Court Efficiency and Procurement Performance*

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Abstract

Disputes over penalties for breaching a contract are often resolved in court. A simple model illustrates how inefficient courts can sway public buyers from enforcing a penalty for late delivery in order to avoid litigation, therefore inducing sellers to delay contract delivery. By using a large dataset on Italian public procurement, we empirically study the effects of court inefficiency on public work performance. We find that where courts are inefficient: i) public works are delivered with longer delays; ii) delays increase for more valuable contracts; iii) contracts are more often awarded to larger suppliers; and iv) a higher share of the payment is postponed after delivery. Other interpretations receive less support in the data.

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Keywords: court efficiency; public procurement; time incentives; performance in contract execution; delay; litigation; enforcement cost.

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1 Introduction

Explicit contracting is the crucial governance instrument for public procurement transactions. Accountability concerns severely limit civil servants' discretion and, with it, the scope for relational contracting (Kelman, 2002; Spagnolo, 2012). Similarly, reputational considerations based on non-verifiable performance are rarely allowed in public procurement.[1] On the other hand, contract enforcement costs can be significant where the law court system is inefficient (Djankov et al., 2003). Contracting parties may then choose ex-post not to exercise their contractual rights to save on enforcement costs. In public procurement, high enforcement costs can imply that buyers are unable to effectively control suppliers' opportunism.

In this paper we study whether suppliers are more prone to opportunistic behavior in public procurement when courts are less efficient. We specifically focus on suppliers' opportunism with regards to delivery delays. As Lewis and Bajari (2011) stressed, delivery time is often an important quality dimension, and delays can have a significant negative impact on end-users. First, to clarify the logic behind our main hypothesis, we develop a simple model in the spirit of the nuisance claim literature (Rosenberg and Shavell, 1985). We characterize the conditions under which in equilibrium suppliers strategically delay delivery when courts are inefficient, predicting that the public buyer will not exercise penalties such as to avoid litigation and, specifically, additional costs. We then use a large dataset on public works collected by the Italian Public Procurement Authority (AVCP) for the years 2000-2006 to empirically investigate this relationship. We merge this dataset with information collected by the Italian Statistics Institute (ISTAT) on the duration of civil trials by province for each year. Our focus is Italy, which represents a unique lab to study the costs of an inefficient judiciary among the developed countries. Italy is a judicial outlier, twice as slow as any other member of the OECD.

[1] This has been particularly true in Europe where reputational considerations have always been seen by legislators as a tool to discriminate against foreign suppliers, e.g., EC Directives 17 and 18, 2004. However, a recent report by the General Accountability Office highlights widespread concerns for the use of reputational indicators in public procurement also in the USA (GAO, 2011, http://www.gao.gov/products/GAO).

Our empirical findings suggest that the delays in executing public works are positively associated with the duration of civil trials, and this effect is statistically significant after including a large number of contract-level, geographical and time controls to our regressions. This association is stronger for larger and more complex projects. These findings are coherent with our simple model. Note that duration of civil trial has to be interpreted considering that it might have ambiguous effects on real outcomes; indeed, the cost related to court inefficiency depends on *"who is suing who"*, i.e., on the plaintiff/defendant relative legal costs in the suit. In the Italian public procurement setting, disputes over enforced penalties are resolved in civil courts where the contractor acts as a plaintiff. The seminal paper by Bajari and Tadelis (2001) highlights that complex contracts - and the asymmetric information advantage belonging to them - are known to favor the plaintiff's action in legal disputes.

Furthermore, we find that where trials take longer, contracts are often awarded to larger suppliers. In line with previous evidence (see Laeven and Woodruff, 2007), an intuitive potential explanation for this result is that larger suppliers have internal legal departments that contain litigation costs. We also find that the size of payment to be paid after delivery is larger where trial duration is longer. This is in line with our hypothesis, which suggests that the public buyer attempts to reduce the incentive to delay by increasing the supplier's financial cost.

Finally, we consider different explanations and extensions of our findings on delivery delays, including corruption and public buyers' fiscal restraints. We find that our results are robust across model specifications and sample selections.

Related literature. Our paper relates to three main strands of economic literature. First, there have recently been works on time incentives in public procurement contracts. In particular, Lewis and Bajari (2011) theoretically and empirically investigate an innovative procurement-awarding design adopted by the California Department of Transportation that provides for explicit time incentives. They estimate the benefit in terms of social welfare of including project completion time in the auction mechanism. D'Alpaos et al.

(2013) find that when penalties for late delivery are included in the contract, the supplier's choice concerning the execution time can be modelled as a real option (i.e., a put option). This choice is affected by the volatility of investment costs and by the enforcement of penalty clauses: the higher the former and the lower the latter, the greater the penalty needed to oblige the suppliers to give up the potential savings they obtain by delaying the delivery of the works. Lewis and Bajari (2014) investigate how higher penalties for delay in delivery can induce higher effort, but can also increase the agent's risk in performing the contract. Using micro-level data on Minnesota highway construction contracts, these authors find evidence of suppliers' ex-post moral hazard in adjusting their effort level during the course of the contract in response to unanticipated productivity shocks. We contribute to this literature by studying the interactions between the penalties for late contract delivery and their enforcement by the local law courts.

Second, there is a strand of empirical literature on contract enforcement costs. Djankov et al. (2003) show the extent to which these costs are linked to court efficiency in various legal systems. Using the length of a trial in civil courts as a measure (among others) of judicial efficiency in 109 countries, they investigate how a law court's efficiency depends on different levels of procedural "formalism". Their empirical findings demonstrate that the level of such formalism is higher in civil than in common law countries, and is typically associated with longer lasting trials, less fair sentences and more corruption. The authors emphasize that inefficient judicial enforcement of contractual clauses often gives rise to opportunistic behavior and settlements. A number of papers evaluate the implication of these findings for economic outcomes. For example, Jappelli et al. (2005) investigate the effect of judicial enforcement on credit markets. Testing their model on panel data from Italian provinces, they find that the duration of civil trials and the stock of pending civil trials per inhabitant are negatively correlated with loans granted to local firms, and positively correlated with credit constraint measures. Chemin (2012) empirically studies the effect of judicial reforms implemented in India in 2002 on small firms' performance, finding that expediting the disposal of civil suits results in fewer breaches of contract, encourages

investments, and facilitates firms' access to finance.[2] We contribute to this literature with empirical evidence on the costs of inefficient courts in terms of delayed execution of public works.

Third, a body of empirical and theoretical literature focuses on the use of relational contracts to escape the adverse effects of weak contracting institutions. Johnson et al. (2002) analyze the role of court efficiency in maintaining trust and reducing transaction costs in private procurement transactions in developing countries. They show that, although the main instruments for governing buyer-supply exchanges are long-term relationships, transaction costs are significantly lower when courts are effective. More recent theoretical papers have also analyzed parties' ex-post decisions on whether or not to enforce previously signed explicit contractual clauses by weighting the costs and benefits of doing so (Chakravarty and MacLeod, 2009; Doornik, 2010; Iossa and Spagnolo, 2011). We contribute to this literature by investigating the possibility that explicit contractual clauses (i.e., penalties for late delivery) are not enforced by public buyers because of the high costs of seeing these clauses disputed in front of inefficient law courts.

Structure of the paper. In Section 2, we briefly present the relevant institutional details of penalties for late delivery in the Italian regulations on public procurement, and a simple model based on the nuisance suits literature showing how agents may interact in such a setting. In Section 3, we describe our dataset, showing the cross-sectional variability (across Italian provinces) of delays in the execution of works, and the cross-sectional and time-related (i.e., within) variability in the average duration of civil trials. Then, in Section 4, we present our estimation strategy and discuss our results. In Section 5, we check whether the duration of trials interacts with the complexity of the contract, and correlates with the size of the winning company and with the contracting authority's (CA) proportion of final payment; we also control for alternative explanations for our results

[2]See also Litschig and Zamboni (2015), who estimate the effect of state judiciary presence on rent extraction (administrative irregularities) by Brazilian local governments; Ponticelli (2015), who empirically assesses the extent to which the effects of a financial reform in Brazil depend on the quality of court enforcement; and Moretti (2014), who, using Italian data, finds that an increase in the availability of credit has a larger effect on firm productivity in provinces with shorter civil trials.

and provide further robustness checks. Section 6 concludes.

2 Equilibrium delay in delivering public procurement

In this section, we first illustrate how time incentives and other terms are regulated in Italian public procurement. Then, we present a simple model describing the equilibrium delay in completing the contracted works when the public buyer has the choice of whether or not to enforce the agreed penalty for late delivery.

2.1 Institutional setting

Until August 2006,[3] contracts for public works in Italy were governed by Law No. 109/94,[4] which was enacted in the early 1990s, immediately after the crushing wave of corruption scandals that wiped out a large part of the Italian political class. This historical context helps us understand why the law is so strict in the use of scoring auctions and negotiations, and in imposing new clauses on price definitions (and revisions).

The contractual terms that suppliers have to comply with in the delivery of public works are specified in the call for tenders. Italian law: i) prescribes time incentive clauses (in the form of payment deductions for late delivery) in all contracts; ii) regulates the lower and upper limit of such penalties, and caps their total amount; and iii) describes the procedures to adopt in case of delays.[5] According to these rules, penalties for late delivery are calculated on a daily basis and must be set within the range of 0.03% to 0.1% per cent of the contract value for each day of this delay, while their total amount may not exceed 10% of the total value.[6] According to Italian law, when the total amount of penalties for

[3]Afterwards, D.Lgs No. 163/2006, which acknowledges the EU Directives 2004/17/EC and 2004/18/EC, was enacted.

[4]Framework Law on Public Works Contracts - a.k.a. "Legge Merloni".

[5]See the General Terms for Procurement of Public Works Contracts, Ministerial Decree No. 145/2000, art. 22, and Presidential Decree No. 554/1999, art. 117; Regulation implementing the framework law on public works No.109/94. Note that these laws do not permit suppliers that delivered late in the past to being blacklisted. The contractual penalties are the only punishment for late delivery.

[6]The legislator considers this 10% as the supplier's (average) profit: thus, the rationale for this time incentive rule is that the CA can make a claim on the supplier's whole profit, but not exceed it. Should the accumulated delay imply damages exceeding that threshold, the CA has to terminate the contract and start a new awarding procedure to select another firm to complete the works (and may also go to court

delay exceeds 10 percent of the contract value, contract resolution is mandatory and the CA can set further legal actions for damages. This value is determined by an engineer employed by the CA that sets the reserve price of the auctions, following a price-list of the standardized costs for each type of work (see Decarolis, 2013, and Coviello and Mariniello, 2014 for details on how CA determines this price). This reserve price is the maximum price the CA is willing to pay for a public work before the auctions takes place.

Enforcement of penalty for late delivery. Although the regulatory environment mentioned above is strict, Italian public procurement law grants public buyers a considerable degree of discretion in exercising their right to enforce penalties for late deliveries.[7] These penalties are enforced in the form of payment deductions and are usually subtracted from the last payment to the contractor. The current procedure establishes that the supplier can always request that penalties not be implemented (or be implemented partially), either because the supplier is not responsible for the delay (i.e. planning errors, adverse weather conditions, contingencies, etc.) or because the fee is "manifestly disproportionate" to the harm done. Thus, if the supplier presents a claim on the enforced penalty, the public buyer should assess it and decide whether to wholly (or partially) accept it or reject it. If the public buyer rejects the supplier's claim, thus confirming the penalty enforcement, the supplier can go to court; this solution is often very time-consuming for both parties due to the typically long duration of civil trials in Italy.

Note that the costs incurred by the supplier and the public buyer from disputing in court may differ substantially. The public buyer's costs are not limited to the resources needed to defeat the claim; litigation in court means that the works remain inaccessible to end users, and the related social welfare loss can affect the public buyer's reputation and political interests. The longer the court proceedings, the greater the delay for citizens and

to claim for the payment of further damages). In this case, the completion of the works will be further delayed as the work at the construction site will have been stopped while the new awarding procedure is implemented.

[7] We believe that in the Italian context this form of discretion need not result in implicit dealings between the two parties as it is limited by law in open competitive auctions. Thus, if implicit dealings exist, we can reasonably assume that are randomly distributed (and captured by the error term in our empirical model specification).

the larger the political cost. Suppliers, on the other hand, can make use of these delays by allocating productive capacity more efficiently.[8] Moreover, their future chances of winning a contract cannot be penalized, because suing is their constitutional right.[9] This asymmetry generates an incentive for public buyers to avoid entering into a dispute with suppliers where the law courts are particularly slow.

The timing of events which generate the supplier's right to a law suit is the following: once the supplier delivers the work with a delay, the public buyer can enforce the penalty by subtracting it from the final payment; if the penalty is enforced, the supplier can request its review and the public buyer should consider it. If the public buyer rejects the supplier's claim, the supplier can sue him. Thus, in this legal framework, the supplier acts as *plaintiff* and the public buyer as *defendant* in the resulting trial.

2.2 A simple model of equilibrium delay in delivery

In the very simple model we present in this section, which recalls the main features of the Italian institutional public procurement setting, we characterize conditions under which - in equilibrium - suppliers strategically delay the delivery of public contracts and public buyers do not exercise penalties.

We investigate a setting where a public buyer, i.e. a contracting authority (CA), entrusts the execution of a contract to a supplier firm (F). The parties sign a contract specifying the work involved, the timing of the execution, the price Π to be paid to the supplier, and the penalty p for each day of delay.

We assume that CA and F are risk neutral. We also assume that F is capacity constrained and derives a positive value from postponing the contract's execution: $V(d)$ is F's benefit

[8] Note that if the firm loses its case against incurring penalties for delays: i) it has to pay the administrative costs of the trial, ii) it has to pay the fine for the days of delay in the execution of works. The latter fine refers to the days of delay prior to the trial (and does not include the delays incurred due to the duration of the trial). The fine, which is good approximation of the social damages caused by the delay, does not cover the social damages caused by postponing the works due to the trial.

[9] Depending on the court's decision, suppliers could also - partly - recover the enforced penalty. To reduce this strategic use of litigation, an Italian large publicly owned firm, *Gruppo Ferrovie dello Stato*, has just introduced a scoring system that penalizes suppliers with high past litigation records, and rewards past performance (*Sole 24 Ore, October 14, 2015).*

from the d days of delay in delivery of the works. Delaying the contract's execution generates a damage $D(d)$ for the CA, with $D(d) > V(d)$. We shall also make the following assumptions of regularity of the functions $V(d)$ and $D(d)$: $V(0) = 0$, $D(0) = 0$; $V(d)$ and $D(d)$ are continuous and strictly concave.

The timing of the game and the actions available to players are described by the game tree in Figure 1. Payment occurs once the works are complete and eventual penalties are deducted at that time. In case F delays the contract's delivery, CA might enforce the corresponding penalty pd and, if it does, F can file a claim in the local court to recover such a penalty. Filing a claim carries a small administrative sunk cost for F, $k_F \geq 0$, that we assume to be given and known to both the parties involved.

If F files a claim and CA withdraws, CA will be damaged by F's delay, losing $D(d)$, and will not pocket the penalty. If F files a claim and CA does not withdraw, the case goes to trial, F expects to recover αpd, where $\alpha \in (0, 1/2)$ is the probability that the court decides in favour of F, thereby making a *type 1 error* - i.e. a *false positive*. Indeed, since we are dealing with strategic delays, F can only recover an enforced penalty by inducing the court to make a *type 1 error*.[10] If CA defends itself in court, it will incur a cost, $R_{CA} \geq 0$, that we assume to be given and known to both parties, and will get the enforced penalty minus the fraction $(1-\alpha)pd$ that F will recover according to the judge's assessment. If CA goes to court, F will face the legal costs of litigation, $R_F \geq 0$, and will expect to partially recover the penalty, αpd, depending on the judge's assessment.[11]

If F does not delay in the delivery of the works, F and CA will have the following payoffs, respectively:

$$(\Pi, b(\Pi)),$$

where Π is the contract's price paid to F, and b is the utility gained by CA from the contract's execution; b is an increasing function of the contract's price Π, and also includes

[10] We thank an anonymous referee for suggesting that we highlight this point. Note that *type 2 error* - i.e. *false negative*- is not present in our setting as F's files a claim in court only if a strategic delay took place.

[11] Note that higher value contracts are usually delivered by larger firms: the latter often have more information than the CA on the performed works, and therefore can use this information to influence the judge towards *type 1 error*.

some measure of social welfare for the citizens using the public works in question.[12]

If F delays and CA does not react, their respective payoffs will be:

$$(\Pi + V(d), b(\Pi) - D(d)).$$

If F delays, CA enforces the penalty and F does not file a claim in the local court, the parts' respective payoffs become:

$$(\Pi + V(d) - pd, b(\Pi) - D(d) + pd).$$

If F delays, CA enforces the penalty, F files a claim and CA does not defend itself but rather withdraws, they will respectively achieve:

$$(\Pi + V(d) - k_F, b(\Pi) - D(d)).$$

If F delays, CA enforces the penalty, F files a claim and CA defends itself in court, the respective payoffs will be:

$$(\Pi + V(d) - (1-\alpha)pd - (k_F + R_F), b(\Pi) - D(d) + (1-\alpha)pd - R_{CA}).$$

In this setting, we first investigate the simpler case where F's costs for filing a claim and defending it in court $(k_F + R_F)$ and CA's costs for responding, (R_{CA}), are both fixed, positive and common knowledge, where $R_{CA} > (k_F + R_F)$. We also assume that α, the probability that the judge makes *type 1 error*, is constant. We then extend our results to the cases in which:

i) parties' legal costs are increasing in (γ), the average time of solving a dispute in court, i.e. $R'_{CA}(\gamma) > 0$ and $R'_F(\gamma) > 0$, where $R_{CA}(\gamma) > k_F + R_F(\gamma)$;

ii) the probability of a judge's *type 1 error* increases in the size/complexity of the contract, i.e. $\alpha'(\Pi) > 0$;

iii) the daily penalty p can be chosen in an interval $\underline{p} \leq p \leq \overline{p}$;[13]

[12] Π, the final project payment to F, is a proxy for the size, importance and cost of the project, and for its complexity given that larger projects tend to be more complex. Alternatively, Π could be assumed to indicate the reserve price as determined by the CA's engineers, as that also is a proxy for the value and the complexity of the project.

[13] In the Italian public procurement, $\underline{p}$ and $\overline{p}$ corresponds respectively to 0,03 and 0,1 percent of the contract value.

Equilibrium delay. As highlighted in Rosenberg and Shavell (1985), in a legal dispute, defeating a claim is more costly than making it. This is even more the case for complex procurement contracts (i.e. higher value contracts) where the supplier has more information than the buyer (Bajari and Tadelis, 2001).Such information advantage can be used by the supplier to reinforce the signal in filing the claim in court: "a stronger signal increases the probability that the judge or the jury will favor the fact as represented by its sender" (Cooter and Rubenfeld, 1985, p.1072).

Moreover, in the Italian public procurement setting, litigation in court further delays the citizens' use of the contracted works until the trial is over, and this determines a social welfare loss and a consequent additional cost for CA of disputing enforceable penalties in court: the longer the trial, the higher the related social loss from not accessing the executed public work.[14] These considerations lead us to assume $R_{CA} > k_F + R_F$.

The expectation of large R_{CA} could make it too costly for CA to take F to court, and induce it to not enforce the penalty. Specifically, at node 4 having enforced the penalty, CA will *not* go to court after F files a claim against the penalty whenever

$$b(\Pi) - D(d) \geq b(\Pi) - D(d) + (1-\alpha)pd - R_{CA},$$

$$R_{CA} \geq (1-\alpha)pd, \text{ or } d \leq \frac{R_{CA}}{(1-\alpha)p}. \tag{1}$$

Condition 1 determines a threshold of delay $\tilde{d} = \frac{R_{CA}}{(1-\alpha)p}$ such that CA will *not* go to court as long as $d \leq \tilde{d}$.

If (1) is satisfied, F has opted for a delay d, and CA has enforced the allowable penalty, F expects CA not to fight in court, and will file a claim as long as $k_F < \alpha pd$. If, instead, (1) is not satisfied, F expects CA to go to court at node 4 so that litigation takes place and the relative costs are incurred. Let d' define the optimal choice of d in this case, i.e.

$$d' = \arg\max_d \left\{\Pi + V(d) - (1-\alpha)pd - k_F - R_F\right\}. \tag{2}$$

[14]Consider public works for the construction of a new kindergarden: if these works are executed with delay, and if CA enforces the penalty, F files a claim in the local court and CA will defend itself in court, end users of the kindergarden will only access the service once the dispute has been resolved. This determines a social welfare loss that can further affect the public buyer's reputation and political interests.

We can then state the following.

Proposition 1: *There is a positive number m such that for any $d' \leq \tilde{d} + m$, there is a pure strategy subgame perfect equilibrium of the game in which F chooses $d = \tilde{d}$ and CA does not enforce the penalty.*

Proof of the Proposition in Appendix 1

Proposition 1 indicates that there are reasonable parameter configurations of this simple model in which it is natural to expect that F strategically delays delivery and CA does not enforce the penalty for the delay. This will generally be the case when the cost of litigations for CA are relatively large, undermining the credibility of the threat by CA to litigate a nuisance suit by F aimed at not paying the penalties.

Crucial thresholds for this equilibrium are $\tilde{d} = \frac{R_{CA}}{(1-\alpha)p}$ and $d > \frac{k_F}{p}$, hence we can already see by inspection that this outcome will be more common and equilibrium delays will be larger the higher $CA's$ legal costs R_{CA}, the lower penalties for delay p, the higher courts' precision $(1 - \alpha)$, and the lower the fixed cost for F of filing a nuisance suit.

This simple result can now be extended to consider other important aspects of reality and get additional empirical predictions that can be studied with our data.

Court delay, project size and endogenous penalties. Legal costs are obviously affected by the average duration of the trial, γ, conducted by the local law courts, i.e. we should take into account that $R_{CA}(\gamma)$ and $R_F(\gamma)$, with $R'_{CA}(\gamma)$,$R'_F(\gamma) > 0$. There is considerable empirical evidence that judicial systems characterized by lengthy trials tend to be more costly: Palumbo et al. (2013), investigating different judicial systems and using OECD and EU data, highlighted the positive correlation between the length of the trial and the litigants' cost for the trial, with Italy being in the worst position. Although these empirical findings are for national judicial systems, the same effects could be inferred for courts at the provincial level: lengthy local trials result in higher legal costs. Note that in Italian public procurement, where penalties for delayed delivery are disputed in court, longer trials further delay the end users' access to the public work, increasing the related social welfare loss.

Two other characteristics that we temporarily ignored in our simple model are much more complex and worth considering. The first is that, as mentioned by Bajari and Tadelis (2001) and broadly acknowledged in the procurement literature, larger value contracts tend to be more complex, or complex contracts are ceteris paribus more costly to perform. The second is that larger, more complex projects tend to increase the importance of the informational advantage of F relative to the court. Accordingly, the larger in value/more complex the project, the higher F's ability to dispute penalties for delay in court, i.e. to induce the judge in *type 1 error*. The fraction α of the reduction in penalty F expects will increase with Π, i.e. $\alpha(\Pi)$, with $\alpha'(\Pi) > 0$. We can then state the following corollary.

Corollary 1. *When* $R'_{CA}(\gamma), R'_F(\gamma), \alpha'(\Pi) > 0$, *the equilibrium delay* $\tilde{d}$ *increasing in* γ *and* Π. *Moreover, the effects of* γ *and* Π *on* $\tilde{d}$ *reinforce each other.*
Proof of the Corollary 1 in Appendix 1.

To endogenize the penalty p we need to add a decision stage for CA at the beginning of the game. We can then state the following corollary.

Corollary 2. *Suppose* CA *can choose* p *from a finite interval. Then it will always choose the highest possible* p, *as higher* p *induce both lower and less frequent delays.*
Proof of the Corollary 2 in Appendix 1.

3 The data

We merge a dataset on procurement auctions administered by each Italian public administration between 2000 and 2006 with a database containing the duration of judicial trials in Italy. The former database is provided by the Authority for Vigilance over Contracts for Public Works, Services and Supplies (AVCP), which collects data on all procurement auctions for public works with a starting value greater or equal to 150,000 euros. The latter database is collected by the Italian National Statistics Institute (ISTAT).
Our procurement data includes information on several dimensions of each procurement

contract, such as the auction's awarding mechanism, the reserve price and the winning rebate (i.e., the percentage discount from the reserve price offered by the auction's winning firm), the number of bidders, the expected and actual duration of the works, the main category of works involved, and the location and type of *CA* awarding the contract. For a subsample of auctions, we also observe the business identity of the winning *F* and the proportion of the final payment (on completion) relative to the total amount that the *CA* pays the *F*.

Our sample consists of contracts awarded in 83 provinces.[15] As shown in Table 1, most of the contracts were awarded by means of an open auction to all-comers (about 75.8%), and about 70% of the CAs involved were municipal or provincial authorities.[16] The contracts relate to projects for different types of works, but the majority concern the construction of buildings (about 32.3%) or roads and bridges (about 30.4%). Table 1 shows that 75% of our works have a value below 550,000 euros. As discussed in Bajari and Tadelis (2006), small contracts are easy to design and involve little uncertainty on what needs to be produced.

We define delay in completion of the contracted work *d*, in the simple model in Section 2.2, as the difference between the expected delivery (due) date and the actual completion of the contracted work; the former is usually calculated by the *CA*'s engineers and stated in the contract, while the latter is recorded once the works have been delivered. In our

[15]We consider provinces from 15 of the 20 Italian regions because the others (Val D'Aosta, Trentino Alto-Adige, Friuli Venezia-Giulia, Sicily and Sardinia) enjoy a greater degree of legislative autonomy and have rather different rules for public procurement contracts.

[16] The Italian legislation on public procurement indicates three main types of awarding procedures: open and restricted procedures, and negotiations. In our sample, about 75.8% of the contracts were awarded through open procedures, about 9.7% through negotiations, and the remaining 14.5% through restricted (or simplified restricted) procedures. In our dataset, differently from Decarolis and Palumbo (2015), design and build contracts are excluded because we do not have data on this type of contracts. The choice for a particular awarding procedure depends on the reserve price of the auction and other technical aspects; the standard approach is the open procedure, based on first price or average bid auctions. As argued in Decarolis (2014), the auction mechanisms "are identical in everything except for the exact way the winner is determined". The mathematical algorithm for determining the winner in average bid auctions is illustrated in Decarolis (2014). This auction mechanism is somewhat unconventional, as it has some "beauty contest" features whereby the highest bidder does not necessarily win. The specific features of the mechanism raise the theoretical possibility that increased participation need not result in greater competition (Albano et al. 2006, and Decarolis, 2014).

dataset, the delays in completion averaged around 153 days, with a maximum of 1,578 days. Some works were completed on time, or even in advance (this was true for about 6.72% and 8.74% of the sample, respectively), but about 84.54% of the works were delivered late.[17] Figure 2 shows provincial variations in the average days of delay in the completion of public works. A higher concentration of delays is apparent in Central and Southern Italy, but the picture varies considerably among the Northern Italian provinces too.

Our measure of the duration of trials, γ in the model in Section 2.2, is calculated by ISTAT every year for each province. This estimate is obtained for each court as the average time taken to arrive at a sentence (weighted over the number of pending cases); the resulting figure was averaged if a province had more than one law court.[18] We focus on first instance civil trials (i.e., "procedimento civile di cognizione ordinaria di primo grado") by province and by year from 2000 to 2006. We consider local civil courts because these are the courts where disputes over the execution of a public procurement contract should be resolved.[19]

The average duration of a first instance civil trial in Italy in the years 2000 to 2006 was 911 days, with a minimum of 205 days and a maximum of 2,221 (for our sample, the mean was 889, and the standard deviation was of about 294 days). The figures show variations across the provinces (see Figure 3) and over time (see Figure 4).[20] These cross-sectional and over-time variations (i.e., within variation) lie at the heart of our strategy to identify

[17]Similar empirical evidence on the delay in delivery of Italian public procurement contracts has been also found by Decarolis and Palumbo (2011), Coviello and Gagliarducci (2010), Coviello and Mariniello (2014), Decarolis (2013), D'Alpaos et al. (2013), Bucciol et al. (2013).

[18]This measure has been adopted in other studies on Italy; see, for instance, Jappelli et al. (2005) on the relationship between the duration of trials and banking market performance in the Italian provinces. In D'Alpaos et al. (2013), the duration of trials was related to performance in Italian public procurement contracts; however, their work differs from ours in the research question, in the richness of the dataset and in the model specifications.

[19]On the other hand, disputes concerning the awarding phase of public procurement contracts have to be handled by the local administrative tribunals.

[20] Figure 4 shows an inversion in the trend for the South, which can be partially explained by the court of Lecce. In this court, the average duration of trials passed from 1017 days in 2005 to 1899 days in 2006. This court, therefore, may have influenced the average duration of trials in the South in 2006. Our analysis suggests that other courts in the South have a similar "jump". As a robustness check we have repeated our main analysis by removing from our sample the courts in the South of Italy. Table A19 in the Online Appendix shows that our results are robust to exclusion of these courts.

the relationship between the duration of trials and the delay in the completion of public works within the framework of a fixed-effect model.[21]

Figures 2 and 3 suggest that there is a positive correlation between the average delay in the completion of public works and the average duration of trials across Italian provinces (during our sample period). This is confirmed in the scatter plot in Figure 5, which shows a positive correlation when we consider the province-year averages.

4 Empirical analysis

We want to test whether the duration of trials affects the delay in the completion of public works. We consider project-level data, controlling for the characteristics of the project and the *CA*, and estimating different versions of the following specification:

$$Delay_{ipt} = \alpha + \beta_1 J_{pt} + \beta_2 X_i + \beta_3 Q_{pt} + \beta_4 T_t + \beta_5 P_p + \epsilon_{ipt} \tag{3}$$

where J is the value of the average duration of trials in the province p taken at the beginning of works (year t) for each project. X is a set of variables including: i) the characteristics of the project, e.g., the reserve price and the main category of works (which are proxies for the project's size or complexity, and the type of work involved); ii) the characteristics of the auction (e.g., the type of participation in the auction); iii) the type of *CA*. Q contains province population (time-varying), and T represents year dummy variables. Our empirical strategy relies on the within-province variation in the duration of trials after controlling for province fixed effects (P). In alternative specifications, we experiment with the inclusion of *CA* fixed effects.[22]

[21] Note that in 2012, a reform of the Italian judicial system has reduced the number of courts (Leg. Decrees 155 and 156/2012). We cannot exploit this change that has likely affected the average duration of trials in the remaining courts as this reform is well outside the period of our analysis (2000-2006).

[22] One limitation of our data is that it does not include the address of the winning firm and therefore we cannot compute the exact distance with courts. As discussed in Litschig and Zamboni (2015), distance from the court can be an issue in larger countries, such as Brazil. This problem is somewhat smaller in Italy where there is at least one court within any given 1800km squared region (that is, about an area of 43 x 43 km) and the density of courts is rather uniform across the country. We consider this value a rather small distance to argue that the distances between the CAs and the courts might matter in terms of costs. Furthermore, we also believe that the distance between the firm's headquarter location and the courts do not play a relevant role. In fact, firms operating in different regions must engage local lawyers to defend themselves in the local courts.

4.1 Main results

Table 2 reports estimates on the relationship between the delay in the delivery of contracted works and the average duration of trials in the law courts in the province in which the *CA* operates. In columns 1 to 4, we control for province fixed effects, in columns 5 to 8 for *CA* fixed effects. The latter model (i.e., after including *CA* fixed effects) seems to fit the data better, suggesting that variability in the completion time of works correlates strongly with local factors that are not observable to the econometrician. These might include the personal attitudes of *CA* managers (or other *CA* staff) to the more or less strict enforcement of the penalties for a contract, all else being equal.

In columns 1, 3, 5 and 7 in Table 2, we present linear models for the duration of trials, which turn out to be not statistically significant. In columns 2, 4, 6 and 8, we add the quadratic term in the duration of trials and the effect of court delay is statistically significant. This suggests that the effect of the duration of trials on delay in the delivery of works is positive and decreasing. The non-linear effect indicates that, for extremely lengthy trials, the extra time they take does not change the suppliers' perception of the law court's inefficiency as much as when the duration is in the lower ranges. Indeed, for the firm the very large inefficiency of the court results in a very long time to - partially - recover the penalty; this can make the option to delay and file a claim - once the penalty has been enforced - less attractive to the firm. Our estimates suggest that one standard deviation increase in the duration of trials (computed at average duration of trials) is associated with an increase of about 3% in the province fixed-effect models and 4.8% in the *CA* fixed-effect models of delays in completion of works.[23]

Our empirical model also includes the reserve price of the auctions expressed in 100,000 euros (year 2000 equivalents), which corresponds to Π in the model illustrated in Section 2.2 and is a proxy of the complexity and/or size of the works involved (see Bajari et al. 2009

[23]This percentage is computed as follows: *Percentage increase over the mean value* = $[(\beta_{Duration} * SD_{Duration} + 2 * \beta_{Duration^2} * SD_{Duration} * MEAN_{Duration})/MEAN_{Delay}] * 100$= [7.417 / 153.3]*100= 4.84. Note that, based on results in Table 2 column 8, one standard deviation increase in the duration of trials, computed at 25^{th} (75^{th}) percentile of its distribution, induces an increase relative to the mean value of delays in the completion of works of about 8% (2.5%).

for a discussion of the role of the reserve price in the auctions). We introduce the reserve price either as a single term (columns 1, 2, 5 and 6), or as a single and as a squared term (columns 3, 4, 7 and 8) to take possible non-linear effects into account. The reserve price turns out to be positively and significantly correlated with the delay in the completion of the works. An increase of one standard deviation in the reserve price (about 1.1 million euros) is associated with an increase of about 20% in the average delay in completing the works (or about 1.8% if we consider a 100,000 euro increase in the reserve price). When we introduce the squared term of the reserve price as well, our results show that the effect on delays is still positive and statistically significant, but its marginal effect is lower when the reserve price is higher. A positive, declining relationship between the complexity of a project and the delays in the delivery of the works can be explained by the supplier's evaluation of the benefit it derives from delaying the works: more complex projects are more uncertain so that delays caused by unforeseen factors may arise; in addition, we can interpret this result as deriving from the fact that for a more complex project, a supplier has more resources to transfer from this project to other projects, so its benefits increase with the size of the resources it has to mobilize. However, the supplier firm does not necessarily obtain extra benefits from increasingly larger projects, because transferring a large amount of resources can become more costly (i.e., because the supplier may not have other similarly complex projects underway where such large resources might be usefully exploited).

5 Extensions and robustness checks

In this section, we investigate a possible mechanism behind the effects of an inefficient law court on performance in public works contracts, consider alternative explanations of our findings, and perform several robustness checks. In particular, we check whether the duration of the trial interacts with the complexity of the contract (Section 5.1), and whether it correlates with the type of winning company, F, adjudicating the contract (Section 5.2), and with the proportion of the CA's final payment (Section 5.3). We then

test whether the relationship between inefficient enforcement by local courts and late delivery of contracted works is compatible with other explanations, such as corruption or the *CA*'s financial constraints (Section 5.4). Finally, we present further robustness checks (Section 5.5).

Each introduced change in the estimated empirical model or analyzed sample is estimated using different model specifications and a set of fixed effects. In Tables 3 and 4 we only report the main results, whereas we report the full set of results in the Online Appendix.

5.1 Contract complexity and the duration of trials

We first check whether there is any heterogeneous effect of the duration of trials for different levels of complexity of a project. According to our model, if F takes advantage of such features, we would expect to see larger delays for more complex projects completed in provinces where the average duration of trials is longer. We thus add the interaction term between the reserve price for the contract and the duration of trials to our main empirical specification. Table 3, column 1, shows that the greater the complexity of the works involved in a project, the greater the effect of the duration of trials.[24]

5.2 Winning firms' characteristics and the duration of trials

We test here whether law court inefficiency systematically selects different types of winning supplier firms. Longer trials imply an increase in litigation costs (i.e., if an F delays and the CA enforces the penalty, and the F takes the CA to the court). These litigation costs will be higher for smaller Fs than for larger enterprises: the latter typically have their own legal offices that make the burden of legal costs easier to sustain. We thus expect to see that in provinces where trials last longer, large Fs are more likely to bid for contracts than small Fs, and consequently have higher chances of winning the contracts.

We focus on proxies for the size of F. In particular, we consider two types of business entities: one-man businesses as a proxy for micro(small)-sized Fs, and joint-stock companies

[24]See Table A2 in the Online Appendix for the full set of results.

(JSCs) as a proxy for large Fs.[25] We refer only to these two business entities because the correlation with the supplier's size is less clear for other types of suppliers, and because JSCs and one-man businesses had much the same probability of winning a contract in the period observed: according to our dataset, they won about 11.4% and 10.7% of the contracts, respectively.[26]

The results of our estimations in columns 2 and 3 of Table 3 show that JSCs have a higher likelihood of winning contracts in provinces where trials in law courts last longer, whereas the effects are not significant for one-man business.[27] In particular, JSCs have 1.5 percentage points higher predicted probability of winning in provinces at the 75^th percentile of the distribution of the duration of trails than in provinces the 25^th percentile of the same distribution (i.e., about 15% higher than the mean probability of winning).

5.3 Final payments and duration of trials

We next test whether or not the CA strategically uses the amount of the final payment as a proportion of the total amount paid to the F for the execution of the works. In the subsample of contracts for which we observe this information, we see that this proportion averages around 6% of the total value of the contract, with a standard deviation of about 11%. According to the Italian regulations on procurement, the final balance is only payable to the F after the contract has been completed and all necessary tests have been conducted to confirm the proper execution of the works. This final payment should not exceed 10% of the total outlay. In our setting, CAs can use this final payment to deter Fs from delaying

[25] One alternative is to use the AIDA Bureau Van Dijk dataset, which contains information on the balance sheets and characteristics of Italian corporations. This dataset, however, has the main limitation that does not cover the whole sample of winning firms for public works: in AIDA, most of the small companies are not reported. A similar strategy is described in Moretti and Valbonesi (2015) that also use the types of business entity as a proxy for the size of the firms participating to the Italian procurement market.

[26] As for the other types of business entities, we see that limited partnerships (SAS) win about 6% of the contracts, general partnerships (SNC) about 9%, limited-liability companies (SRL) about 49%, and the remaining of contracts are won by temporary consortia and cooperative firms.

[27] See Tables A3 and A4 in the Online Appendix for the full set of results. Note that we cannot fully disentangle whether this result is driven by a change of bidding strategy (holding fixed the set of bidders, see Table A14 in the Online Appendix) or from different types of bidders entering the auctions. This is because we do not have information on the name of each bidder participating in the auction.

the execution of works, adopting larger final payments as a "stick" where any external enforcement by the local court is a weak threat.

Table 3, column 4, shows the estimated positive (and statistically significant) correlation between the duration of trials and the proportion of the final payment for each contract, i.e., that *CA*s tend to make up for weak external enforcement (due to long and costly civil trials) by means of an instrument of their own (proportionally larger final payments) to deter *F*s from delaying.[28]

5.4 Alternative explanations for the late delivery of works

We now explore whether the duration of trials is related to other factors such as corruption and *CA's* financial constraints that might contribute to explaining our empirical findings.

Corruption. A possible concern with our findings stems from the fact that the duration of trials probably correlates with an overall poor quality of the local socio-institutional environment. In particular, the positive relationship between the duration of trials and the late delivery of public works might be affected by other factors, such as corruption. In turn, corruption might be correlated with courts having an overload of cases and with the time it takes to arrive at a sentence (i.e., to enforce the law).

To test this alternative hypothesis we also include as a regressor the proxy for corruption in public procurement proposed by Golden and Picci (2005). This indicator is at the provincial level for Italy and measures the extent of corruption in public works; it is constructed from the difference between the monetary amount actually spent in completing public infrastructure in a given province and the estimated monetary amount of the existing physical infrastructure. Golden and Picci show that a higher difference between the two coincides with more money being wasted to corruption. Since this indicator does not vary over time,[29] we introduce it in our model through an interaction with the vari-

[28] See Table A5 in the Online Appendix for the full set of results. Note that a proportionally larger final payment may also contribute to fewer small *F*s bidding for and winning contracts in provinces where trials take longer (because those *F*s typically have a tighter budget).

[29] Golden and Picci (2005) do not offer a time-varying variable, but it would seem reasonable to adopt such an indicator in our analysis because we focus on a timeline of six years, and corruption - like social capital - is typically a slow-moving factor.

able measuring the average duration of trials. Table 3, column 5, shows that the effect of the duration of trials on the late delivery of public works changes very little when the corruption indicator is included in the model.[30]

Municipalities: Financial constraints and electoral cycle. Another possible explanation for the late delivery of public works relates to some sort of exchange between the contracting parties. Due to budget constraints, the *CA* might approve a *F*'s delays in the completion of works (i.e., the *CA* waives enforcing a penalty in exchange for delayed payments), and this benefits the *F*. In a recent paper, Grembi et al. (2015) analyzed the effect of an unexpected relaxation of the municipal authorities' budgetary constraints on the outcome of their policies; they found that this coincided with higher deficits (mainly due to lower revenues). We follow Grembi et al. (2015) and explore whether the relaxation of the local stability growth pact for municipalities (i.e., the *CAs*) with a population of less than 5,000 in 2001 had any direct effect on delays in the delivery of public works.[31] We check whether changes in the *CAs*' budget constraints - due to exogenous relaxation of the limits imposed on the amount of debt issued by the municipalities - affect the relationship between the inefficiency of the law courts and late completion of public works by suppliers. To test this possibility, we focus on a subsample of contracts awarded by municipal authorities.

The *CA*'s budget constraints are proxied in two different ways: a) in column 6 of Table 3, through the interaction between a dummy variable for the municipalities with a population of less than 5,000, and a dummy variable representing the treated period (from 2001 onwards, after the stability and growth pact was relaxed); and b) in column 7, we use a third-order polynomial of the population and make it interact with the post-2000 dummy variable. We include in our model specification both a linear term of the population and

[30] See Table A6 in the Online Appendix for the full set of results. The evidence from Table A19 confirms the positive and statistically significant effect of duration of trials. This latter evidence is obtained considering the sub-sample of Italian regions located in the the North of Italy, which are usually viewed to be homogeneous in the (low) level of corruption.

[31] To comply with the EU stability and growth pact, in 1999, Italian government introduced a cap to the deficit of all municipalities. In 2001, the government relaxed this fiscal rule for those municipalities with a population below 5,000 because this rule was thought to be too restrictive given the small size of these municipalities. See Grembi et al. (2015) for further details.

a third order polynomial (like in standard Regression Discontinuity Design) to capture potential non-linearity for municipalities of different sizes. Our estimations suggest that these proxies for a *CA*'s budget constraints have no direct effect on the late completion of public works, while the positive relationship between the duration of trials remains statistically significant.

In addition to municipal budget characteristics, there can also be other political factors in the municipalities that can influence the late delivery of public works. To control for a political budget cycle, we include in our model specification a variable measuring the days between the expected end of the works and the next elections in the municipality. This variable may be a proxy for the incentives of politicians near the end of the electoral term. Our estimates from Table 3 columns 6 and 7 suggest that the coefficient of the timing of municipal elections is not statistically different from zero.[32]

5.5 Other robustness checks

In this section, we first report four different robustness checks on our main estimated relationship between the duration of trials and delays in the delivery of the public works, and we later inspect the relationship between the duration of trials and other procurement outcomes.

Firstly, we check whether or not our results are robust to the inclusion of additional covariates to our model specification.

A first concern is regarding the demand for justice. A recent study on litigation in labor courts in France (Fraisse et al. 2015) shows that an increase in lawyers' density is likely to reduce legal fees due to greater competition, and this has an influence on the decision to litigate and file a case in court. To allow for this source of heterogeneity, we added to our model specification a variable indicating the density of lawyers in the population. The estimates reported in Table 4, column 1, confirm our main results on the effects of court delay.[33]

[32] See Table A7 in the Online Appendix for the full set of results.

[33] See Table A8 in the Online Appendix for the full set of results.

A further concern is about the inclusion of more meaningful project level's controls. So far we used as proxies of the project's complexity the value of the project (reserve price) and the type of the main category of work included in the project. An additional measure of project complexity used in the public procurement literature is the expected (contractual) duration of works, which is estimated by the CA's engineers. When we include this variable in our model specification, our main results do not change (Table 4, column 2).[34]

Then, we consider the average duration of trials in the province from time T_0 to T_{-2}, where T_0 refers to i) the median year between the date of award and the date of expected delivery, or ii) the year of the expected delivery. This is because so far, we have used the duration of trials taken at the beginning of the works. This means that the supplier firm decides whether to delay or not, and the length of the eventual delay, taking into account the province's observed duration of trials at the year the contract is awarded. One might argue that F i) does not necessarily decide to delay at the beginning of the execution of the works, but it might take the decision at any time during the life of the contract or just before the date of expected delivery, when the province's average duration of trials could differ from the average duration observed at the beginning of the works (especially for longer contracts); ii) does not necessarily have a sharp perception of the actual duration of trials at any time in a province. In our data, we cannot observe when the supplier begins to slow-down the execution of the works (i.e., it begins to delay), since we do not have information on the project's intermediate timetables and the relative assessment of intermediate goals. This robustness check is a first attempt to take into account this data limitation. Our estimation results show that the duration of trials have a positive and decreasing effect on the delay of delivery of the works, when we consider as the reference year of the duration of trials the median date of the expected life of the project (Table 4, column 3) or the date of expected delivery (Table 4, column 4).[35]

A possible concern rises from the fact that there are provinces with more than one court.

[34] See Table A9 in the Online Appendix for the full set of results.

[35] See Tables A10 and A11 in the Online Appendix for the full set of results. Note that since we consider two lagged years and we do not have information about the duration of trials prior to 2000, projects that were expected to end before 2002 are not included in the sample.

In our dataset, 31 out of the 83 provinces which we consider have more than one civil court. In such cases, the court where the trial is to take place is chosen according to the territorial borders of the courts within the province. So far, we have considered as a measure for the delays of trials the average duration within the provinces. To deal with the possible measurement error generated by considering these averages, we exclude from our sample the contracts procured by those municipalities located within provinces containing more than one court. Column 5 of Table 4 confirms our main findings.[36]

To understand the broad impact of the duration of trials we next inspect its relationship with procurement outcomes that may represent extra procurement costs. First, we look at whether or not firms submit higher rebates (to increase their probability of winning the contract) when the duration of trials is longer, given that (where the court is inefficient) they could delay the execution of work and recover their profits. The evidence reported in Table 4, column 6, shows that there is a statistically non-significant relationship between the duration of trials and the winning bid.[37] Second, we explore the relationship between duration of trials and cost overrun (i.e., extra costs accumulated during the execution of the works). Note that although, on average, time and cost overrun are positively associated, the duration of trials does not have a statistically significant effect on the cost overrun (Table 4, column 7).[38]

[36] Table A12 reports the full set of results. Another possible confounding factor of our estimates is that during our period of analysis, arbitrations (i.e., alternative dispute resolutions) were allowed by law. The presence of arbitrators may generate a bias of our results. However, according to the ACVP Annual Reports (available at www.avcp.it) just a few cases were resolved through arbitrations. Moreover, the presence of an alternative dispute resolution mechanism should reduce the importance of the role played by regular courts. If this is the case, then our estimates may represent a lower bound of the true effect of courts' delay. This is because parties could use arbitrators prior to going to courts, therefore reducing the importance of the role played by courts.

[37] See Table A13 in the Online Appendix for the full set of results. To better understand this zero effect we have also inspected the relationship between the duration of trials and the number of bidders. As a first approximation, this relationship would tell us whether or not there are differences in the set of bidders. The evidence from Table A14 suggests that the set of bidders is somewhat constant since we find no effect on the number of bidders. However, not having data on the exact identity of each of the bidders our estimates are not informative of whether duration of trials changes bidding strategies or selective entry in auctions.

[38] See Tables A15 and A16 in the Online Appendix for the full set of results. We have also done other robustness checks: (i) we have controlled for awarding prices instead of reserve price as a proxy of project's complexity. Our estimation results do not change (see Table A17 in the Online Appendix); (ii) Our estimation results are robust to the use of fixed effects Poisson model, where the negative values

6 Conclusion

Contracts are a good deterrent against opportunistic behavior only insofar as they are credibly and effectively enforced. In this paper, we empirically investigate how the quality of enforcement of contractual obligations by local courts affect suppliers' performance in public procurement contracts in Italy. Following Djankov et al. (2003) and Jappelli et al. (2005), among others, we proxy the "inefficiency" of enforcement by the local law courts with a measure of the average duration of a trial. Using information on the late delivery of contracted works obtained from a large public procurement database, we investigate such breaches of contract, relating them to the competent local court.

Our empirical analysis suggests that public works are delivered with longer delays in provinces where the local courts are less efficient, and that the marginal effect decreases when delays become very large. The effect is bigger for higher-value contracts (i.e., more complex projects), suggesting that the stronger information advantage typical of suppliers managing larger-scale works allows them to behave more opportunistically. These findings are consistent with the simple theoretical model we developed in which an equilibrium delay results from the costs of disputing penalties in court, these costs being greater for the public buyer than for the supplier. We also find that where local courts are inefficient, public procurement contracts are more often awarded to larger firms; this could be because larger companies have their own legal offices and consequently incur lower costs when they face litigation in court than smaller suppliers. Finally, our empirical results highlight that,

of the delays in the execution of works are replaced with zeros (see Table A18 in the Online Appendix). (iii) We have also checked whether our estimates are influenced by poor data quality and *CA*'s potential misreporting of information. We thus focused on the sample of contracts awarded in the Piedmont and Lombardy regions, which usually coincide with a better-quality data collection. In this subsample, there is a more limited cross-province and over-time variability of the duration of trials; however, as shown in Table A19 in the Online Appendix, our main evidence is confirmed. (iv) As a final test, we explored the relationship between the duration of trials and the on the number of contracts awarded by the public administrations running the auctions. This test consists in repeating our analysis considering as a dependent variable the yearly number of public contracts awarded in a province (divided by the resident population and multiplied by 10,000) during the period 2000-2006. Table A20, reported in the Online Appendix suggests that the duration of trials does not affect the number of contracts per year. The fact that the number of contracts is stable during our sample period suggests that (ceteris paribus) the contract type is not correlated with the efficiency of the judiciary during our sample period.

on average, public buyers opt for a proportionally higher final payment in their contracts if their local courts are inefficient. This suggests that buyers use proportionally larger final payments as a "stick" to reduce the benefit the supplier can gain from delaying the delivery of the works.

Taken together, our results suggest that court efficiency is a determinant of procurement performance. These contract enforcement institutions are crucial not only for financial contracting and the performance of the private sector, but also for the quality in the provision of basic public goods.

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Appendix 1: **Proof of Proposition 1.** We proceed by backward induction.

At **node 4**, CA does not defends itself but rather withdraws if condition (1) is satisfied, i.e., if

$$\begin{aligned} b(\Pi) - D(d) &\geq b(\Pi) - D(d) + (1-\alpha)pd - R_{CA} \\ &\Updownarrow \\ R_{CA} &\geq (1-\alpha)pd, \text{ i.e., if } d \leq \tilde{d} = \frac{R_{CA}}{(1-\alpha)p}. \end{aligned}$$

At **node 3**, At node 3, if $d \leq \tilde{d}$, i.e., when CA does not defend itself and cancel the penalties, F files a claim in court if $\Pi + V(d) - k_F > \Pi + V(d) - pd \Leftrightarrow k_F < pd$, or $d > \frac{k_F}{p}$.

If instead $d > \tilde{d}$ then CA will defend itself in court at node 4, in which case F files a claim only if

$$\begin{aligned} \Pi + V(d) - (1-\alpha)pd - k_F - R_F &> \Pi + V(d) - pd. \\ &\Updownarrow \\ \alpha pd &> R_F + k_F, \quad \text{or} \\ d &> \widehat{d} = \frac{R_F + k_F}{\alpha p}. \end{aligned}$$

Note that since $R_{CA} > R_F + k_F$ and $1 - \alpha > \alpha$, for low α, i.e.,α close to 0, we will have $\widehat{d} > \tilde{d}$, and the opposite will be true for high α, α close to 1/2 .If (1) is not satisfied and $d \leq \widehat{d}$, i.e., if $\widetilde{d} < d \leq \widehat{d}$ (feasible if α is relatively low), then F does not file a claim at node 3, and $F's$ payoff is $\Pi + V(d) - pd$, in which case at node 1 F will always choose $d = 0$.

At **node 2**, CA enforces the penalties if the expected payoff of doing it is larger than $b(\Pi) - D(d)$. When $\frac{k_F}{p} < d \leq \widetilde{d}$, even if CA enforces the penalties, F files a claim and CA does not defend in court but withdraw the penalties, obtaining again $b(\Pi) - D(d)$, so that it enforces the penalty if $b(\Pi) - D(d) > b(\Pi) - D(d)$, which is never satisfied. For $d \leq \frac{k_F}{p}$ instead, F does not file a suit at node 3, hence CA does enforce penalties at node 2. For $d > \widetilde{d}$ also CA finds convenient to enforce penalties.

At **node 1**, F will choose d to maximize expected profits including gains from delay, minus expected legal costs and penalties. Since $V(d)$ is increasing in d and no penalty is enforced in the interval $\frac{k_F}{p} < d \leq \widetilde{d}$, within this interval choosing $d = \widetilde{d}$ dominates any other choice. In the interval $0 \leq d \leq \frac{k_F}{p}$ penalties are exercised and paid, and no litigation takes place, and since $pd > V(d)$ in this interval it is optimal for F to set $d = 0$. In the interval $\widetilde{d} < d \leq \widehat{d}$, if non-empty, penalties are exercised and paid but no claim is filed by F, and given $pd > V(d)$ it is optimal for F to set $d = 0$. For any other $d > \widehat{d}$ the optimal delay d is set as to

$$d' = \arg\max_d \left\{ \Pi + V(d) - (1-\alpha)pd - k_F - R_F \right\}.$$

When $d' \leq \widetilde{d}$ the optimal delay for F is $d = \widetilde{d}$ (lower d reduce $V(d)$ without saving any penalty or legal cost, which are zero). When $d' > \widetilde{d}$ it may be optimal to choose $d > \widetilde{d}$, in which case penalties are exercised by CA. For a set of values of d larger but close to $\widetilde{d}$, however, there is either a discrete drop in $V(d)$ (when $\widetilde{d} < d \leq \widehat{d}$, in which case the optimal delay for F is $d = 0$ because of the assumption $pd > V(d)$), or there is a discrete jump in expected penalties and legal costs (when $\widetilde{d} \geq \widehat{d}$, so that $d = d' > \widetilde{d} \Leftrightarrow d' > \widehat{d}$, so that F files a suite and CA fights it in court. Hence, for d' close enough to $\widetilde{d}$ it will still be optimal for F to choose $d = \widetilde{d}$. Only for a large enough d' gains in $V(d)$ may outweight these losses. Specifically, it is optimal for F to choose $d = d' > \widetilde{d}$ only if

$$\Pi + V(d') - (1-\alpha)pd' - k_F - R_F \, \Pi + V(\widetilde{d}) \Leftrightarrow V(d') - V(\widetilde{d}) \, (1-\alpha)p(d') - k_F - R_F,$$

which may or may not be satisfied for a large enough d'. If this condition is not satisfied, then $\widetilde{d}$ is a pure strategy equilibrium of the game as it is a global optimum for F at node one. If it is satisfied strictly, then the optimum for F is d' and $\widetilde{d}$ is not equilibrium. Hence, there is a number m, defined by the equality: $V(\widetilde{d}+m) - V(\widetilde{d}) = (1-\alpha)p(\widetilde{d}+m) - k_F - R_F$, such that if $d' \leq \widetilde{d} + m$ the equilibrium has $d = \widetilde{d}$, and if $d' > \widetilde{d} + m$ the equilibrium has $d = d'$.**QED**

Proof of Corollary 1. We can now write $\tilde{d} = \frac{R_{CA}(\gamma)}{(1-\alpha(\Pi))p}$, and
$d' = \arg\max_d \{\Pi + V(d) - (1-\alpha(\Pi))pd - k_F - R_F(\gamma)\}$. Differentiating $\tilde{d}$ we obtain

$$\begin{aligned}
\frac{\partial \tilde{d}}{\partial \gamma} &= \frac{R'_{CA}(\gamma)}{(1-\alpha(\Pi))p} > 0, \\
\frac{\partial \tilde{d}}{\partial \Pi} &= \frac{\alpha'(\Pi) p R_{CA}(\gamma)}{[((1-\alpha(\Pi))p]^2} > 0 \\
& \quad and \\
\frac{\partial^2 \tilde{d}}{\partial \gamma \partial \Pi} &= \frac{\partial [R'_{CA}(\gamma)[((1-\alpha(\Pi))p]^{-1}]}{\partial \Pi} = -R'_{CA}(\gamma)[((1-\alpha(\Pi))p]^{-2}(-\alpha'(\Pi)) \\
&= \frac{R'_{CA}(\gamma)\alpha'(\Pi)}{[((1-\alpha(\Pi))p]^2} > 0.
\end{aligned}$$

implying that $\tilde{d}$ is increasing in both γ and Π and that the effects of γ and Π, reinforce each other. **Q**.**E**.**D**.

Proof of Corollary 2. By inspection $\tilde{d}$ and d' are both decreasing in p, hence ceteris paribus a higher p always reduces the amount of procurement delay. Moreover, inspecting the equality that determines m, one sees that the right hand side is increasing in p, while the left hand ide is not affected, implying that m must also increase in p.**Q**.**E**.**D**.

Figure 1: The Game Tree

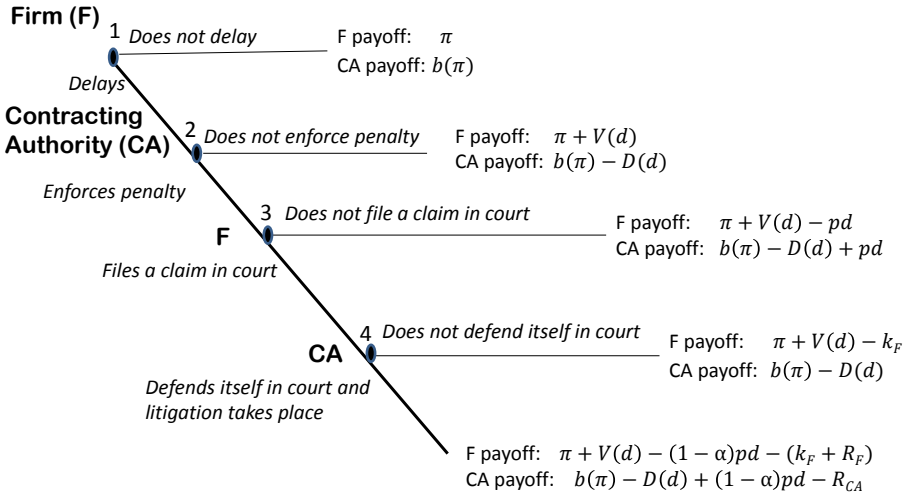

Figure 2: Delays in completion of works (days)

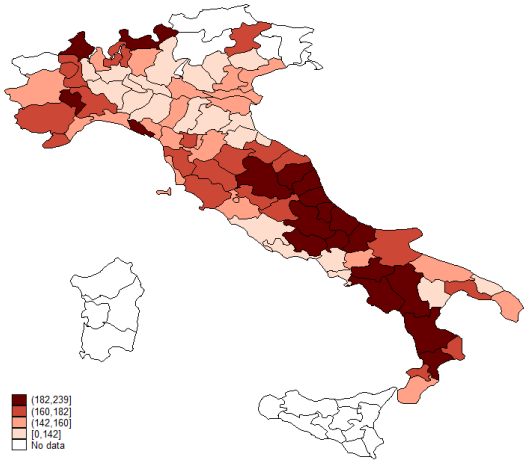

Figure 3: Duration of trials (days)

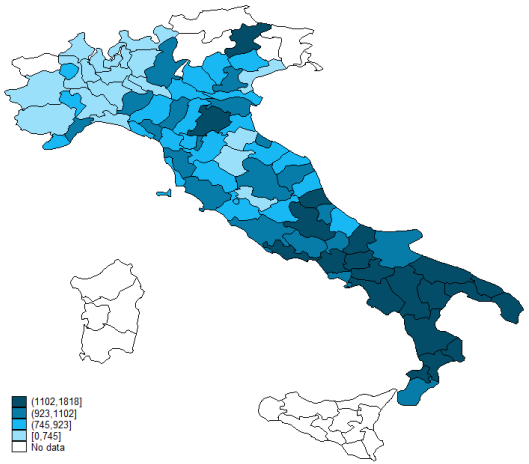

Figure 4: Duration of trials (days) by year and macro-regions

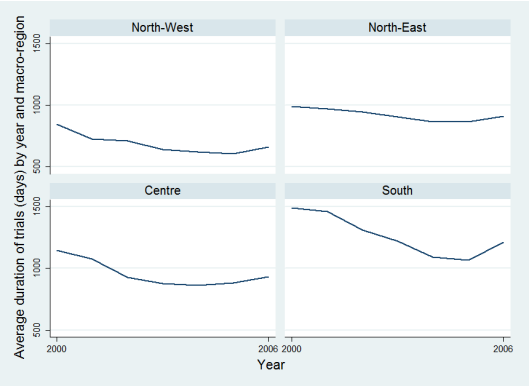

Figure 5: Delays in completion of works and duration of trials

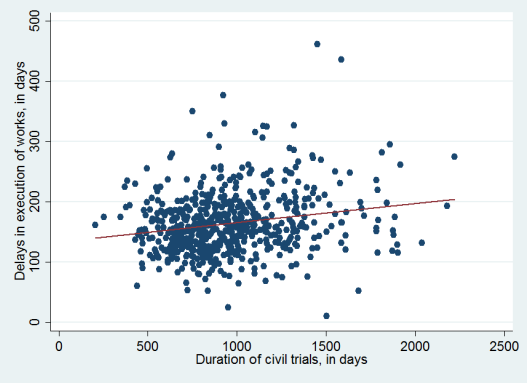

Table 1: Summary statistics

VARIABLE	(1) OBS	(2) MEAN	(3) SD	(4) MIN	(5) P25	(6) P50	(7) P75	(8) MAX
Dependent variable								
Delay in completion (days)	40521	153.339	168.209	-194	30	108	225	1578
Contract characteristics								
Reserve price	40521	5.824	11.154	1.303	1.998	3.008	5.492	299.805
Awarding procedure:								
open	40521	0.758	0.428	0	1	1	1	1
restricted	40521	0.081	0.273	0	0	0	0	1
simplified restricted	40521	0.064	0.245	0	0	0	0	1
negotiation	40521	0.097	0.296	0	0	0	0	1
Category of works:								
buildings	40521	0.323	0.467	0	0	0	1	1
roads and bridges	40521	0.304	0.460	0	0	0	1	1
cultural heritage	40521	0.065	0.247	0	0	0	0	1
hydraulic	40521	0.065	0.247	0	0	0	0	1
Type of CA:								
municipal authorities	40521	0.548	0.498	0	0	1	1	1
provincial authorities	40521	0.151	0.358	0	0	0	0	1
ministries	40521	0.042	0.200	0	0	0	0	1
Provincial controls								
Duration of trials (days)	40521	889.389	293.701	205	664	839.5	1063	2221
Population of prov.	40521	11.356	11.598	0.890	3.577	6.430	11.498	40.131

Notes. The reference period is 2000-2006. *Delay in completion of works (days)* represents the delay in delivering the works. *Reserve price* is the auction's starting value (in 100,000s of euros, CPI deflated, 2000 equivalents) set by the *CA*. *Awarding procedure* is a set of dummy variables indicating the types of awarding mechanism: *Open* is a dummy variable that takes the value of 1 if participation in the auction is open to any *F* certified for the execution of the works, or a value of 0 otherwise; *Restricted* and *Simplified restricted* are two dummy variables that indicate two slightly different types of awarding mechanism; they both take a value of 1 if participation in the auction is restricted to *F*s certified for the execution of the works and invited by the *CA* (after *F*s have shown interest in bidding for the works), or a value of 0 otherwise; *Negotiation* is a dummy variable indicating a type of awarding mechanism, that takes a value of 1 if the *CA* invites a limited number of certified *F*s, or a value of 0 otherwise. *Category of works* includes a set of dummy variables indicating the main categories of works involved in the project. The table shows only the most commonly-observed categories: *Buildings* is a dummy variable taking a value of 1 if the main category of works relates to the construction of buildings, or a value of 0 otherwise; *Roads and bridges* is a dummy variable taking a value of 1 if the main category of works relates to road works or bridge building, or a value of 0 otherwise; *Cultural heritage* is a dummy variable taking a value of 1 if the main category of works relates to cultural heritage conservation works, or a value of 0 otherwise; *Hydraulic* is a dummy variable taking a value of 1 if the main category of works relates to the construction, conservation or improvement of hydraulic systems, or a value of 0 otherwise. *Type of CA* includes a set of dummy variables for the type of *CA* awarding the contract. The table only shows the most frequent encountered types of *CA*: *Municipal authorities* is a dummy variable that takes a value 1 if the *CA* is a municipal authority, or a value of 0 otherwise; *Provincial authorities* is a dummy variable that takes a value of 1 if the *CA* is a provincial government, or a value of 0 otherwise; *Ministries* is a dummy variable that takes a value of 1 if the *CA* is a ministry, or a value of 0 otherwise. *Duration of trials (days)* is a province-level variable (varying over time), computed as the average number of days elapsing between the date of filing a suit and the date when a sentence is passed in a civil trial. *Population of prov.* is a province-level variable (varying over time) that indicates the resident population (x 100,000) in a given province. Sources: auction/project-level variables are from the AVCP (Italian Authority for the Vigilance on Contracts for Public Works, Services and Supplies); province-level variables are from ISTAT (Italian Statistics Institute).

Table 2: Main estimation results

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable	Delay in completion of works (days)							
Duration of trials	0.00182	0.06142*	0.00161	0.06166**	0.00939	0.08274***	0.00863	0.08655***
	(0.007)	(0.033)	(0.007)	(0.030)	(0.007)	(0.030)	(0.007)	(0.030)
Duration of trials^2		-0.00003*		-0.00003**		-0.00003**		-0.00003***
		(0.000)		(0.000)		(0.000)		(0.000)
Reserve price	2.83227***	2.83373***	6.35360***	6.35523***	2.95800***	2.96120***	6.73345***	6.73922***
	(0.299)	(0.299)	(0.410)	(0.410)	(0.269)	(0.269)	(0.318)	(0.318)
Reserve price^2			-0.02779***	-0.02779***			-0.03080***	-0.03082***
			(0.002)	(0.002)			(0.002)	(0.002)
Type of CA FE	X	X	X	X				
Category of works FE	X	X	X	X	X	X	X	X
Awarding mechanism FE	X	X	X	X	X	X	X	X
Province FE	X	X	X	X				
CA FE					X	X	X	X
Year FE	X	X	X	X	X	X	X	X
Province-year control	X	X	X	X	X	X	X	X
Observations	40,521	40,521	40,521	40,521	40,521	40,521	40,521	40,521
R-squared	0.103	0.103	0.124	0.124	0.369	0.369	0.385	0.386
Mean outcome	153.3	153.3	153.3	153.3	153.3	153.3	153.3	153.3
t-test[b(Dur.)+b(Dur.)^2=0]		3.44*		4.09**		7.40***		8.26***
Effect +SD at mean Dur.		4.621		4.591		7.354		7.417

Notes. Coefficients (standard errors). Standard errors clustered at province (*CA*) level in columns 1-4 (5-8). Significance levels: *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is the *Delay in completion of works (days)* and represents the delay in delivering of the works. *Duration of trials* is a province-level variable (varying over time) estimating the duration of civil trials, computed by the National Institute of Statistics (ISTAT). *Reserve price* is the auction's starting value (in 100,000 euros, CPI deflated, 2000 equivalents) set by *CA*. When denoted with an "X", regressions additionally include: *Type of CA FE*, a set of dummy variables for the type of *CA* awarding the contract; *Category of works FE*, a set of dummy variables for the main category of works; *Awarding mechanism FE*, a set of dummy variables for the type of awarding mechanism; *Province FE* is a set of dummy variables for the province where the contract is awarded; *CA FE* is a set of dummy variables for each *CA*; *Year FE* is a dummy variable corresponding to the year when the contract is awarded (between 2000 and 2006); *Province-year control* means that (time varying) population of the province is added as a control. *Mean outcome* is the mean value of the dependent variable. *t-test* reports the *t-statistics* for the sum of the coefficients Duration of trials and (Duration of trials)^2 different from zero. *Effect +SD at Mean Dur.* represents the change in the dependent variable associated with an increase of one standard deviation in the Duration of trials from the mean value of its distribution.

Table 3: Extensions and alternative explanations

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	OLS	Probit	Probit	OLS	OLS	OLS	OLS
Dependent Variable	Delays	Large f.	Small f.	Final pay. (share)	Delays	Delays	Delays
Duration of trials	0.05486	0.00090*	-0.00041	0.00005*	0.06328*	0.09907**	0.10390***
	(0.035)	(0.000)	(0.000)	(0.000)	(0.033)	(0.040)	(0.040)
Duration of trials^2	-0.00003**	-0.00000*	0.00000	-0.00000*	-0.00002*	-0.00004**	-0.00004**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Reserve price	1.30111*	0.02932***	-0.02864***	-0.00179***	2.83011***	4.01244***	4.01423***
	(0.709)	(0.002)	(0.005)	(0.000)	(0.304)	(0.658)	(0.658)
Reserve price^2		-0.00010***	0.00011***	0.00001***			
		(0.000)	(0.000)	(0.000)			
Reserve price*Duration of trials	0.00175**						
	(0.001)						
Corruption*Duration of trials					-0.00571		
					(0.006)		
(Municipal Pop. < 5,000)*(Post 2000)						-9.57785	
						(11.614)	
Post 2000						-19.10122***	-24.81025***
						(5.507)	(6.234)
Post2000*(Municipal Pop.)							0.00007
							(0.000)
Post2000*(Municipal Pop.)^2							-0.00000
							(0.000)
Post2000*(Municipal Pop.)^3							0.00000
							(0.000)
Days from next election						0.00111	0.00112
						(0.002)	(0.002)
Category of works FE	X	X	X	X	X	X	X
Awarding mechanism FE	X	X	X	X	X	X	X
Type of CA	X	X	X	X	X		
CA FE						X	X
Province FE	X	X	X	X	X		
Year FE	X	X	X	X	X		
Province-year control	X	X	X	X	X	X	X
Observations	40,521	19,920	19,876	28,175	40,071	22,197	22,197
R-squared	0.104			0.070	0.103	0.335	0.335
Mean outcome	153.3	0.108	0.115	0.060	153.5	159.2	159.2
Effect +SD at mean Dur.	4.748			0.005	4.630	7.997	8.278

Notes. Coefficients (standard errors). Standard errors clustered at province (*CA*) level in columns 1-5 (6-7). Estimations in columns 6-7 are limited to projects awarded by municipal governments. Significance levels: *** p<0.01, ** p<0.05, * p<0.1. The dependent variable: in columns 1 and 5-7, is the *Delay in completion of works (days)* and represents the delay in delivering of the works; in column 2 (3) is a dummy variable *Large firm* (*Small firm*) that takes a value of 1 if the winner of the project is a joint-stock company (one-man business), or a value of 0 otherwise; in column 4, is *Final payment (share)* that indicates the balance paid on completion of the works (by the *CA* to the *F*) as a proportion of the total payment. *Duration of trials* is a province-level variable (varying over time) estimating the duration of civil trials, computed by the National Institute of Statistics (ISTAT). *Reserve price* is the auction's starting value (in 100,000 euros, CPI deflated, 2000 equivalents) set by *CA*. *Corruption* is a province-level variable (not varying over time), that indicates the level of corruption in public works in a given province (it refers to 1997; data are from Golden and Picci, 2005). *Municipal Pop.*<5,000 is a dummy variable that takes a value of 1 if the contract is awarded by a municipality with less than 5,000 inhabitants, or a value of 0 otherwise. *Municipal Pop.* represents the population of the municipality (source: ISTAT). *Days from next election* is a variable indicating the days between the expected end of the works and the next elections in the municipality (source: Ministry of Interior). When denoted with an "X", regressions additionally include: *Type of CA FE*, a set of dummy variables for the type of *CA* awarding the contract; *Category of works FE*, a set of dummy variables for the main category of works; *Awarding mechanism FE*, a set of dummy variables for the type of awarding mechanism; *Province FE* is a set of dummy variables for the province where the contract is awarded; *CA FE* is a set of dummy variables for each *CA*; *Year FE* is a dummy variable corresponding to the year when the contract is awarded (between 2000 and 2006); *Province-year control* means that (time varying) population of the province is added as a control. *Mean outcome* is the mean value of the dependent variable. *Effect +SD at Mean Dur.* represents the change in the dependent variable associated with an increase of one standard deviation in the Duration of trials from the mean value of its distribution.

Table 4: Further robustness checks

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Dependent Variable	Delays	Delays	Delays	Delays	Delay	Win Rebate	Cost overrun
Duration of trials	0.06166**	0.06132**			0.06339*	-0.00160	0.00017
	(0.030)	(0.030)			(0.032)	(0.002)	(0.000)
Duration of trials^2	-0.00003**	-0.00003**			-0.00003**	0.00000	-0.00000
	(0.000)	(0.000)			(0.000)	(0.000)	(0.000)
Reserve price	6.35548***	6.11610***	6.26588***	6.85128***	6.38673***	0.14985***	0.11618***
	(0.410)	(0.402)	(0.423)	(0.448)	(0.361)	(0.010)	(0.004)
Reserve price^2	-0.02779***	-0.02676***	-0.02801***	-0.03075***	-0.02828***	-0.00057***	-0.00080***
	(0.002)	(0.003)	(0.003)	(0.003)	(0.002)	(0.000)	(0.000)
Lawyer density	0.00415						
	(0.008)						
Expected duration		0.01922					
		(0.013)					
(Av. lags)Duration of trials			0.15501***	0.17828***			
			(0.052)	(0.055)			
(Av. lags)Duration of trials^2			-0.00008***	-0.00009***			
			(0.000)	(0.000)			
Category of works FE	X	X	X	X	X	X	X
Awarding mechanism FE	X	X	X	X	X	X	X
Type of CA	X	X	X	X	X	X	X
Province FE	X	X	X	X	X	X	X
Year FE	X	X	X	X	X	X	X
Province-year control	X	X	X	X	X	X	X
Observations	40,521	40,521	33,053	35,088	30,128	40,521	27,299
R-squared	0.124	0.124	0.124	0.128	0.127	0.490	0.360
Mean outcome	153.3	153.3	149.4	154.1	149.0	14.90	0.468
Effect +SD at mean Dur.	4.593	4.570	6.162	6.511	3.441	-0.296	0.022

Notes. Coefficients (standard errors). Standard errors clustered at province level. Significance levels: *** p<0.01, ** p<0.05, * p<0.1. The dependent variable: in columns 1-5, is the *Delay in completion of works (days)* that represents the delay in delivering of the works; in column 6, is *Winning rebate* that represents the percentage discount offered by the winning firm over the reserve price; in column 7, is *Cost overrun* that represents the difference between the final price and the awarding price offered by the winning firm (in 100,000 euros, CPI deflated, 2000 equivalents). *Duration of trials* is a province-level variable (varying over time) estimating the duration of civil trials, computed by the National Institute of Statistics (ISTAT). *Reserve price* is the auction's starting value (in 100,000 euros, CPI deflated, 2000 equivalents) set by *CA*. *Lawyers density* is the number of lawyers at the level of court of appeal over the province population (x 100,000). *Expected duration* is the contractual duration of works set by *CA*. When denoted with an "X", regressions additionally include: *Type of CA FE*, a set of dummy variables for the type of *CA* awarding the contract; *Category of works FE*, a set of dummy variables for the main category of works; *Awarding mechanism FE*, a set of dummy variables for the type of awarding mechanism; *Province FE* is a set of dummy variables for the province where the contract is awarded; *Year FE* is a dummy variable corresponding to the year when the contract is awarded (between 2000 and 2006); *Province-year control* means that (time varying) population of the province is added as a control. *Mean outcome* is the mean value of the dependent variable. *Effect +SD at Mean Dur.* represents the change in the dependent variable associated with an increase of one standard deviation in the Duration of trials from the mean value of its distribution.

ONLINE APPENDIX: Full set of estimation results

Table A1: Additional controls: Summary statistics

VARIABLE	(1) OBS	(2) MEAN	(3) SD
Dependent variable			
Winner is:			
Large firm	20070	0.107	0.309
Small firm	20070	0.114	0.317
Final payment (share)	28175	0.060	0.115
Winning rebate	40521	14.899	8.723
Cost overrun	27299	0.468	0.892
Number of bidders	40359	29.797	33.598
Contract characteristics			
Expected duration	40521	261.013	174.129
Awarding price	40521	4.860	8.978
Municipal controls			
Municipal pop.	22197	168956.5	446272.3
Days from next elections	22197	875.603	538.762
Provincial controls			
Corruption	40071	1.140	0.947
Lawyers density	40521	1117.547	1156.199
Number of contracts	579	1.345	0.826

Notes. The reference period is 2000-2006.*Large firm* is a dummy variable that takes a value of 1 if the winner of the project is a joint-stock company, or a value of 0 otherwise. *Small firm* is a dummy variable that takes a value of 1 if the winner of the project is a one-man business, or a value of 0 otherwise. *Final payment (share)* indicates the balance paid on completion of the works (by the *CA* to the *F*) as a proportion of the total payment. *Winning rebate* represents the percentage discount offered by the winning firm over the reserve price. *Number of bidders* represents the number of companies submitting a bid. *Expected duration* is the contractual duration of works set by CA. *Awarding price* is the auction's starting value (in 100,000 euros, CPI deflated, 2000 equivalents) set by CA minus the percentage rebate offered by the winning firm. *Cost overrun* represents the difference between the final price and the awarding price offered by the winning firm (in 100,000 euros, CPI deflated, 2000 equivalents). *Municipal pop.* represents the number of inhabitants in a municipality. *Days from next election* presents the days between the expected end of the works and the next elections in the municipality (source: Ministry of Interior). *Corruption* is a province-level variable (not varying over time), that indicates the level of corruption in public works in a given province (it refers to 1997; data are from Golden and Picci, 2005). *Lawyers density* is the number of lawyers at the level of court of appeal over the province population (x 100,000). *Number of contracts* represents the number of contracts (per 10,000 inhabitants) awarded in a province in a given year. Sources: auction/project-level variables are from the AVCP (Italian Authority for the Vigilance on Contracts for Public Works, Services and Supplies); population data are from ISTAT (Italian Statistics Institute).

Table A2: Interaction effects: Complexity of the works and duration of trials

	(1)	(2)	(3)	(4)
Dependent Variable	Delay in completion of works (days)			
Duration of trials	-0.00882	0.05486	-0.00493	0.06887**
	(0.009)	(0.035)	(0.009)	(0.032)
Duration of trials^2		-0.00003**		-0.00003**
		(0.000)		(0.000)
(Duration of trials)*Reserve price	0.00174**	0.00175**	0.00235**	0.00236***
	(0.001)	(0.001)	(0.001)	(0.001)
Reserve price	1.30855*	1.30111*	0.99256	0.99460
	(0.716)	(0.709)	(0.749)	(0.740)
Type of CA FE	X	X		
Category of works FE	X	X	X	X
Awarding mechanism FE	X	X	X	X
Province FE	X	X		
CA FE			X	X
Year FE	X	X	X	X
Province-year control	X	X	X	X
Observations	40,521	40,521	40,521	40,521
R-squared	0.104	0.104	0.370	0.371
Mean outcome	153.3	153.3	153.3	153.3
Effect +SD at mean Res.	0.378		2.580	
Effect +SD at mean Res. (and mean Dur.)		4.748		7.204

Notes. Coefficients are presented with standard errors in parentheses (clustered at province level in columns 1 and 2, or at *CA* level in columns 3 to 4). Significance levels: *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is *Delay in completion of works (days)*, i.e., the delay in delivering of the works. *Duration of trials* is a province-level variable (varying over time) estimating the duration of civil trials, computed by the National Institute of Statistics (ISTAT). *Reserve price* is the auction's starting value (in 100,000 euros, CPI deflated, 2000 equivalents) set by *CA*. When denoted with an "X", regressions additionally include: *Type of CA FE*, a set of dummy variables for the type of *CA* awarding the contract; *Category of works FE*, a set of dummy variables for the main category of works; *Awarding mechanism FE*, a set of dummy variables for the type of awarding mechanism; *Province FE* is a set of dummy variables for the province where the contract is awarded; *CA FE* is a set of dummy variables for each *CA*; *Year FE* is a dummy variable corresponding to the year when the contract is awarded (between 2000 and 2006); *Province-year control* means that a variable with a province-year dimension has been added (i.e., population of the province). *Mean outcome* is the mean value of the dependent variable. *Effect +SD at mean Res.* represents the change in the dependent variable associated with an increase of one standard deviation in the Duration of trials computed at the mean level of the Reserve price (this effect is only included when the Duration of trials enters the model as a single term and interacts with the Reserve price). *Effect +SD at mean Res. and mean Dur.* represents the change in the dependent variable associated with an increase of one standard deviation in the Duration of trials computed at the mean value of the Reserve price variable and at the mean value of the Duration of trials (this effect is only included when the Duration of trials enters the model as a single term and as a quadratic term, and interacts with the Reserve price).

Table A3: Alternative outcome: Dimensions of the winning firms

	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) Probit	(6) Probit	(7) Probit	(8) Probit	(9) Logit	(10) Logit	(11) Logit	(12) Logit
Dependent Variable	Winning firms is: Large firm(JSC)											
Duration of trials	0.00001	0.00014**	0.00001	0.00014**	0.00007	0.00087*	0.00008	0.00090*	0.00015	0.00160*	0.00018	0.00161*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.001)
Duration of trials^2		-0.00000**		-0.00000**		-0.00000*		-0.00000*		-0.00000*		-0.00000*
		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)
Reserve price	0.00457***	0.00457***	0.00679***	0.00679***	0.01760***	0.01762***	0.02930***	0.02932***	0.03142***	0.03147***	0.05112***	0.05118***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)	(0.004)	(0.004)
Reserve price^2			-0.00002***	-0.00002***			-0.00010***	-0.00010***			-0.00018***	-0.00018***
			(0.000)	(0.000)			(0.000)	(0.000)			(0.000)	(0.000)
Type of CA FE	X	X	X	X	X	X	X	X	X	X	X	X
Cat. of works FE	X	X	X	X	X	X	X	X	X	X	X	X
Aw. mechanism FE	X	X	X	X	X	X	X	X	X	X	X	X
Province FE	X	X	X	X	X	X	X	X	X	X	X	X
Year FE	X	X	X	X	X	X	X	X	X	X	X	X
Province-year c.	X	X	X	X	X	X	X	X	X	X	X	X
Observations	20,070	20,070	20,070	20,070	19,920	19,920	19,920	19,920	19,920	19,920	19,920	19,920
Mean outcome	0.107	0.107	0.107	0.107	0.108	0.108	0.108	0.108	0.108	0.108	0.108	0.108

Notes. Coefficients are presented with standard errors in parentheses (clustered at province level). Significance levels: *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is a dummy variable indicating that the winning *F* is a *large firm* (i.e., a *JSC*-joint stock company). *Duration of trials* is a province-level variable (varying over time) estimating the duration of civil trials, computed by the National Institute of Statistics (ISTAT). *Reserve price* is the auction's starting value (in 100,000 euros, CPI deflated, 2000 equivalents) set by *CA*. When denoted with an "X", regressions additionally include: *Type of CA FE*, a set of dummy variables for the type of *CA* awarding the contract; *Category of works FE*, a set of dummy variables for the main category of works; *Awarding mechanism FE*, a set of dummy variables for the type of awarding mechanism; *Province FE* is a set of dummy variables for the province where the contract is awarded; *Year FE* is a dummy variable corresponding to the year when the contract is awarded (between 2000 and 2005); *Province-year control* means that a variable with a province-year dimension has been added (i.e., population of the province). *Mean outcome* is the mean value of the dependent variable.

Table A4: Alternative outcome: Dimensions of the winning firms

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	OLS	OLS	OLS	OLS	Probit	Probit	Probit	Probit	Logit	Logit	Logit	Logit
Dependent Variable	Winning firms is: One-man business (Small firm)											
Duration of trials	0.00004*	-0.00016*	0.00004*	-0.00016*	0.00012	-0.00042	0.00012	-0.00041	0.00019	-0.00070	0.00019	-0.00070
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.001)
Duration of trials^2		0.00000**		0.00000**		0.00000		0.00000		0.00000		0.00000
		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)		(0.000)
Reserve price	-0.00157***	-0.00157***	-0.00333***	-0.00333***	-0.02359***	-0.02362***	-0.02863***	-0.02864***	-0.05122***	-0.05123***	-0.06058***	-0.06059***
	(0.000)	(0.000)	(0.001)	(0.001)	(0.004)	(0.004)	(0.005)	(0.005)	(0.010)	(0.010)	(0.010)	(0.010)
Reserve prices^2			0.00002***	0.00002***			0.00011***	0.00011***			0.00023***	0.00023***
			(0.000)	(0.000)			(0.000)	(0.000)			(0.000)	(0.000)
Type of CA FE	X	X	X	X	X	X	X	X	X	X	X	X
Cat. of works FE	X	X	X	X	X	X	X	X	X	X	X	X
Aw. mechanism FE	X	X	X	X	X	X	X	X	X	X	X	X
Province FE	X	X	X	X	X	X	X	X	X	X	X	X
Year FE	X	X	X	X	X	X	X	X	X	X	X	X
Province-year c.	X	X	X	X	X	X	X	X	X	X	X	X
Observations	20,070	20,070	20,070	20,070	19,876	19,876	19,876	19,876	19,876	19,876	19,876	19,876
Mean outcome	0.114	0.114	0.114	0.114	0.115	0.115	0.115	0.115	0.115	0.115	0.115	0.115

Notes. Coefficients are presented with standard errors in parentheses (clustered at province level). Significance levels: *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is a dummy variable indicating that the winning *F* is a *small firm* (i.e., one-man business). *Duration of trials* is a province-level variable (varying over time) estimating the duration of civil trials, computed by the National Institute of Statistics (ISTAT). *Reserve price* is the auction's starting value (in 100,000 euros, CPI deflated, 2000 equivalents) set by *CA*. When denoted with an "X", regressions additionally include: *Type of CA FE*, a set of dummy variables for the type of *CA* awarding the contract; *Category of works FE*, a set of dummy variables for the main category of works; *Awarding mechanism FE*, a set of dummy variables for the type of awarding mechanism; *Province FE* is a set of dummy variables for the province where the contract is awarded; *Year FE* is a dummy variable corresponding to the year when the contract is awarded (between 2000 and 2005); *Province-year control* means that a variable with a province-year dimension has been added (i.e., population of the province). *Mean outcome* is the mean value of the dependent variable.

Table A5: Alternative outcome: Share of final payment

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable	Final payment (share)							
Duration of trials	0.00001	0.00005*	0.00001	0.00005*	-0.00000	0.00003	-0.00000	0.00002
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Duration of trials^2		-0.00000*		-0.00000*		-0.00000		-0.00000
		(0.000)		(0.000)		(0.000)		(0.000)
Reserve price	-0.00073***	-0.00073***	-0.00179***	-0.00179***	-0.00069***	-0.00069***	-0.00160***	-0.00160***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Reserve price^2			0.00001***	0.00001***			0.00001***	0.00001***
			(0.000)	(0.000)			(0.000)	(0.000)
Type of CA FE	X	X	X	X				
Category of works FE	X	X	X	X	X	X	X	X
Awarding mechanism FE	X	X	X	X	X	X	X	X
Province FE	X	X	X	X				
CA FE					X	X	X	X
Year FE	X	X	X	X	X	X	X	X
Province-year control	X	X	X	X	X	X	X	X
Observations	28,175	28,175	28,175	28,175	28,175	28,175	28,175	28,175
R-squared	0.066	0.066	0.070	0.070	0.386	0.386	0.388	0.388
Mean outcome	0.060	0.060	0.060	0.060	0.060	0.060	0.060	0.060
Effect +SD at mean Dur.		0.005		0.005		0.001		0.001

Notes. Coefficients are presented with standard errors in parentheses (clustered at province-level in columns 1-4, or *CA*-level in columns 5-8). Significance levels: *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is the *Final payment (share)*, that is the final payment as a proportion of the total payment the *F* receives from *CA* for completing the works. *Duration of trials* is a province-level variable (varying over time) estimating the duration of civil trials, computed by the National Institute of Statistics (ISTAT). *Reserve price* is the auction's starting value (in 100,000 euros, CPI deflated, 2000 equivalents) set by *CA*. When denoted with an "X", regressions additionally include: *Type of CA FE*, a set of dummy variables for the type of *CA* awarding the contract; *Category of works FE*, a set of dummy variables for the main category of works; *Awarding mechanism FE*, a set of dummy variables for the type of awarding mechanism; *Province FE* is a set of dummy variables for the province where the contract is awarded; *CA FE* is a set of dummy variables for each *CA*; *Year FE* is a dummy variable corresponding to the year when the contract is awarded (between 2000 and 2006); *Province-year control* means that a variable with a province-year dimension has been added (i.e., population of the province). *Mean outcome* is the mean value of the dependent variable. *Effect +SD at Mean Dur.* represents the change in the dependent variable associated with an increase of one standard deviation in the Duration of trials from the mean value of its distribution (this effect is only included when the Duration of trials enters the model as single term and as a quadratic term).

Table A6: Robustness: Controlling for corruption

	(1)	(2)	(3)	(4)
Dependent Variable	Delays in completion of works (days)			
Duration of trials	0.01353	0.06328*	0.00673	0.08337***
	(0.009)	(0.033)	(0.008)	(0.031)
Duration of trials^2		-0.00002*		-0.00003***
		(0.000)		(0.000)
Corruption * Duration of trials	-0.00893	-0.00571	0.00335	0.00371
	(0.006)	(0.006)	(0.003)	(0.003)
Reserve price	2.82917***	2.83011***	2.94424***	2.94754***
	(0.304)	(0.304)	(0.269)	(0.269)
Type of CA FE	X	X		
Category of works FE	X	X	X	X
Awarding mechanism FE	X	X	X	X
Province FE	X	X		
CA FE			X	X
Year FE	X	X	X	X
Province-year control	X	X	X	X
Observations	40,071	40,071	40,071	40,071
R-squared	0.103	0.103	0.369	0.369
Mean outcome	153.5	153.5	153.5	153.5
Effect +SD at mean Corr.	0.987		3.104	
Effect +SD at mean Corr. (and mean Dur.)		4.630		7.991

Notes. Coefficients are presented with standard errors in parentheses (clustered at province-level in columns 1 and 2, or *CA*-level in columns 3 and 4). Significance levels: *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is the *Delay in completion of works (days*), i.e., the delay in delivering of the works. *Duration of trials* is a province-level variable (varying over time) estimating the duration of civil trials, computed by the National Institute of Statistics (ISTAT). *Corruption* is a province-level variable (not varying over time), that indicates the level of corruption in public works in a given province (it refers to 1997; data are from Golden and Picci, 2005). *Reserve price* is the auction's starting value (in 100,000 euros, CPI deflated, 2000 equivalents) set by *CA*. When denoted with an "X", regressions additionally include: *Type of CA FE*, a set of dummy variables for the type of *CA* awarding the contract; *Category of works FE*, a set of dummy variables for the main category of works; *Awarding mechanism FE*, a set of dummy variables for the type of awarding mechanism; *Province FE* is a set of dummy variables for the province where the contract is awarded; *CA FE* is a set of dummy variables for each *CA*; *Year FE* is a dummy variable corresponding to the year when the contract is awarded (between 2000 and 2006); *Province-year control* means that a variable with a province-year dimension has been added (i.e., population of the province). *Mean outcome* is the mean value of the dependent variable. *Effect +SD at mean Corr.* represents the change in the dependent variable associated with an increase of one standard deviation in the Duration of trials computed at the mean level of the Corruption (this effect is only included when the Duration of trials enters the model as a single term and interact with the Corruption). *Effect +SD at mean Corr. and mean Dur.* represents the change in the dependent variable associated with an increase of one standard deviation in the Duration of trials computed at the mean value of the Corruption variable and at the mean value of the Duration of trials (this effect is only included when the Duration of trials enters the model as a single term and as a quadratic term, and interacts with the Corruption).

Table A7: Robustness: Controlling for the CA's budget constraints and political cycle

	(1)	(2)	(3)	(4)
Dependent Variable	Delays in completion of works (days)			
Duration of trials	0.00937	0.09907**	0.00935	0.10390***
	(0.011)	(0.040)	(0.011)	(0.040)
Duration of trials^2		-0.00004**		-0.00004**
		(0.000)		(0.000)
(Municipal Pop. < 5,000)*(Post 2000)	-9.56751	-9.57785		
	(11.789)	(11.614)		
Post 2000	-20.95222***	-19.10122***	-26.21231***	-24.81025***
	(5.478)	(5.507)	(6.255)	(6.234)
Post2000*(Municipal Pop.)			0.00006	0.00007
			(0.000)	(0.000)
Post2000*(Municipal Pop.)^2			-0.00000	-0.00000
			(0.000)	(0.000)
Post2000*(Municipal Pop.)^3			0.00000	0.00000
			(0.000)	(0.000)
Reserve price	4.00681***	4.01244***	4.00809***	4.01423***
	(0.657)	(0.658)	(0.657)	(0.658)
Days from next election	0.00118	0.00111	0.00118	0.00112
	(0.002)	(0.002)	(0.002)	(0.002)
Category of work FE	X	X	X	X
Awarding mechanism FE	X	X	X	X
CA FE	X	X	X	X
Province-year control	X	X	X	X
Observations	22,197	22,197	22,197	22,197
R-squared	0.335	0.335	0.335	0.335
Mean outcome	159.2	159.2	159.2	159.2
Effect +SD at mean Dur.		7.997		8.278

Notes. Coefficients are presented with standard errors (clustered at *CA* level) in parentheses. Significance levels: *** p<0.01, ** p<0.05, * p<0.1. The sample is restricted to contracts awarded by municipal authorities. The dependent variable is the *Delay in completion of works (days)*, i.e., the delay in delivering of the works. *Duration of trials* is a province-level variable (varying over time) estimating the duration of civil trials, computed by the National Institute of Statistics (ISTAT). *Municipal Pop.*<5,000 is a dummy variable that takes a value of 1 if the contract is awarded by a municipality with less than 5,000 inhabitants, or a value of 0 otherwise. *Municipal Pop.* represents the population of the municipality. *Post*2000 is a dummy variable that takes a value of 1 for years from 2001 to 2006, a value of 0 for the year 2000. *Reserve price* is the auction's starting value (in 100,000 euros, CPI deflated, 2000 equivalents) set by *CA*. *Days from next election* is a variable indicating the days between the expected end of works and the next elections in the municipality. When denoted with an "X", regressions additionally include: *CA FE*, is a set of dummy variables for each *CA* (capturing also the municipality population); *Category of works FE*, a set of dummy variables for the main category of works involved in the contract; *Awarding mechanism FE*, a set of dummy variables for the type of awarding mechanism; *Province-year control* means that a variable with a province-year dimension has been added (i.e., population of the province). *Mean outcome* is the mean value of the dependent variable. *Effect +SD at mean Dur.* represents the change in the dependent variable associated with an increase of one standard deviation in the Duration of trials from the mean value of its distribution (this effect is only included when the Duration of trials enters the model as single term and as a quadratic term).

Table A8: Robustness: Controlling for density of lawyers

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable	Delays in completion of works (days)							
Duration of trials	0.00183	0.06142*	0.00162	0.06166**	0.00938	0.08288***	0.00863	0.08663***
	(0.007)	(0.033)	(0.007)	(0.030)	(0.007)	(0.030)	(0.007)	(0.030)
Duration of trials^2		-0.00003*		-0.00003**		-0.00003**		-0.00003***
		(0.000)		(0.000)		(0.000)		(0.000)
Reserve price	2.83213***	2.83360***	6.35385***	6.35548***	2.95788***	2.96106***	6.73333***	6.73904***
	(0.299)	(0.299)	(0.410)	(0.410)	(0.269)	(0.269)	(0.318)	(0.317)
Reserve price^2			-0.02779***	-0.02779***			-0.03080***	-0.03082***
			(0.002)	(0.002)			(0.002)	(0.002)
Lawyer density	0.00277	0.00276	0.00417	0.00415	-0.00074	-0.00091	-0.00028	-0.00046
	(0.009)	(0.009)	(0.008)	(0.008)	(0.004)	(0.004)	(0.003)	(0.003)
Type of CA FE	X	X	X	X				
Category of works FE	X	X	X	X	X	X	X	X
Awarding mechanism FE	X	X	X	X	X	X	X	X
Province FE	X	X	X	X				
CA FE					X	X	X	X
Year FE	X	X	X	X	X	X	X	X
Province-year control	X	X	X	X	X	X	X	X
Observations	40,521	40,521	40,521	40,521	40,521	40,521	40,521	40,521
R-squared	0.103	0.103	0.124	0.124	0.369	0.369	0.385	0.386
Mean outcome	153.3	153.3	153.3	153.3	153.3	153.3	153.3	153.3
Effect +SD at mean Dur.		4.622		4.593		7.360		7.420

Notes. Coefficients are presented with standard errors in parentheses (clustered at province level in columns 1 to 4, or at *CA* level in columns 5 to 8). Significance levels: *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is *Delay in completion of works (days)*, i.e., the delay in delivering of the works. *Duration of trials* is a province-level variable (varying over time) estimating the duration of civil trials, computed by the National Institute of Statistics (ISTAT). *Reserve price* is the auction's starting value (in 100,000 euros, CPI deflated, 2000 equivalents) set by *CA*. *Lawyers density* is the number of lawyers at the level of court of appeal over the province population (x 100,000). When denoted with an "X", regressions additionally include: *Type of CA FE*, a set of dummy variables for the type of *CA* awarding the contract; *Category of works FE*, a set of dummy variables for the main category of works; *Awarding mechanism FE*, a set of dummy variables for the type of awarding mechanism; *Province FE* is a set of dummy variables for the province where the contract is awarded; *CA FE* is a set of dummy variables for each *CA*; *Year FE* is a dummy variable corresponding to the year when the contract is awarded (between 2000 and 2006); *Province-year control* means that a variable with a province-year dimension has been added (i.e., population of the province). *Mean outcome* is the mean value of the dependent variable. *Effect +SD at Mean Dur.* represents the change in the dependent variable associated with an increase of one standard deviation in the Duration of trials from the mean value of its distribution (this effect is only included when the Duration of trials enters the model as single term and as a quadratic term).

Table A9: Robustness: Controlling for expected duration of works

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable	Delays in completion of works (days)							
Duration of trials	0.00184	0.06026*	0.00163	0.06132**	0.00971	0.08403***	0.00863	0.08654***
	(0.007)	(0.032)	(0.007)	(0.030)	(0.007)	(0.030)	(0.007)	(0.030)
Duration of trials^2		-0.00003*		-0.00003**		-0.00003**		-0.00003***
		(0.000)		(0.000)		(0.000)		(0.000)
Reserve price	2.45441***	2.45609***	6.11384***	6.11610***	2.66351***	2.66632***	6.74074***	6.74588***
	(0.262)	(0.262)	(0.402)	(0.402)	(0.280)	(0.280)	(0.361)	(0.361)
Reserve price^2			-0.02676***	-0.02676***			-0.03083***	-0.03085***
			(0.003)	(0.003)			(0.002)	(0.002)
Expected duration	0.06640***	0.06635***	0.01927	0.01922	0.04961***	0.04968***	-0.00058	-0.00053
	(0.014)	(0.014)	(0.013)	(0.013)	(0.014)	(0.014)	(0.013)	(0.013)
Type of CA FE	X	X	X	X				
Category of works FE	X	X	X	X	X	X	X	X
Awarding mechanism FE	X	X	X	X	X	X	X	X
Province FE	X	X	X	X				
CA FE					X	X	X	X
Year FE	X	X	X	X	X	X	X	X
Province-year control	X	X	X	X	X	X	X	X
Observations	40,521	40,521	40,521	40,521	40,521	40,521	40,521	40,521
R-squared	0.106	0.106	0.124	0.124	0.370	0.370	0.385	0.386
Mean outcome	153.3	153.3	153.3	153.3	153.3	153.3	153.3	153.3
Effect +SD at mean Dur.		4.546		4.570		7.508		7.416

Notes. Coefficients are presented with standard errors in parentheses (clustered at province level in columns 1 to 4, or at *CA* level in columns 5 to 8). Significance levels: *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is *Delay in completion of works (days)*, i.e., the delay in delivering of the works. *Duration of trials* is a province-level variable (varying over time) estimating the duration of civil trials, computed by the National Institute of Statistics (ISTAT). *Reserve price* is the auction's starting value (in 100,000 euros, CPI deflated, 2000 equivalents) set by *CA*. *Expected duration* is the contractual duration of works set by *CA*. When denoted with an "X", regressions additionally include: *Type of CA FE*, a set of dummy variables for the type of *CA* awarding the contract; *Category of works FE*, a set of dummy variables for the main category of works; *Awarding mechanism FE*, a set of dummy variables for the type of awarding mechanism; *Province FE* is a set of dummy variables for the province where the contract is awarded; *CA FE* is a set of dummy variables for each *CA*; *Year FE* is a dummy variable corresponding to the year when the contract is awarded (between 2000 and 2006); *Province-year control* means that a variable with a province-year dimension has been added (i.e., population of the province). *Mean outcome* is the mean value of the dependent variable. *Effect +SD at Mean Dur.* represents the change in the dependent variable associated with an increase of one standard deviation in the Duration of trials from the mean value of its distribution (this effect is only included when the Duration of trials enters the model as single term and as a quadratic term).

Table A10: Robustness: Duration of trials

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable	Delays in completion of works (days)							
(Average lags) Duration of trials	-0.01211	0.13666***	-0.01013	0.15501***	0.02439**	0.15604***	0.02572**	0.17175***
	(0.014)	(0.052)	(0.014)	(0.052)	(0.012)	(0.053)	(0.012)	(0.053)
(Average lags) Duration of trials^2		-0.00007***		-0.00008***		-0.00006***		-0.00007***
		(0.000)		(0.000)		(0.000)		(0.000)
Reserve price	2.81140***	2.81530***	6.25542***	6.26588***	2.84250***	2.84719***	6.37210***	6.38386***
	(0.307)	(0.306)	(0.424)	(0.423)	(0.295)	(0.296)	(0.362)	(0.362)
Reserve price^2			-0.02796***	-0.02801***			-0.02954***	-0.02960***
			(0.003)	(0.003)			(0.003)	(0.003)
Type of CA FE	X	X	X	X				
Category of work FE	X	X	X	X	X	X	X	X
Awarding mechanism FE	X	X	X	X	X	X	X	X
Province FE	X	X	X	X				
CA FE					X	X	X	X
Year FE	X	X	X	X	X	X	X	X
Province-year control	X	X	X	X	X	X	X	X
Observations	33,053	33,053	33,053	33,053	33,053	33,053	33,053	33,053
R-squared	0.104	0.104	0.124	0.124	0.382	0.382	0.397	0.397
Mean outcome	149.4	149.4	149.4	149.4	149.4	149.4	149.4	149.4
Effect +SD at mean Dur.		4.747		6.162		12.340		13.330

Notes. Coefficients are presented with standard errors in parentheses (clustered at province level in columns 1 to 4, or at *CA* level in columns 5 to 8). Significance levels: *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is *Delay in completion of works (days)*, i.e., the delay in delivering of the works. *(Average lags) Duration of trials* is a province-level variable (varying over time) and it is constructed as a moving average from time T_0 to T_{-2} where T_0 is the median year between the date of awarding and the date of expected (contractual) delivery of works; it represents the estimation of the duration of civil trials, computed by the National Institute of Statistics (ISTAT). *Reserve price* is the auction's starting value (in 100,000 euros, CPI deflated, 2000 equivalents) set by *CA*. When denoted with an "X", regressions additionally include: *Type of CA FE*, a set of dummy variables for the type of *CA* awarding the contract; *Category of works FE*, a set of dummy variables for the main category of works; *Awarding mechanism FE*, a set of dummy variables for the type of awarding mechanism; *Province FE* is a set of dummy variables for the province where the contract is awarded; *CA FE* is a set of dummy variables for each *CA*; *Year FE* is a dummy variable corresponding to the year when the contract is awarded (between 2000 and 2006); *Province-year control* means that a variable with a province-year dimension has been added (i.e., population of the province). *Mean outcome* is the mean value of the dependent variable. *Effect +SD at Mean Dur.* represents the change in the dependent variable associated with an increase of one standard deviation in the Duration of trials from the mean value of its distribution (this effect is only included when the Duration of trials enters the model as single term and as a quadratic term).

Table A11: Robustness: Duration of trials

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable	Delays in completion of works (days)							
(Average lags) Duration of trials	-0.01605	0.16609***	-0.01439	0.17828***	0.01492	0.18199***	0.01611	0.18882***
	(0.015)	(0.059)	(0.015)	(0.055)	(0.012)	(0.057)	(0.012)	(0.055)
(Average lags) Duration of trials^2		-0.00008***		-0.00009***		-0.00008***		-0.00008***
		(0.000)		(0.000)		(0.000)		(0.000)
Reserve price	3.02397***	3.02926***	6.84147***	6.85128***	3.13707***	3.14225***	7.11113***	7.11930***
	(0.304)	(0.304)	(0.449)	(0.448)	(0.306)	(0.306)	(0.369)	(0.369)
Reserve price^2			-0.03071***	-0.03075***			-0.03264***	-0.03267***
			(0.003)	(0.003)			(0.003)	(0.003)
Type of CA FE	X	X	X	X				
Category of work FE	X	X	X	X	X	X	X	X
Awarding mechanism FE	X	X	X	X	X	X	X	X
Province FE	X	X	X	X				
CA FE					X	X	X	X
Year FE	X	X	X	X	X	X	X	X
Province-year control	X	X	X	X	X	X	X	X
Observations	35,088	35,088	35,088	35,088	35,088	35,088	35,088	35,088
R-squared	0.104	0.105	0.128	0.128	0.377	0.378	0.395	0.396
Mean outcome	154.1	154.1	154.1	154.1	154.1	154.1	154.1	154.1
Effect +SD at mean Dur.		5.500		6.511		11.290		11.850

Notes. Coefficients are presented with standard errors in parentheses (clustered at province level in columns 1 to 4, or at *CA* level in columns 5 to 8). Significance levels: *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is *Delay in completion of works (days)*, i.e., the delay in delivering of the works. *(Average lags) Duration of trials* is a province-level variable (varying over time) and it is constructed as a moving average from time T_0 to T_{-2} where T_0 is the year of expected (contractual) delivery of works; it represents the estimation of the duration of civil trials, computed by the National Institute of Statistics (ISTAT). *Reserve price* is the auction's starting value (in 100,000 euros, CPI deflated, 2000 equivalents) set by *CA*. When denoted with an "X", regressions additionally include: *Type of CA FE*, a set of dummy variables for the type of *CA* awarding the contract; *Category of works FE*, a set of dummy variables for the main category of works; *Awarding mechanism FE*, a set of dummy variables for the type of awarding mechanism; *Province FE* is a set of dummy variables for the province where the contract is awarded; *CA FE* is a set of dummy variables for each *CA*; *Year FE* is a dummy variable corresponding to the year when the contract is awarded (between 2000 and 2006); *Province-year control* means that a variable with a province-year dimension has been added (i.e., population of the province). *Mean outcome* is the mean value of the dependent variable. *Effect +SD at Mean Dur.* represents the change in the dependent variable associated with an increase of one standard deviation in the Duration of trials from the mean value of its distribution (this effect is only included when the Duration of trials enters the model as single term and as a quadratic term).

Table A12: Robustness: Controlling for the presence of more than a single court within the province

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable	Delays in completion of works (days)							
Duration of trials	-0.00116	0.06185*	-0.00137	0.06339*	0.00701	0.07496**	0.00575	0.08005**
	(0.007)	(0.034)	(0.007)	(0.032)	(0.008)	(0.034)	(0.008)	(0.034)
Duration of trials^2		-0.00003**		-0.00003**		-0.00003**		-0.00003**
		(0.000)		(0.000)		(0.000)		(0.000)
Reserve price	2.79300***	2.79459***	6.38445***	6.38673***	2.86029***	2.86226***	6.48087***	6.48633***
	(0.297)	(0.297)	(0.361)	(0.361)	(0.290)	(0.290)	(0.342)	(0.341)
Reserve price^2			-0.02827***	-0.02828***			-0.02880***	-0.02883***
			(0.002)	(0.002)			(0.002)	(0.002)
Type of CA FE	X	X	X	X				
Category of works FE	X	X	X	X	X	X	X	X
Awarding mechanism FE	X	X	X	X	X	X	X	X
Province FE	X	X	X	X				
CA FE					X	X	X	X
Year FE	X	X	X	X	X	X	X	X
Province-year control	X	X	X	X	X	X	X	X
Observations	30,128	30,128	30,128	30,128	30,128	30,128	30,128	30,128
R-squared	0.104	0.104	0.127	0.127	0.370	0.370	0.386	0.386
Mean outcome	149.0	149.0	149.0	149.0	149.0	149.0	149.0	149.0
Effect +SD at mean Dur.		3.396		3.441		5.591		5.579

Notes. Coefficients are presented with standard errors in parentheses (clustered at province level in columns 1 to 4, or at *CA* level in columns 5 to 8). Significance levels: *** p<0.01, ** p<0.05, * p<0.1. The estimation results reported in this table are based on a sample excluding contracts awarded by municipalities in those provinces where there are more than a single court. The dependent variable is *Delay in completion of works (days)*, i.e., the delay in delivering of the works. *Duration of trials* is a province-level variable (varying over time) estimating the duration of civil trials, computed by the National Institute of Statistics (ISTAT). *Reserve price* is the auction's starting value (in 100,000 euros, CPI deflated, 2000 equivalents) set by *CA*. When denoted with an "X", regressions additionally include: *Type of CA FE*, a set of dummy variables for the type of *CA* awarding the contract; *Category of works FE*, a set of dummy variables for the main category of works; *Awarding mechanism FE*, a set of dummy variables for the type of awarding mechanism; *Province FE* is a set of dummy variables for the province where the contract is awarded; *CA FE* is a set of dummy variables for each *CA*; *Year FE* is a dummy variable corresponding to the year when the contract is awarded (between 2000 and 2006); *Province-year control* means that a variable with a province-year dimension has been added (i.e., population of the province). *Mean outcome* is the mean value of the dependent variable. *Effect +SD at Mean Dur.* represents the change in the dependent variable associated with an increase of one standard deviation in the Duration of trials from the mean value of its distribution (this effect is only included when the Duration of trials enters the model as single term and as a quadratic term).

Table A13: Alternative outcome: Winning rebate

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable	Winning rebate							
Duration of trials	-0.00083	-0.00160	-0.00083	-0.00160	-0.00010	-0.00174	-0.00011	-0.00169
	(0.001)	(0.002)	(0.001)	(0.002)	(0.000)	(0.002)	(0.000)	(0.002)
Duration of trials^2		0.00000		0.00000		0.00000		0.00000
		(0.000)		(0.000)		(0.000)		(0.000)
Reserve price	0.07782***	0.07780***	0.14987***	0.14985***	0.07251***	0.07243***	0.12569***	0.12558***
	(0.006)	(0.006)	(0.010)	(0.010)	(0.007)	(0.007)	(0.009)	(0.009)
Reserve price^2			-0.00057***	-0.00057***			-0.00043***	-0.00043***
			(0.000)	(0.000)			(0.000)	(0.000)
Type of CA FE	X	X	X	X				
Category of works FE	X	X	X	X	X	X	X	X
Awarding mechanism FE	X	X	X	X	X	X	X	X
Province FE	X	X	X	X				
CA FE					X	X	X	X
Year FE	X	X	X	X	X	X	X	X
Province-year control	X	X	X	X	X	X	X	X
Observations	40,521	40,521	40,521	40,521	40,521	40,521	40,521	40,521
R-squared	0.487	0.487	0.490	0.490	0.707	0.707	0.708	0.708
Mean outcome	14.90	14.90	14.90	14.90	14.90	14.90	14.90	14.90
Effect +SD at mean Dur.		-0.296		-0.296		-0.133		-0.132

Notes. Coefficients are presented with standard errors in parentheses (clustered at province level in columns 1 to 4, or at *CA* level in columns 5 to 8). Significance levels: *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is *Winning rebate*, i.e., the percentage discount offered by the winning firm over the reserve price. *Duration of trials* is a province-level variable (varying over time) estimating the duration of civil trials, computed by the National Institute of Statistics (ISTAT). *Reserve price* is the auction's starting value (in 100,000 euros, CPI deflated, 2000 equivalents) set by *CA*. When denoted with an "X", regressions additionally include: *Type of CA FE*, a set of dummy variables for the type of *CA* awarding the contract; *Category of works FE*, a set of dummy variables for the main category of works; *Awarding mechanism FE*, a set of dummy variables for the type of awarding mechanism; *Province FE* is a set of dummy variables for the province where the contract is awarded; *CA FE* is a set of dummy variables for each *CA*; *Year FE* is a dummy variable corresponding to the year when the contract is awarded (between 2000 and 2006); *Province-year control* means that a variable with a province-year dimension has been added (i.e., population of the province). *Mean outcome* is the mean value of the dependent variable for the sample. *Effect +SD at Mean Dur.* represents the change in the dependent variable associated with an increase of one standard deviation in the Duration of trials from the mean value of its distribution (this effect is only included when the Duration of trials enters the model as single term and as a quadratic term).

Table A14: Alternative outcome: Number of bidders

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable	Number of bidders							
Duration of trials	-0.00434	-0.00054	-0.00438	-0.00050	-0.00234	0.00950	-0.00244	0.01004
	(0.003)	(0.012)	(0.003)	(0.012)	(0.003)	(0.009)	(0.003)	(0.009)
Duration of trials^2		-0.00000		-0.00000		-0.00001		-0.00001
		(0.000)		(0.000)		(0.000)		(0.000)
Reserve price	0.20280***	0.20289***	0.79937***	0.79947***	0.17906***	0.17957***	0.70954***	0.71045***
	(0.042)	(0.042)	(0.090)	(0.090)	(0.041)	(0.041)	(0.081)	(0.081)
Reserve price^2			-0.00470***	-0.00470***			-0.00432***	-0.00433***
			(0.001)	(0.001)			(0.001)	(0.001)
Type of CA FE	X	X	X	X				
Category of works FE	X	X	X	X	X	X	X	X
Awarding mechanism FE	X	X	X	X	X	X	X	X
Province FE	X	X	X	X				
CA FE					X	X	X	X
Year FE	X	X	X	X	X	X	X	X
Province-year control	X	X	X	X	X	X	X	X
Observations	40,359	40,359	40,359	40,359	40,359	40,359	40,359	40,359
R-squared	0.277	0.277	0.292	0.292	0.500	0.500	0.508	0.508
Mean outcome	29.80	29.80	29.80	29.80	29.80	29.80	29.80	29.80
Effect +SD at mean Dur.		-1.015		-1.020		0.057		0.066

Notes. Coefficients are presented with standard errors in parentheses (clustered at province level in columns 1 to 4, or at *CA* level in columns 5 to 8). Significance levels: *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is *Number of bidders*, i.e., the number of companies submitting a bid. *Duration of trials* is a province-level variable (varying over time) estimating the duration of civil trials, computed by the National Institute of Statistics (ISTAT). *Reserve price* is the auction's starting value (in 100,000 euros, CPI deflated, 2000 equivalents) set by *CA*. When denoted with an "X", regressions additionally include: *Type of CA FE*, a set of dummy variables for the type of *CA* awarding the contract; *Category of works FE*, a set of dummy variables for the main category of works; *Awarding mechanism FE*, a set of dummy variables for the type of awarding mechanism; *Province FE* is a set of dummy variables for the province where the contract is awarded; *CA FE* is a set of dummy variables for each *CA*; *Year FE* is a dummy variable corresponding to the year when the contract is awarded (between 2000 and 2006); *Province-year control* means that a variable with a province-year dimension has been added (i.e., population of the province). *Mean outcome* is the mean value of the dependent variable for the sample. *Effect +SD at Mean Dur.* represents the change in the dependent variable associated with an increase of one standard deviation in the Duration of trials from the mean value of its distribution (this effect is only included when the Duration of trials enters the model as single term and as a quadratic term).

Table A15: Alternative outcome: Cost overrun

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable				Cost overrun				
Duration of trials	0.00005	0.00015	0.00005	0.00017	0.00005	-0.00009	0.00005	-0.00006
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Duration of trials^2		-0.00000		-0.00000		0.00000		0.00000
		(0.000)		(0.000)		(0.000)		(0.000)
Reserve price	0.07855***	0.07855***	0.11618***	0.11618***	0.07902***	0.07900***	0.11315***	0.11313***
	(0.003)	(0.003)	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)
Reserve price^2			-0.00080***	-0.00080***			-0.00070***	-0.00070***
			(0.000)	(0.000)			(0.000)	(0.000)
Type of CA FE	X	X	X	X				
Category of works FE	X	X	X	X	X	X	X	X
Awarding mechanism FE	X	X	X	X	X	X	X	X
Province FE	X	X	X	X				
CA FE					X	X	X	X
Year FE	X	X	X	X	X	X	X	X
Province-year control	X	X	X	X	X	X	X	X
Observations	27,299	27,299	27,299	27,299	27,299	27,299	27,299	27,299
R-squared	0.328	0.328	0.360	0.360	0.530	0.530	0.549	0.549
Mean outcome	0.468	0.468	0.468	0.468	0.468	0.468	0.468	0.468
Effect +SD at mean Dur.		0.0221		0.0225		0.00639		0.00736

Notes. Coefficients are presented with standard errors in parentheses (clustered at province level in columns 1 to 4, or at *CA* level in columns 5 to 8). Significance levels: *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is *Cost overrun*, i.e., the difference between the final price and the awarding price offered by the winning firm (in 100,000 euros, CPI deflated, 2000 equivalents). *Duration of trials* is a province-level variable (varying over time) estimating the duration of civil trials, computed by the National Institute of Statistics (ISTAT). *Reserve price* is the auction's starting value (in 100,000 euros, CPI deflated, 2000 equivalents) set by *CA*. When denoted with an "X", regressions additionally include: *Type of CA FE*, a set of dummy variables for the type of *CA* awarding the contract; *Category of works FE*, a set of dummy variables for the main category of works; *Awarding mechanism FE*, a set of dummy variables for the type of awarding mechanism; *Province FE* is a set of dummy variables for the province where the contract is awarded; *CA FE* is a set of dummy variables for each *CA*; *Year FE* is a dummy variable corresponding to the year when the contract is awarded (between 2000 and 2006); *Province-year control* means that a variable with a province-year dimension has been added (i.e., population of the province). *Mean outcome* is the mean value of the dependent variable for the sample. *Effect +SD at Mean Dur.* represents the change in the dependent variable associated with an increase of one standard deviation in the Duration of trials from the mean value of its distribution (this effect is only included when the Duration of trials enters the model as single term and as a quadratic term).

Table A16: Relationship between cost overrun and delays (time overrun)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable					Cost overrun			
Days of delay	0.00055***	0.00055***	0.00045***	0.00045***	0.00055***	0.00055***	0.00046***	0.00046***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Duration of trials	0.00005	0.00011	0.00005	0.00014	0.00005	-0.00011	0.00005	-0.00008
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Duration of trials^2		-0.00000		-0.00000		0.00000		0.00000
		(0.000)		(0.000)		(0.000)		(0.000)
Reserve price	0.07602***	0.07602***	0.11261***	0.11261***	0.07626***	0.07624***	0.10934***	0.10932***
	(0.003)	(0.003)	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)
Reserve price^2			-0.00076***	-0.00077***			-0.00067***	-0.00067***
			(0.000)	(0.000)			(0.000)	(0.000)
Type of CA FE	X	X	X	X				
Category of works FE	X	X	X	X	X	X	X	X
Awarding mechanism FE	X	X	X	X	X	X	X	X
Province FE	X	X	X	X				
CA FE					X	X	X	X
Year FE	X	X	X	X	X	X	X	X
Province-year control	X	X	X	X	X	X	X	X
Observations	27,299	27,299	27,299	27,299	27,299	27,299	27,299	27,299
R-squared	0.337	0.337	0.366	0.366	0.535	0.536	0.553	0.553
Mean outcome	0.468	0.468	0.468	0.468	0.468	0.468	0.468	0.468

Notes. Coefficients are presented with standard errors in parentheses (clustered at province level in columns 1 to 4, or at *CA* level in columns 5 to 8). Significance levels: *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is *Cost overrun*, i.e., the difference between the final price and the awarding price offered by the winning firm (in 100,000 euros, CPI deflated, 2000 equivalents). *Days of delay* (or *Delay in completion of works, days)*, i.e., the delay in delivering of the works. *Duration of trials* is a province-level variable (varying over time) estimating the duration of civil trials, computed by the National Institute of Statistics (ISTAT). *Reserve price* is the auction's starting value (in 100,000 euros, CPI deflated, 2000 equivalents) set by *CA*. When denoted with an "X", regressions additionally include: *Type of CA FE*, a set of dummy variables for the type of *CA* awarding the contract; *Category of works FE*, a set of dummy variables for the main category of works; *Awarding mechanism FE*, a set of dummy variables for the type of awarding mechanism; *Province FE* is a set of dummy variables for the province where the contract is awarded; *CA FE* is a set of dummy variables for each *CA*; *Year FE* is a dummy variable corresponding to the year when the contract is awarded (between 2000 and 2006); *Province-year control* means that a variable with a province-year dimension has been added (i.e., population of the province). *Mean outcome* is the mean value of the dependent variable.

Table A17: Robustness: Controlling for awarding price

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable	Delays in completion of works (days)							
Duration of trials	0.00184	0.06010*	0.00174	0.06202**	0.00969	0.08110***	0.00896	0.08490***
	(0.007)	(0.033)	(0.007)	(0.031)	(0.007)	(0.030)	(0.007)	(0.030)
Duration of trials^2		-0.00003*		-0.00003**		-0.00003**		-0.00003***
		(0.000)		(0.000)		(0.000)		(0.000)
Awarding price	3.54653***	3.54801***	7.59334***	7.59569***	3.71582***	3.71903***	8.12088***	8.12700***
	(0.380)	(0.381)	(0.505)	(0.505)	(0.342)	(0.342)	(0.379)	(0.379)
Awarding price^2			-0.03869***	-0.03870***			-0.04378***	-0.04381***
			(0.004)	(0.004)			(0.003)	(0.003)
Type of CA FE	X	X	X	X				
Category of works FE	X	X	X	X	X	X	X	X
Awarding mechanism FE	X	X	X	X	X	X	X	X
Province FE	X	X	X	X				
CA FE					X	X	X	X
Year FE	X	X	X	X	X	X	X	X
Province-year control	X	X	X	X	X	X	X	X
Observations	40,521	40,521	40,521	40,521	40,521	40,521	40,521	40,521
R-squared	0.103	0.103	0.124	0.124	0.369	0.369	0.386	0.386
Mean outcome	153.3	153.3	153.3	153.3	153.3	153.3	153.3	153.3
Effect +SD at mean Dur.		4.535		4.643		7.321		7.390

Notes. Coefficients are presented with standard errors in parentheses (clustered at province level in columns 1 to 4, or at *CA* level in columns 5 to 8). Significance levels: *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is *Delay in completion of works (days)*, i.e., the delay in delivering of the works. *Duration of trials* is a province-level variable (varying over time) estimating the duration of civil trials, computed by the National Institute of Statistics (ISTAT). *Awarding price* is the auction's starting value (in 100,000 euros, CPI deflated, 2000 equivalents) set by *CA* minus the percentage rebate offered by the winning firm. When denoted with an "X", regressions additionally include: *Type of CA FE*, a set of dummy variables for the type of *CA* awarding the contract; *Category of works FE*, a set of dummy variables for the main category of works; *Awarding mechanism FE*, a set of dummy variables for the type of awarding mechanism; *Province FE* is a set of dummy variables for the province where the contract is awarded; *CA FE* is a set of dummy variables for each *CA*; *Year FE* is a dummy variable corresponding to the year when the contract is awarded (between 2000 and 2006); *Province-year control* means that a variable with a province-year dimension has been added (i.e., population of the province). *Mean outcome* is the mean value of the dependent variable. *Effect +SD at Mean Dur.* represents the change in the dependent variable associated with an increase of one standard deviation in the Duration of trials from the mean value of its distribution (this effect is only included when the Duration of trials enters the model as single term and as a quadratic term).

Table A18: Robustness: Poisson regression

	(1)	(2)	(3)	(4))
Dependent Variable	Delays in completion of works (days)			
Duration of trials	0.00002	0.00047**	0.00002	0.00045**
	(0.000)	(0.000)	(0.000)	(0.000)
Duration of trials^2		-0.00000**		-0.00000**
		(0.000)		(0.000)
Reserve price	0.00932***	0.00934***	0.03035***	0.03035***
	(0.001)	(0.001)	(0.002)	(0.002)
Reserve price^2			-0.00015***	-0.00015***
			(0.000)	(0.000)
Type of CA FE	X	X	X	X
Category of works FE	X	X	X	X
Awarding mechanism FE	X	X	X	X
Province FE	X	X	X	X
Year FE	X	X	X	X
Province-year control	X	X	X	X
Observations	40,521	40,521	40,521	40,521
Mean outcome	155.0	155.0	155.0	155.0

Notes. Coefficients are presented with standard errors in parentheses (clustered at province level). Significance levels: *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is *Delay in completion of works (days)*, i.e., the delay in delivering of the works (negative value are replaced with 0). *Duration of trials* is a province-level variable (varying over time) estimating the duration of civil trials, computed by the National Institute of Statistics (ISTAT). *Reserve price* is the auction's starting value (in 100,000 euros, CPI deflated, 2000 equivalents) set by *CA*. When denoted with an "X", regressions additionally include: *Type of CA FE*, a set of dummy variables for the type of *CA* awarding the contract; *Category of works FE*, a set of dummy variables for the main category of works; *Awarding mechanism FE*, a set of dummy variables for the type of awarding mechanism; *Province FE* is a set of dummy variables for the province where the contract is awarded; *Year FE* is a dummy variable corresponding to the year when the contract is awarded (between 2000 and 2006); *Province-year control* means that a variable with a province-year dimension has been added (i.e., population of the province). *Mean outcome* is the mean value of the dependent variable.

Table A19: Robustness: Northern provinces

	(1)	(2)	(3)	(4)
Dependent Variable	Delays in execution of works (days)			
	Only Piedmont and Lombardy			
Duration of trials	0.03773**	0.03344	0.01065	-0.01060
	(0.016)	(0.087)	(0.018)	(0.085)
Duration of trials^2		0.00000		0.00001
		(0.000)		(0.000)
Reserve price	2.10474***	2.10456***	-0.67628	-0.68383
	(0.286)	(0.286)	(0.871)	(0.871)
(Duration of trials)*(Reserve price)			0.00468***	0.00469***
			(0.001)	(0.001)
Category of works FE	X	X	X	X
Awarding mechanism FE	X	X	X	X
CA FE	X	X	X	X
Year FE	X	X	X	X
Province-year control	X	X	X	X
Observations	13,401	13,401	13,401	13,401
R-squared	0.318	0.318	0.320	0.320
Mean outcome	144.7	144.7	144.7	144.7
Effect +SD at mean Dur.		8.105		
Effect +SD at mean Res.			8.768	
Effect +SD at mean Res. (and mean Dur.)				7.392

Notes. Coefficients are reported with standard errors (clustered at *CA* level) in parentheses. Significance levels: *** p<0.01, ** p<0.05, * p<0.1. We only consider regions with a better-quality data collection, i.e., Piedmont and Lombardy. The dependent variable is the *Delay in completion of works (days)*, i.e., the delay in delivering of the works. *Duration of trials* is a province-level variable (varying over time) estimating the duration of civil trials, computed by the National Institute of Statistics (ISTAT). *Reserve price* is the auction's starting value (in 100,000 euros, CPI deflated, 2000 equivalents) set by *CA*. When denoted with an "X", regressions additionally include: *CA FE*, a set of dummy variables for each *CA*; *Category of works FE*, a set of dummy variables for the main category of works involved in the contract; *Awarding mechanism FE*, a set of dummy variables for the type of awarding mechanism; *Year FE*, a dummy variable corresponding to the year when the contract is awarded (between 2000 and 2006); *Province-year control* means that a variable with a province-year dimension has been added (i.e., population of the province). *Mean outcome* is the mean value of the dependent variable. *Effect +SD at mean Dur.* represents the change in the dependent variable associated with an increase of one standard deviation in the Duration of trials from the mean value of its distribution (this effect is only included when the Duration of trials enters the model as a single term and as a quadratic term). *Effect +SD at mean Res.* represents the change in the dependent variable associated with an increase of one standard deviation in the Duration of trials computed at the mean level of the Reserve price (this effect is only included when the Duration of trials enters the model as a single term and interacts with the Reserve price). *Effect +SD at mean Res. and mean Dur.* represents the change in the dependent variable associated with an increase of one standard deviation in the Duration of trials computed at the mean value of the Reserve price variable and at the mean value of the Duration of trials (this effect is only included when the Duration of trials enters the model as a single term and as a quadratic term, and interacts with the Reserve price).

Table A20: Robustness: Number of yearly per-capita contracts in the Public Administration

	(1)	(2)
Dependent Variable	Number of public contracts (yearly)	
Duration of trials	0.00019	-0.00040
	(0.000)	(0.000)
Duration of trials^2		0.00000
		(0.000)
Year FE	X	X
Province FE	X	X
Observations	579	579
R-squared	0.807	0.808
Mean outcome	1.345	1.345

Notes. Coefficients are reported with standard errors (clustered at province level) in parentheses. Significance levels: *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is *Number of contracts*, i.e. the number of public contracts for works (per 10,000 inhabitants) awarded in a province in a given year. *Duration of trials* is a province-level variable (varying over time) estimating the duration of civil trials, computed by the National Institute of Statistics (ISTAT). When denoted with an "X", regressions additionally include: *Year FE*, a dummy variable corresponding to the year when the contracts are awarded (between 2000 and 2006); *Province FE* is a set of dummy variables for the province where the contracts are awarded. *Mean outcome* is the mean value of the dependent variable.

Table A21: Robustness: Corruption, duration of trials and type of firms

	(1)	(2)	(3)	(4)	(5)	(6)
	OLS	Probit	Logit	OLS	Probit	Logit
Dependent Variable	Winning firms is:					
	Large firms (JSC)			Small firms (one-man business)		
Duration of trials	0.00014**	0.00092**	0.00170*	-0.00016*	-0.00042	-0.00071
	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.001)
Duration of trials^2	-0.00000*	-0.00000*	-0.00000	0.00000*	0.00000	0.00000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Corruption*Duration of trials	-0.00001	-0.00009	-0.00019	0.00001	0.00004	0.00007
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Reserve price	0.00457***	0.01761***	0.03140***	-0.00155***	-0.02323***	-0.05036***
	(0.000)	(0.002)	(0.003)	(0.000)	(0.004)	(0.010)
Type of CA FE	X	X	X	X	X	X
Cat. of works FE	X	X	X	X	X	X
Aw. mechanism FE	X	X	X	X	X	X
Province FE	X	X	X	X	X	X
Year FE	X	X	X	X	X	X
Province-year c.	X	X	X	X	X	X
Observations	19,866	19,716	19,716	19,866	19,672	19,672
Mean outcome	0.108	0.108	0.108	0.114	0.115	0.115

Notes. Coefficients are presented with standard errors in parentheses (clustered at province level). Significance levels: *** p<0.01, ** p<0.05, * p<0.1. The dependent variable in columns 1-3 is a dummy variable indicating that the winning *F* is a *large firm* (i.e., a *JSC*-joint stock company); in columns 4-6 is a dummy variable indicating that the winning *F* is a *small firm* (i.e., one-man business). *Duration of trials* is a province-level variable (varying over time) estimating the duration of civil trials, computed by the National Institute of Statistics (ISTAT). *Reserve price* is the auction's starting value (in 100,000 euros, CPI deflated, 2000 equivalents) set by *CA*. When denoted with an "X", regressions additionally include: *Type of CA FE*, a set of dummy variables for the type of *CA* awarding the contract; *Category of works FE*, a set of dummy variables for the main category of works; *Awarding mechanism FE*, a set of dummy variables for the type of awarding mechanism; *Province FE* is a set of dummy variables for the province where the contract is awarded; *Year FE* is a dummy variable corresponding to the year when the contract is awarded (between 2000 and 2005); *Province-year control* means that a variable with a province-year dimension has been added (i.e., population of the province). *Mean outcome* is the mean value of the dependent variable.