CENTRE *for* ECONOMIC
PERFORMANCE

CEP Discussion Paper No 1465

January 2017

Tenure in Office and Public Procurement

Decio Coviello
Stefano Gagliarducci

THE LONDON SCHOOL
OF ECONOMICS AND
POLITICAL SCIENCE

E·S·R·C
ECONOMIC
& SOCIAL
RESEARCH
COUNCIL

Abstract
We study the impact of politicians' tenure in office on the outcomes of public procurement. To this purpose, we match a data set on the politics of Italian municipal governments to a data set on the procurement auctions they administered. In order to identify a causal relation, we apply two different identification strategies. First, we compare elections where the incumbent mayor barely won another term, with elections where the incumbent mayor barely lost and a new mayor took over. Second, we cross-validate these estimates using a unique quasi-experiment determined by the introduction of a two-term limit on the mayoral office in March 1993. This reform granted one potential extra term to mayors appointed before the reform. The main result is that an increase in the mayor's tenure is associated with ``worse" outcomes: fewer bidders per auction, a higher cost of procurement, a higher probability that the winner is local and that the same firm is awarded repeated auctions. Taken together, our estimates are informative of the possibility that time in office progressively leads to collusion between government officials and a few favored local bidders. Other interpretations receive less support in the data

1 Introduction

An overriding concern in politics is that politicians who have been in power for too long might be more likely to develop a set of corrupt relations. This is a very old concern. Ancient Greeks and Romans used to impose rotation on the most important elective offices to prevent entrenchment of power. Jacksonians in the 19th century also held the view that long-term tenure in office fostered corruption (Knott and Miller, 1987).[1] Many modern democracies adhere to this view and thus inhibit apical elected officials from being in power for too long at both legislative and local level. To the best of our knowledge, there are no studies proving the causal effect of tenure on the behavior of elected officials.[2]

In this paper, we document the effect of mayors' tenure in office on the functioning of public procurement in Italy. Specifically, we compare the outcomes of procurement auctions for public works administered by Italian mayors between 2000 and 2005. For each municipality, we relate the mayor's tenure to several outcomes of the procurement process: the number of bidders per auction, the winning rebate, the probability that the winner is local, and the probability that the same firm is awarded repeated auctions.

A potential threat to the identification of the effect of time in office is that this might be endogenous. For example, mayors who favor local contractors might survive longer if the rents accruing from collusive behaviors help them in being reelected. Conversely, mayors who collude might find it difficult to get reelected if voters punish their unlawful behavior. To identify a causal relationship, we apply two different identification strategies.

First, we implement a Regression Discontinuity (RD) design by comparing elections where the incumbent mayor won another term by a small margin with elections where the incumbent mayor lost by a small margin and a new mayor took over. Mayors elected in close races are likely to be ex-ante identical in terms of observable and unobservable characteristics, the only difference being their tenure and, possibly, their procurement outcomes. Our main results show that one additional term in office not only significantly

---

[1] Andrew Jackson was among the first to support the implementation of rotation in office to mitigate the corruption of long tenured bureaucrats. Prior to Jackson's stipulation, Thomas Jefferson wrote in the Resolution for Rotation of Members of Continental Congress 1 that the rotation in office is useful "..to prevent every danger which might arise to American freedom from continuing too long in office."

[2] Besley and Prat (2006) found that, in a cross-country comparison, political longevity is positively associated with higher levels of corruption.

reduces the number of bidders participating in the auctions (-11.48%) but also reduces the winning rebate (-5.7%), which means a higher cost for public works. A back-of-the-envelope calculation suggests that an average public work (540,000 euros) costs, other things being equal, about 3,426 euros more in municipalities with a second term mayor relative to municipalities with a first term mayor. Moreover, we also find that having the same mayor in power for an additional term increases the probability that the contract is awarded to a local firm (+5%), or to the same firm repeatedly (+25.6%).

We interpret the fact that RD estimates are larger in magnitude than the OLS estimates as evidence that voters do understand that reelecting an incumbent mayor might come with worse public procurement outcomes. If this is the case, why should voters be indifferent between an incumbent and a challenger in close electoral races, despite knowing that the former is likely to run a worse procurement? We argue that this evidence could still be compatible with our RD approach if the outcomes that we measure are not a sufficient statistic of the overall performance of a mayor, or if incumbents still have an advantage in the presence of risk-averse voters.

Second, we cross-validate the RD estimates using a unique quasi-experiment determined by the introduction in March 1993 of a two-term limit on the mayoral office. Since local elections are staggered across time and regions, the date of the election created two groups of otherwise comparable mayors: mayors appointed before the reform could be reelected for two additional terms, while those appointed after the reform for one term only. Under the assumption that mayors elected just before or after the reform were almost identical, we use the distance of the date of the first election from March 1993 as an instrument for tenure (2SLS). The results from this specification are similar, and provide a validity check to the RD estimates.

Note that, since the term limit only applied to the terms starting after the reform, we could obtain estimates of the tenure effect that are purged from the effect of non-eligibility. In fact, some mayors would eventually face term limit in the third term or more (those elected for the first time before the reform), while some others in the second term (those elected for the first time after the reform). This is not the case in most of the studies that look at the impact of term limit on economic outcomes. Usually, the term limit applies to everybody with a certain tenure (e.g., the second term), in which case it is not clear

whether the last term effect is driven by the different experience, or by the absence of reelection incentives (Besley and Case, 1995; Ferraz and Finan, 2011).[3] With this respect, the two empirical strategies we propose rely on the same heterogeneity in the application of the term limit to separate the effect of tenure from the effect of non-eligibility, although they exploit two distinct exogenous variations within the sample of mayors (close electoral races, and closeness to the 1993 reform, respectively).

It is also important to point out that our focus is on the effect of the elapsed time in office (tenure), not of the remaining time in office (horizon). As shown in other papers, the latter is related to the possibility of future opportunities, rather than to the frequency of past interactions. For example, Gamboa-Cavazos et al. (2008) use firm-level data from Mexico on extra-official payments made to public authorities and show that corruption is more intense over long and short political horizons and less intense over intermediate ones, because of a combination of "horizon" and "capture" effects. Using cross-country data, Campante et al. (2009) find a similar U-shaped relationship between corruption and political stability. Our estimates allow us to demonstrate whether two politicians holding different tenure in office behave differently with respect to public procurement despite having identical political horizons.

Our findings are compatible with the notion that tenure in office deteriorates the functioning of the procurement process, as it takes time for mayors and contractors to establish collusive relationships. We explore possible mechanisms through which a mayor could interfere with the procurement process. First, we consider whether the size and the characteristics of the project can be manipulated by mayors with longer tenure. We find that mayors' tenure in office does not affect this aspect of the auction design, which is mainly determined by engineer estimates, and therefore exogenous. Second, over a subsample of auctions for which the data is available, we find that newly elected mayors are more likely to replace the bureaucrat who supervises the procurement auctions (Iyer and Mani, 2012), which suggests a possible channel through which mayors can exert direct control over the procurement process. In this sense, our estimates seem to validate Jackson's view that time in office corrupts.

---

[3]An important exception is Alt et al. (2011), who use the variation in the length of gubernatorial term limits across US states to separately estimate the accountability and the competence effect over taxes, spending, and borrowing cost.

One important alternative explanation for our results is that more experienced mayors are better at mastering the procurement process (Padró i Miquel and Snyder, 2006; Dal Bó and Rossi, 2011), and so they deliberately favor more expensive bidders because they are more likely to deliver works with better non-contractible characteristics. We investigate this possibility and study the delays in the delivery of the public works over a subsample of municipalities for which the data is available. We find that tenure in office actually implies higher delays, which reinforces the idea that time in office has a negative impact on the cost of procurement. A similar argument might also apply to the unobserved quality of the supplied works, which is not easily contractible. We repeated our analysis on an additional sample of goods and services purchased by the Italian municipalities. These, unlike public works, are more standardized in their quality (Bandiera et al., 2009). Still, we find that tenure in office increases procurement costs, which suggests that the effects we identify in the main sample should not be confounded by the hidden quality of public works.

The rest of the paper is organized as follows. In Section 2, we describe the Italian institutional background, and in Section 3, the data. In Section 4, we explain the identification strategy, and in Section 5, we present the main results. In Section 6, we discuss the results and alternative interpretations of the main evidence. We conclude with Section 7.

2   The Institutional Background

The Italian municipal administration (*Comune*) is made of a mayor (*Sindaco*), who supervises an executive committee (*Giunta*), and a council (*Consiglio Comunale*) that endorses the policies proposed by the mayor with majority rule. In addition to contracting for public works, a municipal administration provides public transportation, some welfare programs, and utilities to the community. On March 27, 1993, the mayoral electoral system was changed from party to individual ballot, with a majority premium for the winning candidate of at least two-thirds of the seats in the council (60% in cities with more than 15,000 inhabitants).[4] The same reform also introduced a two-term limit over the mayoral

---

[4]The reform was a response to the political crisis that originated on February 1992 from a judicial investigation (so called *"Mani Pulite"*) on the corruption of national and local administrators. This investigation led to not only the dissolution of the Christian Democratic Party (*Democrazia Cristiana*), which had ruled the country for over forty years, but also to the end of the so called *"Prima Repubblica"* (First Republic).

office, which only applied to the terms elected after the reform (i.e., past terms in office did not count).

Municipalities are required to outsource public works and select contractors through public tenders. During our sample period, the applicable procurement law requires auctions to be sealed-bid and single-attribute (i.e., technical and quality components of the offers are not evaluated).[5] Each auction is administered by a manager, who is appointed by the mayor among the bureaucrats working in the municipal administration. The manager supervises the whole procurement process, which entails the following duties: preparing the preliminary project, advertising the call for tender, administering the auction, paying the winning firm and monitoring the realization of the work.

Participation to the auctions can be of three types: the *Pubblico incanto*, where participation is open to any firm satisfying some minimum technical requirements; the *Licitazione privata*, which is similar to *Pubblico incanto* except that the contracting authority invites all firms satisfying some technical requirements; or the *Trattativa privata*, where the contracting authority only invites a restricted number of firms, with a minimum of 15.[6] The choice of a particular participation mechanism depends on the reserve price of the auction and some other technical components. The reserve price of the auction represents the maximum price a municipality is willing to pay for a public work. The reserve price also determines the auction's publicity requirements, with auctions with a value below 500,000 euros not requiring any publicity. An engineer employed by the municipal administration sets the reserve price. The reserve price is the result of a calculation of the total costs required to realize the work computed using a price-list of the standardized costs for each type of work. Contractual conditions (e.g., the reserve price of the public administration and the works' deadlines) are described in the call for tender.

Firms bid the price at which they are willing to do the work in the form of a percentage reduction (a rebate) with respect to the auction's reserve price. For a given reserve price, a

---

[5]All Italian public administrations had to follow *"Legge Merloni"*: *Legge 109/94* and amendments (*"Merloni-bis"* in 1995, *"Merloni-ter"* in 1998, and *"Merloni-quater"* in 2002). Major legislative changes were introduced in 2006, but do not affect our sample.

[6]The technical requirements for participation must be certified by an external private agency. Other formats include the *Licitazione privata semplificata*, which is substantially similar to the *Licitazione privata*, and the *Appalto concorso*, which is only used for works with a high architectural content starting from 300,000 euros.

lower rebate represents a higher cost for the public administration. The winning bid (and the winner of the auction) is determined by the following algorithm. After a preliminary trimming of the top/bottom 10% of the collected bids, the bids exceeding the average by more than the average deviation are further excluded, and the winning bid is the highest among the remaining bids, i.e., the one just below this "anomaly threshold".[7]

The Italian auction mechanism is somewhat unconventional, as it has some "beauty contest" features whereby the highest bidder does not necessarily win.[8] The specific features of the mechanism raise the theoretical possibility that increased participation need not result in greater competition (Decarolis, 2014). However, Conley and Decarolis (2015) also show that increased participation may indeed result in more aggressive bidding, because of competition among cartels and independent bidders. This theoretical result is consistent with our evidence, which points towards a positive and significant relationship between the number of bidders and their rebates (i.e., their bidding strategies). Taken together, theory and evidence suggest that, despite the fact that the auction mechanism is unconventional, lower participation is pejorative for the auctioneer just as in a conventional auction.[9]

Part of the terms of the procurement contract (the time of the work delivery, and the total cost of the work) might be (*ex-post*) renegotiated in cases of unforeseen natural events (like floods, storms, earthquakes, landslides, etc.). According to procurement law, renegotiations are granted by the auction manager under mayoral approval.[10] The award-

---

[7] To illustrate, consider this simple example. In a hypothetical auction, after the trimming of the tails there are three participants placing the following bids (in the form of a rebate over the reserve price): 10, 14 and 16. The average bid is thus 13.33. The average difference of the bids above this average bid is 1.12. Thus the "anomaly threshold" is 14.44. It turns out that in this case the winning bid is 14, which is above the average, even if 16% is the highest bidden rebate. See Figure A.1 for a graphical representation of the algorithm.

[8]Decarolis (2014) shows the similarities between this auction mechanism and the one used in other countries like China, Taiwan, Japan, Switzerland, and several US states.

[9] This is in line with the experimental study of Chang et al. (2014), documenting that the empirical bidding functions in the average bid mechanism are statistically indistinguishable from the empirical bidding functions in first-price auctions. This paper also shows that the average bid mechanism performs quite well at reducing the price paid by the auctioneer as in conventional first-price auctions. Our evidence is also in line with the results from Coviello and Mariniello (2014), who use the same Italian data as ours to show that an exogenous increase in publicity (i.e., the potential competition) increases the number of bidders and the winning rebates, reducing the cost of public procurement. Figure A.2 reports a positive correlation between the number of bidders and the minimum, winning and maximum rebate in our sample.

[10]Bajari and Tadelis (2014) show that a) Californian engineers have heterogeneous propensity of making renegotiations of procurement contracts; b) engineers are randomly assigned across different contracts.

ing of public works requires city council approval, full publicity of the call for tender, and the disclosure of the identity of the bidders (and their bid) after the auction takes place. *Ex-post* renegotiations are decided instead by the mayor (or the engineer appointed by the mayor) and do not require public disclosure, although Italian local media typically devote much coverage to the execution of public works, including any eventual delay.

3   The Data

We use an administrative data set that includes all Italian mayoral terms elected between 1985 and 2010, which was provided by the Italian Ministry of Interiors (*Ministero degli Interni*). The data set contains information on the identity, gender, age, highest educational attainment, political affiliation, and previous job of the elected mayor. It also contains information about the legislature, including the exact duration of service, the reasons for any eventual early termination and the electoral results. Finally, we also have yearly information at the municipality level about the size of the resident population, the total revenues and expenditure, plus some demographic characteristics as of 2005, such as the disposable income per capita.

We combine this mayoral information with a data set about the procurement auctions administered by each municipality between 2000 and 2005. This is provided by the Italian Authority for the Surveillance of Public Procurement (*Autorità per la Vigilanza sui Contratti Pubblici di Lavori, Servizi e Forniture, A.V.C.P.*), which collects data on all procurement auctions for public works with a reserve price greater or equal to 150,000 euros.

The data set includes auction-level information about the number of bidding firms, the reservation price, the identity of the winning bidder and the type of work. In particular, the data set allows us to define a large number of procurement outcomes. For our main analysis, we focus on two sets: the *level of competition* and the *nature of competition*. The *level of competition* set includes the number of bidders, and the final percentage rebate over the reservation price. The *nature of competition* set includes an indicator for whether the winning firm is registered in the same region of the contracting authority, and the maximum percentage of works awarded to the same firm per term. This variable is built

only for terms elected between 1998 and 2003, so we could observe auctions over at least three years between 2000 and 2005, and is term-invariant. Each procurement auction is then matched with the corresponding mayoral term, according to the last date allowed for bids' delivery.

The initial sample consists of 4,171 cities (out of the existing 8,104) with at least one auction between 2000 and 2005, and for which we have information on all the relevant variables (the number of bidders, the reserve price, the winning rebate, the identity of the winning bidder, and the time the mayor has been in office). To maximize sample size, we assign the sample mean (or the mode, if a dummy variable) to other variables with missing data (namely, whether the mayor was born in the city/region, the mayor's previous job and highest education level), and include a dummy for missing status for these variables. This procedure increases our sample by about 8.5% and allows us to obtain more precise estimates.

In Table 1, we present summary statistics for the sample of municipalities over which we run the estimation analysis. The final sample is made of 3,878 cities, for a total of 5,481 mayoral terms. Of these, 3,147 are first term mayors, 1,897 second term mayors, 266 third term mayors, 169 fourth term mayors, and 2 fifth term mayors. Table 2 describes the characteristics of the auctions in the sample, where we excluded a few outliers with more than 100 bidders. The data includes a total of 28,058 auctions, with an average of 21 bidders per auction and a mean winning rebate of 12.91%. The winner was a firm registered in the same city about 12% of the time (71% in the same region), and on average the highest percentage of auctions within a term awarded to the same firm is 25%. In only 10% of the cases the selection criterion was the private invitation (*Trattativa privata*), while the rest were with open participation (*Pubblico incanto* or *Licitazione privata*). The average size of a public work is relatively small (540,000 euros, in 2000 equivalents). It is also interesting to note that the number of auctions per year was constant over the period 2000 and 2004 (between 15% and 21% per year), although there are fewer auctions in 2005 when the sample was originally collected.

4 Identification Strategy

We want to test whether a mayor's tenure affects the outcome of the procurement auctions administered in the city. We assume that the outcome of an auction i, managed by a mayor m, can be specified in the following linear form:

$$y_{im} = \alpha + \beta T_{im} + \gamma TL_{im} + \delta_1 X_i + \delta_2 X_m + \nu_{im}, \tag{1}$$

where y_{im} is the outcome of the auction; T_{im} denotes the mayor's tenure in office at the time of the bids' delivery; TL_{im} denotes whether the mayor can be reelected in the term after the date of the bids' delivery; X_i is a vector of auction characteristics; X_m is a vector of mayor and city characteristics; and ν_{im} represents the disturbance term, which includes a mayor's specific fixed effect η_m and the usual white noise component ϵ_{im}. The main coefficient of interest is β. We perform the analysis at auction level, using for T_{im} both the exact time in office at the date of the bids' delivery, and the term in office.[11]

Note that in our set-up we could separate the effect of time in office (β) from the effect of electoral accountability (γ) because terms elected before 1993 were not included in the computation of the term limit. This is because, in 2000-2005, some mayors would face term limit when in the second term (those elected for the first time after the reform), while some others would face term limit when in the third term or more (those elected for the first time before the reform).[12] Specifically, 7.3% (138) of the second term mayors, 18% (48) of third term mayors, and 11.8% (20) of fourth term mayors could still be reelected, while the percentage of those who could not be reelected was 92.7% (1,749), 82% (218), and 88.2% (149), respectively. Furthermore, as the timing of local elections is staggered across and within regions (to a certain degree, any city has its own electoral schedule, depending on past events), this provides some heterogeneity across the entire country.

We specify X_i and X_m using the following sets of characteristics. To control for geographical and municipal effects we include: the resident population in the municipality at the beginning of the term, to proxy for the number of potential competitors and any other size effect; a full set of dummies for all the 102 Italian provinces to control for time invariant characteristics at the local level; an indicator for the judicial efficiency at year-region

---

[11]We compute cluster adjusted standard errors to allow for a generic mayor-level error component.

[12] See Figure A.3 for a graphical intuition.

level, to control for differences in the quality of local institutions;[13] the budget deficit over the total revenues, to control for the efficiency of the municipal administration; and a set of indicators for the year of the delivery of the bid, to control for possible time effects. To address the heterogeneity of the projects, we include: a second order polynomial in the reserve price of the auction (i.e., the reservation price of the contracting authority) in 100 thousand Euro increments and deflated to year 2000 price level; an indicator of whether the selection mechanism of the auction was by public participation or by private invitation; and five project type dummies (road, school, building, housing, art). To control for the characteristics of the mayors, we include: gender; age; four education dummies; four previous occupation dummies; an indicator for whether the mayor had been appointed before in any other municipal elective office; and whether the mayor was born in the same region. Finally, to control for the electoral characteristics of the mayoral term, we include: two dummies for the mayor's party (center-left and center-right), the tenure in office of the mayor's party (measured in terms), and a dummy for whether the bid was delivered in the last year before the next scheduled election to capture electoral cycles within terms and to address the censoring of terms that started before 2000 or were concluded after 2005.

The main concern when estimating the effect of time in office on the outcomes of public procurement is that time in office might be endogenous. For example, mayors who are willing to collude might be able to survive longer if the rents produced by collusive behaviors help them to be reelected. Conversely, mayors who collude might find it difficult to get reelected if voters punish their unlawful behavior on the ballot. Next, we illustrate the two strategies we use to address this problem.

4.1 Close Electoral Races

To estimate the causal effect of time in office, we implement a regression discontinuity design on the Italian municipal elections. The probability of having a mayor reelected for a second (or more) term in office is a function of the margin of victory in the previous election (MV_{im}), and has a sharp discontinuity equal to one at the zero threshold, $MV_{im} = 0$.

---

[13]This is computed as the ratio between settled and incoming cases for each regional administrative court (TAR), and for public works related disputes.

Incumbent mayors with a margin of victory above zero are reelected, while those below are not reelected and replaced by a new mayor.

However, the margin of victory itself may be determined by the functioning of the procurement auctions. We follow Lee's (2008) example and focus our analysis on mayors elected in closely contested races.[14] Close-race elections have the characteristics that their outcome is uncertain and the winner is typically determined by elements which are beyond the candidate's control (e.g., weather on election day, breaking news, etc.). In these races, the tenure of the elected mayor is "as if" it has been randomly determined and exogenous with respect to mayor and city observable and unobservable characteristics. Then the RD estimand of the effect of time in office is simply the difference in auction outcomes between mayors with higher tenure and mayors with lower tenure who had won by a small margin.

We parametrically implement the RD by estimating the following equation:

$$y_{im} = \alpha + \beta T_{im} + g(MV_{im}) + \gamma TL_{im} + \delta_1 X_i + \delta_2 X_m + \nu_{im}. \tag{2}$$

Because of the discrete change induced by the discontinuity design, T_{im} is the number of terms in office, MV_{im} denotes the margin of victory of the incumbent mayor, and $g(MV_{im})$ is a smooth function that we approximate with a symmetric third order polynomial function.[15] As discussed in Lee (2008), the RD framework also allows us to test for the validity of the continuity assumption by comparing a set of pre-intervention characteristics for the treated and the control group. If there were nonrandom selections around the threshold, we should expect some of these characteristics to differ systematically. To this purpose, we will also estimate equation (2) considering the pre-intervention characteristics as an outcome. To further inspect the validity of the continuity assumption, we will look at the distribution of the margin of victory around the threshold and implement the McCrary (2008) test.

---

[14]See Imbens and Lemieux (2008) for a survey on RD. See also Lee, Moretti and Butler (2004) and Lee (2008) for empirical studies that have exploited the assignment mechanism generated by the margin of victory in single-member plurality elections. Closer to our spirit, Ferraz and Finan (2011) use the share of districts won by a newly elected mayor in a close election against a term limited mayor, to identify the effect of lack of accountability on corruption in Brazil.

[15] In Table A.2 we experiment with different specifications of $g(MV_{im})$.

4.2 Distance from the 1993 Reform

To cross-validate the RD estimates, we further exploit the electoral reform approved in March 1993. As explained in Section 2, mayors elected for the first time before the reform could stay in office for two terms more (the treated group), while mayors elected for the first time after the reform could stay in office for one term more only (the control group). However, we could not directly implement a 2SLS estimate using the time of first election as an instrument for tenure. In fact, the 1993 reform also introduced another change in the institutional setting that might have had a direct effect on the way public procurement auctions were administered, in which case the exclusion restriction does not hold. In particular, the reform changed the mayor's electoral rule from party to individual ballot. This may have induced a different selection among candidates, because the new electoral system encouraged competition between candidates and reduced party interference with voting. Although this could be a major concern, it is worth recognizing two things. First, this selection bias is minimal within the estimation sample, as at 2000-2005 all the mayors had gone through at least one individual ballot election. Second, while the term limit applied sharply after the reform, the introduction of individual ballot elections probably had a delayed effect on candidates' selection, since it was initially difficult for parties to recruit suitable candidates for the new system. If this is true, we can reduce the bias from the changing electoral rule by focusing on mayors elected immediately before and after the 1993 reform (i.e., a fuzzy-RD).

Following the above discussion, we re-estimate equation (1) within a 2SLS framework. As an exclusion restriction in the first-stage, we use an indicator for whether or not the mayor was elected for the first time before March 1993, augmented with a function of the distance of the first election from the discontinuity threshold as follows:

$$y_{im} = \alpha + \beta_1 T_{im} + \beta_2 f(dist_m) + \gamma TL_{im} + \delta_1 X_i + \delta_2 X_m + \nu_{im} \tag{3}$$

and,

$$T_{im} = a + b_1 PR_m + b_2 g(dist_m) + \gamma TL_{im} + c_1 X_i + c_2 X_m + e_{im} \tag{4}$$

where T_{im} is the number of terms in office, PR_m indicates whether or not the date of the first election was before March 27, 1993, $dist_m$ is the time distance of the first election from the reform, and $f(.)$ and $g(.)$ are flexible functions. Since the running variable is not

12

continuous, as elections are held at few points in time, we specify $f(.)$ and $g(.)$ as a series of time dummies. To be sure that no one in the sample could be reelected for a second term before the implementation of the reform, this estimate is calculated for the sample of mayors elected for the first time between five years before and four years after the electoral reform.[16] This procedure delivers a final sample of mayors in the second term (with or without a binding term limit) and in the third term. The 2SLS framework also allows us to test for the validity of the exogeneity assumption by comparing a set of pre-intervention characteristics for the treated and the control group (Lee, 2008). If there was nonrandom selection around the 1993 reform, we should expect some of these characteristics to differ systematically.

5   Empirical Evidence

5.1   OLS Estimates

In Tables 3 and 4, we report the OLS results from fitting equation (1) to the data. In columns 1, 2, 4, and 5 we use consecutive years in office at the time of the bids' delivery. In columns 2, 3, 5, and 6 we also include an indicator of whether the term limit is binding or not, in addition to the full set of observable characteristics discussed in Section 4. In columns 3 and 6, we replace the number of years with the number of terms in office.

In Table 3, we report estimates of the effect of tenure on the number of bidders, and the winning rebate. Estimates confirm the presence of a negative relationship between mayors' tenure and the level of competition in the procurement auctions. A one standard deviation increase in the years in office (3.76 years) is associated with a decrease in the number of bidders by about 7.34% (with respect to a sample mean of 21.18 bidders), and a decrease in the winning rebate by 3.2% (with respect to a sample mean of 12.91%). Estimates are qualitatively invariant to the inclusion of a full set of controls, except for the coefficient on the winning rebate being relatively smaller. Similarly, one additional term in office is associated with a decrease in the number of bidders and in the winning rebate by about 9% and 4%, respectively. The invariance of the estimates to the measurement

---

[16]That is, between March 27, 1988 and March 27, 1997, as the duration of a legislature before and after the reform was 4 and 5 years, respectively.

unit (years or terms) is also reassuring that the different duration of the terms elected before and after September 2000 (4 and 5 years, respectively) does not affect our results.[17]

In Table 4, we report estimates when the dependent variable is an indicator of whether the winning firm is registered in the same region, and the highest percentage of auctions awarded to the same firm within the term. In both of these regressions, the effect of time in office is both statistically and economically significant. A one standard deviation increase in time in office is associated with an increase in the probability that the winner is a local firm by about 3.1% (with respect to a sample mean of 70.58%), and with an increase in the maximum percentage of auctions assigned to the same firm by 15% (with respect to a sample mean of 22.86%).[18] Similarly, one additional term in office is associated with an increase in the probability that the winner is local and with an increase in the maximum percentage of auctions assigned to the same firm by about 4.7% and 22.6%, respectively.

It is worth noting that in Table 3 the coefficient on the term limit is positive and statistically significant on the number of bidders (+10%), i.e., there is higher participation when a mayor is about to leave office, although the term limit has no effect on the final adjudication price. In Table 4, the same coefficient is negative and statistically significant on both outcomes, which shows that local contractors win less frequently when the term limit is binding. Overall, our empirical evidence seems to suggest that mayors facing a term limit have, to a certain degree, better procurement outcomes, which seems at odds with other empirical evidence (Besley and Case, 1995; Ferraz and Finan, 2011; Alt et al., 2011).[19] One possible explanation is that in our data 46% of mayors facing a term limit are then elected again in the same administration (e.g., as city councilor) and 6% in a higher administration (e.g., in a province/region/national administration), these figures being even larger if we could observe those who were not successful in running for office again. These mayors may still have a career concern, and are therefore willing to run better procurement in order to be granted another term. This is especially true in large

---

[17] We also tried excluding auctions run with a restricted participation procedure (*Trattativa Privata*), and could not find any difference in the results. We also tried including a quadratic term for the time in office to capture any eventual non-linearity, but this was never statistically significant.

[18] We ran similar estimates on the probability that the winning firm is registered in the same province/city. Results are quantitatively and qualitatively the same, but less statistically significant.

[19] This is compatible with the findings of other studies using similar data for Italy, which confirm the absence of a term limit effect over different outcomes (Grembi et al., 2015; Gagliarducci and Nannicini, 2013).

cities, where the chance of moving to a higher offices is significantly larger (14%), possibly because of higher visibility and media exposure. Accordingly, in Table A.1 we also show that mayors facing a term limit have better procurement outcomes in large cities, while the opposite holds true in small cities.

5.2 RD Estimates

In this section, we present the results of the RD analysis as outlined in equation 2. Since the RD design induces variation in tenure by terms, not years, and given the similarity of the OLS estimates with the two measures, from now on we will only focus on tenure as measured by terms. We consider a sub-sample of 12,687 auctions managed by 2,268 mayors elected in non-open elections (i.e., the incumbent mayor is running for reelection) with at least one rival. This sample is made of 531 first term mayors, 1,553 second term mayors (22 could still be reelected), 182 third term mayors (2 could still be reelected), and 2 fourth term mayors who should not be reelected, and is similar to the original sample of all auctions in terms of city, mayor and auction characteristics.[20]

Figure 1 reports the running-mean smoothing estimates of the four auction outcomes. For values of MV_{im} smaller than zero, the elected mayor is at the first term, while for values above zero the elected mayor is at the second term or more. MV_{im} is measured as the difference between the percentage votes of the two best candidates in the decisive electoral round. The jump in the outcomes is visible for the number of bidders and for the highest percentage of auctions awarded to the same firm within the term. However, we do not find a visible jump in the winning rebate, and in the indicator of whether the winning firm is registered in the same region.

Table 5 reports the effects of tenure on the number of bidders and the winning rebate. In columns 2 and 4, where we also control for a full set of observable characteristics, we find that the effect of tenure on the number of bidders and the winning rebate are -11.48% and -5.7%, respectively. Results are not qualitatively different when controls are excluded (columns 1 and 3), which is first evidence of the validity of our RD strategy. A back-of-the-envelope calculation suggests that the average public work costs, other things

---

[20] RD estimates over the sample collapsed at city/term level are almost identical in terms of magnitude and statistical significance. Also, OLS estimates over the RD sample are qualitatively similar to those in Section 5.1. All these estimates available upon request.

being equal, about 3,426 euros more in municipalities with a tenured mayor relative to municipalities with a first term mayor.

In Table 6 we report the effects of tenure on the other two auction outcomes (the *nature of competition*). The RD estimates of the effect of tenure on whether the winning firm is registered in the same region or the highest percentage of auctions awarded to the same firm within the term are positive and statistically significant (5%, and 25.6%, respectively).[21] Although we do not have direct evidence of any misbehavior on the part of mayors, we find the last two estimates quite informative about the possible mechanism that is driving the deterioration of the procurement process described in Table 5. In particular, the result on the geographical origin of the winning firm seems fairly compatible with the possibility that, when a mayor stays in power for longer, there is a higher probability that he might distribute favors to local bidders. This is either because geographical proximity enhances personal relationships, or because local bidders represent an easier target for electoral exchange.

A major concern with the implementation of the RD design is that we may not be able to control for all the relevant unobserved determinants of tenure in office and of the procurement outcomes. For example, incumbent candidates may still be able to sort just above the winning threshold because of larger campaign resources (Caughey and Sekhon, 2011), or because of more electoral strength.[22] Alternatively, incumbent mayors might be more likely to engage in fraudulent electoral activity when confronted with a tight race, in which case they would be systematically different from first term mayors. To address this issue, we first check whether the density of the running variable (MV) is continuous around

---

[21]In Table A.2 we try different alternative specifications of the RD model: 1) controlling for term limit and pre-treatment variables only; 2) interacting the 3th order polynomial in the margin of victory with the tenure indicator 3) using a fourth-order polynomial in the margin of victory; 4); using a third-order polynomial in the margin of victory within the optimal bandwidth (estimated with the Imbens and Kalyanaraman (2013) procedure); finally, using a local linear regression with optimal bandwidth. In Table A.3 we also run placebo tests at two simulated thresholds for the model discussed in section 4. The first one considers elections with $MV_{im} > 0$ and threshold at the median of this subsample, while the second one considers elections with $MV_{im} < 0$ and threshold at the median of this subsample. The evidence is that estimates are fairly robust to different models specification and sample selection, and that at the two simulated thresholds there are no effects of tenure on auctions' outcomes, except on the highest percentage of auctions awarded to the same firm within the term.

[22]Eggers et al. (2015) show that this problem is more severe in the U.S. House elections, where electoral competition is extremely high, but it is almost irrelevant in other countries like the UK, France and Germany.

the threshold (Imbens and Lemieux, 2008). Estimates presented in Figure 2 suggest that the density of MV is smooth and well behaved around the threshold (up to some small sample noise). A formal density test (McCrary, 2008) rejects the presence of a statistically significant jump (the estimated log-difference is -0.18, with a standard error of 0.13).

We further test the validity of the RD estimates by analyzing the behavior of the available pre-treatment covariates in the neighborhood of the threshold. In Table A.4, we estimate a simplified version of equation (2) without mayor and city covariates, considering the pre-treatment covariates as dependent variables. When we compare first term mayors to tenured mayors, we find that most of the municipality characteristics are well balanced, although the probability of an incumbent to win seems higher in the North-West and lower in the Center of Italy. Figure A.5 shows that as the electoral race becomes tight, the observable characteristics of municipalities tend to equalize, which is not always the case for less contested races. This is compelling evidence in support of the randomization induced by tight electoral competitions. We also do not find significant differences between tenured and untenured mayors, except for the former being on average older (see also Figure A.6).[23] In particular, all the politically relevant variables (previous political experience within the same administration, whether the previous mayor was from the same party) are well balanced, which is additional evidence against the possibility that more powerful incumbents might be able to sort just above the threshold.[24]

It is worth noting that most of the RD estimates are larger in magnitude than the OLS estimates. As discussed before, this is because the OLS estimates also include the positive effect of electoral selection (mayors who are better at running procurement are also more likely to gain reelection), whereas the RD estimates identify the causal effect of tenure net of any selection bias. Now, we just proved that mayors who barely won reelection are *ex-ante* identical in terms of observable characteristics to mayors who barely won a first term,

---

[23]One possible interpretation for this difference is that voters trade-off more experienced candidates with new and younger candidates. Similar figures could be obtained comparing the subsample of mayors without term limit, and the subsample of mayors with term limit, although in the latter group also city extension and college education were not balanced.

[24]We also regressed first term procurement outcomes over the margin of victory in the next election (only if the incumbent mayor is running for reelection), to check whether incumbents' behavior may have an impact on the probability of having a close race in the following election. We could not detect any specific pattern around close races, if not the opposite: the number of bidders and the final rebate are unaffected, while the probability that the winner is local, and the highest percentage of auctions awarded to the same bidder grow with the margin of victory.

i.e., there is no omitted variable bias in close electoral races. However, the comparison between the OLS and the RD estimates corroborates (admittedly imperfectly) the idea that Italian voters do understand that electing an incumbent for another term might be associated with worse public procurement. So why should voters still be indifferent between an incumbent and a challenger in close electoral races, despite knowing that the former is likely to run a worse procurement? We could think of at least three possible explanations.

First, one could simply assume that voters are not rational, i.e., they disregard the information on the incumbents' performance over procurement being negative. This explanation seems to be at odds with the above comparison between the OLS and the RD estimates.

Second, it could be that the outcomes that we measure are not a sufficient statistic of the overall performance of a mayor in some important way. Therefore, there must be some other outcome that compensates for the negative effect of tenure over procurement in close electoral races. For example, it could be that more experienced mayors are more effective at obtaining transfers from the central government, or at dealing with the municipal bureaucracy.[25] While this argument does not contradict our results on the effect of tenure over procurement, it could certainly help explain why voters may still want to grant reelection to an incumbent mayor who is likely to run a worse procurement.

Finally, the fact that voters reelect mayors who are worse at running procurement relative to challengers can also be explained within a simple model of electoral accountability with risk-averse voters and incumbency advantage. Let's assume that voters know the level of inefficiency in procurement (x) for incumbent mayors (I), whereas they do not know the challengers' level of inefficiency (C), which is randomly drawn from some distribution.[26] In close race elections, incumbent mayors have a level of inefficiency x_m that satisfies the voters' indifference condition between electing I over C candidates, such that

---

[25] For example, Padró i Miquel and Snyder (2006) show that productivity, measured by surveying legislators, lobbyists, and journalists in North Carolina about the effectiveness of legislators in the House of Representatives, rises sharply with tenure. More recently, Dal Bó and Rossi (2011) exploit a natural experiment in the Argentine House of Representatives, where term lengths (two or four years) were randomly assigned across members of parliament, to show that longer terms enhance legislative productivity, as measured by attendance, committee activity, and the number of legislative achievements.

[26] See Bernhardt and Ingerman (1985) for a more general model of electoral accountability with risk-averse voters, and Berinsky and Lewis (2007) for a quantification of risk aversion among the U.S. electorate.

$U_I(x_m) = E(U_C(x))$, where $U_I(x_m)$ is the utility from appointing an incumbent mayor I and $E(U_C(x))$ is the expected utility from appointing a challenger C. With concave utility (risk-averse voters), we have that $x_m > E(x)$, where $E(x)$ is the average level of inefficiency among challengers. This inequality implies that incumbent mayors in close race elections have a higher level of inefficiency than average challengers, i.e., voters are indifferent between incumbents and challengers despite the former display a higher level of inefficiency. Note that a similar argument can be used to compare the level of inefficiency of challengers and incumbent mayors in an average election, which applies to the OLS case. In these elections voters elect an incumbent mayor only if the level of inefficiency is lower than the expected level of inefficiency among challengers, such that $E(x|x \leq E(x))$. Since $x_m > E(x)$, it turns out that the expected level of inefficiency of an incumbent in average elections is smaller than x_m, the level of inefficiency of incumbent mayors in close race elections. This explains why the level of inefficiency of incumbent mayors in the OLS estimates is lower than that of incumbent mayors in the RD estimates.

5.3   2SLS Estimates

In this section, we present the results of the 2SLS estimation as outlined in equation 3. Before that, we discuss the quality of the instrument. We first report evidence that the election timing was independent from the reform by inspecting the distribution of elections around March 1993. Between 1985 and 2008, elections were held fairly regularly, up to a certain degree of asynchronism, although early terminations were more frequent before March 1993 because the winning coalition did not receive a majority premium at that time.[27]   When we focus on the four years around the March 1993 reform (see Figure 3), we find that there were some elections that anticipated the reform (148 over 2,435) and very few that were delayed after the reform (46 out of 304), but the majority of anticipated elections did not allow the incumbent mayor to gain one potential extra term, with only 29 being reelected. We could not detect any significant difference in the observable characteristics of mayors who anticipated the election and mayors who did not, except for the former being on average slightly older. The final sample is made of 108 first

---

[27]An early termination is any anticipated conclusion of the term for one of the following reasons: a) the resignation of the mayor; or b) the resignation of the majority of the council or a no-confidence vote in the council. The variable is, therefore, missing after 2002. See Figure A.4.

term mayors, 1,419 second term mayors (108 could still be reelected), and 252 third term mayors (37 could still be reelected), and is similar to the original sample of all auctions in terms of city, mayor and auction characteristics.[28]

In Tables 7 and 8 we report the 2SLS estimates on the number of bidders, the winning rebate, the probability that the winning firm is local, and the maximum percentage of auctions assigned to the same firm within the term. The functions $f(.)$ and $g(.)$ are specified as a set of year dummies, while we exclude the two years before and after the March 1993 reform. The first two columns in Table 7 report the first-stage estimates of the effect of the reform on the terms in office, with and without controls. Mayors elected for the first time before the reform accumulate an average of 0.970 terms more than mayors elected after the reform.[29] Moreover, the first-stage F-statistic of the excluded instrument suggests that the instrument is relevant. When looking at the estimates with controls, we find that one additional term in office causes a 16.7% decrease in the number of bidders (with respect to a sample mean of 19.36), and a 9.9% reduction in the winning rebate (with respect to a sample mean of 11.57%). Estimates without controls are somehow larger in magnitude, although the sign and statistical significance is the same as with controls. Finally, in Table 8, we report evidence of the relationship between the time in office and the probability that the winning firm is local, and for the maximum percentage of auctions assigned to the same firm within the term. Estimated coefficients in columns 2 and 4 are positive for both outcomes, but not statistically different from zero for the probability that the winning firm is local. In particular, a one term increase in the time in office implies a 36.7% increase in the maximum percentage of auctions assigned to the same firm within the term (with respect to a sample mean of 25.05%).

As discussed in Section 4.2, we have to test the assumption that mayors elected right before and after the reform were actually similar. To this purpose, in Table A.5 we estimate a simplified version of the first-stage equation (4) without city and mayor covariates, and using the mayor characteristics as dependent variable.[30] Numbers show that most of the

___

[28] 2SLS estimates over the sample collapsed at city/term level are almost identical in terms of magnitude and statistical significance. Also, OLS estimates over the 2SLS sample are qualitatively similar to those in Section 5.1. All these estimates available upon request.

[29] This is additional evidence against the presence of a severe sample selection bias, otherwise the coefficient should have been significantly lower than 1.

[30] City characteristics, like the resident population or the geographical location, would not be balanced

differences at the discontinuity point are not statistically different from zero, although mayors elected right after the reform (324 out of a total of 1,470 elected after the reform) were slightly younger and more educated than those elected right before the reform (228 out of a total of 251 elected before the reform). However, most of the other characteristics are well balanced, and in particular the percentage of mayors who had any appointment in the same municipality before, which is evidence that parties had some initial difficulties in recruiting new candidates more suited to the individual-ballot electoral system (see also Figure A.7).[31]

There are at least three major concerns related to this identification strategy. First, there might be a problem of sample selection, as we only observe the mayors who were elected around 1993 and then survived until 2000-2005. In our data, we find that both treated and control mayors have about 80% probability of being elected for a second term, and that all the second term mayors without a term limit were then reelected for a third term. This evidence allows us to rule out that the probability of being in the 2000-2005 sample might depend on the date of first election.

Second, at the time of the first election, mayors appointed before the 1993 reform had potentially an infinite political horizon, while those elected after the reform could stay in office for at most two more terms. Two implications can derive from this observation: 1) since all the mayors were aware of the term limit, this knowledge had no impact on their *ex-post* incentives; 2) since mayors had different career prospectives at the first election, this may have affected their *ex-ante* decision to run for a mayoral office. Many political careers, however, do not terminate after the mayoral office, as we report at the end of Section 5.1. In particular, we do not find any statistical difference between mayors elected before and after the reform on this probability, which corroborates the assumption that they actually had similar political horizons. We will also return to this point when comparing mayor characteristics around the reform in Section 5.3.

Finally, for the 2SLS identification strategy to hold, it also matters that mayors did not anticipate the introduction of the term limit. Since the bill of the reform was first

---

if the election timing was to a certain degree coordinated, as it actually was, across regions. Accordingly, we include these two variables in every specification along with the other controls.

[31]Similar figures could be obtained when comparing the subsample of mayors without term limit, and the subsample of mayors with term limit.

submitted to the national parliament on July 4, 1992, and finally approved on March 27, 1993, we can confidently assume that the reform was indeed unexpected. To rule out the possibility that some mayors systematically resigned before the natural termination of the term to take advantage of a potential extra term, we will further inspect the frequency distribution of the election timing around March 1993 and look for any suspicious density jump before March 27, 1993.

To sum up, the 2SLS estimates are similar in size and statistical significance to the RD estimates of the causal effects of tenure in office. This allows us to provide external validity to the RD findings, as we have estimated the same effects over two differently selected samples, and with two different sets of identification assumptions.

6 Interpretation and Alternative Explanations

The analysis up to this point has shown fairly robust evidence that tenure in office affects the functioning of public procurement: it reduces the number of bidders participating in the auctions and the winning rebate, and it increases the probability that the contract is awarded to a local firm, or to the same firm repeatedly. This evidence suggests that tenured mayors do pay more for public goods, which is the cost of dealing with local contractors that win repeated auctions. In what follows we consider a number of possible explanations for these results.

6.1 Tenure in Office and Collusion

Our most preferred interpretation of the results is that tenure in office increases the likelihood of collusion between mayors and local contractors, as it takes time for contractors to establish a preferential relationship with the mayor. With this respect, our evidence seems at odds with the possibility that connections could be set up instantaneously at the beginning of each electoral term, or that candidates already had established acquaintances upon election, in which case the level of collusion should remain stable throughout the elective office.

This interpretation builds on two key characteristics of public procurement auctions. First, politicians can help preferred bidders in exchange for a bribe, and bidders may ben-

efit from such an exchange. Second, politicians and contractors have repeated interactions over time. Such characteristics have been highlighted in the literature on favoritism in procurement auctions (Arozamena and Weinschelbaum, 2009; Burguet and Perry, 2009) and on repeated auctions (Skrzypacz and Hopenhayn, 2004).

In Appendix B we lay out a simplified model of collusion where time in office helps politicians and contractors build collusive relationships. The model assumes that types (collusive or not) are predetermined and *ex-ante* unknown, and at each point in time (term) a collusive mayor is randomly matched with a bidder. If the bidder is also collusive, then the mayor, in exchange for a bribe, will allow the bidder to adjust the rebate and win. If the bidder is not collusive, then the auction will be held regularly. Under these assumptions, the probability of a collusive match increases with mayor's tenure in office.

The model has the following four predictions, which resemble our main empirical results. First, as the mayor's tenure in office increases, the probability that auctions are assigned to the same bidder increases. Second, as the mayor's tenure in office increases, the revenues from the auction decrease. Third, in presence of entry costs, as the mayor's tenure in office increases, the number of bidders per auction decreases. Fourth, if local bidders have lower costs of bribing (i.e., they find it easier to pay the bribe to the mayor) and types (local or not) are not perfectly observed before the first interaction, as the mayor's tenure in office increases, the probability that the winner is local increases.

6.1.1 Tenure in Office and the Design of the Auction

In this section, we discuss in more detail some features of the auction design that may highlight the mechanisms through which a mayor could interfere with the procurement process.

First, it could be that more tenured mayors adjust the size or the type of works to accomodate some specific bidders. We test this possibility by looking at four different characteristics of the works. In columns 1-3 of Table 9 we consider the size of the works in terms of reserve price. In columns 4-6 we consider whether there is a change in the type of works, and specifically whether there is an increase in the works for construction or maintenance of municipal roads (the largest share of public works).[32] In columns 7-9

---

[32] In Table A.6 we also test the presence of any effect over other categories of work, and found no

23

we consider whether mayors run more complex works, where complexity is measures with an indicator for whether works have a reserve price below 300,000 euros, which is the threshold under which procurement is run with a simplified set of rules (see Coviello et al. 2016). Finally, in columns 10-12 we consider whether more tenured mayors run auctions with a reserve price below 500,000 euros, which is the threshold under which auctions are subject to less publicity requirements (see Coviello and Mariniello, 2014). Overall, we could not detect any manipulation in the size and the type of the works either in the OLS, RD and 2SLS estimates. This excludes the possibility that mayors could affect the decision to execute a specific public work, which is under the control of the municipal council, or could affect the size of the work, which is the result of a technical assessment (see Section 2). At the same time, this result is reinsuring that our estimates of the effect of tenure are not biased by any other change in the size and the type of works.[33]

Finally, we inspect whether tenure in office affects the identity of the auction manager. In testing this hypothesis, we follow a similar argument to Iyer and Mani (2012), who show that a change in the identity of Indian state politicians results in a significant increase in the probability of bureaucrat reassignments. In the Italian set-up, the turnover of local bureaucrats across different posts within the same municipality can be interpreted as a form of control from the mayors over the administration. This is especially the case if mayors want to have the power to assign bureaucrats to specific tasks, for example in order to favor local contractors. Bureaucrats, in turn, might care about the prestige and importance of the posts they are assigned to, or they can also benefit from getting close repeated interactions with local contractors (for example, to share part of the bribes). We test this hypothesis in the subsample of municipalities for which we have data on the identity of the managers (10,795 auctions for 1,789 mayors in the RD sample). Looking at Table 10, we find that the highest percentage of auctions managed by the same manager increases by about 19-21% (compared to an average of 60%) at each additional term in office, which highlights a possible channel through which mayors can exert direct control

---

significant evidence.

[33] At aggregate level, we also find that the number of auctions per term slightly declines with tenure (see Table A.7), possibly because mayors anticipate some works to the initial terms, given uncertainty about future reelection. This is reinsuring about our estimates not being driven by the possibility that the number of bidders declines with tenure as there are also more auctions taking place, in which case firms would eventually face a capacity constraint.

over the procurement process.

6.2   Tenure in Office and Learning

One possible alternative explanation for our results is that, as tenure increases, mayors acquire more skills in designing and mastering the procurement mechanism. If this was the case, more tenured mayors should be more likely to deliver better public works (see Padró i Miquel and Snyder, 2006, and Dal Bó and Rossi, 2011).

This hypothesis would be compatible with our evidence if, for example, we were still missing some important dimensions of the procurement process, like the *ex-post* renegotiations and the unobserved quality of the works. It could be that more experienced mayors are willing to favor more expensive bidders because in the past they had delivered public works with better quality and with less delays, whereas unexperienced mayors do not. Therefore, although it is true that tenured mayors are paying a higher price, they also do better in favoring contractors that systematically deliver better works. On the other hand, the OECD (2005) and Ferraz and Finan (2010) associate the over-use of *ex-post* renegotiations to corruption practices. This is the case, for example, if public officials protect contractors that use low quality construction materials, or tolerate excessive delays in the delivery of the works without reporting contractors to public officials.[34] We can test this hypothesis by studying the effect of tenure in office on two additional sources of data.

First, we analyze the delays in the delivery of the public works, which represent a measure of *ex-post* renegotiation of the original deadline of the contract. In the subsample of municipalities for which we have the data (5,218 auctions for 1,160 mayors in the RD sample), almost 90% of the works were not delivered on time, with an average of 178 days of delay. In Table 11, we report the OLS, RD, and 2SLS estimates of our equations of interest. Our evidence suggests that tenure in office actually raises the number of days of delay in the delivery of the public work by about 1 month (13-22%) per term. This evidence, together with the evidence on the reduction in the winning rebate, suggests that the extra cost of procurement is not offset by faster delivery.

Second, we look at the price of repeated purchases of goods and services by the Italian

---

[34]Olken (2007) shows that there are large discrepancies between the official cost and an independent engineers' estimate of the cost of road projects in Indonesia, and that these discrepancies are sensitive to anti-corruption audits.

municipalities. As discussed in Bandiera et al. (2009), goods and services are more standardized in their quality compared to public works. For instance, the purchase of paper for a photocopy machine should be a standard activity, and the price should not be affected by the tenure of the mayor. To test this hypothesis, we repeat our analysis on a sample of all the municipal procurement auctions for the purchase of goods and services that we could recover for the period 2000-2010.[35] As in Bandiera et al. (2009), we control for unobservable quality characteristics by including 93 fixed effects for the typology of the good or service, that we can estimate because goods and services are the same across different years and administrations. These fixed effects should purge our estimates from any compositional effect. Looking at Table 12, in all specifications but one (2SLS), we find that conditional on quality, the price of an average good increases by about 9-16% at each additional term in office (compared to an average winning rebate of 17%). This evidence suggests that screening for quality cannot be the only reason why we observe procurement prices of goods and service increasing with the mayor's tenure. These results are also in line with the description of municipal corruption in Ferraz and Finan (2010), which show that corruption in Brazilian municipalities is often associated with over-invoicing of goods and services.

7 Conclusions

In this paper, we used a matched mayor-auction data set to provide novel empirical evidence on the extent to which politicians can influence public procurement. Our main result is that, when politicians stay in power for a longer period of time, there is a systematic deterioration in the functioning of the auction mechanism: we observe less participation, a higher cost of public works, and an increase in the probability that the winner is an insider and that the same firm wins more often. These effects persist even after controlling for the endogeneity of time in office using close race elections and an instrumental variable approach.

With the aid of more data on the *ex-post* executions of the works, and the purchases of

---

[35]Data provided by *Telemat S.p.A.*, an information-provider leader in the Italian market for reselling information on public contracts.

standardized goods and services, we interpret these findings as evidence that when a mayor stays in power for a longer period there is a higher probability of collusion. Alternative explanations, like mayors learning the quality of the bidders, are not supported by the data.

From the point of view of a regulator interested in rationalizing public spending, our empirical findings encourage the implementation of policies favoring political turnover (for example, through a term limit), such that competition in public procurement can be restored. Our findings also suggest that the local economy might benefit from the introduction of policies aimed at limiting the power that politicians can exercise through public procurement (for example, through the institution of a central purchasing authority), but only when the functioning of procurement auctions is sensitive to the repeated interaction between politicians and local bidders.

References

Aghion, P., and P. Bolton, 1990. Government Domestic Debt and the Risk of Default: a Political-Economic model of the Strategic Role of Debt. In R. Dornbusch and M. Draghi (eds.), Public Debt Management: Theory and History, Cambridge University Press.

Alt, J., Bueno de Mesquita, E., and S. Rose, 2011. Disentangling Accountability and Competence in Elections: Evidence from U.S. Term Limits. The Journal of Politics, 73, 171-186.

Arozamena, L., and F. Weinschelbaum, 2009. The Effect of Corruption on Bidding Behaviour in First-Price Auctions. European Economic Review, 53, 645-657.

Bajari, P., Houghton, S., and S. Tadelis, 2014. Bidding for Incomplete Contracts: An Empirical Analysis of Adaptation Costs. American Economic Review, 104, 1288-1319.

Bandiera, O., Prat, A., and T. Valletti, 2009. Active and Passive Waste in Government Spending: Evidence from a Policy Experiment. American Economic Review, 99, 1278-1308.

Berinsky, A, J., and J. B. Lewis, 2007. An Estimate of Risk Aversion in the U.S. Electorate. Quarterly Journal of Political Science, 2, 139-54.

Bernhardt, M. D., and D. E. Ingerman, 1985. Candidate Reputations and the Incumbency Effect'. Journal of Public Economics, 27, 47-67.

Besley, T., and A. Case, 1995. Does Political Accountability Affect Economic Policy Choices? Evidence from Gubernatorial Term Limits. Quarterly Journal of Economics, 110, 769-98.

Besley, T., and A. Prat, 2006. Handcuffs for the Grabbing Hand? The Role of the Media in Political Accountability. American Economic Review, 96, 720-736.

Burguet, R., and M.K. Perry, 2009. Preferred Suppliers in Auction Markets. The RAND Journal of Economics, 40, 283-295.

Campante, F., Chor, D., and Q. Do, 2009. Instability and the Incentives for Corruption. Economics & Politics, 21, 42-92.

Chang,W.-S., Chen, B., and T.C. Salmon, 2014. An Investigation of the Average Bid Mechanism for Procurement Auctions. Management Science, 61, 1237-1254.

Conley, T., and F. Decarolis, 2015. On Collusion in Average Bid Auctions. American Economic Journal: Microeconomics, forthcoming.

Coviello, D., and M. Mariniello, 2014. Publicity Requirements in Public Procurement. Journal of Public Economics, 109, 76-100.

Coviello, D., Guglielmo, A., and G. Spagnolo, 2015. The Effect of Discretion on Procurement Performance. Management Science, forthcoming.

Caughey, D., and J. S. Sekhon, 2011. Elections and the Regression Discontinuity Design: Lessons from Close US House Races, 1942-2008. Political Analysis, 19, 385-408.

Dal Bó, E., and M. Rossi, 2011. Term Length and Political Performance. Review of Economic Studies, 78, 1237-1263.

Decarolis, F., 2014. Awarding Price, Contract Performance and Bids Screening: Evidence from Procurement Auctions. American Economic Journal: Applied Economics, 6, 108-132.

Dick, A. R., and J. R. Lott, 1993. Reconciling Voters' Behavior with Legislative Term Limits. Journal of Public Economics, 50, 1-14.

Eggers, A., Folke, O., Fowler, A., Hainmueller, J., Hall, A., and J. Snyder, 2015. On The Validity Of The Regression Discontinuity Design For Estimating Electoral Effects: New Evidence From Over 40,000 Close Races. American Journal of Political Science, 59, 259-274.

Ferraz, C., and F. Finan, 2011. Electoral Accountability and Corruption: Evidence from the Audits of Local Governments. American Economic Review, 101, 1274-1311.

Gagliarducci, S., and T. Nannicini, 2013. Do Better Paid Politicians Perform Better? Disentangling Incentives from Selection. Journal of the European Economic Association, 11, 369-398.

Gamboa-Cavazos, M., Garza-Cantu, V., and C.E. Salinas, 2007. The Organization of Corruption: Political Horizons and Special Interests. Mimeo.

Grembi, V., Nannicini, T., and U. Troiano, 2015. Policy Responses to Fiscal Restraints: A Difference-in-Discontinuities Design. American Economic Journal: Applied Micro, forthcoming.

Iyer, L., and A. Mani, 2012. Travelling Agents: Political Change and Bureaucratic Turnover in India. The Review of Economics and Statistics, 94, 723-739.

Imbens, G., and K. Kalyanaraman, 2013. Optimal Bandwidth Choice for the Regression Discontinuity Estimator. Review of Economic Studies, 20, 1-27.

Imbens, G. and T. Lemieux, 2008. Regression Discontinuity Designs: A Guide to Practice. Journal of Econometrics, 142, 615-635.

Knott, J., and G. J., Miller, 1987. Reforming Bureaucracy: The Politics of Institutional Choice, Prentice-Hall.

Lee, D. S., Moretti, E., M. J. Butler, 2004. Do Voters Affect or Elect Policies? Evidence from the U.S. House. Quarterly Journal of Economics, 119, 807-859.

Lee, D.S., 2008. Randomized Experiments from Non-random Selection in the U.S. House Elections. Journal of Econometrics, 142, 675-697.

McCrary, J., 2008. Manipulation of the Running Variable in the Regression Discontinuity Design: A Density Test. Journal of Econometrics, 142, 698-714.

OECD, 2005. Fighting Corruption and Promoting Integrity in Public Procurement. ISBN-92-64-01399-7.

Olken, B. A., 2007. Monitoring Corruption: Evidence from a Field Experiment in Indonesia. Journal of Political Economy, 115, 200-249.

Padró i Miquel, G., and J. Snyder, 2006. Effectiveness and Legislative Careers. Legislative Studies Quarterly, 31, 347-381.

Skrzypacz, A., and H. Hopenhayn, 2004. Tacit Collusion in Repeated Auctions. Journal of Economic Theory, 114, 153-169.

Tables and Figures

Table 1: City, mayor, and term characteristics

	Mean	St.Dev.	Min	p25	p50	p75	Max
	City characteristics. N. cities: 3,947						
Outcome:							
North-West	0.41	0.49	0	0	0	1	1
North-East	0.20	0.40	0	0	0	0	1
Center	0.14	0.35	0	0	0	0	1
South	0.21	0.41	0	0	0	0	1
Islands	0.04	0.19	0	0	0	0	1
Population	9,977	56,914	49	1,490	3,445	7,855	2,733,908
Budget deficit	0.02	0.05	-0.45	-0.01	0.01	0.03	0.64
Efficiency of the judiciary	100.65	62.4	30.20	55.30	94.10	126.60	462.50
	Mayor/term characteristics. N. terms: 5,481						
Female	0.08	0.28	0	0	0	0	1
Age	49.84	9.21	25.30	43.35	49.61	55.74	85.61
Born in the city	0.52	0.50	0	0	1	1	1
Born in the province	0.85	0.36	0	1	1	1	1
Born in the region	0.94	0.24	0	1	1	1	
Education:							
Secondary	0.53	0.50	0	0	1	1	1
College	0.45	0.50	0	0	0	1	1
Employment:							
Not employed	0.11	0.32	0	0	0	0	1
Low-skilled	0.04	0.19	0	0	0	0	1
Medium-skilled	0.09	0.29	0	0	0	0	1
High-skilled	0.76	0.43	0	1	1	1	1
Political characteristics:							
Any previous experience	0.62	0.49	0	0	1	1	1
Years in office	4.74	3.76	0.00	1.84	3.92	6.81	20.22
Term in office = 1	0.57	0.49	0	0	1	1	1
Term in office = 2	0.35	0.48	0	0	1	1	1
Term in office = 3	0.05	0.21	0	0	0	1	1
Term in office = 4	0.03	0.17	0	0	0	1	1
Term limit binding	0.39	0.49	0	0	0	1	1
Center-right	0.10	0.30	0	0	0	0	1
Center	0.06	0.23	0	0	0	0	1
Center-left	0.28	0.45	0	0	0	1	1
N. terms in office (party)	0.42	0.61	0	0	0	1	4

Notes. Cities with at least one auction between 2000-2005. *Population* is the number of resident inhabitants at the beginning of the first observed term. *Budget deficit* is the municipal budget deficit over total revenues. *Efficiency of the judiciary* is the ratio between settled and incoming cases for each regional administrative court (*TAR*), and for public works related disputes. *Low-skilled* includes blue-collars, *Medium-skilled* clerks, and *High-skilled* entrepreneurs and self-employed. *Any previous experience* is a dummy for whether the mayor was in the council or in the executive committee before. *Years/terms in office* without interruption. *Term limit binding* is a dummy for whether or not the mayor can be reelected. *N. terms in office (party)* is the tenure of the mayor's party in terms.

Table 2: Auction characteristics

	Mean	St.Dev.	Min	p25	p50	p75	Max
Outcome:							
Number of bidders	21.18	21.08	1	5	14	31	100
Winning rebate (%)	12.91	8.39	0	6.78	12.36	17.05	49.99
Winner in the city (%)	12.31	32.86	0	0	0	0	100
Winner in the region (%)	70.58	45.57	0	0	100	100	100
Max wins same firm (%)	25.05	25.81	2.21	8.00	16.67	33.33	100
Selection mechanism:							
Restricted auction	0.10	0.29	0	0	0	0	1
Characteristics of the good:							
Reserve price	5.39	9.31	1.34	2.03	2.94	5.15	190.83
Road	0.23	0.42	0	0	0	0	1
School	0.13	0.33	0	0	0	0	1
Building	0.05	0.22	0	0	0	0	1
Housing	0.01	0.11	0	0	0	0	1
Art	0.04	0.19	0	0	0	0	1
Others	0.54	0.50	0	0	1	1	1
Year bid delivery:							
2000	0.16	0.36	0	0	0	0	1
2001	0.20	0.40	0	0	0	0	1
2002	0.21	0.40	0	0	0	0	1
2003	0.20	0.40	0	0	0	0	1
2004	0.15	0.36	0	0	0	0	1
2005	0.09	0.29	0	0	0	0	1
			N. auctions: 28,058				

Notes. Auctions for works with reserve price greater than or equal to 150,000 euros, and no more than 100 bidders. *Winner in the city/region* is a dummy for whether or not the winning firm is registered in the same city/region of the contracting authority. *Max wins same firm* is the highest percentage of auctions assigned to the same firm within the term. *Restricted auction* is a dummy for the selection mechanism being a *Trattativa privata*. *Reserve price* is the reserve price set by the contracting authority, in 100,000 euros (2000 equivalents).

Table 3: Tenure in office and the *level of competition*, OLS

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable:	N. of bidders	N. of bidders	N. of bidders	Winning rebate	Winning rebate	Winning rebate
Mean outcome:	21.18	21.18	21.18	12.91%	12.91%	12.91%
N. years in office	-0.403***	-0.414***		-0.307***	-0.107***	
	(0.097)	(0.118)		(0.064)	(0.037)	
N. terms in office			-1.910***			-0.695***
			(0.475)			(0.203)
Term limit binding		2.022**	2.130***		0.024	0.274
		(0.855)	(0.826)		(0.290)	(0.313)
Population		0.061***	0.061***		0.046***	0.046***
		(0.019)	(0.019)		(0.009)	(0.009)
Reserve price		0.687***	0.687***		0.084***	0.084***
		(0.076)	(0.076)		(0.012)	(0.012)
Female		-0.489	-0.446		-0.151	-0.143
		(0.709)	(0.713)		(0.237)	(0.237)
Age		0.016	0.010		0.021**	0.020**
		(0.024)	(0.025)		(0.009)	(0.009)
N. terms in office (party)		-0.673	-0.465		-0.365**	-0.303*
		(0.424)	(0.443)		(0.156)	(0.162)
N. auctions	28,058	28,058	28,058	28,058	28,058	28,058
R-squared	0.004	0.234	0.233	0.014	0.483	0.483
Province fixed effects	no	yes	yes	no	yes	yes
Year dummies	no	yes	yes	no	yes	yes
City characteristics	no	yes	yes	no	yes	yes
Auction characteristics	no	yes	yes	no	yes	yes
Mayor characteristics	no	yes	yes	no	yes	yes
Electoral characteristics	no	yes	yes	no	yes	yes

Notes. Estimates on 5,481 terms. *N. of bidders* is the number of firms that submitted a bid. *Winning Rebate* is expressed as a percentage discount from the the reserve price. *Term limit binding* is a dummy for whether or not the mayor cannot be reelected. *Population* is the number of resident inhabitants at the beginning of the term, in 10,000. *Reserve price* is the reserve price set by the contracting authority, in 100,000 euros (2000 equivalents). *N. terms in office (party)* is the tenure of the mayor's party in terms. When denoted with "yes", regressions additionally include *Province fixed effects* (102 dummies); *Year dummies* (2000-2004) refer to the year of bid delivery; *City characteristics* (the budget balance deficit in percentage of the revenues at year level, judiciary efficiency at year-regional level); *Auction characteristics* (squared term of the reserve price, 5 object characteristics dummies, 1 selection mechanism dummy); *Mayor characteristics* (2 education dummies, 3 previous occupation dummies, a dummy for being born in the region); *Electoral characteristics* (a dummy for being in the last year before the next election, 2 political party dummies, a dummy for previous experience in council or executive committee). All mayoral and electoral characteristics are at the beginning of the term. Standard errors are robust to clustering at the mayor level in parentheses. Significance at the 10% level is represented by *, at the 5% level by **, and at the 1% level by ***.

Table 4: Tenure in office and the *nature of competition*, OLS

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent variable:	Winner local	Winner local	Winner local	Max wins same firm	Max wins same firm	Max wins same firm
Mean outcome:	70.58%	70.58%	70.46%	22.86 %	22.86 %	22.86 %
N. years in office	0.536***	0.588***		0.898***	0.916***	
	(0.141)	(0.158)		(0.185)	(0.215)	
N. terms in office			3.346***			5.165***
			(0.930)			(1.311)
Term limit binding		-2.993**	-3.850***		-2.722**	-3.960**
		(1.211)	(1.414)		(1.351)	(1.657)
Population		0.025	0.025		-0.128***	-0.133***
		(0.015)	(0.015)		(0.033)	(0.032)
Reserve price		-0.986***	-0.986***		-0.156***	-0.156***
		(0.072)	(0.072)		(0.030)	(0.030)
Female		-0.655	-0.705		-1.677	-1.687
		(1.252)	(1.253)		(1.535)	(1.518)
Age		-0.008	-0.001		-0.185***	-0.175***
		(0.050)	(0.050)		(0.051)	(0.051)
N. terms in office (party)		1.466*	1.146		2.486***	2.183***
		(0.749)	(0.750)		(0.844)	(0.833)
N. auctions	28,058	28,058	28,058	23,523	23,523	23,523
R-squared	0.001	0.098	0.098	0.015	0.295	0.295
Province fixed effects	no	yes	yes	no	yes	yes
Year dummies	no	yes	yes	no	yes	yes
City characteristics	no	yes	yes	no	yes	yes
Auction characteristics	no	yes	yes	no	yes	yes
Mayor characteristics	no	yes	yes	no	yes	yes
Electoral characteristics	no	yes	yes	no	yes	yes

Notes. Estimates on 5,481 terms for *Winner local*, and on 3,995 terms for *Max wins same firm* (terms elected between 1998 and 2003). *Winner local* indicates whether or not the winning firm is registered in the same region. *Max wins same firm* is the highest percentage of auctions assigned to the same firm within the term,. *Term limit binding* is a dummy for whether or not the mayor can be reelected or not. *Population* is the number of resident inhabitants at the beginning of the term, in 10,000. *Reserve price* is the reserve price set by the contracting authority, in 100,000 euros (2000 equivalents). *N. terms in office (party)* is the tenure of the mayor's party in terms. When denoted with "yes", regressions additionally include *Province fixed effects* (102 dummies); *Year dummies* (2000-2004) refer to the year of bid delivery; *City characteristics* (the budget balance deficit in percentage of the revenues at year level, judiciary efficiency at year-regional level); *Auction characteristics* (squared term of the reserve price, 5 object characteristics dummies, 1 selection mechanism dummy); *Mayor characteristics* (2 education dummies, 3 previous occupation dummies, a dummy for being born in the region); *Electoral characteristics* (a dummy for being in the last year before the next election, 2 political party dummies, a dummy for previous experience in council or executive committee). All mayoral and electoral characteristics are at the beginning of the term. Standard errors are robust to clustering at the mayor level in parentheses. Significance at the 10% level is represented by *, at the 5% level by **, and at the 1% level by ***.

Table 5: Tenure in office and the *level of competition*, RD

	(1)	(2)	(3)	(4)
Dependent variable:	N. of bidders	N. of bidders	Winning rebate	Winning rebate
Mean outcome:	21.52	21.52	12.26%	12.26%
N. terms in office	-1.866	-2.469***	-1.581**	-0.705**
	(1.859)	(0.930)	(0.664)	(0.308)
Term limit binding		3.740**	1.301	1.181**
		(1.715)	(1.157)	(0.499)
Population		0.090***		0.031***
		(0.025)		(0.004)
Starting value		0.746***		0.104***
		(0.093)		(0.017)
Female		0.006		0.146
		(0.845)		(0.309)
Age		0.035		0.025**
		(0.030)		(0.010)
N. terms in office (party)		-0.885		-0.103
		(0.583)		(0.192)
N. auctions	12,687	12,687	12,687	12,687
R-squared	0.004	0.255	0.005	0.464
Margin of victory	yes	yes	yes	yes
Province fixed effects	no	yes	no	yes
City characteristics	no	yes	no	yes
Year dummies	no	yes	no	yes
Auction characteristics	no	yes	no	yes
Mayor characteristics	no	yes	no	yes
Electoral characteristics	no	yes	no	yes

Notes. Estimates on 2,268 terms. *N. of bidders* is the number of firms that submitted a bid. *Winning Rebate* is expressed as a percentage discount from the the reserve price. *Term limit binding* is a dummy for whether the mayor can be reelected or not. *Population* is the number of resident inhabitants at the beginning of the term, in 10,000. *Reserve price* is the reserve price set by the contracting authority, in 100,000 euros (2000 equivalents). *N. terms in office (party)* is the tenure of the mayor's party in terms. When denoted with "yes", regressions additionally include *Margin of victory* (3rd order polynomial in the margin of victory); *Province fixed effects* (102 dummies); *Year dummies* (2000-2004) refer to the year of bid delivery; *City characteristics* (the budget balance deficit in percentage of the revenues at year level, judiciary efficiency at year-regional level); *Auction characteristics* (squared term of the reserve price, 5 object characteristics dummies, 1 selection mechanism dummy); *Mayor characteristics* (2 education dummies, 3 previous occupation dummies, a dummy for being born in the region); *Electoral characteristics* (a dummy for being in the last year before the next election, 2 political party dummies, a dummy for previous experience in council or executive committee). All mayoral and electoral characteristics are at the beginning of the term. Standard errors are robust to clustering at the mayor level in parentheses. Significance at the 10% level is represented by *, at the 5% level by **, and at the 1% level by ***.

Table 6: Tenure in office and the *nature of competition*, RD

	(1)	(2)	(3)	(4)
Dependent variable:	Winner local	Winner local	Max wins same firm	Max wins same firm
Mean outcome:	70.20%	70.20%	22.37 %	22.37 %
N. terms in office	4.776**	3.458	6.023***	5.729***
	(1.926)	(2.173)	(1.861)	(2.189)
Term limit binding		-1.604		-2.491
		(3.325)		(2.837)
Population		0.003		-0.108**
		(0.015)		(0.044)
Starting value		-0.992***		-0.157***
		(0.105)		(0.036)
Female		3.035*		-4.637**
		(1.730)		(1.841)
Age		-0.078		-0.222***
		(0.075)		(0.067)
N. terms in office (party)		0.552		1.367
		(1.335)		(1.146)
N. auctions	12,687	12,687	11,099	11,099
R-squared	0.002	0.100	0.032	0.309
Margin of victory	yes	yes	yes	yes
Province fixed effects	no	yes	no	yes
City characteristics	no	yes	no	yes
Year dummies	no	yes	no	yes
Auction characteristics	no	yes	no	yes
Mayor characteristics	no	yes	no	yes
Electoral characteristics	no	yes	no	yes

Notes. Estimates on 2,268 terms for *Winner local*, and on 1,825 terms for *Max wins same firm* (terms elected between 1998 and 2003). *Winner local* indicates whether or not the winning firm is registered in the same region. *Max wins same firm* is the highest percentage of auctions assigned to the same firm within the term. *Term limit binding* is a dummy for whether the mayor can be reelected or not. *Population* is the number of resident inhabitants at the beginning of the term, in 10,000. *Reserve price* is the reserve price set by the contracting authority, in 100,000 euros (2000 equivalents). *N. terms in office (party)* is the tenure of the mayor's party in terms. When denoted with "yes", regressions additionally include *Margin of victory* (3rd order polynomial in the margin of victory); *Province fixed effects* (102 dummies); *Year dummies* (2000-2004) refer to the year of bid delivery; *City characteristics* (the budget balance deficit in percentage of the revenues at year level, judiciary efficiency at year-regional level); *Auction characteristics* (squared term of the reserve price, 5 object characteristics dummies, 1 selection mechanism dummy); *Mayor characteristics* (2 education dummies, 3 previous occupation dummies, a dummy for being born in the region); *Electoral characteristics* (a dummy for being in the last year before the next election, 2 political party dummies, a dummy for previous experience in council or executive committee). All mayoral and electoral characteristics are at the beginning of the term. Standard errors are robust to clustering at the mayor level in parentheses. Significance at the 10% level is represented by *, at the 5% level by **, and at the 1% level by ***.

Table 7: Tenure in office and the *level of competition*, 2SLS

Dependent variable:	(1) N. terms in office	(2) N. terms in office	(3) N. of bidders	(4) N. of bidders	(5) Winning rebate	(6) Winning rebate
Mean outcome:	2.075	2.075	19.36	19.36	11.57%	11.57%
N. terms in office			-10.227***	-3.231***	-4.717***	-1.143***
			(2.726)	(1.154)	(1.009)	(0.376)
Elected before March 1993	0.501***	0.970***				
	(0.136)	(0.079)				
Term limit binding		0.821***		0.846		0.591
		(0.041)		(1.956)		(0.605)
Population		-0.000		0.110***		0.045***
		(0.000)		(0.037)		(0.005)
Reserve price		0.000		0.780***		0.119***
		(0.000)		(0.087)		(0.022)
Female		-0.009		1.035		0.154
		(0.006)		(1.034)		(0.368)
Age		-0.000		0.063*		0.026**
		(0.001)		(0.033)		(0.011)
N. terms in office (party)		0.051**		-1.057*		0.130
		(0.021)		(0.559)		(0.179)
N. auctions	9,016	9,016	9,016	9,016	9,016	9,016
R-squared	0.756	0.892	0.022	0.264	0.034	0.472
F-exc.-Inst	3280.8	1006.5				
Province fixed effects	no	yes	no	yes	no	yes
Year dummies	no	yes	no	yes	no	yes
City characteristics	no	yes	no	yes	no	yes
Auction characteristics	no	yes	no	yes	no	yes
Mayor characteristics	no	yes	no	yes	no	yes
Electoral characteristics	no	yes	no	yes	no	yes

Notes. Estimates on 1,783 terms. *N. of bidders* is the number of firms that submitted a bid. *Winning Rebate* is expressed as a percentage discount from the the reserve price. *Elected before March 1993* is a dummy for whether or not the mayor was elected for the first time before March 27, 1993. *Term limit binding* is a dummy for whether the mayor can be reelected or not. *Population* is the number of resident inhabitants at the beginning of the term, in 10,000. *Reserve price* is the reserve price set by the contracting authority, in 100,000 euros (2000 equivalents). *N. terms in office (party)* is the tenure of the mayor's party in terms. When denoted with "yes", regressions additionally include *Province fixed effects* (102 dummies); *Year dummies* (2000-2004) refer to the year of bid delivery; *City characteristics* (the budget balance deficit in percentage of the revenues at year level, judiciary efficiency at year-regional level); *Auction characteristics* (squared term of the reserve price, 5 object characteristics dummies, 1 selection mechanism dummy); *Mayor characteristics* (2 education dummies, 3 previous occupation dummies, a dummy for being born in the region); *Electoral characteristics* (a dummy for being in the last year before the next election, 2 political party dummies, a dummy for previous experience in council or executive committee). All mayoral and electoral characteristics are at the beginning of the term. Standard errors are robust to clustering at the mayor level in parentheses. Significance at the 10% level is represented by *, at the 5% level by **, and at the 1% level by ***.

Table 8: Tenure in office and the *nature of competition*, 2SLS

Dependent variable:	(1) Winner local	(2) Winner local	(3) Max wins same firm	(4) Max wins same firm
Mean outcome:	71.05 %	71.05 %	25.05 %	25.05 %
N. terms in office	10.953***	4.342	16.836***	8.934***
	(3.581)	(2.721)	(3.234)	(2.789)
Term limit binding		4.370		0.498
		(4.712)		(8.380)
Population		-0.002		-1.502***
		(0.024)		(0.152)
Starting value		-0.937***		-0.061
		(0.120)		(0.043)
Female		3.077*		0.449
		(1.846)		(1.742)
Age		0.027		-0.094
		(0.079)		(0.069)
N. terms in office (party)		1.540		1.367
		(1.300)		(1.285)
N. auctions	9,016	9,016	7,834	7,834
R-squared	0.006	0.115	0.029	0.395
Province fixed effects	no	yes	no	yes
Year dummies	no	yes	no	yes
City characteristics	no	yes	no	yes
Auction characteristics	no	yes	no	yes
Mayor characteristics	no	yes	no	yes
Electoral characteristics	no	yes	no	yes

Notes. Estimates on 1,783 terms for *Winner local*, and on 1,443 terms for *Max wins same firm* (terms elected between 1998 and 2003). *N. terms in office* instrumented with *Elected before March 1993* as in Table 7. *Winner local* is a dummy for whether or not the winning firm is registered in the same region. *Max wins same firm* is the highest percentage of public tenders assigned to the same firm within the term. *Term limit binding* is a dummy for whether the mayor can be reelected or not. *Population* is the number of resident inhabitants at the beginning of the term, in 10,000. *Reserve price* is the reserve price set by the contracting authority, in 100,000 euros (2000 equivalents). *N. terms in office (party)* is the tenure of the mayor's party in terms. When denoted with "yes", regressions additionally include *Province fixed effects* (102 dummies); *Year dummies* (2000-2004) refer to the year of bid delivery; *City characteristics* (the budget balance deficit in percentage of the revenues at year level, judiciary efficiency at year-regional level); *Auction characteristics* (squared term of the reserve price, 5 object characteristics dummies, 1 selection mechanism dummy); *Mayor characteristics* (2 education dummies, 3 previous occupation dummies, a dummy for being born in the region); *Electoral characteristics* (a dummy for being in the last year before the next election, 2 political party dummies, a dummy for previous experience in council or executive committee). All mayoral and electoral characteristics as at the beginning of the term. Standard errors robust to clustering at the mayor level in parentheses. Significance at the 10% level is represented by *, at the 5% level by **, and at the 1% level by ***.

Table 9: Tenure in office and the design of the auction

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Dependent variable:		Reserve price			Roads			Less complex			No publicity	
Method:	OLS	RDD	IV	OLS	RDD	IV	OLS	RDD	IV	OLS	RDD	IV
Mean outcome:	5.387	5.395	5.113	0.229	0.235	0.240	0.511	0.510	0.519	0.740	0.741	0.755
N.terms in office	-0.175	-0.190	-0.185	-0.003	0.030	0.013	0.005	0.003	0.022	0.016*	0.006	0.031
	(0.131)	(0.223)	(0.329)	(0.012)	(0.023)	(0.027)	(0.013)	(0.024)	(0.029)	(0.009)	(0.019)	(0.026)
Term limit binding	-0.031	-0.829*	-0.108	0.003	-0.062*	-0.015	-0.002	-0.008	0.028	-0.009	0.036	0.011
	(0.211)	(0.460)	(0.510)	(0.016)	(0.036)	(0.039)	(0.016)	(0.034)	(0.045)	(0.013)	(0.028)	(0.041)
Population	0.040***	0.038***	0.024***	-0.001**	-0.000	-0.000	-0.001***	-0.001***	-0.001***	-0.002***	-0.002***	-0.001***
	(0.005)	(0.006)	(0.003)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Reserve price				-0.006***	-0.005***	-0.006***						
				(0.001)	(0.001)	(0.001)						
Female	-0.151	0.086	0.675	-0.021**	-0.033**	-0.033*	0.017	0.013	-0.000	0.021*	0.014	-0.015
	(0.223)	(0.370)	(0.470)	(0.011)	(0.016)	(0.019)	(0.016)	(0.026)	(0.030)	(0.012)	(0.019)	(0.024)
Age	0.018**	0.025***	0.020*	0.000	0.000	0.000	-0.001**	-0.001	-0.001	-0.001**	-0.002***	-0.001
	(0.008)	(0.010)	(0.012)	(0.000)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)	(0.000)	(0.001)	(0.001)
N. terms in office (party)	-0.202*	-0.107	0.154	-0.006	-0.014	-0.014	0.022***	0.040***	0.026*	0.021***	0.025**	0.015
	(0.108)	(0.167)	(0.205)	(0.008)	(0.012)	(0.013)	(0.008)	(0.012)	(0.014)	(0.007)	(0.011)	(0.012)
N. auctions	28,058	12,688	9,016	28,058	12,688	9,016	28,058	12,688	9,016	28,058	12,688	9,016
R-squared	0.041	0.054	0.039	0.078	0.076	0.079	0.037	0.051	0.042	0.048	0.071	0.046
Margin of victory	no	yes	no	no	yes	no	no	yes	no	no	yes	no
Province fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Year dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
City characteristics	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Auction characteristics	yes	yes	yes	no	no	no	no	no	no	yes	yes	yes
Mayor characteristics	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Electoral characteristics	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes

Notes. Estimates on 5,481, 2,269, and 1,783 terms for the OLS, RD, and 2SLS estimates, respectively. In the 2SLS estimates *N. terms in office* is instrumented with *Elected before March 1993* as in Table 7. *Reserve price* is the reserve price set by the contracting authority, in 100,000 euros (2000 equivalents). *Roads* is a dummy for whether the work is for construction or maintenance of municipal roads. *Less Complex* is a dummy for whether the reserve price is below the 300,000 euros. *No publicity* is a dummy for whether the reserve price is below the 500,000 euros. *Term limit binding* is a dummy for whether the mayor can be reelected or not. *Population* is the number of resident inhabitants at the beginning of the term, in 10,000. *N. terms in office (party)* is the tenure of the mayor's party in terms. When denoted with "yes", regressions additionally include *Margin of victory* (3rd order polynomial in the margin of victory); *Province fixed effects* (102 dummies); *Year dummies* (2000-2004) refer to the year of bid delivery; *City characteristics* (the budget balance deficit in percentage of the revenues at year level, judiciary efficiency at year-regional level); *Auction characteristics* (5 object characteristics dummies, 1 selection mechanism dummy). In columns 4-9, we only include the selection mechanism dummy. *Mayor characteristics* (2 education dummies, 3 previous occupation dummies, a dummy for being born in the region); *Electoral characteristics* (a dummy for being in the last year before the next election, 2 political party dummies, a dummy for previous experience in council or executive committee). All mayoral and electoral characteristics are at the beginning of the term. Standard errors are robust to clustering at the mayor level in parentheses. Significance at the 10% level is represented by *, at the 5% level by **, and at the 1% level by ***.

Table 10: Tenure in office and the auction manager

Dependent variable:	(1)	(2)	(3)
	Auctions with the same manager		
Method:	OLS	RD	2SLS
Mean outcome:	59.04%	60.97%	64.24%
N. terms in office	12.747***	11.878***	13.521***
	(2.350)	(2.387)	(3.506)
Term limit binding	-10.781***	-8.074**	-13.375*
	(3.143)	(3.911)	(7.112)
Population	-0.436***	-0.504***	-2.705***
	(0.068)	(0.078)	(0.234)
Reserve price	-0.246***	-0.268***	-0.227***
	(0.048)	(0.058)	(0.060)
Female	-2.172	-8.029**	-2.135
	(2.653)	(3.594)	(3.348)
Age	-0.435***	-0.519***	-0.256**
	(0.091)	(0.126)	(0.124)
N. terms in office (party)	2.528*	0.506	0.409
	(1.422)	(1.772)	(1.923)
N. auctions	20,551	10,795	6,893
R-squared	0.469	0.485	0.546
Margin of victory	no	yes	no
Goods fixed effects	yes	yes	yes
Province fixed effects	yes	yes	yes
Year dummies	yes	yes	yes
City characteristics	yes	yes	yes
Auction characteristics	yes	yes	yes
Mayor characteristics	yes	yes	yes
Electoral characteristics	yes	yes	yes

Notes. Estimates on 3,397, 1,791, and 1,256 terms (terms elected between 1998 and 2003) for the OLS, RD, and 2SLS estimates, respectively. In the 2SLS estimates *N. terms in office* is instrumented with *Elected before March 1993* as in Table 7. *% auctions with the same manager* is the highest percentage of public tenders administrated by to the same manager within the term, and it is term invariant. *Winning Rebate* is expressed as a percentage discount from the the reserve price. *Term limit binding* is a dummy for whether the mayor can be reelected or not. *Population* is the number of resident inhabitants at the beginning of the term, in 10,000. *Reserve price* is the reserve price set by the contracting authority, in 100,000 euros (2000 equivalents). *N. terms in office (party)* is the tenure of the mayor's party in terms. When denoted with "yes", regressions additionally include *Margin of victory* (3rd order polynomial in the margin of victory); *Goods fixed effects* (91 good or service characteristics dummies); *Province fixed effects* (102 dummies); *Year dummies* (2000-2010 and an indicator for purchases after the introduction of CONSIP) refer to the year of bid delivery; *City characteristics* (the budget balance deficit in percentage of the revenues at year level, judiciary efficiency at year-regional level); *Auction characteristics* (squared term of the reserve price,1 selection mechanism dummy); *Mayor characteristics* (2 education dummies, 3 previous occupation dummies, a dummy for being born in the region); *Electoral characteristics* (a dummy for being in the last year before the next election, 2 political party dummies, a dummy for previous experience in council or executive committee). All mayoral and electoral characteristics are at the beginning of the term. Standard errors are robust to clustering at the mayor level in parentheses. Significance at the 10% level is represented by *, at the 5% level by **, and at the 1% level by ***.

Table 11: Tenure in office and the delay in the delivery of the works

|	(1)	(2)	(3)
Dependent variable:		Days of delay	
Method:	OLS	RD	2SLS
Mean outcome:	182	178.1	186.8
N. terms in office	23.953***	30.888**	41.803**
	(5.706)	(15.106)	(18.609)
Term limit binding	-25.248***	-36.913*	-23.552
	(7.442)	(19.853)	(24.914)
Population	-0.434***	-0.413***	-0.487***
	(0.091)	(0.102)	(0.165)
Reserve price	9.874***	9.962***	10.670***
	(0.669)	(0.870)	(0.901)
Female	4.374	-6.060	-13.606
	(6.470)	(8.737)	(10.508)
Age	-0.318	-0.356	-1.235***
	(0.240)	(0.383)	(0.427)
N. terms in office (party)	7.102*	1.193	7.416
	(4.292)	(7.098)	(9.175)
N. auctions	12,118	5,218	4,048
R-squared	0.155	0.148	0.182
Margin of victory	no	yes	no
Province fixed effects	yes	yes	yes
Year dummies	yes	yes	yes
City characteristics	yes	yes	yes
Auction characteristics	yes	yes	yes
Mayor characteristics	yes	yes	yes
Electoral characteristics	yes	yes	yes

Notes. Estimates on 2,889, 1,186, and 991 terms for the OLS, RD, and 2SLS estimates, respectively. In the 2SLS estimates *N. terms in office* is instrumented with *Elected before March 1993* as in Table 7. *Days of delay* represent the days of delay in the delivery of the works. *Term limit binding* is a dummy for whether the mayor can be reelected or not. *Population* is the number of resident inhabitants at the beginning of the term, in 10,000. *Reserve price* is the reserve price set by the contracting authority, in 100,000 euros (2000 equivalents). *N. terms in office (party)* is the tenure of the mayor's party in terms. When denoted with "yes", regressions additionally include *Margin of victory* (3rd order polynomial in the margin of victory); *Province fixed effects* (102 dummies); *Year dummies* (2000-2004) refer to the year of bid delivery; *City characteristics* (the budget balance deficit in percentage of the revenues at year level, judiciary efficiency at year-regional level); *Auction characteristics* (squared term of the reserve price, 5 object characteristics dummies, 1 selection mechanism dummy); *Mayor characteristics* (2 education dummies, 3 previous occupation dummies, a dummy for being born in the region); *Electoral characteristics* (a dummy for being in the last year before the next election, 2 political party dummies, a dummy for previous experience in council or executive committee). All mayoral and electoral characteristics are at the beginning of the term. Standard errors are robust to clustering at the mayor level in parentheses. Significance at the 10% level is represented by *, at the 5% level by **, and at the 1% level by ***.

Table 12: Tenure in office and the purchase of goods and services

|	(1)	(2)	(3)
Dependent variable:		Winning rebate (%)	
Method:	OLS	RD	2SLS
Mean outcome:	17.34	16.85	17.91
N. terms in office	-1.529**	-2.696**	-2.189
	(0.643)	(1.076)	(1.975)
Term limit binding	1.456*	1.106	-2.435
	(0.835)	(1.373)	(2.605)
Population	0.037***	0.039**	0.004
	(0.012)	(0.016)	(0.025)
Reserve price	-0.076*	-0.078	-0.397***
	(0.040)	(0.088)	(0.126)
Female	-0.034	-0.594	1.437
	(0.858)	(0.994)	(2.134)
Age	0.050**	0.148***	0.086
	(0.024)	(0.034)	(0.074)
N. terms in office (party)	-0.083	0.159	1.552
	(0.375)	(0.394)	(1.285)
N. auctions	9,257	3,640	1,165
R-squared	0.216	0.278	0.295
Goods fixed effects	yes	yes	yes
Margin of victory	no	yes	no
Province fixed effects	yes	yes	yes
Year dummies	yes	yes	yes
City characteristics	yes	yes	yes
Auction characteristics	yes	yes	yes
Mayor characteristics	yes	yes	yes
Electoral characteristics	yes	yes	yes

Notes. Estimates on 2,978, 1,315, and 412 terms for the OLS, RD, and 2SLS estimates, respectively. In the 2SLS estimates *N. terms in office* is instrumented with *Elected before March 1993* as in Table 7. *Winning Rebate* is expressed as a percentage discount from the the reserve price. *Term limit binding* is a dummy for whether the mayor can be reelected or not. *Population* is the number of resident inhabitants at the beginning of the term, in 10,000. *Reserve price* is the reserve price set by the contracting authority, in 100,000 euros (2000 equivalents). *N. terms in office (party)* is the tenure of the mayor's party in terms. When denoted with "yes", regressions additionally include *Margin of victory* (3rd order polynomial in the margin of victory); *Goods fixed effects* (93 good or service characteristics dummies); *Province fixed effects* (102 dummies); *Year dummies* (2000-2010 and an indicator for purchases after the introduction of CONSIP) refer to the year of bid delivery; *City characteristics* (the budget balance deficit in percentage of the revenues at year level, judiciary efficiency at year-regional level); *Auction characteristics* (squared term of the reserve price,1 selection mechanism dummy); *Mayor characteristics* (2 education dummies, 3 previous occupation dummies, a dummy for being born in the region); *Electoral characteristics* (a dummy for being in the last year before the next election, 2 political party dummies, a dummy for previous experience in council or executive committee). All mayoral and electoral characteristics are at the beginning of the term. Standard errors are robust to clustering at the mayor level in parentheses. Significance at the 10% level is represented by *, at the 5% level by **, and at the 1% level by ***.

Figure 1: Outcomes, RD
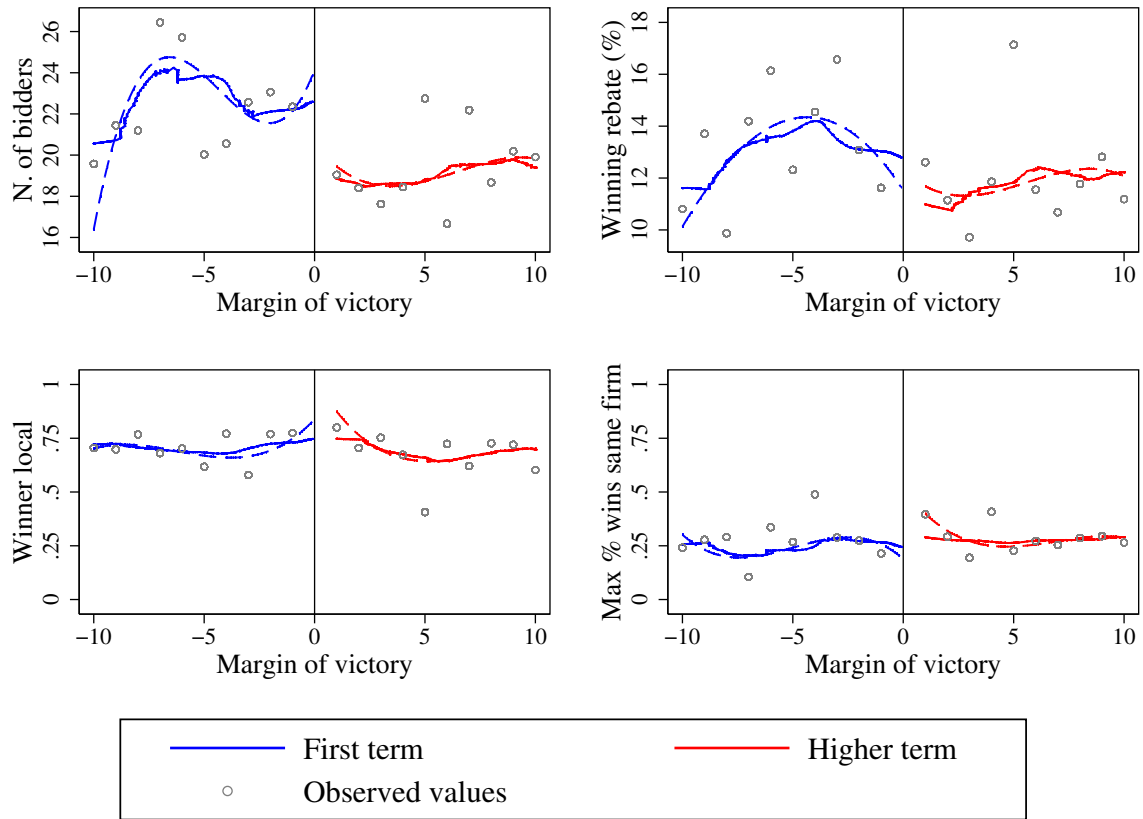
Notes. For values of MV smaller than zero, the mayor is at the first term, while for values above zero the mayor is at the second term or more. The solid line is a running-mean smoothing (least squares), separate on either side of the threshold; the dash line is a third-order polynomial fit, separate on either side of the threshold.

Figure 2: Distribution of the margin of victory, RD
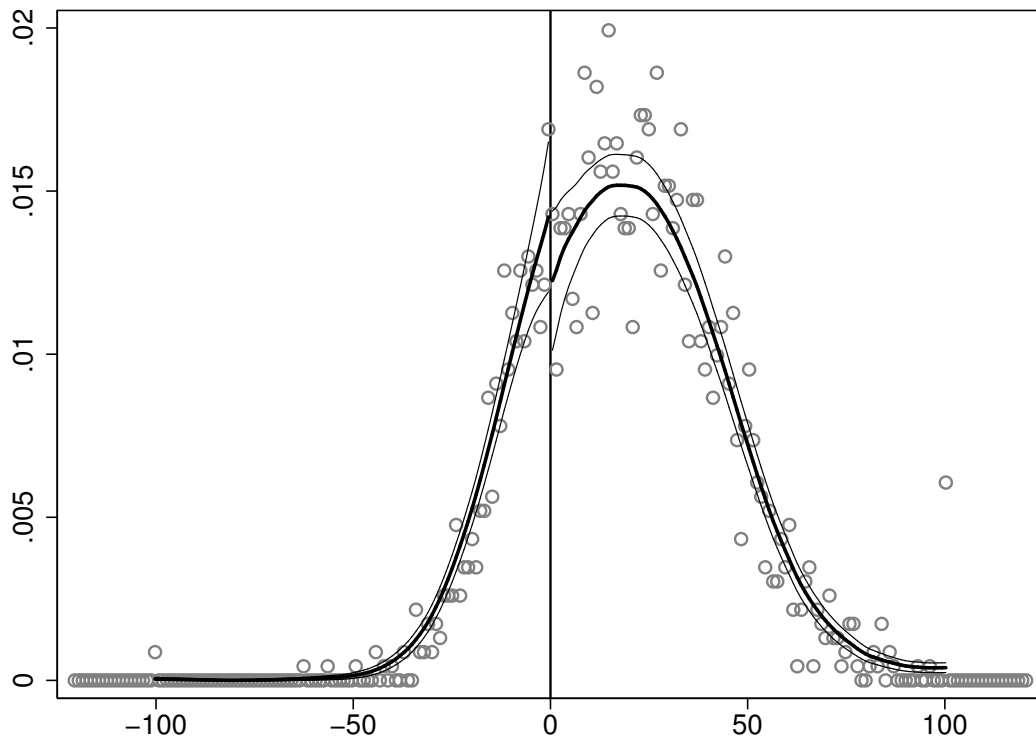
Notes. For values of MV smaller than zero, the mayor is at the first term, while for values above zero the mayor is at the second term or more. Circles are average observed values, the bold solid line is a kernel estimate (see McCrary, 2008), and the two thin lines are 95% confidence intervals. The point estimate (standard error) of the discontinuity is -.18 (.13).

Figure 3: Manipulation of the election timing around the March 1993 reform

Notes. The blue vertical line denotes the time of the electoral reform.

45
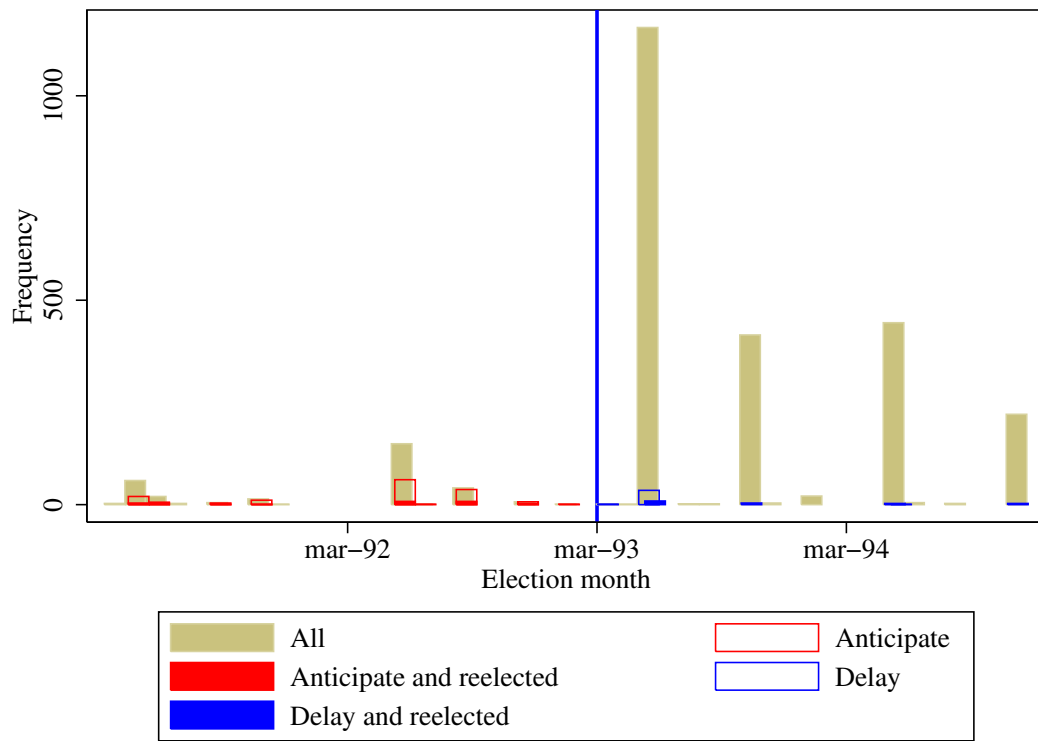
Appendix A: Extra Tables and Figures

Table A.1: Term limit and large cities, OLS

Dependent variable:	(1) N. of bidders	(2) Winning rebate	(3) Winner local	(4) Max wins same firm
N. terms in office	-1.077**	-0.505***	0.029***	0.019
	(0.436)	(0.196)	(0.009)	(0.012)
Term limit binding	-2.051***	-0.710**	-0.011	0.129***
	(0.693)	(0.307)	(0.016)	(0.018)
Term limit binding * large city	4.885***	1.166***	-0.035***	-0.205***
	(0.718)	(0.243)	(0.013)	(0.012)
Population	0.058***	0.046***	0.000*	-0.001***
	(0.018)	(0.009)	(0.000)	(0.000)
Reserve price	0.678***	0.082***	-0.010***	-0.001***
	(0.075)	(0.011)	(0.001)	(0.000)
Female	-0.456	-0.145	-0.007	-0.018
	(0.714)	(0.234)	(0.013)	(0.014)
Age	0.001	0.018**	0.000	-0.001***
	(0.025)	(0.009)	(0.000)	(0.000)
N. terms in office (party)	-0.408	-0.290*	0.011	0.020**
	(0.433)	(0.165)	(0.007)	(0.008)
N. auctions	28,058	28,058	28,058	23,523
R-squared	0.237	0.484	0.099	0.348
Province fixed effects	yes	yes	yes	yes
Year dummies	yes	yes	yes	yes
City characteristics	yes	yes	yes	yes
Auction characteristics	yes	yes	yes	yes
Mayor characteristics	yes	yes	yes	yes
Electoral characteristics	yes	yes	yes	yes

Notes. Estimates on 5,481 terms. *N. of bidders* is the number of firms that submitted a bid. *Winning Rebate* is expressed as a percentage discount from the the reserve price. *Winner local* is a dummy for whether or not the winning firm is registered in the same region. *Max wins same firm* is the highest percentage of public tenders assigned to the same firm within the term. *Term limit binding* is a dummy for whether or not the mayor cannot be reelected, and *large city* is an indicator for the population being larger than the Italian median (about 7,000 inhabitants). *Population* is the number of resident inhabitants at the beginning of the term, in 10,000. *Reserve price* is the reserve price set by the contracting authority, in 100,000 euros (2000 equivalents). *N. terms in office (party)* is the tenure of the mayor's party in terms. When denoted with "yes", regressions additionally include *Province fixed effects* (102 dummies); *Year dummies* (2000-2004) refer to the year of bid delivery; *City characteristics* (the budget balance deficit in percentage of the revenues at year level, judiciary efficiency at year-regional level); *Auction characteristics* (squared term of the reserve price, 5 object characteristics dummies, 1 selection mechanism dummy); *Mayor characteristics* (2 education dummies, 3 previous occupation dummies, a dummy for being born in the region); *Electoral characteristics* (a dummy for being in the last year before the next election, 2 political party dummies, a dummy for previous experience in council or executive committee). All mayoral and electoral characteristics are at the beginning of the term. Standard errors are robust to clustering at the mayor level in parentheses. Significance at the 10% level is represented by *, at the 5% level by **, and at the 1% level by ***.

Table A.2: Robustness, RD

Dependent variable:	(1) N. of bidders	(2) Winning rebate	(3) Winner local	(4) Max wins same firm
Pre-treatments	-2.606***	-0.643	4.408**	4.570*
	(1.009)	(0.422)	(2.082)	(2.730)
Asymmetric	-1.977	-1.625***	0.549	7.579**
	(1.778)	(0.607)	(3.419)	(3.492)
4th order polynomial	-2.448***	-0.761**	3.901*	5.230**
	(0.937)	(0.309)	(2.169)	(2.219)
3th order polynomial OB	-2.257**	-0.728**	3.868*	7.524**
	(0.955)	(0.334)	(2.289)	(3.394)
Local Linear OB	-1.297	-0.724	-1.079	7.389*
	(1.357)	(0.454)	(3.310)	(3.948)

Notes. Coefficients on the number of terms in office at the discontinuity point. *N. of bidders* is the number of firms that submitted a bid. *Winning Rebate* is expressed as a percentage discount from the the reserve price. *Winner local* is a dummy for whether or not the winning firm is registered in the same region. *Max wins same firm* is the highest percentage of public tenders assigned to the same firm within the term. Each of the rows indicates a different specification of the empirical model: *Pre-treatments* (5 macro-area dummies, the number of resident inhabitants at the beginning of the term; the city's altitude above sea-level; the geographical extension of the city administrative territory; an indicator of mayors born in the same region of the municipality; 2 education dummies, 3 previous occupation dummies, a dummy for being born in the region are included in the baseline specification); *Asymmetric* (the interaction of the 3th order polynomial in the margin of victory with the tenure indicator is included in the baseline specification); 4th *order polynomial* (a 4th order polynomial in the margin of victory is included in the baseline specification); 3th *order polynomial OB* (the baseline specification is estimated in the optimal bandwidth sample selected with the Imbens and Kalyanaraman (2013) procedure); *Local Linear OB* (an interaction of the tenure indicator and the margin of victory is included in the baseline specification and it is estimated in the optimal bandwidth sample selected with the Imbens and Kalyanaraman (2013) procedure). All estimates (but *Pre-treatments*) include province fixed effects, year dummies, city, auction, mayor and electoral characteristics as in Table A.1. Significance at the 10% level is represented by *, at the 5% level by **, and at the 1% level by ***.

Table A.3: Placebo tests, RD

Dependent variable:	(1) N. of bidders	(2) Winning rebate	(3) Winner local	(4) Max wins same firm
$MV > 0$	-1.158	0.282	-0.185	-2.007
	(1.822)	(0.364)	(2.366)	(2.269)
$MV < 0$	3.215	-1.680*	-9.581	14.194**
	(2.938)	(1.013)	(7.224)	(6.824)

Notes. Coefficients of the simulated number of terms in office at the discontinuity point. *N. of bidders* is the number of firms that submitted a bid. *Winning Rebate* is expressed as a percentage discount from the the reserve price. *Winner local* is a dummy for whether or not the winning firm is registered in the same region. *Max wins same firm* is the highest percentage of public tenders assigned to the same firm within the term. Regressions include a dummy for whether the mayor can be reelected or not; the 3rd order polynomial in the margin of victory; the number of resident inhabitants at the beginning of the term, in 10,000; the reserve price set by the contracting authority, in 100,000 euros (2000 equivalents); the tenure of the mayor's party in terms; 102 province fixed effects dummies); year dummies; the budget balance deficit in percentage of the revenues at year level, and the judiciary efficiency at year-regional level; the squared term of the reserve price, 5 object characteristics dummies, 1 selection mechanism dummy; 2 mayors' education dummies, 3 previous occupation dummies, a dummy for being born in the region; a dummy for being in the last year before the next election, 2 political party dummies, a dummy for previous experience in council or executive committee. All mayoral and electoral characteristics are at the beginning of the term. Standard errors are robust to clustering at the mayor level in parentheses. Significance at the 10% level is represented by *, at the 5% level by **, and at the 1% level by ***.

Table A.4: Balancing tests, RD

	Coefficient on N. terms in office at the discontinuity point
	(1)
City characteristics:	
North-West	0.069*
	(0.04)
North-East	-0.002
	(0.03)
Center	-0.089***
	(0.03)
South	0.02
	(0.04)
Islands	0.002
	(0.016)
Population	-1520.97
	(5284.21)
Altitude	-3.255
	(22.241)
Extension	-3.362
	(4.458)
Mayor's characteristics:	
Female	-0.015
	(0.022)
Age	2.634***
	(0.767)
Local	0.009
	(0.021)
Education: College	0.044
	(0.04)
Employment: Not employed	0.010
	(0.026)
Employment: High-skilled	0.021
	(0.035)
Previous experience	-0.050
	(0.041)
Incumbent party	-0.007
	(0.040)
N. mayors	2,195

Notes. All cities/mayors in the RD estimation sample. *Altitude* is the city's altitude above sea-level. *Extension* is the geographical extension of the city administrative territory. *Population* is the Census population as of 1991. *Local* is a dummy for being born in the same region. *High-skilled* includes entrepreneurs and self-employed. *Previous experience* is a dummy for whether the mayor was in the council or in the executive committee before. *Incumbent party* is a dummy for whether the mayor belongs to the incumbent party. Significance at the 10% level is represented by *, at the 5% level by **, and at the 1% level by ***.

Table A.5: Balancing tests, 2SLS

	Coefficient on being elected before March 1993
	(1)
Female	-0.027
	(0.020)
Age	-1.867**
	(0.756)
Local	0.008
	(0.020)
Education: College	-0.227***
	(0.041)
Employment: Not employed	-0.024
	(0.019)
Employment: High-skilled	-0.054
	(0.034)
Previous experience	-0.048
	(0.043)
Incumbent party	0.010
	(0.040)
N. mayors	1,722

Notes. All mayors in the 2SLS estimation sample. *Local* is a dummy for being born in the same region. *High-skilled* includes entrepreneurs and self-employed. *Previous experience* is a dummy for whether the mayor was in the council or in the executive committee before. *Incumbent party* is a dummy for whether the mayor belongs to the incumbent party. Significance at the 10% level is represented by *, at the 5% level by **, and at the 1% level by ***.

Table A.6: Tenure in office and the type of works

|	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
Dependent variable:		Schools			Buildings			Housing			Art			Other	
Method:	OLS	RDD	2SLS	OLS	RDD	2SLS	OLS	RDD	2SLS	OLS	RDD	2SLS	OLS	RDD	2SLS
Mean outcome:	0.127	0.128	0.123	0.0523	0.0582	0.0613	0.0127	0.0149	0.0111	0.0383	0.0392	0.0417	0.540	0.525	0.524
N. terms in office	-0.019***	-0.023	0.004	-0.003	-0.013	-0.021	0.002	0.008	-0.004	-0.006*	-0.004	-0.006	0.029**	0.003	0.015
	(0.007)	(0.015)	(0.018)	(0.004)	(0.011)	(0.013)	(0.003)	(0.010)	(0.007)	(0.003)	(0.008)	(0.011)	(0.014)	(0.023)	(0.029)
Term limit binding	0.012	-0.006	0.048*	0.004	-0.005	-0.004	0.001	-0.003	0.009	0.003	0.005	0.008	-0.022	0.070*	-0.045
	(0.010)	(0.020)	(0.026)	(0.006)	(0.015)	(0.019)	(0.004)	(0.011)	(0.009)	(0.005)	(0.010)	(0.015)	(0.019)	(0.039)	(0.049)
Population	0.000	-0.000	-0.000	-0.000	0.000	0.000	0.000***	0.001***	0.000***	0.000	0.000	0.000***	0.000	-0.000	-0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Reserve price	0.001	-0.000	-0.000	0.000	0.001	0.001	0.001**	0.001**	0.001	0.001***	0.001**	0.001*	0.002**	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)
Female	-0.000	0.004	0.022	0.005	0.009	0.015	0.001	-0.002	0.001	0.001	0.006	0.011	0.014	0.015	-0.018
	(0.009)	(0.015)	(0.017)	(0.006)	(0.009)	(0.012)	(0.004)	(0.003)	(0.004)	(0.005)	(0.008)	(0.009)	(0.018)	(0.025)	(0.027)
Age	0.000	0.001	0.001	0.000	0.000	0.000	-0.000	-0.000	-0.000	0.000	-0.000	-0.000	-0.001	-0.001	-0.001
	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)	(0.001)	(0.001)
N. terms in office (party)	0.003	0.002	-0.010	-0.001	-0.004	0.001	-0.001	-0.004	-0.003	0.001	-0.003	0.003	0.005	0.025*	0.025
	(0.005)	(0.008)	(0.010)	(0.003)	(0.006)	(0.008)	(0.002)	(0.003)	(0.003)	(0.003)	(0.005)	(0.006)	(0.010)	(0.014)	(0.015)
N. auctions	28,058	12,688	9,016	28,058	12,688	9,016	28,058	12,688	9,016	28,058	12,688	9,016	28,058	12,688	9,016
R-squared	0.039	0.040	0.039	0.022	0.025	0.030	0.030	0.051	0.055	0.031	0.040	0.037	0.176	0.169	0.148
Margin of victory	no	yes	no	no	yes	no	no	yes	no	no	yes	no	no	yes	no
Province fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Year dummies	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
City characteristics	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Auction characteristics	no	no	no	no	no	no	no	no	no	no	no	no	no	no	no
Mayor characteristics	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Electoral characteristics	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes

Notes. Estimates on 5,481, 2,269, and 1,783 terms for the OLS, RD, and 2SLS estimates, respectively. In the 2SLS estimates *N. terms in office* is instrumented with *Elected before March 1993* as in Table 7. *Schools*, *Buildings*, *Housing*, *Art*, and *Other* are dummies for whether the work is of a specific type. *Reserve price* is the reserve price set by the contracting authority, in 100,000 euros (2000 equivalents). *Term limit binding* is a dummy for whether the mayor can be reelected or not. *Population* is the number of resident inhabitants at the beginning of the term, in 10,000. *N. terms in office (party)* is the tenure of the mayor's party in terms. When denoted with "yes", regressions additionally include *Margin of victory* (3rd order polynomial in the margin of victory); *Province fixed effects* (102 dummies); *Year dummies* (2000-2004) refer to the year of bid delivery; *City characteristics* (the budget balance deficit in percentage of the revenues at year level, judiciary efficiency at year-regional level); *Auction characteristics* (5 object characteristics dummies, 1 selection mechanism dummy). In columns 4-9, we only include the selection mechanism dummy. *Mayor characteristics* (2 education dummies, 3 previous occupation dummies, a dummy for being born in the region); *Electoral characteristics* (a dummy for being in the last year before the next election, 2 political party dummies, a dummy for previous experience in council or executive committee). All mayoral and electoral characteristics are at the beginning of the term. Standard errors are robust to clustering at the mayor level in parentheses. Significance at the 10% level is represented by *, at the 5% level by **, and at the 1% level by ***.

Table A.7: Tenure in office and the number of auctions

|	(1)	(2)	(3)
Method:	OLS	RD	2SLS
Mean outcome:	5.119	5.295	5.057
N. terms in office	-0.870***	-1.103**	-0.865
	(0.246)	(0.436)	(0.819)
Term limit binding	0.615	0.711	2.626***
	(0.539)	(0.881)	(0.897)
Population	1.164***	1.151***	0.617**
	(0.424)	(0.422)	(0.261)
Female	-0.799	-0.776	0.575
	(0.490)	(0.527)	(0.993)
Age	0.055***	0.0568***	0.096***
	(0.020)	(0.0215)	(0.029)
N. terms in office (party)	-0.754**	-0.647*	-0.344
	(0.302)	(0.333)	(0.361)
N. terms	5,481	4,794	1,783
R-squared	0.311	0.316	0.312
Margin of victory	no	yes	no
Province fixed effects	yes	yes	yes
Year dummies	yes	yes	yes
City characteristics	yes	yes	yes
Auction characteristics	yes	yes	yes
Mayor characteristics	yes	yes	yes
Electoral characteristics	yes	yes	yes

Notes. Observations weighted by the number of auctions in the term. In the 2SLS estimates *N. terms in office* is instrumented with *Elected before March 1993* as in Table 7. *Term limit binding* is a dummy for whether the mayor can be reelected or not. *Population* is the number of resident inhabitants at the beginning of the term, in 10,000. *Reserve price* is the reserve price set by the contracting authority, in 100,000 euros (2000 equivalents). *N. terms in office (party)* is the tenure of the mayor's party in terms. When denoted with "yes", regressions additionally include *Margin of victory* (3rd order polynomial in the margin of victory); *Province fixed effects* (102 dummies); *Year dummies* (2000-2010 and an indicator for purchases after the introduction of CONSIP) refer to the year of bid delivery; *City characteristics* (the budget balance deficit in percentage of the revenues at year level, judiciary efficiency at year-regional level); *Auction characteristics* (squared term of the reserve price,1 selection mechanism dummy); *Mayor characteristics* (2 education dummies, 3 previous occupation dummies, a dummy for being born in the region); *Electoral characteristics* (a dummy for being in the last year before the next election, 2 political party dummies, a dummy for previous experience in council or executive committee). All mayoral and electoral characteristics are at the beginning of the term, while all auction characteristics are term averages. Standard errors are robust to clustering at the mayor level in parentheses. Significance at the 10% level is represented by *, at the 5% level by **, and at the 1% level by ***.

Figure A.1: The awarding mechanism
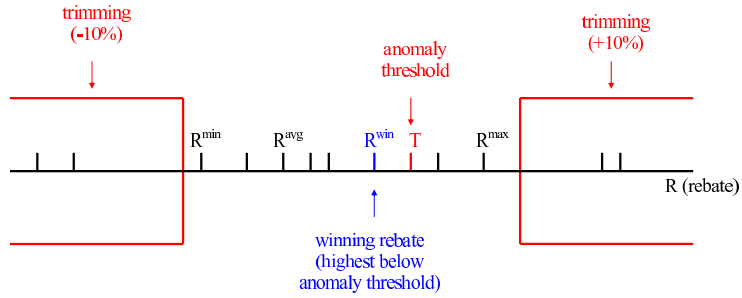
Notes. R^{avg} is the average rebate expressed as a percentage reduction from the reserve price. T, is the anomaly threshold obtained as the sum of R^{avg} and the average deviation of the bids above R^{avg}. R^{win} is the winning rebate that minimizes the distance from below T.

Figure A.2: Correlation between n. of bidders and winning rebate
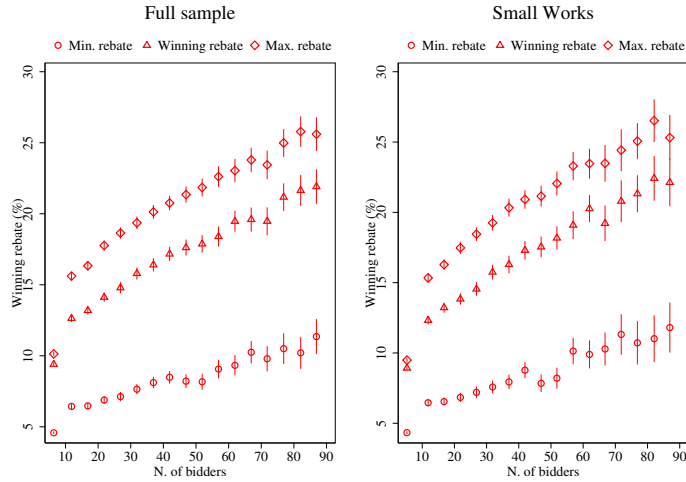
Notes. Distribution of the Winning rebate (%) conditional on the N. of bidders. Circles denote the minimum rebate; triangles the winning rebate; diamonds the maximum rebate. Vertical lines denote the 95% confidence intervals. *Small works* are projects with reserve price below 500,000 euros.

Figure A.3: The introduction of the term limit
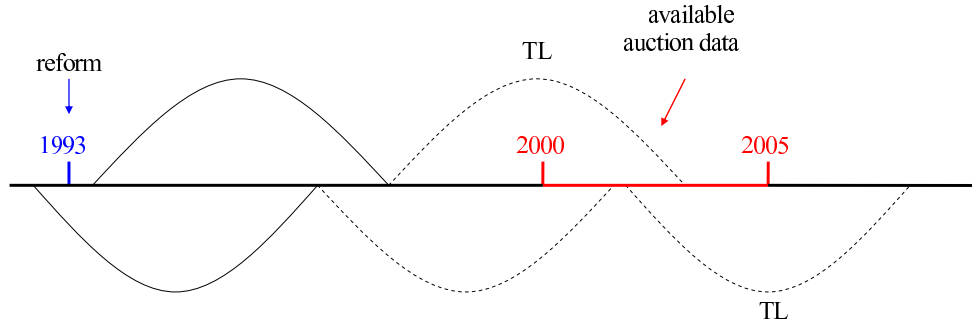
Notes. *TL* means that the term limit is binding. Dash lines indicate potential terms.

Figure A.4: Election timing
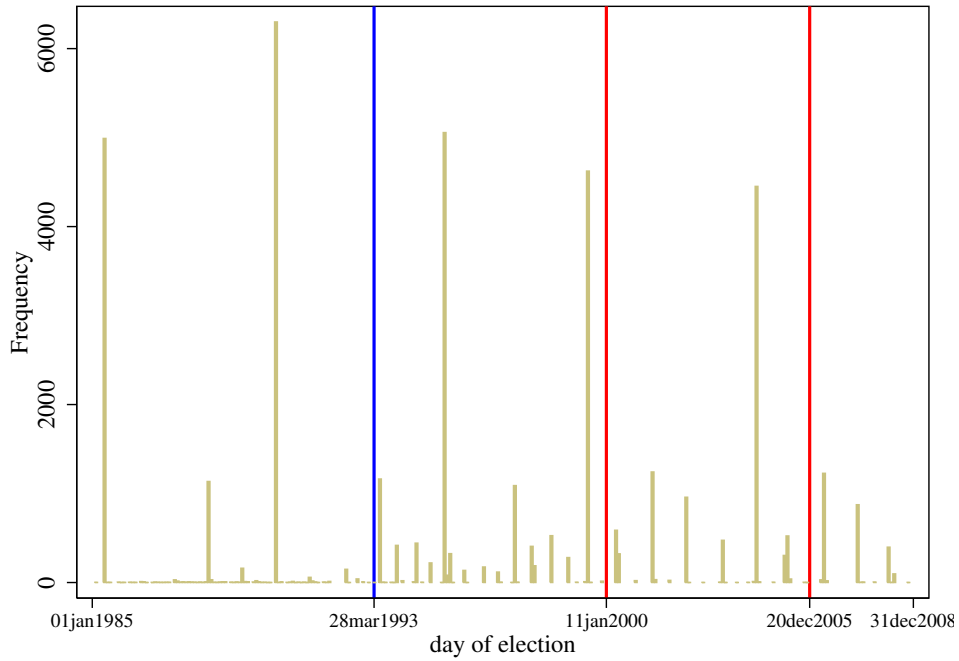
Notes. The blue vertical line denotes the time of the electoral reform. Between red lines: the period over which we have auction data. *Early termination* is before the beginning of the last year in office because of: mayor's resignation, vote of no confidence by 50% of either the council or the executive committee. *Early termination* is computed on terms elected before 2003 only, otherwise right censored.

Figure A.5: Pre-determined city characteristics, RD
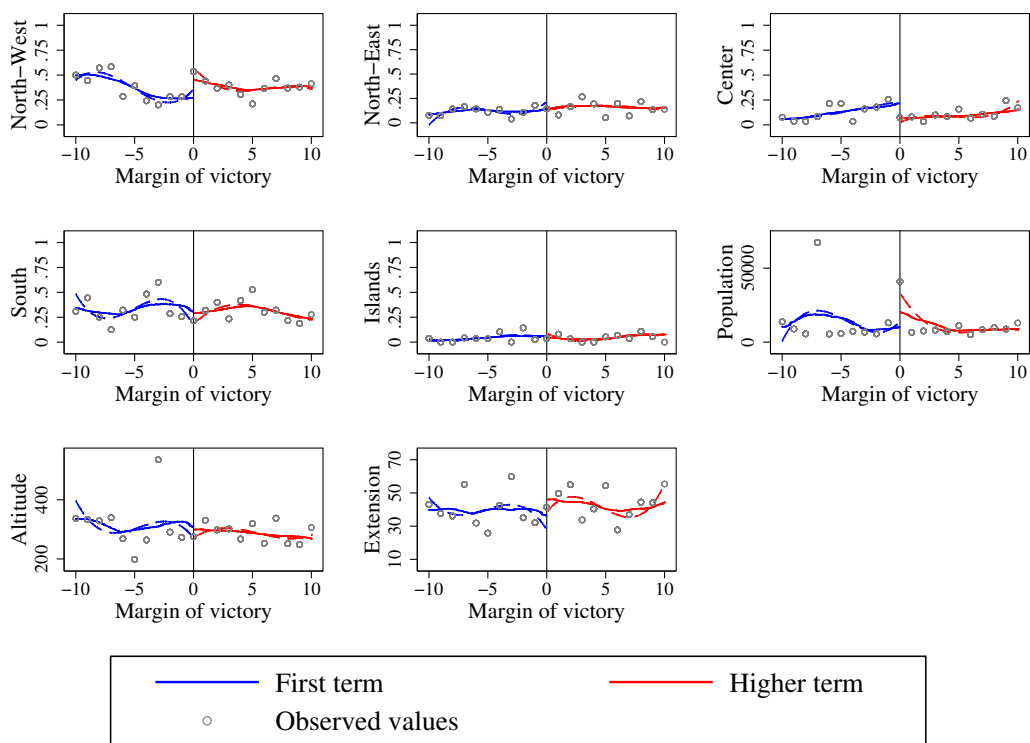
Notes. For values of *MV* smaller than zero, the mayor is at the first term, while for values above zero the mayor is at the second term or more. The solid line is a running-mean smoothing (least squares), separate on either side of the threshold; the dash line is a third-order polynomial fit, separate on either side of the threshold. *Altitude* is the city's altitude above sea-level. *Extension* is the geographical extension of the city administrative territory. *Population* is the Census population as of 1991.

Figure A.6: Pre-determined mayor characteristics, RD
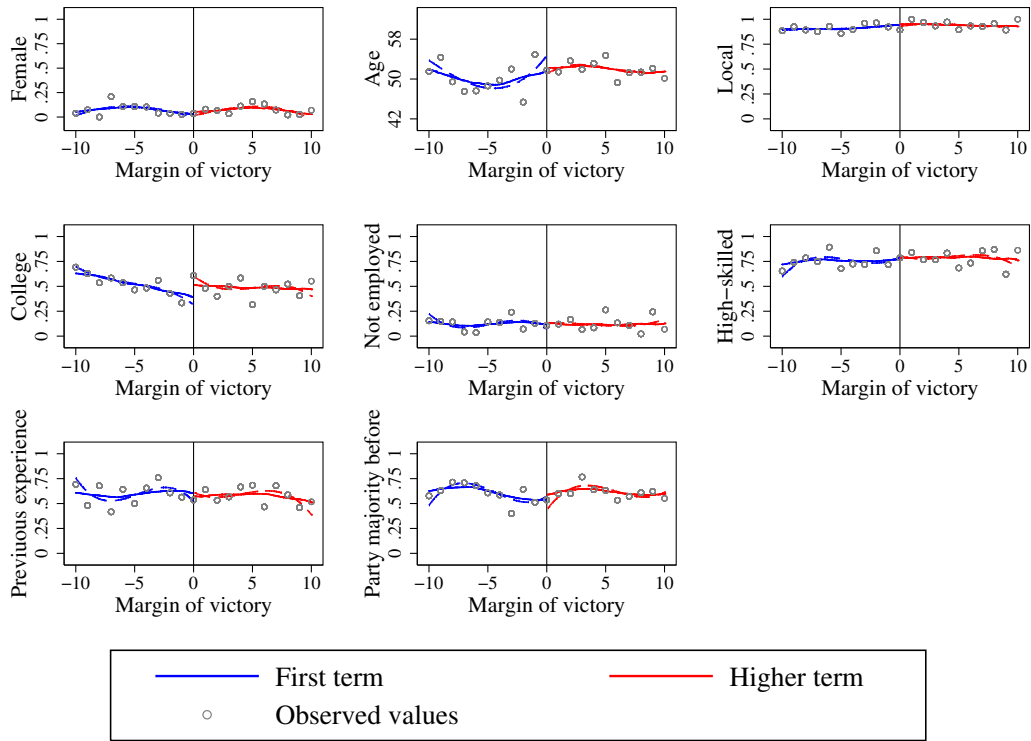
Notes. For values of *MV* smaller than zero, the mayor is at the first term, while for values above zero the mayor is at the second term or more. The solid line is a running-mean smoothing (least squares), separate on either side of the threshold; the dash line is a third-order polynomial fit, separate on either side of the threshold. *Local* is a dummy for being born in the same region. *High-skilled* includes entrepreneurs and self-employed. *Previous experience* is a dummy for whether the mayor was in the council or in the executive committee before. *Incumbent party* is a dummy for whether the incumbent party was majority in the previous term.

Figure A.7: Mayor characteristics around the March 1993 reform
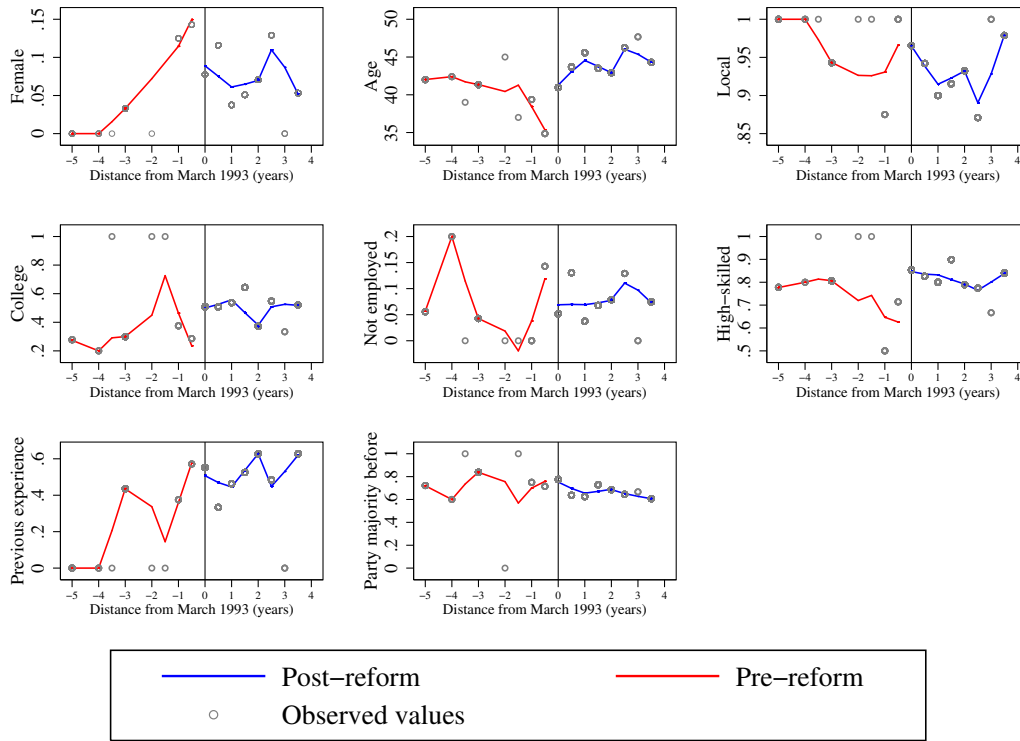
Notes. The solid line is a running-mean smoothing least squares estimates, separate on either side of the threshold. All mayors in the 2SLS estimation sample. *High-skilled* includes entrepreneurs and self-employed. *Local* is a dummy for being born in the same region. *Previous experience* is a dummy for whether or not the mayor was in the council or the executive committee before. *Incumbent party* is a dummy for whether the incumbent party was majority in the previous term.

Appendix B: Conceptual Framework

In this section we illustrate a simple theoretical model that we use to rationalize the evidence on the effects of tenure in office on procurement outcomes. Figure B.1 describes the time-line of the model for a generic period/auction t. Collusion takes place in a sequence of two hypothetical stages, over infinitely many first-price auctions.[36] In the first stage, a new mayor searches for a collusive bidder. The mayor, in exchange for a bribe, commits to reveal the highest bid and to allow the collusive bidder to adjust his bid. In the second stage, the favored bidder can adjust his original bid and win, if the highest bid was lower than his own private valuation. In this case, he earns the difference between his valuation and the highest bid, minus the bribe. A long-lived relationship is settled if the mayor is matched with a collusive bidder; otherwise in the next period/auction he searches for another bidder. We illustrate the model by focusing on one generic sub-game (t) and discuss the main assumptions. We then present the predictions of the model and its implications.

2.1 Stage 1: Collusion/Search Game

At any point in time (t), for $t = (1, 2, ...)$, a mayor is delegated by the principal (the citizens) to run one sealed-bid first price auction.[37] In each auction there are N_t bidders, and entry is costless. The mayor is randomly matched with one of the N_t bidders. In exchange for the promise of a bribe $B > 0$, he commits to reveal the highest bid and to let the bidder adjust the bid after the auction takes place, as well as every future auction.[38] The bribe is assumed to be fixed and exogenously determined.[39] The mayor has no costs of revealing the information, and can test only one bidder per auction. With probability π he is matched with a collusive bidder, i.e., a bidder who is willing to pay a bribe; otherwise he is matched with a non-collusive bidder who is not willing to pay the bribe. In this simplified setup, the mayor's per-period expected revenues from collusion are strictly positive and

---

[36]In Section 5.1 we have documented that a significant fraction of term limited mayors (52%) is later appointed either in the same administration (e.g., as councilor) or at higher offices (e.g., in a province/regional/national administration). It is then plausible to assume that they actually face a continuation game. Moreover, if the payoffs in the continuation game are large enough, collusion is still an equilibrium even when the continuation probability is small (Mailath and Samuelson, 2006). Using the available political and procurement data, we find that projects administered by provincial governments are larger (an average reserve price of 650,000 euros).

[37]From now on, we will refer to a generic ascending auction, which is equivalent in its functioning to a descending procurement auction.

[38]The agreement is reached in Stage 1, but the transfer in Stage 2 after the auction takes place.

[39]We do not have direct evidence of favoritism (bids adjustments, envelopes substitutions, or fake bids submissions) and bribes' exchanges as for example in Ferraz and Finan (2010), Ingraham (2005) and Tran (2010). However, the cases of kickbacks in Italian procurement auctions, reported by newspapers, share the same dynamics discussed in the literature.

larger than the revenues from non collusion, as $V_c^m = \pi B + (1 - \pi)0 > V_{nc}^m = 0$. Hence, it is always optimal for the mayor to collude. If no collusion occurs then at the beginning of period $t + 1$ the mayor searches for another bidder.

The bidder's decision problem is to choose whether to pay or not the bribe B. The amount of the bribe is assumed to be fixed and exogenously determined. This decision depends on the exogenous costs of collusion C_j: collusive bidders have low cost of collusion C_L, while non-collusive C_H, with $C_H > C_L$. If the matched bidder is of a collusive type, $V_c^b > V_{nc}^b > 0$ and paying B is always optimal (where V_c^b and V_{nc}^b are the expected revenues from collusion and from a standard first price auction). If the matched bidder is non-collusive, $V_{nc}^b > (V_c^b - B) < 0$ and he will never pay the bribe B.

2.2 Stage 2: Procurement Auctions with Collusion

At the beginning of each Stage 2, bidders' valuations of the good ν_i are identically and independently drawn from the c.d.f. $F(\nu)$, with support over the interval $[\underline{\nu}, \overline{\nu}]$ within the independent private value framework. $F(\nu)$ is assumed log concave, hence the ratio $\alpha(\nu_i) = \frac{F(\nu_i)}{f(\nu_i)}$ is increasing and bidders are risk neutral. There is no reserve price, and the bidder with the highest bid is awarded the auction.

The core of this setup is the information structure. We denote by $h(t)$ the public history of the game. At the beginning of every period/auction, the $N_t - 1$ non-favored bidders learn t, the time the mayor has been in office. This information is publicly known, likewise the proportion of collusive bidders in the population π. Bidders use this information to compute $P_t = 1 - (1 - \pi)^t$, the probability that the mayor has found a collusive bidder after t independent trials, which is increasing in t. The auction, therefore, is asymmetric: with probability P_t there is one favored bidder, and with $1 - P_t$ there are $N_t - 1$ non-favored bidders. To avoid both explicit and tacit collusion between bidders, we assume that bidders do not communicate and that the identity of present and past winners is not immediately observed (Skrzypacz and Hopenhayn, 2004). We also restrict the attention to equilibria where players' bids depend only on their current valuation and the public history of the game. This is equivalent to assume that at every auction there is a new set of non-collusive bidders replaced, for example because they rotate across municipalities.[40]

The auction proceeds as follows. A favored bidder (denoted by c) is allowed to observe the highest bid b_h, and may opt to adjust his original bid and set $b_c = b_h + \varepsilon$ if this is lower than his valuation, v_c. The $N_t - 1$ other bidders are all symmetric, and their beliefs about the collusive bidder are reflected in P_t. Bidding is guaranteed by the fact that some of the $N_t - 1$ bidders in any auction may value the good more than the colluded bidder.

---

[40]This assumption is compatible with the requirements of the procurement law that prescribes contractors to submit financial guarantees before bidding. Depending on their assets, contractors, might then be limited in the possibility of participating in succeeding auctions.

Assuming that the expected continuation payoffs of winning or losing the auction for the non-collusive bidders are the same as in a one-shot game, we describe the per-period bidding behavior of the $N_t - 1$ non-favored bidders. A non-favored bidder solves a maximization problem according to a strictly increasing inverse bidding function $\phi(\cdot)$:[41]

$$\max_{b} \, (\nu_i - b) \left[P_t(F(\phi(b))^{(N-2)} F(b) + (1 - P_t)(F(\phi(b))^{(N-1)} \right] \tag{5}$$

where the term in square brackets is the probability that a non-favored bidder i wins the auction by bidding b, $F(\cdot)^{(N-2)}$ is the probability that a non-favored bidder defeats the $N - 2$ honest rivals, and $F(b)$ is the probability of defeating the favored bidder.

We consider a symmetric equilibrium where $\nu_i = \phi(b)$ for all the non-favored bidders. Given the information structure, we can consider each auction as independent and use the results from Arozamena and Weinschelbaum (2009). If $\alpha(\nu) = \frac{F(\nu)}{f(\nu)}$ is strictly concave, then $\phi_t(b) < \phi_{t+1}(b)$, as $\phi_t(b)$ is strictly increasing in t for all $b > \underline{\nu}$, and the per-period expected revenues of the auction (the per-period coalition's expected utility) are decreasing (increasing) when $0 \leq P_t < P_{t+1} \leq 1$.

After the auction is concluded, with some exogenous probability the term ends, and with the complementary probability the mayor continues in office and runs one more auction in the next period.

This simplified model only considers the case in which the mayor reciprocates the bribe by showing the highest bid to the colluded bidder, then allowing that bidder to adjust his price. Other equivalent mechanisms could be considered, though. For example, the mayor could grant the collusive bidder *ex-post* favorable renegotiations relative to the original contract, both in terms of time to delivery and costs. In this way, the colluded bidder can bid more aggressively, even above its valuation, and win the auction with a higher probability than if all firms were equally competitive.

2.3   Predictions

In this model an equilibrium is defined by the mayor, the favored bidder, and the non-favored bidders optimization problems, plus the commonly known probability of collusion P_t. A public perfect Bayes-Nash equilibrium exists because: it is always optimal for the mayor to ask for a bribe; ii) it is optimal for the collusive bidder to pay the bribe; iii) the equilibrium bidding function of non-favored bidders maximizes equation (5) in a perfect Bayes-Nash Equilibrium; (iv) it is optimal for non-collusive bidders not to pay the bribe. As long as P_t is increasing in t, one potential equilibrium of the model is characterized by a gradual diffusion of collusion over periods/auctions, where in each following period/auction

---

[41]For the average bid auction framework, this assumption is supported by the experimental evidence of Chang et al. (2014).

non-colluded bidders learn the probability that the mayor has found a colluded bidder, and behave accordingly.[42] The model delivers the following predictions:

Prediction 1 *As the mayor's tenure in office increases, the probability that auctions are assigned to the same bidder increases.*

Proof. By construction of P_t, if $0 < \pi < 1$ then $P_{t+1} > P_t$.

Prediction 2 *As the mayor's tenure in office increases, the revenues from the auction decrease.*

Proof. This follows from the results of Proposition 3, pg. 651 of Arozamena and Weinschelbaum (2009) as in our setup each auction can be treated as independent and the increase in P_t exogenously determined by the time in office of the mayor.

In presence of entry costs, the number of bidders may also depend on the mayor's tenure in office. The main intuition is that non-favored bidders will enter up to the point where their expected profit is larger than the entry cost k, with $k > 0$ (Menezes and Monteiro, 2000). Since $P_{t+1} > P_t$, the expected profits of non-colluded bidders should also decrease with t, thus reducing the participation of less efficient bidders. Therefore, when entry is costly we expect that:

Prediction 3 *As the mayor's tenure in office increases, the number of bidders per auction decreases.*

We also enrich the model by arguing that local bidders might have lower costs of bribing (or lower entry costs), i.e., they find easier to pay the bribe to the mayor (Garicano et al., 2005). If types (local or not) are not perfectly observed before the first interaction, it follows that:

Prediction 4 *As the mayor's tenure in office increases, the probability that the winner is local increases.*

Finally, we extend the model and consider the effect of a policy that removes the mayor from politics at the end of every period (a one period term limit in politics). Since in this new scenario the structure of the game is the same, we can focus on the probability of

---

[42]A more sophisticated equilibrium should consider the role of citizens/voters (the principal) in disciplining mayors (the agent) granting or not reelection. This would clearly enrich the dynamics of the model and the number of testable predictions, at the price of complicating the analysis of collusive dynamics. We leave this extension to further research, while addressing its empirical implications in Section 4. There, we discussed how the interaction between mayors and voters could bias our empirical analysis, and how our identification strategy allows us to take voters' behavior as exogenous.

collusion computed by the non-favored bidders ($P_t = 1 - (1 - \pi)^t$). Accordingly, every period non-favored bidders know that the mayor is new mayor ($t = 1$) and matches with a collusive bidder with probability (π), so the model predicts:

Prediction 5 *A policy that rotates the mayor every period delivers a constant level of collusion, and the outcomes of the auctions are constant over time.*

Proof. It is a sequence of one shot games with $P_t = P_1 = \pi$, which is constant $\forall\ t$.

As a concluding remark, notice that the model considered the possibility of favoritism as in first-price auctions, while to be more coherent with the Italian institutional setting the model should consider that the winner of the auction is the one who bids the highest value below the *averaged-average* (see Section 2). However, even in this set-up non-favored bidders will compete against a favored bidder, who eventually observes a particular moment of the distribution of the bids (the averaged-average bid, instead of the highest bid), and may adjust and win. For this reason, we believe that a more complicated model would not give qualitatively different predictions from the one we propose.

Additional References

Garicano, L., I., Palacio-Huerta, and C., Prendergast, 2005. Favoritism Under Social Pressure. The Review of Economics and Statistics, 87, 208-216.

Ingraham, A., 2005. A Test for Collusion Between a Bidder and an Auctioneer in Sealed-Bid Auctions. Contributions to Economic Analysis and Policy, 4, Article 10.

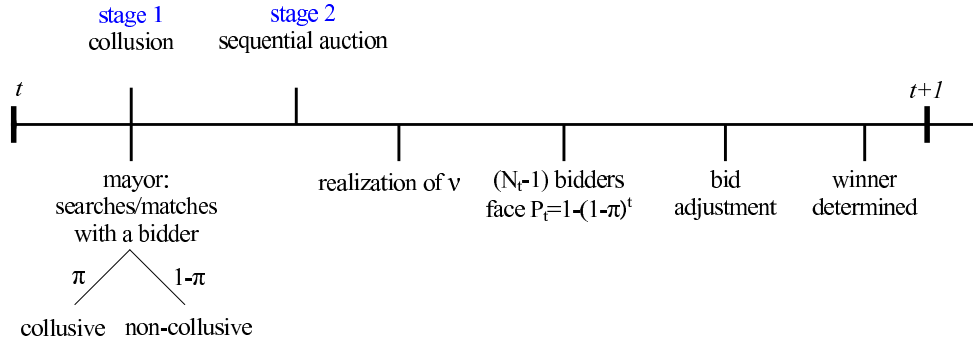Mailath, G.J., and L. Samuelson, 2006. Repeated Games and Reputations. Oxford: Oxford University Press.

Menezes, F.M., and P.K. Monteiro, 2000. Auctions with Endogenous Participation. Review of Economic Design, 5, 71-89.

Tran, A., 2010. Which Regulations Reduce Corruption? Evidence from the Internal Records of a Bribe-Paying Firm. Mimeo.

Figure B.1: The Time-line of the model

Notes. π is the proportion of colluded bidders in the population. ν_i is the individual evaluation.

CENTRE FOR ECONOMIC PERFORMANCE
Recent Discussion Papers

1464	Claudia Olivetti Barbara Petrongolo	The Economic Consequences of Family Policies: Lessons from a Century of Legislation in High-Income Countries
1463	Claudia Hupkau Marion Leturcq	Fertility and Mothers' Labor Supply: New Evidence Using Time-to-Conception
1462	Clement Bellet	The Paradox of the Joneses: Superstar Houses and Mortgage Frenzy in Suburban America
1461	Georg Graetz Guy Michaels	Is Modern Technology Responsible for Jobless Recoveries?
1460	Thomas Breda Alan Manning	Diversity and Social Capital within the Workplace: Evidence from Britain
1459	Monica Langella Alan Manning	Diversity and Neighbourhood Satisfaction
1458	Giordano Mion Luca David Opromolla Alessandro Sforza	The Diffusion of Knowledge via Managers' Mobility
1457	Kristian Behrens Giordano Mion Yasusada Murata Jens Suedekum	Distorted Monopolistic Competition
1456	Tony Beatton Michael P. Kidd Stephen Machin Dipa Sarkar	Larrikin Youth: New Evidence on Crime and Schooling
1455	Andrew Eyles Stephen Machin Sandra McNally	Unexpected School Reform: Academisation of Primary Schools in England
1454	Rabah Arezki Thiemo Fetzer Frank Pisch	On the Comparative Advantage of U.S. Manufacturing: Evidence from the Shale Gas Revolution

1453	Randolph Bruno Nauro Campos Saul Estrin Meng Tian	Foreign Direct Investment and the Relationship Between the United Kingdom and the European Union
1452	Stephen J. Redding Esteban Rossi-Hansberg	Quantitative Spatial Economics
1451	Elias Einiö	The Loss of Production Work: Evidence from Quasi-Experimental Identification of Labour Demand Functions
1450	Marcus Biermann	Trade and the Size Distribution of Firms: Evidence from the German Empire
1449	Alessandro Gavazza Simon Mongey Giovanni L. Violante	Aggregate Recruiting Intensity
1448	Emmanuel Amissah Spiros Bougheas Fabrice Defever Rod Falvey	Financial System Architecture and the Patterns of International Trade
1447	Christian Fons-Rosen Vincenzo Scrutinio Katalin Szemeredi	Colocation and Knowledge Diffusion: Evidence from Million Dollar Plants
1446	Grace Lordan Jörn-Steffen Pischke	Does Rosie Like Riveting? Male and Female Occupational Choices
1445	Stephen J. Redding David E. Weinstein	A Unified Approach to Estimating Demand and Welfare
1444	Anna Valero John Van Reenen	The Economic Impact of Universities: Evidence from Across the Globe