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Cronyism in Hungary

An empirical analysis of public tenders 2010-2016

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Abstract

In this paper, we use the public procurement database built by CRCB, which contains data from more than 230,000 public tenders from 1997 to 2017. The analysis is based on data from 126,330 public procurement contracts from 2010 to 2016. The focus of the analysis is public tenders (without framework agreements) won by companies related to cronies and family members of Hungarian Prime Minister Viktor Orbán: Lőrincz Mészáros, István Garancsi, István Tiborcz and Lajos Simicska (we will refer to this group with the abbreviation MGTS). During the analysis, we make a statistical comparison of the corruption risks, the intensity of competition and the strength of price competition among tenders won by crony companies and that among tenders won by other, ordinary Hungarian firms. We use indicators as a dummy variable of the single bidder to measure corruption risks, index of intensity of competition and the relative price drop, RPRD to measure of the strength of competition. Our results point out the existence of political favouritism in Hungarian public procurement during the period under examination. The corruption risk is significantly higher and the intensity of competition is significantly lower in tenders won by MGTS firms than other tenders won by ordinary Hungarian companies and the median RPRD values of tenders won by MGST firms are very close to the median value of tenders with the highest corruption risks and lowest intensity of competition.

Keywords: cronyism, corruption, public procurement, empirical analysis, Hungary

JEL classification: D22, D72, D73, H57, P16

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1 Introduction

This paper is going to present empirical evidence about the existence of the kleptocratic state in Hungary that has been built since 2010 within the framework of Viktor Orbán's autocratic regime. The Hungarian case can be considered as an extreme case of cronyism when the resources of the country are no longer distributed to cronies selected by the political leader; instead, political leaders, their fronts and their families become the beneficiaries par excellence. The state then becomes an extortionary state or a kleptocratic state (Rose-Ackerman, 1999). In such cases, the political leader treats companies in the private sector as his own; if he sees a very successful company, he raises the possibility of 'getting involved' – by forcing the owner to pass on their stake. In extreme cases, tax revenues are spent indirectly for the political leader's amusement (e.g., the construction of football stadiums¹), or he or his friends indirectly acquire shares in state-owned companies, whose profits are then channelled into his family's businesses. Sometimes, he assists by introducing a law that enables become rich his close friends and family members (Rijkers et al.; 2014, Nucifora et al.; 2015, Laki, 2015; Magyar and Vásárhelyi, 2017; CRCB, 2015). János Kornai thoroughly discussed the autocratic characteristics of the Hungarian state administration (Kornai, 2016). Kornai also described the peculiar nature of the Hungarian 'autocratic capitalism': the aim of the regime is not to end the dominance of the private ownership; what it wants is to strengthen the position of political power holders in the business realm. How this is realized is not the abolishing of the market, but simply the intervention in the market coordination for selfish financial gain.

The present study is going to show up an example for such interference from the domain of Hungarian public procurement in the period 2010-2016. In the analysis, we use a methodology developed by us which is based on objective indicators to detect corrupt behaviour of actors of public procurement (Fazekas, et al. 2016; Fazekas and Toth, 2017; Toth and Hajdu, 2017a).

First, we deal with a literature review than we present the data used and the indicators which measure the corruption risks, the intensity of competition and price competition. After that, we show basic statistics of these indicators during the analysed period and we present the models and the results of estimation. In the final part, we deal with the conclusions briefly.

¹ See The Guardian, January 11th, 2018, <http://bit.ly/2qXYSnx>

2 Literature

Sergei Guriev and Daniel Treisman draw attention to the new characteristics of the modern authoritarian systems: instead of relying on mass terror, violence to frighten opponents and indoctrination, a new, less fierce form of the authoritarian governing emerged adapted to the globalized media and the recent technologies (Guriev and Treisman, 2015). Such regimes pretend to be democratic by holding elections but with influencing the results, allowing the private press to work but with corrupting the media and also, they tend to follow and spread an anti-Western creed. An essential tool of the new totalitarian leaders is the propaganda, what they use to convince the citizens about their competences to govern. They rely more on manipulating the beliefs about the world instead of terrorizing victims – the political opponents are strongly encouraged to emigrate. The authors conclude that until there is no significant economic crisis what reveals the incompetence of leader, the authoritarian system can be maintained. Finally, what is very important from the perspective of our study, is that the Hungarian regime of Viktor Orbán is one of the examples of the authors for modern dictatorships.

In order to be able to contextualize our results, we also have to review the conceptualizations from the field of corruption research which we followed during our work. Corruption, albeit it is a micro-phenomenon, now is considered as an umbrella term and is used to refer to 'grand corruption' (Rose-Ackerman, 1978; Lambsdorff, 2007). Thereby the notion of corruption covers the concepts of rent-seeking, state capture, cronyism and kleptocratic state which are some of its distinct manifestations; the presence of corruption leads to limited competition, overpricing and therefore to social losses.

Rent-seeking is understood as the activity of a group of economic actors to achieve an exceptional situation what inevitably leads to social losses (Murphy, Shleifer and Vishny, 1993). The state capture can throw up through rent-seeking: when citizens or groups of companies can achieve that the government or the state institutions create laws and rules that are favourable to them – the state becomes captured by narrow interest groups and regulates economic processes following their interests (Rose-Ackerman, 1999). Rent-seeking may also result in cronyism when the state allocates its resources to the individuals and groups closely related to its leader or in extreme cases to the dictator (Haber, 2002). The extreme case of the cronyism is when the resources of the country are no longer distributed to the cronies selected by the political leader, but par excellence the political leaders, their strawmen and their families will be the beneficiaries – the state then becomes an extortionary or kleptocratic state (Rose-Ackerman, 1999). In such cases, the political leader treats the companies of the private sector as their own; if he sees a very successful company, he raises the possibility of "getting involved" - by forcing the entrepreneur to pass the ownership. In extreme cases, tax revenues are spent indirectly on his fun (e.g. construction of football stadiums); or he or his friends indirectly acquire shares in state-owned companies, whose profits are then attributed to his family's businesses. Sometimes he helps to introduce a law that enables to trade with residence bonds and thereby with citizenship. However, the revenues of this business do not go to the state budget but to the account of offshore companies (Rose-Ackerman, 1999; CRCB, 2015: 75–82). Public procurement is another commonly used channel for the transfer of tax revenue to family members and/or cronies. The functioning of the cronyism was mostly analysed based on examples from Africa, Asia and South America (Harm and Charap, 1999; Haber, 2002; Kang, 2002; Diwan, Keefer and Schiffbauer, 2015; Nucifora, Churchill and Rijkers, 2015; Rijkers, Freund and Nucifora, 2017). We are going to discuss it through the Hungarian case.

3 Data and Indicators

In this paper we use the public procurement database built by the CRCB and take into consideration procurement between 2010 and 2016; the following analysis is based on data from 126,330 public procurement contracts (see Figure 1 and Figure 2).

(Figure 1 here)

(Figure 2 here)

The focus of the analysis is public procurement (not including framework agreements) won by companies tied to cronies and family members of Hungarian Prime Minister Viktor Orbán: Lőrincz Mészáros, István Garancsi, István Tiborcz and Lajos Simicska (we will refer to this group with the abbreviation MGTS, see the Annex for more detailed information). During the period under examination, they won 510 contracts and Hungarian public institutions spent \$49.3 billion on public procurement, of which MGTS companies received \$2.5 billion, thus accounting for 5.1% of the total value of public procurement (see Figure 2 for the aggregated net contract values in the Hungarian public procurement per year). Between 2010 and 2016, this percentage significantly changed by year (see Table 1 and Figure 3 and 4).

Table 1. The share of the value of procurement won by MGTS companies of the total value of public procurement, 2010–2016, N=126,330

	%
2010	0.8
2011	1.6
2012	3.4
2013	11.8
2014	5.6
2015	4.8
2016	1.3

Note: tenders without framework agreements
 Source: CRCB

(Figure 3 here)

(Figure 4 here)

Three indicators will be used in order to investigate the strength of the competition during the tenders. The first indicator refers to the existence of competition: the occurrence of single-bidder contracts, what is an essential indicator of corruption risks or in other terms, of the conditions facilitating corruption. Several studies consider it as an objective indicator of corruption risk (e.g., Coviello & Gagliarducci, 2010; Fazekas et al. 2013b; Fazekas et al. 2016; Tóth – Hajdu, 2016a).

For measuring the prevalence of single-bidder contract, we constructed an indicator called Single-bidder (SB) using the following rule:

$$SB = 1 \text{ if the tender was conducted with only one bid}$$

$$SB = 0 \text{ if there were more than one bid.}$$

The second indicator we take into account in the present study is also related to the number of bids (NB). It measures the intensity of competition (Index of Competition Intensity)². This indicator has missing value if NB= 1 because we assume that if there is only one bid, then there was no competition that could be measured – such cases are analysed by the single-bidder indicator presented in the previous paragraphs. We calculate the ICI with the following formula:

$$ICI = \lg NB \quad \text{if } 1 < NB \leq 10 \text{ and,} \quad (1)$$

$$ICI = 1 \quad \text{if } 10 < NB \leq 200.$$

(observations in which NB > 200 were excluded from the calculations because we assume that they are affected by data inconsistencies)

Finally, as for our third indicator, to measure the strength of price competition, we compare the estimated value of contracts with the final contract value. The estimated value is determined by the issuer and indicates the highest price that was estimated based on a market analysis for a particular product, and sometimes it could also signal how much money was available to implement the project.

² See: CRCB, 2016 and Tóth & Hajdu 2016a.

First, we calculated the difference between the estimated value and the final contract value, then we divided it by the contract value, and finally, we multiplied these results by 100. We can thereby analyse the percentage rate of decline in the estimated value as a percentage, the relative price drop (RPRD). We calculate it in the following way:

$$RPRD = \frac{(P^* - P)}{P} * 100 \quad (2)$$

if $P^ > P$ and $RPRD < 100$*

(cases in which $RPRD \geq 100$ were excluded from the calculations because we assume that they are affected by data inconsistencies)

where P^ is the estimated net value and P is the net contract value.*

Experts determine the P^* (the estimated net value) for the issuers. If they act in accordance with Hungarian regulations, they indicate the maximum market price known to them or the value obtained based on preliminary market research, or, if they do not follow the official rules, it simply corresponds to how much funding is available for the project or how much money they could negotiate with ministries or state institutions that deal with managing EU funds. P is the net price given by the successful tenderer (the net contract price). If $RPRD=0$ or its value is close to zero, then this means that the public procurement contract was concluded at the estimated value. This happened when the final winner knew the estimated value in advance, and he was informed in advance that there would be no competition or that the 'competing' companies were in fact 'loser companies': they had only submitted a tender to cover for the crony company. It is the issuer or predetermined winner that arranges for the 'loser companies' to submit a tender.

According to an internationally accepted interpretation, if contract prices are close to the estimated value, then this should be interpreted as a 'red flag' a sign of possible corruption (Heggstand et al., 2010).

The RPRD thus characterizes the price competition for a single public procurement: the higher value indicates more intense competition and cheaper public procurement, a lower magnitude of overpricing and thereby a lower rate of corruption rents (Tóth and Hajdu, 2017), and the lower value shows the higher level of corruption risks and lower level of intensity of competition.

4 The intensity of competition and corruption risks

During the period under examination, MGTS companies concluded 330 construction contracts as individual tenderers or consortium members with a total value of HUF 564 billion, which amounted to 9.6% of the total value of all construction contracts, excluding framework agreements.

The first indicator suggests that the ratio of contracts with no competition within the tenders won by the MGTS companies were far higher than in the case of procurements won by other firms between 2010 and 2015. In 2016, the situation changed – the tenders related to the MGTS group were conducted in a more favourable environment from this point of view (see Figure 5).

(Figure 5 here)

As for the intensity of competition indicator, similar consequences can be drawn. We can see that the MGTS companies could win the tenders within less competitive circumstances during the analysed period except for 2011 (see Figure 6).

(Figure 6 here)

However, an interesting phenomenon can be observed if we distinguish between the MGT and the S companies: after Viktor Orbán and Lajos Simicska broke up in 2015, Simicska's companies began to face with intense competition on the tenders (see Figure 7). The RPRD indicator also suggests that the competition during those tenders which are won by the MGTS companies is more limited than in the cases of the procurement with other winners, but the year of 2013 was an exception (see Figure 8).

(Figure 7 here)

(Figure 8 here)

RPRD

The empirical data from the Hungarian public tenders from 2010 to 2016 shows that the value of RPRD has a strong correlation with the intensity of competition and corruption risks. The increase of the number of bidders and decrease in corruption risks increases the median value of RPRD (see Table 2). These results support a priori assumptions on our interpretation of the relative price drop. There is a low intensity of competition and high risk of corruption at the tenders where the value of RPRD is close to zero – and it also means that the values of RPRD of tenders give us information independent from the number of bidders on the level of corruption risks of tenders as well.

Table 2. The median value of RPRD by number of bidders and corruption risks (CR3) 2010 - 2016, N= 68,725

Number of bidders	Corruption risks (CR3)			
	0	0.33	0.66	1
1		3.81	0.63	0.04
2	11.06	2.57	0.80	
3	12.57	1.66	0.96	
4	16.86	4.90	0.89	
5	20.07	10.62	3.44	
6 or more	23.01	7.70	0.00	
N	13,929	28,902	21,671	4,223

Figure 9 compares the RPRD values in construction contracts won by MGTS companies, two multinational companies (Strabag and Swietelsky) and simple (non-crony) Hungarian companies between 2010 and 2016 (a total of 20,740 contracts).

(Figure 9 here)

The figure shows the median values of the relative price drop (RPRD) in the different groups of tenders. The ideal case is public procurement with zero corruption risks and intense competition (at least six competitors; 1,182 such tenders were found): in such cases, the median price drop was 21%. Thus, in the case of public procurement conducted within ideal circumstances – with intense market competition – contract prices are typically 21% lower than the estimated value. In such cases, there is no social loss as public procurement prices are set after intense market competition and a minimum risk of corruption. Under less stringent conditions (at least four bidders and less than the maximum risks of corruption), the median price drop was 8.4% (5,032 such tenders were found). The other extreme case is when there was no competition (only one bidder submitted an offer) and the corruption risks reached the highest possible level (we measure this with a corruption risk indicator,

which has a minimum value of zero and a maximum value of one). In such cases (533 tenders), the final contract prices practically matched the price previously estimated by the contracting authority. Prices did not fall because the winner, the crony, understood there would be no competition, knew in advance that he was guaranteed to win, and thus indicated the estimated value as the bid price. Thereby, the social loss is maximized: contract prices contain huge corruption rents as they have been set without competition. Values related to the other three groups of tenders speak for themselves: if Strabag or Swietelsky won alone, then the price drop was the closest to tenders with intense market competition (5.8%). By contrast, in the case of public procurement won by MGTS companies, the contract prices practically equalled the estimated value. A 0.5% price drop rate characterized these tenders (107 such tenders). Therefore, as with tenders with high corruption risks and no competition, prices for tenders won by MGTS companies exceeded real market prices and thereby resulted in a maximum social loss.

According to an article in The Wall Street Journal from 12th January 2018, the European Union's anti-fraud office (OLAF) discovered 'serious irregularities' in projects carried out by Elios Innovative S.A.³ In 2015–2016. At that time, that company was owned by István Tiborcz, Hungarian Prime Minister Viktor Orbán's son-in-law, one of the members of MGTS group. Tiborcz is one of the most critical figures in Hungary's new emerging elite (see Annex). Using the indicator of the relative price drop (RPRD), we calculated its value in tenders won by every member of the MGTS group. We used a total of 69,010 tenders, including 253 tenders won by MGTS firms, for this analysis. Thus, we calculated this indicator separately for tenders won by Mészáros, Garancsi, Tiborcz, and Simicska (see Figure 10).

(Figure 10 here)

In this figure, we can see that while the median RPRD value was 0.9% for tenders won by companies in the MGTS group in 2010–2016, the median RPRD value was 5.9% for tenders won by business organisations owned by István Garancsi (18 tenders), 1.4% for tenders won by Lajos Simicska's businesses (146 tenders), only 0.1% for tenders won by Lőrinc Mészáros' firms (26 tenders), and, finally, only 0.7% for tenders won by Istvan Tiborcz's concerns (63 tenders). We must add another essential result: with the calculation by the CRCB, the value of the RPRD was 27.4% for tenders with a minimum level of corruption risks and a high level of competition (these are tenders with more than six bidders), while it was only 0.5% for non-competitive tenders with a maximum level of corruption risks. These results may provide information on the possible magnitude of rent created by corruption as well.

³ See <http://on.wsj.com/2FyEIDI>

5 Models and Estimations

The present part of the study is going to show some results based on regression models which allow us to investigate the effect of the MGTS companies on the corruption risks and the intensity of competition during the public procurement. By the application of the regression analysis, we can take into consideration several control variables which may be related to whether the winner was an MGTS company or not. Thereby we can remove the effects of these control variables from the effect of the MGTS companies on the indicators mentioned above.

The estimations were conducted by applying the propensity score matching (PSM) method. This method enables us to compare the contracts that were arranged within public procurements won by MGTS companies and won by other companies with reducing the bias due to confounding variables or selection bias. By considering these confounding variables, we can compare more homogeneous subgroups of contracts distinguished based on whether the winner belongs to the MGTS companies or not. The variables that were selected on this purpose are the following:

- The sector of the public procurement (whether it belongs to the construction or not)
- EU funding
- The natural logarithm of the net contract value
- Year of the procurement

So we estimate the following equations:

$$SB = f(MGTS, S, EU, LNCV, Y)$$

$$ICI = f(MGTS, S, EU, LNCV, Y)$$

$$RPRD = f(MGTS, S, EU, LNCV, Y)$$

where the estimated indicators are the indicators of corruption risks (SB), the intensity of competition (ICI) and the relative price drop (RPRD)

The MGTS is a dummy variable which has value one if the tender won by the MGTS companies and has value zero if the tender won by other ordinary Hungarian companies.

S is a variable of the industrial sector

EU is a dummy variable which has value one if the tender financed by EU funds, and zero if domestic sources finance it

LNCV is the logarithm of the net contract value and

Y is the year of the given contract.

We suppose that in the case of regression models, there would a selection bias as the MGTS companies apply for tenders with favourable conditions for corruption and weak competition on purpose. They choose tenders with high contract values and with EU-funding in order exploit the economies of scale (taking consideration the fixed cost of creation of conditions favourable to corruption) that can be achieved, in particular with applying for larger tenders. Thereby the creation of circumstances that are needed for corruption has to be repeated fewer times (for a more in-depth discussion of this phenomenon in the field of communication procurement, see Tóth & Hajdu 2017b). Also, there are

some pieces of evidence proving that the leaders of the MGTS companies may have affected how the public procurement they applied for was conducted. For instance, the companies related to Lajos Simicska won plenty of tenders issued by the Hungarian Roads Nonprofit Plc. (Magyar Közút Nonprofit Zrt.) when it was led by Attila Mázsi who was considered as Lajos Simicska's man⁴.

The outputs of the analyses can be found in the Annex. Here we only discuss the main results. As it is shown in Table 2, the significant positive effect of the MGTS companies on the restriction of competition and the extension of corruption risks can be traced in the case of the SB, our robust corruption risk indicator what is signed by the significant positive coefficient. The significant negative coefficient in the case of the ICI indicator indicates that the MGTS companies won the tenders after significantly weaker competition than the other companies compared homogenous subgroups of contracts. These results mean that the MGTS companies win their tenders within significantly higher corruption risks and significantly weaker competition.

The RPRD what is in correlation with the SB and the ICI is also significantly lower within the group of the tenders won by the MGTS companies (see table 3). This result suggests that corruption rent for the MGTS companies is above the average. However, the results concerning the RPRD suggest a new direction for our research, as the estimated values for the contracts may be manipulated and also there is a considerable amount of lack of data regarding this characteristic. The correct values of the RPRD indicator in the suspicious cases may be estimated based on the data from tenders with low corruption risks and high-level competition.

Table 3. The effects of MGTS companies on the analysed indicators, 2010–2016, PSM

	The single bidder (SB)	The intensity of competition (ICI)	Relative price drop (RPRD)
MGTS	0.190***	-0.067***	-2.526*
Sector	Y	Y	Y
EU	Y	Y	Y
LNNCV	Y	Y	Y
YEAR	Y	Y	Y
N	122,582	85,658	68,823

***: $p < 0.01$

**: $p < 0.05$

*: $p < 0.10$

⁴ <https://vs.hu/kozelet/simicska/a-szamokon-is-latszok-a-simicska-orban-haboru-0211#!s1>
<http://www.borsonline.hu/aktualis/levadasszak-simicska-katonait/100212>

6 Discussion and Conclusions

Our results support that the crony system and the kleptocratic state is operating in the field of the public procurement in Hungary what can be traced by several objective indicators. What does this say about the future of the Hungarian economy? In the short term, the development and operation of cronyism may have no noticeable effects on the competitiveness of an economy. However, in the medium and long run, there will be severe consequences. Both theoretical and empirical economic research concludes that cronyism, fuelled by rent-seeking, can ultimately only gain ground through the destruction of the market economy, and, in the meantime, it results in a less efficient allocation of resources. Societies based on rent-seeking and corruption become uncompetitive and fall behind developed market economies in the long term (see Murphy et al., 1993, Acemoglu and Robinson, 2012).

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Annex

A1. Main statistics of the public tenders analysed

Table A1: Summary of the main figures

filter	indicator	2010	2011	2012	2013	2014	2015	2016
	Total number of contracts	27528	16864	17098	24315	25485	25298	17949
goodx==1	Total number of contracts	21192	15078	15118	21944	23119	23029	15729
goodfwc==1	Total number of contracts	20472	14517	14043	20725	21519	20936	14118
goodfwc==1	Total value of contracts (billion Ft)	1435.883	683.2144	1391.982	2474.073	2163.849	1749.454	1765.743
goodfwc==1	Total number of EU-funded contracts	7625	6223	5376	8849	9242	8083	1170
goodfwc==1	Total value of EU-funded contracts (billion Ft)	746.696	375.283	695.046	1356.255	1006.281	608.359	197.747
goodfwc==1	Total number of construction contracts	6104	5189	3904	5123	6284	5479	3664
goodfwc==1	Total value of construction contracts (billion Ft)	765.879	388.462	671.601	1467.460	1046.295	683.237	874.904
goodfwc==1	Tl==1 number of contracts	16422	6355	6858	9059	8185	8075	5725
goodfwc==1	Tl==1 value of contracts (billion Ft)	1128.506	477.52	1074.699	2072.793	1721.158	1250.596	1334.747
goodfwc==1	SB==1 number of contracts	6853	3732	3665	5369	6863	6602	3774
goodfwc==1	SB==1 value of contracts (billion Ft)	465.031	193.638	508.089	717.259	839.380	613.412	535.174
goodfwc==1	CR3 átlag. goodfwc==1	0.275	0.375	0.377	0.391	0.417	0.415	0.380
goodfwc==1	CR3==0 number of contracts	8107	3483	3289	4587	3941	3833	2755
goodfwc==1	CR3==0 value of contracts (billion Ft)	549.598	229.175	508.682	1108.832	708.143	530.315	782.549
goodfwc==1	CR3==1 number of contracts	781	806	625	957	1295	1285	588
goodfwc==1	CR3==1 value of contracts (billion Ft)	52.634	22.772	89.542	42.938	43.909	51.237	92.264

Table A2: Summary of the contracts won by the MGTS group

filter	indicator	2010	2011	2012	2013	2014	2015	2016
goodfwc==1	MGTS==1 number of contracts	87	45	61	76	141	84	16
goodfwc==1	MGTS==1 value of contracts (billion Ft)	11.0	11.0	47.8	291.7	120.8	84.4	23.3
goodfwc==1	M number of contracts	1	1	8	2	11	14	6
goodfwc==1	M value of contracts (billion Ft)	0.001	0.486	3.219	0.046	26.391	27.424	0.531
goodfwc==1	G number of contracts	4	1	1	4	10	25	5
goodfwc==1	G value of contracts (billion Ft)	2.855	0.025	0.898	19.317	8.541	46.280	13.072
goodfwc==1	T number of contracts	2	2	9	5	27	28	3
goodfwc==1	T value of contracts (billion Ft)	0.567	0.048	0.095	0.364	3.436	7.989	7.528
goodfwc==1	S number of contracts	80	41	43	65	93	17	2
goodfwc==1	S value of contracts (billion Ft)	7.565	10.464	43.629	271.996	82.439	2.701	2.184

Table A3: Summary of the NB, ICI and RPRD indicators

Number of contracts with the given number of bidders	2010	2011	2012	2013	2014	2015	2016
1	6853	3732	3665	5369	6863	6602	3774
2	4218	3194	3044	4803	4559	4323	2748
3	3614	3853	4141	6967	6755	6537	3137
4	1843	1140	1098	1372	1400	1498	2630
5	1004	650	556	693	747	734	632
6 or more	2256	1569	1402	1485	1181	1236	1189
ICI average	0.59	0.51	0.50	0.48	0.48	0.48	0.52
RPRD median	9.9	5.3	3.3	1.6	1.3	1.7	2.4

A2. The players: members of the MGTS group

Lőrincz Mészáros

A close childhood friend of the Hungarian Prime Minister; a gas fitter; the mayor of Felcsút (the village where Viktor Orbán spent his childhood). A Hungarian billionaire since 2013 (<http://bit.ly/1nKficQ>). Many experts assume that he serves as a front (straw man) for Viktor Orbán's business dealings (<http://on.ft.com/2BSL2qp> and <http://bit.ly/2Dy7R09>). While he was an ordinary citizen without any considerable wealth in 2009, according to estimates by Forbes Hungary in 2017, his wealth had reached \$392 million (<http://bit.ly/2DBEeLq>, <http://bit.ly/2DAnk05>, <http://bit.ly/2E7pEMZ> and <http://bit.ly/2GeKF97>).

Istvan Garancsi

Hungarian businessman, owner of the Videoton FC football team, president of the Hungarian Association of Hikers; close friend of Viktor Orbán's (<http://bit.ly/2DIKt3p>). Many assume that he serves as a front for Viktor Orbán's business dealings (<http://bit.ly/2DMLprv> and <http://bit.ly/2Bs57jc>).

István Tiborcz

Hungarian lawyer and businessman; son-in-law of Viktor Orbán, Hungary's prime minister (<http://bit.ly/2DxhgoN>).

Lajos Simicska

Hungarian businessman, owner of Hungarian TV news channel *Hír TV* and one of Hungary's leading dailies, *Magyar Nemzet*; Hungary's 11th richest person estimated by napi.hu on its list of the 100 richest Hungarians; Viktor Orbán's dormitory roommate. Later, he held several positions: Fidesz treasurer, President of the Hungarian Tax Office, and general manager and CEO of Mahir, one of the market leaders in advertising in Hungary. He fell out with Viktor Orbán on 6th February 2015 (<http://politi.co/2rBxFap> and <http://bit.ly/2dY2TA4>).

A3. Definition of variables used

	Variable names	Definition
1	GOODFWC	Filter variable [0,1];
2	GOODFWC	Filter variable [0,1]; it drops the framework agreements from the analysis – useful for analysing the contract values as the cases of framework agreements may bias the results
3	DATE_	Date variable for monthly data;
4	DATEY	Date variable for yearly data;
5	EU	Tender is funded by the EU [0,1]; If the tender was funded by EU, EU=1 else, EU=0
6	NCVALUE	Net contract price (in HUF)
7	LNNCV	Logarithm of net contract price
8	ICI	Index of Competition Intensity [$0.3 \leq ICI \leq 1$]; It measures the intensity of competition: low value means low intensity, high value means high intensity. X: the number of bidders in a tender. $ICI = \lg X / \lg 10$ in case where $2 \leq X \leq 10$, and $ICI = 1$ if $X > 10$. $ICI = 99$ if $X = 1$; $ICI = 99$ if X value is missing; If $ICI = 99$, this is a missing value.
9	SECTOR6	Product market [1,2,3,4,5,6] of tenders; the information came from cpv codes published in tender documentation; The values are: 1 “Industrial goods” 2 “Construction works and services” 3 “IT works and services”, 4 “Real estate and business services”, and 5 “Engineering, R&D and financial services”, 6 “Other services”.
10	SB	Single bidder [0,1]; the value of 0 means there were more than one bids; the value of 1 means there was only one bid.
11	CR2	Corruption Risk Indicator [0, 0.5, 1]; The value of 0 means low corruption risk (more than one bids and tender with announcement), the value of 1 means high corruption risk (only one bid and tender without announcement). The formula of CR” is the following: $CR2 = \frac{(1-TI)+SB}{2}$
12	ROUND4	If the contract price is divisible by 10^4 without remainder (rounded at thousands), ROUND4 = 1 If the contract price is not divisible by 10^4 without remainder, ROUND4 = 0,
13	ROUNDRO	[1,2,3,4] Recoded version of (ROUNR2): ROUNDRO (1): ROUND (0.25), ROUNDRO (2): ROUND (0.50), e.t.c.

14	CR3	<p>Corruption Risk Indicator [0, 0.33, 0.66, 1]; The value of 0 means low corruption risk (more than one bidder, tender with announcement, and not rounded price), the value of 1 means high corruption risk (only one bidder, tender without announcement and rounded price).</p> <p>We constructed the CR3 using the following formula:</p> <p>If CR2=0 & ROUND4 =0 THEN CR3 =0</p> <p>If CR2=0 & ROUND4 =1 THEN CR3=0.33</p> <p>If CR2=0.5 & ROUND4 =0 THEN CR3=0.33</p> <p>If CR2=0.5 & ROUND4 =1 THEN CR3=0.66</p> <p>If CR2=1 & ROUND4 =0 THEN CR3=0.66</p> <p>If CR2=1 & ROUND4 =1 THEN CR3=1;</p> <p>the value of 999 means missing value.</p>
15	RPRD	$RPRD = \frac{(P^* - P)}{P} * 100$ <p>Where P* is the estimated net price and P is the net contract price of the tender and $0 \leq RPRD < 100$</p>

A4. Outputs of the estimations

SB

```
Treatment-effects estimation      Number of obs      =      122582
Estimator      : propensity-score matching      Matches: requested =      1
Outcome model  : matching                      min =      1
Treatment model: logit                       max =      42
```

```
-----
          |           AI Robust
          |           Coef.   Std. Err.      z    P>|z|      [95% Conf. Interval]
-----+-----
ATET     |
  mgts   |
(1 vs 0) |      .1900692   .0299492    6.35  0.000    .1313698    .2487687
-----
```

ICI

```
Treatment-effects estimation      Number of obs      =      85658
Estimator      : propensity-score matching      Matches: requested =      1
Outcome model  : matching                      min =      1
Treatment model: logit                       max =      32
```

```
-----
          |           AI Robust
          |           Coef.   Std. Err.      z    P>|z|      [95% Conf. Interval]
-----+-----
ATET     |
  mgts   |
(1 vs 0) |     -.0667369   .0157547   -4.24  0.000   -.0976155   -.0358583
-----
```

RPRD

```
Treatment-effects estimation      Number of obs      =      68823
Estimator      : propensity-score matching      Matches: requested =      1
Outcome model  : matching                      min =      1
Treatment model: logit                       max =      26
```

```
-----
          |           AI Robust
          |           Coef.   Std. Err.      z    P>|z|      [95% Conf. Interval]
-----+-----
ATET     |
  mgts   |
(1 vs 0) |     -2.5258    1.338116   -1.89  0.059   -5.148459    .0968589
-----
```

Figures

Figure 1.: Monthly number of contracts, 2010-2016

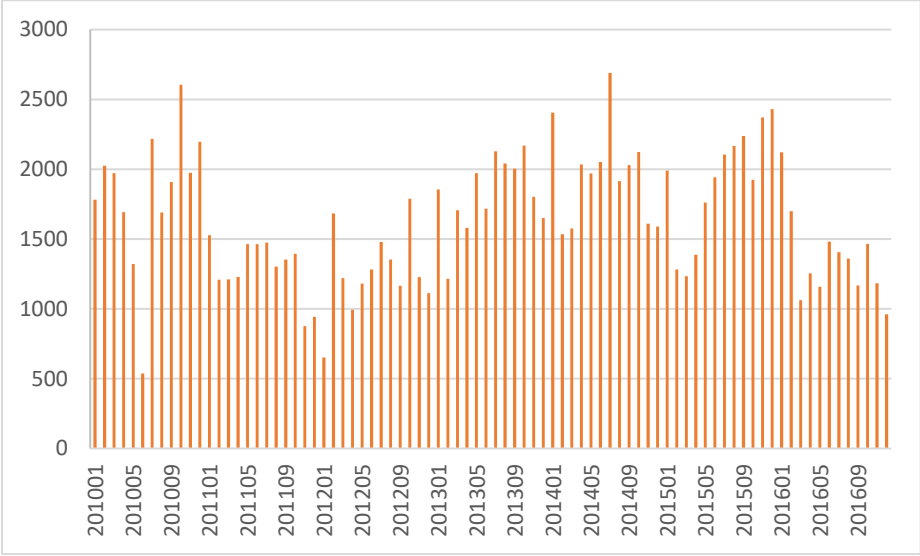


Figure 2.: Aggregated net contract values in the Hungarian public procurement per year, 2010-2016

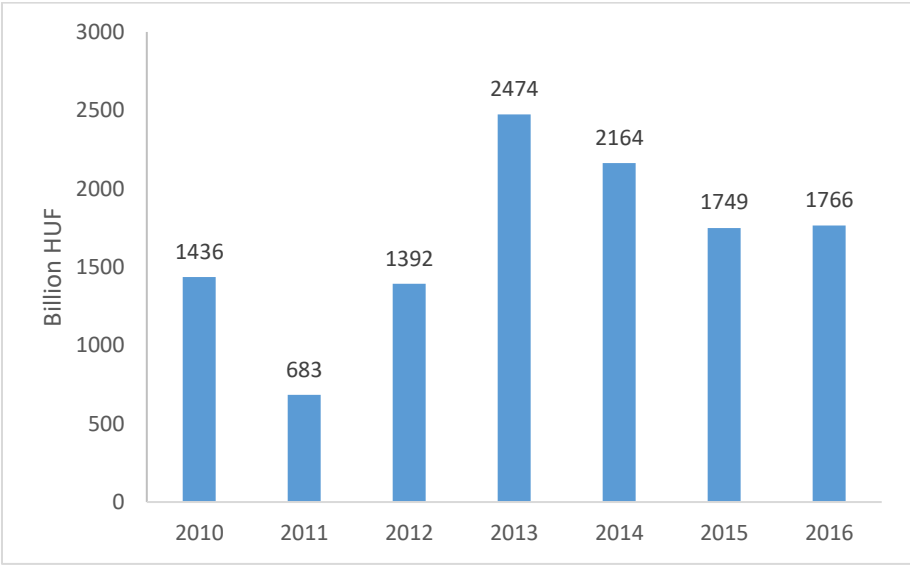


Figure 3: The share of the value of procurement won by MGTS companies of the total value of public procurement, 2010–2016

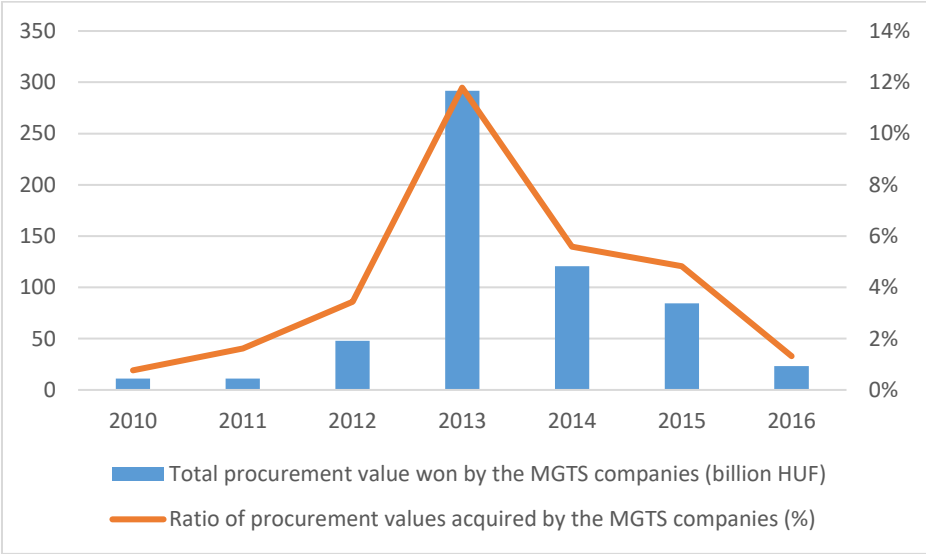


Figure 4: The share of the value of procurement won by MGT and S companies of the total value of public procurement, 2010–2016

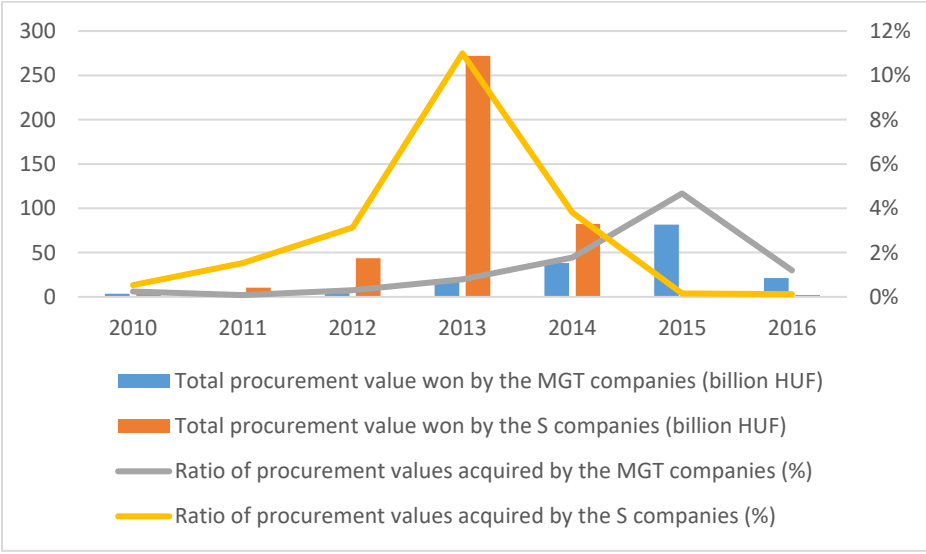


Figure 5: Share of public procurement tenders with single-bidder (SB) within the MGTS group and among other winners, 2010-2016

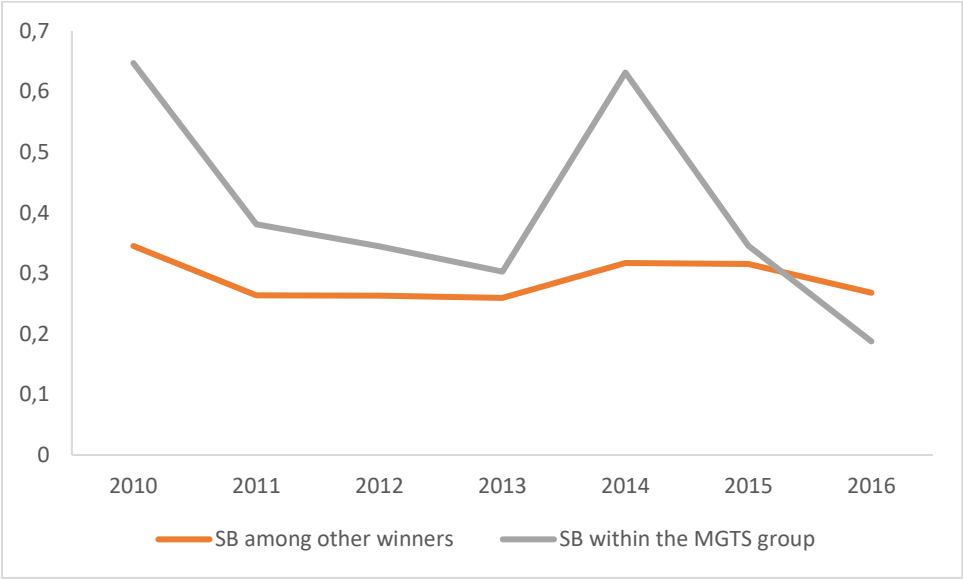


Figure 6: The Index of Competition Intensity in Hungarian public procurement within the MGTS group and among other winners, 2010-2016

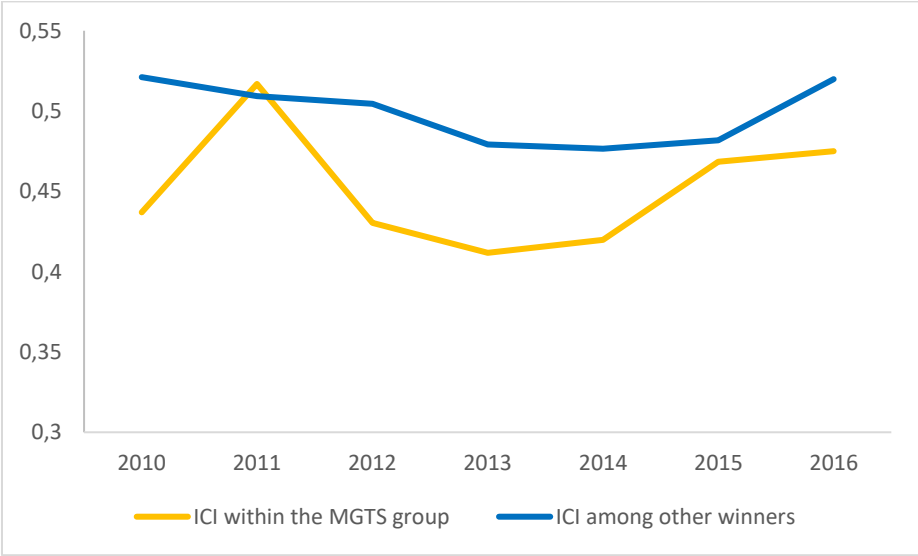


Figure 7: The Index of Competition Intensity in Hungarian public procurement within the MGT and the S group and among other winners, 2010-2016

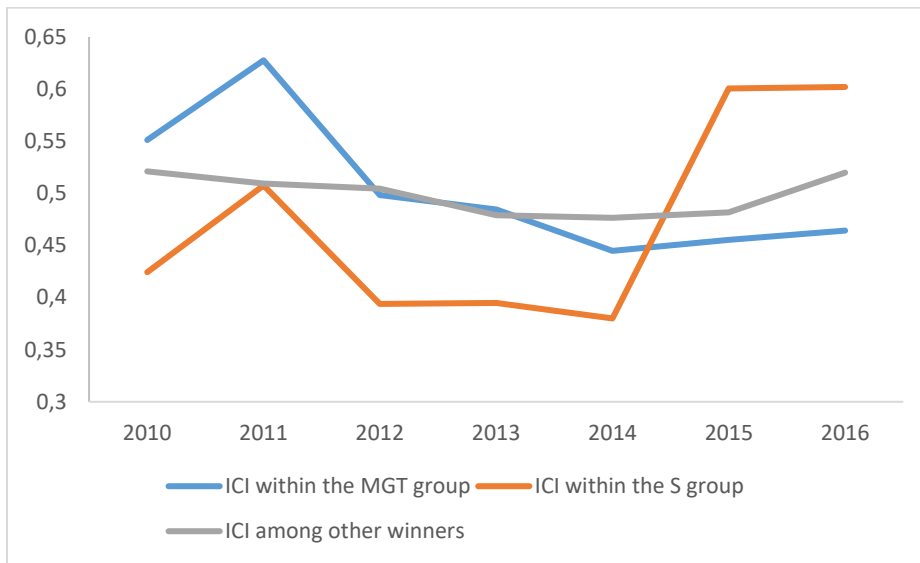
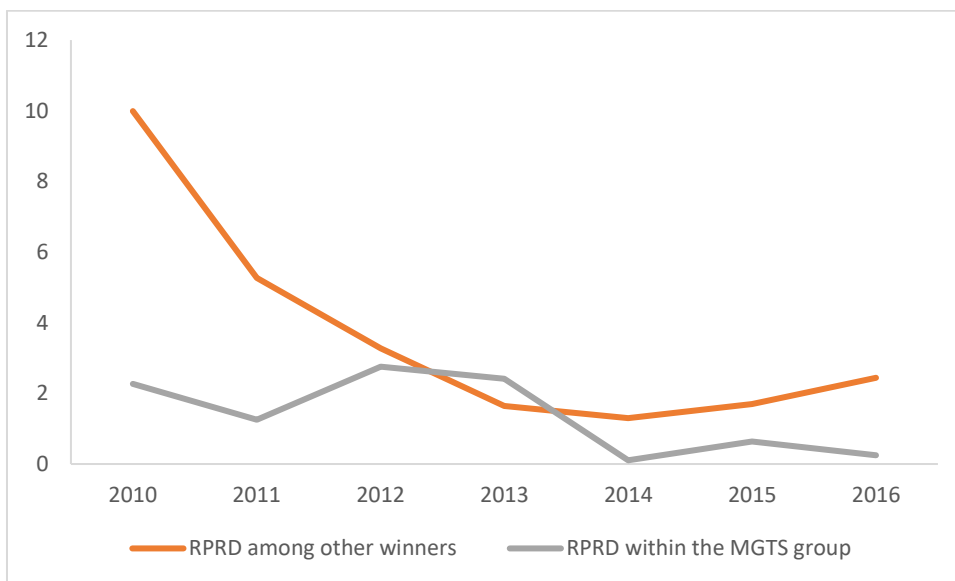
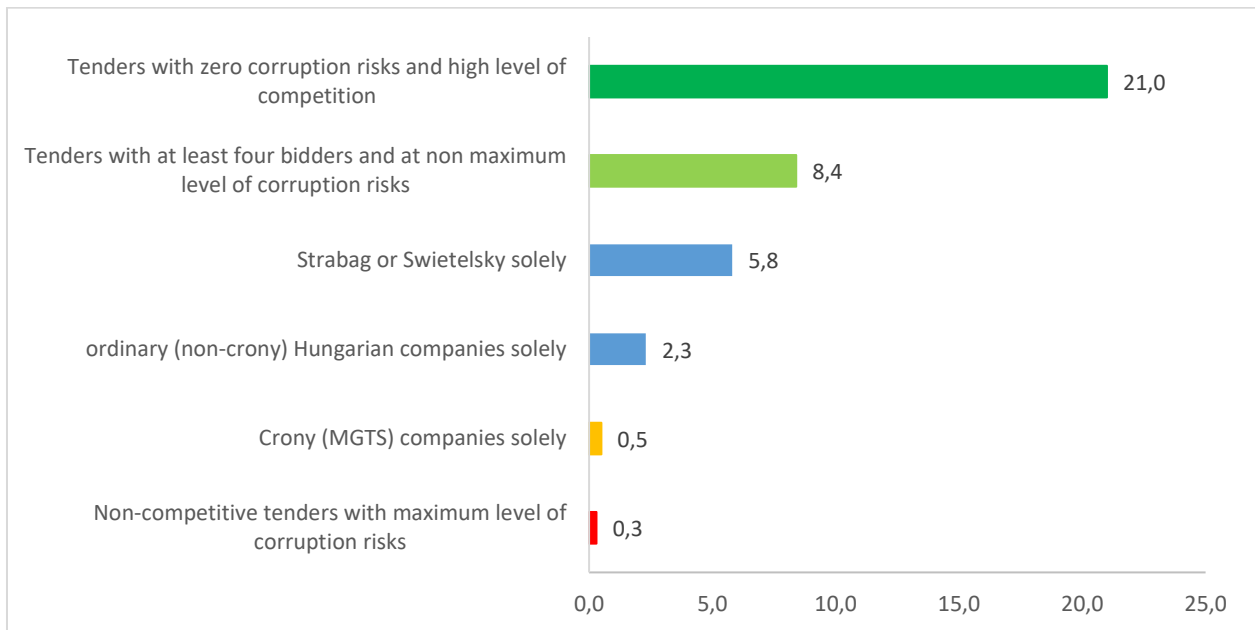


Figure 8: The median of the RPRD indicator in Hungarian public procurement within the MGTS group and among other winners, 2010-2016



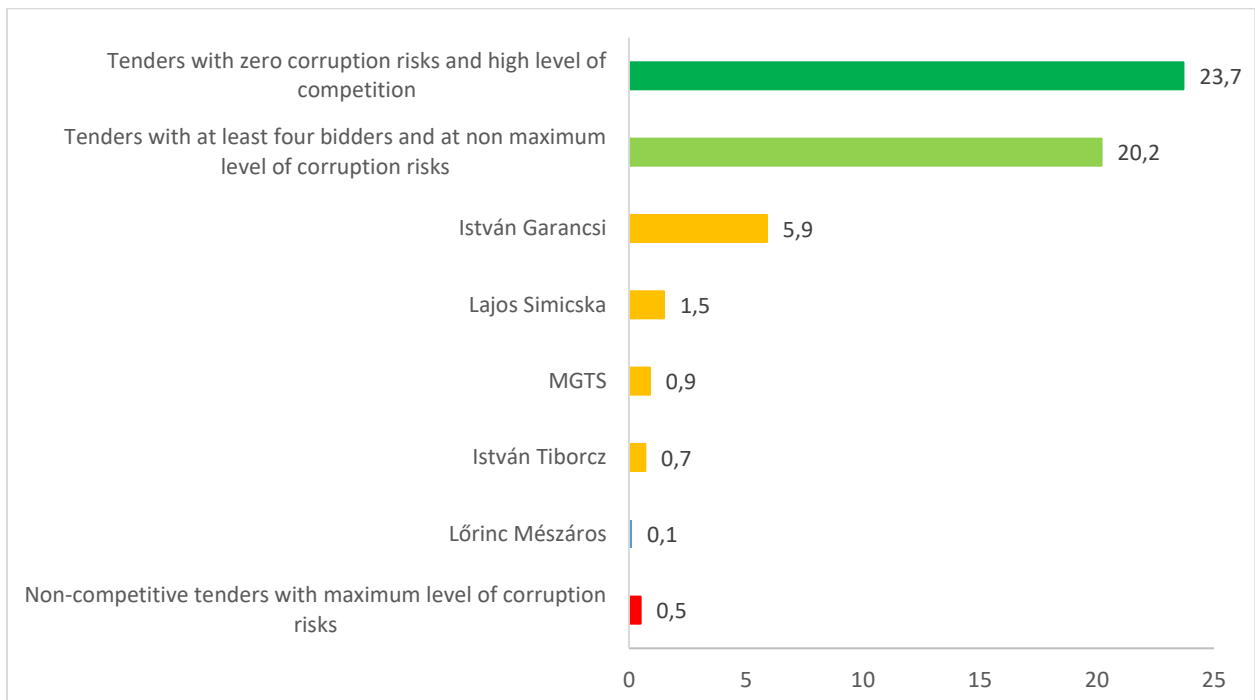
Note: only for contracts with $RPRD \geq 0$

Figure 9: The median value of the relative price drop (RPRD) in tenders won by different groups of winners, construction tenders, 2010–2016, N=20,740



Note: only for contracts with RPRD ≥ 0

Figure 10: The median value of the relative price drop (RPRD) by intensity of competition and in tenders won by companies owned by members of the MGST group, 2010–2016, N=69,010, %



Note: only for contracts with RPRD ≥ 0