Court Efficiency and Procurement Performance*

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Abstract

Contracts are a good deterrent for opportunistic behavior only insofar they are credibly and effectively enforced by the direct application their rules and the functioning of the judicial system. We study the effects of local courts inefficiency - i.e. the court average length in ending a trial - on contractors incentives to delay public works in Italy, a setting where disputes on penalty for delay public procurement contracts are solved in local court. We first present a simple model showing how courts inefficiency may lead public buyers to refrain for enforcing penalties for late delivery in the aim to avoid the costly dispute in court of the claim filed by the contractor. Then we discuss our empirical results showing that in provinces where local court are inefficient, i) public works are delivered with higher delay, and this is stronger for higher value - i.e. complex - project; ii) the contract are awarded to larger firm, and iii) on average, a higher share of final payment higher is adopted. These results are not driven by omitted environmental variables, since we show that the delays in contracts' delivery are still affected by courts efficiency when province fixed effect are included in the model.

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1 Introduction

Explicit contracting is the crucial governance instrument for public procurement transactions because accountability concerns severely limit civil servants discretion and with it the scope for relational contracting (Kelman, 1990 and 2002). Similarly, reputational considerations based on non-verifiable performance assessment are typically not admitted in the evaluation of public procurement tenders.[1]

Contract enforcement costs can be significant once the court system is inefficient, i.e. is characterized by large expected duration of judicial proceedings (Djankov *et al.* 2003).[2] Contracting parties may therefore choose ex-post not to exercise contractual rights if the benefits are lower than the costs from doing it.[3] In public procurement contracts, high enforcement costs translate directly in the lack of ability to deter the supplier's opportunistic behavior.

This paper. We empirically verify whether firms opportunistic behavior in public procurement transactions is more likely where the local court is less efficient, and we theoretically investigate how this is the result of an equilibrium strategy in the Italian institutional setting. Our intuition is that the contractors opportunism may be fostered by the inefficiency of the local court, particularly in the case of large and complex projects. We specifically focus in the contractor's opportunism in the form of delayed contractual delivery.

According to the Italian public procurement regulations, the penalty for late delivery should be included in each awarded public contract. This penalty is calculated for every day of delay as a percentage of the contract value.[4] If the contractor delays the delivery of the contracted work, the public administration (i.e. the buyer) can directly exercise the penalty;[5] the contractor might then sue the public buyer in the local civil court to recover the penalty, showing that such delay belongs

[1] This is particularly true in Europe where reputational considerations are (erroneously) seen by law-makers as sure source of entry deterrence and discrimination of foreing suppliers (EC Directives 17 and 18, 2004). Thus, the crucial role played by explicit contracts in public procurement makes the efficiency of court enforcement particularly relevant.

[2] Literature on court systems investigates efficiency referring also to the judge's honesty and fairness in his decisions, corruption, and access to justice. Our study mainly focus - both empirically and theoretically - on efficiency as the time required for dispute resolution in each local court.

[3] Doornik (2010) investigates how the form of the contract systematically affects the likelihood of proceeding to court; Iossa and Spagnolo (2011) present a model where over-contracting on explicit tasks is used as a threat to facilitate relational contracting on crucial but non contractible tasks.

[4] In Italy penalty fees in PPC range from 0.03 per cent to 0.1 per cent of the contract value for each day of delay (see Government Decree n. 163/2006 and DPR n. 554/1999).

[5] According to most legal systems, penalties should not be levied if the delay is not direct responsability of the contractor.

not on its own responsability.

We show in a simple theoretical setting under which conditions it is an equilibrium strategy for the contractor to delay the work's delivery and for the contracting authority (CA, henceforth) not to enforce the penalty: this occurs when for the CA the cost to defeat the claim by the contractor in court is high, i.e. the local court where to dispute the claim is characterized by large expected duration of judicial trials. Rephrasing Rosenberg and Shavell (1985) words for our setting, the possibility of a "nuisance suit" arises whenever the plaintiff (i.e. in our setting, the contractor) "is able to obtain a positive settlement from the defendant" (in our setting, the CA): this is enhanced when courts are inefficient and for large value contracts, because the as the CA's cost to stay in trial once suited becomes larger, and higher the advantage for the contractor from suiting.[6]

The data. We use data on public works collected by the AVCP (Italian Authority for the Vigilance on Contracts for Public Works, Services and Supplies) for the period 2000-2006, which includes information on every contract for public works valued 150,000 euros or more awarded in Italy. This dataset is characterized by its huge variability in terms of category, size, complexity and geographical localization of the works involved and gives the opportunity to test the predictions of our model without having to restrict the attention to very particular markets. The dataset contains information on several aspects of each procurement contract, such as award mechanism, starting value, execution time and costs. We observe large variability between provinces, categories and size of works, with an average value of delays of about 157 and a maximum of over 1500 days.[7]

We merge this dataset with informations from ISTAT-Italian Statistical Institute on information on the duration of civil trials at province level for each year which has a large variability among provinces and over time (ranging from about 200 to over 2000 days, with a mean value of about 900 days, during the period of analysis), and other provincial time-varying characteristics.

Our empirical results. We estimate a model specification which includes controls for the category and complexity of works, award mechanisms, province (or PA) and year fixed effects. Our results show that the duration of civil trials is positively and significantly associated with the de-

[6]The PAs costs of being in a lawsuit can be increased by "political" negative effects: being filed in a lawsuit may delay further the provision/completion of the contracted task, and/or may suggest electors poor management of public resources by the CA.

[7]Similar empirical evidence on the delay in delivery of Italian public procurement contracts has been also found by Decarolis and Palumbo (2011); Moretti and Valbonesi (2011); Guccio et al. (2009); Decarolis (2013); D'Alpaos et al. (2013), Bucciol et al (2013).

lays of execution of public work, in particular with larger/more complex projects. These results are confirmed also for a sub-sample of provinces belonging to Northern Italy where the accuracy of data filling is better than the average. Moreover, for a sub-sample of contracts we can detect the name of the winner; using as a proxy of the firms size the juridical form, the estimation results indicate that where the duration of trials is longer, it is more likely to have as a winner a larger firm.

Finally, we check for the share of the final payment on each contracts winning price: the larger the final payment, the higher the incentive for the contractor to deliver according to the agreed timing. Estimation results show that the duration of trial is on average positively and significantly associated with a higher share of final payment: where court are inefficient, the PAs use final payments as sticks to enforce the contracted deliver time.

The structure of the paper. The paper is organized as follows. In Section 2 we discuss the related literature. In Section 3, we shortly present characteristics of penalty for delay in the Italian public procurement setting and a simple model which sketchs it and investigate how agents interact, accordingly. In Section 4, we describe our dataset, we show the cross-sectional variability (across Italian provinces) of delays in the execution of works and the cross-sectional and overtime variability of the average duration of civil trials. Then, in Section 4, we present our estimation strategy, we show our main estimation results (4.1) and the heterogeneous effects for project with different size (4.2); finally, we discuss additional evidence and some evidence on competing interpretations of the results (4.3). Section 5 concludes.

RELATED LITERATURE HERE - to be done

2 Penalty enforcement for delayed delivery: a simple model

In this Section we first briefly illustrate the institutional setting for public procurement contracts in Italy in the period between 2000 and 2006 and how times incentives rules are there regulated. We then present a simple model to investigate the firm's optimal delay in contract execution and the public buyer's choice to enforce the contractual penalty (Section 2.1).

In Italy, until August 2006 contracts for public works were governed by the Law no. 109/94[8] and then by the Public Procurement Code[9], which acknowledges the EU Directives 2004/17/EC and 2004/18/EC[10]. The Law no. 109/94 saw the light in the early 90s, immediately after the crushing wave of scandals that literally wiped out almost the entire Italian political class, which used systematic bribery in public procurement (not only) to finance their parties. The historical context helps us to understand the rigidity of that law, which reduced the possibility to use auctions with scoring rules, limited the opportunity to award contracts through private negotiations and imposed new strict rules on price definitions (and revisions).

The contractual conditions procurers have to respect when delivering public works are reported in the call for tender. In particular, Italian laws:[11] i) prescribe that time incentive clauses in the form of liquidated damages have to be necessarily included in each contract, ii) regulate the lower and upper limit of such penalties, and also cap their total amount, i.e. it cannot exceed 10% of the contract's value,[12] iii) describe the procedures to be adopted in case of delay. According to these rules, penalty for delivery delay is to be calculated on a daily basis and must be set in the range of 0.03% and 0.1% of the value of the contract.[13]

The Italian law grants the CA a considerable degree of discretion in the actual exercise of the penalty for delayed delivering. The firm can always request the total or partial non-implementation of the penalty fee whether able to show either that it is not responsible for the delay (i.e.: wrong plans, adverse weather conditions, unexpected events, etc.) or that the fee is "manifestly disproportionate" with respect to the CA's interests harmed. The CA evaluates the firm's claims and decides whether to (partially) accept or reject them. In the latter case, the firm has the possibility to go to

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

[9]D.Lgs no. 163/2006 - Code of public contracts relating to works, services and supplies

[10]The Code essentially provides a single framework for contracts for public works, supplies and services and the rules governing the former are not very different from the previous ones, since the Regulation (Presidential Decree no. 554/1999) has been barely touched.

[11]See the *General Terms for Procurement of Public Works Contracts*, the Ministerial Decree no. 145/2000, art. 22 and the Presidential Decree no. 554/1999, art. 117 (*Regulation implementing the framework-law on public works no.109/94*)

[12]In fact the legislator considers this 10% as the firm's (average) profit: thus, the *ratio* for the time incentive rule is that the CA can make a claim on the whole firm's profit but cannot exceed it. Should the accumulated delay imply liquidated damages exceeding that threshold, the CA must terminate the contract and start another awarding procedure for the completion of the work (and perhaps go to court to claim for further payment of damages). In this case, the completion of the work will be further delayed because of blockage of the construction site and the new awarding procedure.

[13]The exact percentage chosen by the CA is indicated in the *Special terms* of each contract where is also specified whether the delay has to be computed once at the end of the entire work (the standard case) or - given different contractual deadlines for separated phases of the work - for each single delayed phase.

court a solution often very time-consuming for the parties due to the average duration of civil trials in Italy. Note that legal costs for the CA are not limited to the resources devoted in following the trial; litigation can further affect the CA's reputation and the related political interests, and this determines strong incentives to the CA not to initiate litigation against contractors and to exploit its degree of discretion to accommodate problems.[14]

2.1 A simple model on optimal delay in delivery the contract's execution

We investigate a setting where a *CA* delegates the execution of a contract to a firm (*F*, henceforth). *CA* and *F* sign a contract which specifies the task to be performed, the execution timing in exchange of a payment Π, and a penalty $V^{\mathrm{P}}(d)$ which has to be payed by *F* for each day of delay, *d*, in the delivery of the contract.

We assume that *F* is capacity constrained and gets positive value from postponing the contract's execution: $V(d)$ is the *F*'s benefit from days *d* of delay in delivery the contract. The executed contract gives to *CA* a payoff $b(\Pi)$, where *b* is an increasing function of the contract's value Π, and it also includes the social utility from the realized public work (i.e. the citizens' utility from the new swimming pool); delaying the contract's execution generates a damage for the *CA* which is, for simplicity, equal to $-V(d)$, and - if *CA* enforces penalty - is compensated by $V^{P}(d)$.

We shall also take on the following regularity assumptions on the functions $V(d)$ and $V^{\mathrm{P}}(d)$: $V(0) = 0$, $V^{\mathrm{P}}(0)=0$; $V(d)$ and $V^{\mathrm{P}}(d)$ are continuous function; $V(d)$ is strictly concave and $V(d)$ and $V^{\mathrm{P}}(d)=Nd$ is linear, for $N>0$.

Let's assume that the *CA* and the *F* are risk neutral and that the sequence of actions they take is as illustrated in *Figure 1*.

[Insert Figure 1 about here]

In case *F* delays, *CA* might choose whether enforce or not the penalty. When *CA* enforces the penalty, *F* might file a claim to recover an expected fraction of the enforced penalty $(1-s)V^{\mathrm{P}}(d)$,

[14] The firm can also require an arbitration to dispute about enforced penalty, but this possibility has been reduced by the regulator as the CAs have been almost invariable the losing parties (89% of the times) and pay on average 28% more than originally agreed. (see about the annual report by the Authority for the Vigilance on Contracts for Public Works, Services and Supplies (AVCP) - 2008" (p. 208)

with $1 \geq s > 0$; filing a claim has a cost for F which is $R_F \geq 0$, which we assume as given and known by parts.

If F delays and files a claim, CA can either defend itself in court or withdraw. Defending in court has a cost for CA which is $R_{CA} \geq 0$, and which we assume as given and known by parts. If the CA defeats the claim in court - in expected terms - it will get $sV^{\mathrm{P}}(d)$, with $1 \geq s > 0$.

Payoffs

If the F does not delay the delivery of the contract, the F and the CA respectively will get the following payoffs:

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

where Π is the value of the contract which is payed to F, and b is the CA's utility from the executed contract.

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

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

If F delays and CA enforces the penalty, their payoffs become respectively:

$$(\Pi + V(d) - V^P(d), b(\Pi) - V(d) + V^P(d))$$

If F delays, CA enforces the penalty, F files a claim and CA withdraws, they will get:

$$(\Pi + V(d) - R_F, b(\Pi) - V(d))$$

If F delays, CA enforces the penalty, F files a claim and CA defeats the claim in court, payoffs will be respectively:

$$(\Pi + V(d) - sV^P(d) - R_F, b(\Pi) - V(d) + sV^P(d) - R_{CA})$$

In this setting, we first investigate the CA's choice to enforce the penalty considering the F's cost to file a claim and the CA's cost to respond both positive and given. Moreover, we take s - the fraction of penalty to be payed if F files a claim - as exogenously given.

Then, as an extension of the analysis, we study the case in which two new elements are investigated. Firstly, the fraction of the penalty F is going to pay once it has filed the claim in court and CA

has defeated it, is now defined as $s(\Pi)$, that is s as a function of the contract value, Π. Secondly, the F and CA's legal costs are assumed to be positive and defined as a function of γ, the expected average length to end a trial by the local court, that is, $R_F(\gamma) > 0$ and $R_{CA}(\gamma) > 0$. We also assume that $\frac{\delta R_{CA}}{\delta \gamma} > \frac{\delta R_F}{\delta \gamma}$.

The CA's choice to enforce penalty

For very large value of $R_{CA} > 0$, it would be too costly for the CA to defend itself in court (and, previously, to enforce the penalty). This would be - for instance - when a CA does not have an internal legal office and, thus, should outsource to a professional lawyer to defeat the F's claim. Note that - as highlighted in Shavell and Rosenmberg (1985) - to defeat a claim usually requires to engage in actions - i.e. to gather evidence supporting the defendant's contention - which are frequently more costly than those to make the claim itself.

In particular, CA results indifferent between enforcing and not enforcing the penalty, provided that the firm delays and files a claim, whenever

$$b(\Pi) - V(d) = b(\Pi) - V(d) + sV^P(d) - R_{CA}$$
$$\iff R_{CA} = sV^P(d)$$

Hence, CA will defend in court only if $R_{CA} \leq sV^{\mathrm{P}}(d)$.

Similarly, if F has chosen a delay d, and CA has enforced the penalty, F will then file a claim if and only if

$$\Pi + V(d) = \Pi + V(d) - sV^P(d) - R_F$$
$$\iff R_F = (1-s)V^P(d)$$

This imply that F will file a claim when $R_F \leq (1\text{-}s)V^{\mathrm{P}}(d)$.

Therefore, if the following two conditions are simultaneously satisfied:

$$R_F \leq (1-s)V^P(d) \tag{1}$$
$$R_{CA} > sV^P(d)$$

so that $\hat{d} = V^{\text{P-1}}(\frac{R_F}{1-s}) < \tilde{d} = V^{\text{P-1}}(\frac{R_{CA}}{s})$, (implying $\frac{R_F}{1-s} < \frac{R_{CA}}{s}$), F delays and files the claim and CA does not enforce the penalty for any $d \in [\hat{d}, \tilde{d}]$. For $d < \hat{d}$, CA enforces the penalty as - provided that F will delay - F will not file a claim. For $d > \tilde{d}$, CA enforces the penalty and defeats the claim

in court.

Lemma 1 Let $\hat{d} = V^{\text{P-1}}(\frac{R_F}{1-s})$ *and* $\tilde{d} = V^{\text{P-1}}(\frac{R_{CA}}{s})$, *for* $d \in [\hat{d}, \tilde{d}]$, *CA does not enforce the penalty.*

The F's optimal delay

Defining *d'* the delay which maximizes $\Pi + V(d) - sV^P(d) - R_F$, the *F*'s expected payoff from delaying and filing the claim, provided that *CA* enforces the penalty and defeats the claim in court, the following Proposition states the optimal delay chosen by *F*.

Proposition 1: *The optimal delay chosen by F is* d' *if: i)* $d' > \tilde{d}$ *and ii)* $V(d') - V(\tilde{d}) > R_F + sV^P(d')$*; it is* $\tilde{d}$ *otherwise.*

Proof: Any delay *d'*, smaller than $\hat{d}$, is not optimal for *F*, as it will not file a claim, and the *CA* would enforce the penalty. For any $d \in [\hat{d}, \tilde{d}]$, *F* exploits the maximum advantage by choosing $\tilde{d}$, being $\tilde{d}$ the largest delay for which *CA* is not enforcing penalty. Finally, *F* will optimally choose a delay $d' > \tilde{d}$, only if the expected profit from choosing such *d'* is larger than the expected profit from choosing $\tilde{d}$, that is:

$$(\Pi + V(d') - sV^P(d') - R_F) > (\Pi + V(\tilde{d}))$$

$$V(d') - V(\tilde{d}) > R_F + sV^P(d') \tag{2}$$

The larger the *F*'s legal cost to claim and the higher the fraction of penalty *s* which *F* has to pay once *CA* defeats the claim in court, and the more difficult that (2) results satisfied, i.e. that *d'* results the optimal delay. Considering our real setting, (2) results rarely satisfied as. DISCUSSION.

Extensions

i) Penalty size, s(Π).

As suggested by Bajari and Tadelis (2001) and widely accepted by the following procurement literature, larger value contracts tend to be more complex. This, in turn, determines an informative advantage for *F* which can opportunistically be used to file a claim and then dispute in court. We thus reasonably assume that *s* is a function of the contract's value, Π. Since *d'* and $\tilde{d}$ are both increasing in Π, we expect delay becomes larger with the value of the contract.

ii) $R_{CA}(\gamma)$ *and* $R_F(\gamma)$*, with* $\frac{\delta R_{CA}}{\delta \gamma} > \frac{\delta R_F}{\delta \gamma}$.

Assuming now that the parts' legal cost is increasing in γ, and that such increase is larger for CA than for F, it is easy to see that $\tilde{d}$ becomes larger where courts are less efficient, thus determining higher delay. DISCUSS HERE ABOUT d'.

3 The data

We employ the AVCP dataset as the main source of information on procurement contracts in Italy: this dataset collects information on every public contract for public works awarded and valued 150,000 euro or more. Information on several aspects of each procurement contract such as award mechanism, reserve price, winning rebate, name of the winning firm, number of bidders, execution times, type and location of CA, type of the project main task are included in this dataset. Given these information we can control for the features of contracts and we do not restrict our attention to particular markets but, after several steps of data cleaning, we employ the entire sample of contracts.

Our sample consists of contracts awarded between 2000 and 2006, in 15 ordinary statute regions; we use 15 out of 20 regions since the other 5 (Val D'Aosta, Trentino Alto-Adige, Friuli Venezia-Giulia, Sicily and Sardinia) enjoy an extensive legislative autonomy and have rather different rules for public procurement contracts. As shown in Table 1, most of the contracts have been awarded with open participation auctions (about 75%) by local CA authorities (about 70% by municipalities and provincial governments). The contracts refer to projects with different tasks; however, the majority of them concern the construction of buildings (about 33%) and the construction of roads and bridges (about 30%).

About the participation procedures, Italian legislation for public procurement indicates three main different types: *open procedure*, *restricted procedure* and *negotiation*.[15] In our sample about the 75.8% of contracts were awarded through open procedures, about the 9.7% through negotiation and the remaining 14.5% through the restricted (or simplified restricted) procedures.

The **delays in the work's execution** is defined as the difference between *expected* due date of

[15] According to the Italian legislation, the choice of a particular awarding procedure depends on the reserve price of the auction, plus some other technical components: the standard one was the *open procedure* which is exploited through first price or average bid auctions. As stressed by Decarolis (2013), the mechanisms "are identical in everything except for the exact way the winner is determined".

the work and *actual* end of the work: the former is usually computed by the CA's engineers and indicated in the contract, while the latter is recorded once the work has been effectively delivered. In our dataset, on average, the delay in contracts' execution is of about 153 days, with a maximum of 1578 days. There are indeed works completed on time and even in advance - respectively about 7% and about 9% of the sample - but about 85% of the observed works are delayed. In Figure 2, we can observe that there is a territorial variation across provinces for the average days of delay in the execution of public works. An higher concentration of delays is recorded in the Centre and South of Italy, but variation persists also among Northern provinces.

[Insert Table 1 about here]

As underlined in Djankov et al. (2003) there are different definitions of **court's efficiency**, measuring it is not an easy task. In this paper we employ an outcome measure - previously used in economic literature - which is based on the average duration of trial.[16] This measure is computed - for each court - as the average time to get a sentence, weighted over the number of pending cases, and then averaged at province-level if in the province there are more than one courts.

To implement this measure, we use data referring to the duration of civil trials (the so called: *procedimento civile di cognizione*) at province level for each year between 2000 and 2006 provided by ISTAT, the Italian National Statistics Institute. We specifically refer to local civil courts as those are the tribunals in Italy where disputes on the *execution* of a public procurement contract should be presented.[17]

The average duration of civil trial for Italy during the period 2000-2006 has a mean value of 911 days, a minimum 205 days and a maximum 2,221 days (in our sample the mean is 889, the minimum 205, the maximum 2,221 days, and a standard deviation of about 294 days), with variability across provinces (see Figure 3) and over time (see Figure 4). This variation cross-section variation across provinces and over time will be at the core of our identification strategy of the relationship between the duration of trials and the delay in the execution of work, and will allow us to identify the effect

[16] This measure has been adopted in cross-country and with-in country studies. See, for example, Djankov et al (2003) for a cross-country study, and Jappelli, Pagano, Bianco (2005) on the relationship between duration of trials and banking market performance on Italian provinces.

[17] Differently, disputes on the *awarding phase* of public procurement have to be suited in the local administrative tribunals.

in the framework of a fixed-effect model.

The two maps previously showed (Figures 2 and 3), there seems to be a cross-sectional correlation between the average duration of trials and average delays in the execution of public works by province across the period 2000-2006. This correlation is confirmed also in the scatter plot in Figure 4, which shows a positive correlation considering average data by province and year.

[Insert Figures 2, 3, 4 and 5 about here]

4 Empirical analysis

The goal of the empirical analysis is to estimate the relationships between the average duration of trials and the delay in the execution of public works. In Section 3 we showed a correlation between the province average values of those two variables. However, to establish a stronger relationship we employ project-level data to control for project's and CA's characteristics which are among the determinants of the delays in the execution. In this aim, we estimate a reduced form model which looks as follows:

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

where J is a measure of courts' efficiency in province p at time t. X is a set of variables used as proxies for: i) characteristics of the project (such as its dimension or complexity and the type of work involved); ii) characteristics of the auction (such as the type of auction's participation); iii) type of the CA. Furthermore, to contain the omitted variable problems, we also included other variables Q with province and time variability (as the province's population), province fixed effects P to better exploit with-in province variation of courts' efficiency, and year dummy variables T to adjust for temporal shocks that might have affected both the time-related trends of the firm's outcome and the contracts chosen by the CA. In alternative to type of CA's dummy and provice's dummy, we include CA's fixed effects to better account for CA's characteristics and location.

4.1 Estimation results

Table 2 presents estimation results of the relationship between the delay in the contract's delivering and the duration of trials in the province's courts. Columns 1 and 2 have fixed effects for the

provinces, while columns 3 and 4 have a squared term of the measure of courts' efficiency and fixed effects for each CA. The models including the CA-fixed-effects seem to fit the data better, suggesting that the variability in the execution time of the works is strongly correlated with local factors not observable by the econometrician. Among them one can think about the relative personal attitude of a CA's manager - and or the CA's staff - to be more or less strict in the enforcement of the contract, everything else being equal.

In column 1 and 3, where the average duration of trials enters with a single term, we estimate its linear effect on the delays of execution, which is not statistically significant. When we add its quadratic term (columns 2 and 4), the effect of the average duration of the trials is positive and decreasing, and statistically significant. This non-linear effect indicates that for extremely high values of the duration of trials, further increases do not change firms' perception of court's inefficiency as much as for lower ranges. A back-of-the-envelop calculation of the effect indicates that a standard deviation increase of the duration of the trials (measured at average duration of trials) induces an increase of the mean value of delays of execution of about 3% in the province fixed-effect model.

[Insert Table 2 about here]

Following Bajari, MacMillan and Tadelis (2009), as a proxy of project's complexity we employ the reserve price of the auctioned project (which comes from the CA's engineers computation). From the results in Table 2 (columns 1 to 4), the reserve price appears to be a significant determinant of days of the delay, and its effect is positive but decreasing. The positive but decreasing relationship between the project complexity and the delays can be explained by the firm's evaluation of the benefits from delays: for higher complex projects the firm has more resource to mobilize from the procured project and to devote to alternative projects; thus, its benefits increase with the dimension of the mobilized resources. However, the firm does not necessarily obtain constant increasing benefits from very large projects because the mobilization of very large resources can be very costly (or because of the shortage of alternative large projects to exploit).

An additional result obtained in the theoretical model is the joint effect of the complexity of the

project and the duration of trials on delays in execution of works. If the firm takes advantage of both those features, we would expect to find larger delays for more complex projects executed in provinces with longer average duration of trials. We thus estimate our model specification augmented with the interaction between the reserve price of the contract and the duration of trial. Estimation results in Table 3 show that higher is the complexity of a project, larger and statistically significant is the effect of an increase in the duration of trials on the firms' delay.

[Insert Table 3 about here]

4.2 Inspecting the mechanism

In this section, we further explore our dataset to present additional estimation results to support the validity of our main established relationship between duration of trials and firm's incentive to delay the execution of works. Firstly, given that longer duration of trials is likely to be associated with higher legal costs, we expect that larger sized firms participate and win the contracts with higher probability in those provinces where the duration of trials is longer. Secondly, we discuss and present estimation results on two competing interpretation of our results, as one might suspect that our fixed effect models might not fully control for the territorial and CA's characteristics and there might be other mechanisms at work that significantly influence the delays. In particular, we control whether a measure of corruption, which, in Italy, is geographically correlated with the duration of trials, and the delays in the payments by the public administration significantly influence the performance in the execution of the contract.

Since we do have information about the winning firm's size[18], our proxy of the firm's size is based on the winning firm's recorded type of business entity. In particular, we focus our attention on two types of business entity: *individual firms* (one-man business) as proxy for micro sized enterprises, and *joint-stock companies - JSC* as a proxy for larger enterprises.[19] We use only those two types of business because for the others is less clear the correlation with the size of firms and because, in the observed period, on average, *JSC* and individual firms have a similar probability of winning a

[18]We can not fully retrieve this information from other sources, as for instance databases containing Italian firms' balance sheet and characteristics, because these databases do not fully cover small and micro size firms

[19]Using the AIDA Bureau Van Dijk dataset, which however does not cover the whole sample of winning firms of contracts of public works, we see that *JSC* that have won public work contracts in the period 2008-2011 have a median number of employees of 74 (average 440).

contract: according to our dataset (as shown in Table 1) they win about the 11.3% and the 10.7% of the contracts, respectively.[20]

We expect that in provinces where the duration of trials is longer, *JSC* will participate to the awarding procedures more frequently than *micro* firms, having thus an higher probability to win the contract. In fact, the incentive to participate in auctions where local courts are inefficient should be higher for *JSC* than for *micro* firms as, in relative terms, the former can better sustain higher judicial costs from longer trials as larger firms have typically internal legal offices or active lines with external offices.[21] Estimation results in Table 4 show that (*JSC* have higher probability of winning a contract in those provinces where courts' inefficiency is larger. A rough calculation of the effects indicates that to a standard deviation increase of the duration of the trials (measured at average duration of trials) corresponds about a 1% higher probability of win by a *JSC* and -0.2% of win by a *micro* firm.

[Insert Table 4 about here]

Further concerns about the robustness of our results and the correct interpretation come from the fact that the courts' inefficiency is likely to be correlated to the overall low quality of the local socio-institutional environment. In particular, the positive relationship between the duration of trials on delays in the execution of public works might be affected by other factors, such as the presence of corruption, which is territorially correlated with courts' inefficiency. In the previously estimated model, we include province-level or CA's fixed effects which should be able to capture the different degrees of corruption among Italian areas. However, to bring additional evidence and to exclude that our estimated relationship is not affected by corruption (which can have an

[20] About the other types of business entities, we observe that limited partnership business entities (*SAS*) win about the 6%, general partnership firms (*SNC*) about the 9%, limited liability companies (*SRL*) about the 49%, while the remaining 13.5% of contracts are won by temporary consortia and cooperatives.

[21] In addition, smaller firms - which have tighter budget constraints - can have lower incentive to participate in provinces where the duration of trials is high because, in those provinces, CAs typically hold a larger share of the final payment. In fact, we find that where the duration of trials is longer the CAs use to adopt larger share of final payment over the total value of the contract (see Table A.2 in Appendix). According to the Italian regulation on procurement, the final payment is due to the firm only when the contract has been executed and the testing necessary to confirm the proper completion of the works has been positively carried out. According to our data, on average, the share of the final payment is about the 6% of the value of the project; however, it has a large variation going from 0% (in the 4% of the contracts) to 100% (in very few cases). Note also that, in our setting, the CAs can use this contingent payment to disincentive firms to delay in the execution of works using the "stick" of larger final payment where the external enforcement by the local court is weak.

independent direct effect on works' delays), we introduce in our model specification an indicator of corruption.

We use the indicator of corruption by Golden and Picci (2005), which is at province-level for Italy and measures the amount of corruption in public works. In fact, the indicator is constructed as the difference between the estimated monetary amount of public infrastructures built in a given province and the monetary amount actually spent to execute those infrastructures. The authors show that higher is the difference, larger is the amount of money wasted in corruption.

Since this indicator is not varying over time,[22] we introduce it in our model specification through the interaction with the variable measuring the average duration of trials. The estimation results presented in Table 5 show that the effect of duration of trials on the delays in public works does not change much when the corruption index is included.

[Insert Table 5 about here]

A further factor that might affect our relationship is the timing of payments made by the public administration. This is one of the main concerns in the debate about the efficiency of the public administration and has an important impact on the management of private firms engaged in business with the public administration. In Italy, the average timing of payment by the public administration for a private firm's performance is increased over time since the introduction of the Local Stability and Growth Pact introduced in 1999 for all municipalities (ie. an annual cap to local administrations spending has been imposed to reduce the public debt). We do not exclude that the delays in payment by public administration have a direct effect on the delays in the execution of public works, since there could be a form of compensation between the firm and the administration. In particular, the CA might agree on firms' delays in execution in exchange of the firm's acceptance of the delays in payments. We follow Nannicini et al. (2012) and we explore whether the relaxation of the the local stability growth pact in 2001 for the municipalities below 5,000 inhabitants, which might have a direct effect on delays, affects our main estimated relationship between courts' inefficiency and firms' delays in execution of works.

[22] Golden and Picci (2005) do not offer a time-varying indicator; however, it seems reasonable to adopt this indicator in our analysis, as the time-span we focus on is six years and corruption (like for instance social capital) is typically a slow moving factor.

[Insert Table 6 about here]

Estimated results in Table 6, looking at a sample of contracts awarded only by Municipalities, show that the effect of the courts' inefficiency is still positive and decreasing on the delays of the execution of works, when we introduce in the estimated equations the interactions between the Municipal population and a dummy variable representing the treatment period (i.e., from 2001 onwards - the period of the relaxation of the stability and growth pact).

5 Conclusion

Our empirical results show the effects of the duration of trials on the three dependent variables, namely i) the delays in the execution of works, ii) the size of the winner - proxied by the probability of winning of a Joint stock company (JSC) or an individual enterprise - and iii) the share of the final payment. Summing up, we found that the higher the local court inefficiency,

1) the larger the delay in delivering public procurement contract;

2) the higher the probability a JSC wins the auction relatively to an individual enterprise; 3) the larger the share of committed final payment.

These results are coherent with a simple "nuisance suit" model we provide, following Rosenberg and Shavell (1985). Our theoretical setting highlights that the firms opportunistic behaviour in public procurement - i.e., in the form of delaying delivery of works - can be boosted when local courts are inefficient. Indeed, in our setting the possibility of a "nuisance suit" increases when the duration of trials is long: in particular, the firm (plaintiff) is able to obtain a positive settlement from the CA (defendant) also if the firm's case is weak. The nuisance suit provide a gain to the contractor because for the CA it results less expensive to settle immediately than to defend itself in a long and costly trial.

The firm knows the CA's cost to stay in trial and this rises its opportunism: the firm knows that where court are inefficient, it is easier to get a settlement from the CA about the delivery of delayed works, because the CA's cost to be suited (i.e., to stay in trial) becomes larger. Notwithstanding the presence of contractual penalty for delays, the possibility to file nuisance suit gives the firm potential gains to exploited, also when the CA knows that the firm's case is weak.

TO BE COMPLETED.

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Figure 1: Model's tree

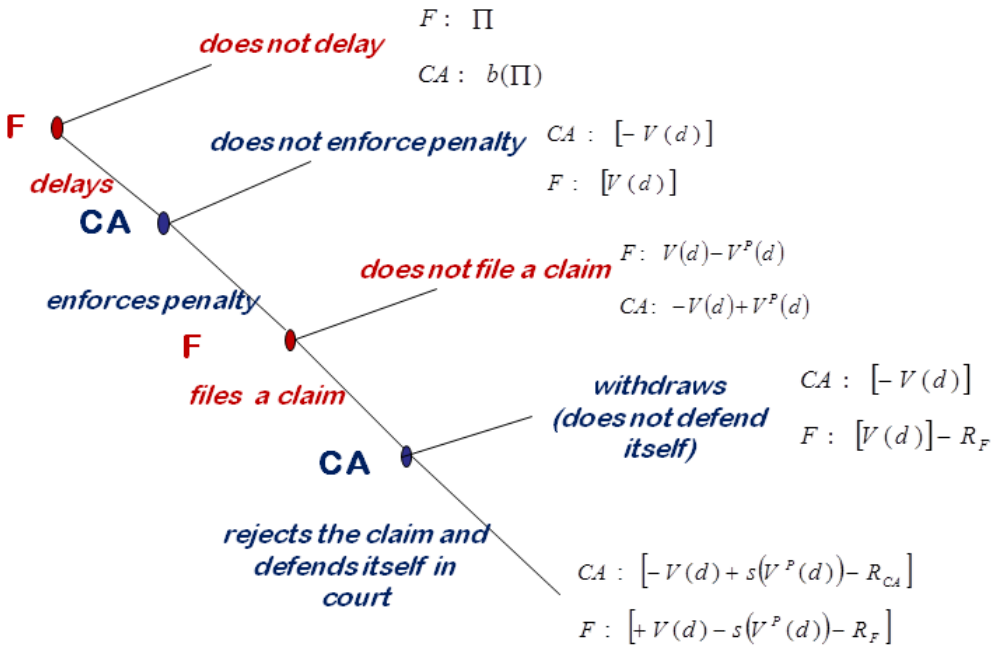

Table 1: Summary statistics

VARIABLE	(1) OBS	(2) MEAN	(3) SD	(4) MIN	(5) P25	(6) P50	(7) P75	(8) MAX
Dependent variable								
Final payment (share)	28175	0.060	0.114	0	0.005.006	0.060	1	
Delay in execution (days)	40521	153.339	168.209	-194	30	108	225	1578
Winner is:								
joint-stock company	20070	0.107	0.309	0	0	0	0	1
one-man business	20070	0.114	0.317	0	0	0	0	1
Contract characteristics								
Reserve price (in 100,000 euros, CPI deflated)	40521	5.824	11.154	1.303	1.998	3.008	5.492	299.805
Awarding procedures:								
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	0.0642	0.245	0	0	0	0	1
negotiation	40521	0.0969	0.296	0	0	0	0	1
Main category of work:								
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
fluvial	40521	0.065	0.247	0	0	0	0	1
Type of CA:								
municipalities	40521	0.548	0.498	0	0	1	1	1
provinces	40521	0.151	0.358	0	0	0	0	1
ministries	40521	0.042	0.200	0	0	0	0	1
Province controls								
Duration of trials (days)	40521	889.389	293.701	205	664	839.5	1063	2221
Population prov. (100,000)	40521	11.356	11.598	0.890	3.577	6.430	11.498	40.131

Figure 2: Average delays in execution of works (days) by provinces

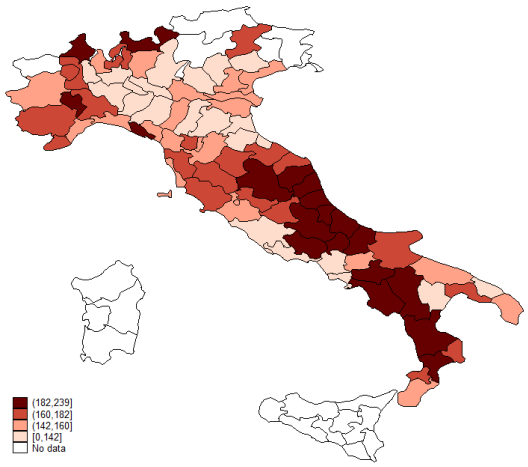

Figure 3: Average duration of trials (days) by provinces

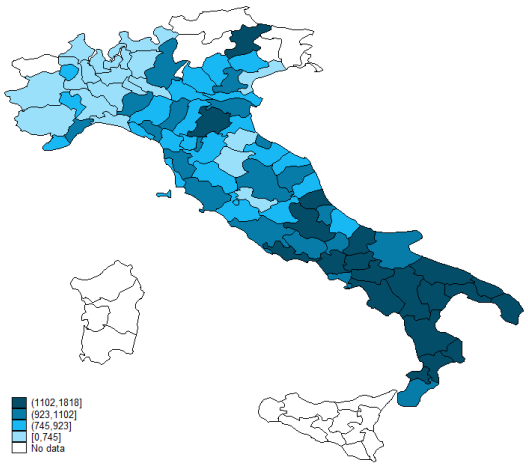

Figure 4: Average duration of trials (days) by year and macro-regions

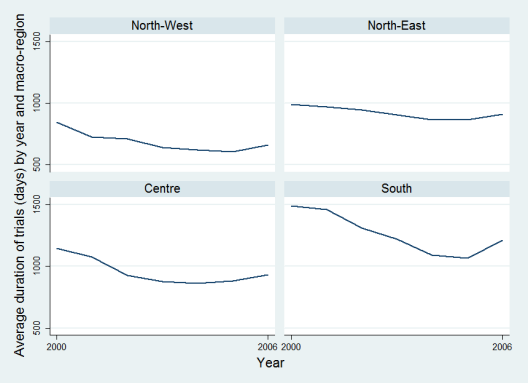

Figure 5: Average delays in execution of works and average duration of trials (by province-year)

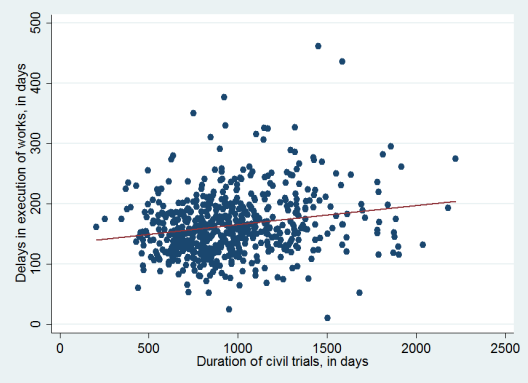

Table 2: Delays in execution and duration of trials

	(1)	(2)	(3)	(4)
DEPENDENT VARIABLES	Delays in execution of works (days)			
Duration of trials	0.00161	0.06166**	0.00863	0.08655***
	(0.007)	(0.030)	(0.006)	(0.026)
Duration of trials, squared		-0.00003**		-0.00003***
		(0.000)		(0.000)
Reserve price	6.35360***	6.35523***	6.73345***	6.73922***
	(0.410)	(0.410)	(0.151)	(0.151)
Reserve price, squared	-0.02779***	-0.02779***	-0.03080***	-0.03082***
	(0.002)	(0.002)	(0.001)	(0.001)
Restricted procedure	1.81254	1.93809	-9.65933**	-9.31646**
	(6.744)	(6.733)	(4.358)	(4.359)
Simplified restricted procedure	-21.75543***	-21.76834***	-11.39042***	-11.45388***
	(4.665)	(4.699)	(4.345)	(4.345)
Negotiation	-11.34606	-11.37043	-17.27045***	-17.24290***
	(7.430)	(7.438)	(3.385)	(3.385)
Population prov.	4.01171	4.62549	-0.30183	-0.27482
	(3.174)	(3.676)	(0.287)	(0.287)
Type of CA FE	YES	YES	NO	NO
Category of work FE	YES	YES	YES	YES
Province FE	YES	YES	NO	NO
CA FE	NO	NO	YES	YES
Year FE	YES	YES	YES	YES
Observations	40,521	40,521	40,521	40,521
R-squared	0.124	0.124	0.385	0.386
Mean outcome	153.3	153.3	153.3	153.3
Mean Duration of trials	889.4	889.4	889.4	889.4
SD Duration of trials	293.7	293.7	293.7	293.7
Linear effect +SD	0.473		2.535	
Effect +SD at mean Dur.t.		4.591		7.417
Effect +SD at 25perc. Dur.t.		8.017		11.980
Effect +SD at 75perc. Dur.t.		1.952		3.903

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 3: Delays in execution, duration of trials and complexity of the project

	(1)	(2)	(3)	(4)
DEPENDENT VARIABLES	Delays in execution of works (days)			
Duration of civil trials	-0.00776	0.05587*	-0.00145	0.07669***
	(0.008)	(0.032)	(0.006)	(0.026)
Duration of trials, squared		-0.00003**		-0.00003***
		(0.000)		(0.000)
Duration of trials*Reserve price	0.00153***	0.00154***	0.00166***	0.00166***
	(0.001)	(0.001)	(0.000)	(0.000)
Reserve price	4.98355***	4.97610***	5.26672***	5.27157***
	(0.627)	(0.621)	(0.266)	(0.266)
Reserve price, squared	-0.02758***	-0.02757***	-0.03014***	-0.03016***
	(0.003)	(0.003)	(0.001)	(0.001)
Restricted procedure	0.87217	0.99904	-10.43084**	-10.08745**
	(6.680)	(6.666)	(4.356)	(4.357)
Simplified restricted procedure	-21.60264***	-21.61531***	-10.82375**	-10.88703**
	(4.672)	(4.707)	(4.343)	(4.343)
Negotiation	-11.47960	-11.50635	-17.26532***	-17.23768***
	(7.422)	(7.431)	(3.383)	(3.382)
Population prov.	4.11091	4.76266	-0.31660	-0.28952
	(3.033)	(3.532)	(0.287)	(0.287)
Type of CA FE	YES	YES	NO	NO
Category of work FE	YES	YES	YES	YES
Province FE	YES	YES	NO	NO
CA FE	NO	NO	YES	YES
Year FE	YES	YES	YES	YES
Observations	40,521	40,521	40,521	40,521
R-squared	0.125	0.125	0.386	0.386
Mean outcome	153.3	153.3	153.3	153.3
Mean Duration of trials	889.4	889.4	889.4	889.4
SD Duration of trials	293.7	293.7	293.7	293.7
Effect +SD at mean Res.p.	0.336		2.414	
Effect +SD at 25perc. Res.p.	-1.383		0.548	
Effect +SD at 75perc. Res.p.	0.187		2.252	
Effect +SD at mean Res.p. and mean Dur.t.		4.703		7.310
Effect +SD at 25perc. Res.p. and mean Dur.t.		2.972		5.443
Effect +SD at 75perc. Res.p. and mean Dur.t.		4.553		7.148

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table 4: Dimension of the winning firm and duration of trials

	(1)	(2)	(3)	(4)
DEPENDENT VARIABLES	Winning firms is:			
	JSC (large firm)		One-man business (micro firm)	
Duration of trials	0.00001	0.00014**	0.00004*	-0.00016*
	(0.000)	(0.000)	(0.000)	(0.000)
Duration of trials, squared		-0.00000**		0.00000**
		(0.000)		(0.000)
Reserve price	0.00679***	0.00679***	-0.00333***	-0.00333***
	(0.000)	(0.000)	(0.001)	(0.001)
Reserve price, squared	-0.00002***	-0.00002***	0.00002***	0.00002***
	(0.000)	(0.000)	(0.000)	(0.000)
Restricted procedure	0.00879	0.00884	-0.00542	-0.00549
	(0.009)	(0.009)		
Simplified restricted procedure	0.01787*	0.01795*		
	(0.010)	(0.010)	(0.012)	(0.012)
Negotiation	0.05591***	0.05582***	-0.02845***	-0.02830***
	(0.013)	(0.013)	(0.009)	(0.009)
Population prov.	-0.01543	-0.01146	0.00573	-0.00046
	(0.010)	(0.011)	(0.019)	(0.019)
Type of CA FE	YES	YES	YES	YES
Category of work FE	YES	YES	YES	YES
Province FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
Observations	20,070	20,070	20,070	20,070
R-squared	0.076	0.076	0.085	0.085
Mean outcome	0.107	0.107	0.114	0.114
Mean Duration of trials	884.9	884.9	884.9	884.9
SD Duration of trials	286.7	286.7	286.7	286.7
Linear effect +SD	0.002		0.010	
Effect +SD at mean Dur.t.		0.011		-0.003
Effect +SD at 25perc. Dur.t.		0.018		-0.014
Effect +SD at 75perc. Dur.t.		0.005		0.006

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 5: Delays in execution, duration of trials and corruption

	(1)	(2)	(3)	(4)
DEPENDENT VARIABLE	Delays in execution of works (days)			
Duration of trials	0.01399	0.06378**	0.00671	0.08763***
	(0.009)	(0.031)	(0.007)	(0.026)
Duration of trials, squared		-0.00002*		-0.00004***
		(0.000)		(0.000)
(Duration of trials)*Corruption	-0.00933	-0.00611	0.00284	0.00322
	(0.006)	(0.005)	(0.003)	(0.003)
Reserve price	6.37283***	6.37378***	6.76679***	6.77262***
	(0.419)	(0.418)	(0.152)	(0.152)
Reserve price, squared	-0.02818***	-0.02818***	-0.03131***	-0.03132***
	(0.003)	(0.003)	(0.001)	(0.001)
Restricted procedure	1.58045	1.67891	-11.17745**	-10.83373**
	(6.852)	(6.834)	(4.405)	(4.406)
Simplified restricted procedure	-22.68007***	-22.67308***	-12.47784***	-12.56555***
	(4.715)	(4.745)	(4.408)	(4.407)
Negotiation	-11.70741	-11.73239	-17.66670***	-17.65626***
	(7.536)	(7.546)	(3.421)	(3.420)
Population prov.	4.54020	5.08312	-0.40668	-0.39240
	(3.064)	(3.536)	(0.307)	(0.307)
Type of CA FE	YES	YES	NO	NO
Category of work FE	YES	YES	YES	YES
Province FE	YES	YES	NO	NO
CA FE	NO	NO	YES	YES
Year FE	YES	YES	YES	YES
Observations	40,071	40,071	40,071	40,071
R-squared	0.124	0.124	0.386	0.386
Mean outcome	153.5	153.5	153.5	153.5
Mean Duration of trials	887.1	887.1	887.1	887.1
SD Duration of trials	294.2	294.2	294.2	294.2
Effect +SD at mean Corr.	0.987		2.925	
Effect +SD at 25perc. Corr.	2.329		2.517	
Effect +SD at 75perc. Corr.	-0.137		3.267	
Effect +SD at mean Corr. and mean Dur.t.		4.632		8.085
Effect +SD at 25perc. Corr. and mean Dur.t.		5.511		7.623
Effect +SD at 75perc. Corr. and mean Dur.t.		3.897		8.473

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 6: Delays in execution, duration of trials and CA's budget constrints

	(1)	(2)	(3)	(4)
DEPENDENT VARIABLE	Delays in execution of works (days)			
Duration of trials	0.01202	0.09813***	0.01073	0.10097***
	(0.008)	(0.035)	(0.009)	(0.035)
Duration of trials, squared		-0.00004**		-0.00004***
		(0.000)		(0.000)
Post 2000	-24.70268**	-23.29207**	-25.89880***	-24.64228***
	(11.070)	(11.082)	(5.128)	(5.149)
Municipal Pop.¿5,000	14.74441	13.63711		
	(16.914)	(16.917)		
(Municipal Pop.¿5,000)*(Post 2000)	3.46473	3.87114		
	(11.617)	(11.616)		
Municipal Pop.			-0.00008	-0.00008
			(0.000)	(0.000)
Municipal Pop.,squared			0.00000	0.00000
			(0.000)	(0.000)
Municipal Pop.,cubed			-0.00000	-0.00000
			(0.000)	(0.000)
Post2000*(Municipal Pop.)			0.00007	0.00007
			(0.000)	(0.000)
Post2000*(Municipal Pop.,squared)			-0.00000	-0.00000
			(0.000)	(0.000)
Post2000*(Municipal Pop.,cubed)			0.00000	0.00000
			(0.000)	(0.000)
Reserve price	8.53232***	8.53607***	8.53704***	8.53971***
	(0.245)	(0.245)	(0.245)	(0.245)
Reserve price, squared	-0.04350***	-0.04348***	-0.04347***	-0.04343***
	(0.002)	(0.002)	(0.002)	(0.002)
Restricted procedure	4.37706	4.58332	4.75394	4.93004
	(5.845)	(5.845)	(5.869)	(5.869)
Simplified restricted procedure	-13.63514**	-13.63267**	-12.94349**	-12.87196**
	(5.999)	(5.998)	(6.017)	(6.016)
Negotiation	-13.85175***	-13.81479***	-13.89349***	-13.86853***
	(4.523)	(4.522)	(4.524)	(4.524)
Population prov.	-4.62940***	-4.26069**	-3.73337**	-3.42947**
	(1.701)	(1.707)	(1.733)	(1.736)
Category of work FE	YES	YES	YES	YES
CA FE	YES	YES	YES	YES
Observations	22,199	22,199	22,199	22,199
R-squared	0.353	0.354	0.353	0.354
Mean outcome	159.1	159.1	159.1	159.1
Mean Duration of trials	880.1	880.1	880.1	880.1
SD Duration of trials	291.7	291.7	291.7	291.7
Linear effect +SD	3.506		3.130	
Effect +SD at mean Dur.t.		8.552		8.419
Effect +SD at 25perc. Dur.t,		13.72		13.84
Effect +SD at 75perc. Dur.t.		4.560		4.236

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Appendix

In Table A.1 we present a simple robustness check. We restrict our sample of contracts according to two criteria: i) in columns 1 to 4, we focus on a common sample (i.e. on the same sample of contracts) where for each contract we observe value for the three alternative dependent variables (i.e., the delays in the execution of works, and the size of the winning firms); ii) in columns 5 to 8, we consider only regions with a better quality of data collection: Piedmont and Lombardy. Even if this restriction reduce the variability in terms of courts' efficiency, estimation results in Table A.1 show that estimation results do not change.

Table A.1: Robustness checks

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
DEPENDENT VARIABLES	Delays in execution of works (days)							
	Reduced sample				Only Piedmont and Lombardy			
Duration of trials	0.00759	0.13063***	-0.00181	0.11686**	0.03852***	0.05008	0.02314	0.02458
	(0.011)	(0.046)	(0.011)	(0.046)	(0.014)	(0.061)	(0.015)	(0.061)
Duration of trials, squared		-0.00006***		-0.00005***		-0.00001		-0.00000
		(0.000)		(0.000)		(0.000)		(0.000)
(Duration of trials)*(Reserve price)			0.00140***	0.00137***			0.00265***	0.00265***
			(0.000)	(0.000)			(0.001)	(0.001)
Reserve price	7.42592***	7.43226***	6.20002***	6.23542***	5.38723***	5.38830***	3.69018***	3.69084***
	(0.229)	(0.229)	(0.425)	(0.426)	(0.222)	(0.222)	(0.516)	(0.516)
Reserve price, squared	-0.03494***	-0.03496***	-0.03455***	-0.03458***	-0.02452***	-0.02452***	-0.02361***	-0.02361***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)
Restricted procedure	-15.68347**	-15.41779**	-16.06450**	-15.79965**	-24.41835***	-24.21944***	-23.98089***	-23.95639***
	(6.566)	(6.565)	(6.564)	(6.564)	(8.602)	(8.663)	(8.598)	(8.658)
Simplified restricted procedure	-13.92345*	-14.00258*	-13.55606*	-13.64101*	-7.48225	-7.46677	-7.63395	-7.63199
	(7.273)	(7.271)	(7.271)	(7.269)	(8.258)	(8.258)	(8.253)	(8.254)
Negotiation	-13.05271**	-13.03900**	-13.07850**	-13.06469**	-10.37209	-10.34558	-10.51986	-10.51653
	(5.277)	(5.276)	(5.275)	(5.274)	(8.651)	(8.652)	(8.646)	(8.648)
Population prov.	-0.75421*	-0.72393	-0.76805*	-0.73856*	-0.78751*	-0.78450*	-0.78069*	-0.78032*
	(0.446)	(0.446)	(0.446)	(0.446)	(0.422)	(0.423)	(0.422)	(0.422)
Category of work FE	YES	YES	YES	YES	YES	YES	YES	YES
CA FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
Observations	20,070	20,070	20,070	20,070	13,401	13,401	13,401	13,401
R-squared	0.428	0.428	0.428	0.429	0.336	0.336	0.336	0.336
Mean outcome	165.5	165.5	165.5	165.5	144.7	144.7	144.7	144.7
Mean Duration of trials	884.9	884.9	884.9	884.9	668.1	668.1	668.1	668.1
SD Duration of trials	286.7	286.7	286.7	286.7	222.2	222.2	222.2	222.2
Linear effect +SD	2.175				8.559			
Effect +SD at mean Dur.t.		9.007				9.310		
Effect +SD at 25perc. Dur.t.		16.110				9.684		
Effect +SD at at 75perc. Dur.t.		2.962				9.192		
Effect +SD at at mean Res.p			1.919				8.770	
Effect +SD at 25perc. Res.p.			0.297				6.346	
Effect +SD at at 75perc. Res.p.			1.808				8.609	
Effect +SD at at mean Res.p and mean Dur.t.				8.501				8.863
Effect +SD at 25perc. Res.p. and mean Dur.t.				6.918				6.439
Effect +SD at at 75perc. Res.p. and mean Dur.t.				8.393				8.702

Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Table A.2: Final payment and duration of trials

	(1)	(2)	(3)	(4)
DEPENDENT VARIABLES	Final payment (share on total payment)			
Duration of trials	0.00001	0.00005*	-0.00000	0.00002
	(0.000)	(0.000)	(0.000)	(0.000)
Duration of trials, squared		-0.00000*		-0.00000
		(0.000)		(0.000)
Reserve price	-0.00179***	-0.00179***	-0.00160***	-0.00160***
	(0.000)	(0.000)	(0.000)	(0.000)
Reserve price, squared	0.00001***	0.00001***	0.00001***	0.00001***
	(0.000)	(0.000)	(0.000)	(0.000)
Restricted procedure	0.00130	0.00140	-0.00299	-0.00284
	(0.003)	(0.003)	(0.004)	(0.004)
Simplified restricted procedure	-0.00781*	-0.00787*	-0.00075	-0.00080
	(0.004)	(0.004)	(0.004)	(0.004)
Negotiation	0.00664*	0.00657*	0.00227	0.00227
	(0.004)	(0.004)	(0.003)	(0.003)
Population prov.	-0.00629**	-0.00584**	0.00004	0.00005
	(0.002)	(0.003)	(0.000)	(0.000)
Type of CA FE	YES	YES	NO	NO
Category of work FE	YES	YES	YES	YES
Province FE	YES	YES	NO	NO
CA FE	NO	NO	YES	YES
Year FE	YES	YES	YES	YES
Observations	28,175	28,175	28,175	28,175
R-squared	0.070	0.070	0.388	0.388
Mean outcome	0.0600	0.0600	0.0600	0.0600
Mean Duration of trials	866.4	866.4	866.4	866.4
SD Duration of trials	292.8	292.8	292.8	292.8
Linear effect +SD	0.002		-0.000	
Effect +SD at mean Dur.t.		0.005		0.001
Effect +SD at 25perc. Dur.t.		0.007		0.002
Effect +SD at 75perc. Dur.t.		0.003		-0.000