

DISCRETION AND SUPPLIER SELECTION IN PUBLIC PROCUREMENT^{*}

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Abstract. Using Italian data on municipal public works tendered in the period 2009-2013, we study how a reform extending the scope of bureaucrat discretion affects supplier selection. We find that the share of contracts awarded to politically connected firms increases while the (ex-ante) labor productivity of the winning firm decreases, thus suggesting a potential misallocation of the public funds. These effects are concentrated among municipalities characterized by less competent politicians and bureaucrats and by higher levels of corruption. We also show that under broader discretion public agencies comply less frequently with transparency requirements.

JEL codes: D72, D73, H57, P16.

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1. Introduction

The criteria by which procuring agencies select their suppliers are a primary element in the design of procurement systems. One important dimension along which these criteria differ is the extent of discretion granted to the procuring agencies, that might range from almost none (as in open competitive auctions) to essentially complete (as in privately-contracted purchases). Open competitive auctions are seen as a powerful tool to avoid corruption and obtain fair prices and efficient procurement outcomes (OECD, 2016). However, they are more complex and costly to organize than less formal procedures such as direct negotiations. Moreover, discretion may allow competent procuring agencies to exploit their local expertise in order to guarantee quality dimensions that are difficult to cover by explicit contractual terms.

This paper provides novel empirical evidence on the real effects of public procurement. First, we study the impact of bureaucrat discretion on supplier selection in public procurement. In particular, we focus on firms' political connections, as an indicator of potential political favoritism, and (ex-ante) firms' productivity, as an indicator of the allocative efficiency of the selection process. Second, we examine the mechanisms active at different stages of the supplier selection and distinguish between firms' selection into the pool of bidders and the screening process in which the winning firm is chosen among participants. Third, we study the heterogeneous effects of discretion on supplier selection along several dimensions of the quality of the procuring agency. Indeed, one may expect that discretion is less effective when granted to less competent and more corrupt public administrations. Finally, to shed light on the impact of a more discretionary regime on the functioning of the public administrations, we provide evidence on a set of contract execution outcomes.

To address these questions we build a rich and novel dataset combining information on (i) public works contracts tendered by Italian municipalities, (ii) winning firms' identities and their balance-sheet information and ownership structure and (iii) identities of local politicians. The identification strategy exploits the fact that the Italian procurement system is characterized by different degrees of discretion granted to administrations depending on tender size, as measured by the base price, and that a policy reform in 2011 relaxed the obligation of using an open competitive auction above a certain threshold. More specifically, before 2011 the use of discretionary (*negotiated*) procedures was severely restricted for public

works with a base price above €500,000; the 2011 reform raised this threshold from €500,000 to €1mln, thus increasing the scope of discretion of procuring agencies.¹ No other substantial changes concerning bureaucrats' discretion were introduced by the reform.

Using a difference-in-differences (DID) empirical strategy we estimate that broader discretion leads to a large increase in the share of procurement contracts awarded to politically connected firms and to a decrease of winning firms' ex-ante productivity. The results are robust to alternative measures of political connections and productivity and to accounting for strategic manipulation of the tenders' base price by the procuring agencies. These findings suggest that more discretion results, on average, in wider political favoritism and in a lower ability of the procuring agency to select the most productive firms. Besides constituting a suboptimal allocative solution, such awarding of contracts to less efficient firms may produce poorer outcomes, also along dimensions that hard to quantify for researchers (e.g., the quality of the work).

In order to better understand the mechanisms by which discretion induces changes in the awarding of tender contracts, we further study the different stages of the procurement procedures. We find that discretion leads to a significant drop in the number of participants, while the composition of the bidding firms' pool in terms of observable outcomes is not significantly affected. These results show that discretion induces procuring agencies to more often choose politically connected and low-productivity firms from a smaller, but otherwise similar, pool of participants, highlighting a specific distortion in the screening of candidate firms.

The heterogeneity analysis shows that the negative effects of discretion are concentrated in smaller municipalities, in those with less-educated politicians and public officials and in those located in areas with more widespread corruption. These results suggest that the lack of competence may prevent local procuring agencies from exploiting potential benefits of discretion. Moreover, discretion effects appear to be adverse primarily in corrupt environments, in which special interests are more likely to capture public officials intending to pursue private benefits in conflict with public interests.

Finally, we examine the impact of discretion on procurement costs and other aspects of

¹ We note that the Italian law does not completely forbid the use of negotiated procedures over the base price threshold: they are indeed allowed under specific conditions (see Section 2). Similarly, the use of such procedures is not completely unrestricted under the threshold. In practice, our data show that the use of negotiations in procurement procedures below the base price threshold is substantially more frequent than above.

the functioning of public administrations. While we do not find any substantial effect of discretion on the price rebates obtained by public administrations, the data reveals a large number of tenders for which no information regarding the actual implementation of the project (e.g., cost overruns) is available. Most importantly, we document that higher discretion leads to lower transparency (i.e. lower probability of observing such information on the execution stage). Discretion does not seem to augment cost overruns in procedures for which execution stage information is available, although these results clearly suffer from a severe bias due to selection into reporting information.

This paper contributes to a well-established literature on the trade-off between rules and discretion in public procurement. On the one hand, competitive procedures are often standard in conducting procurement, because of their potential to drive efficiencies, fight corruption and ensure competition (OECD, 2016). Indeed, some empirical studies document a negative relationship between bureaucrat discretion and procurement outcomes. Di Tella and Schargrodsky (2003) show that limiting bureaucrat discretion in Argentinian procurement improves price rebates. Palguta and Pertold (2017) show that an increase in discretion in the Czech Republic leads to manipulation of base prices and to more tenders awarded to “anonymous” firms. On the other hand, procedures which delegate higher decision making power to local public agencies may be desirable when projects’ management are particularly complex (Bajari et al., 2008); when important quality dimensions are not sufficiently guaranteed by contractual terms (Manelli and Vincent, 1995); to encourage public officials to acquire relevant information (Aghion and Tirole, 1997); to sustain reputational mechanisms and long-term relationships (Spagnolo, 2012; Coviello et al., 2017). Our contribution with respect to these studies is twofold. First, we provide firm-level evidence on the selection of suppliers rather than tender-level outcomes. Namely, we focus on firms’ productivity and a precise measure of political connection.² The latter variable is arguably better suited to capture improper ties and favoritism than other variables, such as localism or firm anonymity, so far used in the literature on the effects of discretion. Second, we argue that the diverging results in the existing literature may be partially explained by the heterogeneity of public

² In this respect, our study connects to the literature studying procurement performance of firms with politically involved ownership and administration (in the same spirit as Goldman et al., 2013, Straub, 2014, and Schoenherr, 2017), and of firms that support politicians by monetary means (see, e.g., Baltrunaite, 2017; Mironov and Zhuravskaya, 2016). More broadly, this paper positions itself within a vast literature on political connections and their impact on other outcomes, such as firm value (e.g., Fisman, 2011), access to credit (e.g., Khwaja and Mian, 2005) and general public sector demand (e.g., Cingano and Pinotti, 2013).

agencies and of the environments in which they operate.

Closest to our paper, Coviello et al. (2017) show that discretion is associated with larger chances of repeated wins by the same firm, but appears to have limited effects on *ex-post* execution of public works in Italian municipalities. Our results provide a less optimistic perspective on the effects of discretion on the functioning of procurement procedures and on its aggregate consequences. Indeed, we find that discretion leads to an advantage of politically connected and less efficient firms, this being especially true for local procuring agencies with less competent governance and in more corrupt environments.³ Thus, we also highlight a possible interaction between public sector inefficiencies due to bureaucratic frictions and those due to intentional diversion of resources (i.e., between *passive* and *active waste* as defined in Bandiera et al., 2009).

Last, but not least, our results show that strategic behaviors by public administrations have to be seriously taken into account when dealing with public procurement data. As in Palguta and Pertold (2017), we find evidence of significant manipulation of tender base prices, suggesting that procuring agencies set them strategically to avoid more formal procedures. Moreover, we find that information on execution outcomes are oftentimes not reported, and this lack of transparency worsens when discretion grows. This information manipulation constitutes another example of strategic response by public administrations to changes in the institutional set-up.

The rest of the paper is organized as follows. Section 2 presents the Italian institutional setting. Sections 3 and 4 describe the data and the empirical strategy, respectively. Section 5 shows the main findings, as well as a sensitivity analysis and a wide set of additional results. Section 6 concludes the paper.

2. The Italian Regulatory Framework

The Italian regulatory framework identifies three main types of procedures for awarding public works: open, restricted and negotiated procedures. Open and restricted procedures are ordinary procedures to assign public contracts. Both are characterized by limited discretionary

³ We also note that our results confirm those by Coviello et al. (2017) when the same variables are examined. Indeed, though we use a different empirical strategy – exploiting time variation of the threshold induced by the reform instead of a (cross-section) regression discontinuity design around the threshold – we find broadly comparable results in terms of localism of the winning firms and cost overruns.

powers for administrations in the selection of contractors. They presume the administration itself is capable of defining, accurately and from the outset, the subject of the contract and the relevant technical specifications, so that bidders may immediately submit definite, non-renegotiable offers. In *open procedures* the contracting authority publishes a contract notice containing, among other things, an accurate description of the subject of the contract. This notice precedes the presentation of the offers by all interested parties and their requisites are verified during the bids' assessment. *Restricted procedures*, instead, start with a pre-qualification phase in which requisites are verified to identify the suppliers which are invited to a subsequent bidding phase.

Negotiated procedures, on the contrary, are characterized by significant discretionary powers for the administration as the contracting authority consults potential suppliers and negotiates the contract conditions with one or more of them. As negotiated procedures depart from the general principle of no bid renegotiation, they are considered exceptional and are admissible only when specific conditions apply (chiefly those related to urgency or lack of appropriate offers or applicants), or for tenders below the established base price threshold (Decarolis and Giorgiantonio, 2015).⁴

This paper exploits a reform that took place in July 2011 with the primary aim of accelerating the awarding of public works. The reform raised the base price threshold below which contracting authorities can use negotiated procedures from €500,000 to €1mln.⁵ The reform also establishes that for public contracts between €100,000 and €500,000 the administration had to consult at least five economic operators (as in the period preceding the reform), while for contracts between €500,000 and €1mln the administration had to consult at least ten economic operators. Therefore, the reform arguably led to more discretion being granted to contracting authorities in the selection of private contractors.

In order to regulate potential conflict of interest, the Italian Law stipulates the cases in which contemporaneously holding positions in private firms and public offices leads to incompatibility with tendering. In particular, the role of owner, administrator or legal representative of a firm awarded the tender contracts is not compatible with the office of

⁴ Under any of these procedures the “lowest price” criterion or “most economically advantageous tender” criterion can be used to award the tender contract. For more details see Decarolis and Giorgiantonio (2014).

⁵ See Article 4 of Law Decree no. 70/2011, converted into Law no. 106/2011, which modified Article 122(7) of the Legislative Decree no. 163/2006 (the main source of public procurement regulation in the period analyzed in this paper).

mayor or municipal council member of the same municipality.⁶

3. Data and variables

The analysis relies on several sources of information. First, we use a rich dataset, built and managed by Telemat, containing data on all public works contracts tendered by Italian municipalities in the period 2009-2013.⁷ It contains information on main tender characteristics: the name of procuring municipality/agency, the type of works procured, the tender date, the tender object and the estimated base price. Moreover, the dataset contains information on tender outcomes, i.e., the name of the firm to which the contract is awarded (henceforth “the winner”), its address and the winning rebate. In addition, we retrieve information on non-winning participants from non-digitized documentation provided by Telemat. We complement these data with information on public works’ execution stage, provided by the Italian Anti-corruption Authority (ANAC).

Second, we obtain information on firm characteristics from two databases provided by, respectively, the Cerved Group and the Italian Chambers of Commerce. The former is the Company Accounts Data System (CADS) and contains identity details (name, sector of activity and location of headquarters) as well as information from balance sheets and income statements of Italian limited-liability companies. Around 940,000 firms are recorded, on average, in each year of the period under analysis. The second database (Infocamere) lists the identity of firms’ administrators and shareholders (up to the fourth tier of ownership). Around 2,450,000 distinct individuals are identified as administrators and 6,230,000 as shareholders for the entire 2009-2013 period.

Finally, information on local politicians comes from the Registry of Local Administrators managed by the Italian Ministry of the Interior. It covers between 115,000 and 135,000 individuals per year, holding any municipal office, both elected (mayors and *consiglieri*, i.e. members of the municipal council) and appointed (*assessori*, i.e. members of the executive committee).

Our dataset is built by combining information from these sources. First, we merge information on the identity of firms’ administrators and shareholders with that on the identity

⁶ See Article 63(2) of the Legislative Decree no. 267/2000.

⁷ The period of the analysis is restricted to these dates in order to avoid possibly confounding effects due to other legislative changes prior to 2009 and after 2013.

of local politicians. This allows us to construct a year-specific measure of each firm's political connections, defined as follows: for each firm i and each year t , we say that i is politically connected at t if at least one of the administrators or shareholders of i is recorded as a local politician in year t or in any year prior to t .⁸

In our main analysis, we consider tenders with base price between €200,000 and €800,000 and whose winner can be identified on the basis of the winner's name or through the identification code. The former restriction is implemented in order to obtain a symmetric interval around the €500,000 threshold affected by the reform. The resulting sample contains 9,079 tender procedures. We then associate each procedure with the information on winning firms, including their political connections and other firm-level variables.

Table 1 shows the main descriptive statistics for all variables included in the empirical analysis. Overall, there is a marked increase in the share of negotiated procedures above the €500,000 threshold. About 8% of winners are politically connected in the year the contract is awarded to them; the fraction of connected winner increases after the reform, primarily among tenders above the threshold. In contrast, firms' labor productivity (and total factor productivity) decrease above the threshold (against an increase below the threshold).

[Table 1]

4. Empirical Strategy

We analyze whether and how the reform extending the scope of bureaucrat discretion affects the characteristics of the winning firm and other procurement outcomes. In our empirical analysis we run tender-level regressions using information on public works procured by Italian municipalities in the period 2009-2013. As explained in Section 3, for each tender we observe, among other variables, the characteristics of the contract and of the winning firm (our dependent variables), the base price (to distinguish between tenders affected and unaffected by the reform) and the date of the tender (to distinguish between the periods before and after the reform). We use a DID estimation to compare the change in the outcome variable for tenders above and below the threshold of €500,000, before and after the reform of 2011. Formally, we estimate the following model:

⁸ We use other indicators of political connectedness for robustness analyses in this paper.

$$Y_{imt} = \alpha + \beta_A ABOVE_i + \beta_P POST_t + \gamma ABOVE_i \times POST_t + \delta' X_{imt} + \varepsilon_{imt}$$

where Y_{imt} is the outcome variable for procedure i in municipality m at time t ; $ABOVE_i$ is an indicator for procedures with a base price above €500,000; $POST_t$ is an indicator for procedures executed after the introduction of the reform; $ABOVE_i \times POST_t$ is the interaction between the two indicators. The coefficient of interest is γ . We augment the specification with a broad set of controls (X_{imt}) that include indicators for the type of works, the object of the contract, a flexible control function in the base price (fourth-degree polynomial), predetermined winning firm characteristics and the main socio-demographic characteristics of the municipality. We also include sector-specific and province-specific non-parametric time trends to capture, respectively, sector-specific shocks and the local economic cycle.

In our setting, a regression discontinuity design would seem feasible (as in, e.g., Spagnolo, 2012; Coviello and Mariniello, 2014; Coviello et al., 2017). However, the existence of a treatment being a discontinuous function of an assignment variable is not sufficient to justify the validity of a RDD. In our setting, RDD can be invalid if public officials strategically manipulate the base price of the procedure in order to gain (unobserved) benefits. Indeed, in Section 5 we show evidence of strategic behavior of the municipality in setting the base prices. This factor and the limited sample size (observations above and below the cut-off are sparse) prevent us from using a RDD in favor of a DID strategy.

5. Results

We discuss our results in several steps, as follows. First, we examine the impact of discretion on the procedure characteristics such as the use of negotiated procedures and the base price (Section 5.1). Second, we analyze the effects on the characteristics of the winning firm, namely its political connections and (ex-ante) labor productivity, and present a sensitivity analysis (Section 5.2). The following section tries to disentangle whether our results are driven by a variation in the selection of tender participants or by the screening process among the pool of participants (Section 5.3). We then examine the heterogeneous effects of discretion across municipalities characterized by different corruption prevalence and by different levels of competence of local politicians and public officials (Section 5.4).

Finally, we examine whether increased discretion affects variables directly related to the functioning of public administrations (Section 5.5).

5.1 Use of discretionary procedures

Panel A in Table 2 shows the results of DID regressions with an indicator for procedures awarded using the negotiated procedure as dependent variable. The estimates show that the reform led to a 16 percentage points increase in the use of negotiated procedures. The coefficient is statistically significant and highly stable across specifications, starting with the most parsimonious one in column 1 to the most stringent one in column 5.

[Table 2]

Figure A.1 in the Appendix investigates whether bureaucrats strategically respond to the discontinuous change in procedural costs across the threshold. Specifically, we plot the empirical distribution of the base price of public works tendered before and after the reform, with contracts grouped into 300 bins for each period. There is an evident spike below the €500,000 threshold in both periods, though it is substantially larger in the pre-reform period. This reveals that municipalities strategically manipulate the base price so that it falls below the relevant threshold. In the pre-reform period this presumably is due to bureaucrats' reluctance to use less discretionary open procedures, while in the post-reform period such behavior may be driven by lower administrative costs of (and, possibly, marginally higher discretion in) administering negotiated procedures with five suppliers rather than ten (see Section 2). As discussed in Section 4, this empirical feature of the data may pose serious threats to RDD methods and, hence, we base our analysis on DID estimations. Moreover, in Section 5.2 we check that our results are robust to tackling issues related to strategic manipulation of the base price around the threshold.

5.2 Supplier selection

We now examine the impact of the reform on supplier selection. First, we study whether and to what extent discretion is associated to tender contracts awarded to politically connected

firms. The dependent variable in Panel B of Table 2 is our measure of political connection (see Section 3), i.e. an indicator for whether any of the winning firm's current administrators/shareholders ever held a political office. The point estimates are positive, significant and highly stable across different specifications: they suggest that the reform leads to a 3.6 percentage points increase in the presence of politically connected firms among the winners of tender contracts. This is a sizeable effect, amounting to a roughly 45% increase with respect to the sample mean.

Second, we examine the effects of the reform on the (ex-ante) productivity of winning firms (Table 2, panel C). The dependent variable is the firm's value added over its wage bill, measured in the year prior to the tender. Negative, statistically significant and stable point estimates imply that increasing bureaucrat discretion leads to awarding tender contracts to firms with lower labor productivity. The magnitude of such decrease accounts for around 9% of the dependent variable's sample mean.

Overall, this evidence is consistent with patterns of inefficient favoritism: broader discretion in the hands of the public administrations does not only increase the share of tender contracts awarded to politically connected firms, but also induces allocative inefficiencies, as public resources flow to less productive firms.

Our results are not sensitive to using alternative definitions for the main outcomes of interest (see Table A.1 in the Appendix). In particular, we use a variable capturing localism of the winning firm (i.e. an indicator for the winning firm being located in the same province of the tendering municipality, as in Coviello et al., 2017) in column 1.⁹ The results reveal a positive and significant effect of discretion, which is line with the previous literature. Importantly, the size of the effect is substantially smaller compared to the sample mean, suggesting that localism may only capture one of a broader set of characteristics shared by politically connected firms. Next, in column 2 we use an alternative definition of political connections that allows for longer-lasting business-politics relationships: we include in the connected firms' group also these firms that had politicians on the board or among shareholders in the past. The results are virtually unchanged. We further distinguish between politically aligned connections (i.e., those sharing the same political leaning as the local government) and those who are not, respectively, in columns 3 and 4. As expected, the increase of the share winning firms with political connections is largely driven by political

⁹ In the subsequent analysis we only show estimates from the most stringent regression specification, analogous to the one in column 5 of Table 2 (unless differently specified).

connections characterized by ideological proximity. Finally, to corroborate our evidence on lower productivity, we use a measure of total factor productivity, in lieu of labor productivity, in column 5: the results are qualitatively similar to those of panel C in Table 2.

As discussed in Section 5.1, there is evidence that public administrations strategically alter the base price of the tender contract in order to fall below the €500,000 threshold. We verify that our results are unaffected by base price manipulation. Similarly to the *donut RDD* approach (Barreca et al., 2011), we repeat our analyses excluding observations close to the threshold that are potentially subject to manipulation and replicate regressions for our main dependent variables (Table 6). For easier comparison, column 1 is analogous to column 5 of Tables 3 and 4, respectively, for the variables measuring political connection and labor productivity. Columns 2-5 replicate the same regression specification in samples which exclude observations within the symmetric interval around the threshold ranging from $\pm\text{€}10,000$ to $\pm\text{€}25,000$. The coefficient estimates are fairly unchanged with respect to the baseline. This suggests that the manipulation is not specifically related to qualitative characteristics of the winning suppliers and is more likely to reflect administrative reasons such as the preference of procuring agencies to use less complex and costly procedures.

5.3 Selection vs. screening of participants

What is the mechanism behind the observed results? On the one hand, they may be driven by changes in the number and in the composition of tender participants, if bureaucrats use their discretion to invite more politically connected or less productive firms to tender for public works contracts (*selection of participants*). On the other hand, keeping the pool of participants unchanged, a more discretionary regime allows bureaucrats to pick the “desired” winner more easily. In this case, discretion would be used to manipulate competition among tendering firms, to the advantage of politically connected and/or less productive firms (*screening of participants*). We attempt to distinguish between the two mechanisms by analyzing data on all bidding firms.

We exploit documentation on tender awarding to build a novel dataset on the number of tender participants and their identities. Tender award documents are available in PDF format for most completed tenders. The documentation includes information on the winning firm and, possibly, on participating firms as well. We use text analysis tools to search for and

extract fiscal codes of tender participants, which then are used to merge firm-level information. The participant-level dataset covers 3,750 tenders. These unique data allow us to study both quantitative and qualitative effects of the reform on firms competing for procurement.

In column 1 of Table 3, we examine the effects of the reform on the total number of bidders. The coefficient is negative and statistically significant. This implies that the number of participants significantly decreases due to the reform, in line with the idea that open auctions with no restrictions on participation lead to more competitive tendering than negotiated procedures.

[Table 3]

In the remainder of Table 3 we run firm-level regressions to examine the effects of the reform on the qualitative characteristics of participating and winning firms. The dependent variable in columns 2-4 is the indicator for politically connected winners, while in columns 5-7 the dependent variable is productivity of winning firms. We first examine the overall effect of the reform on the presence of politically connected firms among all tender participants (column 2). The point estimate is positive, yet it is only a quarter of the effect size estimated for winners in panel B of Table 2. We then investigate the effect separately for winning and non-winning participants. Column 3 replicates the same regression for tender participants which are awarded tender contracts. The point estimate confirms the effects documented in Section 5.2 and shows that we observe a significant and large positive effect on politically connected winners also in the sub-sample of tenders for which we have information on participating firms. Column 4 replicates such regression only for tender participants which are *not* awarded tender contracts. The effect of the reform on the presence of connected firms among non-winning firms is virtually null (and precisely estimated, as the standard error is the same as in column 2). A similar pattern is present for productivity measures. Therefore, discretion is associated to selection of more politically connected and less efficient firms from a smaller, but otherwise similar, pool of bidders, highlighting a specific distortion in the screening process.

5.4 Heterogeneity analysis

The documented effects of discretion on supplier characteristics may differ across procuring agencies. Indeed, as discussed earlier, the presence of discretion makes expertise, competence and integrity of the local administration more salient for procurement performance. To study the presence of heterogeneous effects of the reform, in Table 4 we repeat our main empirical exercise splitting the data into subsamples according to characteristics of the local administrations.

[Table 4]

In Panel A, we split the sample according to a composite indicator of corruption developed by Mocetti and Orlando (2017) based on the number of reported crimes against the public administration, on citizens' trust in local public institutions and perceptions of administrations' integrity. We then classify as 'high corruption' ('low corruption') those procedures that are tendered in municipalities whose value of the corruption indicator is above (below) the median. Interestingly, we find that discretion is associated with tender contracts being awarded to politically connected and less productive firms mostly in areas with widespread corruption.

Panels B and C examine heterogeneous effects along individual characteristics of local politicians and local public officials, respectively. In particular, we focus on their education level as a proxy of human capital and competence (e.g., on Italian local politicians see Galasso and Nannicini, 2011). We split the sample into two groups depending on whether the average quality of the local government of the local administration employees is above or below the median. In both cases, we find that discretion is more strongly associated with political favoritism and less efficient choice of the winning firm in municipalities where politicians and/or public officials are less competent.

Finally, in panel D we distinguish between tenders administered by municipalities of different size. The underlying idea is that only larger cities typically possess specialized administrative units devoted to public procurement purchases, which are arguably better equipped with appropriate qualifications and expertise to efficiently manage such procedures. To capture this idea we consider large (small) cities those with more (less) than 50,000

residents. The fact that the negative effects of discretion are concentrated in smaller municipalities indeed confirms the idea that competence is crucial in allowing a beneficial use of discretionary powers.

5.5 Procurement costs and reporting transparency

Although we document adverse discretion effects on supplier selection, it may be the case that public administrations – and the public opinion – are mostly concerned with final procurement outcomes, such as the prices paid for public works and their quality. In addition to other procurement variables used in our analysis, our data contains information on *price rebates*, measured as the relative difference between the base price and the award price, and *cost overruns*, measured as the relative difference between the award price and the final total cost of the public work at completion. We use these variables as outcomes in our regression analysis, to assess whether bureaucrat discretion affects tender prices and possibly extra-costs in charge of the local administration.

Panel A of Table 5 shows that the impact on price rebates is virtually zero. However, these results are difficult to interpret as price reductions might be either good for the public administration – whenever this corresponds to more favorable price conditions – or bad – whenever this induces subsequent price renegotiations (Bajari and Tadelis, 2001; Guasch et al., 2008; Decarolis and Palumbo, 2015).

We then examine the effect on final costs paid for public works projects. We point out that this information is available only for 42% of the tenders, as numerous administrations appear not to comply with the reporting requirements for such data. To directly study this severe sample selection, we define an indicator variable that is equal to 1 if information on the execution stage is available and we label it as *Transparency*. Interestingly, we find that the proportion of contracts for which public administrations report the data on the execution stages decreases significantly in reaction to the 2011 reform (Panel B). This impact is substantial from an economic point of view, as it corresponds to a decrease of nearly 7 percentage points (one sixth of the sample mean). Therefore, expanding bureaucrat discretion seemingly leads to a larger amount of information being withheld by public administrations. Although it is impossible to observe whether information on favorable or negative procurement outcomes is not being reported, this evidence at the very least hints at a decrease

in compliance and transparency due to higher discretion. Finally, we study the presence of cost overruns and, not surprisingly, find no significant effect on monetary renegotiations (Panel C). We, however, abstain from the interpretation of such results as they are directly affected by a sample selection bias due to the limited availability of the dependent variable. At most, these findings indicate that favorable price effects do not compensate for poorer supplier selection resulting from higher bureaucrat discretion.

[Table 5]

6. Conclusions

What are the effects of discretion on supplier selection in public procurement? Using Italian data on municipal public works in the period 2009-2013, we study how a reform extending the scope of bureaucrat discretion affects the characteristics of winning firms. We find that the share of contracts awarded to politically connected firms increases, while the (ex-ante) labor productivity of the winning firm decreases, thus suggesting a potential misallocation of public resources.

To illustrate the active mechanisms, we construct a novel dataset on tender participants and innovate upon the existing literature by showing direct evidence on the entry stage of public tenders. We document that the pool of participant firms is smaller when discretion is higher, but remains unchanged in terms of firms' observable characteristics. Interestingly, effects on political connections and productivity are pronounced only among tender winners. This evidence highlights differential effects discretion may have on the separate stages of supplier selection.

Regulators often argue that agency costs of discretion may be alleviated through transparency, accountability and monitoring (e.g., OECD, 2016). The heterogeneity analysis uncovers evidence in support of this policy stance, showing that the adverse effects are concentrated among municipalities characterized by less competent politicians and bureaucrats, and higher levels of corruption. Last but not least, the analysis of execution outcomes further highlights the importance of transparency and accountability in the functioning of public administrations.

Taken together, the evidence we present highlights potential risks implied by expanding

bureaucrats' discretionary powers in awarding public contracts. First, regulators aiming for efficient allocation of public resources should carefully assess the multifaceted effects of discretion, considering not just the direct effects on public procurement outcomes, but also the implied effects on the related sectors and their productivity. Second, the results on political connections indicate the presence of tangible benefits for politically connected firms, and thus might be useful for refining the regulation on conflict of interests in public procurement. Third, delegation of decision making to local administration should be subject to appropriate checks and balances. These may, for example, include prerequisites in terms of competence and integrity for public administrations or transparency requirements to facilitate accountability to the regulator and the local community.

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Tables and figures

Table 1: Descriptive statistics

	All procedures		Pre-reform, below €500k		Post-reform, below €500k		Pre-reform, above €500k		Post-reform, above €500k	
	Mean	Obs.	Mean	Obs.	Mean	Obs.	Mean	Obs.	Mean	Obs.
Base price (100k €)	4.07	9,079	3.22	3,375	3.22	2,995	6.38	1,369	6.38	968
Negotiated procedure	0.24	9,079	0.24	3,375	0.33	2,995	0.01	1,369	0.25	968
Connected winner	0.08	7,651	0.08	2,825	0.09	2,500	0.07	1,159	0.11	844
Generalized connection	0.09	7,651	0.09	2,825	0.10	2,500	0.07	1,159	0.12	844
Productivity	1.50	7,352	1.47	2,684	1.55	2,449	1.51	1,097	1.50	816
TFP	0.47	7,034	0.46	2,548	0.48	2,351	0.48	1,054	0.44	784
Local winner	0.51	8,321	0.53	3,068	0.53	2,743	0.43	1,261	0.47	908
No. participants	41.98	3,750	36.62	1,381	34.36	1,298	65.43	510	50.85	395
Price rebate	0.22	7,409	0.21	2,912	0.23	2,410	0.22	1,073	0.24	707
Transparency	0.42	9,079	0.43	3,375	0.42	2,995	0.44	1,369	0.37	968
Cost overruns	0.05	3,739	0.07	1,404	0.05	1,230	0.05	594	0.05	350

Notes. For each variable, we report the mean and the number of available observations over all procedures (columns 1 and 2); over procedures with base price smaller than €500,000, occurring before the reform (columns 3 and 4) and after the reform (columns 5 and 6); and over procedures with base price larger than €500,000 occurring before the reform (columns 7 and 8) and after the reform (columns 8 and 9). The unit of observation is procurement procedure. *Base price (100k€)* is the tender's base price. *Negotiated procedure* is a binary indicator for negotiated procedures. *Connected winner* is an indicator for whether the winning firm is politically connected through a current administrator /shareholder. *Generalized connection* is an indicator for whether the winning firm is politically connected through a current or past administrator /shareholder. *Productivity* is a measure of labor productivity, measured as the ratio between the winning firm's value added and labor costs in the year prior to the procedure. *TFP* is a measure of total factor productivity, computed as $TFP = \log(\text{value added}) - 0.7 \log(\text{labor costs}) - 0.3 \log(\text{capital stock})$. *Local winner* is an indicator for whether the winning firm's seat lies in the same province as the tendering municipality. *No. participants* is the number of bidders. *Price rebate* is the (absolute value) of the relative price change between the procedure's base price and the award price. *Transparency* is an indicator for whether information concerning the execution stage of the procedure was made available by the tendering municipality. *Cost overruns* is the relative variation between the final price paid by the administration and the award price.

Table 2: Main results

Panel A: Discretion					
Dependent variable:	Negotiated procedure				
	(1)	(2)	(3)	(4)	(5)
Post × Above	0.166*** (0.023)	0.165*** (0.023)	0.157*** (0.024)	0.156*** (0.024)	0.156*** (0.024)
Observations	7,256	7,256	7,236	7,236	7,234
Adj. R-squared	0.29	0.30	0.34	0.34	0.34
Panel B: Political Connections					
Dependent variable:	Winning firm with political connection				
	(1)	(2)	(3)	(4)	(5)
Post × Above	0.036** (0.015)	0.033** (0.015)	0.036** (0.015)	0.038** (0.016)	0.036** (0.015)
Observations	7,164	7,164	7,144	7,144	7,142
Adj. R-squared	0.03	0.03	0.05	0.05	0.05
Panel C: Productivity					
Dependent variable:	Ratio between value added and labor costs				
	(1)	(2)	(3)	(4)	(5)
Post × Above	-0.111** (0.054)	-0.114** (0.054)	-0.134** (0.055)	-0.138** (0.054)	-0.140*** (0.054)
Observations	6,885	6,885	6,867	6,866	6,864
Adj. R-squared	0.02	0.02	0.02	0.02	0.02
Tender controls	X	X	X	X	X
Year FE	X	X	X	X	X
Province FE	X	X	X	X	X
Firm controls		X	X	X	X
Year FE × Province FE			X	X	X
Year FE × Sector FE				X	X
Municipal controls					X

Notes. The dependent variable is an indicator for negotiated procedures, in Panel A; an indicator for whether the winning firm is politically connected through a current administrator/shareholder, in Panel B; the winning firm's labor productivity, measured as the ratio between the winning firm's value added and total labor costs in the year prior to the procedure, in Panel C. The unit of observation is procurement procedure. *Post* is an indicator for procedures taking place after the reform. *Above* is an indicator for procedures with base price above €500,000. *Tender controls* include a vector of indicators for the category of public works and a 4th-degree polynomial in base price. *Firm controls* refer to the winning firm and include a sector indicator (Ateco 2-digit classification, also denoted as *Sector FE*) and a set of legal form indicators, distinguishing limited-liability firms, joint stock companies and a residual category. *Municipal controls* include population, altitude, average per capita income and share of inhabitants holding a college degree. Standard errors are clustered at the municipality level (* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$).

Table 3: Entry

Dependent variable:	No. bidders	Connected firms			Productivity		
		All	Winners	Non-winners	All	Winners	Non-winners
Post × Above	−13.462** (6.691)	0.010* (0.005)	0.078*** (0.024)	0.003 (0.006)	−0.050 (0.039)	−0.179* (0.104)	−0.034 (0.043)
Tender controls	X	X	X	X	X	X	X
Firm controls	X	X	X	X	X	X	X
Year FE × Province FE	X	X	X	X	X	X	X
Year FE × Sector FE	X	X	X	X	X	X	X
Municipal controls	X	X	X	X	X	X	X
Observations	3,073	38,224	3,007	35,121	36,616	2,925	33,589
Adj. R-squared	0.35	0.02	0.03	0.02	0.02	0.01	0.03

Notes. The dependent variable is the number of bidding firms, in column 1; an indicator for whether the winning firm is politically connected through a current administrator/shareholder, in columns 2-4; and labor productivity, measured as the ratio between the winning firm's value added and labor costs in the year prior to the procedure, in columns 5-7. The unit of observation is procurement procedure in column 1 and participant firm in columns 2-7. *Post* is an indicator for procedures taking place after the reform. *Above* is an indicator for procedures with base price above €500,000. *Tender controls* include a vector of indicators for the category of public works and a 4th-degree polynomial in base price. *Firm controls* refer to the winning firm and include a sector indicator (Ateco 2-digit classification, also denoted as *Sector FE*) and a set of legal form indicators, distinguishing limited-liability firms, joint stock companies and a residual category. *Municipal controls* include population, altitude, average per capita income and share of inhabitants holding a college degree. Standard errors are clustered at the municipality level (* $p < 0.1$, ** $p < 0.5$, *** $p < 0.01$).

Table 4: Heterogeneity

Dependent variable:	Connected winner		Productivity	
Panel A: Corruption	Low	High	Low	High
Post \times Above	0.032 (0.024)	0.043** (0.020)	-0.070 (0.056)	-0.210** (0.092)
Observations	3,647	3,457	3,561	3,263
Adj. R-squared	0.07	0.01	0.07	0.01
Panel B: Politicians' human capital	Low	High	Low	High
Post \times Above	0.052** (0.023)	0.025 (0.023)	-0.201** (0.080)	-0.114 (0.087)
Observations	3,452	3,545	3,301	3,417
Adj. R-squared	0.03	0.08	0.01	0.03
Panel C: Bureaucrats' human capital	Low	High	Low	High
Post \times Above	0.041* (0.022)	0.032 (0.024)	-0.184** (0.087)	-0.056 (0.089)
Observations	3,276	3,342	3,106	3,226
Adj. R-squared	0.04	0.05	0.01	0.05
Panel D: Municipality size	Small	Large	Small	Large
Post \times Above	0.039** (0.020)	0.024 (0.031)	-0.164** (0.067)	-0.126 (0.125)
Observations	4,981	2,065	4,779	1,979
Adj. R-squared	0.05	0.06	0.03	0.00
Procuring ag. FE	X	X	X	X
Firm controls	X	X	X	X
Pol. base price	X	X	X	X
Year FE \times Province FE	X	X	X	X
Year FE \times Sector FE	X	X	X	X
Municipal controls	X	X	X	X

Notes. The dependent variable is an indicator for politically connected firms in columns 1-2 and labor productivity (measured as the ratio between the winning firm's value added and labor costs in the year prior to the procedure) in columns 3-4. The unit of observation is procurement procedure. Panels A-C split the sample according to whether the tendering municipality lies above or below the median in terms of, respectively, a composite indicator of corruption-related crimes (Panel A); the ratio of local politicians holding at least a college degree (Panel B); the ratio of public employees holding at least a college degree (Panel C). Panel D splits the sample according to whether the tendering municipality has fewer or more than 50,000 inhabitants. *Post* is a dummy variable indicating whether the procedure took place after the reform. *Above* is a dummy variable indicating whether the base price exceeds Eur 500,000. *Tender controls* include a vector of indicators for the category of public works and a 4th-degree polynomial in base price. *Firm controls* refer to the winning firm and include a sector indicator (Ateco 2-digit classification, also denoted as *Sector FE*) and a set of legal form indicator, distinguishing limited-liability firms, joint stock companies and a residual category. *Municipal controls* include population, altitude, average per capita income and share of inhabitants holding a college degree. Standard errors are clustered at the municipality level (* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$).

Table 5: Procurement costs

Panel A					
Dependent variable:	Price rebate				
	(1)	(2)	(3)	(4)	(5)
Post × Above	−0.008 (0.007)	−0.007 (0.007)	−0.009 (0.007)	−0.010 (0.007)	−0.008 (0.007)
Observations	5,546	5,546	5,497	5,495	5,492
Adj. R-squared	0.18	0.18	0.21	0.21	0.23
Panel B					
Dependent variable:	Transparency				
	(1)	(2)	(3)	(4)	(5)
Post × Above	−0.048* (0.026)	−0.047* (0.028)	−0.063** (0.028)	−0.065** (0.028)	−0.066** (0.028)
Observations	8,535	7,256	7,236	7,236	7,234
Adj. R-squared	0.10	0.12	0.14	0.14	0.14
Panel C					
Dependent variable:	Cost overruns				
	(1)	(2)	(3)	(4)	(5)
Post × Above	0.022 (0.021)	0.016 (0.023)	0.009 (0.022)	0.011 (0.022)	0.011 (0.021)
Observations	3,551	2,907	2,816	2,807	2,806
Adj. R-squared	0.15	0.15	0.21	0.21	0.21
Tender controls	X	X	X	X	X
Year FE	X	X	X	X	X
Province FE	X	X	X	X	X
Firm controls		X	X	X	X
Year FE × Province FE			X	X	X
Year FE × Sector FE				X	X
Municipal controls					X

Notes. The dependent variable is the price rebate, measured as the difference between the base price and the award price (normalized by the base price), in Panel A; an indicator for tenders with information on the execution of the public work, in Panel B; and the cost overrun, measured as the difference between the award price and the final cost of the public work (normalized by the award price). The unit of observation is procurement procedure. *Post* is an indicator for procedures taking place after the reform. *Above* is an indicator for procedures with base price above €500,000. *Tender controls* include a vector of indicators for the category of public works and a 4th-degree polynomial in base price. *Firm controls* refer to the winning firm and include a sector indicator (Ateco 2-digit classification, also denoted as *Sector FE*) and a set of legal form indicators, distinguishing limited-liability firms, joint stock companies and a residual category. *Municipal controls* include population, altitude, average per capita income and share of inhabitants holding a college degree. Standard errors are clustered at the municipality level (* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$).

Appendix

Table A1: Robustness analyses

Dependent variable:	Local winner	Generalized connection	Political leaning		TFP
			Same political area	Different political area	
	(1)	(2)	(3)	(4)	(5)
Post × Above	0.056** (0.028)	0.035** (0.016)	0.023** (0.011)	0.016 (0.011)	−0.063** (0.028)
Tender controls	X	X	X	X	X
Year FE	X	X	X	X	X
Province FE	X	X	X	X	X
Firm controls	X	X	X	X	X
Year FE × Province FE	X	X	X	X	X
Year FE × Sector FE	X	X	X	X	X
Municipal controls	X	X	X	X	X
Observations	6,647	7,142	7,099	7,099	6,557
Adj. R-squared	0.16	0.06	0.04	0.05	0.04

Notes. The dependent variables are: an indicator for whether the winning firm’s seat lies in the same province as the tendering municipality (column 1); an indicator for whether the winning firm is politically connected through a current or past administrator/shareholder (column 2); an indicator for whether the winning firm is politically connected through a current administrator/shareholder and (at least one) such person and the tendering administration belong to the same political area (column 3; the political areas considered are: left, right, center, Movimento 5 Stelle and *lista civica*) or, contrariwise, whether the firm is politically connected but no connecting individual belongs to the same political area as the tendering administration’s (column 4); a measure of total factor productivity, computed as $TFP = \log(\text{value added}) - 0.7 \log(\text{labor costs}) - 0.3 \log(\text{capital stock})$ (column 5). The unit of observation is procurement procedure. *Post* is an indicator for procedures taking place after the reform. *Above* is an indicator for procedures with base price above €500,000. *Tender controls* include a vector of indicators for the category of public works and a 4th-degree polynomial in base price. *Firm controls* refer to the winning firm and include a sector indicator (Ateco 2-digit classification, also denoted as *Sector FE*) and a set of legal form indicators, distinguishing limited-liability firms, joint stock companies and a residual category. *Municipal controls* include population, altitude, average per capita income and share of inhabitants holding a college degree. Standard errors are clustered at the municipality level (* $p < 0.1$, ** $p < 0.5$, *** $p < 0.01$).

Table A2: *Donut* difference-in-differences estimations

Panel A					
Dependent variable:	Connected winner				
Size of <i>donut</i>	0	+/- 10k	+/- 15k	+/- 20k	+/- 25k
Post × Above	0.036** (0.015)	0.040** (0.016)	0.041*** (0.016)	0.041** (0.016)	0.038** (0.016)
Observations	7,142	6,840	6,769	6,685	6,612
Adj. R-squared	0.05	0.05	0.05	0.05	0.05
Panel B					
Dependent variable:	Productivity				
Size of <i>donut</i>	0	+/- 10k	+/- 15k	+/- 20k	+/- 25k
Post × Above	-0.140*** (0.054)	-0.136** (0.057)	-0.132** (0.058)	-0.133** (0.057)	-0.134** (0.058)
Observations	6,864	6,573	6,505	6,423	6,354
Adj. R-squared	0.02	0.02	0.02	0.02	0.02
Tender controls	X	X	X	X	X
Firms controls	X	X	X	X	X
Year FE × Province FE	X	X	X	X	X
Year FE × Sector FE	X	X	X	X	X
Municipal controls	X	X	X	X	X

Notes. In Panel A, the dependent variable is an indicator for whether the winning firm is politically connected through a current administrator/shareholder. In Panel B, the dependent variable is labor productivity, measured as the ratio between the winning firm's value added and labor costs in the year prior to the procedure. Columns 1-5 report the result of an analysis which is analogous to that in column 5 of Table 3 (Panel A) and 4 (Panel B), with the exception that all observations whose base price lies in a neighborhood of the €500,000 threshold, of the size indicated above each columns, are dropped. The unit of observation is procurement procedure. *Post* is an indicator for procedures taking place after the reform. *Above* is an indicator for procedures with base price above €500,000. *Tender controls* include a vector of indicators for the category of public works and a 4th-degree polynomial in base price. *Firm controls* refer to the winning firm and include a sector indicator (Ateco 2-digit classification, also denoted as *Sector FE*) and a set of legal form indicators, distinguishing limited-liability firms, joint stock companies and a residual category. *Municipal controls* include population, altitude, average per capita income and share of inhabitants holding a college degree. Standard errors are clustered at the municipality level (* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$).

Figure A1: Contract density

