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**‘Sweet deals’: state-owned enterprises, corruption and repeated contracts in public procurement**[[1]](#footnote-1)

**Abstract:** We show how the price analysis of stable relations between customer and supplier in the public procurement of homogeneous goods can help differentiate opportunistic from honest behaviour among economic agents. We consider two types of stable relations: repeated procurements and connections based on the state ownership of suppliers. We assume that honest agents should prefer transparent and competitive procedures, and the price of repeated contracts should be lower than that of one-time deals. Conversely, opportunistic agents seek personal gain from repeated contracts that leads to higher prices for repeat deals and is implemented through non-transparent procurement procedures. Furthermore, we assume that the state ownership of suppliers can intensify both of these effects.

To test these hypotheses empirically, we use a large dataset on the procurement of granulated sugar in Russia from 2011 to 2013. We find that for private suppliers, prices of repeated contracts compared to one-time deals were lower when procured through more transparent procedures and higher when procured through non-transparent procedures. For non-transparent procedures, we observe significant overpricing of contracts with state-owned suppliers compared to private suppliers, especially in the case of repeated contracts, whereas for competitive e-auctions, there is only small difference between the contract prices of state-owned suppliers and private suppliers.

***Keywords:***public procurement, corruption, homogeneous good, state-owned enterprise, repeated contract, procurement procedure

***JEL:*** *H570, L320, H410*

**1. Introduction**

The identification of corruption in public procurement is a difficult task. The seemingly simple job of comparing the prices of similar goods in public procurement with free market and revealing the overpriced procurement contracts often does not work. Previous studies on relational contracts demonstrated that customers should consider not only the contract price but also the transaction costs and risk of suppliers’ non-compliance. From this point of view, the higher prices offered by suppliers with a good reputation can be optimal for public customers (Gulati 1995; Parker and Hartley 2003; Calzolari and Spagnolo 2009). However, the relevant studies focused primarily on cases involving the procurement of complex goods. In these cases, any uncertainty in the quality of the delivered goods can provide an opportunity for price manipulation.

Nevertheless, a price analysis of simple homogeneous goods provides us with some opportunity to identify corrupt behaviour by comparing the prices of repeated contracts with the prices of one-time deals. The extensive literature on relational contracts provides evidence that stable relations between the customer and the supplier can produce both positive and negative effects. Such relations may lead to a reduction of the transaction costs and risks associated with the non-execution of contract obligations, but they may also create conditions for corrupt behaviour between the customer and the supplier (Held 2011; Lambsdorff 2007). Repeated contracts decrease uncertainty and, for homogeneous goods, may lead to a price reduction compared to one-time deal in the case of honest behaviour between the customer and supplier. In this case, the economic agents prefer a competitive and transparent procurement procedure due to the stability of some procurement inspections. In the case of dishonest behaviour on the part of the customer and supplier, repeated contracts are overpriced compared to one-time deals. Accordingly, the economic agents prefer a non-transparent procurement procedure that could be easily manipulated and difficult to inspect.

By the dishonest relations between customer and supplier we understand such relations where exists “abuse of public office for private gains” (World Bank 1997), which is particular case of opportunistic behaviour (Williamson 1993). We suppose that both honest and dishonest behaviors are rational, but they have different purpose. Honest agent (both customer and supplier) have in mind long-term purpose from repeated relations. Supplier maximizes his\her long-term revenue and works for reputation from such honest behaviour. Customer officer may has in mind long-term position or promotion in the office, so he\she has to show effectiveness of current activity and effectiveness of procurement activity in particular. Such honest behavior of agents is also supported by punishment system. Nevertheless, dishonest behavior is also rational for supplier and customer in the case, when both of them are aimed in short-term revenue and when there is weak punishment system.

Our attention was drawn to the problem of corruption in repeated contracts of homogeneous goods by an open corruption scandal in Russia resulting in the arrest in April 2015 of Colonel General Alexander Reimer, the former deputy Minister of Justice and director of the Russian Federal Penitentiary Service (FPS) (see <http://tass.ru/en/russia/786150>). Reimer was charged with fraud that occurred during public procurements conducted by the FPS and involved the theft of approximately $50 million. Answering questions about Reimer’s arrest, Kremlin spokesman Dmitry Peskov referred to President Vladimir Putin’s statement that "anti-corruption activities are carried out and should be further conducted regardless of posts or cabinets." (<http://tass.ru/en/russia/787070>). This corruption scandal began with a less visible investigation of fraud in public procurement for prisons (see <http://rapsinews.com/news/20130307/266649776.html>). The idea behind the fraudulent scheme was that the state-owned firm Selinvest, which is directly subordinate to the FPS and a regular supplier of sugar for the FPS, systematically overpriced public contracts. The total amount of theft was estimated to be $3.2 million. Moreover, Selinvest only supplied sugar thorough a single-source procurement procedure, which is non-competitive and non-transparent.

This example also reveals that the effects of repeated contracts and state-owned suppliers may be complementary. Our research interest in this case was constituted by combination of these factors: repeated procurement from the same supplier and the participation of a state-owned enterprise in supplies for public needs. In this paper, we analyse the impact of the combination of these factors on the standardised final price of a simple homogeneous good acquired through various procurement procedures. We focus on the public procurement of sugar throughout Russia from 2011 to 2013. Following the logic of a previous publication (Yakovlev et al. 2016), we assume that the positive effects of repeated procurements (lower transaction costs and associated price reductions) are most likely observed when procurements are performed through more competitive procedures. Less competitive and less transparent procurement procedures provide opportunities for collusion between the supplier and the customer and lead to relative overpricing in repeated procurements. The connection between the customer and supplier through the ownership structure provides an additional channel for stable relations. If honest behaviour prevails for both public customers and state-owned suppliers, then both parties are prepared to conclude contracts at lower prices. In the case of corruption, the participation of state-owned enterprises in public procurements results in overpricing. The state-owned status of suppliers may enhance the effects of repeated procurements.

Empirical analysis has demonstrated that for private suppliers, the sugar prices were lower in repeated contracts compared to one-time deals, when procured through valid e-auctions (the most transparent procedure). Prices of repeated contracts compared to one-time deals were higher when procurement procedure was requests for quotation (a less transparent procedure). These conclusions were consistent with the findings of our previous paper on the gasoline market (Yakovlev et al. 2016). For non-transparent procedures (request for price quotations and single-source contracting), we observe significant overpricing of contracts with state-owned suppliers compared to private suppliers. This effect is even more pronounced in the case of repeated contracts. At the same time, we observe only a small difference between contract prices of SOE suppliers and private suppliers when contracts are concluded through e-auctions.

This paper is organised as follows. Section 2 is devoted to a review of the literature on corruption and repeated contracts in public procurement. Section 3 describes the sugar market in Russia. In section 4, general information on public procurement is presented and the database on public procurement is described. Section 5 presents the research methodology, and section 6 discusses the results. The final section concludes the paper.

**2. Literature review**

Trustworthy relations between public customers and suppliers may be built on the basis of previous interactions and political connections, among other factors. On the one hand, any business interaction between public customers and suppliers involves an element of risk and entails transaction costs for both sides. Trust between these agents can therefore reduce these costs and risks in the case of honest behaviour. On the other hand, trustworthy relations may stimulate corrupt behaviour between public customers and suppliers because trust can lead to the overpricing of procured goods. The following literature review reveals this tension.

Several studies indicate that the strategy of using repeated contracts with the same supplier is effective. Repeated interactions benefit an honest customer because they help to increase the level of trust between parties, stimulate the exchange of information, and thus mitigate the negative influence of uncertainty on the market. As a result, the transaction costs of repeated interactions decrease both for the customer and the supplier. This effect is particularly important for the procurement of specific goods, such as those for which it is difficult to test for quality at the moment of delivery or contract negotiation (Gulati 1995).

In the paper (Barney and Hansen 1994) it is shown that trust between the parties may be used as a competitive advantage on the market. The article (Zaheer, McEvily, and Perrone 1998) is focused on analysis of the impact of trust on efficiency of interactions between agents. This paper offers a case study of the interactions between American manufacturers of electric appliances and their suppliers. It demonstrates that repeated interactions reduce the level of conflict over incomplete contracts, thus having a positive and significant impact on the efficiency of transaction costs.

Although trust between agents lowers transaction costs, the procurement price in repeated interactions may be higher. This effect may appear if the quality of the procured goods is difficult to test at the moment of delivery or execution. In such case the supplier can demand a reward for a guaranteed high quality of procured goods, which has been already tested by the customer in the previous interactions with this supplier. It is important that the customer be ready to deliver such a reward to avoid the risk of an improper contract execution with another supplier. Under such circumstances, the prices of ‘repeated contracts’ may be higher than the market average price (Parker and Hartley 2003).

Some scholars have identified the factors influencing choice in an optimal contracting strategy: whether to prefer the trustworthy familiar supplier (incumbent bias) or to conclude a contract with a new firm to stimulate competition and reduce the price (new entrant bias).

Held (2011) has analysed the factors that predetermine the choice of a new entrant or incumbent supplier strategy. In particular, Held’s study demonstrates the significant role played by the relative level of costs on the preparation and submission of a bid and the amount of effort required for the supplier to execute its contractual obligations. If the bidding process involves considerable costs to the supplier and the subsequent execution of the contract does not cause significant problems, it would be preferable for the customer to pursue new entrants. If the preparation and submission of a bid does not involve substantial costs but meeting contractual deadlines and successfully delivering high quality goods requires considerable effort on the part of the supplier, the risk of opportunistic behaviour on the part of the supplier is increased. In this case, it would be reasonable for the customer to pursue ‘reliable’ or previously tested counterparties.

Some publications have attempted to find a balance between procurement through transparent competitive procedures and repeated procurement through single-source contracting. A case study of the HP company compared the efficiency of an auction with the efficiency of repeated interactions involving an incumbent supplier and concluded that repeated procurements can guarantee the quality of invisible parameters (Tunca and Zenios 2006). However, an auction should be used for the procurement of standardised goods so that a considerable decrease in price is possible. Another study (Calzolari and Spagnolo 2009) has indicated that new repeated procurement measures may be used by customers to ‘reward’ honest suppliers. Conversely, a customer’s rejection of a new procurement procedure may be considered a ‘punishment’ for those suppliers who previously failed to meet their contractual obligations with regard to quality. Moreover, if quality is a matter of high importance to the customer, the optimal procurement strategy would be single-source contracting and maintaining contact with the incumbent supplier. Such contracts might include a bonus (‘reward’) for quality and a guaranteed delivery of the necessary volume of goods by the specified deadline.

Political connections are another method of making interactions more efficient. State ownership of an enterprise (either full or partial ownership) is an example of a political connection. Previous articles (Wu, Wu, and Rui 2012; Dai and Cheng 2015) have demonstrated that the government tends to grant benefits and subsidies to state-owned enterprises. With an adequate system of incentives and monitoring mechanisms, state-owned companies can perform important economic development functions. This was the case in Italy in the 1950s and 1960s, for example (Barca and Trento 1997). Using a dataset of publicly listed enterprises in China, Song, Nahm, and Zhang (2015) empirically investigated the effects of partial state ownership on firm performance. They demonstrated that partial state ownership results in easier access to resources such as credit and facilities to which entry is restricted by formal barriers. This access ultimately increases firm performance. Su and Fung (2013) revealed that politically connected firms have greater cash holdings, larger long-term loans, lower financing costs, greater sales and lower sales costs.

Other studies have shown that due to the specific nature of interactions between public customers and firms, stable relations often can turn into a channel for corrupt schemes (Lambsdorff 2007). The problems arising from corruption in public procurement are discussed in many studies, but because of the secretive nature of corruption, the most papers on this topic is devoted to its theoretical modeling (Lambert-Mogiliansky and Sonin 2006; Auriol 2006; Evenett and Hoekman 2005). These models of corruptive or collusive behaviour of agents are results of some specific auction design. There also are some empirical paper on association between favoritism in allocation of public procurement contracts and political connection (Goldman, Rocholl, and So 2013; Amore and Bennedsen 2013; Doroftei 2016). Such favoritism may be considered as a proxy for corruption. It is necessary to mention work (Mironov and Zhuravskaya 2016), where authors could show association between political cycles and illicit financial transaction to politicians from procurement winning firms. Nevertheless, most of these papers consider either complex procurements (such as construction) or consider aggregated firms revenue from public procurement without identification of particular corrupted relations. For the first case overpriced complex procurements may indicate both corruption and favoritism for reliable supplier (Spagnolo 2012). The second case just shows favoritism to some firms from political connection.

Because corrupt agreements are illegal, those who participate cannot seek redress in court or use any other legal conflict resolution methods if the contract obligations are violated. Therefore, a corrupt market is inevitably linked to heightened risk, thus agents participating in a corrupt marketplace require additional guarantees of compliance with their obligations. According to (Lambsdorff 2007), one of the informal mechanisms of such guarantees is the reputation and reliability of participants of a corruptive market. A participant’s reputation is based on whether the participant has previously been involved in corrupt agreements. When a participant complies with contractual obligations, conditions are created for the development of trust between participants. As a result, any subsequent agreement formed would have a lesser degree of uncertainty and lower monitoring costs. This is the way that entities involved in a corrupt scheme become motivated to repeat addresses their ‘incumbent partners’. Furthermore, repeated interaction between a customer and supplier may be a consequence of deliberate procurement manipulation aimed at reducing the range of potential suppliers. Such corrupt agreements in the procurement sphere result in relative overpricing, as the supplier has to compensate for the ‘kick-back’ paid to the customer for concluding the contract.

To summarise, a corrupt procurement agreement is always accompanied by overpricing. Overpricing by incumbent suppliers for an honest customer may occur if the quality of the goods is difficult to test at the moment of delivery (execution). Therefore, if the goods sold are simple, homogeneous products, the price of ‘repeated contracts’ and contracts with state-owned enterprises can be an informative indicator.

Yakovlev et al. (2016) used the example of the 2011 Russian gasoline market to demonstrate that the prices of repeated contracts concluded through e-auctions were lower when compared to one-time deals. Repeated procurements through less transparent procurement procedures (requests for price quotations and single-sourcing) led to overpricing. The authors explained that this effect was because unscrupulous customers preferred less transparent procurement methods for repeat transactions because they offered wider opportunities for corrupt collusion with unscrupulous suppliers. Honest customer, conversely, preferred more competitive procedures of procurement through e-auctions. For such suppliers, the positive experience of previous interactions with honest customers meant that in the case of repeated procurements, there was a lower risk of delayed payment for goods and lower costs overall. Therefore while bidding for such repeated contracts honest suppliers may venture an additional price decrease to raise their chances of winning the auction. This strategy would also help to keep costs lower for honest customers.

In this paper, we examine the procurement of granulated sugar in Russia from 2011 to 2013 following the logic of (Yakovlev et al. 2016). In addition to repeated contracts, we analyse an additional level of ‘stable relations’ between customers and suppliers with a focus on the state ownership of suppliers. We assume that if the customer and supplier are connected through ownership structure, the effects of repeated procurements are enhanced. In particular, this assumption means that if honest incentives of contracting prevail in the public sector, both state-owned customers and state-owned suppliers are prepared to conclude repeated procurement contracts at lower prices than one-time deal with private supplier. If dishonest motivations prevail, the participation of state-owned companies in public procurement results in the overpricing of repeated contracts.

Therefore, we can formulate the following hypotheses for our empirical study:

Hypothesis 1. If public procurements are performed in more competitive ways (through e-auctions), the price per unit of simple, homogeneous products in repeated contracts would be lower than in one-time deals. Conversely, if procurement procedures are less competitive and less transparent (requests for price quotations and single-sourcing), overpricing for repeated contracts would be observed.

Hypothesis 2. The participation of state-owned enterprises in public procurements intensifies both of the effects described in hypothesis 1 – a more pronounced relative price reduction for repeated procurements in the case of e-auctions and greater overpricing of repeated procurements in the cases of requests for price quotations and single-sourcing compared to one-time deal with private supplier.

**3. Analysis of the sugar market**

From 2011 to 2013, the annual production of sugar in Russia was approximately 5.7 million tonnes, whereas domestic consumption constituted about 7 million tonnes. Both these factors fluctuated over the years. Import account significant part of consumption - 21.5%, and export was quite marginal - only 2% of production.

The primary sugar production region in Russia is the Central Federal District, which produced 57.1% of the overall production volume in 2013, or 2799 thousand tonnes. The Southern Federal District is the second largest sugar producing region with a volume of 1084 thousand tonnes (22.1%). The Volga Federal District is the third largest region (768 thousand tonnes, 15.7%), with the other federal districts accounting for some 5.2% of the total Russian production volume in 2013.

Sugar manufacturing facilities are located in 22 regions of the country that are home to more than 70 organisations and financial groups. The sugar sales market structure is presented in Table 1.

Table 1: Russian Sugar Sales Market Structure

|  |  |  |
| --- | --- | --- |
| **Name of sugar producer** | **Number of producers in the group** | **Share of sales % (2013)** |
| ‘The Big Five’ sugar manufacturers: | **35** | **44.72** |
| The Sucden Group | 3 | 4.42 |
| The Prodimex Group | 14 | 14.06 |
| The Rusagro Group | 2 | 9.89 |
| The Dominant Group | 7 | 10.31 |
| The Razgulay Group | 9 | 6.04 |
| **Other producers** |  | **46.46** |
| **Import** | **\*** | **8.82** |
| **Total:** | **\*** | **100** |

Source: Russian FAS [[2]](#footnote-2)

According to the Russian FAS, the sugar market in Russia is a low-competitive market. In 2013, more than 44% of the overall sugar sales market belonged to five vertically integrated companies: Prodimex, Razgulay, Rusagro, Dominant, and Sucden. According to the data provided by Russian FAS, there are many independent agents on the market, but the market share of each did not exceed 3% in 2013–2014.

It should be mentioned that public procurements market constituted insignificant part of overall domestic consumption in the period 2011 – 2013. It was only 0.3% - 0.6% in cash and volume.

**4. Institutional context of public procurement in Russia and data description.**

*4.1 Public procurements in Russia*

After a long transformational recession in the 2000s, Russia experienced economic growth and a substantial increase in the income level. Under these circumstances, the institutional environment in Russia (and in many other developing and transition countries) was characterised by two important features. First, it was plagued by a high level of corruption. Second, there was general dissatisfaction with the quality of health, education and other public sector services. Moreover, the system of public administration lacked efficient mechanisms to limit corruption, and the public sector did not have sufficient incentives to improve the quality of its services. A response to these problems came in the form major reform of public procurements by adoption new Federal Law on Public Procurement (94-FL) in 2005.

The fight against corruption was declared the key focus of public procurement reform. Restriction of the discretion of public officials in the choice of suppliers at all levels of public administration, increased transparency of procurement procedures and facilitation of access of new suppliers (particularly small and medium-sized enterprises) to the public procurement system were designated to achieve this goal. These measures were also aimed at increasing competition in auctions and reducing government expense by introduction electronic platforms for auctions.

The new law introduced the requirement to place the information on all procurements that were held by government customers on the federal website www.zakupki.gov.ru. The information was supposed to include descriptions of the procured goods, their supply terms and conditions and the “maximum initial price.” The possible procurement methods were also strictly determined at the same time. 94-FL permitted only four procurement methods:

* Open auction (since 2011, only in electronic form): considered the main method of procurements exceeding RUR 500,000 (approximately $ 17,000) in value.
* Tender: usually used for procurements of complex goods and services such as R&D and consulting.
* Requests for quotations: used for procurements of small amounts (RUR 100,000 to RUR 500,000).
* Single-source contracting: could be used for procurements of value under RUR 100,000 (approximately $ 3,000). All other options for single-source contracting were explicitly prescribed by 94-FL (Article 55).

At the same time, restrictions were imposed on “procurements of identical products” to terminate the practice of splitting procurements into small batches. In particular, government customers could purchase the same product from a single-source supplier up to a value of RUR 100,000 per quarter and through requests for quotations of up to RUR 500,000 per quarter. Suppliers were selected according to the lowest price criterion in most of the procedures. The only exception was for tenders (quality criteria could account for up to 45 percent of considerations during the evaluation of R&D bids, and for other services the share of quality criteria in the bid evaluation could not exceed 20 percent).

In contrast to the previous period, a system of law enforcement was established. The Federal Antimonopoly Service (FAS) became the main public procurement regulator. To ensure enforcement of 94-FL, FAS personnel was increased by 1200 in 2006. FAS conducted over 100,000 annual inspections of government customers and imposed multimillion-RUR fines on offenders. However, the entire system of regulation focused only on the order placement stage and completely disregarded the procurement planning and contract execution stages.

It should be emphasized that World Bank experts noted the excess stringency of the new Law on Public Procurement and its potential inefficiency as early as 2006 (Anderson and Gray 2006). Further application of 94-FL (particularly after 2008-2009) came under growing criticism by government customers, who complained about poor quality and disruption of contractual deadlines by suppliers that were selected on the basis of the lowest price criterion and often lacking adequate experience and skills. At the same time, according to findings of surveys conducted among suppliers, the situation with corruption in the public procurement sphere also had not improved (Yakovlev and Demidova 2012). One of the consequences of such criticism was the political decision to draft a new law on the “federal contracting system” (FCS), which was supposed to expand the spectrum of procurement methods and ensure their greater flexibility. Simultaneously, the new reform was supposed to extend regulation to all stages of the procurement cycle – including procurement planning, placement of orders and execution of contracts. The development of a new comprehensive public procurement regulation system took a great deal of time. The new law on the contracting system (44-FL) was adopted only in the spring of 2013 and took effect on 1 January 2014.

*4.2 Data description*

The analysis of price effects in the procurement of granulated sugar is based on data obtained from three sources. The primary source of information is the public procurement system official website: [www.zakupki.gov.ru](http://www.zakupki.gov.ru). Information on suppliers is taken from the Spark-Interfax system. Weekly regional retail sugar prices are gathered from the Federal State Statistics Service available at [www.gks.ru](http://www.gks.ru).

This paper focuses on an analysis of public procurements of granulated sugar during the period from 1 January 2011 to 31 December 2013. The database as initially obtained consisted of 44,413 entries including information on 40,995 contracts (several entries in the database may refer to same contract). All procurements were made in compliance with Federal Law 94-FL.

Due to missing entries and errors in the database, the final sample used for analysis contained fewer entries. The following changes were introduced to the initial database.

Missing information considered significant for analysis:

* In 1,643 entries, the procurement price or procured quantity could not be established.
* In 19 entries, information on the procurement procedure was not available.
* In 24 entries, the supplier’s TIN was not listed.
* The number of bidders was not listed for 456 entries.
* In 2,220 entries, information on the customer’s sector of activity was missing.
* For 21 entries, information on the type of ownership for the customer was not included.

Detected data errors:

* Errors regarding the contract fulfilment period were contained in 37 entries.
* Contradictory information was present in 451 entries, such as data indicating that the cost of sugar was less than the value of the entire contract.
* Data for 16 entries indicated quantities less than 1 kg; 158 entries indicated a price less than 6 roubles and these observations apparently used a measuring unit different from 1 kg; 3 entries indicated an impossibly high quantity exceeding 5,000 tonnes; and 348 entries indicated prices higher than 120 roubles per kilo. These price and quantity thresholds were obtained empirically through a manual review of entries on the website zakupki.gov.ru. The discarded entries make up less than half of a per cent of the total sample.

The final sample contains 39,017 entries including 36,161 contracts. For the purposes of further analysis, it seems reasonable to integrate the entries corresponding to the same contract. In such cases, the final quantity has been computed as the sum of the quantity for all entries for that contract, and the price has been calculated as the weighted average price of all entries for that contract. All subsequent descriptive statistics indicate the number of contracts.

Figure 1 displays changes in the average monthly public procurement prices and retail prices in Russia. The public procurement price was almost always lower than the average retail price.

Fig. 1. Dynamics of average public procurement and retail prices in 2011-2013

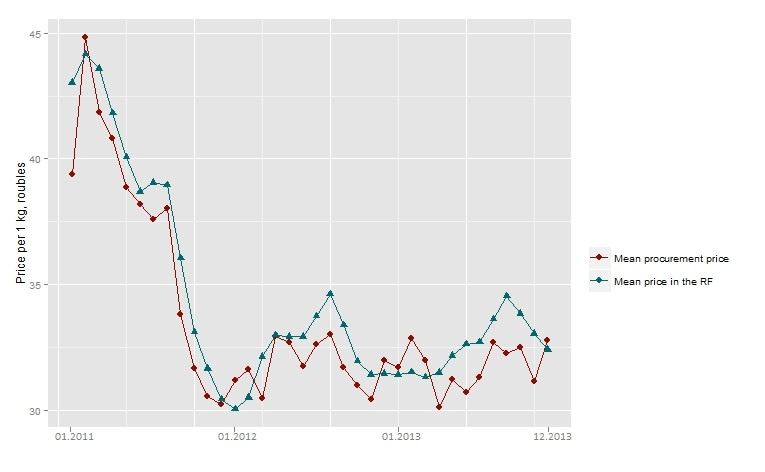
Table 2 presents the primary descriptive statistics for the resulting sample. One of the primary objectives of the research involves finding specific information about the contracts between customers and suppliers who have previously made deals with each other. For this reason, all contracts in the table are divided into two groups: repeated and one-time contracts. Contracts between customer-supplier pairs that have interacted *three or more times* during the period under review are considered to be repeated contracts in this paper. Note that first two contracts of such customer-supplier pair are marked as repeated as well. This is because first two contracts of customer-supplier interaction may already have some honest or dishonest aims in view.

Table 2. Main characteristics of public procurements of sugar in 2011-2013

|  |  |  |  |
| --- | --- | --- | --- |
|  | Type of contract | | whole sample |
| one-time contracts | repeated contracts |
| Number of contracts  Share of contracts, %  Number of contracts concluded:  in 2011  in 2012  in 2013  Total procurement volume:  tonnes  billion roubles  Average price, roubles per kilo:  entire period  in 2011  in 2012  in 2013  Median number of bids  Average number of bids  Average contract length, days  Average size of sugar procurement, tonnes  Average cost of sugar procurement, roubles  Average number of products in a contract  Average number of the supplier’s previous public procurement contracts | 21479  59.4  6349  6682  8448  46412.5  1.56  32.84  35.62  31.63  31.70  2  3.16  133  2.2  72681.7  16.6  16.6 | 14682  40.6  3630  5562  5490  22605.1  0.73  32.85  34.91  32.14  32.21  2  2.51  109  1.5  49706.6  24.8  28.4 | 36161  100  9979  12244  13938  69017.6  2.29  32.84  35.36  31.86  31.90  2  2.90  123  1.9  63353.4  19.9  21.4 |

According to Table 2, the sample contains a total of 36,161 contracts with an overall value of 2.29 billion roubles. The average time of contract negotiations is 123 days; on average, 2.9 suppliers competed for each procurement contract; the average size of each procurement is 1.9 tonnes of sugar; the average number of different products included in each contract is 19.9 items.

Repeated contracts make up 40% of the entire sample, although in monetary terms repeated contracts account for only 32% of the total of all procurements during the period under review (0.73 billion roubles). In comparison to one-time deals, repeated contracts generally are characterised by a lower average number of bidders (2.51), a shorter contract negotiation period (109 days), a smaller average size per procurement (1.5 tonnes), and a larger total number of products in each contract (24.8).

The ownership structure of suppliers is one of the primary factors on which we focused. Based on the Russian classifier for forms of ownership of enterprises, we divided all suppliers into state-owned enterprises (SOE) and private firms. We defined a firm as state-owned if the government had majority or minority shareholding in the firm. Accordingly, there may be other owners in addition to the government for state-owned firms. Even in the case of partial state ownership, we assumed that these firms maintained regular connections with government representatives and that these connections could simplify procurement negotiations.

Table 3 displays contract characteristics organised by type of procurement and type of supplier ownership. For state-owned suppliers the average procurement price is much higher in repeated contracts than it is in one-time deals (40.86 roubles per kilo and 35.27 roubles per kilo, respectively). For private suppliers, the price of repeated contracts and one-time deals is insignificantly different (32.68 roubles per kilo and 32.77 roubles per kilo, respectively). The statistical significance of such differences will be analysed in a further section. Moreover, the average procurement volume per contract for state-owned suppliers is considerably higher than the same figure for private suppliers.

A previous study (Yakovlev, Bashina, and Demidova 2014) has demonstrated that the type of procurement procedure is significant for the analysis of price effects. Analysis by type of procurement procedure indicates that 17263 of these contracts were negotiated through a request for a price quotations, 8851 through valid electronic auctions, and 3200 through single-source contracting procedures. In addition, 6845 contracts were negotiated through electronic auctions that were referred to as ‘void auctions’ because they involved only one bidder. The label ‘void auction’ suggests that there was no competitive bidding in auction and contract is concluded with this supplier. One may considered ‘void auction’ as single-source contracting. The average procurement volume in a single-source contract is much higher than in other types of procurement procedures. The highest average prices per kilo of sugar were observed in single-source contracting and ‘void auctions’. For valid electronic auctions, the difference in price per kilo between one-time and repeated contracts was insignificant. The characteristics of the contracts, organised by type of customer and type of supplier, are presented in Annex 1. The total number of suppliers, organised by the ownership structure and size of the firm, are presented in Annex 2.

Table 3. Comparative analysis of sugar procurement by various characteristics

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | One-time contracts | | | | Repeated contracts | | | |
| Number of contracts | Total contract value (RUR mln) | Average contract value (RUR thou) | Average price (RUR/kg) | Number of contracts | Total contract value (RUR mln) | Average contract value (RUR thou) | Average price (RUR/kg) |
| **Supplier’s ownership status** | | | | | | | | |
| state-owned supplier  private supplier | 596  20883 | 404.4  1156.7 | 678.5  55.4 | 35.27  32.77 | 297  14385 | 164.8  564.9 | 555.0  39.3 | 40.86  32.68 |
| **Type of procedure** | | | | | | | | |
| single-source  request for quotations  valid e-auction  void auction | 1228  10733  5844  3674 | 440.9  369.6  511.6  238.9 | 359.1  34.5  87.5  65.0 | 36.03  32.73  30.74  35.45 | 1942  6560  3022  3158 | 186.1  188.7  214.8  140.2 | 95.8  28.8  71.1  44.4 | 34.74  33.50  29.87  33.17 |

Table 4 displays the characteristics of one-time and repeated contracts organised by type of procurement procedure and supplier ownership. For non-transparent procedures (request for quotation and single-source contracting) we observe significant overpricing of contracts with SOE suppliers compared to private suppliers. This difference is even more pronounced in the case of repeated contracts. At the same time, we observe only small differences between the contract prices of SOE suppliers and private suppliers when the contracts are concluded through competitive e-auctions.

Table 4. Comparative analysis of sugar procurement by the type of procedures and type of suppliers

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Type of supplier | One-time contracts | | | | Repeated contracts | | | |
| Number of contracts | Total contract value (RUR mln) | Average contract value (RUR thou) | Average price (RUR/kg) | Number of contracts | Total contract value (RUR mln) | Average contract value (RUR thou) | Average price (RUR/kg) |
| **Request for quotations** | | | | | | | | |
| state-owned supplier  private supplier | 184  10549 | 5.7  364.0 | 30.9  34.5 | 37.86  32.64 | 106  6454 | 4.7  183.9 | 44.6  28.5 | 44.71  33.32 |
| **Valid e-auction** | | | | | | | | |
| state-owned supplier  private supplier | 135  5709 | 4.7  506.9 | 35.1  88.8 | 30.68  30.74 | 42  2980 | 2.3  212.5 | 54.6  71.3 | 33.07  29.83 |
| **Void auction** | | | | | | | | |
| state-owned supplier  private supplier | 75  3599 | 2.4  236.5 | 32.6  65.7 | 30.45  35.55 | 49  3109 | 2.2  138.0 | 45.4  44.4 | 40.56  33.05 |
| **Single-source contracting** | | | | | | | | |
| state-owned supplier  private supplier | 203  1026 | 391.6  49.4 | 1938.4  48.1 | 37.78  35.68 | 100  1842 | 155.6  30.5 | 1556.0  16.6 | 40.21  34.45 |

The main dependent variable used in the econometric analysis represents the ratio of the procurement price to the average retail price in Russia during the contracting week. For some econometric models we also use ratio of the procurement price to the average retail price in customer’s region during the contracting week. Table 5 presents the second ratio with breakdown by the type of procedures and type of contracts. The contract price is higher than the average retail price for both repeated and one-time contracts procured through void auctions and from a single-source supplier.

Table 5. Main characteristic by the type of procedures and types of contracts

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Request for quotations | Electronic auction | Single-source contracting | Void auction | All procedures |
| One-time contracts | 0.965 | 0.913 | 1.052 | 1.050 | 0.969 |
| Repeated contracts | 0.979 | 0.910 | 1.085 | 1.046 | 0.995 |
| All contracts | 0.970 | 0.911 | 1.072 | 1.048 | 0.979 |

1. **Econometric research methodology**

We conducted econometric analysis on the basis of methodological approaches proposed in the paper (Yakovlev et al. 2016). The ratio of the procurement price to the average retail price in Russia during the contracting week is used as the dependent variable. This rate setting is intended to take into account the seasonal nature of data typical for sugar (see Fig. 1).

The main focus is for the following factors:

* dummy variable for public sector supplier companies;
* dummy variable for repeated contracts;
* interaction term for these factors.

As a result, the models will take the following form:

where *t* stands for the sequential number of the observation. The main focus in this specification will be on estimation of *β* coefficients*.* The variable equals 1 if the supplier is state-owned and 0 if otherwise. The variable *R* equals 1 if the contract is repeated and 0 if otherwise. The vector variable stands for a combination of factors used for control in the models. The coefficient shows the average difference of the dependent variable between state-owned supplier and private supplier if the contract is not repeated. The coefficient shows the average difference of the dependent variable between repeated contract and one-time contract if the supplier is private. The coefficient shows the average difference of the dependent variable between state-owned supplier and private one if the contract is repeated. The coefficient shows the average difference of the dependent variable between repeated and one-time contract if the supplier is state-owned. The coefficient shows the average difference of the dependent variable between repeated contract supplied by state-owned firm and one-time contract supplied by private firm.

The models use the following control variables:

* procurement volume,
* number of goods procured with sugar simultaneously (procurement complexity),
* competition at biddings measured by number of admitted bidders,
* quarters for contract conclusion dates and contract delivery dates,
* contract conclusion year,
* duration of contract,
* normalised regional retail price during the contracting week,
* type of the customer’s activity,
* supplier’s size,
* number of previous public procurement contracts concluded by the supplier

Names, categories, and sources of these variables are presented in Annex 3; descriptive statistics are presented in Annex 4 and Annex 5.

Because the type of procurement procedure is significant to the analysis of price effects (Yakovlev, Bashina, and Demidova 2014) and provides different opportunities for corruption, a separate model is proposed for each type of procedure. We use linear models for the expectation of the dependent variable. The models were estimated by the least square method. To address the problem of heteroscedasticity of disturbances, we used the White estimators (which are more robust but consistent) for standard deviations. Because the contract value is included as an independent variable in all models under review and its value is by several times greater than the value of the dependent variables, the hypothesis concerning the inclusion of this variable in the logarithmic form was accepted on the basis of the Box-Cox test. The variable representing the number of admitted bids is added in the square form.

**6. Results**

*6.1 Main results*

The results of evaluation of the basic models for the entire sample lead to the following conclusions (see Table 6, models (1)–(4)):

* In one-time contracts (coefficient ‘stateown’) for non-transparent procedures (models (1) and (4)), the contract prices of SOE suppliers compared to private suppliers are 12–13% of the Russian average retail price higher. In the case of auctions (models (2) and (3)), the prices of SOE suppliers and private suppliers differ by 1.5–2% of the Russian average retail price.
* In repeated contracts (coefficient ‘stateown + staterep’) for non-transparent procedures, the contract prices of SOE suppliers are 16–20% of the Russian average retail price higher than prices of private suppliers. For ‘void auctions’, this difference is 9.7%. The difference is statistically insignificant for valid auctions.
* For non-transparent procedures, the prices of SOE suppliers under repeated contracts are 17–21% of the Russian average retail price higher than the prices of private suppliers under one-time deals (coefficient ‘repeated + stateown + staterep’). For ‘void auctions’ this difference is 9% and it is statistically insignificant for valid auctions.
* Regarding private suppliers the prices of repeated contracts are higher for request for quotations and lower for valid auctions (coefficient ‘repeated’). This difference is statistically significant but the value does not exceed 1% in absolute value. For SOE suppliers, prices of repeated contracts are 4-8% higher than prices of one-time deals under non-transparent procedures (coefficient ‘repeated + staterep’). For void auctions the overpricing is 11.7%, but for valid auctions it is insignificant.

Summarising the results, note that in the case of auction we do not have economically significant price decreases from the repeated contracts compared to one-time contracts. Moreover, procurement prices from SOE suppliers are even a little higher than from private suppliers for e-auctions. So, our positive hypothesis about procurement from repeated contracts and SOE suppliers through transparent procedure is not consistent enough for Russian case. Nevertheless, negative hypothesis about significant overpricing of repeated contracts with SOE suppliers through non-transparent procedure is strong enough. Moreover, this significant overpricing consistent for all the types of customer: educational, health and security[[3]](#footnote-3). These may be explained by low quality of government in Russian regions. There are no sustainable government mechanisms that can support honest behaviour, and there are quite strong bureaucratic barriers as well.

Table 6. Regression results for modeling of expectation of normalized price

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **(1)** | **(2)** | **(3)** | **(4)** | **(5)** |
|  | **Request for quotations** | **E-auctions** | **Void auctions** | **Single sourcing** | **Single source (without Selinvest)** |
| **stateown** | 0.1252\*\*\* | 0.0172\*\* | -0.0263\* | 0.1275\*\*\* | 0.0309 |
|  | (0.0196) | (0.0084) | (0.0143) | (0.0172) | (0.0200) |
| **repeat** | 0.0088\*\*\* | -0.0085\*\* | -0.0064 | 0.0064 | 0.0013 |
|  | (0.0025) | (0.0042) | (0.0050) | (0.0102) | (0.0102) |
| **state\_repeat** | 0.0760\*\* | 0.0071 | 0.1233\*\*\* | 0.0348 | 0.0979\*\*\* |
|  | (0.0386) | (0.0218) | (0.0306) | (0.0223) | (0.0273) |
| **ln(quantity)** | -0.0238\*\*\* | -0.0015 | -0.0018 | -0.0040\*\* | -0.0136\*\*\* |
|  | (0.0013) | (0.0021) | (0.0022) | (0.0020) | (0.0023) |
| **Duration** | 0.0001\*\*\* | 0.0001\*\*\* | 0.0002\*\*\* | 0.0002\*\*\* | 0.0002\*\*\* |
|  | (1.8e-05) | (2.5e-05) | (3.0e-05) | (4.5e-05) | (4.6e-05) |
| **application amount** | -0.0502\*\*\* | -0.0096\*\*\* |  |  |  |
|  | (0.0036) | (0.0026) |  |  |  |
| **application amount squared** | 0.0040\*\*\* | 0.0006\*\*\* |  |  |  |
| (0.0004) | (0.0002) |  |  |  |
| **products amount** | 0.0007\*\*\* | 0.0013\*\*\* | 0.0020\*\*\* | 0.0023\*\*\* | 0.0024\*\*\* |
|  | (0.0001) | (0.0001) | (0.0001) | (0.0005) | (0.0005) |
| **normalized price** | 0.6979\*\*\* | 0.5108\*\*\* | 0.7102\*\*\* | 0.7148\*\*\* | 0.7174\*\*\* |
|  | (0.0161) | (0.0161) | (0.0242) | (0.0360) | (0.0377) |
| **number of contracts** | -0.0003\*\*\* | -0.0004\*\*\* | -0.0002\*\*\* | -0.0003\*\* | -0.0005\*\*\* |
|  | (1.8e-05) | (3.7e-05) | (3.3e-05) | (0.0001) | (0.0001) |
| **Other factor variables a** | | | | | |
| **R-squared** | 0.4326 | 0.2042 | 0.3341 | 0.2937 | 0.2955 |
| **N** | 17293 | 8866 | 6832 | 3170 | 3034 |
| **repeat+state\_repeat ()** | 0.0848\*\*\* | -0.0014 | 0.1169\*\*\* | 0.0412\*\* | 0.0992\*\*\* |
| (0.0385) | (0.0212) | (0.0302) | (0.0207) | (0.0259) |
| **stateown+state\_repeat ()** | 0.2012\*\*\* | 0.0243 | 0.0970\*\*\* | 0.1623\*\*\* | 0.1288\*\*\* |
| (0.0326) | (0.0205) | (0.0278) | (0.0185) | (0.0224) |
| **repeat+stateown+state\_repeat ()** | 0.2100\*\*\* | 0.0158 | 0.0906\*\*\* | 0.1687\*\*\* | 0.1302\*\*\* |
| (0.0325) | (0.0203) | (0.0278) | (0.0191) | (0.0234) |

\*\*\* p<0.01, \*\* p<0.05, \* p<0.10. Robust standard errors in parentheses

a **Other factor variables** include: type of customer, firm size of supplier, contracting year, contracting quarter, delivery quarter.

We suggest that the considerable overpricing of repeated contracts with state-owned suppliers can be an indicator of corrupt deals. Tables 4 and 5 and the regression results in Table 6 may be used to estimate the average amount of money spent per contract in which a SOE supplier might pay a ‘bribe’ under different procurement procedures.

Table 7. Estimated average amounts of ‘bribe’ per one contract (thousand roubles)

|  |  |  |
| --- | --- | --- |
|  | One-time contracts | Repeated contracts |
| Request for quotations | 3.4 – 3.8 | 6.7 – 8.9 |
| Void auction |  | 3.4 – 4.4 |
| Single-sourcing | 225.7 – 251.7 | 201.9 – 255.6 |

According to Table 7, the available amount of money that might be paid as a ‘bribe’ is marginal for competitive procedures. It is more likely an indication of corruption at the level of the specialists responsible for procurement (low-level corruption). The situation is entirely different for single-source procurements. The volume of potential bribes is much higher and on average equal to 13–16% of the contract value.

*6.2 Robustness check*

We provided several models for robustness checks of our results. Firstly, in order to reduce the variation across regions we construct another dependent variable as ratio of the procurement price to the retail price in region of customer during the contracting week. Secondly, we used linear median models instead of linear expectation models. Thirdly, we employed expectation linear model where definition of repeated contracts is changed. Finally, we run linear models excluding the contracts concluded with Selinvest (as we told in the introduction this SOE firm participated in corruption scheme).

Preliminary analysis of retail price across regions shows that there is price variation. Since our main dependent variable is normalized on RF price, we should check that this variation does not impact the main effect of repeated contracts with state-owned suppliers. Therefore, we construct new dependent variable as ratio of the procurement price to the retail price in region of customer during the contracting week. Results are presented in Table 8 (models (6)-(10)). They are close to the results of Table 6. The only difference that coefficient ‘repeat+state\_repeat’ (difference between repeated and one-time contracts for state-owned suppliers) is insignificant for request for quotations, though it is positive and constitutes 3.7%.

To test the robustness of our results against price outliers and skewness of procurement prices to the right, we consider median models. The median models produce the same results as described for basic models (Table 9, models (11)–(15)). Considerable overpricing by state-owned suppliers is observed in the case of non-transparent procedures. This overpricing is even stronger for repeated contracts. For valid auction the price difference is insignificant. For private suppliers prices of repeated contracts are significantly differ from one-time contract, but the magnitude of the difference is still not exceed 1.5%.

In our basic models we defined all contracts as repeated if there were three and more deals between the same customer and supplier during the period 2011-2013. Moreover first two contracts of such customer-supplier pair are marked as repeated as well. To check the robustness of these results we changed the definition of repeated contracts. It assumes that third and greater contracts of customer-supplier pair only are marked as repeated, but first two contracts are not (see Annex 6 for descriptive statistics). The results of linear expectation models are presented in Table 10 (models (16)-(20)). The variable ‘*repeat\_new*’ equals 1 if contract is repeated under new definition. The variable ‘*first\_two*’ equals 1 if contract is repeated under old definition but it is not repeated under new definition (i.e. these are first two contracts for customer-supplier pair with more than two contracts during 2011-2013). For private suppliers we also see significant but not high difference in request for quotations and valid auctions. But for SOE suppliers contracts are significantly overpriced in case of non-transparent procedures. As for basic models, these overpricing is much higher for repeated contracts with SOE suppliers. Moreover, even first two contracts with SOE suppliers are already overpriced (variable ‘*state\_first\_two*’) in the case of non-transparent procedures. For valid auctions price difference is not significant neither for one-time contracts nor for repeated contracts.

In view of the corruption incident involving Selinvest[[4]](#footnote-4), we test the robustness of our results excluding the contracts where this firm was the supplier. It should be mentioned that this company did not participate in competitive procedures and supplied sugar through single-sourcing only. Results of all models are presented in right columns of Tables 6, 8, 9, and 10. The results of linear expectation models demonstrate that one-time contracts with SOE suppliers are not significantly overpriced, but repeated contracts are still significantly overpriced.

Table 8. Regression results for modeling of expectation of regionally normalized price

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **(6)** | **(7)** | **(8)** | **(9)** | **(10)** |
|  | **Request for quotations** | **E-auctions** | **Void auctions** | **Single sourcing** | **Single sourc. (no Selinvest)** |
| **stateown** | 0.1082\*\*\* | 0.01543\* | -0.02979\* | 0.1356\*\*\* | 0.04354\*\* |
|  | (0.01564) | (0.008926) | (0.01526) | (0.01681) | (0.01978) |
| **repeat** | 0.008873\*\*\* | -0.007002\* | -0.007982 | 0.008860 | 0.004025 |
|  | (0.002387) | (0.004067) | (0.004862) | (0.009262) | (0.009262) |
| **state\_repeat** | 0.02865 | 0.003543 | 0.1051\*\*\* | 0.02570 | 0.08331\*\*\* |
|  | (0.02569) | (0.02143) | (0.02851) | (0.02202) | (0.02751) |
| **ln(quantity)** | -0.02294\*\*\* | -0.001014 | -0.003266 | -0.003785\* | -0.01310\*\*\* |
|  | (0.001234) | (0.002047) | (0.002134) | (0.001983) | (0.002261) |
| **duration** | 1.262e-04\*\*\* | 6.494e-05\*\*\* | 2.437e-04\*\*\* | 1.608e-04\*\*\* | 1.721e-04\*\*\* |
|  | (1.695e-05) | (2.430e-05) | (2.824e-05) | (4.290e-05) | (4.327e-05) |
| **application amount** | -0.04435\*\*\* | -0.01024\*\*\* |  |  |  |
|  | (0.003075) | (0.002422) |  |  |  |
| **application amount squared** | 0.003321\*\*\* | 5.773e-04\*\*\* |  |  |  |
| (3.734e-04) | (1.691e-04) |  |  |  |
| **products amount** | 6.935e-04\*\*\* | 0.001274\*\*\* | 0.001875\*\*\* | 0.002315\*\*\* | 0.002379\*\*\* |
|  | (8.423e-05) | (1.243e-04) | (1.319e-04) | (4.084e-04) | (4.055e-04) |
| **normalized price** | -0.2309\*\*\* | -0.3149\*\*\* | -0.2268\*\*\* | -0.2949\*\*\* | -0.2884\*\*\* |
|  | (0.009710) | (0.01266) | (0.01612) | (0.02789) | (0.02915) |
| **number of contracts** | -2.906e-04\*\*\* | -4.015e-04\*\*\* | -2.286e-04\*\*\* | -2.665e-04\*\* | -4.387e-04\*\*\* |
|  | (1.710e-05) | (3.566e-05) | (3.294e-05) | (1.330e-04) | (1.293e-04) |
| **Other factor variables a** | | | | | |
| **R-squared** | 0.172 | 0.108 | 0.157 | 0.164 | 0.161 |
| **N** | 17293 | 8866 | 6832 | 3170 | 3034 |
| **repeat+state\_repeat ()** | 0.03752 | -0.003459 | 0.09707\*\*\* | 0.03456\* | 0.08733\*\*\* |
| (0.02807) | (0.02550) | (0.03337) | (0.03128) | (0.03677) |
| **stateown+state\_repeat ()** | 0.1369\*\*\* | 0.01897 | 0.07527\*\*\* | 0.1613\*\*\* | 0.1269\*\*\* |
| (0.04133) | (0.03036) | (0.04377) | (0.03883) | (0.04728) |
| **repeat+stateown+state\_repeat ()** | 0.1457\*\*\* | 0.01197 | 0.06728\*\*\* | 0.1701\*\*\* | 0.1309\*\*\* |
| (0.04372) | (0.03443) | (0.04863) | (0.04809) | (0.05655) |

\*\*\* p<0.01, \*\* p<0.05, \* p<0.10. Robust standard errors in parentheses

a **Other factor variables** include: type of customer, firm size of supplier, contracting year, contracting quarter, delivery quarter.

Table 9. Regression results for modeling of median of normalized price

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **(11)** | **(12)** | **(13)** | **(14)** | **(15)** |
|  | **Request for quotations** | **E-auctions** | **Void auctions** | **Single sourcing** | **Single sourc. (no Selinvest)** |
| **stateown** | 0.0510\*\*\* | -0.0019 | -0.0674\*\*\* | 0.1456\*\*\* | 0.0762\*\*\* |
|  | (0.0117) | (0.0036) | (0.0070) | (0.0076) | (0.0114) |
| **repeat** | 0.0107\*\*\* | -0.0075\*\*\* | -0.0114\*\*\* | 0.0080 | 0.0077 |
|  | (0.0019) | (0.0028) | (0.0032) | (0.0057) | (0.0059) |
| **state\_repeat** | 0.0586\*\*\* | 0.0112 | 0.1443\*\*\* | 0.0630\*\*\* | 0.0979\*\*\* |
|  | (0.0193) | (0.0121) | (0.0102) | (0.0172) | (0.0164) |
| **ln(quantity)** | -0.0178\*\*\* | -0.0030\*\*\* | -0.0056\*\*\* | -0.0068\*\*\* | -0.0135\*\*\* |
|  | (0.0009) | (0.0007) | (0.0011) | (0.0015) | (0.0015) |
| **duration** | 0.0001\*\*\* | 0.0001\*\*\* | 0.0002\*\*\* | 0.0002\*\*\* | 0.0002\*\*\* |
|  | (1.0e-05) | (1.0e-05) | (2.0e-05) | (3.0e-05) | (3.0e-05) |
| **application amount** | -0.0315\*\*\* | -0.0161\*\*\* |  |  |  |
|  | (0.0027) | (0.0017) |  |  |  |
| **application amount squared** | 0.0023\*\*\* | 0.0009\*\*\* |  |  |  |
| (0.0003) | (0.0001) |  |  |  |
| **products amount** | 0.0010\*\*\* | 0.0010\*\*\* | 0.0017\*\*\* | 0.0018\*\*\* | 0.0019\*\*\* |
|  | (0.0001) | (0.0001) | (0.0001) | (0.0001) | (0.0001) |
| **normalized price** | 0.6117\*\*\* | 0.4490\*\*\* | 0.6722\*\*\* | 0.5641\*\*\* | 0.5554\*\*\* |
|  | (0.0089) | (0.0067) | (0.0172) | (0.0242) | (0.0254) |
| **number of contracts** | -0.0002\*\*\* | -5.4e-05\* | -0.0000\*\*\* | 0.0001 | -0.0003\* |
|  | (1.0e-05) | (3.0e-05) | (2.0e-05) | (0.0001) | (0.0002) |
| **Other factor variables a** | | | | | |
| **N** | 17293 | 8866 | 6832 | 3170 | 3034 |
| **Percentile** | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| **repeat+state\_repeat ()** | 0.0693\*\*\* | 0.0037 | 0.1329\*\*\* | 0.0709\*\*\* | 0.1057\*\*\* |
| (0.0213) | (0.0047) | (0.0134) | (0.0230) | (0.0231) |
| **stateown+state\_repeat ()** | 0.1096\*\*\* | 0.0092 | 0.0769\*\*\* | 0.2085\*\*\* | 0.1741\*\*\* |
| (0.0310) | (0.0157) | (0.0191) | (0.0248) | (0.0278) |
| **repeat+stateown+state\_repeat ()** | 0.1203\*\*\* | 0.0018 | 0.0655\*\*\* | 0.2165\*\*\* | 0.1819\*\*\* |
| (0.0329) | (0.0185) | (0.0203) | (0.0306) | (0.0337) |

\*\*\* p<0.01, \*\* p<0.05, \* p<0.10. Robust standard errors in parentheses

a **Other factor variables** include: type of customer, firm size of supplier, contracting year, contracting quarter, delivery quarter.

Table 10. Regression results for new definition of repeated contracts

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **(16)** | **(17)** | **(18)** | **(19)** | **(20)** |
|  | **Request for quotations** | **E-auctions** | **Void auctions** | **Single sourcing** | **Single source (without Selinvest)** |
| **stateown** | 0.1253\*\*\* | 0.0158\* | -0.0224 | 0.1262\*\*\* | 0.0299 |
|  | (0.0196) | (0.0084) | (0.0143) | (0.0173) | (0.0200) |
| **repeat\_new** | 0.0123\*\*\* | -0.0103\*\* | 0.0053 | 0.0118 | 0.0081 |
|  | (0.0033) | (0.0050) | (0.0059) | (0.0107) | (0.0107) |
| **state\_repeat\_new** | 0.0768 | 0.0241 | 0.1007\*\* | 0.0199 | 0.0782\*\*\* |
|  | (0.0565) | (0.0373) | (0.0451) | (0.0263) | (0.0302) |
| **first\_two** | 0.0057\* | 0.0031 | -0.0178\*\*\* | -0.0048 | -0.0115 |
|  | (0.0032) | (0.0057) | (0.0063) | (0.0120) | (0.0120) |
| **state\_first\_two** | 0.0751 | -0.0194 | 0.1364\*\*\* | 0.0622\*\* | 0.1452\*\*\* |
|  | (0.0473) | (0.0182) | (0.0382) | (0.0293) | (0.0412) |
| **ln(quantity)** | -0.0238\*\*\* | -0.0004 | -0.0017 | -0.0042\*\* | -0.0136\*\*\* |
|  | (0.0013) | (0.0021) | (0.0022) | (0.0020) | (0.0023) |
| **duration** | 0.0001\*\*\* | 0.0001\*\*\* | 0.0003\*\*\* | 0.0002\*\*\* | 0.0002\*\*\* |
|  | (1.7e-05) | (2.1e-05) | (2.8e-05) | (4.6e-05) | (4.7e-05) |
| **application amount** | -0.0502\*\*\* | -0.0090\*\*\* |  |  |  |
|  | (0.0036) | (0.0026) |  |  |  |
| **application amount squared** | 0.0040\*\*\* | 0.0005\*\*\* |  |  |  |
| (0.0004) | (0.0002) |  |  |  |
| **products amount** | 0.0007\*\*\* | 0.0013\*\*\* | 0.0020\*\*\* | 0.0023\*\*\* | 0.0024\*\*\* |
|  | (0.0001) | (0.0001) | (0.0001) | (0.0005) | (0.0005) |
| **normalized price** | 0.6975\*\*\* | 0.5090\*\*\* | 0.7090\*\*\* | 0.7184\*\*\* | 0.7224\*\*\* |
|  | (0.0161) | (0.0161) | (0.0242) | (0.0361) | (0.0378) |
| **number of contracts** | -0.0003\*\*\* | -0.0004\*\*\* | -0.0002\*\*\* | -0.0003\*\* | -0.0005\*\*\* |
|  | (1.7e-05) | (3.5e-05) | (3.3e-05) | (0.0001) | (0.0001) |
| **Other factor variables a** | | | | | |
| **R-squared** | 0.4327 | 0.2003 | 0.3349 | 0.2945 | 0.2966 |
| **N** | 17293 | 8866 | 6832 | 3170 | 3034 |
| **repeat+state\_repeat ()** | 0.0892\* | 0.0139 | 0.1060\*\*\* | 0.0317 | 0.0864\*\*\* |
| (0.0564) | (0.0370) | (0.0447) | (0.0253) | (0.0290) |
| **stateown+state\_repeat ()** | 0.2022\*\*\* | 0.0400 | 0.0782\*\* | 0.1461\*\*\* | 0.1081\*\*\* |
| (0.0525) | (0.0366) | (0.0430) | (0.0233) | (0.0258) |
| **repeat+stateown+state\_repeat ()** | 0.2145\*\*\* | 0.0297 | 0.0835\*\* | 0.1579\*\*\* | 0.1163\*\*\* |
| (0.0524) | (0.0365) | (0.0429) | (0.0238) | (0.0266) |

\*\*\* p<0.01, \*\* p<0.05, \* p<0.10. Robust standard errors in parentheses

a **Other factor variables** include: type of customer, firm size of supplier, contracting year, contracting quarter, delivery quarter.

**7. Conclusion**

In this paper we demonstrate how a price analysis of stable relations in the public procurement of simple, homogeneous goods can help differentiate between opportunistic and honest behaviour among economic agents. We consider two instances of stable relations: repeated procurements of customer from the same supplier and public procurements from a state-owned supplier. Our identification strategy assumes that honest agents will benefit from repeated procurements due to lower uncertainty and transaction costs. Therefore, the prices of repeated procurements between honest agents are lower compared to one-time deals and these agents prefer transparent and competitive procedures. Conversely, opportunistic agents seek personal gain from repeated contracts (in the form of ‘kick-backs’ paid by suppliers to corrupt procurement officers), and this strategy leads to higher prices. Implementing of such a strategy is possible by employing of non-transparent procurement procedures. Additionally, we assume that state ownership of suppliers can intensify these effects providing an additional channel for interaction between honest agents in the first case and more opportunities for dishonest agents in the second case.

To empirically test these hypotheses, we used a large dataset of procurement contracts for granulated sugar sold in Russia from 2011 to 2013. Taking into account the peculiarities of the national regulation of public procurements, we used separate models for each type of procurement procedure – considering valid e-auctions as the most competitive and transparent procedure and requests for price quotations and single-sourcing as less transparent procedures. We used the normalised contract price as the dependent variable and dummies for the primary explanatory variables, which included repeated contracts, SOE status of suppliers, and their interactions.

Empirical analysis has indicated that for private suppliers, prices were lower in repeated contracts compared to one-time deals when procured through valid e-auctions and higher when procured through requests for price quotations. These conclusions were consistent with the findings of Yakovlev et al. (2016) concerning the gasoline market. For non-transparent procedures (request for price quotations and single-source contracting), we observe significant overpricing of contracts with state-owned suppliers compared to private suppliers. This effect is even more pronounced in the case of repeated contracts. At the same time, we observe only a small difference in the prices of contracts between SOEs and private suppliers when contracts are concluded through valid e-auctions. But for ‘void auctions’ repeated contracts with state-owned suppliers were significantly overpriced compared to private suppliers. In our opinion, these results have important policy implications for the enforcement of public procurement regulation and combating corruption in developing and transitioning economies.

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**Annex**

Annex 1. Contract characteristics by sector of customers’ activity and firm size of suppliers

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Type of supplier | One-time contracts | | | | Repeated contracts | | | |
| Number of contracts | Total contract value (RUR mln) | Average contract value (RUR thou) | Average price (RUR/kg) | Number of contracts | Total contract value (RUR mln) | Average contract value (RUR thou) | Average price (RUR/kg) |
| **Sector customers’ activity** | | | | | | | | |
| health  education  security  other | 9940  9916  804  819 | 517.2  231.7  630.3  181.9 | 52.0  23.4  783.9  222.1 | 32.14  33.25  34.18  35.02 | 5886  7732  444  620 | 267.4  126.1  252.3  84.0 | 45.4  16.3  568.3  135.5 | 32.44  32.84  36.50  34.19 |
| **Size of suppliers** | | | | | | | | |
| Micro firm (1-10 employee)  Small firm (11- 100 employee)  medium-sized firm (101 – 250 employee)  large-sized firm (>250 employee)  undefined firm size | 12839  4586  853  545  2656 | 937.6  263.3  68.4  81.8  210.1 | 73.0  57.4  79.1  150.1  79.1 | 32.70  32.66  31.66  34.11  33.91 | 8295  2963  2054  299  1071 | 414.8  163.9  63.4  33.1  54.6 | 50.0  55.3  30.9  110.6  50.9 | 32.72  32.39  33.16  32.67  34.52 |

Annex 2. Number of suppliers in sugar procurements in 2011-2013

|  |  |  |  |
| --- | --- | --- | --- |
|  | | Number of suppliers | % from total number |
| *Type of ownership:* | | | |
| SOE supplier | 89 | | 2,0 |
| non-SOE supplier | 4409 | | 98,0 |
| *Size of company:* | | | |
| extra small (from 1 to 10 employees) | 2959 | | 65,8 |
| small (from 11 to 100 employees) | 594 | | 13,2 |
| medium (from 101 to 250 employees) | 99 | | 2,2 |
| large (more than 250 employees) | 80 | | 1,8 |
| indefinite size | 766 | | 17,0 |
| **Total number** | 4498 | | 100,0 |

Annex 3. Description of independent variables and sources of data

|  |  |  |  |
| --- | --- | --- | --- |
| **Name** | **Description** | **Type** | **Source** |
| stateown | if supplier is state-owned | factor (1-yes, 0-no) | spark-interfax.ru |
| repeat | if contract is repeated | factor (1-yes, 0-no) | zakupki.gov.ru |
| repeat\_new | if contract is repeated in new definition | factor (1-yes, 0-no) | zakupki.gov.ru |
| first\_two | if the contract is the first or second in the series of repeated contracts | factor (1-yes, 0-no) | zakupki.gov.ru |
| state\_repeat | interaction of variables repeated and stateown | Factor | zakupki.gov.ru + spark-interfax.ru |
| year | year of contract conclusion | factor (2011, 2012, 2013) | zakupki.gov.ru |
| ln(quantity) | logarithm of procured amount of sugar | Quantitative | zakupki.gov.ru |
| application amount | number of admitted bidders | Quantitative | zakupki.gov.ru |
| application amount  squared | squared number of admitted bidders | Quantitative | zakupki.gov.ru |
| duration | duration of contract in days | Quantitative | zakupki.gov.ru |
| norm\_price | ratio of average regional retail price to the average RF retail price in the week of contract conclusion | Quantitative | gks.ru |
| quarter of sign | quarter of contract conclusion date | factor (1-4) | zakupki.gov.ru |
| quarter of delivery | quarter of contract delivery date | factor (1-4) | zakupki.gov.ru |
| org\_type | sector of customer activity | factor (Health, Education, Security, Other) | clearspending.ru |
| products amount | number of different products that are procured with granulated sugar simultaneously in the contract | Quantitative | zakupki.gov.ru |
| firmsize | firm size | factor (micro, small, medium, large, undefined) | spark-interfax.ru |
| number of contracts | total number of public procurement contracts that were conducted by the supplier since 2010 | Quantitative | clearspending.ru |

Annex 4. Main descriptive statistics of numeric variables

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Variable** | **Number of observations** | **Average** | **Standard deviation** | **Minimum** | **Maximum** |
| Normalized contractual price of one kg of sugar | 36161 | 0.974 | 0.218 | 0.180 | 3.963 |
| Contract volume, kg | 36161 | 1909 | 10282 | 7 | 648000 |
| Contract volume logarithm | 36161 | 6.355 | 1.394 | 2.001 | 13.380 |
| Contract period, days | 36161 | 123 | 96 | 1 | 834 |
| Number of admitted bidders, request for quotations | 17293 | 2.638 | 1.170 | 1 | 14 |
| Number of admitted bidders, valid auction | 8866 | 4.88 | 2.87 | 2 | 27 |
| Amount of products in the contract | 36161 | 19.92 | 21.73 | 1 | 484 |
| Normalized average retail regional price | 36161 | 1.000 | 0.156 | 0.727 | 2.448 |
| Number of previous procurement contracts for the supplier | 36161 | 214 | 463 | 0 | 3793 |

Annex 5. Main descriptive statistics of categorical variables

|  |  |  |
| --- | --- | --- |
| **Variable** | **Values** | **Number of observations** |
| Dummy-variable for repeated contracts | Repeated contract | 14682 |
| Non-repeated contract | 21479 |
| Dummy-variable for supplier | State-owned supplier | 893 |
| Private supplier | 35268 |
| Contracting year | 2011 | 9979 |
| 2012 | 12244 |
| 2013 | 13938 |
| Contracting quarter | 1st quarter | 8175 |
| 2nd quarter | 8952 |
| 3rd quarter | 7806 |
| 4th quarter | 11228 |
| Delivering quarter | 1st quarter | 4656 |
| 2nd quarter | 7323 |
| 3rd quarter | 6394 |
| 4th quarter | 17788 |
| Value of contracts | Contract up to 100,000 rubles | 18580 |
| Contract from 100,000 rubles to 500,000 rubles | 14280 |
| Contract over 500,000 rubles | 3301 |
| Type of customer | Health | 15826 |
| Education | 17648 |
| Security | 1248 |
| Others | 1439 |
| Size of supplier company | Micro firm | 21134 |
| Small firm | 7549 |
| Medium-sized firm | 2907 |
| Large-sized firm | 844 |
| Undefined firm size | 3727 |
| Type of procurement procedure | Request for quotations | 17293 |
| Electronic auction | 8866 |
| Void auction | 6832 |
| Single-source contracting | 3170 |
| Repeated contracts in new definition | Repeated contract | 27656 |
| Non-repeated contract | 8505 |
| First two contracts of repeated interaction | Yes | 29984 |
| No | 6177 |

Annex 6. Distribution of repeated contracts in new definition

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Procedure of procurement** | **repeat\_new** | | **first\_two** | |
| **one-time contract** | **repeated contract** | **0** | **1** |
| Request for quotations | 13977 | 3316 | 14049 | 3244 |
| Valid e-auction | 7196 | 1670 | 7514 | 1352 |
| Void auction | 4619 | 2213 | 5887 | 945 |
| Single-source contracting | 1864 | 1306 | 2534 | 636 |
| Total amount | 27656 | 8505 | 29984 | 6177 |

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2. <http://fas.gov.ru/documents/documentdetails.html?id=14232> [↑](#footnote-ref-2)
3. We also calculated models from Table 6 separately for each type of customer. The results are approximately similar to the main model. There is significant overpricing of repeated contracts from SOE suppliers; however, the size of effect is differing for different type of customers. [↑](#footnote-ref-3)
4. http://rapsinews.com/news/20130307/266649776.html [↑](#footnote-ref-4)