

Political Turnover and Competition in Public Procurement Auctions*

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(VERY PRELIMINARY)

Abstract

We investigate the extent to which a change in the political executive, as opposed to the incumbent remaining in office for one more term, can affect the functioning of public procurement auctions. To this purpose, we use a large dataset on the Italian municipal governments and all the public procurement auctions they administered between 2000 and 2005. Identification is obtained by exploiting one particular feature of the mayoral electoral rule, i.e. the two-terms limit, which introduces exogenous turnover in the mayor. Our results show that a change in the identity of the mayor, keeping any other characteristic constant, rationalizes public spending. In fact, it increases the number of bidders and, more importantly, increases the winning rebate. The same results hold when we focus on municipalities where there was a change in the mayor but not in the political party-i.e. the long term player. We interpret these figures as evidence that turnover breaks political connections, because it removes the personal relationship that the mayor and the bidders may establish over time. Accordingly, we also find that political turnover reduces the discretion in the choice of the auction format, the incumbency advantage of the winning firms and the probability of time and money renegotiations.

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1 Introduction

The relationship between the political and the private sector is particularly evident in the case of public procurement, where the political authority delegates to a private agent the realization of some policies, like public construction or the provision of services.¹ However, while there is some evidence that political connections drive the allocation of procurement contracts (Goldman, Rocholl and So, 2007a), and more generally bust firms' performance (Dombrovsky, 2008; Ferguson and Voth, 2008; Fisman, 2001; Goldman, Rocholl and So, 2007b), little is known about their process of making. If it takes time for potential bidders to establish a personal relationship with the political authority, the replacement of the person who is in charge for the assignment might break collusion, thus improving the efficiency of auction mechanisms. If instead connections could be instantaneously build up at the beginning of any electoral term, or if all candidates already had acquaintances that get elected along with them, we should observe no effect of political turnover on the level of collusion.

Using a dataset on Italian mayoral terms, and all the public procurement auctions they administered between 2000 and 2005, we bring this question to the data and analyze how a change in the mayor can affect procurement outcomes. The institutional setting is particularly suited for the analysis because all the municipal auctions are sealed first-price, which reduces the possibility of complex strategic behaviors, and single-attribute, which instead simplifies the identification of collusive behaviors. We draw inference by comparing consecutive terms for cities where there was a change in the mayor, and cities where instead the same person has remained in power. This procedure allows us to control for term effects and city fixed-effects. For identification purposes, we exploit one particular feature of the municipal electoral rule, i.e. the two-term limit, which induces exogenous changes in the mayor. Main results show that changing the person of the mayor, keeping any other characteristic constant, increases the number of bidders and, more importantly, increases the winning rebate. In line with Besley and Pratt (2006), who show that political longevity is positively correlated with corruption, we interpret these figures as evidence that political turnover breaks political connections, because it removes the personal relationship that the incumbent mayor and the bidders establish over time. Accordingly, we also find that

¹Public procurement is also important in terms of numbers, as it accounts for 14.5 percent of the GDP of the OECD countries (Audet, 2002).

political turnover reduces the probability of time and money renegotiation, which is a practice used to transfer additional funds to the contractor, reduces the discretion in the choice of the auction format and the incumbency advantage of the winning firms.

We find similar numbers when focusing on municipalities where there was a substitution in the mayor but not in the political party in power, although in this case the effect is slightly smaller. This result matches with recent empirical evidence about the importance of political parties. Among the others, Pettersson-Lidbom (2008) finds that left-wing municipal governments in Sweden, where the decision-making body is the municipal council, spend more, have lower unemployment rates and are more disposed to favoritism in public procurement (Hyytinen, Lundberg and Toivanen, 2007), while party labels do not have a significant effect on the size of the government, the allocation of spending and the crime rate in U.S. municipalities (Ferreira and Gyourko, 2008), where instead the power of the city council is smaller. Since the Italian mayoral government shares some features of both presidential and parliamentary systems, it is not surprising to find that, although parties are the long-run players, mayors still preserve some degree of freedom over the policy making (see Carey, 1998).

The rest of the paper is organized as follows. In Section 2, we review the related literature and outline the theoretical background. In Section 3, we summarize the estimation strategy. In section 4, we describe the Italian institutional framework. In Section 5 we describe the data. In Section 6, we present the results. We conclude with Section 7.

2 Background and conceptual framework

2.1 Related literature

There has been an increasing interest over the last few years in analyzing the way political competition affects economic outcomes. Some authors argue that the lack of political competition may lead to policies that hinder economic growth, this because dominant parties have less incentives to appeal to swing voters, who are not committed to one party and are prepared to vote against candidates pursuing distorted policies (Besley, Persson and Sturm, 2007; Polo, 1998). Others have argued instead that as far as political leaders are constrained by the threat of entry, regimes with no challengers may nonetheless implement policies in the public interest and carry out long-term reforms without the need

to please small but pivotal interest groups (Mulligan and Tsui, 2008).

There is also a wide theoretical literature which analyzes the way a principal can manipulate an auction to favor one of the bidders in exchange for a bribe. Some authors have emphasized the importance of specific weighting rules to help reducing the importance of manipulative attributes (Laffont and Tirole, 1991; Burguet and Che, 2004). However, Compte, Lambert-Mogiliansky and Verdier (2005) show that, even in the case of single-attribute sealed-bid procurement auctions, bureaucrats may still provide an opportunity for bid readjustments, in which case a tighter control is the only solution.²

More broadly, we relate to the literature on lobbying which analyzes the way special-interest groups use political contributions to influence a government's policy choice (Grossman and Helpman, 1994). In the traditional view of Becker (1983), lobbying can improve the efficiency of political outcomes by giving voice to economic interests under-represented in the political process. However, some claim that lobbying has little or no effect on policy outcomes if voters can restrict the influence of lobbyists by supporting candidates with offsetting policy preferences (Besley and Coate, 2001).

Compared to this literature, the contribution of our paper is threefold. First, we bring new empirical evidence on the link between the political turnover, which may be seen as one realization of political competition, and the way public procurement auctions are administered. Second, we highlight a new mechanism to mitigate favoritism, i.e., the political turnover. Third, we assess the importance of political parties over individual policy makers.

2.2 Theoretical framework

Political authorities commonly use public contracting to realize works in outsourcing, the objective for the contractor being the minimization of public expenditure under the provision of a certain quality. However, the miss-practice of using public contracts to strategically allocate public funds to interest groups is widespread, and it renders public contracts a powerful tool for incumbent politicians to consolidate their political consensus through favoritism, and eventually to get bribes. Recently, Burguet and Che (2004) provide descriptive evidence on the size of procurement frauds in the U.S., with some

²Another strand of literature has focused instead of the collusion among bidders (the so called bidding rings). Among the others, Robinson (1985), Graham and Marshall (1987), and McAfee and McMillian (1992).

anecdotes indicating that these distortions are also relevant in other countries, like Italy and Germany. Besley and Prat (2004), using cross-country data, find a positive correlation between political longevity of the executive and several measure of corruption. We depart from these facts to argue that, by increasing political turnover, there might be a rationalization of public spending via the reduction of collusion and corruption.

Specifically, in this section we briefly outline the mechanisms through which political turnover can spur bidders' competition in public procurement auctions. We derive some testable predictions from the discussion of a model of endogenous entry in auctions in the spirit of Menezes and Monteiro (2000), our main departure being that we allow for connected firms to bid more aggressively, even below their marginal cost, because of the possibility to *ex-post* renegotiate the contract with a corrupted auctioneer.³

Auctions are first-price and sealed-bid. Entry is assumed to be a costly activity incorporating time and monetary fixed costs of bid preparation. Potential bidders, after solving a profit maximization problem and knowing the probability distribution of others' valuations, decide whether to take part in the auction and how much to bid. Because the auctions are first-price, each bidder will bid at a price which is equal to its marginal cost, less the expected gain from being awarded a renegotiation.

When a new mayor is elected there are no political connections and every bidder faces the same probability of renegotiation. For this reason, the number of bidders is high and competitive pressure lowers the final rebate. Throughout the term, nature starts allocating political connections, which are not reversible and grow in numbers at each new draw until they reach an upper bound.⁴ The probability distribution of political connections is not common knowledge, but bidders learn about it at each random draw. When a bidder is drawn, he or she will pay a bribe to the mayor in exchange for a higher renegotiation probability. For the same reason, those who are not drawn will update downward their expected renegotiation probability. In this way, by the end of the first term all political connections are revealed: only connected bidders participate in the auctions, rebates are lower because of the reduction in the competitive pressure, and the probability of renegotiation is higher. If the mayor is reelected for a second term, unlucky bidders

³From now on, we will assume that the person in charge of the auction is the political executive. Section (4) discusses the plausibility of this assumption in the Italian institutional framework.

⁴The upper bound must be lower than the total number of potential bidders otherwise the process would collapse to the perfect competition case.

leave the stage to connected bidders only.⁵ If instead the mayor is not reelected, political connections are reset and competition in public contracting follows the same pattern as before.

One important alternative to the outlined framework regards the process of making of political connections. If, instead of growing over time, all connections were instantaneously formed at the beginning of each term (or, alternatively, if every candidate already had a set of connections at the time of election), we should not observe any change in the outcome of public procurement auctions. This is because bidders know that if they are not drawn first, they will never have the chance of being assigned an auction.

This stylized model deliver the following two alternative hypotheses for the effect of a change in the mayor on public procurement auctions:

Hypothesis 1: If the process of making of political connections is slow, we should observe an increase in competition, a reduction in the assignment price, a reduction in the bidders' incumbency advantage and a lower probability of renegotiation.

Presumption 2: If the process of making of political connections is instantaneous, we should observe no effect on competition, on the assignment price, on the bidders' incumbency advantage and on the probability of renegotiation.

In what comes next, we describe the identification strategy that will allow us to bring these hypotheses to the data.

3 Identification

We want to estimate the effect of a change in the identity of the mayor on the outcome of public procurement auctions administered in a municipality. In what follows, we provide an intuition for our identification strategy in the simplest two-municipalities two-terms case. Then, in the next section we will formally generalize our econometric model and set the stage for the estimation.

Suppose that we observe two cities only, e.g. Rome and Milan, for two terms between a time span of ten years, and that the two-term limit was already in place at time zero. Without loss of generality let us assume that between year 1 and 5 Rome has a mayor a

⁵We assume that colluded bidders cannot influence electoral voting, such that the outcome of elections is orthogonal to favoritism in public procurement.

(who could be at the first or the second term in office), and Milan has a mayor c at the first term. Between year 6 and 10, Rome has a new mayor b at the first term, and Milan has the same mayor c but now at the second term, as summarized in the next table:

	Time									
	1	2	3	4	5	6	7	8	9	10
Rome	$a_{I,II}$					b_I				
Milan	c_I					c_{II}				

where a_I , a_{II} , b_I , c_I , c_{II} are the average outcomes for public procurement auctions over the term. By taking the difference $((b_I - a_{I,II}) - (c_I - c_{II}))$ we can estimate the effect of a change in the person of the mayor, against the case in which the mayor remains the same. However, if we use a_I (the mayor of Rome changes after one term only) instead of a_{II} (the mayor of Rome changes because of the two-terms limit), estimates will be biased for two reasons. First, because the change in the mayor of Rome may have been induced by a specific behavior in the way public procurement was administered by mayor a in the first term (see Besley and Case, 2000). For example, a particularly collusive behavior might have facilitated the reelection, or the contrary might hold if the excessive collusion was punished in the ballot by voters. Second, because there could be dissimilarities between c_I and c_{II} due to the different term in office, i.e., the fact that c could be reelected after a first term, but not after a second. There is in fact a well established literature showing that the lack of political accountability alters dramatically the policy making.⁶ If this is the case, the difference $((b_I - a_I) - (c_I - c_{II}))$ would capture not only the effect of a change in the mayor of Rome, but also the fact that mayor c could not be reelected for a third term. To address these two issues, we focus therefore on the difference $((b_I - a_{II}) - (c_I - c_{II}))$.

Other estimation strategies could be implemented. For example, in the spirit of Lee, Moretti and Butler (2004) we could make use of close races where an incumbent loses or wins by a small margin to instrument the probability of the same mayor remaining in office for one additional term. However, in this case we would not be able to control for the term-limit effect outlined before. We confidently conclude that our estimation strategy is

⁶Among the others, Besley and Case (1995a and 1995b) find evidence that taxes, spending, and other policy instruments respond to a binding term limit if a Democrat Governor is in office. More recently, Ferraz and Finan (2008) show that there is significantly less corruption in Brazilian municipalities where mayors can get re-elected, while List and Sturm (2006) find that there are strong effects of electoral incentives also on U.S. states' secondary policies, like environmental ones.

the most suited for the study of the effect of change in the mayor over public procurement outcomes.

3.1 Regression framework

The average outcome y of auctions in city j at time s can be formalized in the following linear form:

$$y_{js} = \beta \mathbf{1}_{\{i(j,s)=i(j,s-1)\}} + \alpha_j + \alpha_j \gamma_{i(j,s)} + X_{js} + Z_{is} + \epsilon_{js}, \quad (1)$$

where β is a term index (1 if the term-limit is binding, zero otherwise), α_j is a city fixed-effect, γ_i is a mayor fixed-effect, X_{js} and X_{is} two sets of city and mayor specific time-varying covariates, and ϵ_{js} is a two factor error term (θ_{is} and ν_{js}) which is assumed to be uncorrelated with X_{js} and X_{is} .⁷

Following the outline of the previous section, we get rid of the city-fixed effects by first differencing equation (1) with respect to time, obtaining:

$$y_{js} - y_{js-1} = (\beta_{(j,s)} - \beta_{(j,s-1)}) + \alpha_j (\gamma_{i(j,s)} - \gamma_{i(j,s-1)}) + (X_{js} - X_{js-1}) + (X_{is} - X_{is-1}) + (\epsilon_{js} - \epsilon_{js-1}), \quad (2)$$

where, if the mayor in city j remains in office for two terms, $i(j, s) = i(j, s - 1)$ and $\alpha_j (\gamma_{i(j,s)} - \gamma_{i(j,s-1)})$ is equal to zero. Under the assumption that:

Assumption 1 *In the absence of treatment, the term effect is the same across cities, i.e.,*
 $\beta_{(j,s)} = \beta_{(j',s)} \quad \forall j \neq j',$

a second difference between municipalities j and j' , where:

$$j \quad \text{s.t.} \quad \begin{aligned} i(j, s-1) &\neq i(j, s) \\ \gamma_{i(j,s-1)} &\neq \gamma_{i(j,s)}, \end{aligned}$$

and

$$j' \quad \text{s.t.} \quad \begin{aligned} i(j', s-1) &= i(j', s) \\ \gamma_{i(j',s-1)} &= \gamma_{i(j',s)}, \end{aligned}$$

of the type:

$$\begin{aligned} (y_{js} - y_{js-1}) - (y_{j's-1} - y_{j's}) &= & (3) \\ &= \alpha_j (\gamma_{i(j,s)} - \gamma_{i(j,s-1)}) - \alpha_{j'} (\gamma_{i(j',s-1)} - \gamma_{i(j',s)}) \\ &= \alpha_j (\gamma_{i(j,s)} - \gamma_{i(j,s-1)}). \end{aligned}$$

⁷The first city fixed-effect is implicitly normalized to zero.

will further get rid of any term effect. Specifically, the term $E(\alpha_j(\gamma_{i(j,s)} - \gamma_{i(j,s-1)})|X_{js}, X_{is}) = 1[i(j, s) \neq i(j, s-1)]$ is the expected value of the difference between the fixed effect of the new and the old mayor in city j . However, if the change was induced by the way public procurement was administered by the mayor at time $s-1$, $\alpha_j(\gamma_{i(j,s)} - \gamma_{i(j,s-1)})$ would be correlated with $(\epsilon_{js} - \epsilon_{js-1})$ through $(\theta_{is} - \theta_{is-1})$, and estimates would still be biased. In this case we will have to assume that:

Assumption 2 *Conditional on the mayor changing because of the two-term limit, $(\theta_{is} - \theta_{is-1})$ is orthogonal to $\alpha_j(\gamma_{i(j,s)} - \gamma_{i(j,s-1)})$.*

For the term $\alpha_j(\gamma_{i(j,s)} - \gamma_{i(j,s-1)})$ to identify the effect of a change in the identity of the mayor, we will have to make the further Conditional Independence Assumption:

Assumption 3 *Controlling for X_{is} , the only difference between the new and the old mayor is represented by the identity, i.e., $\theta_{is} = \theta_{is-1}$ with $i(j, s) \neq i(j, s-1)$.*

Note that, in order to get rid of the term effect $(\beta_s - \beta_{s-1})$ in equation (3), we inverted the two terms for the control city j' , otherwise the term effect would not cancel out. It is easy to show, however, that in the presence of a common time effect λ_s , this could not be separately identified from the effect of a change in the mayor, with the estimator being now: $E(\alpha_j(\gamma_{i(j,s)} - \gamma_{i(j,s-1)}) + 2(\lambda_s - \lambda_{s-1})|X_{js}, X_{is})$. We need therefore to make the following additional assumption:

Assumption 4 *In the absence of treatment, the time effect is common across cities and equal to zero, i.e., $(\lambda_s - \lambda_{s-1}) = 0$.*

The last assumption highlights the trade-off which arises between controlling for time effects, or for term effects. Since we have no *a priori* reasons to believe that between 2000 and 2005 there was an aggregate time trend which affected the way public procurement auctions were administered in Italy, while we have for first and second terms in office being systematically different, we control for the latter. Finally, we have to assume that bidders do not sort across cities and can potentially participate only in auctions within the same area.

In Section 6.1 we will discuss the plausibility of the assumptions above and assess the extent to which their failure to hold can affect the estimation results.

3.2 Inference

In this section we address the potential inference pitfalls which arise in models where the same policy applies equally to all the individual units (*the auctions*) within each of the group units (*the municipalities*), over two period units (*the electoral terms*).

It is widely recognized that inference based on the independence assumption of the units is misleading in the presence of a common group correlation generated by the policy. The common group effect is showed to cause a downward bias of classical and heteroskedasticity robust OLS standard errors, and thus an higher rejection rate of the null hypothesis. Donald and Lang (2007) suggest to take into account the presence of common groups errors computing standard errors clustered at municipality-term level. However, following Bertrand et al. (2004), we are aware of the possibility that outcomes over two consecutive term limits may be persistent and potentially serially correlated. It is not hard, in fact, to imagine that bidding is a persistent process, and local firms systematically apply to all the actions in the municipality. For this reason, in any estimation we report standard errors clustered at municipality level only.

4 The Italian institutional framework

In the Italian municipal administration (*Comune*) the executive authority is represented by an elected Mayor (*Sindaco*), together with an Executive Committee (*Giunta*) which is appointed by the mayor himself. They are assisted by a Council (*Consiglio Comunale*), which is instead the legislative authority. In 1993 the mayoral electoral system was changed from a party-ballot to an individual-ballot, with some differences depending on the size of the city. Mayors are subject to a two-term limit, unless one of the two terms lasted for less than two years. In 2000 the statutory duration of the legislature was extended from four to five years. The functions of a municipal administration, besides contracting for public works, include the provision of public transportation, some welfare (like assistance to elderly people, nursery schools, and public housing), and managing public utilities (like water, electricity, and gas).

Public procurement auctions at municipal level are sealed-bid, and multi-attribute or single-attribute depending on the size and the complexity of the public work. For the sake of our exercise, we only observe single-attribute auctions, i.e., the technical component

of firms' offer plays no role in the assignment, provided that the winner satisfies some minimum quality standards which are set by the contracting authority. Firms bid the price for which they are willing to do the works in the form of a percentage reduction (the rebate) with respect to the auction's starting value. Notice, however, that because of the institutional mechanism prescribed by the law, the winning rebate is not necessarily the highest bidden: in order to prevent firms from over-bidding (i.e. bidding a price which does not allow to recoup works' expenses) a complex mechanism is implemented which is summarized in Figure 1. According to this rule, all bids which exceed the average bid by more than the average deviation are automatically excluded.⁸ It is easy to show, however, that despite this complex mechanism all the auctions in our data set can still be considered as first-price. The only difference with respect to the standard case is that now the bidders have to guess another first moment of the distribution of bids, i.e., the anomaly threshold, instead of the minimum value.

Each auction is administered by a manager, who is appointed by the mayor among the experts working in the city administration. He or she defines all the details concerning the works that have to be carried on by the winning firm, including the starting price that the auctioneer would pay to the winner if only one firm participates to the auction, as well as the selection mechanism. The latter can be of three types: the *Pubblico incanto*, in which case the participation is open to any firm satisfying some requirements; the *Licitazione privata*, in which case the contracting authority invites a number of firms to participate, provided a minimum number is satisfied; and the *Trattativa privata*, which is similar to the *Licitazione privata* except that the procedure is faster and the minimum number of firms to be invited is reduced.⁹ Although the law prescribes the general cases in which each specific auction format has to be used, the municipal authority still retains large discretion.

⁸Bidders thus have to guess which will be these 'anomaly thresholds', as they are called, and try to place a bid within them. As for illustration, consider this simple example. In a hypothetical auction there are three participants placing the following bids (rebates to the auction's starting value): 5, 6 and 19. The average bid is thus 10. The average difference from the average bid is 6. Thus the bottom and the upper anomaly thresholds are 4 and 16 respectively. It turns out that in this case the winning bid is 6 even if 19 is the highest bidden rebate.

⁹Other formats include the *Licitazione privata semplificata*, which is similar to the *Licitazione privata*, and the *Appalto concorso*, which is used for works with a high architectural content starting from 300,000 euros.

5 The data

We use an administrative data set about all the Italian mayoral terms elected between 1995 and 2007, provided by the Italian Ministry of Interiors. 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 on the legislature, such as the exact duration and the reasons of early termination, and the electoral results. Finally, we also have yearly information at municipality level about the size of the resident population, total revenues expenditure, plus some demographic characteristics as of 2005, like the disposable income per capita, the labor force participation rate, the number of productive units per capita, the elderly index, and the population density.

We combine the mayoral information with a data set about the municipal public procurement auctions, which is provided by the Italian Authority for Surveillance of Public Procurement (*“Autorità per la Vigilanza sui Lavori Pubblici”*, *AVLP*), which collects data on the universe of public procurement auctions in Italy for public works with starting value greater or equal to 150,000 euros. For our analysis we refer to the data collected between 2000 and 2005. The data set includes information at auction level about the identity of the bidder, the typology of the works, the bidding behavior and the identity of the winning bidding firms.¹⁰

5.1 Sample selection

The initial sample consists of all the cities for which we observe a fraction of at least two mayoral terms between 2000 and 2005, conditional on at least one auction tendered in the observed part of the term.¹¹ To make the sample homogeneous, we further excluded cities with less than 1,000 inhabitants because for most of them we do not observe any auction. As we can see in Table 1, we are left with 465 cities where the mayor did not change over two terms (28.88 percent), 413 cities where there was a change in the mayor but not because of the two-term limit (25.78 percent), and 730 cities where there was a change because of the two-term-limit (45.34 percent).

Before proceeding, two issues deserve some discussion. First, since the term-limit was

¹⁰In a recent paper Bandiera, Prat and Valletti (2008) also use Italian data to identify active waste (the case of bribery) and passive waste (the case of inefficiency due to red tape) in public service provision.

¹¹Of the 8,206 existing Italian municipalities, 4,506 had only one term overlapping between 2000 and 2005.

introduced in 1993, between 2000 and 2005 some mayors happened to be in their third or fourth term because they were already in office before the two-term limit was introduced. We will account for these differences by including in the estimation an indicator for the term-limit becoming binding at higher terms. Second, the fact that for some cities we observe more than one term between 2000 and 2005, while for others we only observe one, can be assumed to be random, provided that the different timing of election was determined by historical reasons which have nothing to do with the collection of the auction data set.¹²

In Table 2 we present summary statistics for the final sample of municipalities over which we will run the estimation analysis, i.e., we exclude cities where the change was not induced by the two-term limit. The final sample is made of 1,192 cities for which we no missing information, 43 percent of which are located in the North-West of Italy, 17 percent in the North-East, 20 percent in the Center, 18 percent in the South and only 3 percent in the Islands. The average municipality is relatively large, with almost 21,000 inhabitants (compared to a national average of 7,015). The per capita income is instead in line with the national average (14,782 euros, as opposed to 15,143), as well as most of the other demographic indicators.

Since in 465 cities there is a change in the mayor over the period 2000-2005, the total number of mayors we observe is 1,922 (see Table 3). Only 8.3 percent of them are women, the average age is 48, the average political experience in the same city administration is 7 years, and only half of the mayors were born in the city they administer. About 48 percent of the mayors have a college degree, while 41 percent have a high-school degree and 9 percent a lower-secondary degree. Almost 9 percent were not employed before being appointed, the majority being self-employed (44 percent), followed by entrepreneurs (34 percent), white collars (4.6 percent) and blue-collar (3.8 percent). Finally, 39 percent were elected with a center-left party, only 12 percent with a center-right party, 5.4 with a separatist party and all the rest were in a center-wing or independent party.

5.2 Defining the dependent variable

Our data set contains a large number of measures that can help to identify the lack of competition in public procurement auctions, and indirectly the degree of collusion. These are: the number of bidders; the final percentage rebate over the reserve price; the selection

¹²Remember that, over the period 2000-2005, the duration of a term was five years.

mechanism of the auction; the maximum number of adjudications per term to the same firm, weighted by the average number of adjudications; an indicator for the time of delivery being delayed; and an indicator for the price of the work being raised after assignment.

We are aware that some of these measures does not represent an exact indicator for the lack of competition or for the presence of collusion. For example, if bidders were colluding among themselves, finding that the number of auctioneers increases when a new mayor is elected would not necessarily be a signal of increasing competition. At the same time, since the reserve price is set endogenously by the mayor (or the manager he or she had appointed), the final rebate would not necessarily capture the effect of an increasing competition. However, as outlined in the Section 2.2, these measures, together with the choice of the auction format, with the probability that the same firms is awarded more than one contract, and with the probability of renegotiation, provide many insights about the way political turnover can affect the functioning of public procurement auctions.

Table 4 describes the average characteristics of the auctions per term. The total number of terms we observe is 2,368, with an average number of auctions per term equal to 7.8. In 76 percent of the cases the selection criterion was the public participation (*Pubblico incanto*), the average number of bidders was 22, with a final rebate of 12 percentage points. The majority of the public works concern the construction of roads (23 percent) and schools (13 percent). The maximum number of times that the same firm is awarded a public contract is on average 1.4, although in 25 percent of cases it is 2, with a maximum of 21. In 21 percent of the auctions the price set at the time of the selection is then increased, and in 32 percent the deadline is delayed. Interestingly, the size of the public work tendered is quite small, varies from 140,000 to 530,000 euros and with an average value of 460,000 euros.

Note that these averages represent the mean value for the part of the term we observe. Some terms, however, may be right or left censored depending on whether they overlap with year 2000 or 2005, and this might introduce some measurement error. For the same reason, auctions in right censored terms were administered in the first part of the term, while auctions in left censored terms were administered in the first part of the term. For our estimation strategy to hold, we will have to further assume that, although differences exists depending on whether the mayor can be reelected or not, there is homogeneity in the way public procurement auctions are administered within a term.

6 Results

In this section we present our main estimation results. Estimation was performed on averages per term since the treatment does not vary within terms, and all the specifications include city and term fixed-effects.¹³ With respect to column (1), results in column (2) also include mayor characteristics (age, gender, political experience, education, political party, and previous job) and municipality characteristics (resident population and the budget deficit), results in column (3) also include the average auction characteristics per term (the reserve price and the type of work), while column (4) includes all the controls at city, mayor and auction level.

Looking at columns from (1) to (4) in Table from 5 to 10, we can see that a change in the mayor has a relevant effect on the functioning of public procurement auctions. In fact, depending on the set of controls we use, political turnover increases the number of bidders by about 42-47 percent, it increases the final rebate by 18-27 percent, it reduces the probability that there will be a delay in the realization of the work by 47-54 percent, it rises the actual price paid by the contracting authority by 41-52 percent, and it reduces the probability that the auction will be held with a private invitation procedure. We also find a small negative effect on the maximum number of times that the same firm is assigned a public work, although this result is not statistically significant when we control for the mayor's characteristics.

Specifically, results in Table 5 and Table 8 show that a change in the mayor provides new incentives for firms to participate in public procurement auctions. This, in turn, has a significant effect on the final price which is awarded, and consequently on the cost of procurement. A back to the envelop calculation suggests in fact that by simply changing the mayor delivers a reduction in an the average cost of procurement auction between 82,000 and 124,000 euros. These numbers could be even larger if we accounted for the reduction in the probability that the price of the work will be raised after assignment, or that the work will be delivered with a delay. Where does this effect come from? Results in Tables 9 and Table 10 suggest that it is the effect of a reduced discretion in awarding public procurement, which actually reduces the incumbency advantage of the winning firms and thus favors competition.

¹³We find similar figures when performing the same analysis at auction level. These results are available from the author upon request.

It is also important to notice that results still hold, both in the magnitude and the statistical significance, when in column (5) we restrict the sample to the cities where there were at least three auctions in each term, the only exception being the probability of time renegotiation. This means that the fact that we do not observe all the auctions administered in a term, but only those administered between 2000 and 2005, is not a relevant issue here.

Finally, in column (6) we perform the same estimation as in column (4) but restricting the treatment group to those cities where there was a change in the mayor but not in the party in power. Strikingly, we find that a change in the mayor has an effect on almost all the outcomes even when the same party had remained in power, although in this case numbers are slightly smaller.

6.1 Discussion

In this section we discuss some of the hypotheses underlying the evaluation framework and assess the extent to which their failure to hold can affect the estimation results. While we cannot directly test assumption 2, 1 and 4, we can provide some evidence in support of assumption 3, plus the other corollary assumptions.

First, in column (7) from Table 5 to 10 we check whether the same results hold when we restrict the control group to cities where we know that the new mayor will then be reelected. If θ_{is} was capturing an unobservable ability to be reelected, the fact that both the old and the new mayor get to the second term should reduce the possibility that the two mayors differ not just for the identity, but also for this unobservable skill. We can see that, although the sample is now smaller, results are basically unchanged.

In Table 11 we instead address the issue that bidders may sort across cities looking for better bidding opportunities, thus falsifying our estimation strategy. If this was the case, in fact, we could not identify anymore the "treated" and the "control" bidders. We can see that this is actually not the case. A new mayor never attracts new bidders from other cities, which is plausible given the size of the public works considered in our exercise.

7 Conclusions

In this paper we have shown that a change in the political authority can have a relevant effect on the functioning of public procurement auctions. Specifically, it attracts more bidders, lowers the final price, reduces the discretion in the auction format and reduces the probability that the contract will be renegotiated. These results are particularly interesting because they point out another channel through which competition in public procurement could be restored, i.e., political turnover. This was not highlighted in the previous literature.

Of course, we are aware that political turnover might have some drawbacks, especially when it creates instability and reduces the incentive for politicians to implement long-run policies. However, at least for what concerns the transparency of the policy making, institutional features like the term-limit prove to be effective in reducing collusion.

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Tables and Figures

Table 1: Political turnover - summary

<i>No change</i>				
	Time		N.	%
	1	2		
Term in office	1	2	431	26.77
	2	3	27	1.68
	3	4	7	0.43
Tot.			465	28.88
<i>Change without term-limit</i>				
	Time		N.	%
	1	2		
Term in office	1	1	368	22.86
	2	1	32	1.99
	3	1	13	0.81
Tot.			413	25.78
<i>Change because term-limit</i>				
	Time		N.	%
	1	2		
Term in office	2	1	587	36.46
	3	1	96	5.96
	4	1	47	2.92
Tot.			730	45.34

Term in office is the number of terms the same mayor has been in office.

Table 2: Municipalities - summary

	Mean	St.Dev.	Min	p25	p50	p75	Max	N.
<i>Geographical location:</i>								
North-East	.17	.37	0	0	0	0	1	1,192
North-West	.43	.49	0	0	0	1	1	1,192
Center	.20	.40	0	0	0	0	1	1,192
South	.18	.38	0	0	0	0	1	1,192
Islands	.03	.16	0	0	0	0	1	1,192
<i>Demographics:</i>								
Population (2000)	21,034	102,903	1,010	3,198	6,931	14,489	2,733,908	1,192
% Active population (2005)	43	4.4	23	40	44	46	54	1,192
Production units p.c. (2005)	.087	.024	.027	.071	.085	.1	.25	1,192
Elderly index (2005)	156	60	28	115	146	189	729	1,192
Income p.c. in euros (2005)	14,782	3,153	6,228	12,930	14,831	16,790	44,949	1,192

Population reported by the Minister of Interiors. The elderly index is defined as 100 times the ratio of population above age 65 over population below age 14.

Table 3: Mayors - summary

	mean	sd	min	p25	p50	p75	max	n
Female	.083	.28	0	0	0	0	1	1,922
Age	48	8.9	24	41	47	53	80	1,922
Experience (years)	7.2	5.2	0	4	8	10	20	1,922
Born in the city	.51	.5	0	0	1	1	1	1,902
<i>Education:</i>								
Lower secondary	.089	.29	0	0	0	0	1	1,870
Upper secondary	.41	.49	0	0	0	1	1	1,870
College	.48	.5	0	0	0	1	1	1,870
<i>Employment:</i>								
Not employed	.093	.29	0	0	0	0	1	1,820
Self-employed	.44	.5	0	0	0	1	1	1,820
Entrepreneur	.34	.47	0	0	0	1	1	1,820
White-collar	.046	.21	0	0	0	0	1	1,820
Blue-collar	.038	.19	0	0	0	0	1	1,820
<i>Political party:</i>								
Center-right	.12	.33	0	0	0	0	1	1,922
Separatist	.054	.23	0	0	0	0	1	1,922
Center-left	.39	.49	0	0	0	1	1	1,922
Center	.048	.21	0	0	0	0	1	1,922
Others	.39	.49	0	0	0	1	1	1,922

Table 4: Auctions per term - summary

	mean	sd	min	p25	p50	p75	max	n
N. auctions	7.8	24	1	1	3	7	698	2,368
<i>Selection mechanism:</i>								
Public participation	.76	.35	0	.62	1	1	1	2,368
Private invitation	.11	.26	0	0	0	0	1	2,368
Direct negotiation	.12	.26	0	0	0	.077	1	2,368
<i>Outcome:</i>								
N. bidders	22	19	0	8.2	17	29	170	2,364
Maximum % rebate	15	8	0	9.8	14	18	100	2,303
Minimum % rebate	6	5	0	2.6	4.9	8.1	33	2,294
Final % rebate	12	6.9	0	7.8	12	15	39	2,325
Reserve price (100 thousand euros)	4.6	4.2	1.4	2.4	3.4	5.3	93	2,363
Max assignments to the same firm	1.4	.95	1	1	1	2	21	2,212
Time renegotiation	.21	.34	0	0	0	.5	1	2,368
Money renegotiation	.32	.44	0	0	0	.89	1	2,363
<i>Object:</i>								
Road	.23	.31	0	0	.022	.4	1	2,368
School	.13	.24	0	0	0	.17	1	2,368
Public building	.052	.16	0	0	0	0	1	2,368
Public housing	.0091	.069	0	0	0	0	1	2,368
Art	.034	.12	0	0	0	0	1	2,368
Others	.54	.39	0	.18	.5	1	1	2,368
<i>Year delivery:</i>								
2000	.16	.3	0	0	0	.2	1	2,368
2001	.15	.25	0	0	0	.25	1	2,368
2002	.15	.24	0	0	0	.25	1	2,368
2003	.14	.24	0	0	0	.22	1	2,368
2004	.19	.31	0	0	0	.29	1	2,368
2005	.21	.36	0	0	0	.29	1	2,368

Table 5: Number of bidders

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Mean outcome if no change = 24.09						
New mayor	10.085*** (1.384)	10.514*** (2.074)	11.284*** (1.338)	11.225*** (2.069)	11.047*** (3.363)	11.203*** (2.921)	6.419* (3.468)
Female		5.097** (2.318)		3.620 (2.319)	-0.440 (2.842)	1.940 (3.612)	1.286 (3.995)
Age		0.184 (0.665)		0.257 (0.651)	-1.790* (0.954)	-0.320 (0.754)	-0.205 (1.046)
Reserve price			1.873*** (0.217)	1.380*** (0.333)	0.459 (0.658)	1.263*** (0.430)	1.291*** (0.419)
City effects	yes	yes	yes	yes	yes	yes	yes
Term effects	yes	yes	yes	yes	yes	yes	yes
City char.	no	yes	no	yes	yes	yes	yes
Mayor char.	no	yes	no	yes	yes	yes	yes
Auction char.	no	no	yes	yes	yes	yes	yes
>= 3 auctions	no	no	no	no	yes	no	no
Same party	no	no	no	no	no	yes	no
Mayor reelected	no	no	no	no	no	no	yes
N. cities	1181	830	1176	825	245	379	414
R-squared	0.047	0.074	0.176	0.173	0.233	0.211	0.201

Clustered standard errors (at municipality level) in parentheses. *City characteristics* include the resident population and the percentage budget deficit. *Mayor characteristics* include age squared, years of political experience (also squared), indicator for being born in a different city, 3 education dummies, 5 occupation dummies, 5 political party dummies, number of seats and parties in the governing coalition. *Auction characteristics* include the reserve price squared and 6 dummies for the type of work. *Reserve price* is in 100 thousand euros.

Table 6: Winning rebate (%)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Mean outcome if no change = 13.36						
New Mayor	3.538*** (0.395)	2.666*** (0.564)	3.312*** (0.403)	2.416*** (0.594)	1.396* (0.803)	2.540*** (0.867)	2.630*** (0.975)
Female		0.792 (0.750)		0.764 (0.762)	-0.324 (0.802)	1.131 (1.182)	1.266 (1.497)
Age		0.159 (0.212)		0.161 (0.211)	-0.054 (0.216)	0.353 (0.362)	0.705* (0.386)
Reserve price			0.234*** (0.052)	0.179** (0.077)	0.000 (0.204)	0.231* (0.138)	0.255** (0.107)
City effects	yes	yes	yes	yes	yes	yes	yes
Term effects	yes	yes	yes	yes	yes	yes	yes
City char.	no	yes	no	yes	yes	yes	yes
Mayor char.	no	yes	no	yes	yes	yes	yes
Auction char.	no	no	yes	yes	yes	yes	yes
>= 3 auctions	no	no	no	no	yes	no	no
Same party	no	no	no	no	no	yes	no
Mayor reelected	no	no	no	no	no	no	yes
N. cities	1145	806	1140	801	243	365	397
R-squared	0.074	0.079	0.100	0.101	0.210	0.152	0.152

Clustered standard errors (at municipality level) in parentheses. *City characteristics* include the resident population and the percentage budget deficit. *Mayor characteristics* include age squared, years of political experience (also squared), indicator for being born in a different city, 3 education dummies, 5 occupation dummies, 5 political party dummies, number of seats and parties in the governing coalition. *Auction characteristics* include the reserve price squared and 6 dummies for the type of work. *Reserve price* is in 100 thousand euros.

Table 7: Probability of time renegotiation

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Mean outcome if no change = 0.17						
New mayor	-0.091*** (0.019)	-0.080*** (0.029)	-0.093*** (0.022)	-0.080** (0.034)	-0.031 (0.039)	-0.098* (0.056)	-0.110*** (0.037)
Female		-0.005 (0.031)		-0.005 (0.031)	0.034 (0.036)	-0.026 (0.047)	0.030 (0.049)
Age		0.013 (0.011)		0.014 (0.010)	-0.000 (0.010)	0.014 (0.017)	0.008 (0.015)
Reserve price			0.002 (0.003)	0.003 (0.004)	-0.000 (0.007)	-0.003 (0.010)	0.003 (0.006)
City effects	yes	yes	yes	yes	yes	yes	yes
Term effects	yes	yes	yes	yes	yes	yes	yes
City char.	no	yes	no	yes	yes	yes	yes
Mayor char.	no	yes	no	yes	yes	yes	yes
Auction char.	no	no	yes	yes	yes	yes	yes
>= 3 auctions	no	no	no	no	yes	no	no
Same party	no	no	no	no	no	yes	no
Mayor reelected	no	no	no	no	no	no	yes
N. cities	1185	834	1180	829	245	380	416
R-squared	0.021	0.047	0.024	0.048	0.180	0.098	0.081

Clustered standard errors (at municipality level) in parentheses. *City characteristics* include the resident population and the percentage budget deficit. *Mayor characteristics* include age squared, years of political experience (also squared), indicator for being born in a different city, 3 education dummies, 5 occupation dummies, 5 political party dummies, number of seats and parties in the governing coalition. *Auction characteristics* include the reserve price squared and 6 dummies for the type of work. *Reserve price* is in 100 thousand euros.

Table 8: Probability of money renegotiation

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Mean outcome if no change = 0.27						
New mayor	-0.129*** (0.017)	-0.111*** (0.024)	-0.140*** (0.019)	-0.132*** (0.027)	-0.134*** (0.036)	-0.196*** (0.046)	-0.085** (0.033)
Female		-0.017 (0.030)		-0.015 (0.030)	-0.008 (0.036)	0.008 (0.054)	-0.019 (0.051)
Age		-0.007 (0.009)		-0.005 (0.009)	-0.005 (0.010)	-0.007 (0.016)	-0.011 (0.013)
Reserve price			0.002 (0.002)	0.001 (0.003)	0.002 (0.007)	0.006 (0.006)	0.005 (0.005)
City effects	yes	yes	yes	yes	yes	yes	yes
Term effects	yes	yes	yes	yes	yes	yes	yes
City char.	no	yes	no	yes	yes	yes	yes
Mayor char.	no	yes	no	yes	yes	yes	yes
Auction char.	no	no	yes	yes	yes	yes	yes
>= 3 auctions	no	no	no	no	yes	no	no
Same party	no	no	no	no	no	yes	no
Mayor reelected	no	no	no	no	no	no	yes
N. cities	1180	830	1175	825	245	378	413
R-squared	0.055	0.093	0.073	0.105	0.246	0.203	0.061

Clustered standard errors (at municipality level) in parentheses. *City characteristics* include the resident population and the percentage budget deficit. *Mayor characteristics* include age squared, years of political experience (also squared), indicator for being born in a different city, 3 education dummies, 5 occupation dummies, 5 political party dummies, number of seats and parties in the governing coalition. *Auction characteristics* include the reserve price squared and 6 dummies for the type of work. *Reserve price* is in 100 thousand euros.

Table 9: Auction by private invitation

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Mean outcome if no change = .08						
New mayor	-0.142*** (0.017)	-0.146*** (0.025)	-0.141*** (0.017)	-0.147*** (0.025)	-0.124*** (0.042)	-0.123*** (0.039)	-0.170*** (0.053)
Female		-0.003 (0.027)		-0.003 (0.028)	0.069 (0.046)	-0.011 (0.038)	-0.023 (0.086)
Age		-0.011 (0.009)		-0.011 (0.009)	0.005 (0.011)	-0.017 (0.018)	-0.017 (0.015)
Reserve price			0.001 (0.002)	-0.001 (0.003)	-0.019* (0.011)	-0.003 (0.006)	-0.007* (0.004)
City effects	yes	yes	yes	yes	yes	yes	yes
Term effects	yes	yes	yes	yes	yes	yes	yes
City char.	no	yes	no	yes	yes	yes	yes
Mayor char.	no	yes	no	yes	yes	yes	yes
Auction char.	no	no	yes	yes	yes	yes	yes
>= 3 auctions	no	no	no	no	yes	no	no
Same party	no	no	no	no	no	yes	no
Mayor reelected	no	no	no	no	no	no	yes
N. cities	1185	834	1180	829	245	380	416
R-squared	0.061	0.075	0.064	0.084	0.125	0.113	0.113

Clustered standard errors (at municipality level) in parentheses. *City characteristics* include the resident population and the percentage budget deficit. *Mayor characteristics* include age squared, years of political experience (also squared), indicator for being born in a different city, 3 education dummies, 5 occupation dummies, 5 political party dummies, number of seats and parties in the governing coalition. *Auction characteristics* include the reserve price squared and 6 dummies for the type of work. *Reserve price* is in 100 thousand euros.

Table 10: Max number of adjudications per winning firm

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Mean outcome if no change = 1.32						
New mayor	-0.395*** (0.067)	0.059 (0.093)	-0.434*** (0.068)	-0.004 (0.092)	0.171 (0.256)	0.139 (0.141)	0.612*** (0.216)
Female		-0.011 (0.137)		0.010 (0.137)	0.064 (0.312)	0.170 (0.153)	0.425* (0.244)
Age		-0.019 (0.027)		-0.016 (0.027)	-0.059 (0.062)	0.056 (0.039)	-0.014 (0.053)
Reserve price			0.003 (0.008)	0.013 (0.011)	0.034 (0.063)	0.000 (0.028)	0.022 (0.015)
City effects	yes	yes	yes	yes	yes	yes	yes
Term effects	yes	yes	yes	yes	yes	yes	yes
City char.	no	yes	no	yes	yes	yes	yes
Mayor char.	no	yes	no	yes	yes	yes	yes
Auction char.	no	no	yes	yes	yes	yes	yes
>= 3 auctions	no	no	no	no	yes	no	no
Same party	no	no	no	no	no	yes	no
Mayor reelected	no	no	no	no	no	no	yes
N. cities	1061	747	1058	744	241	326	380
R-squared	0.036	0.084	0.046	0.098	0.181	0.167	0.155

Clustered standard errors (at municipality level) in parentheses. *City characteristics* include the resident population and the percentage budget deficit. *Mayor characteristics* include age squared, years of political experience (also squared), indicator for being born in a different city, 3 education dummies, 5 occupation dummies, 5 political party dummies, number of seats and parties in the governing coalition. *Auction characteristics* include the reserve price squared and 6 dummies for the type of work. *Reserve price* is in 100 thousand euros.

Table 11: Probability of the winner coming from outside the city

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Mean outcome if no change = 0.09							
New mayor	-0.017 (0.016)	-0.014 (0.024)	-0.025 (0.017)	-0.035 (0.026)	-0.039 (0.048)	-0.063 (0.051)	-0.056 (0.051)
Female		-0.028 (0.035)		-0.022 (0.036)	0.072* (0.038)	-0.044 (0.060)	0.091* (0.052)
Age		0.004 (0.006)		0.004 (0.006)	0.014 (0.010)	0.000 (0.011)	0.014 (0.012)
Reserve price			-0.004** (0.002)	-0.002 (0.003)	-0.013* (0.007)	-0.010 (0.009)	-0.001 (0.003)
City effects	yes	yes	yes	yes	yes	yes	yes
Term effects	yes	yes	yes	yes	yes	yes	yes
City char.	no	yes	no	yes	yes	yes	yes
Mayor char.	no	yes	no	yes	yes	yes	yes
Auction char.	no	no	yes	yes	yes	yes	yes
>= 3 auctions	no	no	no	no	yes	no	no
Same party	no	no	no	no	no	yes	no
Mayor reelected	no	no	no	no	no	no	yes
N. cities	794	563	791	560	191	221	301
R-squared	0.002	0.026	0.016	0.046	0.150	0.092	0.086

Clustered standard errors (at municipality level) in parentheses. *City characteristics* include the resident population and the percentage budget deficit. *Mayor characteristics* include age squared, years of political experience (also squared), indicator for being born in a different city, 3 education dummies, 5 occupation dummies, 5 political party dummies, number of seats and parties in the governing coalition. *Auction characteristics* include the reserve price squared and 6 dummies for the type of work. *Reserve price* is in 100 thousand euros.

Figure 1: The Awarding Mechanism

