

## PUBLIC CONTRACTS IN HOLDING COMPANIES OPERATING IN THE CONSTRUCTION INDUSTRY – A CASE OF THE CZECH REPUBLIC

Karel BRYCHTA \*

*Department of Finance, Faculty of Business and Management, Brno University of Technology,  
Brno, Czech Republic*

Received 31 July 2020; accepted 24 February 2021

**Abstract.** This paper is produced as an exploratory study with the aim of carrying out a taxonomy of construction companies operating in the Czech Republic, taking into account the type and number of concluded public procurement contracts. In processing the multidimensional matrix describing the companies, a cluster analysis was used to identify the dependence between the set of variables. Results of the analysis suggest that the prevailing types of public procurement procedures include *negotiated procedure without prior publications*, *open procedure* and *simplified below-threshold procedure*, while from the point of view of the contracted value, the open procedure is of the highest importance. As for the cluster analysis conducted for the types of public procurement analysis, one can conclude that there is a relation between the number of public contracts concluded and the scope of the types. On the other hand, the extension of the conducted cluster analysis did not provide any conclusive evidence regarding the relationship between the types of public procurement contracts and the types of holding structures. Such a study has not been realised in the Czech Republic yet. Thus, the results of this study provide a background for research in the area of public procurement in the Czech Republic. Some potential research questions have been stated in the discussion part of the paper.

**Keywords:** construction industry, cluster analysis, Czech Republic, holding structure, public procurement.

**JEL Classification:** G38, H57, L74.

### Introduction

As stated by the WTO (2018), “*Government procurement is of considerable economic significance at both the domestic and international levels, accounting for a significant proportion of national GDP. At the domestic level, the procurement of goods and services by government agencies provides needed input that enable governments to deliver public services and fulfil other tasks.*” The relevance of this proclamation can be supported by showing relevant figures demonstrating the importance of public procurement on a global scale. As stated by the European Commission (2018b), “*Accounting for 15–20% of global GDP, public procurement represents a substantial portion of the EU economy and the economies of many countries around the world. Public procurement commitments under the World Trade Organization’s Agreement on Public Procurement (GPA) have been estimated at around EUR 1.3 trillion.*” This positive assessment as to the global importance of public procurement can also be easily deduced from the data and information as published by the OECD (2018).

In relation to public procurement, it is worth mentioning that public procurement provides a necessary input for the provision of public goods and services. In this respect, the construction industry plays an especially important and special role. Its importance and specifics can be supported even by the fact that in the European Union, and even in particular Member States, there are special institutions dealing with situations within the construction industry (for the European Union, see (European Commission, 2018a), for the Czech Republic, see (Ministerstvo průmyslu a obchodu České republiky, 2018)). There are many reasons for that – most significant of which is the socially and thus politically sensitive issues are involved and, at the same time, inappropriate rules can negatively influence the functioning of the single EU market. Thus, the construction industry and naturally public procurement have been regulated not only by specific Member States but also on an EU level. In this respect, there are established goals for this sector for the EU (European Commission, 2018a with reference to European Builders Confederation, 2018). The importance of the construction

\*Corresponding author. E-mail: [brychta@fbm.vutbr.cz](mailto:brychta@fbm.vutbr.cz)

industry for the whole economy of an EU Member State can also be easily deduced from the number of the subjects operated therein. For instance, in the Czech Republic in 2016, a total of 285,610 entities operated in the broader construction sector and despite facing a decline during the period of 2010–2016 (European Commission, 2018a), it is evidently a sector of vital importance for the whole economy.

There is quite extensive expert literature focusing on the issue of public procurement. The key points (topics) include the transparency, effectiveness and identification of key factors influencing the transparency and effectiveness in public procurement: two sides of the same coin. The study by Pavel and Rističová (2015) has confirmed a relationship between the situation on the public procurement market and both the level of corruption and efficiency of the public sector. The existing fair competition and compliance with the rules represent good tools for meeting transparency goals and more suitable pricing for the public sector at the same time. A frequently addressed issue in relation to public procurement is the issue of corruption and its negative impact on public procurement effectiveness. For instance, in their study of the Czech Republic (for the period 2007–2014), Titl and Geys (2019) demonstrated that firms donating 10% more to a political party gaining (losing) the power witnessed an increase (decrease) in the value of their public procurement contracts by 0.5–0.6%, while these effects arose just for the contracts allocated under less restrictive procurement allocation processes. The issue of corruption, however, relates also to large and uncommon projects in which the public sector acts as a client/owner or even as the main contractor as demonstrated by Locatelli et al. (2017). The corruption is not only a sociological problem affecting the trust and confidence of the citizens in the functioning of the State, but also a serious economic problem. As stated by Ochrana and Maaytová (2012), there are – for the Czech Republic – estimates that losses due to non-transparent and corruptive behaviour amount to 10% of the volume of public procurements, showing that in the case of the construction industry the percentage is even higher. The problem of corruption in the area of public procurement and its negative influence is generally and globally acknowledged (see, for instance, study by Yap et al. (2020), Owusu et al. (2019) and references to the expert literature stated therein).

There is also understandable agreement on the relevance of competition for public procurement effectiveness (above all for the final price). In their research focusing on the issue of overpricing of public procurement for construction works, Ochrana and Stehlík (2015) highlighted that owing to any additional bid, the difference between final and presumed price was lower by 2.19%. A subsequent study by Stehlík (2018) proved that the average price dropped with each additional tender in the open procedure by 3.04%. The positive impact of the number of the bids to the final price has also been highlighted by

some of the conclusions from the study by Ochrana and Hrnčířová (2015). The positive effect of the openness of the procedure and number of the participants in the competition were proven by Sičáková-Beblavá et al. (2013) in the study focused on the effects of the e-auctions – there were positive results in the form of 10–12% savings. In their recent study Yu et al. (2020) deal with the issue of electronic procurement and sustainable procurement just in the construction industry which contributed to the research area by developing an integration framework of strategies for effective promotion of electronic procurement and sustainable procurement. As concluded also by Roman (2017), considering the sustainability, the impact of construction processes and activities has become urgent globally. Giving the importance to enhance industry practice in a green, safe, and economic manner, the study by Wong et al. (2016) stresses that facilitating the wider adoption of green procurement in building developments should be the major concern of the construction industry, while stating that the top three most significant factors identified are: mandatory environmental regulations by the government, client requirements in tendering, and government and non-governmental organisation requirements.

When getting back to the issue of openness, the issue of publicity cannot be omitted. In the study by Coviello and Mariniello (2014) the positive effects of published outcomes, by comparing auctions around a discontinuity threshold caused by legally mandated rules on whether an auction must be publicised on the notice board in the premises of the public administration, or in Regional Official Gazettes and provincial newspapers, were demonstrated (situation in Italy). For the situation in the Czech Republic, the importance of the openness of the procedures within public procurement was also stressed by Pavel and Sičáková-Beblavá (2008), who pointed out a negative trend (years 2004–2006) as to the growing number of public procedures without prior publication for the Czech Republic. These authors pointed out the fact that special attention should be paid to public procurement offered by means of a negotiated procedure without prior publication, showing a rapid increase could indicate an effort of the contracting authority to avoid classical open procedures. Special attention is paid to the post-bidding phase in public procurement. In this respect, Schmidt et al. (2016) investigated factors which could influence the change of the price of a public contract in the post-bidding phase. Among others, these authors have concluded that the low value of the variable “tendered price/anticipated price” leads to an additional increase of the price actually paid as a result of an amendment to the contract.

Neither institutional nor legal aspects/settings have been omitted by the expert literature. The importance of the institutional settings for the proper functioning of the public procurement market is emphasized by Pavel and Sičáková-Beblavá (2008). The analysis of the public procurement legal regulation (former one) was carried out by

Vyklický et al. (2016), who showed that potential foreign suppliers were facing unnecessary administrative burdens, which ultimately discourage the submission of tenders from “foreign” EU countries. A study of the current legal regulations has been missing so far. Due to a relatively short time of the effectiveness (operation) of the “new” act on public procurement, it would be difficult to assess the impact on the new regulation which should eliminate the above stated problem (obstacle). An interesting analysis of the legal regulation is also presented by Pavel (2018), who was dealing with the complexity and developments of public procurement legal regulation in the context of a broader survey relating to private transaction costs of procurements and factors affecting their value. The legal regulation is broadly assessed as a strict and demanding one (for instance, Schmidt 2016), which is understandable on the one hand (public funds are used) but it can create a barrier for participation of some entities in public procurement procedures due to strict and demanding administrative requirements set by law. From an institutional point of view, Plaček et al. (2016) investigated the relevance of decentralisation for the efficiency of public procurement, confirming Oates’ general conclusion about self-government units, which can make effective decisions, is generally applicable also to the field of public procurement. At the same time, their study has shown some specifics for the construction industry: they have found out that there are higher costs for public procurements in the regions with more players.

Another important aspect related to public procurement that is under investigation in the expert literature includes the aforementioned transactional costs. For instance, Dufek (2013) found out, based on the primary research realised by the 48 different firms which took part (in the years 2010 and 2011) in more than 4,000 tenders, that the weighted means of relative costs of a single offer equals 0.25% of the contract value. The level of the costs connected with public procurements can be seen as an obstacle for the participation of smaller companies. For instance, the study realised in Canada for MSMEs (Micro, Small and Middle Enterprises) by Di Mauro et al. (2020) provided evidence that the costs of bidding, requirements for participation, bundling of contracts and award rules based on minimum price affect participation of the MSMEs in public procurement. In more recent research, Pavel (2018) quantified the size of private transaction costs associated with the participation in tenders and identified the main factors that affect their value. The factors observed in his study were as follows: the average value of the public tender for which the company strived during the last two years, the number of tenders during the last two years, the success percentage during the last two years, turnover of the company in millions of CZK, and an artificial variable (the type of public tender from the point of view of its subject matter). Based on the literature review for the situation in the Czech Republic, there is missing a deeper analysis for the procedure of competitive dialogue which was introduced by European law (Eur-lex, 2020).

In this respect, when considering the situation in the European Union, the study by Buccino et al. (2020) reveals that the use of competitive value is greater for larger value contracts, for national rather than local authorities, for the supply of other manufactured products and machinery; for research and development and business, as well as information technology services; and for construction works. Moreover, at the same time, a decreasing trend in the use of competitive dialogue over time is observed.

Based on the carried out secondary research, one can conclude that aspects relating to the assessment of selected categories of entities from the perspective of the types of the public contracts concluded has so far been missing. According to the author’s opinion, these aspects are worth being investigated. There is quite a reasonable presumption that public contracts are of vital importance (even the issue of survival and development) for many companies operating in the construction industry. This idea naturally provokes many mutually interconnected questions related to the behaviour of such entities in the public procurement market and a question whether there are some patterns that can be observed in this respect.

Following the above-stated idea and previous study by Bělušová and Brychta (2018), the aim of the paper is to carry out a taxonomy of construction companies operating in the Czech Republic from the point of view of the type and number of concluded public procurement contracts. To the knowledge of the author of the paper, such a study has not yet been realized (neither for the Czech Republic, nor for other countries). The idea of taxonomy of construction companies from the point of the type and number of concluded public procurement contracts has been omitted in the expert literature so far (conclusion based on the results of the research made in the Web of Science, Scopus and ResearchGate databases – key searching words: cluster analysis, construction companies, construction industry, public procurement contracts and taxonomy).

## 1. Paper objective, materials, and methods

The paper is primarily intended and drawn as an exploratory study – its aim is, as given above, to carry out a taxonomy of construction companies operating in the Czech Republic from the point of view of the type and number of concluded public procurement contracts within the period 2015–2018. The object for the research has been determined as active companies operating in the building industry (NACE codes 41 – Construction of buildings, 42 – Civil engineering and 43 – Specialised construction activities) and, at the same time:

- Having their seats in the Czech Republic.
- Meeting the criteria of having at least one subsidiary in an EU Member State (including the Czech Republic) and
- The company concluded at least one public contract assigned for a sole contractor in the years 2015, 2016, 2017 or 2018.

When defining a subsidiary, the condition of having at least 10% share in the capital was determined (it is one of the conditions determined for the application of the exemption from taxation of dividend payments (for more details see Eur-Lex, 2018). This classification has its relevance in the holding structures due to tax consequences as suggested by Kalová and Brychta (2018).

The basic research questions have been set as follows:

1. What are the prevailing types of public procurement contracts for the companies in question?
2. Are there any similarities among the companies from the perspective of the number of concluded public contracts and types of public procurement used for the public contract (is there any platform in this sense)?
3. Is there a relation between the above-stated criteria and the type of the holding structure?

To provide a more thorough insight, conclusions related to the above-stated research questions were partly elaborated by incorporating selected economic indicators for the resulting evaluation (for more details see the criteria as set in Table 2 below). Table 1 below shows the sources of the primary data for the conducted research; this table also provides the justification of the relevance (use) of the data.

Three main economic categories were subsequently selected to describe an individual company – its economic strength (see Table 2 below). Some recommendations as stated in the expert literature (Siew et al., 2013; Kotane, 2015; Krivka & Stonkutè, 2015; Mohamad et al., 2014; Bělušová & Brychta, 2018) have been partly reflected while choosing the criteria set.

The purpose of the first category indicators has been to briefly describe the economic situation, performance, and strength of the company. As stated above, the data for 2015 was used since the Amadeus database did not offer the data for the following years. The number of employees

Table 2. Criteria followed in relation to the description of an individual company (source: own elaboration)

Category	Particular indicators
Economic situation and performance	Fixed assets [EUR] Operation revenue (turnover) [EUR] Profit margin [%] Total assets [EUR]
Indicators related to employees	Number of employees
Indicators related to subsidiaries	Total number of subsidiaries Number of subsidiaries situated in the Czech Republic Number of countries in which the subsidiaries of the company are located

has been chosen due to its relevance as an indicator related to the capabilities and capacities of the company, which is of key importance in production industries (including the building industry). The last category of indicators provides information of the holding structure of the companies. This set of data describing each company from the economical and related point of view were put aside at the beginning of the research, since only the companies which concluded at least one public contract in the period 2015–2018 were under investigation.

The criteria relating to the public procurement contract for a sole contractor were determined as follows:

- The number of contracts concluded;
- The total volume of the contracts in CZK for particular years; and
- The number of types of contract (the combination of the type of the procurement procedure and the type of the public procurement limit) – for more details, see Table 3.

The specification of the type of the public contract naturally respects the classification as stated by the Act No. 134/2016 Coll., on Public Procurement, as amended

Table 1. Sources of the primary data and their relevance for carried out research (source: own elaboration)

Source of data	Relevance (use) for the research	Commentary
Amadeus database by Bureau van Dijk (2018) (namely in the wording of its update number 292, software version 16.06)	Identification of the companies which meet the above-stated conditions.  Creation of the matrix describing the companies from the point of view of the examined indicators.	Data for 2015 were selected for the description of companies due to the missing data for 2016, 2017 and 2018.  An exchange rate valid as of 31 December 2015 was used for the conversion to EUR – i.e. CZK 27.025/1 EUR (ČNB, 2018).
Database of public procurements as held by the Ministry of Regional Development of the Czech Republic (2018) as available in the Information System of Public Contracts	Identification of the types of the public procurement used and the number and volume of the contracts for the observed years 2015, 2016, 2017 and 2018.	Processing 3,381 records while using SQL to create a matrix describing a particular company from the perspective of the criteria related to public procurement (for details see below).
Database of the Czech Statistical Office (2019) – namely the register of entrepreneurial entities	Gathering other information for a particular company if necessary.	
Commercial Register kept by the Czech Ministry of Justice (2019)	List of documents containing a balance sheet and a profit and loss statement for the investigated companies.	Used when relevant data in the Amadeus database were missing.

Table 3. Types of public procurement (source: own elaboration using the Act on Public Procurement and data as provided by the Ministry of Regional Development of the Czech Republic (2019))

Procedure types (as specified under Sec. 3 of the Act on Public Procurement in association with the specification of the contract in the provided data)	Limit type
Negotiated procedure without prior publication (A) Negotiated procedure with prior publication (B) Open procedure (C) Competitive dialogue (D) Restricted procedure (E) Public service contracts according to Enclosures (F) Simplified below-threshold procedure (G)	Above-threshold regime (0) (for the definition see Sec. 25 and for more details for the procedure see Sec. 55 et seq. of the Act on Public Procurement)  Below-threshold regime (1) (for the definition see Sec. 26 and for more details related to the procedure see Sec. 52 et seq. of the Act on Public Procurement)  Small-scale public contract (2) (for the definition see Sec. 27 of the Act on Public Procurement)  Without specification (3)

Note: alphabetical and numerical codes in the bracket serve to provide a brief description of the category in the following text of the paper.

(hereinafter only as the “Act on Public Procurement”) is given in Table 3 below. Public contracts assigned to more than one contractor were not included in the research.

To process the resulting multidimensional matrix describing the companies, a cluster analysis (for more details see e.g., Hendl, 2012a, 2012b) was used to find the

dependence between the set of variables related to public procurement contracts. The data in the matrix was standardised before carrying out the cluster analysis. This newly created data matrix was subsequently processed using *K-means clustering (maximisation of initial between-cluster distances used for setting initial cluster centres)*. The number of clusters was set based on the formula:

$$k = \sqrt{n/2}, \tag{1}$$

as proposed by Vintilă et al. (2014), where *n* corresponds to the number of entities. The description of the clusters was based on a verbal evaluation, which represents the reflexion of the comparison of clusters among themselves. The author also tested the robustness of the achieved results while using different types of methods/ways established for the cluster analysis. The results reached in relation to public procurements were subsequently extended by the results of the cluster analysis of the matrix in which the companies have been described in conjunction with the indicators related to the holding structure (for more details, see Table 2 above). For the discussion part, there are briefly presented results of the analysis in which the companies were investigated from the perspective of the selected economic indicators.

## 2. Results

In total, 177 Czech companies operating in the construction industry met the criteria of having at least one subsidiary in an EU Member State. At the same time, the condition to conclude as a sole contractor at least one public procurement contract within the period 2015–2018 was met by 43 companies. However, final statements were not published in the case of one company. Thus, research was conducted for 42 companies. The number of the cluster was then set, following about set formula, set as four. The summary of the basic findings is presented in Table 4.

Table 4. Contracts concluded according to the type of public contract procedure used (source: own elaboration)

Entity	No. of concluded contracts	Volume [mil. of CZK]	Type of the public contract procedure used						
			A	B	C	D	E	F	G
1	301	41,542	138	2	119	0	9	10	23
2	2	32	1	0	1	0	0	0	0
3	104	2,230	30	0	37	0	6	0	31
4	16	402	8	1	5	0	0	2	0
5	4	34	1	0	3	0	0	0	0
6	1	4	0	0	0	0	0	0	1
7	33	858	2	0	19	0	3	0	9
8	13	166	0	0	8	0	0	0	5
9	3	73	0	0	2	0	1	0	0
10	148	2,353	32	0	37	0	16	0	63
11	81	2,715	34	0	26	0	14	3	4

End of Table 4

Entity	No. of concluded contracts	Volume [mil. of CZK]	Type of the public contract procedure used						
			A	B	C	D	E	F	G
12	10	93	2	0	3	0	0	1	4
13	13	2,361	3	2	5	0	1	0	2
14	8	63	1	0	1	0	0	0	6
15	1	0	0	0	0	0	0	0	1
16	19	426	2	0	4	0	1	0	12
17	20	365	0	0	13	0	0	0	7
18	1	148	0	0	1	0	0	0	0
19	240	10,952	67	2	89	0	21	2	59
20	48	284	24	1	13	0	0	0	10
21	1	0	0	0	0	0	0	0	1
22	2	11	0	0	0	0	0	0	2
23	2	49	1	0	1	0	0	0	0
24	5	25	0	0	1	0	0	4	0
25	2	36	0	0	1	0	0	0	1
26	2	80	0	0	2	0	0	0	0
27	263	4,800	60	1	105	0	6	1	90
28	12	995	2	0	6	0	2	0	2
29	829	25,468	315	3	249	0	37	1	224
30	61	8,022	29	0	18	0	5	1	8
31	278	14,947	149	0	70	0	14	16	29
32	101	5,402	33	2	44	0	10	5	7
33	1	0	1	0	0	0	0	0	0
34	46	323	7	0	21	0	0	0	18
35	10	77	5	0	3	0	0	0	2
36	46	7,900	16	0	23	1	0	0	6
37	481	5,578	96	0	138	0	16	4	227
38	2	11	0	0	0	0	2	0	0
39	2	4	1	0	1	0	0	0	0
40	3	9	1	0	0	0	0	0	2
41	7	1,155	2	0	5	0	0	0	0
42	5	153	0	0	3	0	0	0	2
43	69	789	7	0	21	0	7	0	34
Sum	3 296	140,935	1,070	14	1,098	1	171	50	892

A mere overview of the results presented in Table 4 gives a clear impression that the public procurement procedures of type A (*negotiated procedure without prior publication*), type C (*open procedure*) and type G (*simplified below-threshold procedure*) are the most significant from the point of view of the number of contracts concluded (the shares are 32.46%, 33.31% and 27.06% respectively). The total volumes of the concluded contracts for the types A, C and G are as follows: CZK 12,773 mil., CZK 101,748 mil. and CZK 9,436 mil.; thus, the relevance of these categories remains valid even when considering

the volume of the contracts. The most frequent type of public procurement procedure within negotiated procedure without prior publication (A) is the below-threshold regime (868 of 1017 contracts, i.e., 81.12%), followed by the above-threshold regime (192 of 1017 contracts, i.e., 17.94%). Considering the open procedure (C), the most frequent type of procedure is the below-threshold regime (836 of 1098 contracts, i.e., 76.14%) followed by the above-threshold regime (259 of 1098 contracts, i.e., 23.59%). For the category of the simplified below-threshold regime (G), there is a total majority of using the below-threshold

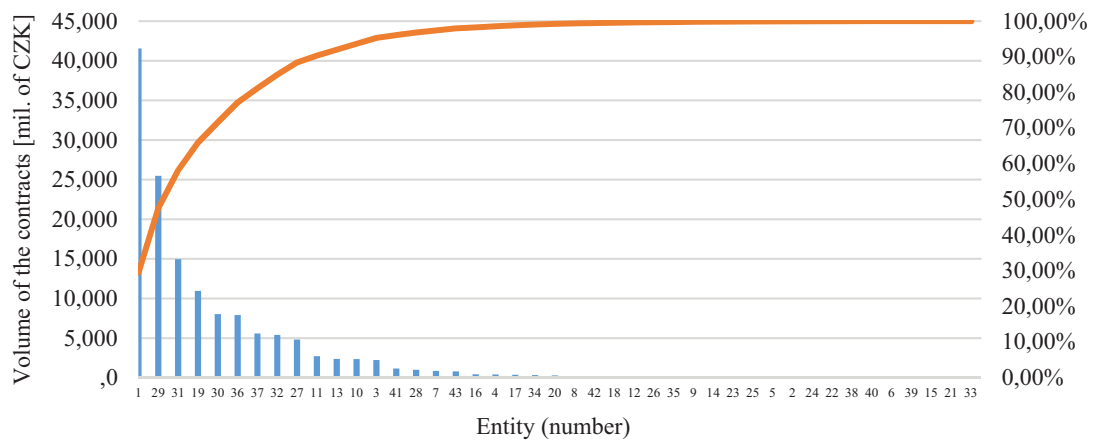


Figure 1. Pareto analysis (source: own elaboration)

regime (891 of 892 contracts, i.e., 99.9%). It is worth mentioning that for the companies under investigation one can conclude that the regime of a competitive dialogue (D) was used only once.

The results of the Pareto analysis for the volume of the contracts concluded [in mil. of CZK] provides conclusive evidence on the existence of the dominant players (see the Figure 1).

The share of the company on the 1<sup>st</sup> position in the volume of the contracts is 29.48%. The share of the first eight companies (20% of the number of companies) is 88.42%. The first three companies considering the volume of the contracts take 58.15% from the total volume of the public procurement contracts, which is a considerable share. The above stated conclusions clearly highlight the strength of a few companies and their importance not only to the construction industry itself but also their relevance to other companies being in the position of their sub-contractors and for the holdings themselves.

The results of the cluster analysis of the data (in total figures for the whole period 2015–2018), after excluding the information on the volume of the public procurement contracts are provided in Table 5. The achieved results can be considered robust since when using different types of the cluster analysis we were provided with the same or at least remarkably similar results. The results of the cluster

analysis in conjunction with the results of the Pareto analysis give further evidence to the presumptions that:

- only a few players are involved in the public contracts based on the above threshold regime;
- within key players one can find a few companies which gain a significant share in the volume of the concluded contracts just thanks to the number of concluded contracts (for instance, subject No. 29 (2<sup>nd</sup> position) has concluded approximately 2.7 times more contracts compared to subject No. 1 (1<sup>st</sup> position)).

Following these results, the analysis was subsequently extended to include the results of the cluster analysis that classify the companies from the point of view of their holding structure (for more details, see the information provided in Table 2 above). Putting the results of these two analyses together (see the information provided in Table 6 below), one can conclude that it seems there is no generally valid and direct relationship between the public procurement contracts and the existing holding structure. One of the eight key players (considering the volume of the public contracts in mil. CZK) comes under cluster I – it means there is an extensive international holding structure. Two subjects come under cluster IV which represent a sole company, a final element of the holding chain structure or an existence of a company in the position of

Table 5. Description of the clusters (criteria related to the public procurement type) (source: own elaboration)

Cluster	Number of entities in the cluster	Specifics of the cluster	
		Number of the concluded public contracts	Prevailing type of public procurement
I	2 (1;31)	High	A-0; A-1; C-0; C-1; G-1
II	34 (2–12; 14–18, 20–26; 28; 30; 33–35; 38 – 43)	Low (prevailing value)	A-1; C-1; G-1
III	2 (29, 37)	Very high	A-1; C-1; E-1; G-1
IV	5 (13; 19; 27; 32; 36)	Variable	A-1; C-0; C-1; G-1

Table 6. Description of the clusters (criteria related to holding structure) (source: own elaboration)

Cluster	Number of entities in the cluster	Specifics of the cluster		
		Number of subsidiaries	Number of subsidiaries in the Czech Republic	Number of countries in which the subsidiaries are located (except the Czech Republic)
I	3 (1; 3; 5)	Very high	Very high	Very high
II	23 (2; 4; 6; 8–15; 17–21; 24; 25; 28; 30–32; 36)	Middle	Low	Low – middle
III	1 (7)	Very high	Very high	None
IV	15 (16; 22; 23; 26; 27; 29; 33–35; 37; 38; 40–43)	One (in one case two)	None	One (as a rule in Slovakia)

a parent company for a subsidiary in Slovakia. The prevailing platform for the six remaining companies cannot be described unambiguously due to the existence of huge variety in the attribute followed.

### Discussion and conclusions

As suggested by the results shown in Table 4, the prevailing types of public procurement procedures include the *negotiated procedure without prior publications*, *open procedure* and *simplified below-threshold procedure*, while from the point of view of the contracted value, the open procedure is of the highest importance, which is positive news. There is also a positive finding relating to the volume of the public contracts concluded by the companies as specified above in the event the public procurement contract was concluded with more than one contractor. In such cases, public contracts in the value of CZK 1,767 mil. from the total volume of CZK 99,508 mil. are attributable to the negotiated procedures without prior publications (the conclusion based on own computation of the data provided by the Ministry of Regional Development of the Czech Republic (2019)). The entities of such contracts seem to be extremely specific ones. The type of the fulfilment indicates, considering the special requirements, a need for a contractor (or contractors) with specific knowledge and property. In this respect, it seems that – for the selected group of companies – open procedures are of the highest importance both in relation to the number and volume of the contracts.

As for the cluster analysis conducted for the types of public procurement analysis, one can conclude that there is, unsurprisingly, a relation between the number of the public contracts concluded and the scope of the types (in the meaning of the combination of the public procedure and the limit of the public procurement used). At the same time, one can conclude that companies with high numbers of concluded public contracts (cluster I and IV) are parties to the public contracts attributable to the negotiated procedure without prior publications. Based on the overview of the figures, a conclusion can also be made that for some

examined companies, the public sector is the key consumer (namely the companies included in cluster I and IV). The detailed analysis of the companies included therein shows that they are usually extremely specific in the sense of their strength, experience and/or knowledge. Using this type of procedure thus seems to be in line with the rules as stated in the Act on Public Procurement. However, this fact itself does not guarantee the effectiveness of the public procurement. The extension of the conducted cluster analysis did not provide any conclusive evidence on the relationship between the types of the public procurement contracts and the type of the holding structure. There is a relevant fact related to the holding structure and this is that a relatively high number of the examined companies represent a part of a broad holding structure with the parent company abroad. This fact supports the statement that foreign companies use the holding structures to gain some advantages of the companies operating in local markets (Russo et al., 2007). In this sense, it would be suitable to carry out a deeper qualitative analysis in the form of multiple case studies to address the issue of the position of the companies in the holding structure. A different position of the company in the holding structure can play its role – who is the owner of the company? Are the dividends/share in the profits transferred to other countries (if yes, which ones) or do they remain in the hands of the Czech owners? Does the company serve as an entity securing the job for other companies in the holding structure and if yes, how could it be identified in a reliable manner? There is quite good reasons for such investigation. For instance, the amount of CZK 214 bn. (measured as a difference between the amount of the inflow and outflow of the dividends from the FDI) was paid and left the Czech Republic in 2014 (Kučera, 2015). The volume of the dividends paid by the entities under foreign control has been continuously increasing; besides, the pace has been significantly higher as compared with the companies under Czech owners' control (Šmíd & Lajka, 2015).

Extending the analysis by including relevant economic factors has not provided obvious (conclusive) evidence on the mutual relationships between public procurements



contracts and economic indicators. This conclusion is, however, based on some simplifications – only some performance indicators and only for one year were considered (longer series should be taken into consideration). In this respect, an analysis related to the settlement of suitable indicators and their reflection should be made while following all the relevant conclusions as set in the expert literature (for instance in (Siew et al., 2013; Kotane, 2015; Krivka & Stonkutě, 2015; Mohamad et al., 2014; Bělušová & Brychta, 2018)) and also other relevant factors could be included (the volume of the contracts, previous experience with public contracts, the position of the company in the market, the delay in the impact of the performance of the public procurement contract on the company performance, etc.)

As pointed out by Pavel (2018), public procurement is regulated by the rules that differ significantly from those stated for the typical contractual relationship between two private entities. There are obviously many particularities of the construction industry operating within the public procurement “arena”, where fights for public finances take place. At the same time, it seems – and some results of the conducted research imply this conclusion – that also players in this arena are very original and specific. From this point of view, it is necessary to pay attention to qualitative research aimed at individual companies and groups of companies. This research could reveal some interesting facts and existing platforms or maybe uncover something unflattering. According to the author’s opinion, this type of research in this area can also contribute to the desirable discussion on the transparency and effectiveness of public procurement.

## Funding

This work was supported by the Brno University of Technology under Grant No. FP-J-18-5036 (Selected Aspects of Holdings in the Construction Industry) and under Grant No. FP-S-20-6466 (Prediction Models in Finance).

## Acknowledgements

Author of the paper would like to express his thanks to both reviewers for their comments, reservations, and suggestions. Their reflection contributed to improvements of the paper.

## Disclosure statement

Author declares that he has no competing financial, professional, or personal interest from other parties.

## References

Bělušová, K., & Brychta, K. (2018, 4–6 September). Taxonomy of holding structures operating in construction industry – a case of the Czech Republic. In *Proceedings of the International Scientific Conference Economic and Social Policy*. Čeladná.

- Buccino, G., Iossa, E., Raganelli, B., & Vincze, M. (2020). Competitive dialogue: an economic and legal assessment. *Journal of Public Procurement*, 20(2), 163–185. <https://doi.org/10.1108/JOPP-09-2019-0059>
- Bureau van Dijk. (2018). *Amadeus Database*. Update number 292. Software version 16.06. <https://www.vutbr.cz/uk/eiz/databaze/amadeus>
- Coviello, D., & Mariniello, M. (2014). Publicity requirements in public procurement: Evidence from a regression discontinuity design. *Journal of Public Economics*, 109(January 2014), 76–100. <https://doi.org/10.1016/j.jpubeco.2013.10.008>
- Czech Statistical Office. (2019). *Registr ekonomických subjektů*. <https://apl.czso.cz/irsw/>
- ČNB. (2018). *Central bank exchange rate fixing*. Valid for 31 Dec 2015 # 251. [http://www.cnb.cz/en/financial\\_markets/foreign\\_exchange\\_market/exchange\\_rate\\_fixing/daily.jsp](http://www.cnb.cz/en/financial_markets/foreign_exchange_market/exchange_rate_fixing/daily.jsp)
- Di Mauro, C., Ancarani, A., & Hartley, T. (2020). Unravelling SMEs’ participation and success in public procurement. *Journal of Public Procurement*, 20(06 June 2020), 377–401. <https://doi.org/10.1108/JOPP-03-2018-0013>
- Dufek, L. (2013). Measuring private transaction cost of public procurement: case of the Czech Republic. *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*, LXI(2), 317–325. <https://doi.org/10.11118/actaun201361020317>
- Eur-Lex. (2018). *Council Directive 2011/96/EU of 30 November 2011 on the common system of taxation applicable in the case of parent companies and subsidiaries of different Member State as amended*. <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32011L0096&from=CS>
- Eur-Lex. (2020). *Directive 2014/24/EU of the European Parliament and of the Council of 26 February 2014 on Public Procurement and Repealing Directive 2004/18/EC as amended (consolidated version as of 01/01/2020)*. <https://eur-lex.europa.eu/legal-content/EN/TXT/?qid=1596100863473&uri=CELEX:02014L0024-20200101>
- European Builders Confederation (2018). *Construction 2020*. [http://www.ebc-construction.eu/index.php?id=policyareas\\_construction2020](http://www.ebc-construction.eu/index.php?id=policyareas_construction2020)
- European Commission. (2018a). *European construction sector observatory*. [https://ec.europa.eu/growth/sectors/construction/observatory\\_en](https://ec.europa.eu/growth/sectors/construction/observatory_en)
- European Commission. (2018b). *Public procurement*. [https://ec.europa.eu/growth/single-market/public-procurement\\_en](https://ec.europa.eu/growth/single-market/public-procurement_en)
- Hendl, J. (2012a). *Kvalitativní výzkum: základní teorie, metody a aplikace*. Portál.
- Hendl, J. (2012b). *Přehled statistických metod: analýza a meta-analýza dat*. Portál.
- Kalová, D., & Brychta, K. (2018). Atributy developera a developerské činnosti ve stavebnictví – případ České republiky. *ACTA STING*, 2018(3), 23–39. [https://www.sting.cz/acta/3-2018/acta3\\_2018\\_web.pdf](https://www.sting.cz/acta/3-2018/acta3_2018_web.pdf)
- Kotane, I. (2015, 25–27 March). Use of financial and nonfinancial indicators evaluations of company’s performance. In *CBU International Conference on Innovation, Technology Transfer and Education*. Praha. <https://doi.org/10.12955/cbup.v3.605>
- Krivka, A., & Stonkutě, E. (2015). Complex analysis of financial state and performance of constructions enterprises. *Business, Management and Education*, 13(2), 220–233. <https://doi.org/10.3846/bme.2015.300>
- Kučera, L. (2015). Odliv dividend zesílil. *Statistika & My*, 5(6), 18. <https://www.statistikaamy.cz/2015/06/odliv-dividend-zesilil/>
- Locatelli, G., Mariani, G., Sainati, T., & Greco, M. (2017). Corruption in public projects and megaprojects: There is an elephant

- in the room! *International Journal of Project Management*, 35(3), 252–268.  
<https://doi.org/10.1016/j.ijproman.2016.09.010>
- Ministerstvo průmyslu a obchodu České republiky. (2018). *Rada vlády pro stavebnictví ČR*. <https://www.mpo.cz/cz/stavebnictvi-a-suroviny/rada-vlady-pro-stavebnictvi-cr/default.htm>
- Ministry of Justice. (2019). *Veřejný rejstřík a sbírka listin*.  
<https://or.justice.cz/ias/ui/rejstrik>
- Ministry of Regional Development of the Czech Republic. (2019). *Information System of Public Contracts*.  
[http://www.isvz.cz/ISVZ/Podpora/ISVZ\\_open\\_data\\_vz.aspx](http://www.isvz.cz/ISVZ/Podpora/ISVZ_open_data_vz.aspx)
- Mohamad, H. H., Ibrahim, A. H., & Massoud, H. H. (2014). Modelling of financial performance construction companies using neutral network via genetic algorithm. *Canadian Journal of Civil Engineering*, 41(11), 945–954.  
<https://doi.org/10.1139/cjce-2014-0065>
- Ochrana, F., & Hrnčířová, K. (2015). Does the lowest bid price evaluation criterion make for a more efficient public procurement selection criterion? (Case of the Czech Republic). *NISPA Journal of Public Administration and Policy*, VIII(1), 41–59. <https://doi.org/10.1515/nispa-2015-0003>
- Ochrana, F., & Maaytová, A. (2012). Východiska pro vytváření transparentního a nekorupčního systému zadávání veřejných zakázek. *Ekonomický časopis*, 60(7), 732–745.  
<https://www.sav.sk/journals/uploads/0622121907%2012%20Ochrana-RS.pdf>
- Ochrana, F., & Stehlík, P. (2015). Předražování veřejných zakázek na stavební práce v České republice. *Ekonomický časopis*, 63(3), 227–238.  
<https://www.sav.sk/journals/uploads/0620132003%2015%20Ochrana-Stehlik%20+%20RS.pdf>
- OECD. (2018). *Governement at a glance – 2017: Public procurement*. <https://stats.oecd.org/Index.aspx?QueryId=78413>
- Owusu, E. K., Chan, A. P. C., & Hosseini, M. R. (2019). Impacts of anti-corruption barriers on the efficacy of anti-corruption measures in infrastructure projects: Implications for sustainable development. *Journal of Cleaner Production*, 246(31 October 2019), 1–15. <https://doi.org/10.1016/j.jclepro.2019.119078>
- Pavel, J., & Rističová, S. (2015). Analysis of relationship between indicators of the public procurement market and the level of perceived corruption in EU Member States. *Ekonomický časopis*, 63(4), 372–394.
- Pavel, J., & Sičáková-Beblavá, E. (2008). Transparentnosť trhu verejného obstarávania v Českej republike a v Slovenskej republike. *Ekonomický časopis*, 56(2), 168–181.  
<https://www.sav.sk/journals/uploads/0920143802%2008%20Pavel-Sicakova.pdf>
- Pavel, J. (2018). Soukromé transakční náklady zadávání veřejných zakázek a faktory ovlivňující jejich výši. *Politická ekonomie*, 66(1), 20–34. <https://doi.org/10.18267/j.polek.1175>
- Plaček, M., Schmidt, M., Ochrana, F., & Půček, M. (2016). Impact of selected factors regarding the efficiency of public procurement (the Case of the Czech Republic) with an emphasis on decentralization. *Ekonomický časopis*, 64(1), 22–26.  
<https://www.sav.sk/journals/uploads/0617090401%2016%20Pla%20c4%8dek%20+%20RS-F.pdf>
- Roman, A. V. (2017). Institutionalizing sustainability: A structural equation model of sustainable procurement in US public agencies. *Journal of Cleaner Production*, 143(01 February 2017), 1048–1059.  
<https://doi.org/10.1016/j.jclepro.2016.12.014>
- Russo, R., Finnerty, Ch., Merks, P., & Petriccione, M. (2007). *Fundamentals of international tax planning*. IBFD.  
<https://www.ibfd.org/IBFD-Products/Fundamentals-International-Tax-Planning>
- Schmidt, M., Ochrana, F., Plaček, M., & Půček, M. (2016). An empirical analysis of post-contractual behaviour in public works contracts: The Czech Case as a secondary comparison with the Slovak Republic. *Ekonomický časopis*, 64(6), 501–518.
- Schmidt, M. (2016). Stanovení nabídkových cen ve veřejných zakázkách: simulace. *Politická ekonomie*, 64(5), 541–558.  
<https://doi.org/10.18267/j.polek.1087>
- Sičáková-Beblavá, E., Klátík, P., & Beblavý, M. (2013). Ekonomické efekty elektronických aukcí na Slovensku. *Ekonomický časopis*, 61(10), 1067–1078.  
<https://www.sav.sk/journals/uploads/0621142810%2013%20Sicakova-Beblava%20a%20kol.pdf>
- Siew, R. Y. J. (2013). The relationship between sustainability practices and financial performance of construction companies. *Smart and Sustainable Built Environment*, 2(1), 6–27.  
<https://doi.org/10.1108/20466091311325827>
- Šmíd, R., & Lajka, J. (2015). Kdo tahá za nitky české ekonomiky? *Statistika & My*, 5(3), 21–24. <https://www.statistikaamy.cz/2015/03/kdo-taha-za-nitky-ceske-ekonomiky/>
- Stehlík, P. (2018). The competitive effect on public procurement for public service contracts: the case of the Czech Republic. *Ekonomický časopis*, 66(4), 416–427. <http://cejsh.icm.edu.pl/cejsh/element/bwmeta1.element.cejsh-e6b1ed17-5d47-4fef-914e-9d1a8497b129>
- Titl, V., & Geys, B. (2019). Political donations and the allocation of public procurement contracts. *European Economic Review*, 111(January 2019), 443–458.  
<https://doi.org/10.1016/j.euroecorev.2018.11.004>
- Vintilă, G., Onofrei, M., & Țibulcă, I. L. (2014). Fiscal convergence in an enlarged European Union. *Transylvanian Review of Administrative Sciences*, 2014(41E), 213–223.  
<http://rtsa.ro/tras/index.php/tras/article/view/164>
- Vyklický, M., Man, P., Heid, R. R., & Jurčík, R. (2016). Qualification requirements for foreign suppliers in public procurement – evidence from the Czech Republic. *DANUBE: Law and Economics Review*, 7(1), 19–39.  
<https://doi.org/10.1515/danb-2016-0002>
- Wong, J. K. W., Chan, J. K. S., & Wadu, M. J. (2016). Facilitating effective green procurement in construction projects: An empirical study of the enablers. *Journal of Cleaner Production*, 135(01 November 2016), 859–871.  
<https://doi.org/10.1016/j.jclepro.2016.07.001>
- WTO. (2018). *General overview of WTO work on government procurement*. [https://www.wto.org/english/tratop\\_e/gproc\\_e/overview\\_e.htm](https://www.wto.org/english/tratop_e/gproc_e/overview_e.htm)
- Yap, J. B. H., Lee, K. Y., & Skitmore, M. (2020). Analysing the causes of corruption in the Malaysian construction industry. *Journal of Engineering, Design and Technology*, 18(May 2020).  
<https://doi.org/10.1108/JEDT-02-2020-0037>
- Yu, A. T. W., Yevu, S. K., & Nani, G. (2020). Towards an integration framework for promoting electronic procurement and sustainable procurement in the construction industry: A systematic literature review. *Journal of Cleaner Production*, 250(20 March 2020), 1–18.  
<https://doi.org/10.1016/j.jclepro.2019.119493>
- Zákon pro lidi. (2018). *Zákon č. 134/2016 Sb., o veřejných zakázkách, ve znění pozdějších předpisů*. [Act No. 134/2016 Coll., on Public Procurement, as amended].  
<https://www.zakonyprolidi.cz/cs/2016-134>