IMPERFECT FORMAL CONTRACT ENFORCEMENT: THE CASE OF RUSSIAN PUBLIC PROCUREMENT[1]

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ABSTRACT. The Russian public procurement law places a number of restrictions on procurement officials' authority. We consider the implications of these restrictions and imperfect formal contract enforcement on the Russian public procurement system. Under current Russian legislation, the procurers' choice in most cases is limited to the first price open-bid or closed-bid auctions; to fixed price contracts; and to legalistic formal contract enforcement. In this paper we present a theoretical model of a sealed bid first price auction that reflects these restrictions. Our model implies that the procurers often may reach an efficient result of the competitive procedure only by breaking the restrictions imposed upon them by law, either by eliminating the suppliers with the low bids or using additional information about the supplier's type in the bid assessment process. We also provide the intuition behind this result in the survey data reflecting Russian public procurement professionals' views on the problem.

INTRODUCTION

The Russian public procurement law (FZ №94) was introduced in July 2005 and became operative in January 2006. The introduction of this law was aimed at several objectives. First of all it had to hinder corruption in public procurement. With this objective in mind the law severely limited procurement officials' authority in the choice of competitive procedure. Although the current law doesn't directly prohibit the use of quality parameters for the assessment of bids, it promotes first price auction as a main tool for public procurement. The list of goods, works and services that should be procured through the first price auction is set by Government Executive Order № 236-p and includes, among others, such complex goods and services as medical equipment, construction works or financial services. For the goods, works and services, not included in the "auction list", such as R&D activity, creative services and so forth, the weight of quality measurements is positive but severely restricted.

The law was also targeted at promoting competition and efficient spending of public funds. It set the new requirements for information

transparency to ensure equal access to information for all potential suppliers. It also prohibited the use of prequalification procedures or any pre-procedural requirements other than financial stability and lack of tax debts.

Together with the set of pre-procedural and procedural restrictions, the new law introduced the set of authorized contract enforcement strategies. Three types of enforcement can be used. First of all, there exists a reputational mechanism of "Official List of Dishonest Suppliers". The procurer can ban the potential supplier from the competitive procedure if the supplier's name is found on this list. Second type of enforcement strategy, administrative enforcement, allows a victim, either a procurer or a supplier, to file a complaint to the Federal Antitrust Service. Finally, the third enforcement strategy available is legalistic enforcement bringing the case of a breached public contract to the local Arbitrazh court. The proposed set of contract enforcement strategies, in our view, is imperfect. The procurer is not obliged either to add a supplier to the "Official List of Dishonest Suppliers" if a breach of a contract had happened, or to ban the supplier from the list from future procedures. At the same time the trust in administrative and legislative systems is low, both between the procurers and the suppliers.

The combination of the severe restrictions of the procurer's authority and imperfect contract enforcement, in our view, should generate frequent breaches of contracts and strong incentives for introducing an alternative informal contract enforcement mechanism.

In order to asses the risks of facing a breached public contract and the incentives for informal contract enforcement strategies implementation, we provide a game-theoretic model of a restricted procurement procedure with imperfect formal contract enforcement. We show that in some cases the formal contract enforcement system would not be used by a law-obedient procurer even when the contract is breached. Moreover, some of the suppliers would enter the competitive procedure without any intentions to execute the contract at hand.

This paper is organized as follows. The next section presents the results of the survey data supporting our general view on the contract enforcement problems in the Russian public procurement system. Section three presents a brief overview of the literature concerning the contract enforcement problems in auctions and public procurement. Section four presents our model, and section five is the conclusion

SURVEY DATA

In order to present an informal view of the state of contract enforcement system in Russian public procurement, we provide in this section a brief discussion of the results of a survey of Russian public procurement professionals conducted in May 2009.[2] We've asked our respondents to emphasize the main problems for both procurers and suppliers at different stages of the procurement process. The results of the survey are discussed at length in the paper by Balsevich and Podkolzina (2009). Here we present the results relative to contract enforcement and quality control practices in Russia. Although the results of this survey should be regarded as anecdotal evidence rather then a sound statistical proof of our hypothesis, they let us summarize the experience of procurement experts and align their view of the Russian system with our theoretical hypothesis.

First of all, our respondents acknowledge the existence of the contract enforcement problem. Most of them mention that as a result of public procurement procedure, they often receive a good, work or service of insufficient quality. In particular, 30.9% consider receiving goods that don't meet official technical requirements a serious problem, and 81.4% consider receiving goods with "bad" quality that nevertheless meets official requirements. The latter result, in our point of view, implies that either the procurers are not able to form a distinct official proposal that would adequately reflect desired quality of the procured good, work or service, or the demands for writing such a proposal are beyond the capabilities of an average procurer. We would not account for this problem in our modeling but that can be one of the questions of our future research.

We've also asked our respondents what they do if the supplier breaches the contract, and what could be additional, ideal, measures to reduce the risks of receiving a good, work or service of insufficient quality. When a good, work or service of insufficient quality is received, most procurers prefer to use direct negotiation with the supplier instead of going to court (46.5% vs. 8.8%) although the current public procurement law doesn't cover the negotiation process. This result correlates with our assumptions of an imperfect and untrustworthy formal contract enforcement system.

Among other things they look out for "one-day-firms" that take part in the competitive procedure and then disappear, executing only a part of their contract obligations (21.3%), and firms that can threaten to derail the competitive procedure by administrative and legal means (29.4%). Procurers also fear facing an under-qualified winning bidder (46.3%), and, finally, dealing with firms that would subcontract the work or service at hand to some unknown suppliers (49%). We have learned that, to reduce the formentioned risks,

procurers tend to add inappropriate points to the official list of "technical requirements" in order to screen the suppliers that they don't know. For example, in private interviews they mentioned adding absurd deadlines for delivery of service (2 days on a full audit service), requesting documentation that should be booked in advance (extract from one of state registries) and so forth. Yet they care about the risk that may arise on the other side too and are ready for sharing the future risks: of the respondents, 33.9% realize that facing absurd requirements is a serious problem for the suppliers; 66.1% wish that they could use contracts with bounded renegotiation possibilities instead of rigid fixed-price contracts in order to be able to adjust to the rapidly changing market environment.

To ensure sufficient quality procurement, our respondents would like to add qualification (competency – 48.9%, and sufficient quality of equipment – 47.1%) and reputation (in the public sector – 50%, and overall market reputation – 47.6%) to the existing list of mandatory requirements for participation in public procurement procedures. The extensive interviews confirm that most of the procurers pay attention to the information on a supplier's qualifications and reputation when assessing bids, and try to ban the potential suppliers with a bad reputation from the competitive procedure, even though these requirements can not be listed in the official call for bids.

Our respondents also emphasized the importance of considering contract enforcement risks at the earlier, pre-competitive stages, such as in the construction of a contract, procurement budget planning and so forth, although these pre-procedural actions are not directly regulated by the current Russian public procurement law. For example, 85.5% of those surveyed mentioned that the preparation of call for bids documentation should account for possibilities of breach of the contract, while only 34.5% mention the importance of attracting additional suppliers at this stage of the procurement process.

To sum up, we may say that contract enforcement is indeed an important issue for Russian public procurers. They consider quality of goods, works and services received through competitive procedures an important issue. Although the public procurement law covers extensively only legalistic enforcement, they prefer informal contract enforcement strategies such as direct negotiations and unofficial pre-screening of suppliers.

LITERATURE OVERVIEW

The importance of post-contract relationships in designing the optimal contract and awarding mechanisms is widely acknowledged in works both on auction theory and public procurement theory.

McAfee and McMillan (1986) build a game-theoretic model of bidding for contracts in the presence of the risk of moral hazard. They show that in this case the optimal contract should take a linear form depending on the supplier's bid and his realized costs of executing the contract, and derive the optimal form of the contract for both risk-neutral and risk-averse suppliers. Even though the authors account for possible risks of both contracting parties, they implicitly assume that the contract can be perfectly enforced.

Spulber (1990) notes that perfect contract enforcement is not always the case, and when the firms that take part in the auction are aware of the imperfections of enforcement system they may breach the contract if the realization of their costs is too high. He demonstrates that common auction design can be considered optimal, i.e. reveal the true costs of potential contractors, only if the promises they make through the auction are truly binding. Spulber argues that when the perceived risks for the future are high and the contractual terms are not fully binding, i.e. there is no perfect contract enforcement, the firms tend to lower their bids and breach the contract in cases of high "cost overruns". However, Spulber doesn't emphasize the features of enforcement mechanisms that may lead to imperfect enforcement.

The "imperfections" of the contract enforcement system can be modeled in several ways. For example, Anderson and Young (2002) assume that the court enforces only a certain proportion of breached contracts. If the contract is left unenforced after court, the victim might either renegotiate, return to the home market or enter the spot market. The authors show that in the case of imperfect contract enforcement modeled this way there may exist multiple market equlibria. These results correspond to the case of a non-government market and don't hold for the case of public procurement, since the procurer can not get the good, work or service desired at a spot market, and often also can not renegotiate the contract.

Doni (2006) models imperfect contract enforcement for public procurement contracts and suggests that in the case of imperfect contract enforcement it is impossible to design a punishment for breaching that would be equal to or greater than the expected damage for the procurer. When the two-dimensional scoring auction is used to choose a supplier, the suppliers perceive the weaknesses of enforcement mechanisms and tend to "promise" high quality levels that they are not going to fulfill.

The model we present in the next section, like that of Doni (2006) describes the public procurement auction with imperfect contract enforcement. We modified some of his assumptions to fit the restrictions of the Russian public procurement system. First, we suppose that the procurer can only set a minimum quality threshold in the contract and then run a first price auction. As any disturbances in a contract form are prohibited by Russian public procurement law – we're not looking for the optimal contract form that would prevent the parties from going to court. Instead, we introduce the imperfect enforcement court stage that enforces a contract only in a certain proportion of cases, as proposed in Anderson and Young (2002). In this case, even if the executed quality is lower than the threshold, it may be unverifiable and unenforceable by the court. We describe a formal setup for this model below.

THE MODEL

Model Setup

There are three types of agents in the model: the procurer, the suppliers and the court. We assume that the procurer is a benevolent agent and is interested in providing a good of sufficient quality, yet is restricted to a price-only procedure by law. The quality of the good of interest can be measured by a continuous variable Q. The utility $u(Q)$ that the procurer gets from receiving a good of certain quality is negative for any quality lower than the minimum acceptable quality level $\underline{Q}$: $u(Q) < 0$, $\forall Q < \underline{Q}$. Although we are aware of the complications of reflecting the actual level of desired quality in the official documentation, we assume that the procurer can state $\underline{Q}$ as a minimum requirement for quality in the call for bids at no additional cost. If the good of insufficient quality $Q < \underline{Q}$ is received, the contract is considered breached and the procurer may appeal to court. Yet, if the procurer takes the case to court, the procurer bears the legislative cost L^G.

The firms in the market are maximizing their expected profits and can be characterized by two parameters: production costs, c, and legislative costs, L^S. Production costs reflect the firms' relative effectiveness, while legislative costs reflect the possible differences in their judicial experience or relative bargaining power.

The court is a non-strategic agent. If the case is taken to court by the procurer, the contract is enforced only in a certain proportion of cases $\mu < 1$. This parameter may be viewed not only as a proportion of contracts enforced in general, but also as a proportion of contracts

enforced by the end of the current budgeting period, as the procurers often treat the cases that stayed in court for too long as lost cases.

The court also collects legislatives fees, L^G and L^S, and ensures that its decision is fulfilled by the parties. In addition to bearing the legislative costs, the losing side pays a fixed fine A to the benefit of the winning side. We assume that if the procurer wins the case, she may cancel the contract and return the good in question to the supplier. On the other hand, is the supplier wins the case, the procurer has to keep and use the good, even if the utility that she gets from its quality is negative.

The procurement process starts when the procurer announces the threshold quality Q. Then all the suppliers in the market can place their bids, P, in a sealed format. The supplier with the lowest bid wins the contract. When the contract is allocated, the winning supplier can choose a quality of the good. If the executed quality of good is insufficient, the procurer decides whether to appeal the case to court. We solve this game backwards and describe the contract enforcement stage in the next subsection.

Contract Enforcement Stage

In our model the attempt of contract enforcement is a decision made by the procurer. When the contract is executed, the procurer receives a good characterized by its quality Q and the resulting price of the auction stage P. If she decides to keep the case out of court whether because she received a good of sufficient quality or because she has decided so after perceiving the legislative risks, the sides receive the following payments:

$$U^G = u(Q) - P,$$
$$U^S = P - cQ,$$

Where:

U^G is the procurer's "profit",

$u(\cdot)$ is the procurer's utility from quality, with $u'(\cdot) > 0, u''(\cdot) \leq 0$, and

$u(Q) < 0 \quad \forall Q < \underline{Q}$, U^S is the supplier's profit, and c is the supplier's cost of producing a unit of quality.

If the procurer decides to appeal the case to court, the sides receive following expected payments:

$$U^G = \mu(A - L^G) + (1 - \mu)(u(Q) - P - A - L^G),$$
$$U^S = \mu(-cQ - A - L^S) + (1 - \mu)(P - cQ + A - L^S),$$

Where:

μ is the probability of success in formal contract enforcement,

L^G and L^S are respectively the procurer's and the supplier's legislative costs, and

A is the amount of the fine paid by the loosing side in favors of the winning side.

The parties go to court only if the expected payment from contract enforcement is larger than the default payment for the procurer:

$$I_{court} = \begin{cases} 1, & \mu(A - L^G) + (1 - \mu)(u(Q) - P - L^G - A) > u(Q) - P, \\ 0, & otherwise. \end{cases}$$

Which can be reduced to:

$$I_{court} = \begin{cases} 1, & \mu(P - u(Q) + 2A) > A + L^G, \\ 0, & otherwise. \end{cases}$$

The contractor then maximizes his profit taking into account the preferences of the procurer. To do this he compares the expected profit from two problem solutions. He may either target quality level that would keep the procurer out of court:

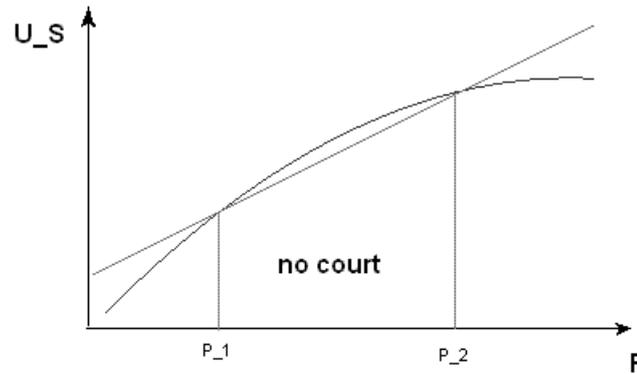$$P - cQ \rightarrow \max_{Q},$$

$$s.t. \, I_{court} = 0,$$

or chose zero quality. In the first case he receives profit equal to

$$U^S = P - cu^{-1}(P + [(2\mu - 1)A - L^G] / \mu).$$

In the second case he receives profit equal to

$$U_{court}{}^S = (1 - \mu)P - L^S + (1 - 2\mu)A.$$

FIGURE 1
The Supplier's Legislative Decision

Taking into account the assumed properties of the procurer's utility function, we can see that, in general, there exists an interval of prices that generate nonzero quality from the supplier (although in some cases the price interval of no appeal incentives for the procurer might consist of one point or vanish).

The interval $[P_1, P_2]$ gets wider when the production cost c gets smaller and legislative cost L^S gets bigger. Inside this interval the supplier chooses to produce and supply a good of quality $Q \neq 0$, while outside the interval, he doesn't produce a good and relies on his legislative powers. This corresponds to the problem of "one-day-firms" that take part in competitive procurement procedures without any intention of executing the contract at hand.

Two extreme cases might be described. In the first case, the supplier's legislative cost is small enough to keep his expected profit of going to court positive. In this case, when $\mu < 1/2 - L^S/2A$, it is always possible for the supplier to reduce the price down to zero at the auction stage and breach the contract afterwards.

In the other extreme case the supplier breaches the contract, but the procurer still does not go to court. The contract price above zero for which a situation like this is possible exists if $\mu < L^G/2A + 1/2$.

Auction Stage

Suppose now that the contract described above is allocated through a sealed bid first price auction with two potential suppliers as participants. When the call for bids is issued, the firms receive information about their production and legislative costs. For the sake

of simplicity, we assume that one of the potential suppliers is characterized by the legislative cost $\overline{L}$, while the other potential supplier is characterized by the legislative cost $\underline{L}$, and $\underline{L} < \overline{L}$. The production costs for both of them are independently drawn realizations of a random variable from a continuous distribution of density $f([\underline{c}, \overline{c}])$.

The expected profit of a potential supplier i can be formalized as follows:

$$
\Pi = \begin{cases}
(1-\mu)P - L^S + (1-2\mu)A, & \text{if } P < P^- \\
& \text{and } P \notin [P_1, P_2]; \\
P - c \cdot u^{-1}(P + [(2\mu - 1A - L^G]/\mu), & \text{if } P < P^-, \\
& \text{and } P \in [P_1, P_2]; \\
0, & \text{otherwise } .
\end{cases}
$$

To calculate his equilibrium bidding strategy, each potential supplier then has to realize the level of his two private values, the value of production and the value of legislative procedure:

$$
v_c: \quad U_{no\_court}^S(v_c) = v_c - c \cdot u^{-1}(v_c + [(2\mu - 1)A - L^G]/\mu) = 0, \text{ and}
$$

$$
v_L: \quad U_{court}^S(v_L) = v_L(1-\mu) - L^S + (1-2\mu)A = 0.
$$

The private value of legislation is a linear function of legislative costs, and can be derived directly: $v_L = [L^S - (1-2\mu)A]/\mu$. As noted above, if $\mu < 1/2 - L^S/2A$ the supplier's private value of legislative procedure is negative. To account for this possibility, we assume that this inequality holds for $L^S = \underline{L}$, so that it is always profitable for the potential supplier with lower legislative costs to produce zero quality at a zero price.

The private value of production is an implicit function of production cost. We assume that the supplier chooses the smallest root of the corresponding equation as his private value of production. Then v_c is a function of c: $v_c = g(c)$, with $g'(c) > 0$.

We denote the equilibrium bidding strategy of the supplier with the type $\overline{L}$: $\beta(\overline{L}, c) = \beta(c)$, and the equilibrium bidding strategy of the supplier with the type $\underline{L}$: $\gamma(\underline{L}, c) = \gamma(c)$. Then, following the standard first price sealed bid auction solution approach, we can

write a system of partially smooth differential equations for $\beta(\overline{L},c)$ and $\gamma(\underline{L},c)$.

The equilibrium bid function of a given supplier would depend both on his own price thresholds $P_1(L,c)$ and $P_2(L,c)$ (as discussed in the previous subsection) and his perceptions of his rival's price threshold realization.

Keeping in mind the properties of the threshold functions $P_1(L,c)$ and $P_2(L,c)$, we may note that if the equilibrium bid of a legalistically-efficient supplier is within the interval $[P_1(\underline{L},c),P_2(\underline{L},c)]$, then the equilibrium strategy of a legalistically-nonefficient supplier also lies within the interval $[P_1(\overline{L},c),P_2(\overline{L},c)]$, so that their equilibrium strategies must coincide and can be derived from a standard auction solution. This happens when the productions costs for the legalistically-efficient firm are sufficiently small. In this case the proposed first price sealed bid auction procurement procedure is efficient in terms of contracted quality control.

When the equilibrium bid of a legalistically-nonefficient supplier lies outside the interval $[P_1(\overline{L},c),P_2(\overline{L},c)]$, the equilibrium bid of a legalistically-efficient supplier also lies outside the interval $[P_1(\underline{L},c),P_2(\underline{L},c)]$. In this case the game takes the form of a discreet auction with the legalistically-efficient supplier winning the contract for the price $v_{\overline{L}}$. This happens when the production costs for the legalistically-nonefficient supplier are sufficiently high. In this case the proposed procedure is never efficient in terms of the contracted quality enforcement, since the contract would always be breached.

When the equilibrium bid lies within the intermediate intervals $(P_1(\overline{L},c),P_1(\underline{L},c))$ or $(P_2(\underline{L},c),P_2(\overline{L},c))$ the equilibrium bidding functions do not coincide and the solution of the differential equations system can not be derived directly. Yet if we suppose that the realization of production costs for the legalistically-efficient supplier are relatively high in comparison with his legalistic costs and legalistic costs of the procurer, for example if:

$$\overline{c} > \frac{[\underline{L} - (1-2\mu)A]/(1-\mu)}{u^{-1}([\mu\underline{L} - (1-\mu)L^G - (1-2\mu)A]/[\mu(1-\mu)])}$$

then the legalistically-efficient supplier would still tend to win and breach the contract.

To sum up, the realization of a low equilibrium bid is always a signal of high risk of contract failure for the procurer. If the procurer

can eliminate the bids lower than $E(P_1(\overline{L},c))$ or even lower than $E(P_2(\overline{L},c))$, she can reduce the risk of contract failure. She can also gain from investing effort in assessing the supplier's production type, or by including quality proposals to the list of requirements of accounting for the supplier's reputation.

CONCLUSION

In this paper we have modeled the outcome of a first price sealed bid procurement auction with several limitations: imperfect contract enforcement, fixed form of a contract and diversity in the potential supplier's legislative abilities. We have shown that in this case the procurer can not reach an efficient outcome unless she has an authority to ban suppliers either on the basis of inadequately low bids, or on the basis of additional information about the type of the supplier. We have also presented the description of a real-life situation in which the formal rules generate the disadvantageous equilibrium for the procurer, and the perception of the situation by the public procurement professionals who are bound to follow these rules. The model we have presented shows that if the procurer follows the rules established by law, she faces the high risk of dealing with a "legally efficient" supplier who does not intend to produce a good of sufficient quality and is able to take advantage of the imperfect formal enforcement system. Real-life procurers are aware of this problem and tend to use additional unofficial mechanisms to screen the suppliers or renegotiate the contract at hand.

This theoretical result also justifies the practice of automatic supplier elimination from the procurement procedure if his bid is lower than a predetermined threshold, used in the countries such as China, Switzerland, or Peru (the full list of such countries is presented, for example, in Decarolis (2009). This practice may be rational for the procurement of goods that are complex and costly in production in the case of imperfect contract enforcement system and costly reputational system.

all the colleagues from the Higher School of Economics who conducted the research project "Functional analysis of the public procurement system in Russia and proposals to improve it" in 2009.

NOTES

1. This paper resulted from the subsequent research projects "Functional analysis of the public procurement system in Russia and proposals to improve it" and "Development of the behavioral strategies of actors in the market of credence goods: an analysis of legal norms and informal practices" financed by the Fundamental research Program of Higher School of Economics in 2009-2010.

2. The survey was conducted by the group of scholars from HSE, including Balaeva O.N., Balsevich A.A., Kuznetsova I.V., Podkolzina E.A., Yakobson L.I., Yakovlev A.A., Yudkevich M.M., as a part of research for "Center for Fundamental Studies", HSE, Moscow. The respondents were participating in the international conference "Public Procurement: Achievements, Technologies and Perspectives", May 22-27 2009, gathering public procurement professionals from Russia, Ukraine, Belarus and Kazakhstan. They surveyed 56 respondents representing Russian procurers and procurement scholars. The survey was processed, conducted and analyzed by a joint group of scholars from Higher School of Economics, Moscow, Russia.

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