g. the programmes which improve the SMEs or the countryside development). During last years the size of public procurement market has been increasing in the transition economies and in this time its value represents more than 10 % of GDP (in the Czech Republic even 17 % of GDP). For example it is almost one quarter of public expenditure in the Czech Republic. So it is necessary to focus to this topic and find the mechanisms, which enable to improve the effectiveness of this institute. It will have a significant influence to the effectiveness of public sector as a whole.

The paper focuses to the problem of connection between the transparency of public tenders and the rate of competition. The main idea of the analysis it that there is a significant relationship between the transparency and the value of private transactional costs there. The high value of private transactional costs has negative influence to the ability of the firms or NGOs to enter to public tenders and consequently the rate of competition decreases. This results in the decrease of the effectiveness of public tenders.

Key Words: Czech Republic; Effectiveness; Public Expenditure; Public Tender; Transactional Costs

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¹ Ing. Jan Pavel, Ph.D., University of Economics, Prague, Faculty of Finance and Accounting, Department of Public Finance, nam. W. Churchilla 4, 130 67 Praha 3, Czech Republic, pavelj@vse.cz, tel.:+420 224 095 170. I would like to thank M. Šumpíková and L. Vitek for helpful comments and J. Přibíl for technical assistance. All remaining errors are mine. The views expressed in this paper are those of the author and do not represent those of the University of Economics, Prague. The Grant Agency of the Czech Republic supports this research (GACR No. 402/05/P009 and 402/03/1221).

I. Introduction

Public tenders play a key role in the public sector operations; they can be defined as an instrument to increase the effectiveness of the public sector as a whole. The objective of this article is to address the problem of public tenders through the theory of transaction costs and their relationship with transparency. In the first part of the article the effectiveness of public tenders is discussed while the theory of transaction costs is applied and the influence of transparency on its level is analysed. In the second part the quantification of public procurement market in the Czech Republic is calculated and the situation in the area of transparency is described. As in the Czech Republic there exist serious problems with the observation of law in the area of publicising information on called public tenders, we carried out an analysis of the impacts of low transparency on the value of private transaction costs.

II. Effectiveness of public tenders – problem of definition and quantification

In the development of public sector in advanced and transition economies it is possible to distinguish two levels of realisation of public projects – the level of financing and the level of production. Private firms are charged with the realisation of many public programmes through procurement contracts. Of course, the aim of the public sector is to achieve the lowest price possible for the highest quality while a public tender is the best way of achieving this aim. From the aspect of neoclassical microeconomic analysis it is really the best solution because it is basically a modification of market mechanism: there is only one agent on the demand side – the state or a government funded body. The price of the public contract realisation is the government cost of public project realisation. If the public tender ensures the lowest price, the best possible result is achieved according to this concept.

III. Transaction costs

The price the public sector will pay to a private firm for the public project realisation is not however the only cost to be considered. The process leading to the awarding of public tender brings about other costs that can be denoted as transaction costs.

Transaction costs are meant to be the costs connected with the working of an economic system. By their nature they are an analogy to friction in a physical system.

The objective of the public sector in the awarding of tenders is to achieve maximum effectiveness of expended funds while the effectiveness is defined as the cost-benefit (or utility) ratio. Benefits depend on the quality of developed public projects to a large extent and now they are not important for this analysis. But costs are crucial for such an analysis. As indicated above, in the neoclassical concept only the price arising from the public tender is projected into these costs. If transaction costs are also considered, applying the knowledge of institutional economics in this way, the cost side will change quite substantially in some cases.

Transaction costs are incurred not only by the public sector (e.g. administrative costs of the calling of tenders, costs of potential lawsuits, etc.) but also by tenderers from the private sector, i.e. firms participating in public tenders. In addition, both groups of transaction costs can be divided into ex ante and ex post costs.

Table 1: Examples of transaction costs incurred by the two sectors in the awarding of public tenders

	transaction costs	
	ex ante	ex post
public sector	<ul style="list-style-type: none"> • setting and administration of a public tender • remuneration of independent experts • legal expertise of contracts 	<ul style="list-style-type: none"> • renovation of a public tender • costs connected with a delay in filling of a public tender • a lawsuit
private sector	<ul style="list-style-type: none"> • elaboration of application • acquirement of qualification presumptions • consignment of a bond 	<ul style="list-style-type: none"> • a lawsuit

There is a marked difference between ex ante and ex post costs because the former costs are incurred almost in all cases while the latter costs are incurred only with definite probability. The level of such probability can often be influenced by negotiation strategy and by some measures that will precede the awarding of public tender. These measures will mostly lead to:

- a) an increase in ex ante transaction costs of the government,
- b) an increase in ex ante transaction costs of the private sector.

In case they are reflected in an increase in ex ante costs of private firms, it will cause a decrease in the profit of these firms. It is to expect that there will be an effort to shift these costs forward – to the price of the public contract, which will result in the growth of “direct costs” of the government (i.e. the public tender price). The ability of shifting the private sector’s transaction costs to the public contract price largely depends on the type of competition structure of tenderers. In the case of monopoly the probability of a shift is very high; on the contrary, if the industry approaches the ideal of perfect competition, the probability will be smaller. Efforts to shift transaction costs can partly be eliminated by the appropriately chosen negotiation strategy.

The effort to increase effectiveness through a decrease in ex post costs (or probability of their incurring) may sometimes lead to a lowering of total effectiveness. It will happen so if the savings of ex post transaction costs of public sector are smaller than the increase in ex ante costs of public sector and the increase in the price of public project caused by the shift of the increase in ex ante costs of private tenderers.

In this context we must pay attention to the term effectiveness of public project realisation. If it is assumed that the project outputs are independent of the method of realisation (i.e. their benefit is identical all the time), minimisation of all costs is the condition of achieving effectiveness and total costs can be expressed by the following equation:

$$TC = C_{av} + C_{pv} + PC + C_{as}$$

Where TC = total costs of public project realisation, C_{av} = ex ante transaction costs of public sector, C_{pv} = ex post transaction costs of public sector, PC = public contract price, C_{as} = ex ante transaction costs of private sector.

When we are searching for the highest effectiveness of public project realisation, it is necessary to define from what aspect it will be addressed. In general, two types of effectiveness can be identified: public sector effectiveness and total effectiveness.

a) Public sector effectiveness: $E_v = B/(C_{av} + C_{pv} + PC)$,

b) Total effectiveness: $E_s = B/(C_{av} + C_{pv} + PC + C_{as})$,

where E_v = public sector effectiveness, E_s = total effectiveness, B = public project benefits.

In the case of public sector effectiveness we try to minimise only the costs incurred by the public sector while in total effectiveness there is an effort to minimise all costs. In general, the minimum will not be reached in either case for one institutional setup.

A crucial problem is that all the four defined types of transaction costs are not interdependent, so they cannot be optimised one after another – they must be optimised simultaneously. Moreover, their quantification is often difficult. Sometimes it is sufficient to carry out a qualitative analysis that can help us draw a conclusion which of the compared institutional setups is more effective.

The level of transaction costs in the awarding of public tenders is influenced mainly by these factors:

- law on the awarding of public tenders
- awarding documentation
- negotiation strategy
- type of competition structure of tenderers
- general quality of the country's institutional environment.

Factors affecting the value of transaction costs arise on the level of the government that may influence them. For this reason e.g. in proposals of amendments of the key law on the awarding of public tenders it is necessary to examine whether there will not be a change in transaction costs if some of its provisions are amended, and if it is so, it should be identified where (in private or in public sector) and at what direction (costs will increase or decrease).

IV. Private transaction costs and transparency

The necessity to ensure transparency of the awarding of public tenders is currently a generally recognised fact that brings about many advantages, particularly in the fight against corruption. In addition, the transparent awarding of public tenders has a positive impact on the level of private transaction costs. As mentioned above, private firms incur these costs in connection with their participation in called public tenders for procurement contracts. A large part of these costs is costs of the acquisition of information on called public tenders, their terms, forms, etc. The worse available this information, the higher the effort of private firms to search for it and the higher the transaction costs. Many times the information necessary to develop a qualified bid is available only in the seat of the body calling a public tender, which is less advantageous for applicants living elsewhere. Transaction costs are also determined by the geographical position of the bidder and the body calling a public tender.

The reason why so much attention is paid to private transaction costs is that their level has a significant impact on the level of competition between bidders in the awarding of public tender. It is to note that their level is the same for both small and large firms. If we say the same level, it means in absolute terms. In relative terms it is not so; particularly for small firms this relative level may be prohibitive and prevent them to participate in public tenders. If the capacity to participate in public tenders for procurement contracts implies a necessity to have specific knowledge (e.g. of the awarding documentation, etc.), it is even possible to state that the absolute level of these costs is indirectly proportionate to the size of the firm. The above analysis shows an explicit relationship that lower transparency implies the necessity of incurring higher transaction costs; so small or medium-size firms are barred from this market while the competition position of large firms is strengthened. It results in a general lowering of the level of competition, which may lead to an increase in the price to be paid by the public sector.

Another consequence is a reduction in the volume of transactions carried out by small and medium-size firms; it may influence their investment development and decrease employment in a mediate way.

In general, an increase in transparency underlies an increase in the effectiveness of public tenders in public sector because the level of competition between bidders is higher. On the other hand, it is to note that such an increase is mostly accompanied by the growth of public sector's costs – of public administrative costs. Therefore it is necessary to carry out the marginal analysis of costs and benefits resulting from a cut in the price of public tenders.

V. Legislation of the awarding of public tenders in the Czech Republic

The accession of the Czech Republic to the European Union in May 2004 was a milestone also in the awarding of public tenders. A new law on the awarding of public tenders was passed to harmonise the legislation in this area.

Principal changes in the awarding of public tenders enacted by the new law were an increase in transparency and a lowering of potential discrimination of foreign firms. Particularly in the above-limit contracts the high level of transparency is ensured thanks to the duty to publish tender information in the Official Journal of the European Union. The situations when restricted public tenders can be used were substantially limited.

In the choice of awarding procedures the new law introduces so called framework contracts that will enable to the state or bodies of the public sector to conclude long-term contracts with contractors that have a monopoly position or a very important position in the industry in question. Another new instrument is a public tender for a design where the awarding of goods whose specificities are not given in advance is treated.

Besides the above-mentioned changes the new law did not amend a possible choice of procedures of public tender awarding very much. The greater accent on transparency is easy to understand regarding the corruption situation in the Czech Republic that is not very good. The potential to increase the effectiveness of public expenditure on public procurement is substantially higher in the area of the fight against corruption than to enlarge space for the choice of alternative awarding strategies. It will be possible to increase effectiveness in this way only after the problem of corruption has been eliminated.

VI. The value of public procurement market in the Czech Republic

In the Czech Republic no studies dealing with the quantification of the value of public procurement market and its desaggregation to the government levels have been published until now. Therefore it is necessary to use methodology presented in studies of international organisations, and it will also be possible to make international comparisons of results. In this article we used OECD methodology based on the System of National Accounts for the quantification of the value of public procurement market in the CR (see Appendix 1).

For the exact quantification of the value of government purchase market and for desaggregation of this data performed by OECD it is necessary to have at disposal in total 30 items of data from the System of National Accounts. Unfortunately, they are not all available for the Czech Republic. Table 6 shows their overview and information on the availability of this data for the CR.

Table 2: Data necessary to calculate the volume of public procurement market according to OECD methodology, the situation in the CR

Transaction	Number	Situation
General government		
Final Consumption Expenditure (FCE)	1	1
Consumption of Fixed Capital (CFC)	2	1
Sales	3	S
Indirect Taxes	4	1
FCE defence- related	5	D
Compensation of employees (CE)	6	1
CE defence- related	7	1
Gross Fixed Capital Formation (GFCF)	8	1
GFCF defence- related	9	1
Central government		
Final Consumption Expenditure (FCE)	10	1
Consumption of Fixed Capital (CFC)	11	1
Sales	12	S
Indirect Taxes	13	1
FCE defence- related	14	D
Compensation of employees (CE)	15	1
CE defence- related	16	1
Gross Fixed Capital Formation (GFCF)	17	1
GFCF defence- related	18	1
Local government		
Final Consumption Expenditure (FCE)	19	1
Consumption of Fixed Capital (CFC)	20	1
Sales	21	S
Indirect Taxes	22	1
Compensation of employees (CE)	23	1
Gross Fixed Capital Formation (GFCF)	24	1
Social Security Fund		
Final Consumption Expenditure (FCE)	25	1
Consumption of Fixed Capital (CFC)	26	1
Sales	27	S
Indirect Taxes	28	1
Compensation of employees (CE)	29	1
Gross Fixed Capital Formation (GFCF)	30	1

N.B.: 1 – data is available, S a D - data is not available, in the calculation are used the estimations (see the following text).

Source: OECD 2001, own calculation

Out of 30 items applied by OECD methodology only 24 items are at disposal in the CR. Missing data on government sales on all levels were substituted by average values of OECD countries where adequate data are

available (designated by “S” in the table). Weighted means were employed for the calculation of these values. It is assumed on the government level that the volume of government sales corresponds to 13% of final consumption expenditure while their desaggregation between the particular government levels is done according to the volume of paid indirect taxes.

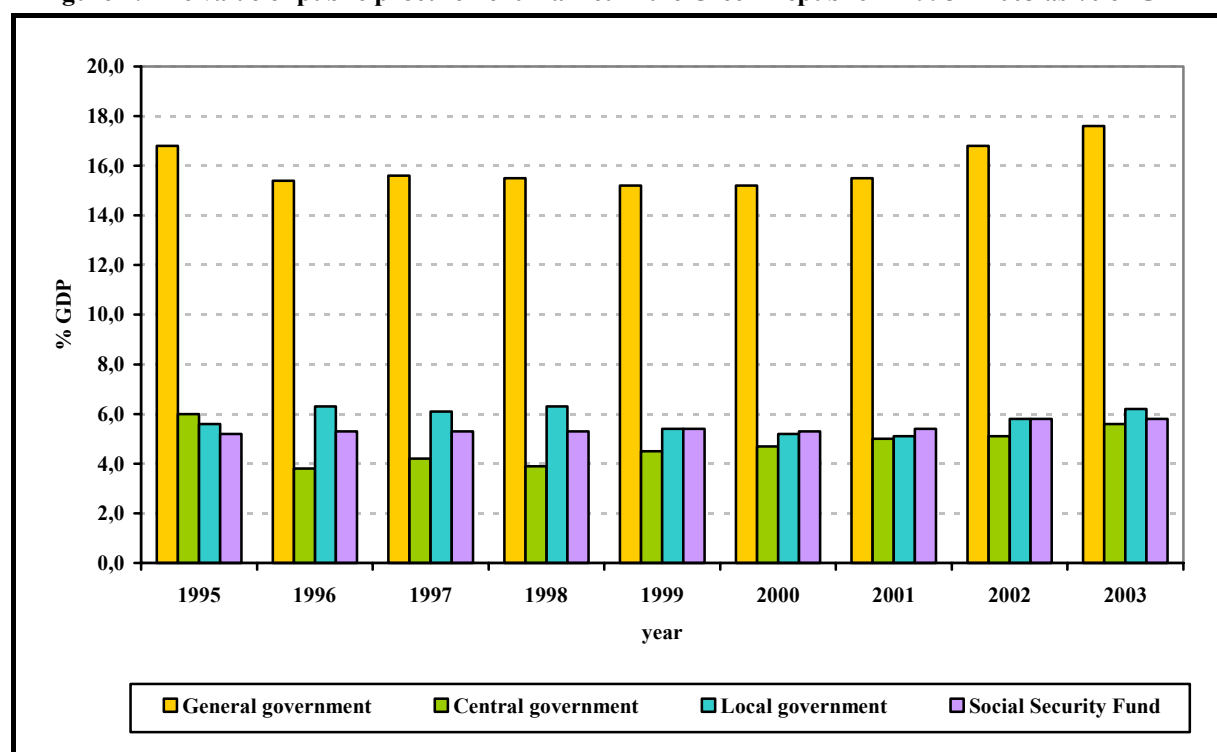
The final consumption expenditure connected with defence (Defence Expenditure – DE; “D” in the table) is estimated in the same way. The ratio of this expenditure to final consumption expenditure is assumed to be 9.3%. The value of public procurement market in the Czech Republic in 1995 – 2003 was calculated under the above assumptions.

Table 3: The value of public procurement market in the Czech Republic in 1995 – 2003 as % of GDP

	1995	1996	1997	1998	1999	2000	2001	2002	2003
General government	16,8	15,4	15,6	15,5	15,2	15,2	15,5	16,8	17,6
Central government	6,0	3,8	4,2	3,9	4,5	4,7	5,0	5,1	5,6
Local government	5,6	6,3	6,1	6,3	5,4	5,2	5,1	5,8	6,2
Social Security Fund	5,2	5,3	5,3	5,3	5,4	5,3	5,4	5,8	5,8

Source: own calculation

Figure 1: The value of public procurement market in the Czech Republic in 1995 – 2003 as % of GDP



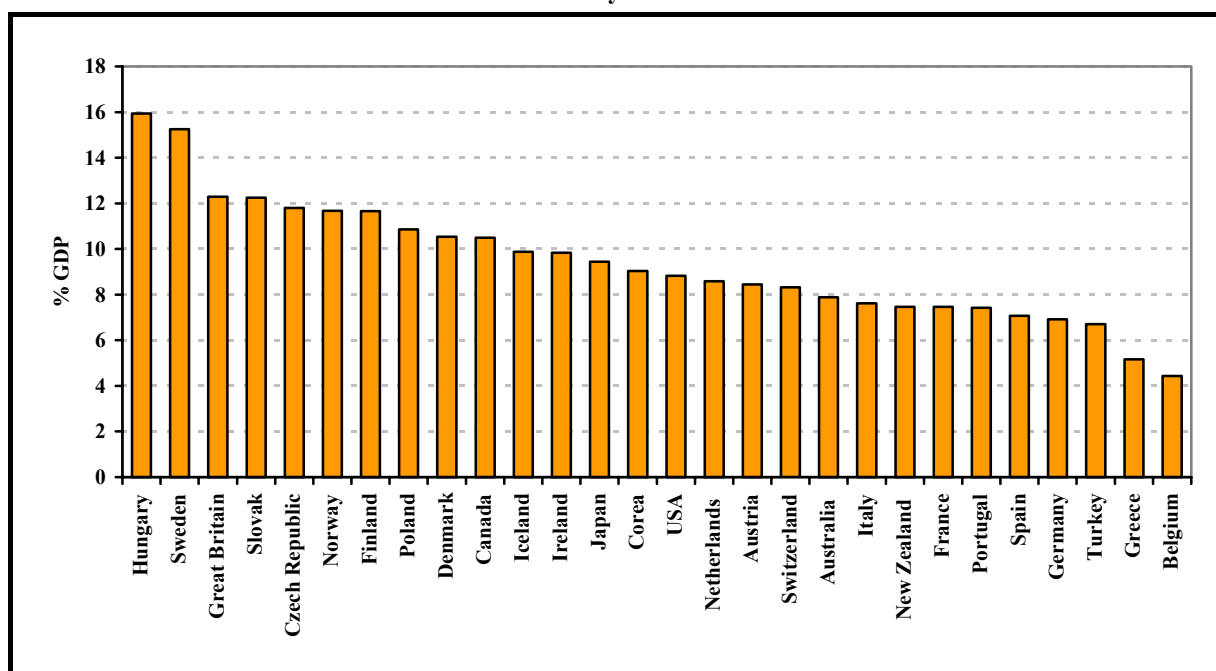
Source: Table 3

It is to state on the basis of our calculations that the volume of funds expended by the public sector on the purchase of goods and services from the private sector, expressed as % of GDP, did not change very much in 1995 – 2003. In the examined period a certain decrease can be identified when the value of public procurement market decreased from 16.8% GDP in 1995 to 15.2% GDP in the years 1999 and 2000. Then there was a change in the trend, and in 2002 and 2003 a substantial increase occurred when the resultant value rose up to 17.6% GDP. From the aspect of desaggregation between the particular government levels a decentralisation tendency slightly prevails in the CR when except 1995 more funds for the purchase of goods and services were expended

on the level of local budgets than on the central level. It is also necessary to take into account that a part of funds expended on the central level (ca. 1.3% GDP according to OECD 2001) is spent in the army sector; many times these funds are allocated in a specific regime of restricted tenders. If the above-mentioned values were translated into 2003 absolute figures, it would show that the government spent almost 450 billion Kč on the purchase of goods and services: 143 billion were expended on the central level, 159 billion on the local level and almost 148 billion Kč on the level of Social Security Funds.²

In international comparison the volume of the purchases of good and services in the CR is markedly above the average of both OECD and EU. In these two groupings the average value of public procurement market is about 9.2% GDP while in the CR this value is higher almost by 8 percentage points. The CR along with Hungary and Slovakia are a “Central European island” of the countries with markedly above-average public procurement markets. Among other factors, these high values result from the extremely high value of the public procurement market for Social Security Funds, i.e. for health insurance companies. Compared to the other OECD countries, the Czech Republic’s value is explicitly the highest of all. It may be explained by different classification of medical entities into the public or private sector. Funds expended in this subsector are not often allocated according to the same mechanisms as “classical” procurement contracts; therefore the value of public procurement market without the contributions of Social Security Funds seems to be a better indicator for international comparison.

Figure 2: The value of public procurement market in OECD countries without contributions of Social Security Funds



Source: OECD 2001, own calculation

The international comparison shows that the Czech Republic is one of the five countries with the largest volume of public procurement market. A higher value of this market was measured only in Hungary, Sweden, Great

² According to OECD (2001) data the value of public procurement market in the Czech Republic is 17.03% GDP. The difference from the above-mentioned results stems from the fact that OECD calculated the value of public procurement market as an average of the values for a definite time period. Moreover, the values of fixed capital consumption and indirect taxes were not available to OECD, these values were estimated on the basis of average values in the other countries. Therefore the public procurement values in the particular subsectors are different from the OECD calculations.

Britain and Slovakia. It is surely interesting that three Central European transition economies are among the five countries with the largest public procurement market while the fourth of them, Poland, ranks at the eighth position.

Based on the performed analysis it is obvious that the government expenditure on the purchase of goods and services accounts for a large part of public spending in the Czech Republic and their better allocation could be one of the ways leading to a lowering of public deficits, which is currently a crucial issue. For illustration, if the savings of 10% were achieved in this area either by increased transparency or by the elimination of corruption, it would be a lowering of the annual deficit of public budgets by ca. 1.7% GDP, i.e. by more than a half of the Maastricht convergence criterion.

VII. Transparency of the awarding of public tenders in the Czech Republic and frequency of particular awarding procedures

In the preceding section we performed a quantitative estimation of the public procurement market in the Czech Republic. This section will be aimed at the methods of awarding tenders and at the transparency of awarding procedures. So-called Central Address is the basic source of information where except contracts of small value all public tenders must be publicised.³ The publicising duty applies to both the calling of public tenders and announcement of their results. Unfortunately, the law observation was very poor in this case.⁴ In the awarding documentation it is possible to find the majority of called tenders but much information is missing. Especially planned prices are not often indicated. A much worse situation is in the announcement of tender results. According to calculations the results of only about 15-20% of public tenders are available on the Czech Central Address. Even this information is not frequently complete. For this reason the following data is not exact, but no other data sources are available.

Table 4: The frequency of various methods of public tender awarding in the Czech Republic in 2001 – 2003

	2001	2002	2003
Number of public tenders	14423	11189	12909
<i>of which</i>			
• Open public tender	1168	1090	1202
• Two stage open public tender	7	3	3
• Call for more competitors (close public tender)	7189	5697	6763
• Simplified awarding	5794	4145	4633
• Small public tenders	88	106	159
• Call for one competitor	116	101	68
• Other	36	0	5
Value of public tenders according Central Address (bill. CZK)	64	87	74
Value of public tenders according my calculation - except Social Security Fund (bill. CZK)	234	264	302
The rate of value of public tenders according Central Address and my calculation (%)	27	33	25

³ Central Address is accessible on the web address www.centralniadresa.cz and its administrator is the institution Česká pošta (Czech Post-Office).

⁴ The following conclusions were drawn on the basis of the analysis of the Central Address operation in 2001 – 2003, when it was used in accordance with “old” Act No. 199/1994. The effectiveness of its operation in accordance with “new” Act No. 40/2004 cannot be evaluated because the time series is too short.

Source: Central Address, own calculation

“Call for more competitors” was used the most frequently to allocate procurement contracts in 2001 – 2003. It was followed by “simplified awarding” and “public tenders”. The importance of two-stage public tenders was similarly small like “non-standard” methods of contract allocation (shown on the line “Others”) that include mainly army contracts. The trend of using “call for one competitor” decreased, and it is the most problematic from the aspect of transparency.

It is to note that we cannot draw any cardinal conclusions from the above data. The reason is the informative capacity of the sample. Although all public tenders except contracts of small value should be publicised on this address, the calculations show that complete data on about only 30% of the tenders are available. This statement is evident from a comparison of the cumulative value of public tenders according to bid prices that have been publicised on the Central Address with the value of public procurement market calculated on the basis of the analysis of System of National Accounts (excluding contributions of Social Security Funds). In spite of some objections that may be made against this simple calculation it is clearly indicated that as a result of the failure to observe the legal rule the level of transparency has not increased by the establishment of Central Address.

After this macro-level approach it is possible to carry out a similar analysis on the level of municipalities where a considerable amount of funds expended in the public procurement market is transacted. The table below shows an overview of the number of executed procurement contracts on the level of municipalities classified according to the population figures. It is obvious that the number of public tenders is directly proportionate to the municipality size or to its budget. The result is logical because it is rather costly to use public tenders and they are used only for contracts of higher value.

Table 5: The frequency of various methods of awarding public tenders in relation to the municipality size

Size (thousands of inhabitants)	Open public tender	Call for more competitors	Simplified awarding	Small public tenders	Total	% of the budget
100-50	3	8	12	23	46	18
50-30	1	4	6	19	30	20
20-30	1	2	3	8	14	18
10-20	1	3	1	7	12	15
5-10	-	-	-	4	4	20
0-5	-	-	-	3	3	21

Source: Central Address, own calculation

In the course of surveying the frequency of awarding methods, the municipalities were inquired what importance was attributed to the lowest price criterion in the awarding of tenders. The hitherto results of research (its sample cannot however be considered as representative) document that the lowest bidding firms are awarded the execution of a procurement contract only at 50% probability. It means that other than purely economic criteria often play their role.

This information shows that the level of transparency in the awarding of public tenders is not very high in the Czech Republic. In spite of the publicising duty enactment not a half of obligatory data is available on the Central Address. It is a clear example of the failure to implement the important legal provision.

Of course, mainly the public sector suffers from the impacts of low transparency because such a situation is not only favourable for corruption but also it increases the value of private transaction costs, which diminishes competition in this market.

Currently, some positive trends can however be identified in this area. Some of them are connected with the necessity of implementation of EU legal rules that lay a great emphasis on transparency. A project of the Ministry of Defence of the Czech Republic, which was recently criticised for the non-transparent awarding of public tenders, can be taken as an example of “individual” activity. This important awarding institution envisages to launch an interesting information system in a short time. In its framework the potential bidder will register itself and indicate the areas of its business. When a public tender for which it could potentially file its application is called, it will be contacted. So it will get rid of any costs of permanent monitoring of websites. It is a very interesting shift from passive to active communication.

VIII. Conclusion

The public sector in most advanced countries allocates a large portion of public expenditure through public tenders. It is not otherwise in the Czech Republic, where more than 17% of GDP is allocated through this instrument. Effectiveness of the awarding of public tenders can be increased (in the sense of a cut in of the price for the public sector) by a reduction in private transaction costs. This approach is urgent especially in transition economies where problems with the observation of elementary rules of transparency can often be identified while transparency is in direct relationship with the value of private transaction costs. In order to reduce private transaction costs e.g. these measures may be taken:

- the simplest possible documentation the bidders have to fill in,
- training of potential applicants,
- active communication (e.g. electronic system that will actively address potential applicants),
- increase in transparency.

Some restraints upon the reduction of private transaction costs should be taken into account. The first restraint is that such a reduction is mostly funded by the private sector, i.e. a reduction in private transaction costs is offset by an increase in public transaction costs (Pavel 2003). Therefore it is necessary to carry out marginal analysis permanently. Another possible hazard ensuing from the reduction in private transaction costs through the transparency increase is a higher probability of the origination of a collusive cartel. It was proved by researches (OECD 1999) that the probability of the origination of collusive cartel was in positive correlation with the level of transaction transparency. In spite of the above-mentioned problems the reduction in private transaction costs is a tool to increase the effectiveness of public tenders the managers of public sector should not leave unnoticed.

Appendix 1 – Description of OECD methodology for the quantification of public procurement market

Studies of OECD whose methodologies and results are described below are based on the System of National Accounts (SNA) that are kept according to its methodical instructions.⁵ Key terms or transactions used for the quantification of public procurement market are Final Consumption Expenditure (FCE) and Intermediate Consumption (IC).

At first, let us look at the indicator final consumption expenditure, which is defined as the expenditure of government bodies on individual consumption (natural social transfers to households) plus the expenditure of government bodies on collective consumption (e.g. defence, science and research, etc.). It is the value of its gross output after subtraction of incomes from the sales of goods and services and capital expenditure (Hronová – Hindls 2000).

⁵ Calculations are based on data of the 1968 System of National Accounts. More recent data processed according to 1993 methodology are not used because their sufficiently long time series are not available in some countries.

To calculate the total value of the purchases of goods and services by the government, the indicator FCE must be adjusted by including the expenditure on Gross Fixed Capital Formation (GFCF) and incomes from Government Sales (SALES) and by subtraction of Consumption of Fixed Capital (CFC) and Indirect Taxes (IT). After this adjustment so called Total Expenditure (TE) is calculated, which is the sum of funds expended by the government in a current year on the purchase of goods and services.

$$\mathbf{TE = FCE - CFC - IT + SALES + GFCF, \text{ where}} \quad (1.1)$$

TE is total expenditure,

FCE is the final consumption expenditure,

CFC is the consumption of fixed capital,

IT is indirect taxes,

SALES is government sales,

GFCF is the gross fixed capital formation.

These purchases also involve Compensation of Employees (CE), which are all payments and natural fringe benefits provided to employees as remuneration for work. The compensation of employees consists of three transactions: wages and salaries, employer's actual social contributions and employer's imputed social contributions. But this type of expenditure is not subject to the public awarding procedure (except some natural fringe benefits) and so this expenditure must be subtracted from it.

$$\mathbf{TEa = TE - CE, \text{ where}} \quad (1.2)$$

TEa is the volume of government expenditure on the purchase of goods and services

TE is total expenditure,

CE is the compensation of employees.

The volume of government expenditure on the purchase of goods and services is calculated according to the above relation, and it can be identified with government expenditure in the public procurement market. This value can be disaggregated into army and non-army expenditure. It is relevant from the aspect of quantification of the volume of goods and services for the production of which also foreign firms may apply. It is assumed here that the purchases of goods and services for the army sector are restricted for strategic reasons to domestic firms only. Other goods are considered as tradeable, being an important component of international trade.

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