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 from the data.

JEL-Code: H41; H57; K41.

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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 therefore 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) stress, delivery time is often an important quality dimension, and delays can have a significant negative impact on end-users. We first develop a stylized model in the spirit of the nuisance claim literature (Rosenberg and Shavell, 1985) to organize the data and guide the empirical analysis. The model also helps our understanding the incentives of the agents (i.e., suppliers and public buyers) involved in the procurement process. The effects of the duration of trials on procurement delays is *a priori* ambiguous and may depend on *who is suing who* (i.e., on who is the plaintiff and who is the defendant), and on other features specific to the institutional environment like litigation costs and their distribution. In the Italian case, it is the contractor that must act as a plaintiff because the contracting authority can move first by detracting the penalty from the contract. Under this assumption, and others chosen to match the institutional setting from where our data come from, we derive testable predictions relevant to the empirical analysis.

[1] This has been particularly true in Europe, where reputational considerations have typically been seen by legislators as a tool to discriminate against foreign suppliers (e.g., EC Directives 2004/17, 2004/18, 2014/24, 2014/25; see Butler et al. 2013 for further discussion on the recent EU regulation).

We then use a large dataset on public works collected by the Italian Public Procurement Authority (henceforth, AVCP) for the years 2000-2006 to empirically investigate this relationship. AVCP maintains a centralized electronic databases containing a wide range of detailed information on public procurement - crucial to our analysis and to any anti-corruption activity - that are not even collected in the vast majority of other countries (see, for instance, Konkurrensverket, 2015). We merge this dataset with information collected by the Italian Statistics Institute (henceforth, 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 developed countries. Italy is a judicial outlier, twice as slow as any other member of the OECD and characterized by large territorial and time variability in judicial efficiency (Palumbo et al., 2013).

Our empirical findings suggest that, as predicted by our model, delays in executing public works are positively associated with the duration of civil trials. This effect is statistically significant, and it is robust to the inclusion of a large set of contract, geographical and time controls in our regressions. We also find that the association between procurement and court delays is stronger for larger and more complex projects. This is also consistent with our model, as the seminal paper by Bajari and Tadelis (2001) highlighted that the stronger asymmetric information typical of large/complex contracts favors contractors in legal disputes.

Furthermore, we find that where trials take longer, contracts are more often awarded to larger suppliers and this is in line with previous evidence by Laeven and Woodruff (2007). We also find that the final amount to be paid after delivery is larger where the trial duration is longer, a result 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 results 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 benefits - in terms of social welfare - of including project completion time in the auction mechanism. D'Alpaos et al. (2013) develop a model in which - if penalties for late delivery are included in the contract - the supplier's choice concerning the execution time can be investigated as a real option (i.e., a put option); in such a setting, the supplier's choice results affected by the volatility of investment costs and by the enforcement of penalty clauses. Lewis and Bajari (2014) investigate how higher penalties for delay in delivery can induce greater 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' moral hazard in adjusting their effort level during the course of the contract in response to unanticipated productivity shocks. Coviello et al. (2016) use data similar to ours, and find that an increase in buyer discretion in selecting potential suppliers needs not result in worst procurement performance. 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 the 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 show that the level of such formalism is higher in civil than in common law countries, and is typically associated with longer lasting trials, fewer fair sentences and more corruption. The same 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 the performance of small firms. He finds that a more expedited 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 (Gil and Zanarone, 2015). Closest to us in this strand is the work of Johnson et al. (2002), who 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) may in fact not be 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 first briefly detail the institutional features of penalties for late delivery in accordance with the Italian regulations on public procurement.

[2]See also Litschig and Zamboni (2015), who estimate the effect of state judiciary presence on rent extraction (administrative irregularities) by local governments in Brazil; Ponticelli (2015), who makes an empirical assessment of the extent to which the effects of a financial reform in Brazil are dependent upon 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.

Then, using the nuisance suits literature as a base, we present a simple model that shows how agents might interact in such a setting. In Section 3, we describe our dataset, illustrating the cross-sectional variability (across Italian provinces) of delays in the execution of works, as well as 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 trial duration interacts with the complexity of the contract and is correlated 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 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 for public works. Then, we present a simple model that describes 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

In our sample period, the applicable procurement law is Law No. 109/94, which was enacted in Italy in the early 1990s, in the immediate aftermath of several corruption scandals in public procurement. This historical context provides us with an understanding of why the law is so strict in the use of scoring auctions and negotiations, and in imposing clauses on price definitions (and revisions).

The contractual terms with which suppliers have to comply in the delivery of public works are specified in the call for tenders, while general rules are specified by Italian procurement law. The latter i) prescribes time incentives clauses to be included in all contracts (in the form of payment deductions/penalties for late delivery), ii) regulates the lower and upper

limits of said penalties (in the range of 0.03% to 0.1% of the contract value for each day of delay), iii) caps the total amount of the penalties that can be exercised (10% of the contract value), and iv) mandates contract resolution and damage action (where possible) if this limit is reached.[3] The contract value is determined by an engineer employed by the CA, according to a price list that enumerates the standardized costs for each type of work (see Decarolis, 2014, and Coviello and Marinello, 2014 for details on how the CA determines this price). This value represents the reserve price of the contract, i.e., the maximum price that the CA is willing to pay for a public work before the auction to award the contract takes place.

Italian procurement law indicates three main types of awarding procedures for public works: open procedures, restricted procedures and negotiations. The standard approach is the open procedure; however, the choice between the three depends on the reserve price of the auction, alongside other technical aspects. In our sample, the winner of the auction is determined by a mathematical algorithm. This auction mechanism is somewhat unconventional in that it includes a number of "beauty contest" features whereby the highest bidder does not necessarily win, but is used with slight modifications in many other countries (see Decarolis 2014 for a discussion). The specific features of the mechanism generate the theoretical possibility that increased participation need not result in greater competition (Albano et al., 2006; Decarolis, 2014).

Enforcement of penalty for late delivery. Even though 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. These penalties are enforced in the form of payment deductions, which are usually subtracted from payments to the contractor. According to the current procedure, the supplier can request for the penalty to be revoked (or only partially implemented) either because of a reason for delay that was outside the supplier's control (i.e., planning errors, adverse weather condi-

[3]Italian procurement law does not allow contractors to penalize suppliers that delivered past works in delay. Contractual penalties are the only punishment for late delivery.

tions, contingencies, etc.) or because the fee is "manifestly disproportionate" to the harm done. If the supplier presents a claim on the enforced penalty, the public buyer can assess the claim and decide whether or not to wholly (or partially) accept 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 due to the typically long duration of civil trials in Italy.

Note that the cost of dispute in court between a supplier and public buyer can vary substantially. The buyer's costs are not limited to spending on the resources that are required 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 to public works and the larger the political cost. Suppliers, on the other hand, can make use of such delays by allocating productive capacity more efficiently. Moreover, their future chances of winning a contract are not damaged because suing is their constitutional right. This asymmetry generates an incentive for public buyers to avoid entering into disputes with suppliers where the law courts are particularly slow. For the supplier to gain the right to a law suit, the sequence of events is as follows: once the supplier has delivered delayed work, the public buyer can enforce the penalty by subtracting it from the final payment. The supplier can then request for the penalty to be reviewed, and if the public buyer rejects the supplier's claim, the supplier can sue him. Thus, in this legal framework, in the resulting trial the supplier would act as *plaintiff* and the public buyer as *defendant*.

2.2 A simple model of equilibrium delay in delivery

In the very simple model we present in this section, which encompasses 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 from d days of delay in delivery of the works. Delaying the contract's execution generates a damage $D(d)$ to the CA, with $D(d) > V(d)$. We shall also make the following assumptions of the 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.

Figure 1 shows the timing of the game and the actions available to players. Payment occurs once the works are completed, and eventual penalties are deducted at that time. In the case that F delays the contract's delivery, CA may enforce the corresponding penalty pd and, if it does, F can file a claim in the local court to recover the 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 in the dispute.

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 $\alpha \in]0, 1[$ is the probability that the judge 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 judge to make a *type 1 error*.[4] 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 receive the enforced penalty minus the fraction $(1 - \alpha)pd$ that F will recover according to the judge's assessment.[5] If CA goes

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

[5] Note that higher value contracts are usually delivered by larger firms; these often have more information than the CA on the works in question, and can therefore use this information to influence the judge towards

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.[6]

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 some measure of social welfare for the citizens using the public works in question.[7]

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 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 withdraws rather than defends itself, they will respectively achieve:

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

a *type 1 error*.

[6] In Italian public procurement, if the firm loses its case against penalties for delay, it has to pay i) these penalties (but not the penalties for the delay incurred because of the trial); ii) its own legal costs for the trial; and iii) at the judge's discretion, part of the CA's legal cost (see the Italian Code of Civil Procedure, art. 91 and 92). Our simple model abstracts from iii) because including partial reimbursement would not change our qualitative results (it determines a smaller equilibrium delay if the judge is unlikely to make an error, and larger if this probability increases).

[7] Π, the final project payment to F, is a proxy for the size, importance and cost of the project, and also 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 is also a proxy for the value and the complexity of the project.

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 commonly known. We assume that α, the probability that the judge makes a *type 1 error*, is constant.

Equilibrium delay. As highlighted in Rosenberg and Shavell (1985), in a legal dispute, defeating a claim is more costly than making a claim. This is especially pertinent for complex procurement contracts (i.e., higher value contracts) where the supplier has more information than the buyer (Bajari and Tadelis, 2001). This information advantage can be used by the supplier to reinforce the signal when filing a 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, 1989, 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. This determines a social welfare loss and, consequently, an additional cost for CA when disputing enforceable penalties in court. The longer the trial, the higher the related social loss from the public's inability to access the executed public work.[8] 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, preventing CA from enforcing the penalty. Specifically, at node 4 having enforced the penalty,

[8]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 defends itself in court, end users of the kindergarden will only be able to 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 interest.

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 does not expect CA 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.,

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

We can then state the following.

Proposition 1: *There exists 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 is in Online Appendix A.

Proposition 1 indicates that there are reasonable parameter configurations of this simple model under 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 litigation for CA is relatively large, undermining the credibility of the threat by CA to contest a nuisance suit by F with the intention of not paying the penalty.

Crucial thresholds for this equilibrium are $\tilde{d} = \frac{R_{CA}}{(1-\alpha)p}$ and $d > \frac{k_F}{p}$, hence on inspection we can already see that this outcome will be more common and that equilibrium delays will be

longer the higher $CA's$ legal costs, R_{CA}, the lower the penalties for delay, p, the higher the courts' precision $(1-\alpha)$, and the lower the fixed cost for F of filing a nuisance suit.

We now make this simple scenario more complex in order to consider other important aspects of reality and develop additional predictions to be tested with our data (see *Corollary 1*), or shed light on CA's choice on p (see *Corollary 2*). Specifically, in what follows we extend our model to consider the following cases in which:

i) *Parties' legal costs increase with court delays,* $R'_{CA}(\gamma) > 0$ *and* $R'_F(\gamma) > 0$*, where* $R_{CA}(\gamma) > k_F + R_F(\gamma)$*, and* (γ) *is the average time to solve a dispute in court.* There is considerable empirical evidence to suggest that judicial systems characterized by lengthy trials tend to be more costly. For example, Palumbo et al. (2013), investigating different judicial systems using OECD and EU data, highlighted the positive correlation between the trial length and the litigants' cost for the trial, with Italy being in the worst position. Although these empirical findings relate to national judicial systems, the same effects could be inferred for courts at the provincial level: lengthy local trials result in higher legal costs. 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; this, as well as the institutional setting discussed in Section 2.1, motivates us to focus on the case $R'_{CA}(\gamma) \geq R'_F(\gamma)$. This extension allows us to make predictions - empirically tested in Section 4 - about the relationship between court efficiency (γ) and the delay, $\tilde{d}$.

ii) *The probability of a judge making a type 1 error increases with the size/complexity of the contract, i.e.,* $\alpha(\Pi)$*, with* $\alpha'(\Pi) > 0$*.* As mentioned by Bajari and Tadelis (2001) and broadly acknowledged in the procurement literature, larger value contracts tend to be more complex, and complex contracts are *ceteris paribus* more costly to perform. Furthermore, the importance of the informational advantage of F relative to the court tends to increase with larger and/or more complex projects. Accordingly, the larger in value and/or more complex the project, the higher F's ability to dispute penalties for delay in court, i.e., to induce a *type*

1 error. [9] This extension gives us predictions for the quantitative analysis in Section 4 on how the equilibrium delay, $\tilde{d}$, is affected by the value of the project (i.e., the complexity of the project, Π).

iii) *The daily penalty,* p*, is chosen in the interval* $\underline{p} \leq p \leq \overline{p}$. This case is for the sake of realism: in Italian public procurement, $\underline{p}$ and $\overline{p}$ correspond to 0.03% and 0.1% of the contract value, respectively. Note that to endogenize the penalty p, we need to add a decision stage at the beginning of the game in which CA defines p.

We can now state the following results:

Corollary 1.

a. *If* $R'_{CA}(\gamma) \geq R'_F(\gamma) \geq 0$, *then the equilibrium delay* $\tilde{d}$ *increases with* γ.

b. *If* $\alpha'(\Pi) > 0$, *then the equilibrium delay* $\tilde{d}$ *increases with* Π.

c. *If* **a.** *and* **b.** *are both simultaneously satisfied, then the effects of* γ *and* Π *on* $\tilde{d}$ *reinforce each other.*

Proof of the Corollary 1 is in Online Appendix A.

As we may intuitively expect, when court inefficiency increases legal costs, CA is even more scared of litigation; this leads F to increase delay without fear of penalty. Similarly, when an increase in project complexity (value) leads to more frequent *type 1 errors* by the court, it makes imposing penalties less attractive for the CA, thus leading her to tolerate longer delays. Both these two predictions will find validating evidence in the empirical Section 4 that follows. And the reinforced effect of complexity of a projet Π and inefficiency of local court γ on the delay in contracts' execution will be empirically confirmed in Section 5.1.

Corollary 2. *Supposing* CA *can choose* p *from a finite interval, it will always choose the highest possible* p*, as a higher* p *induces both lower and less frequent delays.*

Proof of the Corollary 2 is in Online Appendix A.

[9] Coviello et al. (2015) empirically found that faster judges (i.e., lower γ) make fewer mistakes (i.e., lower α). Our dataset, however, does not permit this test; thus, in our simple model, we assume that γ and α are independent. Allowing γ and α to be positively correlated in our model would strengthen our results concerning strategic delays with no enforcement of penalties.

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 civil trials in Italian courts. The former database is provided by the AVCP, which systematically collects data on all procurement auctions for public works with a starting value greater than or equal to 150,000 euros. The latter database is collected by the ISTAT.

Our procurement data includes information on several dimensions of each procurement contract, including the auction's awarding procedure, 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 durations of the works, the main category of works involved, and the location and type of the contracting authority (CA) awarding the contract. For a subsample of auctions, we also observe the business identity of the winning firm (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.[10] As shown in Table 1, most (about 75.8%) of the contracts were awarded by means of an open auction to all-comers, and about 70% of the CAs involved were municipal or provincial authorities.[11] The majority of our contracts are for the construction of buildings (about 32.3%) or roads and bridges (about 30.4%). Table 1 shows that 75% of the 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 regarding what needs to be produced.

We define the delay in completion of the contracted work (d in the simple model in Section 2.2), as the difference between the actual completion of the contracted work and the

[10] 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.

[11] Our dataset does not include design and build contracts, which are analyzed in Decarolis and Palumbo (2015).

expected delivery (due) date; the latter is usually calculated by the *CA*'s engineers and is stated in the contract, while the former is recorded once the works have been delivered. In our 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.[12] Figure 2 shows provincial variations in the average number of days of delay in the completion of public works. A higher concentration of delays is apparent in Central and Southern Italy, but the picture also varies considerably among the Northern Italian provinces.

Our measure of the trial duration (γ in the model in Section 2.2) is calculated by ISTAT yearly for each court and represents the average time taken to arrive at a sentence (weighted over the number of pending cases). In provinces with more than one law court we took the average duration. We focus on first instance civil trials ("*procedimento civile di cognizione ordinaria di primo grado*") by province and by year from 2000 to 2006. We examine local civil courts because these are the courts that resolve disputes over the execution of public procurement contracts.[13]

The average duration of a first instance civil trial in Italy between the years 2000 and 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 about 294 days). The figures show variations across the provinces (see Figure 3) and over time (see Figure 4). These cross-sectional and over-time variations (i.e., within variation) lie at the heart of our strategy to identify the relationship between trial duration and delays in the completion of public works within the framework of a fixed-effect model. Figures 2 and 3 suggest that there is a positive correlation

[12]Similar empirical evidence on delays in delivery of Italian public procurement contracts has been also found by Decarolis and Palumbo (2015), Coviello et al. (2016), Coviello and Mariniello (2014), Decarolis (2013), D'Alpaos et al. (2013) and Bucciol et al. (2013).

[13]Jappelli et al. (2005) use the same measure to examine the relationship between trial duration and banking market performance in the Italian provinces. Note that disputes concerning the awarding phase of public procurement contracts have to be handled instead by local administrative tribunals.

between the average delay in the completion of public works and the average trial duration 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 trial duration affects delays in the completion of public works. We consider project-level data and estimate 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 trial duration 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., entry method); and iii) the type of CA awarding the contract. Q includes the province population (time-varying), T represents year dummy variables, and P province fixed effects. Our estimates are identified provided that there is enough within-province variation in the trial duration. In alternative specifications, we experiment with the inclusion of CA fixed effects.[14]

4.1 Main results

Table 2 reports estimates on the relationship between the delay in the delivery of contracted works and the average trial duration in the law courts in the province in which the CA operates. In columns 1 to 4, we control for province fixed effects, and in columns 5 to 8

[14] Our dataset does not allow us to calculate the distance between the winning firm and the court, as we do not have information on the exact locations of the firms. In Italy, however, the density of courts is rather uniform across the country. In Online Appendix B we provide details on the definitions of the variables.

for *CA* fixed effects. The latter model (i.e., after including *CA* fixed effects) appears to fit the data better, which suggests 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) towards the more or less strict enforcement of penalties for a contract, all else being equal.

In columns 1, 3, 5 and 7 in Table 2, we present linear models for the trial duration, which turn out not to be statistically significant. In columns 2, 4, 6 and 8, when we add the quadratic term in the trial duration, the effect of court delay is statistically significant. This suggests that the effect of trial duration on delays in the delivery of works is positive and decreasing. The non-linear effect indicates that, for extremely lengthy trials, the suppliers' perception of the law court's inefficiency is less affected by the extra time that the trials take than when the trial duration is in the lower ranges. Indeed, the high level of court inefficiency results in taking a very long time for firms to (partially) recover the penalty; this can make the option of delaying and filing a claim - once the penalty has been enforced - less attractive to the firm.[15] Our estimates suggest that a one standard deviation increase in the trial duration (computed at the average trial duration) 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.[16]

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 for the complexity and/or size of the works involved (see Bajari et al.

[15] Discounting could also make CA and F's legal costs concave (i.e. R_{CA} and R_F, respectively in the model). We thank an anonymous referee for this suggestion.

[16] 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, a one standard deviation increase in the trial duration, computed at the 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%).

2009 for a discussion on the role of the reserve price in procurement 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) in order to take into account possible non-linear effects. 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 also introduce the squared term of the reserve price, 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: the execution of more complex projects is more uncertain, so delays caused by unforeseen factors are more likely to arise.

5 Extensions and robustness checks

In this section, we investigate the possible mechanics of how inefficient law courts affect performance in public works contracts, we consider alternative explanations of our findings, and we perform several robustness checks. In particular, we test whether trial duration interacts with the complexity of the contract (Section 5.1), and whether it is correlated with the type of company, F, winning the contract (Section 5.2), as well as 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 financial constraints of the CA (Section 5.4). Finally, we present further robustness checks (Section 5.5).

For each of these robustness checks, we report the main estimation results in Tables 3 and 4, and we cite the full set of results that are reported in Online Appendix C in squared brackets.

5.1 Contract complexity and the trial duration

First, we check whether there are any heterogeneous effects of trial duration for different levels of project complexity. 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 trial duration is longer (see *Corollary 1.c*). We thus add the interaction term between the reserve price for the contract and the trial duration to our main empirical specification. The estimates in column 1 of Table 3 [Table C2 in the online appendix] show that the greater the complexity of the works involved in a project, the greater the effect of the trial duration on delays.

5.2 Winning firms' characteristics and trial duration

Here we test whether law court inefficiency systematically selects different types of winning supplier firms. Longer trials imply an increase in litigation costs. These litigation costs will be higher for smaller Fs than for larger enterprises; the latter typically have their own legal offices, meaning that the burden of legal costs is 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, they have higher chances of winning those contracts.

Due to data limitations, we focus on proxies for the size of F. Specifically, we consider two types of business entities: one-man businesses as a proxy for micro(small)-sized Fs, and joint-stock companies (JSCs) as a proxy for large Fs.[17] We refer only to these two business entities for two reasons: first, for other types of suppliers the correlation with the supplier's size is less clear; and second, 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).[18]

[17] A similar strategy is described in Moretti and Valbonesi (2015), which also uses the types of business entity as a proxy for the size of the firms participating to the Italian procurement market.

[18] 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

The results of our estimates in columns 2 and 3 of Table 3 [C3, C4] show that JSCs are more likely to win contracts in provinces where trials in law courts last longer, whereas the effects are not significant for one-man businesses.[19] In particular, JSCs have a 1.5 percentage points higher predicted probability of winning in provinces in the 75^{th} percentile of the distribution of trial duration than in provinces in the 25^{th} percentile of the same distribution (i.e., about 15% higher than the mean probability of winning).

5.3 Final payments and trial duration

We next test whether or not *CA* strategically uses the amount of the final payment as a proportion of the total amount paid to 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 law 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 payment. In our setting, *CA*s can use this final payment as a means to deter Fs from delaying the execution of works. Therefore, final payments may act as a "stick" to Fs when there is weak enforcement by courts.

The estimates in column 4 of Table 3 [C5] show a positive (and statistically significant) correlation between the trial duration and the proportion of the final payment for each contract, i.e., *CA*s tend to make up for weak external enforcement (due to long and costly civil trials) with an instrument of their own (proportionally larger final payments) to deter Fs from delaying.

remaining of contracts are won by temporary consortia and cooperative firms.

[19] 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 C15) or by different types of bidders entering the auctions. This is because we do not have information on the name of each bidder that participates in the auction.

5.4 Alternative explanations for the late delivery of works

We now explore whether other factors, such as corruption and the *CA's* financial constraints, may explain our empirical findings.

Corruption. One possible concern with our findings is the fact that trial duration is probably correlated with the overall quality of the local socio-institutional environment. In particular, the positive relationship between trial duration and the late delivery of public works could be affected by corruption. In turn, the level of corruption may be correlated with the case load in courts 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 the proxy for corruption in public procurement proposed by Golden and Picci (2005) as a regressor. This indicator is computed at the provincial level for Italy and measures the level of corruption in public works. It is calculated as the difference between the amount actually spent in completing public infrastructure in a given province and the estimated monetary cost of the existing physical infrastructure. Golden and Picci (2005) show that a larger difference between the two coincides with a larger amount of money being wasted due to corruption. Since this indicator does not vary over time,[20] we add it to our model through an interaction with the variable that measures trial duration. The estimates in column 5 of Table 3 [C6] show that the effect of trial duration on the late delivery of public works changes very little when the corruption indicator is included in the model.

Municipalities: Financial constraints and electoral cycle. Another possible explanation to consider for the late delivery of public works is some sort of exchange between the contracting parties. The *CA* may approve *F*'s delays in the completion of works and waive enforcing a penalty (and this benefits the *F*) in exchange for delayed payments (which benefit the budget-constrained *CA*). In a recent paper, Grembi et al. (2016) analyze the effect of an unexpected relaxation of the municipal authorities' budgetary constraints on the outcome of

[20] Golden and Picci (2005) do not calculate a time-varying variable, however corruption is likely to move slowly over time.

their policies, and find that it causes higher deficits. We follow Grembi et al. (2016) and explore whether the relaxation of the local stability pact for municipalities (i.e., the *CAs*) with a population of less than 5,000 in 2001 has an effect on delays in the delivery of public works.[21] 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 pact was relaxed); and b) in column 7, using a third-order polynomial of the population, which interacts with the post-2000 dummy variable. We include in our model specification both a linear term of the population and a third-order polynomial (as in standard Regression Discontinuity Design) to capture potential non-linearity for municipalities of different sizes. Our estimates suggest that these proxies for the *CA*'s budget constraints have no effect on the late completion of public works, while the positive relationship between the trial duration remains statistically significant.

In addition to municipal budget characteristics, there may be political factors in the municipalities that could influence the late delivery of public works. To control for a political budget cycle, we include in our model specification a variable that measures the number of 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 columns 6 and 7 of Table 3 [C7] suggest that the coefficient of the timing of municipal elections is not statistically different from zero.

[21] In 1999, to comply with the EU Stability and Growth Pact, the Italian government introduced a cap on the deficit of all municipalities. In 2001, the government relaxed this fiscal rule only for municipalities with a population below 5,000 because it was thought to be too restrictive given the small size of these municipalities. See Grembi et al. (2016) for further details.

5.5 Other robustness checks

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

A primary concern is with the demand and the supply for justice. A recent study on litigation in labor courts in France (Fraisse et al. 2015) shows that an increase in density of lawyers is likely to lead to a reduction in legal fees due to greater competition. This in turn has an influence on the decision to litigate and file a case in court. To allow for this source of heterogeneity, we added a variable indicating the density of lawyers in the population to our model specification. The estimates reported in column 1 of Table 4 [C8] confirm our main results on the effects of court delay. In column 2 of Table 4 [C9], we repeat these estimates by instrumenting the current trial duration with the 7-year lagged number of judges and staff operating in the courts, and we find that the effects of trial duration are positive and statistically significant as our baseline estimates. The intuition behind the use of these instruments is that they are a proxy for the supply of justice, and that in Italy, variations in the number of judges (and staff) are largely determined by the legal process managing the turnover of judges and staff within courts, and not by either the duration of public works or trial duration.[22] The diagnostic tests for these instruments show that the *p-values* of the Hansen J test statistics for the instrument validity is always greater than 5%, and that the first-stage F-statistics for the relevance of the instruments is greater than 10 in most of the specifications. From these findings, we conclude that the lagged numbers of judges and staff operating in the courts are valid instruments for trial duration.

A further concern is with the inclusion of additional project-level controls. So far, we have used the value of the project (reserve price) and the type of the main category of work

[22] As discussed in Angrist and Imbens (1995), the sign of the the two-stage-least-squares (2SLS) estimates of the effects of the duration of trials on procurement outcomes is determined by the ratio of the intention-to-treatment (ITTs). In our data, our instruments have a negative sign on the duration of trials (ITT1), and they also have a negative sign on the delays of the delivery of the works (ITT2). ITTs estimates are not reported and available on request.

included in the project as proxies of the project's complexity. 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 (column 3 of Table 4, [C10]).

Then, we consider the average trial duration 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 measured the trial duration at the beginning of the works and, thus, assumed that the supplier firm decides whether or not to delay (as well as the duration of the eventual delay) taking into account the trial duration in the province observed in 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 rather might make the decision at any time over the course of the contract, or indeed just before the date of expected delivery, when the province's average trial duration could differ from that observed at the beginning of the works (especially for longer contracts); or ii) does not necessarily have a clear perception of the actual trial duration at any time in a province. In our data, we cannot observe when the supplier begins to slow down the execution of the works, since we do not have information on the intermediate timetables of the projects or on 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 trial duration has a positive and decreasing effect on the delay of delivery of the works, when we consider as the reference year of the trial duration the median date of the expected life of the project (column 4 of Table 4, [C11]) or the date of expected delivery (column 5 of Table 4, [C12]).[23]

Another possible concern arises when we consider the fact that there are provinces with more than one court. In our dataset, 31 out of the 83 provinces that we examine have

[23]Since we consider two lagged years and we do not have information about the trial duration prior to 2000, projects that were expected to end before 2002 are not included in the sample.

more than one civil court. In such cases, the court in which the trial is to take place is chosen according to the territorial borders of the courts within the province. So far, we have considered the average duration within the provinces as the measure for the delays of trials. To deal with the possible measurement error generated by considering these averages, we exclude the contracts procured by those municipalities located within provinces containing more than one court from our sample. Column 6 of Table 4 [C13] confirms our main findings.[24] To understand the broad impact of trial duration, 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 trial duration is longer, given that (where the court is inefficient) they could delay the execution of work and recover their profits. The evidence reported in column 7 of Table 4 [C14] shows that there is a statistically non-significant relationship between the trial duration and the winning bid.[25] Second, we explore the relationship between trial duration 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 [C17], estimation results in column 8 of Table 4 [C16] indicate that the trial duration does not have a statistically significant effect on the cost overrun.

[24] 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 in our results. However, according to the ACVP Annual Reports (available at www.avcp.it), only 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 real effect of court delays. This is because parties could use arbitrators prior to going to courts, therefore reducing the importance of the role played by courts.

[25] To better understand this zero effect, we have also inspected the relationship between trial duration 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 C15 suggests that the set of bidders is somewhat constant, since we find no effect on the number of bidders. However, a lack of data on the exact identity of each of the bidders means that our estimates are not informative of whether trial duration changes bidding strategies or selective entry in auctions.

In the Online Appendix D, we provide several additional robustness checks to the model specification, estimation method, and alternative regression outcomes.

6 Conclusion

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

To guide the empirical analysis, we built a stylized model of how the contract enforcement phase affects suppliers' strategic delay in executing a public procurement work. As we discussed, the effects of duration of trials on procurement outcomes might be ambiguous depending on the specific features of the institutional environment, like who is the *plaintiff* and who is the *defendan*t and how are legal costs distributed. In our model the sequence of play and other assumptions follow closely the institutional setting we investigate empirically, so that it led us to precise predictions relevant to our data.

The empirical analysis suggests that, as predicted by our model, 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 long. The effect of court inefficiency on public contracts' delay is greater for higher-value contracts (i.e., more complex projects), which is also consistent with the models implications, as it suggests that the greater information advantage typical of suppliers managing larger-scale works allows them to behave more

opportunistically when court delays are larger.

We also find that where local courts are inefficient, public procurement contracts are more commonly awarded to large firms. An explanation for this finding, consistent with our simple theoretical model, could be because these firms have their own legal offices and thus incur lower (marginal) costs than smaller suppliers when they face litigation in court. Moreover, where courts are less efficient, we find that buyers use proportionally larger final payments, most likey as a "stick" to reduce the benefit that the supplier can gain from strategically delaying the delivery of the works.

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

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Figure 1: The Game Tree

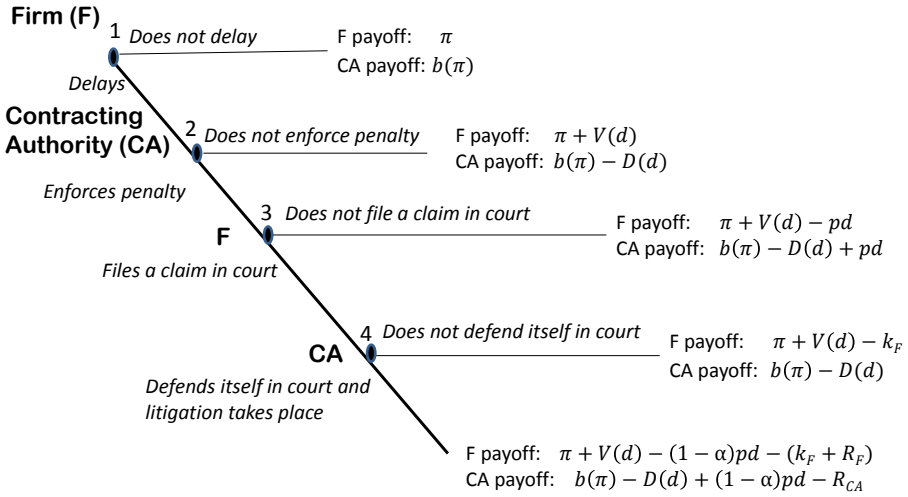

Figure 2: Delays in completion of works (days)

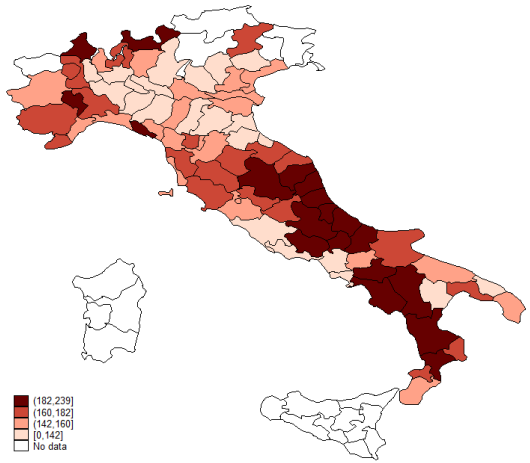

Figure 3: Trial duration (days)

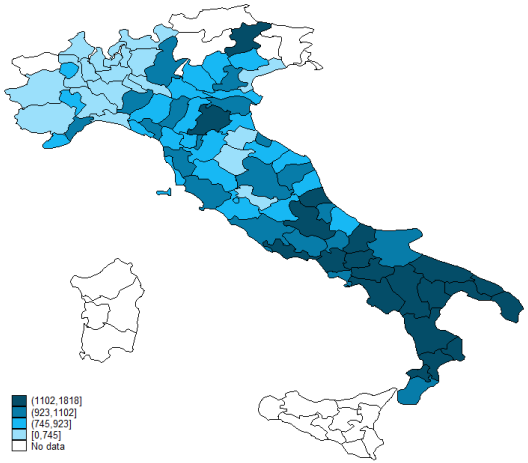

Figure 4: Trial duration (days) by year and macro-regions

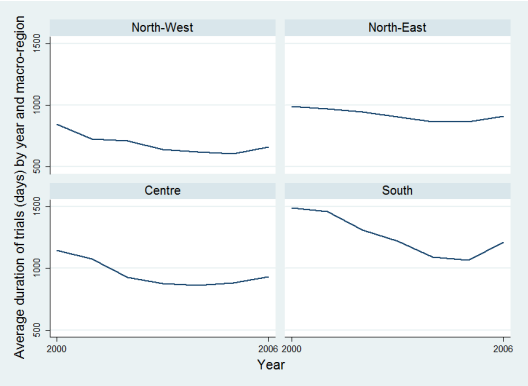

Figure 5: Delays in completion of works and trial duration

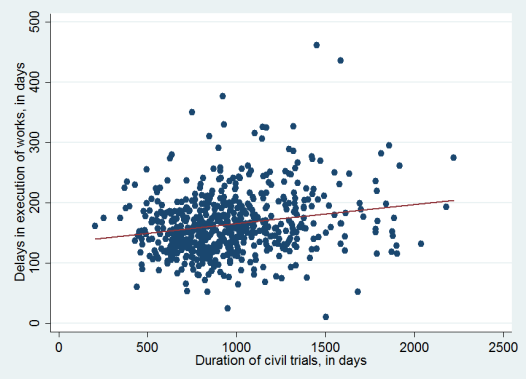

Table 1: Summary statistics

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLE	OBS	MEAN	SD	MIN	P25	P50	P75	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								
Trial duration (days)	40521	889.389	293.701	205	664	839.5	1063	2221
Population	40521	11.356	11.598	0.890	3.577	6.430	11.498	40.131

Notes. The reference period is 2000-2006. See Appendix B for detailed definitions of variables. 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)							
Trial duration	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)
Trial duration^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 procedure 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(Trial)+b(Trial)^2=0]		3.44*		4.09**		7.40***		8.26***
Effect +SD at mean Trial		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. See Appendix B for detailed definitions of the variables. *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. *t-test* reports the *t-statistics* for the sum of the coefficients Trial duration and (Trial duration)^2 different from zero. *Effect +SD at mean Trial* represents the change in the dependent variable associated with an increase of one standard deviation in the Trial duration 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
Trial duration	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)
Trial duration^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*Dur. trials	0.00175**						
	(0.001)						
Corruption*Dur. trials					-0.00571		
					(0.006)		
(Mun.Pop.<5,000)*(Post2000)						-9.57785	
						(11.614)	
Post2000						-19.10122***	-24.81025***
						(5.507)	(6.234)
Post2000*(Mun.Pop.)							0.00007
							(0.000)
Post2000*(Pop.)^2							-0.00000
							(0.000)
Post2000*(Pop.)^3							0.00000
							(0.000)
Days from election						0.00111	0.00112
						(0.002)	(0.002)
Category of works FE	X	X	X	X	X	X	X
Awarding procedure 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 Trial	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). Estimates in columns 6-7 are limited to projects awarded by municipal governments. Significance levels: *** p<0.01, ** p<0.05, * p<0.1. See Appendix B for detailed definitions of the variables. *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 Trial* represents the change in the dependent variable associated with an increase of one standard deviation in the Trial duration from the mean value of its distribution.

Table 4: Further robustness checks

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable	Delays	Delays	Delays	Delays	Delays	Delay	Win Rebate	Cost overrun
Trial duration	0.06166**	0.24629**	0.06132**			0.06339*	-0.00160	0.00017
	(0.030)	(0.108)	(0.030)			(0.032)	(0.002)	(0.000)
Trial duration^2	-0.00003**	-0.00009**	-0.00003**			-0.00003**	0.00000	-0.00000
	(0.000)	(0.000)	(0.000)			(0.000)	(0.000)	(0.000)
Reserve price	6.35548***	6.35552***	6.11610***	6.26588***	6.85128***	6.38673***	0.14985***	0.11618***
	(0.410)	(0.405)	(0.402)	(0.423)	(0.448)	(0.361)	(0.010)	(0.004)
Reserve price^2	-0.02779***	-0.02779***	-0.02676***	-0.02801***	-0.03075***	-0.02828***	-0.00057***	-0.00080***
	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)	(0.002)	(0.000)	(0.000)
Lawyer density	0.00415	0.00424						
	(0.008)	(0.009)						
Expected duration			0.01922					
			(0.013)					
(Av. lags)Trial duration				0.15501***	0.17828***			
				(0.052)	(0.055)			
(Av. lags)Trial duration^2				-0.00008***	-0.00009***			
				(0.000)	(0.000)			
Category of works FE	X	X	X	X	X	X	X	X
Awarding procedure FE	X	X	X	X	X	X	X	X
Type of CA	X	X	X	X	X	X	X	X
Province FE	X	X	X	X	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	33,053	35,088	30,128	40,521	27,299
R-squared	0.124	0.100	0.124	0.124	0.128	0.127	0.490	0.360
Mean outcome	153.3	153.3	153.3	149.4	154.1	149.0	14.90	0.468
Effect +SD at mean Trial	4.593	26.55	4.570	6.162	6.511	3.441	-0.296	0.022
Hansen J (*p-value)*		0.148						
Cragg-Donald Wald F statistic		385.91						

Notes. Coefficients (standard errors). Standard errors clustered at province level. Significance levels: *** p<0.01, ** p<0.05, * p<0.1. In column 2 *Trial duration* (and its squared values) is instrumented with the 7-year lagged values of the number of judges and staff (and their squared values) in the courts operating within the jurisdiction of the court of appeal. See Appendix B for detailed definitions of the variables. *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 Trial* represents the change in the dependent variable associated with an increase of one standard deviation in the Trial duration from the mean value of its distribution. Table reports the Sargan-Hansen test of overidentifying restrictions, and the Cragg-Donald Wald F statistic (for two endogenous variables) denoting the minimum eigenvalue of the joint first-stage F-statistic matrix.

ONLINE APPENDIX

- **A: Proofs of the Proposition and Corollaries.**
- **B: Definitions of the variables.**
- **C: Full set of estimation results.**
- **D: Additional robustness checks.**

A Proofs of the Proposition and Corollaries.

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, 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

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

Note that since $R_{CA} > R_F + k_F$, for low α, we will have $\widehat{d} > \tilde{d}$, and the opposite will be true for high α. If condition (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 so 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 withdraws 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 it 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 costs, 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' may gains in $V(d)$ outweigh 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 $d = d'$.**Q**.**E**.**D**.

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

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

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

Proof of Corollary 2. Upon inspection, $\tilde{d}$ and d' both decrease with p, hence ceteris paribus a higher p always reduces the amount of procurement delay. Moreover, inspecting the equality that determines m, one can observe that the right-hand side increases with p, while the left hand side is not affected, implying that m must also increase with p. **Q**.**E**.**D**.

B Definitions of the variables

Project/auction level variables:

- *Delay in completion of works (days)* represents the delay in delivering the works. This is calculated as the difference between the actual completion of the contracted works and the expected delivery (due) date. Data is from AVCP.

- *Reserve price* is the auction's starting value (in 100,000 euros, CPI deflated, 2000 equivalents) set by the *CA*. Data is from AVCP.

- *Awarding procedure* is a set of dummy variables indicating the different types of awarding procedure: *Open* means that participation in the auction is open to any *F* certified for the execution of the works; *Restricted* and *Simplified restricted* indicate two slightly different types of awarding procedures but in both participation in the auction is restricted to *F*s who are certified for the execution of the works and have been invited by the *CA* (after *F*s have shown interest in bidding for the works); *Negotiation* means that the *CA* invites a limited number of certified *F*s. Data is from AVCP.

- *Category of works* comprises a set of dummy variables indicating the main categories of works involved in the project. The most commonly observed categories of works are: construction of buildings (*Buildings*); road works or bridge building (*Roads and bridges*); cultural heritage conservation works (*Cultural heritage*); and construction, conservation or improvement of hydraulic systems (*Hydraulic*). Data is from AVCP.

- *Type of CA* includes a set of dummy variables for the type of *CA* that is awarding the contract. The most frequently encountered types of *CA* are: *Municipal authorities*; *Provincial authorities*; and *Ministries*. Data is from AVCP.

- *Large firm* (*Small firm*) is a dummy variable 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. Data is from AVCP.

- *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. Data is from AVCP.

- *Winning rebate* represents the percentage discount offered by the winning firm over the reserve price. Data is from AVCP.

- *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). Data is from AVCP.

- *Expected duration* is the contractual duration of works set by the *CA*. Data is from AVCP.

- *Number of bidders* represents the number of companies submitting a bid in the auction. Data is from AVCP.

- *Awarding price* is the auction's starting value (in 100,000 euros, CPI deflated, 2000 equivalents) set by the CA minus the percentage rebate offered by the winning firm. Data is from AVCP.

Province level variables:

- *Trial duration (days)* is a province-level variable (varying over time), calculated as the average number of days that elapse between the date of filing a suit and the date on which a sentence is passed in a first instance civil trial (*Procedimento civile di cognizione ordinaria di primo grado*). Data is from ISTAT.

- *Population of prov.* is a province-level variable (varying over time) that indicates the resident population (x 100,000) in a given province. Data is from 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 is 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. Computed on AVCP and ISTAT data.

- *Real value added* is the province-level variable (varying over time) that indicates the real value added per capita in a given province. Data is from ISTAT.

Municipal level variables:

- *Municipal Pop.*<5,000 is a dummy variable that takes a value of 1 if the contract is awarded by a municipality with fewer than 5,000 inhabitants, and a value of 0 otherwise. Data is from ISTAT.

- *Municipal Pop.* represents the population of the municipality. Data is from ISTAT.

- *Days from election* is a variable that indicates the days between the expected end of the works and the next municipal elections. Data is from the Italian Ministry of Interior.

C Full set of estimation results

The statistics and results presented in this Section complement those in Tables 2, 3, and 4 in the article.

Table C1: 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
Real value added	40521	21201.77	4724.748
Number of contracts	579	1.345	0.826

Notes. The reference period is 2000-2006. See Appendix B for detailed definitions of the variables.

Table C2: Interaction effects: Complexity of the works and trial duration

	(1)	(2)	(3)	(4)
Dependent Variable	Delay in completion of works (days)			
Trial duration	-0.00882	0.05486	-0.00493	0.06887**
	(0.009)	(0.035)	(0.009)	(0.032)
Trial duration^2		-0.00003**		-0.00003**
		(0.000)		(0.000)
(Trial duration)*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 procedure 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 Trial)		4.748		7.204

Notes. Coefficients are presented with standard errors in parentheses (clustered at province level in columns 1 and 2, and at *CA* level in columns 3 and 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. See Appendix B for detailed definitions of the variables. *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 Trial duration computed at the mean level of the Reserve price (this effect is only included when the Trial duration enters the model as a single term and interacts with the Reserve price). *Effect +SD at mean Res. and mean Trial* represents the change in the dependent variable associated with an increase of one standard deviation in the Trial duration computed at the mean value of the Reserve price variable and at the mean value of the Trial duration (this effect is only included when the Trial duration enters the model as a single term and as a quadratic term, and it interacts with the Reserve price).

Table C3: 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: Large firm(JSC)											
Trial duration	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)
Trial duration^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. procedure 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). See Appendix B for detailed definitions of the variables. *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 C4: 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)											
Trial duration	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)
Trial duration^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. procedure 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). See Appendix B for detailed definitions of the variables. *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 C5: Alternative outcome: Share of final payment

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable	Final payment (share)							
Trial duration	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)
Trial duration^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 procedure 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 Trial		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, and *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)*, i.e., the final payment as a proportion of the total payment that the *F* receives from *CA* for completing the works. See Appendix B for detailed definitions of the variables. *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 Trial* represents the change in the dependent variable associated with an increase of one standard deviation in the Trial duration from the mean value of its distribution (this effect is only included when the Trial duration enters the model as single term and as a quadratic term).

Table C6: Robustness: Controlling for corruption

	(1)	(2)	(3)	(4)
Dependent Variable	Delays in completion of works (days)			
Trial duration	0.01353	0.06328*	0.00673	0.08337***
	(0.009)	(0.033)	(0.008)	(0.031)
Trial duration^2		-0.00002*		-0.00003***
		(0.000)		(0.000)
Corruption * Trial duration	-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 prcedure 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 Trial)		4.630		7.991

Notes. Coefficients are presented with standard errors in parentheses (clustered at province-level in columns 1 and 2, and *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. See Appendix B for detailed definitions of the variables. *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 Trial duration computed at the mean level of the Corruption (this effect is only included when the Trial duration enters the model as a single term and interact with the Corruption). *Effect +SD at mean Corr. and mean Trial* represents the change in the dependent variable associated with an increase of one standard deviation in the Trial duration computed at the mean value of the Corruption variable and at the mean value of the trial duration (this effect is only included when the Trial duration enters the model as a single term and as a quadratic term, and interacts with the Corruption).

Table C7: Robustness: Controlling for the CA's budget constraints and political cycle

	(1)	(2)	(3)	(4)
Dependent Variable	Delays in completion of works (days)			
Trial duration	0.00937	0.09907**	0.00935	0.10390***
	(0.011)	(0.040)	(0.011)	(0.040)
Trial duration^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 procedure 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 Trial		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. See Appendix B for detailed definitions of the variables. *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 Trial* represents the change in the dependent variable associated with an increase of one standard deviation in the Trial duration from the mean value of its distribution (this effect is only included when the Trial duration enters the model as single term and as a quadratic term).

Table C8: Robustness: Controlling for density of lawyers

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable	Delays in completion of works (days)							
Trial duration	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)
Trial duration^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 procedure 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 Trial		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, and 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. See Appendix B for detailed definitions of the variables. *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 Trial* represents the change in the dependent variable associated with an increase of one standard deviation in the Trial duration from the mean value of its distribution (this effect is only included when the Trial duration enters the model as single term and as a quadratic term).

Table C9: Robustness: Demand and supply of justice

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable	Delays in completion of works (days)							
Trial duration	0.01644	0.24154**	0.01058	0.24629**	0.07284*	0.28410*	0.07158*	0.32469**
	(0.043)	(0.123)	(0.041)	(0.108)	(0.043)	(0.153)	(0.042)	(0.151)
Trial duration^2		-0.00008**		-0.00009**		-0.00008		-0.00010*
		(0.000)		(0.000)		(0.000)		(0.000)
Reserve price	2.83103***	2.83346***	6.35302***	6.35552***	2.95629***	2.96373***	6.72678***	6.74004***
	(0.297)	(0.296)	(0.407)	(0.405)	(0.242)	(0.242)	(0.287)	(0.287)
Reserve price^2			-0.02779***	-0.02779***			-0.03076***	-0.03080***
			(0.002)	(0.002)			(0.002)	(0.002)
Lawyer density	0.00281	0.00286	0.00419	0.00424	-0.00054	-0.00089	-0.00008	-0.00050
	(0.009)	(0.010)	(0.008)	(0.009)	(0.003)	(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 procedure 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	37,152	37,152	37,152	37,152
R-squared	0.080	0.078	0.101	0.100	0.060	0.057	0.084	0.081
Mean outcome	153.3	153.3	153.3	153.3	153.3	153.3	153.3	153.3
Hansen J (p-value)	0.226	0.172	0.302	0.148	0.637	0.511	0.809	0.637
F test of excluded instruments:	4.44		4.44		11.04		11.04	
Cragg-Donald Wald F statistic:		385.92		385.91		214.31		214.33

Notes. Coefficients are presented with standard errors in parentheses (clustered at province level in columns 1 to 4, and 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. Trial duration (and its squared values) is instrumented with 7-year lagged values of the number of judges and staff (and their squared values) in the courts operating within the jurisdiction of the court of appeal. See Appendix B for detailed definitions of the variables. *Province-year control* means that (time varying) population is added as a control. *Mean outcome* is the mean value of the dependent variable. The table reports the Sargan-Hansen test of overidentifying restrictions, the F-test of excluded instruments (for one endogenous regressor), and the Cragg-Donald Wald F statistic (for two endogenous variables) denoting the minimum eigenvalue of the joint first-stage F-statistic matrix.

Table C10: Robustness: Controlling for expected duration of works

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable	Delays in completion of works (days)							
Trial duration	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)
Trial duration^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 procedure 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 Trial		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, and 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. See Appendix B for detailed definitions of the variables. *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 Trial* represents the change in the dependent variable associated with an increase of one standard deviation in the Trial duration from the mean value of its distribution (this effect is only included when the Trial duration enters the model as single term and as a quadratic term).

Table C11: Robustness: Trial duration

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable	Delays in completion of works (days)							
(Average lags) Trial duration	-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) Trial duration^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 procedure 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 Trial		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, and 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) Trial duration* 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). See Appendix B for detailed definitions of the variables. *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 Trial* represents the change in the dependent variable associated with an increase of one standard deviation in the Trial duration from the mean value of its distribution (this effect is only included when the Trial duration enters the model as single term and as a quadratic term).

Table C12: Robustness: Trial duration

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable	Delays in completion of works (days)							
(Average lags) Trial duration	-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) Trial duration^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 procedure 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 Trial		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, and 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) Trial duration* 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). See Appendix B for detailed definitions of the variables. *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 Trial* represents the change in the dependent variable associated with an increase of one standard deviation in the Trial duration from the mean value of its distribution (this effect is only included when the Trial duration enters the model as single term and as a quadratic term).

Table C13: 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)							
Trial duration	-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)
Trial duration^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 procedure 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 Trial		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, and 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. See Appendix B for detailed definitions of the variables. *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 Trial* represents the change in the dependent variable associated with an increase of one standard deviation in the Trial duration from the mean value of its distribution (this effect is only included when the Trial duration enters the model as single term and as a quadratic term).

Table C14: Alternative outcome: Winning rebate

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable	Winning rebate							
Trial duration	-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)
Trial duration^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 procedure 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 Trial		-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, and 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. See Appendix B for detailed definitions of the variables. *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 Trial* represents the change in the dependent variable associated with an increase of one standard deviation in the Trial duration from the mean value of its distribution (this effect is only included when the Trial duration enters the model as single term and as a quadratic term).

Table C15: Alternative outcome: Number of bidders

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable	Number of bidders							
Trial duration	-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)
Trial duration^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 procedure 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 Trial		-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, and 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. See Appendix B for detailed definitions of the variables. *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 Trial* represents the change in the dependent variable associated with an increase of one standard deviation in the Trial duration from the mean value of its distribution (this effect is only included when the Trial duration enters the model as single term and as a quadratic term).

Table C16: Alternative outcome: Cost overrun

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable	Cost overrun							
Trial duration	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)
Trial duration^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 procedure 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 Trial		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, and 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). See Appendix B for detailed definitions of the variables. *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 Trial* represents the change in the dependent variable associated with an increase of one standard deviation in the Trial duration from the mean value of its distribution (this effect is only included when the Trial duration enters the model as single term and as a quadratic term).

Table C17: 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)
Trial duration^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 procedure 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, and 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). See Appendix B for detailed definitions of the variables. *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.

D Additional robustness checks

In this Appendix we consider four sets of robustness checks.

Model specification:

- We added to our baseline specifications the provincial value added. Results are similar in sign and magnitude to our main results. See Table D1.
- We controlled for awarding prices instead of the reserve price as a proxy of project's complexity. Our estimation results do not change. See Table D2.
- We checked whether the inclusion of the corruption index in the model specification affects the relationship between the trial duration and the size of the winning firm. Estimation results confirm our main findings. See Table D3.
- We included firm-fixed effects in the model specification. Estimation results have a similar sign and magnitude with respect to our main estimation, but they are less precise (probably due to the limited within-firm variability of the variables of interest). See Table D4.

Estimation method:

- We replaced the negative values of the delays in the execution of works with zeros and ran a fixed effects Poisson model. Our main estimation results are confirmed. See Table D5.

Sample:

- We checked whether our estimates are influenced by poor data quality and the *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 better quality data collection. In this subsample, there is a more limited cross-province and over-time variability of the trial duration; however, as shown in Table D6, our main evidence is confirmed. This latter evidence is obtained considering the sub-sample of Italian regions located in the the North of Italy, which are usually viewed as being homogeneous in their (low) level of corruption.

Alternative outcomes:

- We explored the relationship between the trial duration and 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 D7 suggests that the trial duration does not affect the number of contracts per year. Similarly, Tables D8 and D9 indicate that trial duration is not correlated with the engineers' estimates of the size of the projects and of the expected duration of the works during our sample period.

Table D1: Controlling for province's time-varying value added

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable	Delays in completion of works (days)							
Trial duration	0.00112	0.06100*	0.00078	0.06117*	0.00690	0.07944***	0.00612	0.08322***
	(0.007)	(0.033)	(0.007)	(0.031)	(0.008)	(0.030)	(0.008)	(0.030)
Trial duration^2		-0.00003*		-0.00003**		-0.00003**		-0.00003***
		(0.000)		(0.000)		(0.000)		(0.000)
Reserve price	2.83222***	2.83369***	6.35381***	6.35546***	2.95800***	2.96116***	6.73363***	6.73934***
	(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)
Real value added per capita	-0.00113	-0.00124	-0.00134	-0.00144	-0.00193*	-0.00188*	-0.00195*	-0.00190*
	(0.002)	(0.002)	(0.002)	(0.002)	(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 procedure 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 Trial duration		4.420		4.356		6.586		6.643

Notes. Notes. Coefficients are presented with standard errors in parentheses (clustered at province level in columns 1 to 4, and 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. See Appendix B for detailed definition of the variables. *Province-year control* means that an additional 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 Trial* represents the change in the dependent variable associated with an increase of one standard deviation in the Trial duration from the mean value of its distribution (this effect is only included when the Trial duration enters the model as single term and as a quadratic term).

Table D2: Robustness: Controlling for awarding price

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable	Delays in completion of works (days)							
Trial duration	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)
Trial duration^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 procedure 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 Trial		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, and 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. See Appendix B for detailed definition of the variables. *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 Trial* represents the change in the dependent variable associated with an increase of one standard deviation in the Trial duration from the mean value of its distribution (this effect is only included when the Trial duration enters the model as single term and as a quadratic term).

Table D3: Robustness: Corruption, trial duration 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)		
Trial duration	0.00014**	0.00092**	0.00170*	-0.00016*	-0.00042	-0.00071
	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.001)
Trial duration^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*Trial duration	-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. procedure 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). See Appendix B for detailed definition of the variables. *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 D4: Controlling for firm-fixed effects

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable	Delays in completion of works (days)							
Trial duration	-0.00327	0.03655	-0.00287	0.04637	0.01033	0.06912*	0.00883	0.07358*
	(0.017)	(0.048)	(0.016)	(0.047)	(0.011)	(0.041)	(0.011)	(0.039)
Trial duration^2		-0.00002		-0.00002		-0.00003		-0.00003
		(0.000)		(0.000)		(0.000)		(0.000)
Reserve price	2.97406***	2.97552***	6.35293***	6.35694***	2.99673***	3.00216***	6.41775***	6.42762***
	(0.420)	(0.420)	(0.572)	(0.572)	(0.421)	(0.423)	(0.587)	(0.586)
Reserve price^2			-0.02892***	-0.02894***			-0.02928***	-0.02931***
			(0.004)	(0.004)			(0.004)	(0.004)
Type of CA FE	X	X	X	X	X	X	X	X
Category of works FE	X	X	X	X	X	X	X	X
Awarding procedure FE	X	X	X	X	X	X	X	X
Province FE	X	X	X	X				
Region FE					X	X	X	X
Winning firm FE	X	X	X	X	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	19,971	19,971	19,971	19,971	19,971	19,971	19,971	19,971
R-squared	0.347	0.347	0.359	0.359	0.339	0.339	0.351	0.352
Mean outcome	163.6	163.6	163.6	163.6	163.6	163.6	163.6	163.6
Effect +SD at mean Trial duration		1.582		2.288		5.623		5.470

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. See Appendix B for detailed definition of the variables. *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 Trial* represents the change in the dependent variable associated with an increase of one standard deviation in the Trial duration from the mean value of its distribution (this effect is only included when the Trial duration enters the model as single term and as a quadratic term).

Table D5: Robustness: Poisson regression

	(1)	(2)	(3)	(4))
Dependent Variable	Delays in completion of works (days)			
Trial duration	0.00002	0.00047**	0.00002	0.00045**
	(0.000)	(0.000)	(0.000)	(0.000)
Trial duration^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 procedure 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 values are replaced with 0). See Appendix B for detailed definition of the variables. *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 D6: Robustness: Northern provinces

Dependent Variable	(1)	(2)	(3)	(4)
	Delays in execution of works (days)			
	Only Piedmont and Lombardy			
Trial duration	0.03773**	0.03344	0.01065	-0.01060
	(0.016)	(0.087)	(0.018)	(0.085)
Trial duration^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)
(Trial duration)*(Reserve price)			0.00468***	0.00469***
			(0.001)	(0.001)
Category of works FE	X	X	X	X
Awarding procedure 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 Trial		8.105		
Effect +SD at mean Res.			8.768	
Effect +SD at mean Res. (and mean Trial)				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. See Appendix B for detailed definition of the variables. *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 Trial* represents the change in the dependent variable associated with an increase of one standard deviation in the Trial duration from the mean value of its distribution (this effect is only included when the Trial duration 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 Trial duration computed at the mean level of the Reserve price (this effect is only included when the Trial duration enters the model as a single term and interacts with the Reserve price). *Effect +SD at mean Res. and mean Trial* represents the change in the dependent variable associated with an increase of one standard deviation in the Trial duration computed at the mean value of the Reserve price variable and at the mean value of the Trial duration (this effect is only included when the Trial duration enters the model as a single term and as a quadratic term, and interacts with the Reserve price).

Table D7: Robustness: Number of yearly per-capita contracts in the Public Administration

	(1)	(2)
Dependent Variable	Number of public contracts (yearly)	
Trial duration	0.00019	-0.00040
	(0.000)	(0.000)
Trial duration^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. See Appendix B for detailed definition of the variables. *Mean outcome* is the mean value of the dependent variable.

Table D8: Alternative outcome: Reserve price

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable	Reserve price							
Trial duration	0.00060	-0.00234	0.00060	-0.00234	0.00015	-0.00384	0.00015	-0.00384
	(0.001)	(0.003)	(0.001)	(0.003)	(0.001)	(0.003)	(0.001)	(0.003)
Trial duration^2		0.00000		0.00000		0.00000		0.00000
		(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 procedure 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	0.069	0.069	0.069	0.069	0.388	0.388	0.388	0.388
Mean outcome	5.824	5.824	5.824	5.824	5.824	5.824	5.824	5.824
Effect +SD at mean Trial		-0.0246		-0.0246		-0.206		-0.206

Notes. Coefficients are presented with standard errors in parentheses (clustered at province level in columns 1 to 4, and at *CA* level in columns 5 to 8). Significance levels: *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is *Reserve price*, i.e., the auction's starting value (in 100,000 euros, CPI deflated, 2000 equivalents) set by *CA*. See Appendix B for detailed definition of the variables. *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 Trial* represents the change in the dependent variable associated with an increase of one standard deviation in the Trial duration from the mean value of its distribution (this effect is only included when the Trial duration enters the model as single term and as a quadratic term).

Table D9: Alternative outcome: Expected duration of works

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable	Expected duration of works (days)							
Trial duration	-0.00035	0.01747	-0.00075	0.01793	-0.00639	-0.02603	-0.00773	-0.01931
	(0.010)	(0.039)	(0.010)	(0.036)	(0.009)	(0.039)	(0.008)	(0.035)
Trial duration^2		-0.00001		-0.00001		0.00001		0.00001
		(0.000)		(0.000)		(0.000)		(0.000)
Reserve price	5.69087***	5.69130***	12.44034***	12.44085***	5.93642***	5.93557***	12.58074***	12.57988***
	(0.468)	(0.469)	(0.519)	(0.519)	(0.476)	(0.476)	(0.520)	(0.521)
Reserve price^2			-0.05326***	-0.05326***			-0.05421***	-0.05421***
			(0.003)	(0.003)			(0.004)	(0.004)
Type of CA FE	X	X	X	X				
Category of works FE	X	X	X	X	X	X	X	X
Awarding procedure 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	0.235	0.235	0.306	0.306	0.454	0.454	0.502	0.502
Mean outcome	261.0	261.0	261.0	261.0	261.0	261.0	261.0	261.0
Effect +SD at mean Trial		1.118		1.061		-3.107		-2.995

Notes. Coefficients are presented with standard errors in parentheses (clustered at province level in columns 1 to 4, and at *CA* level in columns 5 to 8). Significance levels: *** p<0.01, ** p<0.05, * p<0.1. The dependent variable is *Expected duration of works*, i.e., the contractual duration of works set by *CA*. See Appendix B for detailed definition of the variables. *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 Trial* represents the change in the dependent variable associated with an increase of one standard deviation in the Trial duration from the mean value of its distribution (this effect is only included when the Trial duration enters the model as single term and as a quadratic term).