Does decrease in asymmetric information improve procurement outcomes: The case of Russia

Abstract

Efficient procurement system is vital for obtaining optimal procurement outcomes and decreasing corruption. In my paper I address the question of whether change in asymmetric information between buyers and suppliers can improve procurement outcomes. I discuss a reform that was enacted in Russia on 1st of January 2020 and aimed at reducing information asymmetry. Using data from Russian procurement system, I found out that there was no significant differential effect from the reform on average monthly contract sum. However, there was a significant increase by 0.5 unit in the number of contracts signed by the buyer per month.

Introduction

Public procurement is a sphere where a significant share of tax-payers money is accumulated. In Russia, public procurement contracts only under Federal Law 44 (FZ 44) in 2018 accounted for expenditure of 6.79 trillion rubles. And in some of the regions in Russia, public procurement spending accounts for 5-15% of GDP. Given such costs at stake, society is interested in creating an efficient procurement system that would ensure the optimal procurement outcomes. Decrease of asymmetric information potentially can achieve this goal by increasing competition, improving transparency and reducing the costs. Evaluation of impact of change in asymmetric information is beneficial for future decisions of the policymakers. Many procurement systems in the world are undergoing a period of reforms in recent years due to the introduction of e-procurement and aim to decrease corruption. In Russia, there has been active law enforcement work starting from 2006 with the aim of building an efficient electronic procurement system by 2020-s. Thus, empirical evaluation of the reforms in public procurement is directly applicable to development of future laws in this field.

In my paper, I study the differential effect of reduced asymmetric information on procurement outcomes. I achieve this goal by accessing the reform that was legislated on the 1st of January 2020 in Russia. According to this reform, buyers under Federal Law 44 (FZ 44) were required to register in the Uniform Information

System (UIS). Prior to this reform, buyers could procure using 8 electronic platforms choosing the number of platforms they are present on by themselves. Registration in UIS, in contrast, automatically implies registration of a buyer on 8 platforms. As a result, a reform can be interpreted as a natural experiment of enforcing a decrease in asymmetric information.

My paper contributes to two strands in existing literature. First of all, it assesses the general question of impact of change in asymmetric information in the market. In economic theory there is no consensus of whether asymmetric information is solely bad for the market. I show that in procurement contexts, a decrease in asymmetric information leads to increase in the number of contracts without effect on the average monthly sum of the contract. Secondly, it relates to studies of discretionary power of bureaucrats in procurement context. Again, evidence of effect from decrease in discretionary power bureaucrats is varied. For example,Coviello, Spagnolo, and Guglielmo (2018) conclude that increase in discretion increases the probability of repeated choice of the same contractor. Szucs (2017) comes to the conclusion that increased discretionary power increases contract prices. Requirement to register in UIS may give a nudge for both buyers and suppliers to search and participate in more procurement contracts and, as a result, the process should become more transparent and participation in corrupt behaviour indeed should become harder (discretionary power decreases) . However, I don't find any significant effect from change from this on contract prices.

The structure of the paper is organised as follows. First, I provide a short overview of the institutional context of the Russian procurement system. Secondly, I describe in detail the data which I used in my research. Then, I review empirical strategy . And I end my work with results and conclusions.

Institutional context

Currently, procurement in Russia is governed by two Federal Law: Federal Law 44 (FZ 44) and Federal Law 223 (FZ 223). The difference in laws mainly lies in the types of contracts they cover. I focus my attention solely on Federal Law 44 since reform of interest was solely targeting this law. Types of contracts FZ 44 administrates include procurement conducted by government companies,

government entities(schools, hospitals, municipalities etc) and budgetary organisations.

In such procurement contracts there are usually 3 parties: responsible organizer, buyer(customer) and supplier. Responsible organizer is the entity placing the order on the platform. It may be doing on its own behalf (then buyer and responsible organizer are the same) or on the behalf of the buyer. The buyer is the party which seeks procurement service or goods. For example, it may be the hospital buying medical supplies or the army institute buying military equipment. In my sample, the difference between responsible organizer and the buyer is negligible since buyers are the ones placing orders for themselves in most of the cases. I ignore this difference in proceeding parts. Supplier is the entity which competes for the order and in the end delivers procurement service or goods. For instance, it may be the producer of medical supplies or military equipment.

Moreover, under FZ 44 there are 12 types of purchase methods. These purchase methods differ in competitiveness and administration process. In my work I focus only on procurement by electronic auctions since it is the only method which is fully competitive.The main criteria for identifying the winner in electronic auction is the lowest price. The process of electronic auction procurement can be described in the following way. First, the notification with the desired procurement good/service, reserved price (maximum the buyer is willing to pay) and auction date is published. Then interested suppliers submit simple applications with basic information about themselves and their products. Special commission checks the reliability of the supplier. After this the auction is held and the winner is determined by lowest price.

The reform of interest was enacted from 1st of January 2020 and made the registration in UIS a requirement to participate in all purchases of FZ 44. Before the reform, buyers were procuring in 8 electronic platforms and could choose which platforms they were using.Registration in UIS automatically registers buyers on all 8 platforms. Participation in more platforms means that information about the tender of the buyer is available to a higher number of suppliers. One special group of buyers are the ones who never procured before. These buyers were required to register in

UIS earlier - from 1st of January 2019. Such buyers were excluded from my analysis to avoid counting them towards the control group.

Data and variables of interest

In my research, I work with open public procurement data for Russian Federation. This data is obtained from the FTP server of the website zakupki.gov.ru. The data on the server is saved in XML files inside the zip files. Moreover, it is structured into folders for notifications, contracts, and protocols. Each of the folders contains different information about the purchase: first tender information, contract results, and changes that happened to the purchase.

I parse the XML files to obtain the data set relevant for the research. This dataset is quite detailed and in total contains around 500 variables. I restrict the time period of the data from 1st of January 2018 to 31st of December 2020. In terms of region availability, the data set captures all regions of Russia. However, I limit my sample to purchases that took place in Moscow. This approach has some limitations. Although Moscow has the highest number of contracts taking place, it is not the perfect representation of all regions of Russia. Moreover, as already discussed, I limit my sample only to purchases under Federal Law 44 (FZ 44) and through the procedures of electronic auctions. Only the later procurement procedure is chosen since among 12 different procedures only it is both competitive and price-driven. In the period before reform, I identify whether the buyer was present on the platform by the information through which platform the notification was placed. In the period after reform, the information is automatically placed on all 8 platforms. I identify the buyer by registration number and supplier by INN. Most importantly, I account for possible changes in contracts and record the earliest information for each purchase for notification and the latest for the contract.

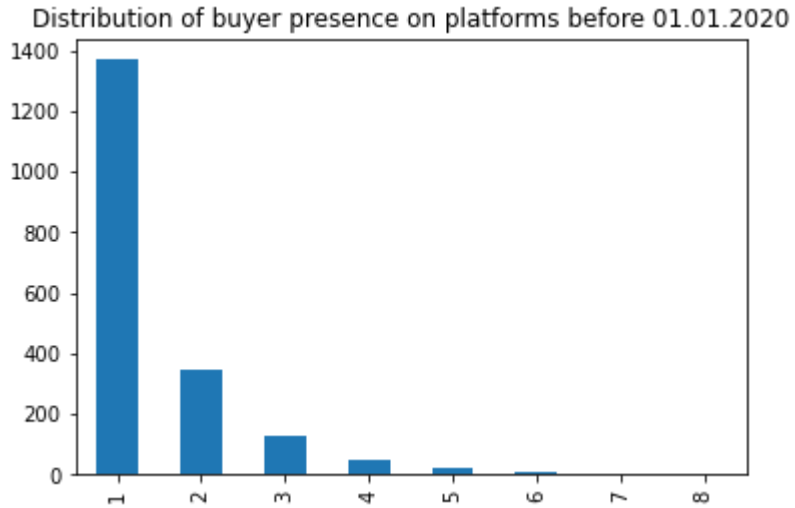
I aggregate the data on the buyers' level. Throughout the period I have 1730 unique buyers in Moscow. Then I construct variables of interest for the research: average contract sum, number of contracts and number of unique suppliers contracted. I aggregate data for each buyer over the month. I also construct variables needed for the fixed-effects: buyer's id number and year-month benchmark. I continue by creating dummy variables for control and treatment groups (logic discussed further

in the methodology section) and a dummy variable which captures whether the outcome is captured before or after the reform took place.

Empirical Strategy

I am interested in the impact of change in information asymmetry due to reform on procurement outcomes. To estimate this effect, I employ a difference-in-difference methodology. The intuition of the observed natural experiment is as follows.The reform reduced information asymmetry by making it a requirement to have accounts everywhere (being registered in UIS) and, as result, suppliers and buyers gained access to more information. Suppliers became exposed to a bigger pool of potential tenders and buyers as well became exposed to a higher number of potential suppliers. This, in turn, is expected to improve procurement outcomes. The control group in my natural experiment are buyers who procured using electronic auctions who were registered on at least 2 platforms before the reform. These buyers were exposed to different competitions on different platforms. Thus, reform shouldn't have changed much for them. The treatment group is buyers who were registered only on 1 electronic. For them, the reform made it impossible not to have access to the information on other platforms. In Figure 1 we can see that most of the buyers used only 1 electronic platform.

Figure 1: Distribution of buyer presence on platforms before reform



Potential issue that I should carefully assess is the possibility of impact on my control and treatment groups caused by other factors. It specifically means that buyers that used only some of the procurement platforms weren't affected to a different extent by some other events than buyers who used all 8 platforms. To provide support for existence of pre-trends for outcome variables, I estimate regression of the following specification:

$$Y_{ijt} = \sum_{\mu} \alpha_{\mu} * Quarter_{\mu} * TreatmentGroup_{j} + \gamma_{c} + \tau_{t} + \epsilon_{ct}$$

where μ indicates year quarter, t is time, γ_c stands for customer fixed effect, τ_t stands for year-month fixed effect. Standard errors are clustered at the customer (buyer) level to account for serial correlation. The omitted variable is the quarter before implementation of the reform. The obtained coefficient plots show that given the confidence intervals of 0.95, the coefficients for all 3 procurement outcomes before the reform aren't significantly different from 0. And in the quarter of reform, there is a sudden 'jump' in coefficients, which gives a suggestion of possible impact of reform.

One factor that one also should be particularly worried about is other procurement reforms. In Russia procurement reforms are enforced in pact on certain dates. Usually, there are 3-4 specific dates like this during the year. It means that on 1st of January 2020 there were at least 10 other reforms changing the procedures in FZ 44. The most important reforms are introduction of independent registrars, changes in construction procurement, changes in procurement for small businesses and changes in specifications for drug procurement goods. However, none of these reforms could have affected discussed treatment and control groups to different extent.

To access differential effect on procurement outcomes, I estimate the following regression:

$$Y_{ijt} = \alpha_1 TreatmentGroup_j + \alpha_2 Reform_t +$$

$$\alpha_3 Reform_t * TreatmentGroup_j + \gamma_c + \tau_t + \epsilon_{ct}$$

where γ_c stands for customer (buyer) fixed effect, τ_t stands for year-month fixed effect. Standard errors are clustered at the customer(buyer) level to account for the possibility of serial correlation. Including time-fixed effect allows me to account for bias in unobservable characteristics which change over-time, and including buyer's fixed effect allows me to account for bias from unobservable characteristics that change from buyer to buyer.

The obtained results for logarithm of average maximum contract sum, number of contracts and unique suppliers contracted are presented below.

Table 1: Differential effect on procurement outcomes			
	1	2	3
VARIABLES	ln maximum price	number of contracts	number of unique suppliers
o.reform	-	-	-
o.treatment_group	-	-	-
reform_treatment	0.242	0.506***	41.78***
	(0.227)	(0.116)	(11.91)
Constant	14.11***	0.159***	12.19***
	(0.000746)	(0.000380)	(0.0391)
Observations	22,541	22,541	22,541
Adjusted R-squared	0.591	0.516	0.707
Robust standard errors in parentheses			
*** p<0.01, ** p<0.05, * p<0.1			

Results and Conclusions

I don't find any significant differential effect from the introduction of the reform on the average contract price per month for a buyer. It means that the buyers didn't start to procure more due to reform. However, what I find is the significant effect of the reform on the number of contracts per month. Number of contracts per month differentially increased by 0.506 due to the reform for the treated group compared to the control group at 0.01 significance level. Is this a tangible increase? Although it may not seem so from the first sight, in reality it is. Procurement contracts are traditionally expensive expenditures and one contract may account for million rubles. Thus, there are not that many contracts for entities per month and differential increase by 0.5 in the number of contracts on a monthly basis is very tangible for the market. What is also important to note, for this coefficient, I obtain quite high adjusted R-squared (0.516) which justifies that my model fits quite well.

Although I obtained a significant estimate for the effect of reform on the number of unique suppliers for each buyer per month, I can't consider this result reliable due to high standard errors. One explanation for this may be that in the data there are quite a lot of missing values for supplier's INN which I use to identify a unique supplier. Apparently, not all buyers and suppliers fill out this in official protocols even though it is a requirement. As a result, there may be simply not enough data on this variable to reliably estimate the effect for the period after reform. One potential solution is expanding the sample as the time will pass or including more regions.

The fact that the average contract sum for the buyer didn't change but the number of contracts increased suggests an interesting conclusion. Apparently, the buyer procures as much as before, but now he splits it into smaller contracts. It may be due to decreased discretionary power and attempts to hide corrupt behavior under smaller deals. The crucial point for the future research would be to evaluate the reason for this change in behavior.

Last but not least, I avoided addressing the endogenous entry in this paper. Due to the fact that registration on UIS was required to procure anything at all, I wasn't

considered with endogeneity arising from the choice of purchase method. However, buyers themselves decided how many platforms they wanted to use before the reform. This way they selected the control and treatment group by themselves. That is a common problem which is hard to avoid in natural experiments in procurement. Usually, models are extended to hypothetical situations to evaluate for potential effect from such endogeneity (see, for example, Best, Hjort, and Szakonyi (2017)). I do not do this in my paper and leave it for future research.

Appendix

The Python code for reproduction of collecting and modifying dataset can be accessed by the following link: pilipentseva/termpaper: Econometrics 2 term paper (github.com)

Literature review:

1. Coviello D., Guglielmo A., and Spagnolo G. (2018). The effect of discretion on procurement performance. Management Science 64:2, 715-738
2. Szucs, F. (2017). Discretion and corruption in public procurement. Job Market Paper.
3. Best, M., Hjort J., and Szakonyi D. (2017). Individuals and organizations as sources of state effectiveness, and consequences for policy design. Retrieved from:https://www.nber.org/papers/w23350