ISSN 2042-2695

CENTRE *for* ECONOMIC PERFORMANCE

CEP Discussion Paper No 1427

April 2016

The Effect of Discretion on Procurement Performance

Decio Coviello
Andrea Guglielmo
Giancarlo Spagnolo

LSE THE LONDON SCHOOL OF ECONOMICS AND POLITICAL SCIENCE

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

Abstract
We run a regression discontinuity design analysis to document the causal effect of increasing buyers' discretion on procurement outcomes in a large database for public works in Italy. Works with a value above a given threshold have to be awarded through an open auction. Works below this threshold can be more easily awarded through a restricted auction, where the buyer has some discretion in terms of who (not) to invite to bid. Our main result is that discretion increases the probability that the same firm wins repeatedly, and it does not deteriorate (and may improve) the procurement outcomes we observe. The effects of discretion persist when we repeat the analysis controlling for the geographical location, corruption, social capital and judicial efficiency in the region of the public buyers running the auctions.

Keywords: Procurement, restricted auctions, regression discontinuity, regulatory discretion
JEL Classifications: D02; D44; C31; L11

This paper was produced as part of the Centre's Growth Programme. The Centre for Economic Performance is financed by the Economic and Social Research Council.

Acknowledgements
We are grateful to the Editor John List, the Associate Editor and three anonymous referees for their helpful comments and suggestions. We owe special thanks to Paola Valbonesi and Luigi Moretti for sharing the data with us. We are grateful for the helpful comments from Francesco Decarolis, Florian Englmaier, Amith Gandhi, Jesse Gregory, Ken Hendricks, Ramus Lentz, Alan Sorensen, Chris Taber and participants at many conferences and seminars. This paper was previously circulated under the title "Open vs Restricted Auctions in Public Procurement: a Regression Discontinuity Approach". Giancarlo Spagnolo thanks the Swedish Research Council for financial support.

Decio Coviello, HEC Montréal and Centre for Economic Performance, London School of Economics. Andrea Guglielmo, University of Wisconsin – Madison. Giancarlo Spagnolo, Tor Vergata, SITE, EIEF and CEPR.

Published by
Centre for Economic Performance
London School of Economics and Political Science
Houghton Street
London WC2A 2AE

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system or transmitted in any form or by any means without the prior permission in writing of the publisher nor be issued to the public or circulated in any form other than that in which it is published.

Requests for permission to reproduce any article or part of the Working Paper should be sent to the editor at the above address.

© D. Coviello, A. Guglielmo and G. Spagnolo, submitted 2016.

1 Introduction

In this paper we use a regression discontinuity design to document the effect of government discretion on public goods provision.[1] We analyze a large database for public procurement works in Italy to estimate the causal effect of increased buyer discretion – measured in terms of ability to discretionally exclude some bidders by using restricted auctions where only invited bidders can bid – on both *ex ante* procurement outcomes (number of bidders, winning rebates, and type of winners) and *ex post* performance measures (completion time, delays in delivery, cost overrun).

The benefits from open, competitive auctions have been widely documented by economists with respect to a number of different markets. When we talk about government procurement, however, the praise for open, transparent auctions goes well beyond their effects on competitive outcomes. Administrative science and law scholars regarded open competition as a crucial "preventive tool" to ensure public sector accountability long before Vickrey's famous contribution. Open auctions with transparent rules are seen as a powerful tool to limit government discretion and its abuse. The several independent stakeholders they generate – competitors – should have the information, ability and incentives to act as effective watchdogs against favoritism and corruption (when they do not collude). Hence, the administrative rules of many countries and the recommendations of international organizations (such as the UN and the World Bank) prescribe whenever possible the use of open, transparent auctions.

Open auctions, however, are typically more complex and costly to organize than less transparent procurement processes. Therefore, the prescription is often tighter when the amount at stake, and thus the temptation to bribe, is larger. In most countries and organizations (and even in some large firms, which are not immune from accountability problems), there are "thresholds" for the value of the transaction above which the discretion of the buyer in charge is limited by the obligation to use open competitive procedures. The US Federal Acquisition Regulation (FAR), for example, has the "simplified acquisition threshold" set at a contract value of $150,000. Below this value threshold, several reporting

[1] Public sector procurement accounts for 15-20% of the GDP of OECD countries. An effective procurement policy is therefore essential to the delivery of works and the allocation of many goods and services. The question of how discretion affects organizations' performance, however, has an importance that goes well beyond the organization and the functioning of public procurement markets.

requirements do not apply, such as the Miller Act (requiring performance bonds). These thresholds may allow the identification of the causal effects of the variables that discretely change at the threshold on outcomes using a regression discontinuity design (henceforth RDD). It is a threshold of this type that we exploit to try to gauge the causal effect of buyer discretion on the procurement outcomes we are able to observe.

The empirical exercise we propose is particularly interesting when the object of the transaction is a procurement contract, that is, a promise. Recent research on transaction costs, contract theory and procurement has identified as many drawbacks as advantages of open auctions, particularly for complex transactions. Limits to contracting and enforcement linked to asymmetric information and transaction costs may lead open auctions to have rather negative effects on the procurement outcomes, if important quality dimensions are not sufficiently protected by the credible threat of a contractual remedy (Spulber, 1990; Manelli and Vincent, 1995). Discretion may then help, rather than harm, as it allows incomplete contracts to be complemented with dynamic informal governance mechanisms typical of the private sector, such as long-term relationships and reputation (Bannerjee and Duflo, 2000; Malcomson, 2013). Administrative rules that try to prevent corruption by limiting *ex ante* discretion may limit abuses but also make it difficult for honest and capable public managers to use these important mechanisms that, much the same as corruption, need a certain degree of discretion (Banfield, 1975).[2] Both the positive and negative effects of discretion are likely to be relevant to at least some degree, so the empirical question is which effect dominates in a given institutional environment.

Steven Kelman recognized these problems in his academic work (Kelman, 1990) and played a key role in reforming US procurement rules when serving as Administrator of the Office of Federal Procurement Policy during the first Clinton administration. The Federal Acquisition Streamlining Act of 1994 and the Federal Acquisition Reform Act of 1995 substantially increased flexibility and discretion in US procurement. Some legal

[2]Discretion also needs *ex post* performance monitoring to maintain accountability. Administrative systems that severely limit *ex ante* public servants' discretion at the selection stage often lead to neglect of *ex post* performance controls, relocating the accountability problem from the selection stage to the project execution one. A supplier planning to bribe a civil servant to allow for lower performance standards at the project execution stage can bid much more aggressively and "honestly" win the selection process in a transparent and well run open auction. Renegotiation and cost overrun are well known forms of this phenomenon (Guash, Laffont and Straub, 2008).

experts, however, are now arguing that this went too far, and that both accountability and performance have fallen in the US in recent years (e.g., Yukins, 2008), without, however, producing evidence in support of the claims. Analogous debates are taking place on the rigidity of EU Procurement Directives, which are strongly influenced by French civil law and are trying to coordinate procurement rules across European countries (e.g. Spagnolo, 2012). Some of these debates specifically focus on where to set the threshold above which EU rules should apply, and seem to be particularly heated in countries like Sweden, where public servants have traditionally enjoyed substantial discretion.

It is hard, therefore, to be in favor of or against these rules and thresholds without some robust empirical evidence on their effects. Surprisingly, these debates are typically based on back of the envelope calculations of the administrative costs of different procurement mechanisms, which even if correct, are likely to be negligible relative to the effects on procurement outcomes and on the accountability of the public sector. In Sweden, for example, a procurement inquiry by the government suggested increasing the threshold for direct (non-competitive) contract awards from about 300,000 SEK to 600,000 SEK. The Director of the Swedish Social Insurance Inspectorate presented a report arguing that this would reduce competition and increase costs for the public sector (see Molander 2014). The procurement inquiry contended that these effects would be overshadowed by reduced transaction costs and more flexibility, and that the report used a limited data set and was mostly based on rough approximations but did not present additional evidence in support of the proposal either.

In this paper we try to contribute to filling this knowledge gap by measuring as rigorously as we can the effects of the increased buyer discretion allowed below these thresholds on a set of public procurement outcomes. We exploit a threshold determined by the Italian procurement regulation, such that works with a value above the threshold have to be awarded through an open auction in almost all cases. Works below the threshold can more easily be run through a restricted auction, where the buyer has discretion in terms of who (not) to invite to bid.

Our identification strategy relies on the assumption that the value of the project (i.e., the auction starting value representing the reserve price for the public buyer running the auction) is not perfectly manipulated around the discontinuity threshold. We test this

assumption using graphical and statistical tests discussed by McCrary (2008) and Lee (2008), and focus on the sample of projects for construction works that do not show sorting around the threshold. In contrast, we drop from our sample road works where bunching around the threshold appears to be a problem.[3]

We further select our sample using the procedure suggested by Imbens and Kalyanaraman (2012). Specifically, we consider auctions with a project value within the interval around the discontinuity threshold selected with the optimal bandwidth method. In this quasi-experimental set-up, projects with a value within a small interval around the threshold are likely to be identical in terms of observable (e.g., entry-requirements) and unobservable (e.g., complexity) characteristics, and increased public buyer discretion is as if quasi-randomly assigned across treated and controls projects.

Our main result is that increased discretion (i.e., our treatment) causes a significant increase in the probability that the same firm is awarded a project repeatedly by the same public buyer. While this result – considered in isolation – could be interpreted in a variety of different ways (productive relationships, saving set-up costs, favoring "friends" or repeated exchanges with bribes), to our knowledge this is the first time that this causal effect is identified with some degree of precision and robustness.

To try to understand how to interpret this finding, we analyse the impact of discretion on other auction outcomes that we are able to observe in our dataset. In our main sample, we find that discretion has no effect on *ex ante* auction outcomes (number of bidders, rebates, size of the winners, distance of the winner from the public buyer) and on most of our *ex post* performance measures (i.e., duration of the works; monetary renegotiations). We find some evidence that discretion may increase delays in the delivery of the works, but this evidence turns out not to be robust. In a closer neighbourhood of the discontinuity threshold (i.e., a smaller sample), we find evidence that the positive effects of discretion may dominate the negative ones. Discretion appears to reduce the total duration of

[3] We discuss the importance of this assumption in Section 5. One possible explanation of the presence of sorting in this sub-sample can be attributed to the increased flexibility of contracting authorities in dividing the road in projects covering different length. We plan to study the reasons behind the observed sorting around the threshold and its effects on road work outcomes in a separate paper, as it requires somewhat different statistical methodologies and precise assumptions on the process of sorting around the threshold. A preliminary exploration in Konkurresverket (2015) suggests that - in the case of Italian roads - bunching below the threshold and the increased discretion it generates seem to be associated with somewhat better procurement outcomes.

the works; to lead to the selection of larger (incorporated) firms, which have typically better quality control systems; and to reduce the number of firms submitting bids, saving administrative costs associated to bid screening. Other outcomes, like the winning rebate, cost overrun and the probability that the project is awarded to a local firm, are not significantly affected by the degree of discretion.

Although the time it takes to deliver the works is a crucial quality dimension of the procurement process (Lewis and Bajari, 2011, 2014) our results should be considered with caution because, as in all other papers in this literature, there are other quality dimensions that we do not observe and cannot control for. A possible alternative explanation to our results is that discretion increases the number of repeated wins by incumbent contractors but reduces the unobserved quality of delivered works because of corrupt preferential relationships between public buyers and favored contractors. We explore this possibility by looking at two additional pieces of evidence. First, we repeat our RDD analysis controlling for geographical location, corruption, social capital and judicial efficiency in the region of the public buyers running the auctions. Our evidence suggests that the effects of discretion we identified are robust to the inclusion of these institutional factors as controls. Second, we explore the relationship between projects' past and future delays in delivery and winners' past and future incumbency. We run a propensity score matching analysis and find that contractors who have won in the past systematically deliver current works faster. In addition, contractors characterized by better past performance are more likely to win current auctions. These estimates are sizeable and statistically significant for contracts with a value below the 300,000 euro threshold, where the law allows public buyers to use discretion. These correlations suggest that positive productive relationships may dominate negative corrupt relationships in our sample.

A possible caveat in interpreting our results comes from the fact that the auction format used to allocate procurement contracts in our data is somewhat unconventional, as it has some "beauty contest" features whereby the highest bidder does not necessarily win. We use the theoretical predictions of Albano et al. (2006), Decarolis (2014), and Conley and Decarolis (2015), and the experimental evidence reported in Chang et al. (2015), to guide our empirical analysis. Specifically, their main results are consistent with the evidence in our data of a positive and significant relationship between the number of

bidders and the rebates submitted by these bidders. We also find a positive and significant relationship between the number of bidders and the winning rebate (the maximum rebate) in a small sub-sample of first-price auctions managed by the municipality and province of Turin from the 2003. In this sub-sample, we also replicate our RDD analysis and find qualitatively identical results, although these results are less precisely estimated given the smaller sample size.

We use our overall evidence to conclude that, in the environment we study, increased discretion raises the number of repeated wins by contractors, as in long term (collaborative or collusive) relationships, and need not result in worst public procurement outcomes, on average. Indeed, we have some evidence, albeit not robust, of a small positive overall effect of discretion on the procurement outcomes we observe. Taken together, these results can be coherently interpreted with the evidence in Bandiera et al. (2009) that, for public procurement of goods and services in Italy, corruption is not higher for public buyers with higher discretion, while the prices they pay are significantly lower than average. The results also seem consistent with Kelman (1990) and Banfield (1975) who argued early on that some discretion (coupled with *ex post* performance checks) is essential to good public management, even at the cost of a small loss in accountability.

The rest of the paper is organized as follows. In Section 2, we review the related literature. In Section 3 and 4, we describe the institutional framework and the data. In Section 5, we present the identification strategy. In Section 6 we present the empirical analysis and the main results, and then we assess the robustness of these results. In Section 7, we report additional results on the relationship between winners' incumbency and *ex post* performance. In Section 8, we conclude.

2 Related Literature

This paper directly contributes to the literature that studies the impact of competition and reputation in procurement with incomplete contracts. Previous theoretical papers have shown that – under the assumption that procurement contracts are incomplete – the results on the optimality of open auctions (e.g., Bulow and Klemperer, 1996, 2009) need not apply. Spulber (1990) shows that with incomplete contracting, competition spurs moral hazard and *ex post* opportunism of contractors in the construction industry. Manelli and Vincent

(1995) show that when the non-contractible quality dimensions of the procured good are the most important ones, open competitive auctions on contractible dimensions (e.g., price) are the worst among all of the conceivable allocation mechanisms. Bajari and Tadelis (2001) show that bilateral negotiations may be better than competition for highly complex projects; the more complex the project being procured is, the more costly completing the project is and the more valuable flexibility is. In a dynamic framework, auctions with a choice of participants depending on past performance may allow the buyer to take into account reputational forces and establish long-term relationships that may improve performance (Kim, 1998, Doni, 2006). With limited enforcement, Calzolari and Spagnolo (2009) show that restricted auctions might be the optimal procurement mechanism, even when the auctioneer can attribute bonuses to reward past performance. This literature concludes that it is plausible that when contracts are incomplete, (buyer) discretion in the form of not allowing some suppliers to bid can have positive effects on public procurement outcomes.

On the empirical side, Banerjee and Duflo (2000) study the Indian software industry and find that reputation is positively correlated with low incentive contracts (e.g., time-material instead of fixed-cost contracts) and reputable contractors tend to bear a lower share of cost overrun. Bajari, McMillan and Tadelis (2009) analyse a sample of contracts for the construction of (private) buildings in Northern California and find that restricted auctions and negotiations are more likely to be used in highly complex projects or if there is a smaller pool of potential contractors. They also point out that in restricted auctions it is more likely that more reputable contractors are selected. Gil and Marion (2013) analyse the effect of repeated interaction in the subcontractors market for California's highways and find that past interaction has an effect on bidding behavior only if there is the expectation of future profits. Lalive and Schmutzler (2011) study the procurement of the railway service in Germany, comparing negotiations (with the incumbent) and open auctions. They find evidence that negotiations correlate with lower consumer surplus, increasing prices for similar services. Chever and Moore (2012) and Chever et al. (2013) reach a different conclusion studying construction of social housing in France. They find that negotiations after an informal auction are associated with lower costs relative to open auctions. Kang and Miller (2015) estimate a procurement auction model where the extent

of competition is optimally chosen by public buyers, and find that limiting competition need not result in higher procurement costs.

The contribution of our paper to this literature is twofold. First, it provides the first causal estimates of the effects of increased discretion on procurement auction outcomes (i.e., participation, bidding, and characteristics of the winners). Second, it leverages the fact that its database contains information on some *ex post* performance measures, such as the time taken to deliver the works and cost overrun, to provide evidence on the causal effects of discretion on those final procurement outcomes. In this respect, this paper also complements the results of Lewis and Bajari (2011, 2013), who use highway construction to point out that slow completion inflicts a negative externality on commuters and therefore social welfare depends also on how quickly the works are delivered.

This paper also contributes to a small emerging empirical literature documenting the effect of discretion on the performance of public agencies. Our paper provides corroborating evidence to the result (among many others) of Bandiera et al. (2009) that overall waste in the procurement of Italian goods and services is substantially smaller for more autonomous public purchasing authorities that enjoy more discretion than others. As Bandiera et al. (2009) do, we provide causal evidence on how public administrations use discretion in Italy. Our paper completes the assessment of the effects of discretion by analyzing data on *ex post* performance measures that were not available to Bandiera et al. (2009), by studying a very different industry (public works) where contract incompleteness is a crucial issue; and focusing on how past performance can be indirectly rewarded when restricted auctions allow for the possibility of discretionally not inviting some (e.g., poorly performing) suppliers. A recent related study in this literature is Duflo et al. (2015), which reports on a large field experiment on environmental regulation and its enforcement in India. They show, among other things, that regulatory discretion is highly valuable in that environment because it allows the regulator to better target inspections at extreme polluters, compared to transparent random auditing rules. Our study, as Duflo et al. (2015), shows that regulatory discretion may be a valuable tool for public administrations.

3 The Institutional Framework

In our analysis, a key role is played by the value of the project, which represents the reserve price (i.e., the starting value) of the auction and the maximum price a public buyer is willing to pay for a project. For each auction, the value of the project is estimated by an engineer employed by the public buyer that runs the auction. The engineer evaluates the types and quantities of inputs needed to complete it. The value of the project is then obtained by multiplying these inputs by their prices taken from a menu of standardized costs and summing up these products. For this reason, we agree with Decarolis (2014) when he argues that the public buyer running the auction is not in full control of the value of the project, and cannot set the value of the project in a different way on the basis of the auction format chosen (i.e., just below or above the 300,000 euro threshold).

Italian procurement law specifies three auction formats for public procurement works. *Pubblico Incanto* is an open auction in which every firm with the required certification can participate. *Licitazione Privata* is a restricted auction in which the public buyer invites a number of certified bidders. However, a certified firm that was not invited can ask to be included in the list of invited bidders and the public buyer cannot refuse access. This feature makes the *Licitazione Privata* appear similar to an open auction, provided that public buyers guarantee a certain level of publicity of the call for tenders (see Coviello and Mariniello, 2014). Finally, *Trattativa Privata* is an award mechanism whereby the public buyer has wider discretion in selecting the firms participating in the auction.[4]

The possibility of using a *Trattativa Privata* (our treatment) is a function of the project value.[5] For works with a value above 300,000 euros, it can be used only in cases of disaster or other extreme conditions, which have to be notified and justified by the public buyer to the Italian Authority for Public Procurement. For works with a value below

[4]There is also a fourth format, *Appalto Concorso*, but it is restricted to works with an extreme degree of complexity and high values. These types of work are excluded from our analysis.

[5] Art. 24 of law 109/1994 introduced the 300,000 euro (converted from Italian liras by the authors) threshold giving objective necessary conditions to run restricted auctions. Before this law, in Italy, public administration could run restricted auctions under general circumstances assessed directly by the public administration running the auction. It is plausible that the introduction of this law, reflected the intention of the policy maker of limiting the amount of discretion available to public administrations. The law was passed after a period of corruption scandals in public procurement, discussed in Coviello and Gagliarducci (2015). According to this law, the manipulation of the project value or the division of work into sub-lots to avoid the 300,000 euro threshold are illegal practices.

300,000 euros, the public buyer can use the *Trattativa Privata* under two less extreme circumstances: there should be a particular technical contingency or some emergency reasons; or previous procedures were run with no adjudication of the works. Also, below the threshold, the public buyer does not need to formally report to the Italian Authority for Public Procurement on the use of *Trattativa Privata*. The *Trattativa Privata* encompasses a wide spectrum of procedures in which the public buyer has a varying degree of flexibility in the invitation of the bidders. Above 300,000 euros, the *Trattativa Privata* consists of a two-step procedure. First the public buyer has to invite at least 15 firms to an informal auction.[6] Then, the public buyer can negotiate the terms of the contract with the firm proposing the best offer. The procedure becomes binding for the public buyer once the contract is signed.[7] Below 300,000 euros, the public buyer can follow the same procedure explained above, however in this case the public buyer is legally required to invite at least 5 firms.[8] As an alternative, the public buyer can negotiate directly with one or more firms. However the latter alternative is not frequent in our data, therefore we will consider the observed *Trattativa Privata* as a restricted auction and not a direct negotiation.[9]

The procurement law determines entry requirements, which are a function of the value of the project, regardless of the auction format. For example, if the maintenance of a municipal school is put out to tender and the public buyer estimates that the amount of work that has to be done is valued at 600,000 euros, the required category will be 3-OG1, where 3 refers to the size of the works and OG1 to the category "civic and industrial building constructions". Firms certified for 3-OG1 projects are allowed to bid for projects with a reserve price of at most 650,000 euros. After the inspection of the procurement law, we conclude that entry requirements associated with firms' financial characteristics do not jump discontinuously at the 300,000 euro threshold.

The applicable procurement law during our sample period requires auctions to be sealed-bid and single-attribute (i.e., technical and quality components of the offers are not

[6]The limit is not binding whenever the nature of the project does not allow 15 firms to be identified.

[7]Conversely, the result of a *Pubblico Incanto* or *Licitazione Privata* is already legally binding for the public buyer.

[8]In this case the limit is binding.

[9] We inspected the number of bidders and the number of invitees for *Trattativa Privata* in our sample, and more than 80% of them have enough bidders to be safely considered restricted auctions. In Section 6.4, we repeat our RDD analysis dropping from our sample direct negotiations and auctions with fewer than 5 invited firms and find that results do not change.

part of the bids and are pre-specified by the public buyer before the auction takes place).[10] The firms participating in the auctions submit a percentage reduction (a rebate) with respect to the project value. The rebate that wins the auction determines the reduction from the original reserve price, and therefore, the price paid by the public buyer to the winning contractor to undertake the procured project.

In our main database, the winner of the auction is determined by a mathematical algorithm illustrated in Figure 1.[11] After a preliminary trimming of the top/bottom 10% of the collected rebates, the rebates that exceed the average by more than the average deviation (called the "anomaly threshold") are also excluded. The winning rebate is the highest of the non-excluded rebates (that are below the anomaly threshold).[12] In our sample, the auction mechanism is constant across treated and control works and it should not interfere in our study of the increased discretion in the form of an increased ability to select, and therefore also exclude, participants.[13]

The auction mechanism in our data is somewhat unconventional, as it has some "beauty contest" features whereby the highest bidder does not necessarily win. The specific features of the mechanism raise the theoretical possibility that increased participation need not result in greater competition (Albano et al. 2006, and Decarolis, 2014). If so, then a

[10]During the period covered by our 2000-2005 sample, Italian public administrations had to follow *"Legge Merloni"*: *Legge 109/94* and amendments (*"Merloni-bis"* in 1995, *"Merloni-ter"* in 1998, and *"Merloni-quater"* in 2002). Major legislative changes were introduced in 2006, but do not affect our sample. These changes are used in Decarolis (2014) to identify the effects of the auction mechanism on outcomes.

[11] This mechanism is not used in three sets of procurement works. First, auctions with a reserve price above the European Community threshold that are administrated under the European Community common law, *"Merloni-quater"* in 2002. Second, the municipality and the province of Turin managed to change the procurement law and from the 2003 introduced first-price auctions. Third, the algorithm does not apply when fewer than 5 bidders participate in the procedure. To keep the auction mechanism constant in our data, we: a) discard EU auctions from the data, to avoid the comparison of outcomes across auctions administrated with different rules; and b) assess the robustness of results to the exclusion of/restriction to the sample of the province and municipality of Turin that run first-price auctions.

[12]As an illustration, consider this simple example. In a hypothetical auction, after the trimming of the tails there are three participants placing the following bids (in the form of a rebate over the starting value): 10%, 14% and 16%. The average bid is thus 13.33%. The average difference of the bids above this average bid is 1.67%. Thus the "anomaly threshold" is 15.%. It turns out that in this case the winning bid is 14%, which is above the average, even if 16% is the highest bidden rebate.

[13]These algorithms are more common than one would expect. In the US, the Florida DoT and the New York State Procurement Agency have used them. They are also present in procurement regulation in many countries including Chile, China, Colombia, Italy, Japan, Peru, Malaysia, Switzerland and Taiwan. Their theoretical properties have been studied by Albano et al. (2006), Decarolis (2014) and Chang et al. (2015), who also test their results in the lab.

reduction in discretion need not have any effect on the cost of procurement, although the possibility to exclude poor past performers that comes with increased discretion may still potentially affect procurement outcomes. Therefore, the evidence on the effects of discretion on auction outcomes would not be easy to extrapolate to contexts with more standard auction formats, where increased participation is usually associated with higher competition. However, Conley and Decarolis (2015) show theoretically that in such an auction, increased participation may indeed result in more aggressive bidding, because of competition among cartels and independent bidders. This theoretical result is consistent with Figure 2 in the paper, which documents a positive and significant relationship between the number of bidders and the rebates submitted by these bidders, in our data.[14] The same dataset is used in Coviello and Mariniello (2014) to study the effects of an exogenous increase in publicity (i.e., potential competition), where it is found that the higher number of potential participants is indeed associated with larger discounts.[15] Taken together, the theory and evidence suggest that, despite the fact that the auction mechanism is unconventional, lower participation is pejorative for the auctioneer as in a conventional auction.

Contractual conditions (e.g., deadlines and the possibility of subcontracts) are described in the call for tender. Some terms of the contract (the date of delivery of the works and the cost of the project) might be partially renegotiated in cases of unforeseen or extreme meteorological events.[16] Subcontracting part of the works is permitted by law, but requires the approval of the public administration.

Each auction is administered by a manager, who is directly appointed among the bureaucrats working in the public administration. The manager supervises the whole procurement process, which entails the following duties: preparing the preliminary project,

[14] We find a similar positive and significant relationship between the number of bidders and the winning rebate (the maximum rebate) in a (small) sub-sample of first-price auctions managed by the municipality and province of Turin from the 2003. In Section 6.4 we repeat all our RDD analysis in this sub-sample for the sake of robustness.

[15] Chang et al. (2015) run an experimental analysis of the empirical bidding functions in average bid auctions, which are similar to the Italian auctions. They show that bidding functions are statistically indistinguishable from the empirical bidding functions in first-price auctions. This paper also shows that the average bid mechanism performs quite well at reducing the price paid by the auctioneer as in conventional first-price auctions.

[16] Floods, storms, earthquakes, landslides, and mistakes by the engineer are the reasons for renegotiations prescribed by the Italian Civil Code.

advertising the call for tender, administering the auction, paying the winning firm, and monitoring the realization of the work. The manager of the auction also sends all the information regarding the auction to the Italian Authority for Public Procurement. The Authority checks, among other things, the quality of the provided information, and collects the information in its database, which we use in this paper. As discussed in Coviello and Gagliarducci (2015), a corrupt auction manager might under-report or report the information on *ex post* renegotiations as missing in order to favor local contractors and to get bribes.

4 Data and Sample Selection

We exploit a unique administrative database collected by the Italian Authority for the Surveillance of Public Procurement (*AVCP*). We gained access to all the public works awarded in Italy between 2000 and 2005 with a project value greater than or equal to 150,000 euros. For each contract, we observe the number of bidders, the winner's rebate, the project value, the identity and the type of the winning bidder, the type of work, the date of contractual and official/effective delivery of the works, the final costs for the public administration running the auction as well as its type (i.e., municipalities, provinces, regions, hospital, universities) and geographical location.

Contractual and effective dates of delivery of the works and total costs, allow us to compute measures of *ex post* renegotiations. In the analysis, we consider as outcome the variable *Work Length*, which is the number of days from the first day of work until the effective end of the project. We also consider the variable *Delay* that represents the difference in days between the effective end of the project and the contractual deadline. We will consider these measures as main outcomes of our regressions. In the robustness section, we also consider as an outcome the ratio between the delay and the effective duration of the procurement process. The information regarding final costs for the buyer allow us to construct a measure of *Cost Overrun*, which we compute as the ratio between the difference in the final cost and the awarding cost (reserve price discounted by the winning rebate). These measures are used to proxy performance of the procurement process.[17]

[17] Our dataset does not allow to track works over time (i.e., after the works are delivered to the public

The identity of winning bidders allows us to construct a measure of firms' incumbency. For each auction, we define the winner as *Incumbent winner* if it has won at least one other auction held by the same buyer within a year from the current auction. This measure is constructed using winners of auctions held between 2001 and 2005.[18] Our database also contains information on the size of the firms winning the auctions. In the analysis, we consider as an outcome the variable *S.R.L.*, which is a dummy for a limited liability firm as the winner. The database also contains information on the geographical origin or the firms winning the auctions. With this information, we use as an outcome the variable *Local Winner*, which is a dummy equal to one if the winning firm is located in the same province of the public buyer. Further, we integrate this data with demographic information (ISTAT) and measures of social capital (Guiso et al., 2004), corruption (Golden and Picci, 2005) and judicial system efficiency.[19]

From the original dataset, we make a first selection of a sub-sample of works with a project value between 200,000 and 500,000 euros. We do this to rule out discontinuities in auction outcomes induced by other regulatory thresholds at a project value of 200,000 and 500,000 euros.[20] We keep all the observations for which we observe all the outcomes of interest (i.e., the number of bidders, the winning rebate, etc.). Data on the number of bidders, the winning rebate and the identity of the winning company contain a limited amount of missing values, whereas data on *ex post* renegotiations contain more missing values. This data might be systematically under-reported in high corruption areas, and this under-reporting might be more severe for auctions with *Trattativa Privata*.[21]

Second, we focus on the building construction sector. This sub-sample has the prop-

administration). This lack of information renders it impossible to build a measure, at auction level, that allows to assess, albeit indirectly, the quality of the works from the frequency of the interventions/repairs.

[18] In Section 6.4 we check the robustness of our results by repeating our RDD analysis in this sub-sample of auctions.

[19] We use population and length of civil trial per year at the provincial level. Guiso et al. (2004) consider two measures of social capital based on the blood donation and referendum turnout; in our analysis we use the latter. Golden and Picci (2005) quantify corruption as the difference between the actual quantities of public infrastructures and the price paid to accumulate that stock of capital.

[20] Public buyers can award works below 200,000 euros using the *Cottimo Fiduciaro*, a procedure that allows a higher degree of discretion. For works above 500,000 euros, the public buyer has to comply with additional publicity requirements, see Coviello and Mariniello (2014) for details on this policy. We also drop the public buyers from five special status regions (out of 20) that have special procurement laws.

[21] As a robustness check of our main results, in Section 6.4, we repeat our RDD analysis without this sample selection.

erty that it shows no sorting of the project value around the discontinuity threshold.[22] Finally, a key decision in implementing the RDD method is the choice of the bandwidth around the discontinuity threshold. Following the routine developed in Imbens and Kalyanaraman (2012), for each of the auction outcomes, we compute the estimates of the effects of discretion in the sub-sample of auctions with a value within the interval around the threshold determined by the optimal bandwidth selection criterion.

4.1 Descriptive Statistics

In Table 1, we report the summary statistics for the sample of public works with a project value between 200,000 and 500,000 euros. The data base amounts to 3,362 public works. 8% of these works are awarded with *Trattativa Privata*. The average project size is 316,000 euros. 62% of the works are managed by municipalities, and 10% by provinces. 61% of the works are located in the north of Italy. This is comparable with the distribution of the population and of public administrations in Italy.[23]

In Table 2, we report descriptive statistics by type of award mechanism and project value. The probability of having a *Trattativa Privata* is higher below 300,000 euros: 12% of works, compared to 3% above 300,000 euros. The number of bidders is lower for *Trattativa Privata* and it increases for high-value works. The distribution of the number of bidders is more skewed for open auctions. The winning rebate is lower for *Trattativa Privata*. Also, the distribution of the rebates looks more skewed for open auctions. Projects awarded with *Trattativa Privata* seem to be delivered faster than open auctions, however they also seem to be subjected to longer delays in relation to the contracted deadline, especially works above the threshold. This can be rationalized by the procedure requiring a certain degree of urgency in the execution of the works. *Cost overrun* differs by a small margin. Winners in *Trattativa Privata* are more frequently local firms, and this effect appears to be

[22] We use the McCrary (2008) and Lee (2008) tests, explained in details in Section 6.1, to drop from our analysis the sample of roads works. This is because these projects show bunching (a discrete jump) of the running variable around the 300,000 euro threshold. This jump violates the assumptions underlying the RDD, making the estimates obtained from this sample not informative on the causal effect of running a restricted auction on auction outcomes. Section 5 clarifies the importance of this requirement.

[23] This distribution is comparable with the distribution of the population in Italy (46% North, 30% Center, 24% South). Regarding the distribution of public administrations in Italy we are aware of 8,050 municipalities, 1,233 hospitals, 110 provinces, 20 regions, and 68 universities. This distribution is compatible with the evidence of Table 1 showing that the majority of works are managed by Italian municipalities.

stronger for projects with a value below the threshold. Incumbent firms are more likely to win a *Trattativa Privata*, regardless of the project size. Winning companies are more likely to be limited liability companies for works adjudicated with *Trattativa Privata*, whereas winning companies are less likely to be limited liability companies for works adjudicated with *Trattativa Privata* below the 300,000 euro threshold.

5 Regression Discontinuity Design

In Section 3, we discussed that projects with a value (i.e., a reserve price) below the 300,000 euro threshold are more likely, by law, to be adjudicated by *Trattativa Privata*, whereas projects with a value above the threshold are more likely to be awarded through open auctions. This specific feature of the procurement law allows us to estimate the effect of discretion in procurement using the RDD methodology (Hahn et al., 2001; Imbens and Lemieux, 2008; Lee and Lemieux, 2010). The economic intuition of the RDD method is that estimates are obtained by comparing auctions which, in terms of value, are immediately above or below the 300,000 euro discontinuity threshold. These two groups of auctions are likely to have different discretion levels, but should otherwise be identical in terms of observable (e.g., entry-requirements) and unobservable (e.g., complexity) characteristics.

The central assumptions of RDD are as follows:

1. The forcing variable (the project value) is continuously distributed around the threshold *(no-sorting)*.

2. The probability of being treated (use of *Trattativa Privata*) changes discontinuously at the threshold.

3. In the absence of treatment, the expected outcome changes continuously around the threshold *(continuity assumption)*.

Hahn et al. (2001) show that, depending on additional assumptions, RDD nonparametrically identifies several types of expected treatment effects. Specifically, under the assumptions that (1) for each observation, treatment assignment is some monotone deterministic function of the forcing variable (the function can be different for different

observations); (2) the forcing variable crossing the discontinuity threshold cannot impact outcomes except through impacting the treatment (i.e., valid exclusion restriction, see Lee and Lemieux, 2010); and (3) the random effect of treatment and treatment assignment function are jointly independent of the forcing variable around the threshold then RDD nonparametrically identifies the local average treatment effect for compliers (LATE) at the threshold.[24]

In this paper we denote with T_i the *Trattativa Privata* variable. Specifically, $T_i = 1$ if the project is managed as a *Trattativa Privata* (i.e., a restricted auction), $T_i = 0$ otherwise. Let Y_i be the project value, y_0 be the threshold value, and O_i denote one of the procurement outcomes. Then, the LATE of *Trattativa Privata* for works at the threshold is identified by

$$\lim_{e \downarrow 0} \frac{E(O_i|Y_i = y_0 + e) - E(O_i|Y_i = y_0 - e)}{E(T_i|Y_i = y_0 + e) - E(T_i|Y_i = y_0 - e)}. \tag{1}$$

When the denominator in (1) is exactly one (perfect compliance), the design is said to be *sharp*. If it is less than one, the design is said to be *fuzzy*. In this paper, we have a case of Fuzzy-RDD as the contracting authorities have some flexibility in deciding the works that are assigned with *Trattativa Privata* (see Section 3).

The numerator and the denominator of equation (1) are usually called the *intention-to-treat* (ITT) effects. As discussed in Lee and Lemieux (2010), they are: (a) derived without relying on a valid exclusion restriction; and (b) informative of the average treatment effect (ATE) of $Z_i = \mathbf{1}\{(Y_i - y_0) \geq 0\}$ on the treatment T_i and on the procurement outcomes O_i. Under the *continuity assumption* of the starting value around the threshold (and of the unobservables), the ITT are unbiased estimates of the average treatment effect (ATE) of change in the ability to use *Trattativa Privata* on procurement outcomes.

5.1 Implementation of the RDD with Regressions

Hahn et al. (2001) recommend using nonparametric (kernel) local linear regressions when estimating the conditional expectations in (1). However, it is also a common practice to

[24]These assumptions allow for endogenous selection into treatment based on anticipated gains from treatment (i.e., non-compliance). At the same time, in view of the *continuity assumption*, the populations on different sides of the threshold (near the threshold) must be identical except for the likelihood of being treated.

use for estimation parametric linear models augmented with a flexible control function in $g(Y_i - y_0)$ that is typically approximated by a polynomial. The latter approach consists of estimating a traditional IV-LATE regression model where the endogenous variable T_i is instrumented by $Z_i = \mathbf{1}\{(Y_i - y_0) \geq 0\}$, and the first and second stages include the same continuous control functions in $g(Y_i - y_0)$.[25] Van der Klaauw (2002) shows that the parametric approach allows all the data in the discontinuity sample to be used and variations coming from work that are not close to the threshold to be absorbed using the flexible controls for the starting value, $g(Y_i - y_0)$.

We start by presenting parametric linear models augmented with a flexible control function in $g(Y_i - y_0)$ used in Angrist and Lavy (1999) and recently surveyed in Lee and Lemieux (2010). We IV-LATE estimate equation (2) with the two-stage least squares method.

$$O_i = g(Y_i - y_0) + \beta T_i + \eta X_i + \omega_i. \tag{2}$$

In the first-stage, equation (3), we consider $Z_i = \mathbf{1}\{(Y_i - y_0) \geq 0\}$ as the excluded instrument for T_i

$$T_i = g(Y_i - y_0) + \gamma Z_i + \alpha X_i + \nu_i. \tag{3}$$

Where, $g(Y_i - y_0)$ is approximated with a third-order polynomial in $(Y_i - y_0)$. The X_i in the baseline model includes just a set of five year dummies.

Throughout the paper, we also report OLS estimates of equation (2) considering $T_i = Z_i = \mathbf{1}\{(Y_i - y_0) \geq 0\}$. These estimates are OLS estimates of the *intention-to-treat* effects, which we denote OLS-ITT. Because of the legislative framework, we expect these OLS-ITT to be diluted estimates and to represent a lower bound of the true treatment effect (see Angrist, 2005).

6 Empirical Analysis

In this section, we present our empirical analysis based on the RDD, the main results, and a number of robustness checks.

[25] See Angrist and Lavy (1999), Lee and Lemieux (2010) and Van der Klaauw (2002).

6.1 Testing the continuity assumption in the pre-treament variables and in the running variable

Compliance with the continuity assumption is a necessary condition to obtain correct estimates of the causal effect of discretion in the RDD framework. We use two graphical methods to inspect the continuity assumption: McCrary (2008) and Lee (2008). These two methods are in some ways complementary.

Figure 3, is a histogram of the starting value of the auction around the *Trattativa Privata* threshold. The figure suggests no sorting around the threshold. We then follow McCrary (2008) and formally test for this possibility. First, we draw a very under-smoothed histogram of the running variable distribution. The bins are defined such that no bin will include points on the left and the right side of the threshold. Second, we run a local linear smoothing of the histogram. The midpoints of the histogram are the regressors and the normalized counts of the number of observations are the outcomes variables. Figure 4 shows that there is no sorting or manipulation of the running variable around the threshold.[26] In Table 3 we report the parametric version of the McCrary (2008) test, which confirms our graphical evidence of no sorting of the starting value of the auctions around the *Trattativa Privata* in the construction sector.[27]

Lee (2008) suggests an alternative procedure to investigate the continuity condition analyzing the behavior of the pretreatment variables around the threshold. We define a set of pretreatment variables from the information available. A pretreatment variable should respect two conditions: it should not be affected by the level of treatment, and it may depend on the unobservable that should affect the procurement outcomes. Identification would not be possible in case of jumps in the distribution of the pretreatment variables, since the project assigned to *Trattativa Privata* Z_h would not be comparable with the work not assigned to *Trattativa Privata* Z_l. We use a number of different variables regarding the identity and the location of the contracting authorities, such as being in the north, in the

[26] Figure A.1 reports estimates of the McCrary(2008) test by North, Center, and South super-regions of Italy. This figure confirms that there is no sorting of the running variable around the discontinuity threshold in the most corrupt areas (i.e., the South) of Italy.

[27] Figure B.1, and Table B.1 reproduce the RDD analysis on the road works sample. Figure B.1 shows that in this sample there is sorting of the running variable around the threshold. This jump in the starting value of the auctions violates the assumptions underlying the RDD, which cannot be used to infer about the causal effect of discretion (McCrary, 2008).

city of Rome, or in Piedmont, or being either a municipality or province. We also control for other variables observed at the provincial level such as population, length of civil trial, corruption and social capital. In Figure 5, we plot non-parametric estimates of our set of pretreatment variables against $y_d = (Y - y_0)$, the distance of the project value from the cut-off point. First, we draw the mean of the pretreatment variable over a fine grid. Then, we estimate separately on the left and on the right of the threshold three different approximations: a linear regression (solid line), a local polynomial regression (dot-dashed line) and a running-mean smooth estimator (dashed line). This figure suggests that there is no substantial evidence of sorting in pretreatment variables other than the municipality.[28]

This evidence shows that the RDD assumptions are satisfied and that there is no perfect manipulation of the value of the auction (the reserve price that determines exposure to treatment) around the discontinuity. We conclude, therefore, that discretion is quasi-experimentally assigned around the threshold.

6.2 Graphical Analysis

In this section, we report graphical evidence of the change in contracting authorities' discretion on our variables of interest. Figure 6 reports graphical evidence around the *Trattativa Privata* threshold. This figure is constructed with the same procedure described in section 6.1 to compute Figure 5.

Our graphical evidence is that (First) authorities use *Trattativa Privata* more when they can. Second, effective work length seems to be shorter when there is more discretion, whereas we find no discontinuous change in the measure of delay in the delivery of the works, below and above the threshold. Third, incumbent firms seem more likely to win below the 300,000 euro threshold. Fourth, we have weak evidence of a positive effect of discretion on the frequency of S.R.L.-type (i.e., limited liability company) winners. Finally, there seems to be no evidence of effects of increased discretion on rebates, number of bidders, cost overrun or local winner.

[28] In Table A.1 we run a parametric version of this test following the same approach described in Section 5.1 for the procurement outcomes. Our evidence suggests that there is no sorting in the majority of these pretreatment variables.

6.3 Parametric Analysis

In this section, we report the results of the parametric analysis on the outcomes of interest. Table 4 reports the estimates and the standard errors (robust to heteroskedasticity) of the empirical model discussed in Section 5.1 on the sample selected using the optimal bandwidth procedure, as suggested by Imbens and Kalyanaraman (2012). The first panel reports the ITT estimates, the second reports instead the results for the Fuzzy-RDD estimates. The bottom three rows report the average in the estimation sample, the size of the optimal bandwidth and the sample size.

We first discuss the results on the use of *Trattativa Privata*. Column 1 reports the estimated coefficient for the *Trattativa Privata*. We find a positive and statistically significant increase (+17.4%) in the use of *Trattativa Privata* for works with a starting value below the 300,000 euro threshold. This suggests that contracting authorities use more discretion when allowed and do comply with the procurement law. In the absence of this discrete jump, our evidence would indicate a violation of Assumption 2 of the RDD discussed in Section 5.

Columns 2 and 3 report the estimated coefficients for the *ex ante* outcomes of the procurement process we observe, the winning rebate and the number of bidders. The coefficients are not statistically significant in either ITT or Fuzzy-RDD for both the winning rebate and the number of bidders. We should note that the coefficient for the number of bidders has the expected negative sign. These results suggest that the limited increase in discretion we study has no sizeable effect on entry and direct costs of the public works.

Columns 4 to 6 display the estimated coefficients when we consider *ex post* outcomes of the procurement process: effective work length, days of delay, and cost overrun. Looking at the ITT estimates, we observe that the increase in discretion seems to induce an increase in the days of delay. On average, works below the threshold have 30 days more of delay; this accounts for about 22% of the average number of days of delay. Fuzzy-RDD estimates, however, do not confirm these results; the estimated coefficient is negative although not statistically significant. Also, we find a negative but not statistically significant effect of increased discretion on the effective length of the work. We do not find any statistically significant evidence on cost overrun.

The last three columns focus on the identity of the winning firm: local winner, incum-

bent winner and S.R.L. (i.e., limited liability company). We do not find any statistically significant evidence on selection of local or limited liability firms. Focusing on column 8 instead we find a statistically significant effect on the probability that an incumbent firm wins the contract. ITT *(Fuzzy-RDD)* estimated effects are +8.4% (+44%). This effect is sizeable given that, on average, incumbent firms win 9.6% of the time.[29]

Overall, our RDD analysis seems to suggest that contracting authorities exploit the increased discretion by using more *Trattativa Privata*. The increased discretion does not directly affect entry or the winning rebate (i.e., the direct costs of procurement). There is contrasting evidence on the *ex post* performance side: longer delays but no difference in effective work length. There seems instead to be a selection based on the type of bidder. Incumbent firms are more likely to win repeated contracts.

6.4 Robustness Checks and Sensitivity Analysis

In this section we consider nine possible concerns of the apparently discontinuous relationship between auction outcomes and discretion.

First, in Table 5, we repeat our analysis approximating $g(Y_i - y_0)$ (henceforth $g(y_d)$) with a linear, quadratic and quartic polynomial specifications of the starting value of the auction. In Table A.2 we approximate $g(y_d)$ with local linear regressions that include a linear term in the starting value of the auction, its interaction with the indicator for works above the threshold and the indicator for works above the threshold. These estimates have the advantage of allowing heterogenous effects of $g(y_d)$ for contracts below and above the 300,000 euro threshold. Our evidence is that contracting authorities systematically use more discretion by using *Trattativa Privata* more often for contracts with a value below the threshold compared to contracts above the threshold, and that the effect of discretion on incumbency is positive and statistically significant across all the specifications of $g(y_d)$.[30] In

[29] We test this result with different specifications, considering the number of times the firm has won in the past, and different time lags of two and three years. These results are available on request.

[30] As discussed in Section 4 the variable "Incumbent winner" is defined for the sub-sample of auctions held between 2001-2005. This data limitation opens the possibility that the estimates on other outcomes are different in this sub-sample of auctions. In Tables A.3 and A.4 we have replicated our analysis in the 2001-2005 sub-sample, and considered the baseline model with year fixed effects and the model with region-year (interactions) fixed effects for all the specifications of $g(y_d)$. The estimates obtained from this table are comparable in sign, magnitude and statistical significance to the estimates obtained using the 2000-2005 sample.

the rest of our robustness checks, which we discuss below, we report the evidence obtained by approximating $g(y_d)$ with a linear, quadratic, cubic, quartic polynomial specifications of the starting value of the auction, and local linear regressions. The sensitivity of the RDD estimates to the specification of the polynomial of the running variable $g(y_d)$ are discussed by Gelman and Imbens (2014). In this paper, they show that RDD estimates are sensitive to high-order specification of $g(y_d)$, and low-order specification of $g(y_d)$ and local linear regression are preferable specifications to approximate $g(y_d)$ to estimate the causal effect of interest.

Second, in Table A.5 we extend our baseline model adding controls for region and year fixed effects. In Table A.6 we add as controls region-year (interactions) fixed effects, in Table A.7 we include 110 province and year fixed effects, and in Table A.8 we include 1,517 contracting authority fixed effects. In Table A.2 (Panels B-D) we report evidence from local linear regressions parametrization of $g(y_d)$ for the three different specifications of time and geographical controls. Our results are robust to different specifications of geographical factors and time controls. To directly control for the impact of specific institutional factors, we repeat our analysis adding as a control in our regression measures of corruption, social capital and judicial inefficiency. To do so, we estimate our baseline model adding as a control a corruption index (Golden and Picci, 2005), a social capital index (Guiso et al., 2004) and a judicial inefficiency index.[31] Table 6 reports the estimated coefficient for ITT and Fuzzy-RDD controlling for our measures of institutional quality. Table A.9 replicates the same analysis but considering local linear regressions. Our main conclusion is that the effects of discretion are robust to the inclusion of institutional and geographical factors that could have explained both the use of discretion and auction outcomes.[32]

Third, we expand the set of controls included in the vector X_i (of equations 2 and 3) to inspect the possible effects of works heterogeneity. In Table A.10 and Table A.11 we repeat our analysis including 8 indicator variables for the categories of the works.

[31] The length of civil trials, our measure of judicial inefficiency varies across years and provinces, and it allows us to estimate a model that includes 110 province fixed effect and year effects. Corruption and social capital, however, are time-invariant measures observed at provincial level and allow us to only include year fixed effects in our regressions.

[32] The estimated coefficient of corruption (Column 1, panel B of Table 6 and Table A.9) is negative and statistically significant, and indicates that an increase in corruption is negatively associated with the use of discretion. This correlation confirms the intuition that public administrations are perhaps underutilizing discretion because they are limited by the law.

These 8 dummies summarize 80% of the distribution of the works. Table A.10 reports the estimates obtained from including these 8 dummies to the baseline model. In Table A.11, we control for the categories of the works and for region-year (interaction) fixed effects. The evidence suggests that works observed heterogeneity and the geographical location of the public buyers running the auctions do not affect our main estimates. In Table A.12 we also include region-year (interactions) fixed effects, time-fixed effects, works-fixed effects, and an indicator for judicial efficiency, to our baseline model. Our evidence is similar to the evidence obtained with the baseline model. A remark: the robustness of our results to the inclusion of these controls indicates that there is randomization of the treatment across different geographical regions, years, and observable characteristics.

Fourth, we test the sensitivity of our results to different bandwidth specifications and sample selection. Figure 7 plots the estimated coefficients for the ITT effects (and 90% confidence interval) obtained by estimating our baseline model in different subsamples around the 300,000 euro threshold. Each subsample considers auctions with a value around the threshold that ranges from 5,000 to 100,000 euros, with increments of 2,500 euros. In the picture, the horizontal line represents zero, and the vertical line represents the optimal bandwidth determined using the Imbens and Kalyanaraman (2012) procedure.[33] The effects on the use of *Trattativa Privata* and incumbency are positive and significant across the different bandwidths below and above the optimal bandwidth. For works with a value in an interval smaller than the one determined by the optimal bandwidth, discretion appears to reduce the contractual work length; to result in the selection of larger (S.R.L. incorporated) firms; and to reduce the number of firms submitting bids. Other outcomes, like the winning rebate, cost overrun and the probability that the project is awarded to a local firm, are not significantly affected by the degree of discretion.

Fifth, we assess the robustness of the results for the outcome *Delay*. Figure 6 shows that the variable *Delay* has no jumps around the 300,000 euro threshold and therefore the parametric estimates do not pass the graphical inspection of the possible jump around the threshold. Regarding the model specification, rows 1, 2 and 4, 5 of Table 5 show that the effects of discretion on the variable *Delay* are negative and not statistically significant.

[33] Figure A.2 plots the same estimates but considering a model with regional-year (interacted) fixed effects. Figure A.3 (A.4) plots the estimates for the local linear regressions (with regional-year interaction terms).

Panel A of Table A.2 reports the local linear regression estimates of the effects of discretion on delays (and on all the other outcomes). The evidence from Table A.2 confirms that discretion has no effect on *Delay*, as in the graphical analysis. That is, by reducing the order of the polynomial specification we get no effects on the variable *Delay*. This evidence is compatible with the econometric discussion in Gelman and Imbens (2014) that shows why high-order polynomials regressions should be interpreted more carefully relative to low-order polynomial regressions and local linear regressions. These results are robust to different specification of geographical and time effects (Panels B-D of Table A.2, and Tables A.5-A.11). Regarding sample selection, Figure 7 shows that the effect of discretion on *Delay* (obtained with third-order polynomial regressions) are not robust if we change the bandwidth around the 300,000 euro threshold, since 10% confidence intervals include the zero. We find similar evidence in Figures A.2-A.4. Our main conclusion is that the positive effects of discretion on the delays in the delivery of the works are sensitive to graphical inspection, variations of model specification and sample selection.[34]

Sixth, we also look at the robustness of the effects of discretion on the overall length of the work, defined as the number of days from the awarding date until the effective date of delivery of the work. The variable that reports the overall duration of the procurement process might capture the interruptions caused by appeals in courts, of which we do not have direct information in our database. If restricted auctions are systematically challenged during the procurement process, then the overall duration of the procurement process should be longer in these auctions. In Table A.14 we repeat our RDD analysis considering as a dependent variable the overall length of the procurement process for the work. Table A.14 suggests that the procurement process is not systematically longer in restricted auctions.

Seventh, in Section 4 we discussed that our main estimates are obtained selecting the subsample of auctions for which we observe all the outcomes of interest. Table A.15 replicates our analysis without this sample selection. Our results are comparable in sign, magnitude and statistical significance to our main estimates.[35] Moreover, in Section 3 we

[34] We have also estimated the effect of discretion on the ratio between the number of the days of delay and the contractual length of the works, defined as the number of days from the first day of work until the contractual deadline. Table A.13 shows, as for the outcome delays, that discretion has no effects on this variable when we consider low order specifications of $g(y_d)$.

[35] In Tables A.16-A.18, we replicate our analysis dropping direct negotiations and auctions with fewer

discussed that the measures of *ex post* quality in the execution of the contract might be systematically under-reported in high corruption areas, and that under-reporting might be more severe in restricted auctions. We tackle this possible issue in two ways. First, we replicate our analysis by looking at the auctions held in the less corrupt areas of Italy. Table A.19 replicates the main results for the North-Center regions of Italy, which are less corrupt. This table suggests that our main evidence in the sample of less corrupt public administrations is similar to the evidence obtained in the main sample. Second, we repeat our RDD analysis in the main sample, considering as a dependent variables the probability that the information on *ex post* renegotiations (effective work length, delays, and cost overrun) and on incumbent winners is missing. These variables, however, are informative if corrupt auctioneers do not report systematically the info on *ex post* renegotiations and the identity of the incumbent winners, whereas are not if they under-report it. Table A.20 reports evidence that this information on *ex post* renegotiations (Panel A) and incumbent winners (Panel B) is not systematically missing in restricted auctions.

Eighth, to assess the robustness of these (local) results around the threshold, we run two placebo tests. We generate two simulated treatments at two different values of the starting value of the auctions: 250,000 and 450,000 euros instead of 300,000 euros. We then use these thresholds to statistically test for the presence of discontinuities in the outcomes in two samples separated by the 300,000 euro threshold (i.e, below the threshold and above the threshold). Tables A.21 and A.22 report estimates obtained estimating our baseline model. We (1) do not find evidence of significant effects in the large majority of the two simulated thresholds; and (2) report evidence of very weak instruments in the Fuzzy-RDD estimates (see Marmer et al., 2015). This evidence reassures us about the robustness of our results, as it indicates that they are not driven by random chance or by other thresholds.

Ninth, does discretion matter in more commonplace auctions formats? We empirically test this possibility by analyzing a small sub-sample of first-price auctions available in our data. We use the auction data collected by the municipality and province of Turin, which voluntary switched to first-price auctions starting from January 2003. Decarolis

than 5 invited firms (see discussion in Section 3, footnote 9). These tables suggest that our evidence in this sub-sample is similar in sign, magnitude and significance to the evidence obtained in the full sample.

(2014) and Branzoli and Decarolis (2015) explain the details of this reform. Within this sub-sample we repeat our RDD analysis. In Table A.23 we report descriptive statistics for the sub-sample of 221 first-price auctions for public works. The average number of bidders per auction is 17.08, and the mean winning rebate is 28.6%. In this (small) sub-sample we find a positive and statistically significant correlation between the number of bidders and the winning rebate, as in our main sample. To gain sample size, we run our RDD analysis in the sample of auctions with starting values between 200,000 and 500,000 euros, but we do not drop auctions that have missing values in some outcomes (see above discussion) and we consider all type of works. In Table A.23 we present estimation results. Panel A displays simple correlations, Panel B reports a model that controls for a linear term in the value of the project, whereas Panel C add as controls categories FEs. The estimates are comparable in sign and in magnitude to those obtained in the main sample, although they are somewhat less significant given the smaller sample size. This evidence is a form of replication of the third type (the most important), discussed by Levitt and List (2009) or Al-Ubaydli and List (2015), which helps to generalize our main results because we are using a different design and a new treatment where the type of open auction is different.

7 Incumbency and Performance

Our RDD analysis delivers some clear evidence on how contracting authorities use increased discretion. Below the threshold we observe an increase in the use of *Trattativa Privata* and in the probability of having an incumbent winner, relative to above the threshold. Other *ex ante* and *ex post* auction outcomes appear not to be directly affected by increased discretion. It is important to notice that our RDD analysis is not informative of the effects of exogenous variations in incumbency on auction outcomes. This is because estimate the impact of incumbency on auctions outcomes requires exogenous variations in incumbency that do not directly affect auction outcomes. Our RD design does not provide such variations.

In this section we explore the correlations between repeated wins by incumbent contractors, and their past and future performance measured by the delays in the delivery of the works. To do so, we first analyze the correlation between performance in the execution of the current works and being an incumbent winning firm. Then, we analyze the

correlation between past firms' performance and the probability of winning in the current auction.

In Table 7, we analyze how winners' incumbency affects the *ex post* efficiency of the execution of the contract. To address the possible endogeneity of winners' incumbency, we implement three estimation strategies. First, we exploit the longitudinal nature of the data. We estimate the impact of winner incumbency on *ex post* efficiency of the execution of the contract controlling for FE at provincial and year level. Second, we use a propensity score matching estimator to estimate the causal effect of being an incumbent firm. The estimator generates causal estimates of this effect by matching the observable characteristics of incumbent winners with those of non-incumbent winners.[36] Third, we implement a re-weighting propensity score matching estimator. This matching estimator differs from the previous matching estimator because it uses the estimated propensity score as a weight for the estimates. A complete exposition of the method is presented in Di Nardo et al. (1996) and Brunel and Di Nardo (2004). Table 7 splits our original sample in auctions above and below 300,000 euros separately (and for auctions with a value chosen with the optimal bandwidth used in the previous sections). Our main result is that incumbent winners that are likely to be selected with discretionary procedures deliver works with less delay. In the full sample this effect is larger and statistically significant in the sample of works below the 300,000 euro threshold. The difference persists once we use the optimal bandwidth sample, however, in this case, the coefficients of incumbency are not statistical different from zero.[37] This evidence suggests that when public buyers select incumbent firms, performance does not worsen; indeed, it may improve on average.

In Table 8, we re-organize the data and construct for each public buyer a panel of potential incumbents. For each year, we define as (a potential) incumbent any firm that has won a contract with a specific public buyer in the previous year. Then, for each of these potential incumbents, we measure the average number of days of delay in the delivery

[36] We follow Rosenbaum and Rubin (1983) and use 4 matching neighbours and estimate the average treatment on the treated (ATT).

[37] We use as controls provincial fixed effects, year fixed effects, a cubic polynomial in the project value, number of bidders, effective work length and winning rebate. We test different specifications, the effect of incumbency is robust across them. We also perform the same analysis using the effective length of the work as the dependent variable, finding similar results. In Table A.24 we also repeat the analysis considering a specification that includes year and region fixed effects and their interaction terms.

of the adjudicated works. Finally, we regress this measure on the probability of winning a work in the current year. To evaluate the impact of discretion, we repeat this regression by splitting the sample above and below the 300,000 euro threshold (and within the optimal bandwidth). The evidence from Table 8 suggests that for works below the 300,000 euro threshold, there is a negative and statistically significant effect of past delay (measured in hundreds of days) on the probability of winning a contract. In contrast, for works above the threshold, that are more often adjudicated with open auctions, the effect is smaller and not statistically significant.[38] This evidence suggests that contracting authorities select incumbent firms, when allowed by the procurement law (i.e., for contracts below the threshold), that had better performed in the past.

We conclude that the results obtained from Table 7 and Table 8 are suggestive of the fact that increased discretion is predominantly used to select incumbents that delivered with less delay in the past and that incumbent firms tend also to have better performance today (i.e., lower delay) when executing public works. These estimates, however, have two main limitations. First, the matching estimates need more stringent assumptions compared to our main RDD analysis in order to be defined as causal. Second, in the potential incumbent panel, the size of the estimated effects is rather small, which can be explained by the fact that in our data we observe only the winner's identity and not the participants in the auctions, and therefore our estimate cannot fully quantify the impact of buyers' discretion in the selection process.

8 Conclusion

Economists have broadly recognized the benefits of open auctions. In government procurement, the merits of open auctions typically exceed their mere pro-competitive effects. The extreme transparency of the mechanism has attracted national and international policy makers who want to limit government discretion and its abuse. The benefits come at a cost, however, because open auctions are typically more complicated and costly to run.

[38]The effect is robust to various specifications. In Table 8, we report the results for two specifications. In the first we control for contracting authorities fixed effects, year fixed effects and a cubic polynomial in project size. In the second specification we also add controls for the public buyer experience, as number of works awarded in the past year. In Table A.25 we repeat the analysis considering a specification that includes year and region interaction terms.

Furthermore, recent literature on transaction costs and contract theory has pointed out other important limitations of open auctions: in the presence of transaction costs and incomplete enforcement and contracting, open auctions may not perform well, especially for complex transactions, because they are rigid and remove all discretion from the buyer. Understanding which of these two conflicting effects of discretion - both of which are likely to be relevant to some degree – dominates in the environment we are studying is therefore an empirical question.

In this paper, we measure the effects of the increase in buyer discretion linked to the use of restricted procurement auctions- in terms of increased ability to select participants- by running a regression discontinuity analysis (RDD). We exploit a threshold present in the Italian procurement law that quasi-experimentally increases the ability of the contracting authorities to use restricted auctions, a mechanism whereby buyers have discretion over who (not) to invite to bid. Works above this threshold are almost inevitably awarded through open auctions; works below this threshold can be awarded through restricted auctions between a set of invited participants. Our identification strategy relies on the assumption that within a small interval around the threshold, contracts will be otherwise identical in terms of observable (e.g., entry-requirements) and unobservable (e.g., complexity) characteristics. Differences in procurement outcomes will then identify the causal effects of increased discretion.

We find that increased discretion leads to a significant increase in the probability that the same firm is awarded a project repeatedly by the same buyer. To our knowledge, we are the first to quantify this causal effects of discretion. By itself, however, this result can either signal the presence of productive relational contracts, or of corrupt buyer-seller relations, or just an attempt to reduce set-up costs.

With the aid of more data on other procurement outcomes we rationalize this finding, concluding that discretion need not deteriorate the overall functioning of the procurement process since it does not affect standard *ex ante* auction outcomes (number of bidders, rebates, size of the winners, distance from the public buyer) or in most of our *ex post* measures of renegotiations (i.e., duration of the works; and monetary renegotiations). We find some evidence that discretion has a positive effect on delays, that turns out not to be robust. In a closer neighbourhood of the discontinuity threshold, we find evidence that the

positive effects of discretion may dominate negative ones. Discretion appears to reduce the total duration of the works; to lead to the selection of larger (incorporated) firms, which have typically better quality control systems; and to reduce the number of firms submitting bids, saving administrative costs associated to bid screening. Other outcomes like the winning rebate, cost overrun, and the probability that the project is awarded to a local firm, are not significantly affected by the degree of discretion.

In the interpretation of our evidence, one might be concerned that discretion increases the number of repeated wins by incumbent contractors but reduces the unobserved quality of delivered works because of corrupt preferential relationships between public buyers and favored contractors. We explore this possibility by looking at two additional pieces of evidence. First, we repeat our RDD analysis controlling for geographical location, corruption, social capital and judicial efficiency in the region of the public buyers running the auctions. Our evidence suggests that the effects of discretion we identified are robust to the inclusion of these institutional factors as controls. Second, we explore the relationship between projects' past and future delays in delivery and winners' past and future incumbency. We find that contractors that have won in the past systematically deliver current works faster. In addition, contractors characterized by better past performance are more likely to win current auctions. These correlations suggests that positive productive relationships may dominate negative corrupt relationships in our sample.

Our overall evidence suggests that discretion increases the number of repeated wins by contractors and need not result in worse overall functioning of public procurement. Indeed, we have some evidence, albeit not causal, of a small positive effect of discretion. Taken together, these results are coherent with the conclusions of Banfield (1975) and Kelman (1990), who claim that some discretion, even at the risk of a reduction in accountability (in the absence of *ex post* performance monitoring), may be necessary to achieve good public management. They are also consistent with the findings of Bandiera et al. (2009), that the amount of (passive) waste linked to red tape and other inefficiencies is considerably larger than (active) waste from corruption in the procurement of goods and services in Italy, and that overall waste is considerably smaller when the purchasing authority is more autonomous and therefore enjoys somewhat more discretion. This is not to say that discretion is not often misused in many instances of public procurement, including those we

are studying in this paper. Our results show that, in our data, the effects of the productive use of discretion appear to dominate the unproductive use of discretion, so that the stricter accountability rules that apply above the threshold may not have been welfare-increasing in this procurement market. However, we are sure that the misuse of discretion is present in many instances in our data, even though our controls do not seem to capture it, and we conjecture that if corruption could be fought effectively with instruments other than reduced buyer discretion and rigidity of procedures, the effect of increased buyer discretion would be even stronger. The complex interaction between accountability rules and the productive and unproductive use of discretion in organizations remains, in our view, an exciting and important issue in great need of further research.

References

Albano, G. L., Bianchi, M., and Spagnolo, G. 2006. Bid Average Methods in Procurement. *Rivista di Politica Economica*, 96(1), 41-62.

Al-Ubaydli, O., and List, J.A. 2015. On the Generalizability of Experimental Results in Economics. In Frèchette, G. R., and Schotter, A. (Eds.). *Handbook of Experimental Economic Methodology*. Oxford University Press.

Angrist, J. D. and Lavy, V. 1999. Using Maimonides Rule to Estimate the Effect of Class Size on the Scholastic Achievement. *The Quarterly Journal Of Economics*, 114(2), 533-575

Angrist, J. D. 2006. Instrumental Variables Methods in Experimental Criminological Research: What, Why, and How. *Journal of Experimental Criminology*, 2(1), 23-44.

Bajari, P., and Tadelis, S. 2001. Incentives versus Transaction Costs: A Theory of Procurement Contracts. *RAND Journal of Economics*, 32(3), 387-407.

Bajari, P., McMillan, R., and Tadelis, S. 2009. Auctions Versus Negotiations in Procurement: An Empirical Analysis. *Journal of Law, Economics, and Organization*, 25(2), 372-399.

Bandiera, O., Prat, A., and Valletti, T. 2009. Active and Passive Waste in Government Spending: Evidence from a Policy Experiment. *American Economic Review*, 99(4), 1278-1308.

Banerjee, A. V., and Duflo, E. 2000. Reputation Effects And The Limits Of Contracting: A Study Of The Indian Software Industry. *The Quarterly Journal of Economics*, 115(3), 989-1017.

Banfield, E. C. 1975. Corruption as a Feature of Governmental Organization. *Journal of Law and Economics*, 18(3), 587-605.

Branzoli, N., and Decarolis, F. 2015. Entry and Subcontracting in Public Procurement Auctions. Management Science. Forthcoming.

Brunell, T. L., and DiNardo, J. 2004. A Propensity Score Reweighting Approach to Estimating the Partisan Effects of Full Turnout in American Presidential Elections. *Political Analysis*, 12(1), 28-45.

Bulow, J., and Klemperer, P. 1996. Auctions Versus Negotiations. *American Economic Review*, 86(1), 180-194.

Bulow, J., and Klemperer, P. 2009. Why Do Sellers (Usually) Prefer Auctions?. *American Economic Review*, 99(4), 1544-1575.

Calzolari, G. and Spagnolo, G. 2009. Relational contracts and Competitive Screening. C.E.P.R. Discussion Papers 7434.

Chang, W. S., Chen, B., and Salmon, T. C. 2015. An Investigation of the Average Bid Mechanism for Procurement Auctions. *Management Science*, 61(6),1237-1254.

Chever, L., Saussier, S., and Yvrande-Billon, A. 2013. The Law of Small Numbers: Investigating the Benefits of Restricted Auctions for Public Procurement., Mimeo.

Chever, L., and Moore, J. 2012. When More Discretionary Power Improves Public Procurement Efficiency: An Empirical Analysis of French Negotiated Procedures, Mimeo.

Chong, E., Staropoli, C. and Yvrande-Billon, A. 2012. Auction versus Negotiation: The implication of political scrutiny, Mimeo.

Conley, T., and Decarolis, F. 2015. Detecting Bidders Groups in Collusive Auctions. *American Economic Journal: Microeconomics*, Forthcoming.

Coviello, D., and Mariniello, M. 2014. Publicity Requirements in Public Procurement: Evidence from a Regression Discontinuity Design. *Journal of Public Economics*, 109(C), 76-100.

Coviello, D. and Gagliarducci, S. 2015. Tenure in Office and Public Procurement. Mimeo.

Decarolis, F. 2014. Awarding price, contract performance, and bids screening: evidence from procurement auctions. *American Economic Journal: Applied Economics*, 6(1), 108-132.

DiNardo, J., Fortin, N. M., and Lemieux, T. 1996. Labor Market Institutions and the Distribution of Wages, 1973-1992: A Semiparametric Approach. *Econometrica*, 64(5), 1001-1044.

Doni, N. 2006. The Importance of Reputation in Awarding Public Contracts. *Annals of Public and Cooperative Economics*, 77(4), 401-429.

Duflo, E., Greenstone, M., Pande, R., and Ryan, N. 2015. The Value of Regulatory Discretion: Estimates from Environmental Inspections in India Cambridge, Massachusetts, USA:Harvard Project on Climate Agreements.

Feir, D., Lemieux, T., and Marmer, V. 2015. Weak Identification in Fuzzy Regression Discontinuity Designs. *Journal of Business and Economic Statistics*, Forthcoming.

Gil, R., and Marion, J. 2013. Self-Enforcing Agreements and Relational Contracting: Evidence from California Highway Procurement. *Journal of Law, Economics, and Organization*, 29(2), 239-277

Guiso, L., Sapienza, P., and Zingales, L. 2004. The Role of Social Capital in Financial Development. *American Economic Review*, 94(3), 526-556.

Golden, M. A., and Picci, L. 2005. Proposal for a New Measure of Corruption, Illustrated with Italian Data. *Economics and Politics*, 17(1), 37-75.

Gelman, A., and Imbens, G.W. 2014. Why high-order polynomials should not be used in regression discontinuity designs. *NBER WP N. 20405.*

Guasch, J. L., Laffont, J. J. and Straub, S. 2008. Renegotiation of concession contracts in Latin America. *International Journal of Industrial Organization*, 26(2), 421-442.

Hahn, J., Todd, P., and Van der Klaauw, W. 2001. Identification and Estimation of Treatment Effects with a Regression-Discontinuity Design. *Econometrica*, 69(1), 201-209.

Imbens, G. W., and Lemieux, T. 2008. Regression Discontinuity Designs: A Guide to Practice. *Journal of Econometrics*, 142(2), 615-635.

Imbens, G. W., and Kalyanaraman, K. 2012. Optimal Bandwidth Choice for the Regression Discontinuity Estimator. *The Review of Economics Studies*, 79(3), 933-959.

Kang, K., and Miller, R. A. 2015. Winning by Default: Why is There So Little Competition in Government Procurement? Mimeo.

Kelman, S. 1990. *Procurement and Public Management.* AEI Press, Washington.

Kim, I. G. 1998. A Model of Selective Tendering: Does Bidding Competition Deter Opportunism by Contractors?. *The Quarterly Review of Economics and Finance*, 38(4), 907-925.

Konkurrensverket, 2015. Public Procurement Thresholds and Data in Sweden. UPPDRAGSFORSKNINGSRAPPORT 2015:3.

Lalive, R., and Schmutzler, A. 2011. Auctions vs Negotiations in Public Procurement Evidence from Railway Market. Mimeo.

Lee, D. S. 2008. Randomized Experiment from Non-Random Selection in U.S. House Elections. *Journal of Econometrics*, 142(2), 675-697.

Lee, D. S., and Lemieux, T. 2010. Regression Discontinuity Designs in Economics. *Journal of Economic Literature*, 48, 281-355.

Levitt, S.D., List, J.A. 2009. Field experiments in economics: The past, the present, and the future. *European Economic Review*, 53 (1).

Levitt, S. D., and List, J. A. 2009. Field Experiments in Economics: the Past, the Present, and the Future. *European Economic Review,* 53(1), 1-18.

Lewis, G., and Bajari, P. 2011. Procurement Contracting With Time Incentives: Theory and Evidence. *The Quarterly Journal of Economics*, 126(3), 1173-1211.

Lewis, G., and Bajari, P. 2014. Moral Hazard, Incentive Contracts and Risk: Evidence from Procurement. *Review of Economics Studies*, 0, 1-28.

Malcomson, J.M. 2013. Relational Incentive Contracts. In Gibbon, R., and J. Roberts (Eds.) *Handbook of Organizational Economics.* Princeton University Press, Princeton, Nj.

Manelli, A. M., and Vincent, D. R. 1995. Optimal Procurement Mechanisms. *Econometrica*, 63(3), 591-620.

McCrary, J. 2008. Manipulation of the Running Variable in the Regression Discontinuity Design: A Density Test. *Journal of Econometrics*, 142(2), 698-714

Molander, P. 2014. Public Procurement in the European Union: The Case for National Threshold Values. *Journal of Public Procurement*, 14(2), 181-214

Rosenbaum, P. R., and Rubin, D. B. 1983. The Central Role of the Propensity Score in Observational Studies for Causal Effects. *Biometrika*, 70(1), 41-55.

Shi, L., and Susarla, A. 2008. Relational Contracts, Reputation Capital, and Explicit Contracts: Evidence from Information Technology Outsourcing. *No. UWEC-2008-16*.

Spagnolo, G. 2012. Reputation, Competition and Entry in Procurement. *International Journal of Industrial Organization*, 30(3), 291-296.

Spulber, D.F. 1990. Auctions and Contract Enforcement. *Journal of Law, Economics and Organization*, 6(2), 325-44.

Van der Klauw, W. 2002. Estimating the Effect of Financial Aid Offers on College Enrollment: a Regression-Discontinuity Approach. *International Economic Review*, 43(4), 1249-1287.

Yukins, C. R. 2008, Are IDIQs Inefficient? Sharing Lessons with the European Framework Contracting. *Public Contracts Law Journal*, 37, 545-568.

Table 1: Descriptive Statistics

VARIABLES	mean	sd	p50	N
	Outcomes			
Trattativa Privata	0.077	0.267	0	3,362
N. Bidders	15.22	19.46	9	3,362
Winning Rebate	12.89	7.301	12.45	3,362
Work Length	392.6	195.7	360	3,362
Days of Delay	142.1	142.2	109	3,362
Cost Overrun	0.137	0.178	0.0835	3,362
Local Winner	0.562	0.496	1	3,362
Incumbent Winner	0.105	0.306	0	2,914
S.R.L.	0.471	0.499	0	2,763
	Characteristics			
Project Value (in 100,000 euro)	3.167	0.846	2.974	3,362
Province	0.096	0.294	0	3,362
Municipality	0.621	0.485	1	3,362
Population (in 1,000)	1,087	1,078	636.4	3,362
Corruption Index	1.074	0.927	0.824	3,329
Lenght Civil Trial (in days)	871.2	292.9	826	3,362
Social Capital Index	0.841	0.0577	0.860	3,362
North	0.613	0.487	1	3,362
Center	0.257	0.437	0	3,362
South	0.130	0.336	0	3,362

Note: *Trattativa Privata* is a dummy equal to one for works assigned with a more discretionary procedure. *Winning Rebate* is the percentage discount over the reserve price. *Work Length* is the number of days from the first day of work until the effective end of the project, which represent the effective duration of the works. *Delay* is the difference in days between the effective end of the project and the contractual deadline. *Cost Overrun* is the ratio between the difference in the final cost and the awarding cost (reserve price discounted by the winning rebate) and the awarding cost. *Local Winner* is a dummy equal to one if the winning firm is located in the same province of the public buyer. *Incumbent Winner* is a dummy equal to one if the winning firm has won a contract with the public buyer in the past year. *S.R.L* is a dummy equal to one if the winning firm is a limited liability firm. *Population* is the number of residents at the provincial level (in 1,000). *Corruption index* is the Golden-Picci Index (2005) defined as the difference between the actual quantities of public infrastructures and the priced paid to accumulate that stock of capital. *Social Capital Index* is the Guiso et al. (2004) measure based on referendum turnout.
Source: Statistics for all the public construction works tendered between 2000 and 2005, with reserve price $y \in [2, 5]$, in 100,000 euros (2005 equivalents).

Table 2: Descriptive Statistics - Comparison across Threshold

VARIABLES	mean	sd	p50	N	mean	sd	p50	N
	Below 300,00 euros							
	No Trattativa Privata				Yes Trattativa Privata			
N. Bidders	14.60	17.59	9	1,520	3.176	2.415	3	204
Winning Rebate	13.11	7.347	12.51	1,520	8.680	6.938	6.815	204
Work Length	354.4	174.6	325.5	1,520	313.3	186.7	283	204
Days of Delay	128.2	130.3	98	1,520	127.5	139.9	97	204
Cost Overrun	0.133	0.184	0.0801	1,520	0.148	0.178	0.0914	204
Local Bidders	0.572	0.495	1	1,520	0.691	0.463	1	204
Incumbent Winner	0.0998	0.300	0	1,313	0.200	0.401	0	185
S.R.L.	0.468	0.499	0	1,253	0.449	0.499	0	178
	Above 300,00 euros							
	No Trattativa Privata				Yes Trattativa Privata			
N. Bidders	17.76	21.84	11	1,583	4.273	3.297	4	55
Winning Rebate	13.38	7.124	12.83	1,583	7.996	5.643	7.060	55
Work Length	438.6	203.8	406	1,583	417.7	227.1	364	55
Days of Delay	156.5	150.1	120	1,583	164.8	183.4	121	55
Cost Overrun	0.138	0.173	0.0857	1,583	0.144	0.155	0.0912	55
Local Bidders	0.536	0.499	1	1,583	0.564	0.501	1	55
Incumbent Winner	0.0962	0.295	0	1,372	0.114	0.321	0	44
S.R.L.	0.474	0.500	0	1,281	0.529	0.504	1	51

Notes: *Trattativa Privata* is a dummy equal to one for works assigned with a more discretionary procedure. *Winning Rebate* is the percentage discount over the reserve price. *Work Length* the number of days from the first day of work until the effective end of the project, which represent the effective duration of the works. *Delay* is the difference in days between the effective end of the project and the contractual deadline. *Cost Overrun* is the ratio between the difference in the final cost and the awarding cost (reserve price discounted by the winning rebate) and the awarding cost. *Local Winner* is a dummy equal to one if the winning firm is located in the same province of the public buyer. *Incumbent Winner* is a dummy equal to one for a winner that has won at least one other auction held by the same buyer within a year from the current auction. *S.R.L* is a dummy equal to one if the winning firm is a limited liability firm.

Source: Statistics for all the public construction works tendered between 2000 and 2005, with reserve price $y \in [2, 5]$, in 100,000 euros (2005 equivalents).

Table 3: McCrary Discontinuity Test

	All Years	2000	2001	2002	2003	2004	2005
Discontinuity	-0.154	-0.194	0.146	-0.185	-0.253	-0.282	-0.549*
(SE)	(0.131)	(0.300)	(0.252)	(0.237)	(0.237)	(0.262)	(0.322)

Notes: The running variable is the difference between the reserve price and the 300,000 euro threshold (in 100,000 euros). Rows 1 and 2 report the Coefficient and Standard Errors of the of the Discontinuity Test according to McCrary (2008). Column 1 reports the result for the Full Sample. Columns 2 through 5 report the results from 2000 and 2005. Significance at the 10% (*), at the 5% (**), and at the 1% (***).

Source: Statistics for all the public construction works tendered between 2000 and 2005, with reserve price $y \in [2, 5]$, in 100,000 euros (2005 equivalents).

Table 4: Baseline Model

VARIABLES	(1) Trattativa	(2) Rebate	(3) N. Bidders	(4) Work Len.	(5) Delay	(6) C. Over.	(7) Local W.	(8) Inc. W.	(9) S.R.L.
ITT	0.174***	0.0530	-2.764	-13.53	29.97*	-0.00953	0.0145	0.0839**	0.0675
	(0.0367)	(0.586)	(1.935)	(20.51)	(16.60)	(0.0209)	(0.0560)	(0.0377)	(0.0742)
Fuzzy-RDD		0.389	-17.22	-78.21	174.8	-0.0562	0.0929	0.440**	0.373
		(4.308)	(11.85)	(117.3)	(109.2)	(0.125)	(0.358)	(0.209)	(0.430)
Observations	2,025	3,314	2,392	2,014	1,620	2,163	2,349	1,850	1,310
Average	0.0889	12.88	14.13	376.8	137.3	0.136	0.567	0.0957	0.479
Bandwidth	0.730	1.836	0.864	0.726	0.585	0.780	0.847	0.775	0.572

Notes: The table reports estimates for discretion from regressions, which include a cubic polynomial in the difference of the reserve price from the 300,000 euro threshold and Fixed Effects for years 2000-2005. Rows 1 and 2 report the Coefficient and SEs (in parenthesis) of the regression of the outcomes on an indicator variable equal to one if the reserve price is below 300,000 euros *(ITT effects)*, Rows 3 and 4 report the IV-LATE estimates of the effects of discretion on the outcomes (*Trattativa Privata*), which use the indicator variable equal to one if the reserve price is below 300,000 euros as instrument *(Fuzzy-RDD)*. The dependent variables are: in column 1, *Trattativa Privata*, a dummy equal to one for works assigned with a more discretionary procedure; in column 2, *Winning Rebate*, the percentage discount over the reserve price; in column 3, the number of bidders; in column 4, *Work Length*, the number of days from the first day of work until the effective end of the project, which represent the effective duration of the works; in column 5, *Delay*, the difference in days between the effective end of the project and the contractual deadline; in column 6, *Cost Overrun*, the ratio between the difference in the final cost and the awarding cost (reserve price discounted by the winning rebate) and the awarding cost; in column 7, *Local Winner*, a dummy equal to one if the winning firm is located in the same province of the public buyer; in column 8, *Incumbent Winner*, a dummy equal to one for a winner that has won at least one other auction held by the same buyer within a year from the current auction; in 9 column, *S.R.L* a dummy equal to one if the winning firm is a limited liability firm. *Observations* reports the number of observations; *Average* reports the average value of the dependent variables; *Bandwidth* reports the optimal bandwidth calculated using the Imbens and Kalyanaraman (2012) procedure. SEs are adjusted for heteroskedasticity. Significance at the 10% (*), at the 5% (**), and at the 1% (***).
Source: Statistics for all the public construction works tendered between 2000 and 2005, with reserve price $y \in [2, 5]$, in 100,000 euros (2005 equivalents). The number of observations is smaller compared the full sample described in Table 1, because we restrict the analysis the optimal bandwidth sample, as in Imbens and Kalyanaraman (2012).

Table 5: Robustness and Sensitivity Analysis: Polynomial Specification

VARIABLES	(1) Trattativa	(2) Rebate	(3) N. Bidders	(4) Work Leng.	(5) Delay	(6) C. Over.	(7) Local W.	(8) Inc. W.	(9) S.R.L.
				Panel A: Intention to Treat					
Linear	0.142***	-0.144	-0.914	-18.02	-7.453	0.00972	-0.00351	0.0505*	0.0978*
	(0.0270)	(0.463)	(1.491)	(15.90)	(12.91)	(0.0154)	(0.0418)	(0.0280)	(0.0560)
Quadratic	0.129***	-0.240	-0.617	-11.69	-6.037	0.00957	0.000143	0.0478*	0.0926
	(0.0249)	(0.513)	(1.532)	(16.40)	(12.91)	(0.0156)	(0.0429)	(0.0275)	(0.0570)
Quartic	0.164***	-0.678	-2.377	-3.762	34.07**	-0.00665	0.0199	0.0897**	0.0647
	(0.0344)	(0.701)	(1.996)	(21.06)	(16.56)	(0.0214)	(0.0571)	(0.0372)	(0.0754)
				Panel B: Fuzzy-RDD					
Linear		-1.254	-6.702	-126.6	-47.56	0.0711	-0.0249	0.330*	0.556
		(4.021)	(10.75)	(111.5)	(82.39)	(0.112)	(0.296)	(0.186)	(0.343)
Quadratic		-1.764	-4.835	-90.43	-42.37	0.0758	0.00109	0.335*	0.594
		(3.732)	(11.87)	(126.3)	(90.69)	(0.123)	(0.325)	(0.197)	(0.391)
Quartic		-4.535	-16.19	-23.01	200.8*	-0.0419	0.139	0.505**	0.357
		(4.661)	(13.38)	(128.3)	(111.4)	(0.136)	(0.398)	(0.226)	(0.431)
Observations	2,025	3,314	2,392	2,014	1,620	2,163	2,349	1,850	1,310
Average	0.0889	12.88	14.13	376.8	137.3	0.136	0.567	0.0957	0.479
Bandwidth	0.730	1.836	0.864	0.726	0.585	0.780	0.847	0.775	0.572

Notes: The table reports estimates for discretion from regressions, which include linear (quadratic) [quartic] polynomial in the difference of the reserve price from the 300,000 euro threshold and Fixed Effects for years 2000-2005. The Panel A, rows 1 (3) [5] and 2 (4) [6], reports the estimates of the Coefficient and SEs (in parenthesis) of the regression of the outcomes on an indicator variable equal to one if the reserve price is below 300,000 euros (*ITT effects)*. The Panel B, rows 7 (9) [11] and 8 (10) [12], reports estimates of IV-LATE estimates of the effects of discretion on the outcomes (*Trattativa Privata*), which use the indicator variable equal to one if the reserve price is below 300,000 euros as instrument *(Fuzzy-RDD)*. The dependent variables are: in column 1, *Trattativa Privata*, a dummy equal to one for works assigned with a more discretionary procedure; in column 2, *Winning Rebate*, the percentage discount over the reserve price; in column 3, the number of bidders; in column 4, *Work Length*, the number of days from the first day of work until the effective end of the project, which represent the effective duration of the works; in column 5, *Delay*, the difference in days between the effective end of the project and the contractual deadline; in column 6, *Cost Overrun*, the ratio between the difference in the final cost and the awarding cost (reserve price discounted by the winning rebate) and the awarding cost; in column 7, *Local Winner*, a dummy equal to one if the winning firm is located in the same province of the public buyer; in column 8, *Incumbent Winner*, a dummy equal to one for a winner that has won at least one other auction held by the same buyer within a year from the current auction; in 9 column, *S.R.L* a dummy equal to one if the winning firm is a limited liability firm. *Observations* reports the number of observations; *Average* reports the average value of the dependent variables; *Bandwidth* reports the optimal bandwidth calculated using the Imbens and Kalyanaraman (2012) procedure, and it is used to estimate the effects of discretion for the sample of works with reserve price within this bandwidth. SEs are adjusted for heteroskedasticity. Significance at the 10% (*), at the 5% (**), and at the 1% (***).
Source: Statistics for all the public construction works tendered between 2000 and 2005, with reserve price $y \in [2, 5]$, in 100,000 euros (2005 equivalents). The number of observations is smaller compared the full sample described in Table 1, because we restrict the analysis the optimal bandwidth sample, as in Imbens and Kalyanaraman (2012)

Table 6: Controlling for Corruption, Social Capital and Judicial Efficiency

VARIABLES	(1) Trattativa	(2) Rebate	(3) N. Bidders	(4) Work Leng.	(5) Delay	(6) C. Over.	(7) Local W.	(8) Inc. W.	(9) S.R.L.
				Panel A: Social Capital					
ITT	0.173***	-0.0174	-2.262	-12.77	29.92*	-0.00757	0.0199	0.0858**	0.0684
	(0.0366)	(0.513)	(1.916)	(20.39)	(16.51)	(0.0206)	(0.0557)	(0.0376)	(0.0739)
Social Capital	0.366***	-71.64***	-105.0***	-281.3***	-133.3**	-0.484***	-0.952***	0.372***	0.524**
	(0.0745)	(2.338)	(7.953)	(67.66)	(55.10)	(0.0916)	(0.168)	(0.108)	(0.231)
Fuzzy-RDD		-0.127	-14.24	-74.21	174.3	-0.0451	0.129	0.445**	0.377
		(3.745)	(11.84)	(117.4)	(108.3)	(0.124)	(0.360)	(0.207)	(0.428)
Social Capital		-71.59***	-99.70***	-254.1***	-197.0***	-0.466***	-1.000***	0.193	0.408
		(2.634)	(9.338)	(81.52)	(70.49)	(0.103)	(0.215)	(0.137)	(0.269)
				Panel B: Corruption					
ITT	0.173***	-0.248	-2.997	-13.02	29.13*	-0.0104	0.00928	0.0882**	0.0717
	(0.0367)	(0.535)	(1.924)	(20.56)	(16.66)	(0.0208)	(0.0559)	(0.0378)	(0.0744)
Corruption	-0.0115**	3.677***	5.518***	1.505	-1.156	0.0228**	0.0435***	-0.00505	0.0457***
	(0.00492)	(0.138)	(0.650)	(5.278)	(4.099)	(0.00900)	(0.0105)	(0.00775)	(0.0159)
Fuzzy-RDD		-1.848	-18.73	-75.65	167.6	-0.0612	0.0597	0.462**	0.391
		(3.951)	(11.83)	(118.2)	(107.2)	(0.126)	(0.359)	(0.211)	(0.427)
Corruption		3.651***	5.273***	0.629	0.505	0.0221**	0.0443***	-0.000761	0.0479***
		(0.142)	(0.669)	(5.421)	(4.336)	(0.00936)	(0.0114)	(0.00805)	(0.0164)
				Panel C: Judicial Efficiency					
ITT	0.161***	-0.0872	-2.093	-18.54	28.77*	-0.00497	0.0182	0.0933**	0.0867
	(0.0365)	(0.421)	(1.764)	(20.36)	(16.35)	(0.0204)	(0.0524)	(0.0382)	(0.0740)
Length Civil Trial	0.00369	-0.0906	0.170	1.340	-3.501	0.00194	-0.0134	-0.00348	-0.00907
	(0.00492)	(0.0851)	(0.365)	(3.710)	(3.182)	(0.00364)	(0.00892)	(0.00667)	(0.0121)
Fuzzy-RDD		-0.663	-14.10	-115.6	178.5	-0.0315	0.128	0.496**	0.502
		(3.183)	(11.57)	(126.5)	(114.6)	(0.130)	(0.368)	(0.220)	(0.466)
Length Civil Trial		-0.0901	0.177	1.748	-4.311	0.00204	-0.0134	-0.00552	-0.00931
		(0.0843)	(0.357)	(3.680)	(3.446)	(0.00363)	(0.00886)	(0.00738)	(0.0129)
Observations	2,025	3,314	2,392	2,014	1,620	2,163	2,349	1,850	1,310
Average	0.0889	12.88	14.13	376.8	137.3	0.136	0.567	0.0957	0.479
Bandwidth	0.730	1.836	0.864	0.726	0.585	0.780	0.847	0.775	0.572

Notes: The table reports estimates for discretion from regressions, which include a cubic polynomial in the difference of the reserve price from the 300,000 euro threshold and Fixed Effects for years 2000-2005. Panel A (B) [C] includes control for Social Capital index (Corruption index) [Length of civil trial]. Rows 1 (9) [17] and 2 (10) [18] report the regression of the outcomes on an indicator variable equal to 1 if the reserve price is below 300,000 euros *(ITT effects)*; rows 3 (11) [19] and 4 (12) [20] report the Coefficient and SEs (in parenthesis) of the Social Capital index (Corruption index) [Length of civil trial]. Rows 5 (13) [21] and 6 (14) [22] the IV-LATE estimates of IV-LATE estimates of the effects of discretion on the outcomes (*Trattativa Privata*), which use the indicator variable equal to 1 if the reserve price is below 300,000 euros as instrument *(Fuzzy-RDD)*; rows 7 (15) [23] and 8 (16) [24] report the Coefficient and SEs (in parenthesis) of the Social Capital index (Corruption index) [Length of civil trial]. The dependent variables are: in column 1, *Trattativa Privata*, a dummy equal to one for works assigned with a more discretionary procedure; in column 2, *Winning Rebate*, the percentage discount over the reserve price; in column 3, the number of bidders; in column 4, *Work Length*, the number of days from the first day of work until the effective end of the project, which represent the effective duration of the works; in column 5, *Delay*, the difference in days between the effective end of the project and the contractual deadline; in column 6, *Cost Overrun*, the ratio between the difference in the final cost and the awarding cost (reserve price discounted by the winning rebate) and the awarding cost; in column 7, *Local Winner*, a dummy equal to one if the winning firm is located in the same province of the public buyer; in column 8, *Incumbent Winner*, a dummy equal to one for a winner that has won at least one other auction held by the same buyer within a year from the current auction; in 9 column, *S.R.L* a dummy equal to one if the winning firm is a limited liability firm. *Observations* reports the number of observations; *Average* reports the average value of the dependent variables; *Bandwidth* reports the optimal bandwidth calculated using the Imbens and Kalyanaraman (2012) procedure, and it is used to estimate the effects of discretion for the sample of works with reserve price within this bandwidth. SEs are adjusted for heteroskedasticity. Significance at the 10% (*), at the 5% (**), and at the 1% (***).
Source: Statistics for all the public construction works tendered between 2000 and 2005, with reserve price $y \in [2, 5]$, in 100,000 euros (2005 equivalents). The number of observations is smaller compared the full sample described in Table 1, because we restrict the analysis the optimal bandwidth sample, as in Imbens and Kalyanaraman (2012)

Table 7: Incumbency and Contract Execution: Delay

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Delay	Delay	Delay	Delay	Delay	Delay
MODEL	FE	PSM	RW	FE	PSM	RW
			Full Sample			
	Below 300,000 euro			Above 300,000 euro		
Incumbent Winner	-21.35**	-19.82*	-22.25**	-3.828	-2.586	-2.276
	(9.739)	(11.24)	(9.163)	(12.33)	(14.29)	(11.87)
Observations	1,292	1,292	1,292	1,094	1,094	1,094
			Optimal Bandwidth			
	Below 300,000 euro			Above 300,000 euro		
Incumbent Winner	-13.91	-10	-13.45	-11.57	-7.886	-8.669
	(11.99)	(13.26)	(10.53)	(17.42)	(20.99)	(15.32)
Observations	913	913	913	409	409	409

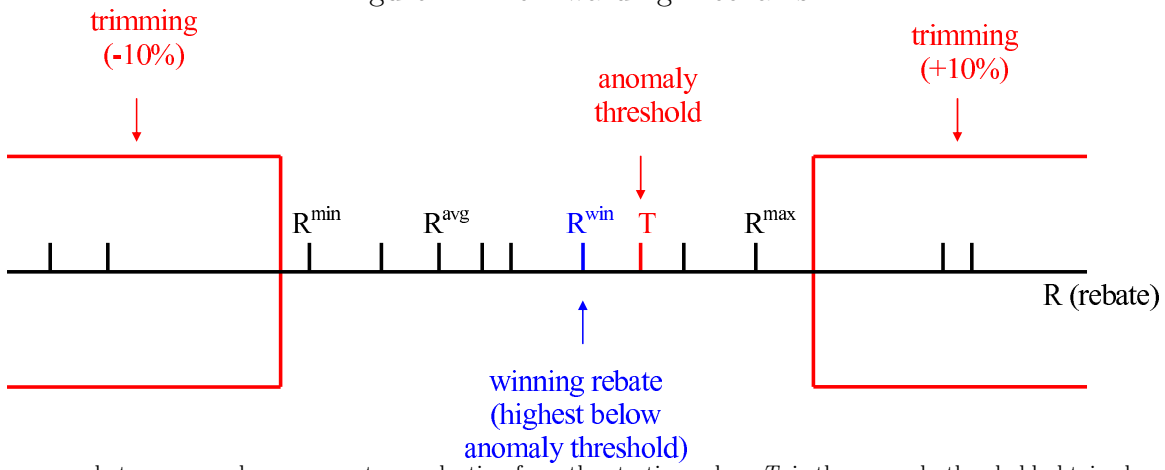
Notes: The table reports the effect of incumbency, defined as a dummy equal to one if the winning firm has won a contract with the public buyer in the past year in the last year, on days of delay, defined as the difference in days between the end of the project and the contractual deadline. Columns 1 through 3 report the results for the public works below 300,000 euros. Columns 4 through 6 report the results for the public works above 300,000 euros. Column 1 and 4 report the results of model including Fixed Effect for each province and year (110 province and years 2000-2005) and controls for the reserve price (cubic polynomial), number of bidders, contractual length, dummy for *Trattativa Privata* and winning rebate. Column 2 and 5 report the results for a Propensity Score Matching model; the project are matched using a propensity score on the reserve price (cubic polynomial), number of bidders, contractual length, dummy for *Trattativa Privata*, winning rebate and Fixed Effect for each province and year (110 province and years 2000-2005). Column 3 and 6 report the results for a Propensity Score Reweigthing model; the propensity score is constructed as in the Propensity Score Matching model. *Observations* reports the number of observations. Standard Errors are adjusted for heteroskedasticity. Significance at the 10% (*), at the 5% (**), and at the 1% (***). Source: Statistics for all the public procurements works tendered between 2000 and 2005, with reserve price $y \in [2, 5]$, in 100,000 euro (2005 equivalents).

Table 8: Incumbency and Past Performance

VARIABLES	(1) Win	(2) Win	(3) Win	(4) Win
		Full Sample		
	Below 300,000		Above 300,000	
Average Delay	-0.00199***	-0.00200***	-0.000839	-0.000849
	(0.000605)	(0.000605)	(0.000539)	(0.000538)
Observations	11,079	11,079	12,008	12,008
		Optimal Bandwidth		
	Below 300,000		Above 300,000	
Average Delay	-0.00215***	-0.00215***	-0.00105	-0.00105
	(0.000731)	(0.000731)	(0.000962)	(0.000961)
Observations	8,658	8,658	5,485	5,485

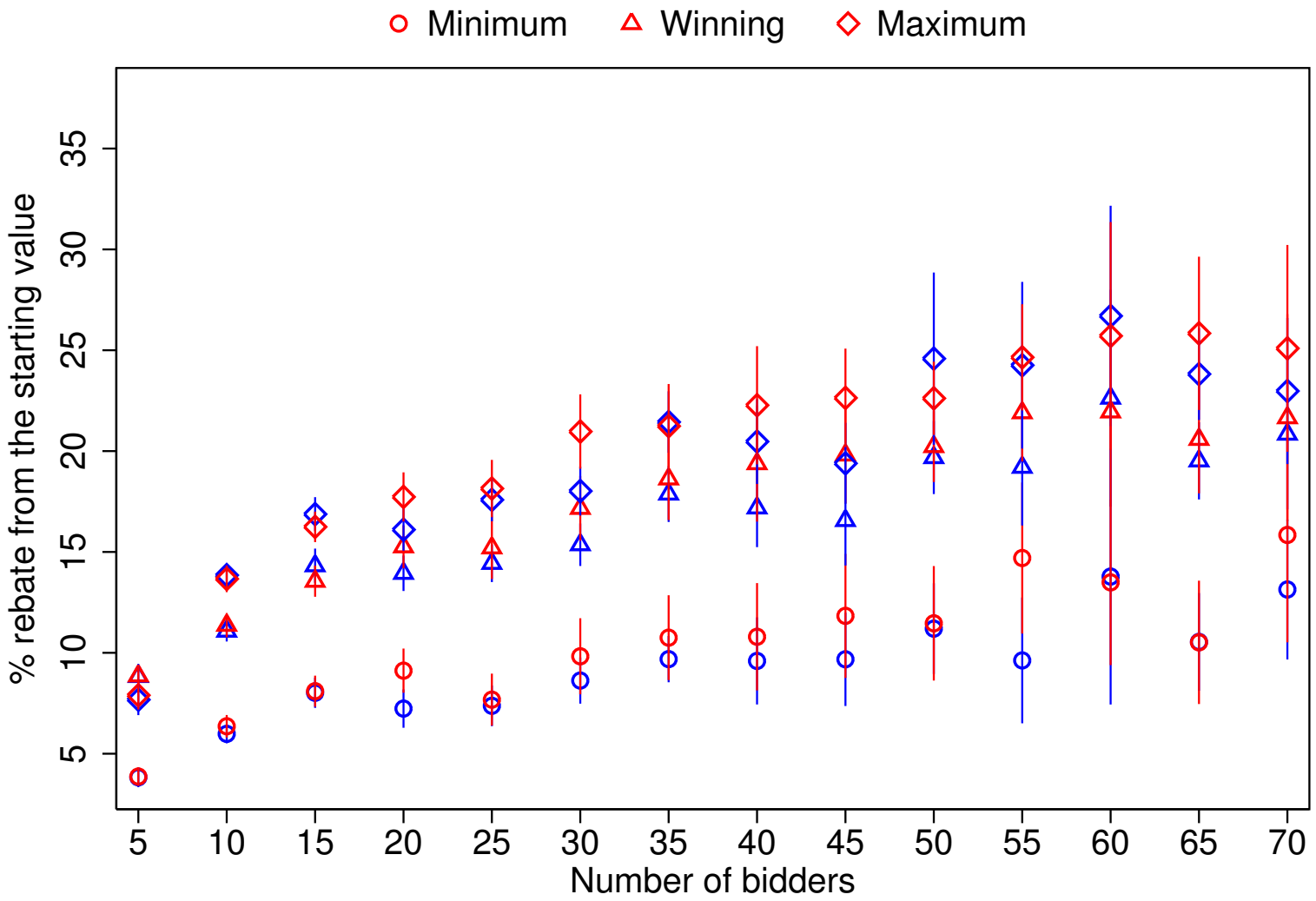
Notes: The table reports the effect of past performance, defined as the average number of days of delay in work executed in the previous year by the incumbent firm, on the probability of winning a auction today. The dependent variable is an indicator equal to one if the incumbent firm have win an auction today. Panel A (B) reports the results on the full sample (Optimal Bandwidth sample, calculated using the Imbens and Kalyanaraman (2012) procedure). Columns 1 and 2 report the results for the public works below 300,000 euros. Columns 3 through 4 reports the results for the public works above 300,000 euros. Columns 1 and 3 report the results of a model including as control contracting authority fixed effect, year fixed effect and project value (cubic polynomial). Columns 2 and 4 report the results of a model that add as additional control the contracting authority experience, defined as the number of works awarded in the past year. *Observations* reports the number of observations. Standard Errors are clustered at contracting authority level. Significance at the 10% (*), at the 5% (**), and at the 1% (***). Source: Statistics for all the public construction works tendered between 2000 and 2005, with project value $y \in [2, 5]$, in 100,000 euro.

Figure 1: The Awarding Mechanism



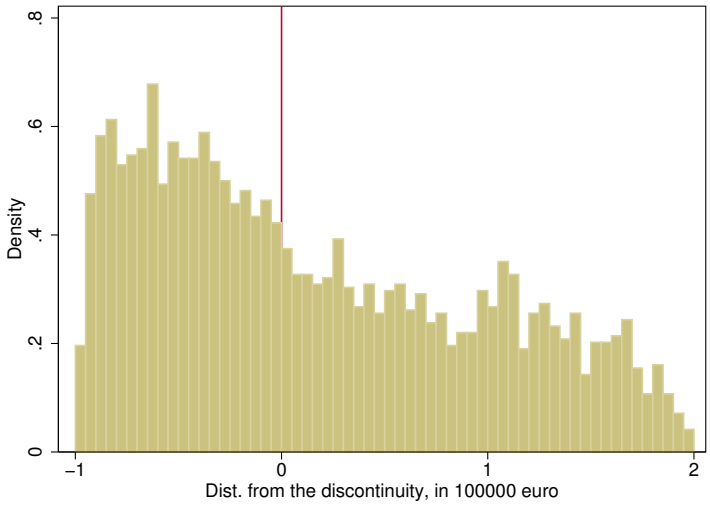
Notes. R^{avg} is the average rebate, expressed as a percentage reduction form the starting value. T, is the anomaly threshold obtained as the sum of R^{avg} and the average deviation of the bids above R^{avg}. R^{win} is the winning rebate and is the max rebate below T. R^{min} and R^{Max} the minimum and the maximum rebate, respectively.

Figure 2: Rebates, Number of Bidders and Discretion



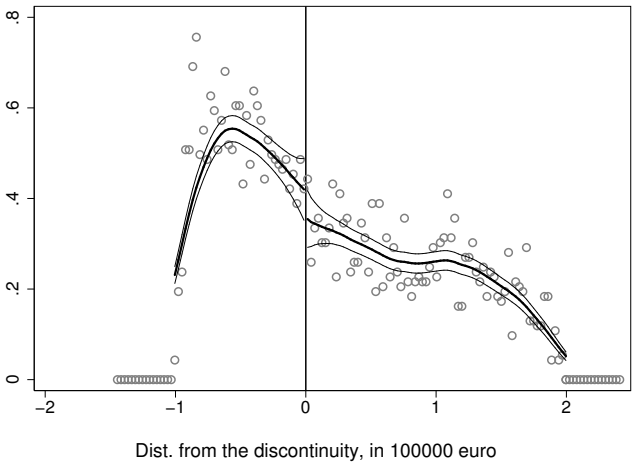
Notes: Distribution of the rebates conditional on the number of bidders participating to the auction at different levels of discretion: high (in red) or low (in blue). Circles denote the minimum rebate; triangles the winning rebate; diamonds the maximum rebate. Vertical lines denote the 95% confidence intervals. Source: Statistics for all the public construction works tendered between 2000 and 2005, with reserve price $y \in [2, 5]$, in 100,000 euros (2005 equivalents).

Figure 3: Overall Distribution of the Auctions Reserve Price



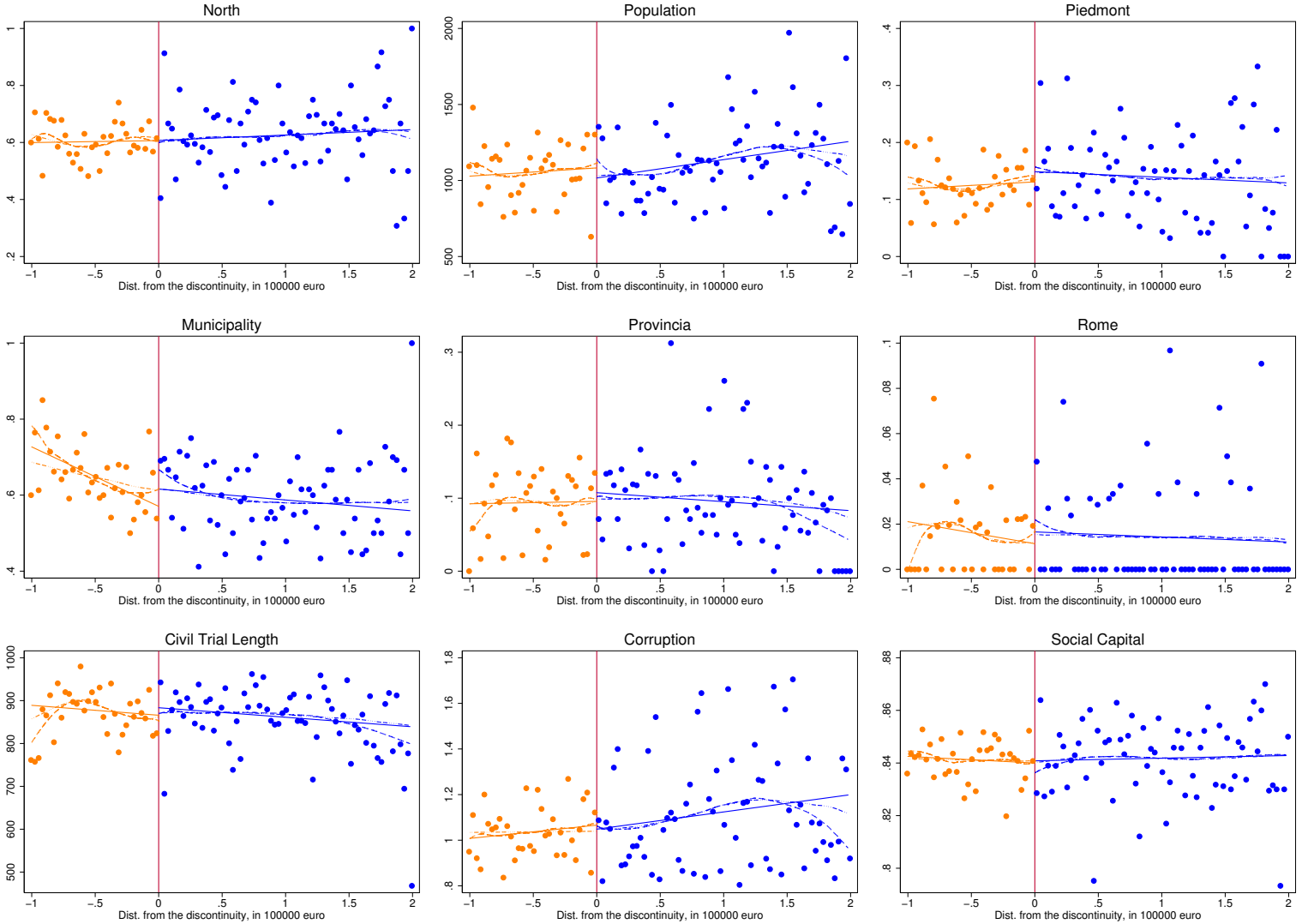
Notes: The running variable is the difference between reservation price and the 300,000 euro threshold (red vertical line).
Source: Statistics for all the public construction works tendered between 2000 and 2005, with auction value $y \in [2, 5]$, in 100,000 euros (2005 equivalents).

Figure 4: Discontinuity Test of Auctions Reserve Price Around the Threshold



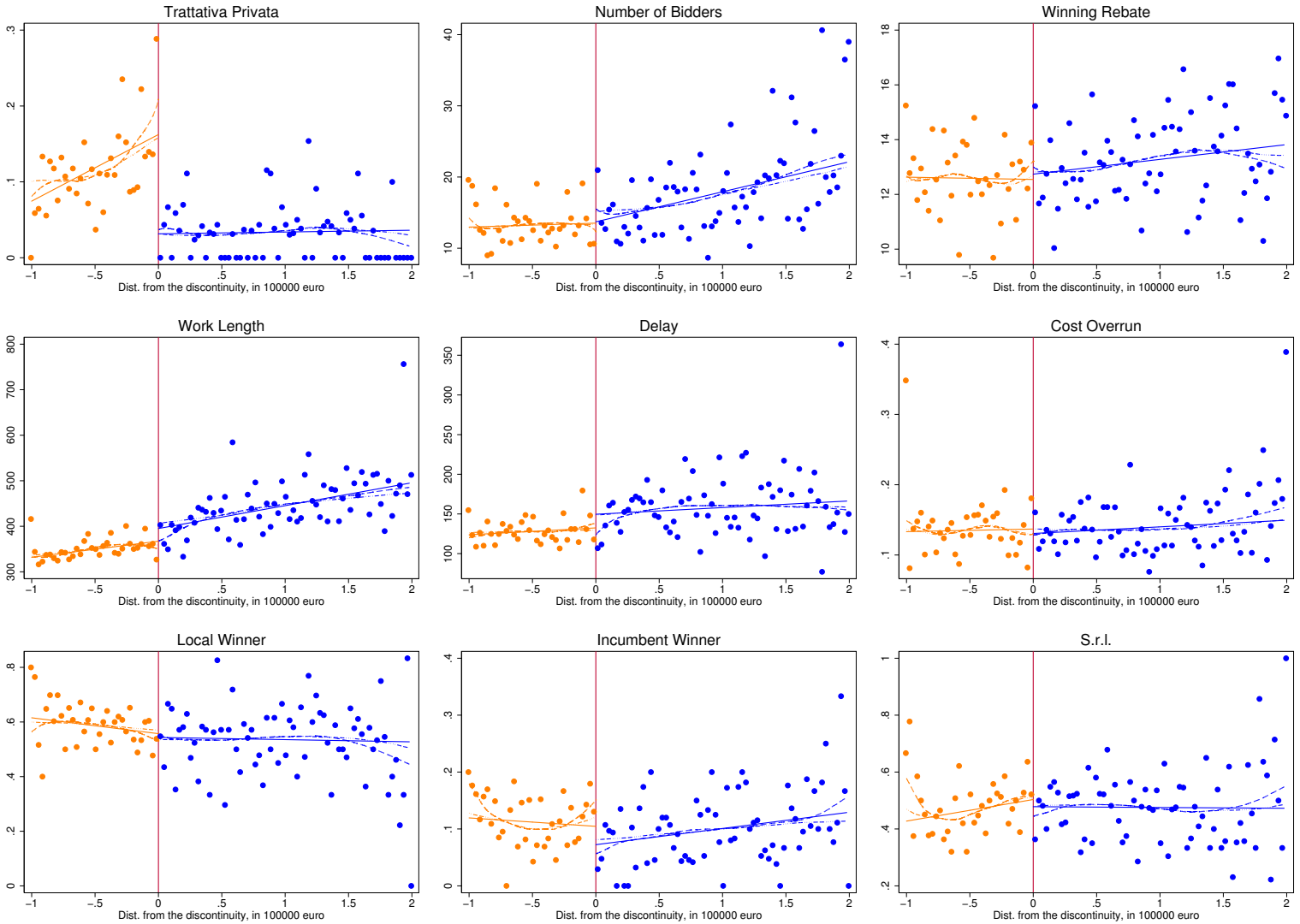
Notes: The running variable is the difference between the reserve price and the 300,000 euro threshold (vertical line). Circles are average observed values, the bold solid line is a kernel estimate (see McCrary, 2008), and the two thin lines are 95% confidence intervals. In this overall sample the McCrary (2008) discontinuity test (standard error) is -.15 (.13), and suggests that the null hypothesis of no sorting cannot be rejected at standard statistical confidence levels.
Source: Statistics for all the public construction works tendered between 2000 and 2005, with auction value $y \in [2, 5]$, in 100,000 euros (2005 equivalents).

Figure 5: Pretreatment Graphical Analysis



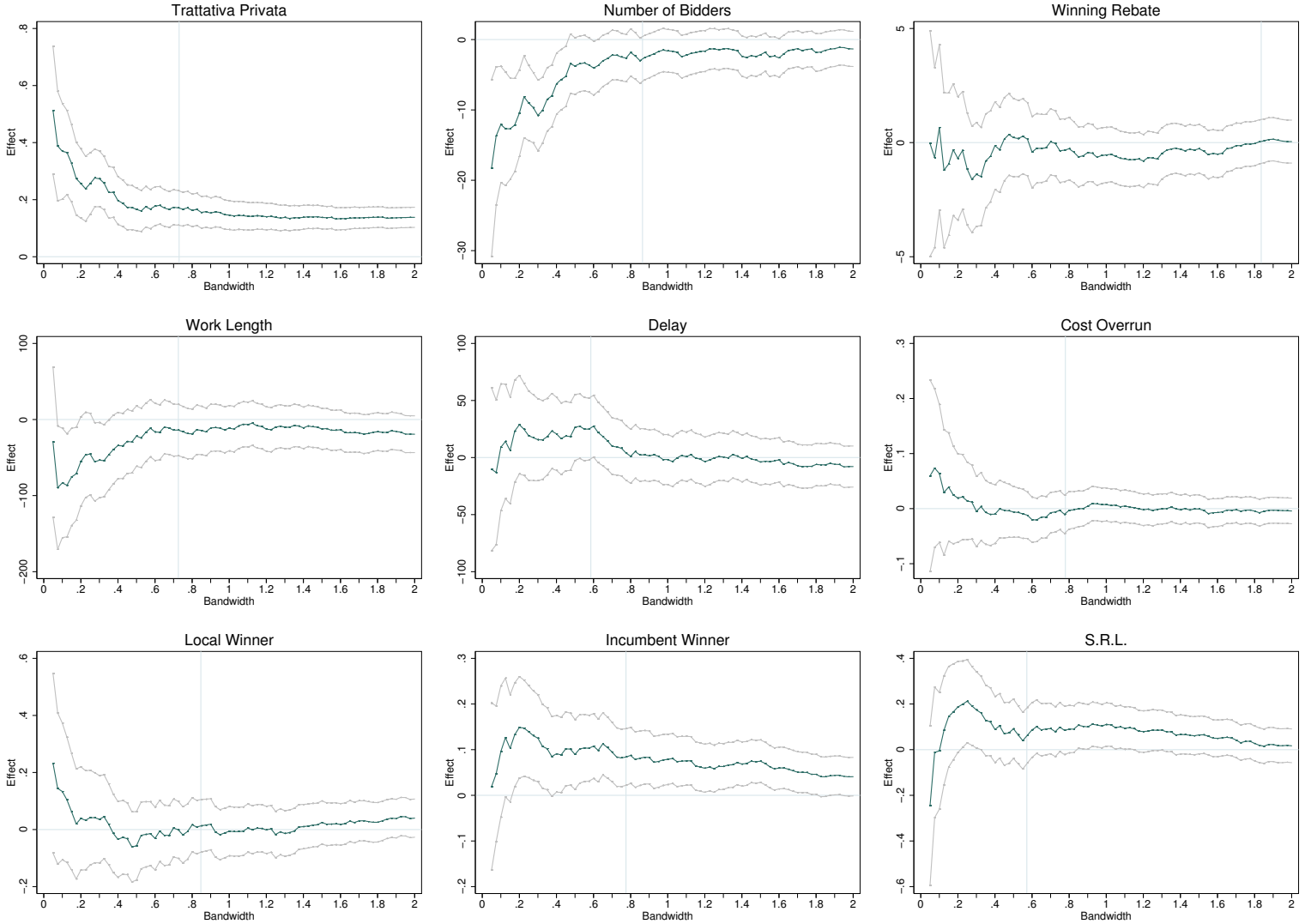
Notes: *North* is a dummy for work assigned warded in the North of Italy. *Population* is the number of residents at the provincial level (in 1,000). *Corruption index* is the Golden-Picci Index (2005) defined as the difference between the actual quantities of public infrastructures and the priced paid to accumulate that stock of capital. *Social Capital Index* is the Guiso et al. (2004) measure based on referendum turnout. The running variable is the difference between the reserve price and the 300,000 euro threshold. Circles represent sample averages of the dependent variable computed on 30,000 euros brackets of the running variable. The solid line is a linear estimate. The dot-dashed line is a local polynomial estimate. The dashed line is a running-mean smooth estimate. The red vertical line denotes the discontinuity, normalized to zero.
Source: Statistics for all the public construction works tendered between 2000 and 2005, with reserve price $y \in [2, 5]$, in 100,000 euros (2005 equivalents).

Figure 6: Graphical Analysis: Outcomes



Notes: *Trattativa Privata* is a dummy equal to one for works assigned with a more discretionary procedure. *Winning Rebate* is the percentage discount over the reserve price. *Work Length* the number of days from the first day of work until the effective end of the project, which represent the effective duration of the works. *Delay* is the difference in days between the effective end of the project and the contractual deadline. *Cost Overrun* is the ratio between the difference in the final cost and the awarding cost (reserve price discounted by the winning rebate) and the awarding cost. *Local Winner* is a dummy equal to one if the winning firm is located in the same province of the public buyer. *Incumbent Winner* is a dummy equal to one for a winner that has won at least one other auction held by the same buyer within a year from the current auction. $S.R.L$ is a dummy equal to one if the winning firm is a limited liability firm.
The running variable is the difference between the reserve price and the 300,000 euro threshold. Circles represent sample averages of the dependent variable computed on 30,000 euros brackets of the running variable. The solid line is a linear estimate. The dot-dashed line is a local polynomial estimate. The dashed line is a running-mean smooth estimate. The red vertical line denotes the discontinuity, normalized to zero.
Source: Statistics for all the public construction works tendered between 2000 and 2005, with reserve price $y \in [2, 5]$, in 100,000 euros (2005 equivalents).

Figure 7: Estimated Effects at Different Bandwidths



Notes: The graph report estimates for discretion from regressions, which estimates polynomial in the difference of the reserve price from the 300,000 euro threshold and Fixed Effects for years 2000-2005. The bold solid line reports point estimates at different bandwidths of the outcomes on an indicator variable equal to 1 if the reserve price is below 300,000 euros *(ITT effects)*, and the two thin lines are 90% confidence intervals. The vertical line denotes the optimal bandwidth computed using the Imbens and Kalyanaraman (2012) procedure, and it is used to estimate the effects of discretion for the sample of works with reserve price within this bandwidth.. *Trattativa Privata* is a dummy equal to one for works assigned with a more discretionary procedure. *Winning Rebate* is the percentage discount over the reserve price. *Work Length* the number of days from the first day of work until the effective end of the project, which represent the effective duration of the works. *Delay* is the difference in days between the effective end of the project and the contractual deadline. *Cost Overrun* is the ratio between the difference in the final cost and the awarding cost (reserve price discounted by the winning rebate) and the awarding cost. *Local Winner* is a dummy equal to one if the winning firm is located in the same province of the public buyer. *Incumbent Winner* is a dummy equal to one for a winner that has won at least one other auction held by the same buyer within a year from the current auction. *S.R.L* is a dummy equal to one if the winning firm is a limited liability firm.
Source: Statistics for all the public construction works tendered between 2000 and 2005, with reserve price $y \in [2, 5]$, in 100,000 euros (2005 equivalents).

Appendix A

Table A.1: Pretreatment Test

Dep. Variables	(1) North	(2) Pop.	(3) Piedmont	(4) Municipality	(5) Province	(6) Rome	(7) Jud. Eff.	(8) Corruption	(9) Soc. Cap.
	Panel A: Intention-to-Treat								
Linear	0.0578	54.80	-0.0149	-0.0812**	-0.00657	-0.00902	-36.24	0.0307	6.13e-06
	(0.0439)	(89.22)	(0.0274)	(0.0378)	(0.0204)	(0.0109)	(25.35)	(0.0700)	(0.00471)
Quadratic	0.0513	52.05	-0.0157	-0.0723*	-0.00346	-0.00942	-29.39	0.0373	0.00144
	(0.0448)	(90.98)	(0.0280)	(0.0385)	(0.0213)	(0.0112)	(25.94)	(0.0726)	(0.00487)
Cubic	0.0161	64.30	0.000817	-0.0556	0.00425	-0.00839	-7.597	0.0524	0.00581
	(0.0589)	(122.4)	(0.0370)	(0.0505)	(0.0264)	(0.0155)	(33.39)	(0.0923)	(0.00637)
Quartic	0.00664	41.75	-0.00282	-0.0611	-0.0121	-0.00693	-5.441	0.0409	0.00553
	(0.0599)	(124.8)	(0.0377)	(0.0510)	(0.0296)	(0.0159)	(34.15)	(0.0935)	(0.00649)
LLR	0.0527	46.46	-0.0170	-0.0749*	-0.00555	-0.00955	-29.90	0.0345	0.00132
	(0.0448)	(90.87)	(0.0280)	(0.0384)	(0.0207)	(0.0113)	(25.90)	(0.0723)	(0.00485)
	Panel B: Fuzzy-RDD								
Linear	0.407	404.7	-0.107	-0.586**	-0.0531	-0.0665	-251.8	0.228	4.55e-05
	(0.316)	(657.9)	(0.197)	(0.282)	(0.164)	(0.0819)	(180.0)	(0.522)	(0.0349)
Quadratic	0.400	416.8	-0.118	-0.546*	-0.0253	-0.0747	-225.5	0.288	0.0112
	(0.355)	(727.9)	(0.209)	(0.297)	(0.155)	(0.0904)	(201.8)	(0.563)	(0.0376)
Cubic	0.0933	391.2	0.00554	-0.378	0.0319	-0.0486	-44.28	0.343	0.0368
	(0.340)	(737.4)	(0.250)	(0.348)	(0.198)	(0.0906)	(193.7)	(0.606)	(0.0406)
Quartic	0.0407	273.0	-0.0203	-0.434	-0.0802	-0.0430	-33.42	0.301	0.0386
	(0.366)	(810.0)	(0.271)	(0.367)	(0.195)	(0.0991)	(208.9)	(0.689)	(0.0454)
LLR	0.391	445.0	-0.0757	-0.602**	-0.0306	-0.0460	-287.3*	0.171	-0.0130
	(0.281)	(601.9)	(0.187)	(0.269)	(0.151)	(0.0707)	(161.1)	(0.502)	(0.0331)
Observations	2,042	2,323	2,649	2,685	3,176	2,139	2,008	2,437	2,545
Average	0.600	1052	0.132	0.631	0.0970	0.0150	876	1.050	0.842
Bandwidth	0.737	0.838	0.975	0.999	1.600	0.770	0.724	0.888	0.919

Notes: The table reports estimates for discretion from regressions, which include linear (quadratic) [cubic] {quartic} polynomial in the difference of the reserve price from the 400,000 euro threshold and Fixed Effects for years 2000-2005. Panel A, rows 1 (3) [5] {7} and 2 (4) [6] {8}, report the estimates of the Coefficient and SEs (in parenthesis) of the regression of the outcomes on an indicator variable equal to one if the reserve price is below 300,000 euro (ITT effects). Panel B, rows 9 (11) [13] {15} and 8 (10) [12] {16} report the IV-LATE estimates of the effects of discretion on the outcomes (*Trattativa Privata*), which use the indicator variable equal to one if the reserve price is below 300,000 euro as instrument (Fuzzy RDD). The dependent variables are: in column 1, *Trattativa Privata*, a dummy equal to one for works assigned with a more discretionary procedure; in column 2, *Winning Rebate*, the percentage discount over the reserve price; in column 3, the number of bidders; in column 4, *Work Length*, the number of days from the first day of work until the effective end of the project, which represent the effective duration of the works; in column 5, *Delay*, the difference in days between the effective end of the project and the contractual deadline; in column 6, *Cost Overrun*, the ratio between the difference in the final cost and the awarding cost (reserve price discounted by the winning rebate) and the awarding cost; in column 7, *Local Winner*, a dummy equal to one if the winning firm is located in the same province of the public buyer; in column 8, *Incumbent Winner*, a dummy equal to one for a winner that has won at least one other auction held by the same buyer within a year from the current auction; in 9 column, *S.R.L* a dummy equal to one if the winning firm is a limited liability firm. *Observations* reports the number of observations; *Average* reports the average value of the dependent variables; *Bandwidth* reports the optimal bandwidth calculated using the Imbens and Kalyanaraman (2012) procedure, and it is used to estimate the effects of discretion for the sample of works with reserve price within this bandwidth. SEs are clustered at region level. Significance at the 10% (*), at the 5% (**), and at the 1% (***).
Source: Statistics for all the public construction works tendered between 2000 and 2005, with reserve price $y \in [2, 5]$, in 100,000 euro (2005 equivalents). The number of observations is smaller compared the full sample described in Table 1, because we restrict the analysis the optimal bandwidth sample, as in Imbens and Kalyanaraman (2012) and we include only municipality, province and region to allow clustering at region level.

Table A.2: Local Linear Regression

Dep. Variables	(1) Trattativa	(2) Rebate	(3) N. Bidders	(4) Work Leng.	(5) Delay	(6) C. Over.	(7) Local W.	(8) Inc. W.	(9) S.R.L.
				Panel A: Baseline Model					
ITT	0.127***	-0.242	-0.580	-10.37	-5.442	0.0104	0.000630	0.0479*	0.0940*
	(0.0246)	(0.488)	(1.521)	(16.28)	(12.88)	(0.0155)	(0.0427)	(0.0273)	(0.0569)
Fuzzy-RDD		-2.134	-5.992	-145.9	-62.35	0.0692	-0.0254	0.329*	0.449
		(3.702)	(11.37)	(109.4)	(75.44)	(0.112)	(0.296)	(0.187)	(0.304)
				Panel B: Region and Year Fixed Effect					
ITT	0.123***	-0.284	-0.961	-5.448	-2.622	0.0115	-0.00979	0.0490**	0.0903
	(0.0239)	(0.358)	(1.259)	(13.98)	(10.17)	(0.0154)	(0.0464)	(0.0219)	(0.0590)
Fuzzy-RDD		-2.392	-8.319	-109.3	-45.18	0.0809	-0.0946	0.348*	0.418
		(2.394)	(8.613)	(82.62)	(88.28)	(0.122)	(0.336)	(0.173)	(0.373)
				Panel C: Region-Year Fixed Effect					
ITT	0.124***	-0.215	-1.259	-11.25	-4.675	0.0123	-0.00804	0.0443**	0.0949
	(0.0255)	(0.376)	(1.384)	(12.18)	(10.48)	(0.0137)	(0.0480)	(0.0196)	(0.0626)
Fuzzy-RDD		-1.787	-10.49	-145.4*	-60.73	0.0886	-0.0844	0.314*	0.394
		(2.607)	(10.08)	(75.35)	(90.14)	(0.108)	(0.340)	(0.153)	(0.399)
				Panel D: Province and Year Fixed Effect					
ITT	0.119***	-0.181	-0.536	-6.458	1.271	0.0118	0.0104	0.0553**	0.103
	(0.0277)	(0.413)	(1.189)	(13.76)	(10.91)	(0.0157)	(0.0407)	(0.0238)	(0.0630)
Fuzzy-RDD		-1.481	-4.876	-101.2	-21.07	0.0912	0.0748	0.409**	0.534
		(2.406)	(11.08)	(119.6)	(86.13)	(0.115)	(0.307)	(0.199)	(0.364)
Observations	2,025	3,314	2,392	2,014	1,620	2,163	2,349	1,850	1,310
Average	0.0889	12.88	14.13	376.8	137.3	0.136	0.567	0.0957	0.479
Bandwidth	0.730	1.836	0.864	0.726	0.585	0.780	0.847	0.775	0.572

Notes: The table reports estimates for discretion from local linear regressions, which includes the difference of the reserve price from the 300,000 euro threshold and an interaction between this variable and an indicator variable for discretion. The Panel A (B) [C] {D} regressions include Fixed Effects for years 2000-2005 (Fixed Effect for each region and year, 20 regions and years 2000-2005)[Fixed Effect for each couple of region-year, 20 regions and years 2000-2005]{Fixed Effect for each province and year, 110 province and years 2000-2005}. Rows 1 (5) [9] {13} and 2 (6) [10] {14} report the Coefficient and SEs (in parenthesis) of the regression of the outcomes on an indicator variable equal to one if the reserve price is below 300,000 euro (ITT effects), Rows 3 (7) [11] {15} and 4 (8) [12] {16} the IV-LATE estimates of the effects of discretion on the outcomes (*Trattativa Privata*), which use the indicator variable equal 1 if the reserve price is below 300,000 euro as instrument and the interaction between this variable the difference of the reserve price from the 300,000 euro threshold as instrument (Fuzzy RDD). The dependent variables are: in column 1, *Trattativa Privata*, a dummy equal to one for works assigned with a more discretionary procedure; in column 2, *Winning Rebate*, the percentage discount over the reserve price; in column 3, the number of bidders; in column 4, *Work Length*, the number of days from the first day of work until the effective end of the project, which represent the effective duration of the works; in column 5, *Delay*, the difference in days between the effective end of the project and the contractual deadline; in column 6, *Cost Overrun*, the ratio between the difference in the final cost and the awarding cost (reserve price discounted by the winning rebate) and the awarding cost; in column 7, *Local Winner*, a dummy equal to one if the winning firm is located in the same province of the public buyer; in column 8, *Incumbent Winner*, a dummy equal to one for a winner that has won at least one other auction held by the same buyer within a year from the current auction; in 9 column, *S.R.L* a dummy equal to one if the winning firm is a limited liability firm. *Observations* reports the number of observations; *Average* reports the average value of the dependent variables; *Bandwidth* reports the optimal bandwidth calculated using the Imbens and Kalyanaraman (2012) procedure, and it is used to estimate the effects of discretion for the sample of works with reserve price within this bandwidth. SEs are adjusted for heteroskedasticity (clustered at region level) [clustered at region level] {clustered at province level}. Significance at the 10% (*), at the 5% (**), and at the 1% (***).
Source: Statistics for all the construction procurements works tendered between 2000 and 2005, with reserve price $y \in [2, 5]$, in 100,000 euro (2005 equivalents). The number of observations is smaller compared the full sample described in Table 1, because we restrict the analysis the optimal bandwidth sample, as in Imbens and Kalyanaraman (2012).

Table A.3: Baseline Model - Sample 2001-2005

Dep. Variables	(1) Trattativa	(2) Rebate	(3) N. Bidders	(4) Work Leng.	(5) Delay	(6) C. Over.	(7) Local W.	(8) Inc. W.	(9) S.R.L.
				Panel A: Intention-to-Treat					
Linear	0.170***	-0.617	-1.779	-2.988	-9.325	0.00336	0.0364	0.0505*	0.0948*
	(0.0305)	(0.649)	(1.350)	(18.71)	(12.19)	(0.0153)	(0.0359)	(0.0280)	(0.0576)
Quadratic	0.156***	-0.476	-1.685	7.892	-7.538	0.00263	0.0262	0.0479*	0.102*
	(0.0284)	(0.652)	(1.391)	(19.41)	(12.53)	(0.0152)	(0.0386)	(0.0275)	(0.0585)
Cubic	0.182***	-0.315	-2.657	-22.25	9.309	0.00232	0.0347	0.0841**	0.103
	(0.0420)	(0.872)	(1.659)	(23.72)	(15.65)	(0.0207)	(0.0456)	(0.0377)	(0.0765)
Quartic	0.174***	-0.309	-2.479	-21.53	8.935	0.00818	0.0277	0.0898**	0.0876
	(0.0399)	(0.880)	(1.681)	(24.57)	(15.92)	(0.0210)	(0.0534)	(0.0373)	(0.0776)
LLR	0.154***	-0.515	-1.600	7.985	-7.406	0.00379	0.0292	0.0479*	0.0994*
	(0.0280)	(0.653)	(1.391)	(19.31)	(12.43)	(0.0151)	(0.0371)	(0.0273)	(0.0585)
				Panel B: Fuzzy-RDD					
Linear		-3.961	-11.95	-18.03	-58.88	0.0224	0.290	0.330*	0.521
		(4.121)	(8.854)	(112.5)	(77.33)	(0.102)	(0.286)	(0.186)	(0.337)
Quadratic		-3.286	-11.73	51.90	-51.60	0.0187	0.180	0.335*	0.623
		(4.468)	(9.484)	(129.2)	(86.07)	(0.108)	(0.264)	(0.197)	(0.383)
Cubic		-1.729	-16.44	-114.5	49.51	0.0124	0.232	0.441**	0.532
		(4.770)	(10.03)	(120.7)	(84.49)	(0.111)	(0.304)	(0.209)	(0.428)
Quartic		-1.826	-15.81	-116.5	51.21	0.0477	0.167	0.506**	0.474
		(5.179)	(10.49)	(131.7)	(92.35)	(0.121)	(0.319)	(0.227)	(0.443)
LLR		-4.052	-11.52	-67.44	-61.11	0.0234	0.179	0.328*	0.371
		(4.065)	(9.475)	(132.6)	(75.00)	(0.103)	(0.264)	(0.187)	(0.322)
Observations	1,614	1,936	2,354	1,488	1,815	1,974	2,836	1,848	1,252
Average	0.0905	12.76	14.00	376.4	135.8	0.134	0.559	0.0958	0.494
Bandwidth	0.670	0.812	1.035	0.620	0.761	0.831	1.762	0.773	0.617

Notes: The table reports estimates for discretion from regressions, which include linear (quadratic) [cubic] {quartic} polynomial in the difference of the reserve price from the 300,000 euro threshold and Fixed Effects for years 2000-2005. |Local linear regressions (LLR) include the difference of the reserve price from the 300,000 euro threshold, an interaction between this variable and an indicator variable for discretion and Fixed Effect years 2000-2005.| Panel A, rows 1 (3) [5] {7} |9| and 2 (4) [6] {8} |10|, report the estimates of the Coefficient and SEs (in parenthesis) of the regression of the outcomes on an indicator variable equal to one if the reserve price is below 300,000 euro (ITT effects). Panel B, rows 11 (13) [15] {17} |19| and 12 (14) [16] {18} |20|, report the IV-LATE estimates of the effects of discretion on the outcomes (*Trattativa Privata*), which use the indicator variable equal 1 if the reserve price is below 300,000 euro as instrument (Fuzzy-RDD). The dependent variables are: in column 1, *Trattativa Privata*, a dummy equal to one for works assigned with a more discretionary procedure; in column 2, *Winning Rebate*, the percentage discount over the reserve price; in column 3, the number of bidders; in column 4, *Work Length*, the number of days from the first day of work until the effective end of the project, which represent the effective duration of the works; in column 5, *Delay*, the difference in days between the effective end of the project and the contractual deadline; in column 6, *Cost Overrun*, the ratio between the difference in the final cost and the awarding cost (reserve price discounted by the winning rebate) and the awarding cost; in column 7, *Local Winner*, a dummy equal to one if the winning firm is located in the same province of the public buyer; in column 8, *Incumbent Winner*, a dummy equal to one for a winner that has won at least one other auction held by the same buyer within a year from the current auction; in 9 column, *S.R.L* a dummy equal to one if the winning firm is a limited liability firm.*Observations* reports the number of observations; *Average* reports the average value of the dependent variables; *Bandwidth* reports the optimal bandwidth calculated using the Imbens and Kalyanaraman (2012) procedure, and it is used to estimate the effects of discretion for the sample of works with reserve price within this bandwidth. SEs are adjusted for heteroskedasticity. Significance at the 10% (*), at the 5% (**), and at the 1% (***).
Source: Statistics for all the public construction works tendered between 2001 and 2005, with reserve price $y \in [2, 5]$, in 100,000 euro (2005 equivalents). The number of observations is smaller compared the full sample described in Table 1, because we restrict the analysis the optimal bandwidth sample, as in Imbens and Kalyanaraman (2012) and works executed in 2000 are dropped.

Table A.4: Region-Year Fixed Effects Model - Sample 2001-2005

Dep. Variables	(1) Trattativa	(2) Rebate	(3) N. Bidders	(4) Work Leng.	(5) Delay	(6) C. Over.	(7) Local W.	(8) Inc. W.	(9) S.R.L.
				Panel A: Intention-to-Treat					
Linear	0.167***	-0.493	-2.427	-12.09	-11.68	0.000727	0.0305	0.0484**	0.0918
	(0.0296)	(0.364)	(1.503)	(14.47)	(11.68)	(0.0180)	(0.0359)	(0.0212)	(0.0718)
Quadratic	0.153***	-0.428	-2.372	-0.829	-8.887	-0.000888	0.0190	0.0445**	0.0991
	(0.0290)	(0.354)	(1.622)	(16.36)	(11.21)	(0.0150)	(0.0364)	(0.0200)	(0.0695)
Cubic	0.186***	-0.361	-2.700*	-25.45	5.948	-0.00154	0.0219	0.0855**	0.121
	(0.0507)	(0.575)	(1.305)	(27.01)	(15.84)	(0.0259)	(0.0414)	(0.0349)	(0.123)
Quartic	0.178***	-0.392	-2.631*	-25.18	6.047	0.00431	0.0174	0.0907**	0.110
	(0.0465)	(0.527)	(1.285)	(28.87)	(15.33)	(0.0257)	(0.0556)	(0.0368)	(0.125)
LLR	0.152***	-0.453	-2.317	-1.187	-8.829	0.000251	0.0231	0.0444**	0.0974
	(0.0282)	(0.344)	(1.601)	(16.37)	(11.25)	(0.0150)	(0.0365)	(0.0196)	(0.0691)
				Panel B; Fuzzy-RDD					
Linear		-3.174	-16.63	-72.80	-74.74	0.00486	0.246	0.315*	0.513
		(2.358)	(9.866)	(86.03)	(81.43)	(0.119)	(0.280)	(0.153)	(0.452)
Quadratic		-2.960	-16.82	-5.406	-61.80	-0.00630	0.132	0.310*	0.613
		(2.304)	(11.14)	(106.6)	(80.90)	(0.107)	(0.247)	(0.155)	(0.495)
Cubic		-2.019	-16.62*	-129.6	31.82	-0.00839	0.145	0.457*	0.626
		(3.245)	(8.923)	(127.0)	(87.35)	(0.142)	(0.270)	(0.221)	(0.735)
Quartic		-2.367	-16.67*	-136.6	34.63	0.0259	0.105	0.521*	0.602
		(3.221)	(8.782)	(143.7)	(90.32)	(0.151)	(0.334)	(0.246)	(0.774)
LLR		-3.170	-16.79	-112.1	-74.76	0.00412	0.146	0.316*	0.388
		(2.420)	(11.28)	(104.8)	(78.39)	(0.117)	(0.242)	(0.153)	(0.418)
Observations	1,614	1,936	2,354	1,488	1,815	1,974	2,836	1,848	1,252
Average	0.0905	12.76	14.00	376.4	135.8	0.134	0.559	0.0958	0.494
Bandwidth	0.670	0.812	1.035	0.620	0.761	0.831	1.762	0.773	0.617

Notes: The table reports estimates for discretion from regressions, which include linear (quadratic) [cubic] {quartic} polynomial in the difference of the reserve price from the 300,000 euro threshold and Fixed Effect for each region-year pair (20 regions and years 2000-2005). |Local linear regressions (LLR) include the difference of the reserve price from the 300,000 euro threshold, an interaction between this variable and an indicator variable for discretion and Fixed Effect for each region-year pair (20 regions and years 2000-2005).| Panel A, rows 1 (3) [5] {7} |9| and 2 (4) [6] {8} |10|, report the estimates of the Coefficient and SEs (in parenthesis) of the regression of the outcomes on an indicator variable equal to one if the reserve price is below 300,000 euro (ITT effects). Panel B, rows 11 (13) [15] {17} |19| and 12 (14) [16] {18} |20|, report the IV-LATE estimates of the effects of discretion on the outcomes (*Trattativa Privata*), which use the indicator variable equal 1 if the reserve price is below 300,000 euro as instrument (Fuzzy-RDD). The dependent variables are: in column 1, *Trattativa Privata*, a dummy equal to one for works assigned with a more discretionary procedure; in column 2, *Winning Rebate*, the percentage discount over the reserve price; in column 3, the number of bidders; in column 4, *Work Length*, the number of days from the first day of work until the effective end of the project, which represent the effective duration of the works; in column 5, *Delay*, the difference in days between the effective end of the project and the contractual deadline; in column 6, *Cost Overrun*, the ratio between the difference in the final cost and the awarding cost (reserve price discounted by the winning rebate) and the awarding cost; in column 7, *Local Winner*, a dummy equal to one if the winning firm is located in the same province of the public buyer; in column 8, *Incumbent Winner*, a dummy equal to one for a winner that has won at least one other auction held by the same buyer within a year from the current auction; in 9 column, *S.R.L* a dummy equal to one if the winning firm is a limited liability firm. *Observations* reports the number of observations; *Average* reports the average value of the dependent variables; *Bandwidth* reports the optimal bandwidth calculated using the Imbens and Kalyanaraman (2012) procedure, and it is used to estimate the effects of discretion for the sample of works with reserve price within this bandwidth. SEs are clustered at region level. Significance at the 10% (*), at the 5% (**), and at the 1% (***).
Source: Statistics for all the public construction works tendered between 2001 and 2005, with reserve price $y \in [2, 5]$, in 100,000 euro (2005 equivalents). The number of observations is smaller compared the full sample described in Table 1, because we restrict the analysis the optimal bandwidth sample, as in Imbens and Kalyanaraman (2012) and works executed in 2000 are dropped.

Table A.5: Region and Year Fixed Effects

Dep. Variables	(1) Trattativa	(2) Rebate	(3) N. Bidders	(4) Work Leng.	(5) Delay	(6) C. Over.	(7) Local W.	(8) Inc. W.	(9) S.R.L.
				Panel A: Intention-to-Treat					
Linear	0.138***	-0.210	-1.159	-12.89	-4.515	0.0106	-0.0135	0.0519**	0.0925
	(0.0271)	(0.397)	(1.095)	(12.95)	(11.44)	(0.0170)	(0.0438)	(0.0227)	(0.0597)
Quadratic	0.126***	-0.324	-1.041	-6.703	-3.124	0.0106	-0.0113	0.0487**	0.0886
	(0.0250)	(0.357)	(1.262)	(13.69)	(10.10)	(0.0153)	(0.0464)	(0.0222)	(0.0596)
Cubic	0.171***	-0.260	-2.559**	-12.32	30.98**	-0.00878	0.00203	0.0887**	0.0651
	(0.0400)	(0.457)	(1.045)	(21.21)	(13.07)	(0.0277)	(0.0714)	(0.0349)	(0.0633)
Quartic	0.161***	-0.534	-2.069	-2.919	34.69**	-0.00634	0.0115	0.0954**	0.0646
	(0.0362)	(0.428)	(1.306)	(23.09)	(13.92)	(0.0286)	(0.0708)	(0.0364)	(0.0598)
				Panel B: Fuzzy-RDD					
Linear		-1.849	-8.700	-92.93	-29.56	0.0804	-0.0979	0.348*	0.540
		(3.363)	(8.192)	(94.99)	(76.35)	(0.124)	(0.326)	(0.169)	(0.422)
Quadratic		-2.431	-8.324	-53.16	-22.44	0.0869	-0.0876	0.350*	0.585
		(2.555)	(9.859)	(108.5)	(73.21)	(0.122)	(0.367)	(0.178)	(0.464)
Cubic		-1.943	-16.33**	-72.33	185.4*	-0.0528	0.0134	0.464*	0.367
		(3.373)	(6.404)	(122.9)	(86.47)	(0.171)	(0.470)	(0.219)	(0.387)
Quartic		-3.674	-14.51	-18.20	212.0**	-0.0406	0.0835	0.532**	0.366
		(3.044)	(8.268)	(143.6)	(92.92)	(0.186)	(0.505)	(0.242)	(0.369)
Observations	2,025	3,314	2,392	2,014	1,620	2,163	2,349	1,850	1,310
Average	0.0889	12.88	14.13	376.8	137.3	0.136	0.567	0.0957	0.479
Bandwidth	0.730	1.836	0.864	0.726	0.585	0.780	0.847	0.775	0.572

Notes: The table reports estimates for discretion from regressions, which include linear (quadratic) [cubic] {quartic} polynomial in the difference of the reserve price from the 300,000 euro threshold and Fixed Effect for each region and year (20 regions and years 2000-2005). Panel A, rows 1 (3) [5] {7} and 2 (4) [6] {8}, report the estimates of the Coefficient and SEs (in parenthesis) of the regression of the outcomes on an indicator variable equal to one if the reserve price is below 300,000 euro (ITT effects). Panel B, rows 9 (11) [13] {15} and 8 (10) [12] {16}, report the IV-LATE estimates of the effects of discretion on the outcomes (*Trattativa Privata*), which use the indicator variable equal to one if the reserve price is below 300,000 euro as instrument (Fuzzy RDD). The dependent variables are: in column 1, *Trattativa Privata*, a dummy equal to one for works assigned with a more discretionary procedure; in column 2, *Winning Rebate*, the percentage discount over the reserve price; in column 3, the number of bidders; in column 4, *Work Length*, the number of days from the first day of work until the effective end of the project, which represent the effective duration of the works; in column 5, *Delay*, the difference in days between the effective end of the project and the contractual deadline; in column 6, *Cost Overrun*, the ratio between the difference in the final cost and the awarding cost (reserve price discounted by the winning rebate) and the awarding cost; in column 7, *Local Winner*, a dummy equal to one if the winning firm is located in the same province of the public buyer; in column 8, *Incumbent Winner*, a dummy equal to one for a winner that has won at least one other auction held by the same buyer within a year from the current auction; in 9 column, *S.R.L* a dummy equal to one if the winning firm is a limited liability firm. *Observations* reports the number of observations; *Average* reports the average value of the dependent variables; *Bandwidth* reports the optimal bandwidth calculated using the Imbens and Kalyanaraman (2012) procedure, and it is used to estimate the effects of discretion for the sample of works with reserve price within this bandwidth. SEs are clustered at region level. Significance at the 10% (*), at the 5% (**), and at the 1% (***).
Source: Statistics for all the public construction works tendered between 2000 and 2005, with reserve price $y \in [2, 5]$, in 100,000 euro (2005 equivalents). The number of observations is smaller compared the full sample described in Table 1, because we restrict the analysis the optimal bandwidth sample, as in Imbens and Kalyanaraman (2012).

Table A.6: Region-Year Fixed Effects

Dep. Variables	(1) Trattativa	(2) Rebate	(3) N. Bidders	(4) Work Leng.	(5) Delay	(6) C. Over.	(7) Local W.	(8) Inc. W.	(9) S.R.L.
				Panel A: Intention-to-Treat					
Linear	0.139***	-0.161	-1.424	-19.90*	-7.154	0.0116	-0.0121	0.0483**	0.0947
	(0.0284)	(0.408)	(1.241)	(10.88)	(11.93)	(0.0161)	(0.0450)	(0.0212)	(0.0634)
Quadratic	0.126***	-0.242	-1.345	-12.26	-5.164	0.0116	-0.00928	0.0443**	0.0932
	(0.0266)	(0.376)	(1.396)	(11.86)	(10.47)	(0.0137)	(0.0480)	(0.0200)	(0.0637)
Cubic	0.178***	-0.217	-3.185***	-13.99	32.46**	-0.00331	0.00631	0.0855**	0.0714
	(0.0413)	(0.464)	(0.892)	(19.96)	(14.04)	(0.0269)	(0.0730)	(0.0349)	(0.0649)
Quartic	0.167***	-0.540	-2.659**	-4.549	36.57**	-0.000729	0.0151	0.0906**	0.0692
	(0.0371)	(0.431)	(0.977)	(22.21)	(14.40)	(0.0277)	(0.0718)	(0.0366)	(0.0607)
				Panel B: Fuzzy-RDD					
Linear		-1.424	-10.68	-142.3	-45.00	0.0851	-0.0872	0.314*	0.538
		(3.509)	(9.461)	(87.49)	(78.52)	(0.113)	(0.332)	(0.153)	(0.438)
Quadratic		-1.826	-10.64	-96.90	-35.90	0.0922	-0.0711	0.309*	0.603
		(2.753)	(11.00)	(97.52)	(74.77)	(0.104)	(0.374)	(0.155)	(0.490)
Cubic		-1.596	-19.65***	-78.37	189.0*	-0.0197	0.0404	0.458*	0.393
		(3.377)	(6.189)	(111.4)	(94.81)	(0.161)	(0.464)	(0.221)	(0.387)
Quartic		-3.646	-18.26**	-27.02	214.6**	-0.00465	0.107	0.521*	0.379
		(3.005)	(6.446)	(131.8)	(97.79)	(0.177)	(0.498)	(0.246)	(0.358)
Observations	2,025	3,314	2,392	2,014	1,620	2,163	2,349	1,850	1,310
Average	0.0889	12.88	14.13	376.8	137.3	0.136	0.567	0.0957	0.479
Bandwidth	0.730	1.836	0.864	0.726	0.585	0.780	0.847	0.775	0.572

Notes: The table reports estimates for discretion from regressions, which include linear (quadratic) [cubic] {quartic} polynomial in the difference of the reserve price from the 300,000 euro threshold and Fixed Effect for each region-year pair (20 regions and years 2000-2005). Panel A, rows 1 (3) [5] {7} and 2 (4) [6] {8}, report the estimates of the Coefficient and SEs (in parenthesis) of the regression of the outcomes on an indicator variable equal to one if the reserve price is below 300,000 euro (ITT effects). Panel B, rows 9 (11) [13] {15} and 8 (10) [12] {16} report the IV-LATE estimates of the effects of discretion on the outcomes (*Trattativa Privata*), which use the indicator variable equal to one if the reserve price is below 300,000 euro as instrument (Fuzzy RDD). The dependent variables are: in column 1, *Trattativa Privata*, a dummy equal to one for works assigned with a more discretionary procedure; in column 2, *Winning Rebate*, the percentage discount over the reserve price; in column 3, the number of bidders; in column 4, *Work Length*, the number of days from the first day of work until the effective end of the project, which represent the effective duration of the works; in column 5, *Delay*, the difference in days between the effective end of the project and the contractual deadline; in column 6, *Cost Overrun*, the ratio between the difference in the final cost and the awarding cost (reserve price discounted by the winning rebate) and the awarding cost; in column 7, *Local Winner*, a dummy equal to one if the winning firm is located in the same province of the public buyer; in column 8, *Incumbent Winner*, a dummy equal to one for a winner that has won at least one other auction held by the same buyer within a year from the current auction; in 9 column, *S.R.L* a dummy equal to one if the winning firm is a limited liability firm. *Observations* reports the number of observations; *Average* reports the average value of the dependent variables; *Bandwidth* reports the optimal bandwidth calculated using the Imbens and Kalyanaraman (2012) procedure, and it is used to estimate the effects of discretion for the sample of works with reserve price within this bandwidth. SEs are clustered at region level. Significance at the 10% (*), at the 5% (**), and at the 1% (***).
Source: Statistics for all the public construction works tendered between 2000 and 2005, with reserve price $y \in [2, 5]$, in 100,000 euro (2005 equivalents). The number of observations is smaller compared the full sample described in Table 1, because we restrict the analysis the optimal bandwidth sample, as in Imbens and Kalyanaraman (2012).

Table A.7: Province Fixed Effects

Dep. Variables	(1) Trattativa	(2) Rebate	(3) N. Bidders	(4) Work Leng.	(5) Delay	(6) C. Over.	(7) Local W.	(8) Inc. W.	(9) S.R.L.
				Panel A: Intention-to-Treat					
Linear	0.133***	-0.157	-0.666	-14.02	-1.039	0.0107	0.00925	0.0585**	0.104**
	(0.0314)	(0.333)	(1.402)	(15.72)	(13.61)	(0.0153)	(0.0393)	(0.0269)	(0.0446)
Quadratic	0.122***	-0.182	-0.635	-7.911	0.884	0.0106	0.00935	0.0549**	0.102**
	(0.0286)	(0.351)	(1.511)	(17.70)	(14.27)	(0.0145)	(0.0391)	(0.0262)	(0.0447)
Cubic	0.161***	-0.0751	-2.114	-18.72	29.40*	-0.00516	0.0197	0.0932**	0.0868
	(0.0466)	(0.494)	(2.223)	(20.30)	(15.99)	(0.0264)	(0.0595)	(0.0417)	(0.0729)
Quartic	0.150***	-0.227	-1.547	-8.301	32.93**	-0.000735	0.0253	0.101**	0.0860
	(0.0437)	(0.547)	(2.329)	(21.78)	(16.13)	(0.0266)	(0.0589)	(0.0416)	(0.0696)
				Panel B: Fuzzy-RDD					
Linear		-1.456	-5.154	-105.1	-7.316	0.0838	0.0700	0.404**	0.653*
		(3.032)	(10.49)	(114.0)	(96.28)	(0.115)	(0.297)	(0.192)	(0.367)
Quadratic		-1.409	-5.190	-64.99	6.890	0.0899	0.0752	0.402**	0.735*
		(2.648)	(11.93)	(142.8)	(110.9)	(0.119)	(0.314)	(0.200)	(0.407)
Cubic		-0.572	-14.24	-117.0	183.4*	-0.0328	0.139	0.495**	0.503
		(3.731)	(13.54)	(120.5)	(106.5)	(0.172)	(0.425)	(0.246)	(0.457)
Quartic		-1.609	-11.46	-55.53	209.7*	-0.00501	0.196	0.579**	0.503
		(3.767)	(15.91)	(141.4)	(110.2)	(0.182)	(0.467)	(0.276)	(0.438)
Observations	2,025	3,314	2,392	2,014	1,620	2,163	2,349	1,850	1,310
Average	0.0889	12.88	14.13	376.8	137.3	0.136	0.567	0.0957	0.479
Bandwidth	0.730	1.836	0.864	0.726	0.585	0.780	0.847	0.775	0.572

Notes: The table reports estimates for discretion from regressions, which include linear (quadratic) [cubic] {quartic} polynomial in the difference of the reserve price from the 300,000 euro threshold and Fixed Effect for each province and year (110 province and years 2000-2005). Panel A, rows 1 (3) [5] {7} and 2 (4) [6] {8}, report the estimates of the Coefficient and SEs (in parenthesis) of the regression of the outcomes on an indicator variable equal to one if the reserve price is below 300,000 euro (ITT effects). Panel B, rows 9 (11) [13] {15} and 8 (10) [12] {16}, report the IV-LATE estimates of the effects of discretion on the outcomes (*Trattativa Privata*), which use the indicator variable equal to one if the reserve price is below 300,000 euro as instrument (Fuzzy RDD). The dependent variables are: in column 1, *Trattativa Privata*, a dummy equal to one for works assigned with a more discretionary procedure; in column 2, *Winning Rebate*, the percentage discount over the reserve price; in column 3, the number of bidders; in column 4, *Work Length*, the number of days from the first day of work until the effective end of the project, which represent the effective duration of the works; in column 5, *Delay*, the difference in days between the effective end of the project and the contractual deadline; in column 6, *Cost Overrun*, the ratio between the difference in the final cost and the awarding cost (reserve price discounted by the winning rebate) and the awarding cost; in column 7, *Local Winner*, a dummy equal to one if the winning firm is located in the same province of the public buyer; in column 8, *Incumbent Winner*, a dummy equal to one for a winner that has won at least one other auction held by the same buyer within a year from the current auction; in 9 column, *S.R.L* a dummy equal to one if the winning firm is a limited liability firm. *Observations* reports the number of observations; *Average* reports the average value of the dependent variables; *Bandwidth* reports the optimal bandwidth calculated using the Imbens and Kalyanaraman (2012) procedure, and it is used to estimate the effects of discretion for the sample of works with reserve price within this bandwidth. SEs are clustered at province level. Significance at the 10% (*), at the 5% (**), and at the 1% (***).
Source: Statistics for all the public construction works tendered between 2000 and 2005, with reserve price $y \in [2, 5]$, in 100,000 euro (2005 equivalents). The number of observations is smaller compared the full sample described in Table 1, because we restrict the analysis the optimal bandwidth sample, as in Imbens and Kalyanaraman (2012).

Table A.8: Contracting Authority Fixed Effect

Dep. Variables	(1) Trattativa	(2) Rebate	(3) N. Bidders	(4) Work Leng.	(5) Delay	(6) C. Over.	(7) Local W.	(8) Inc. W.	(9) S.R.L.
				Panel A: Intention-to-Treat					
Linear	0.120***	-0.296	-1.226	-27.45**	-5.489	0.0136	0.0825*	0.0671*	0.0361
	(0.0360)	(0.484)	(1.504)	(10.69)	(17.65)	(0.0149)	(0.0444)	(0.0363)	(0.116)
Quadratic	0.112***	-0.430	-0.932	-21.93*	-5.990	0.0190	0.0872*	0.0671*	0.0227
	(0.0331)	(0.524)	(1.432)	(11.72)	(16.78)	(0.0126)	(0.0472)	(0.0369)	(0.115)
Cubic	0.145**	-0.0751	-1.842	-19.91*	14.42	0.0255	0.0720	0.129**	-0.0173
	(0.0524)	(0.468)	(2.855)	(11.08)	(21.65)	(0.0437)	(0.0496)	(0.0487)	(0.194)
Quartic	0.134**	-0.466	-1.195	-15.27	14.43	0.0299	0.0696	0.133**	-0.0468
	(0.0515)	(0.399)	(3.180)	(13.84)	(22.70)	(0.0427)	(0.0472)	(0.0478)	(0.197)
LLR	0.107***	-0.454	-0.794	-21.14*	-6.220	0.0190	0.0858*	0.0660*	0.0162
	(0.0321)	(0.501)	(1.445)	(11.47)	(17.03)	(0.0120)	(0.0478)	(0.0348)	(0.115)
				Panel B: Fuzzy-RDD					
Linear		-3.638	-14.14	-229.9*	-42.29	0.130	0.895	0.570*	0.273
		(5.582)	(17.78)	(114.1)	(145.5)	(0.132)	(0.514)	(0.298)	(0.897)
Quadratic		-3.857	-11.74	-194.9	-50.89	0.206	1.017	0.609*	0.195
		(4.262)	(18.85)	(113.8)	(155.8)	(0.142)	(0.610)	(0.324)	(1.011)
Cubic		-0.673	-14.43	-138.5	85.24	0.215	0.594	0.913*	-0.101
		(4.150)	(23.04)	(86.77)	(127.4)	(0.377)	(0.519)	(0.442)	(1.159)
Quartic		-3.867	-10.52	-117.0	87.61	0.260	0.644	0.959*	-0.274
		(3.167)	(28.20)	(129.5)	(139.4)	(0.381)	(0.550)	(0.466)	(1.199)
LLR		-8.029	-26.16	-69.75	-36.93	0.269	0.491	0.910**	0.670
		(5.814)	(18.09)	(80.05)	(320.2)	(0.304)	(0.524)	(0.360)	(0.651)
Observations	935	1,013	1,502	921	723	1,023	1,012	633	741
Average	0.0746	12.60	14.88	374.9	140.4	0.132	0.578	0.0977	0.460
Bandwidth	0.741	0.791	1.311	0.729	0.614	0.794	0.790	0.638	0.723

Notes: The table reports estimates for discretion from regressions, which include linear (quadratic) [cubic] {quartic} polynomial in the difference of the reserve price from the 300,000 euro threshold and Fixed Effect for each region-year pair (20 regions and years 2000-2005) and contracting authority. |Local linear regressions (LLR) include the difference of the reserve price from the 300,000 euro threshold, an interaction between this variable and an indicator variable for discretion and Fixed Effect for each region-year pair (20 regions and years 2000-2005) and contracting authority.| Panel A, rows 1 (3) [5] {7} |9| and 2 (4) [6] {8} |10|, report the estimates of the Coefficient and SEs (in parenthesis) of the regression of the outcomes on an indicator variable equal to one if the reserve price is below 300,000 euro (ITT effects). Panel B, rows 11 (13) [15] {17} |19| and 12 (14) [16] {18} |20|, report the IV-LATE estimates of the effects of discretion on the outcomes (*Trattativa Privata*), which use the indicator variable equal 1 if the reserve price is below 300,000 euro as instrument (Fuzzy-RDD). The dependent variables are: in column 1, *Trattativa Privata*, a dummy for work assigned warded in the North of Italy; in column 2, *Pop*, the number of residents at the provincial level (in 1,000); in column 3, a dummy for work assigned warded in the Piedmont; in column 4, *Municipality*, a dummy for work assigned warded by a Municipality; in column 5, *Provincia*, a dummy for work assigned warded by a Provincia; in column 6, *Rome*, a dummy for work assigned warded by in Rome; in column 7, *Jud. Eff.*, lenght of civil trial at province and year level; in column 8, *Corruption index*, the Golden-Picci Index (2005) the difference between the actual quantities of public infrastructures and the priced paid to accumulate that stock of capital; in 9 column, *Social Capital Index*, the Guiso et al. (2004) measure based on referendum turnout. *Observations* reports the number of observations; *Average* reports the average value of the dependent variables; *Bandwidth* reports the optimal bandwidth calculated using the Imbens and Kalyanaraman (2012) procedure, and it is used to estimate the effects of discretion for the sample of works with reserve price within this bandwidth. SEs are adjusted for heteroskedasticity and clustered at regional level. Significance at the 10% (*), at the 5% (**), and at the 1% (***).
Source: Statistics for all the public construction works tendered between 2000 and 2005, with reserve price $y \in [2, 5]$, in 100,000 euro (2005 equivalents). The number of observations is smaller compared the full sample described in Table 1, because we restrict the analysis the optimal bandwidth sample, as in Imbens and Kalyanaraman (2012).

Table A.9: Controlling for Social Capital, Corruption and Judicial Efficiency - Local Linear Regression

VARIABLES	(1) Trattativa	(2) Rebate	(3) N. Bidders	(4) Work Leng.	(5) Delay	(6) C. Over.	(7) Local W.	(8) Inc. W.	(9) S.R.L.
				Panel A: Social Capital					
ITT	0.125***	-0.242	-0.329	-9.030	-4.753	0.0126	0.00244	0.0473*	0.0910
	(0.0245)	(0.418)	(1.488)	(16.20)	(12.83)	(0.0153)	(0.0425)	(0.0273)	(0.0568)
Social Capital	0.366***	-71.65***	-105.1***	-282.1***	-137.8**	-0.484***	-0.951***	0.365***	0.529**
	(0.0747)	(2.337)	(7.959)	(67.68)	(54.92)	(0.0917)	(0.168)	(0.108)	(0.231)
Fuzzy-RDD		-2.403	-4.372	-137.9	-59.11	0.0809	-0.0165	0.328*	0.443
		(3.233)	(11.40)	(111.1)	(76.14)	(0.113)	(0.297)	(0.187)	(0.305)
Social Capital		-71.29***	-109.3***	-331.9***	-144.5*	-0.562***	-1.029***	0.205	0.269
		(2.638)	(12.20)	(113.3)	(82.96)	(0.138)	(0.300)	(0.183)	(0.335)
				Panel B: Corruption					
ITT	0.124***	-0.303	-0.753	-11.06	-5.474	0.00928	0.00109	0.0483*	0.0911
	(0.0246)	(0.444)	(1.509)	(16.37)	(12.95)	(0.0155)	(0.0428)	(0.0274)	(0.0570)
Corruption	-0.0116**	3.677***	5.523***	1.517	-1.072	0.0229**	0.0435***	-0.00491	0.0456***
	(0.00492)	(0.138)	(0.651)	(5.269)	(4.086)	(0.00898)	(0.0105)	(0.00768)	(0.0159)
Fuzzy-RDD		-2.445	-7.178	-155.2	-65.42	0.0620	-0.0183	0.347*	0.420
		(3.427)	(11.64)	(111.3)	(76.22)	(0.115)	(0.307)	(0.195)	(0.303)
Corruption		3.641***	5.621***	3.512	-0.693	0.0248**	0.0468***	-0.000879	0.0519***
		(0.143)	(0.775)	(6.223)	(4.538)	(0.00994)	(0.0156)	(0.00899)	(0.0178)
				Panel C: Judcial Efficiency					
ITT	0.120***	-0.193	-0.512	-6.295	0.856	0.0121	0.00836	0.0550**	0.103*
	(0.0247)	(0.345)	(1.363)	(16.28)	(12.83)	(0.0147)	(0.0401)	(0.0276)	(0.0562)
Length Civil Trial	0.00361	-0.0905	0.167	1.363	-3.627	0.00186	-0.0134	-0.00314	-0.00907
	(0.00492)	(0.0851)	(0.365)	(3.704)	(3.173)	(0.00365)	(0.00892)	(0.00669)	(0.0121)
Fuzzy-RDD		-1.585	-4.657	-100.5	-23.72	0.0934	0.0586	0.405*	0.533
		(2.753)	(10.67)	(124.3)	(84.98)	(0.122)	(0.305)	(0.208)	(0.365)
Length Civil Trial		-0.0897	0.178	0.742	-4.578	0.00163	-0.0131	-0.00508	-0.0124
		(0.0842)	(0.366)	(3.975)	(3.530)	(0.00379)	(0.00902)	(0.00727)	(0.0144)
Observations	2,025	3,314	2,392	2,014	1,620	2,163	2,349	1,850	1,310
Average	0.0889	12.88	14.13	376.8	137.3	0.136	0.567	0.0957	0.479
Bandwidth	0.730	1.836	0.864	0.726	0.585	0.780	0.847	0.775	0.572

Notes: The table reports estimates for discretion from local linear regressions, which includes the difference of the reserve price from the 300,000 euro threshold and an interaction between this variable and an indicator variable for discretion. Panel A (B) [C] includes control for Social Capital index (Corruption index) [Length of civil trial]. Rows 1 (9) [17] and 2 (10) [18] report the regression of the outcomes on an indicator variable equal to one if the reserve price is below 300,000 euro (ITT effects); rows 3 (11) [19] and 4 (12) [20] report the Coefficient and SEs (in parenthesis) of the Social Capital index (Corruption index) [Length of civil trial]. Rows 5 (13) [21] and 6 (14) [22] the IV-LATE estimates estimates of V-LATE estimates of the effects of discretion on the outcomes (*Trattativa Privata*), which use the indicator variable equal to one if the reserve price is below 300,000 euro as instrument (Fuzzy RDD); rows 7 (15) [23] and 8 (16) [24] report the Coefficient and SEs (in parenthesis) of the Social Capital index (Corruption index) [Length of civil trial]. The dependent variables are: in column 1, *Trattativa Privata*, a dummy equal to one for works assigned with a more discretionary procedure; in column 2, *Winning Rebate*, the percentage discount over the reserve price; in column 3, the number of bidders; in column 4, *Work Length*, the number of days from the first day of work until the effective end of the project, which represent the effective duration of the works; in column 5, *Delay*, the difference in days between the effective end of the project and the contractual deadline; in column 6, *Cost Overrun*, the ratio between the difference in the final cost and the awarding cost (reserve price discounted by the winning rebate) and the awarding cost; in column 7, *Local Winner*, a dummy equal to one if the winning firm is located in the same province of the public buyer; in column 8, *Incumbent Winner*, a dummy equal to one for a winner that has won at least one other auction held by the same buyer within a year from the current auction; in 9 column, *S.R.L* a dummy equal to one if the winning firm is a limited liability firm. *Observations* reports the number of observations; *Average* reports the average value of the dependent variables; *Bandwidth* reports the optimal bandwidth calculated using the Imbens and Kalyanaraman (2012) procedure, and it is used to estimate the effects of discretion for the sample of works with reserve price within this bandwidth. SEs are adjusted for heteroskedasticity. Significance at the 10% (*), at the 5% (**), and at the 1% (***).
Source: Statistics for all the public construction works tendered between 2000 and 2005, with reserve price $y \in [2, 5]$, in 100,000 euro (2005 equivalents). The number of observations is smaller compared the full sample described in Table 1, because we restrict the analysis the optimal bandwidth sample, as in Imbens and Kalyanaraman (2012)

Table A.10: Work Type Fixed Effects

Dep. Variables	(1) Trattativa	(2) Rebate	(3) N. Bidders	(4) Work Leng.	(5) Delay	(6) C. Over.	(7) Local W.	(8) Inc. W.	(9) S.R.L.
				Panel A: Intention-to-Treat					
Linear	0.140***	-0.148	-0.687	-15.35	-9.915	0.0112	-0.00222	0.0505*	0.112**
	(0.0265)	(0.462)	(1.490)	(15.68)	(12.92)	(0.0155)	(0.0419)	(0.0281)	(0.0561)
Quadratic	0.128***	-0.199	-0.376	-8.624	-7.583	0.0115	0.000178	0.0474*	0.105*
	(0.0245)	(0.509)	(1.526)	(16.12)	(12.88)	(0.0157)	(0.0430)	(0.0277)	(0.0570)
Cubic	0.168***	0.161	-2.155	-11.22	25.48	-0.00755	0.00960	0.0852**	0.0828
	(0.0362)	(0.585)	(1.924)	(20.35)	(16.86)	(0.0210)	(0.0563)	(0.0383)	(0.0746)
Quartic	0.159***	-0.486	-1.807	-1.208	29.49*	-0.00489	0.0148	0.0899**	0.0785
	(0.0340)	(0.703)	(1.977)	(20.78)	(16.84)	(0.0213)	(0.0575)	(0.0378)	(0.0758)
LLR	0.126***	-0.221	-0.356	-7.269	-7.035	0.0123	0.000813	0.0473**	0.106*
	(0.0243)	(0.502)	(1.611)	(12.84)	(9.782)	(0.0177)	(0.0449)	(0.0210)	(0.0512)
				Panel B: Fuzzy-RDD					
Linear		-1.289	-5.120	-109.1	-65.41	0.0821	-0.0159	0.340*	0.645*
		(4.001)	(10.95)	(110.7)	(85.36)	(0.113)	(0.300)	(0.193)	(0.352)
Quadratic		-1.479	-2.981	-67.06	-54.76	0.0908	0.00136	0.342*	0.678*
		(3.743)	(12.00)	(124.6)	(93.14)	(0.124)	(0.329)	(0.204)	(0.397)
Cubic		1.183	-13.49	-67.24	155.0	-0.0460	0.0620	0.476**	0.458
		(4.346)	(11.79)	(120.5)	(113.2)	(0.130)	(0.363)	(0.227)	(0.437)
Fuzzy RD		-3.281	-12.32	-7.685	181.4	-0.0319	0.104	0.541**	0.433
		(4.700)	(13.22)	(131.9)	(115.6)	(0.140)	(0.401)	(0.247)	(0.437)
LLR		-1.865	-4.178	-129.3	-86.74	0.0799	-0.0153	0.340*	0.553
		(3.324)	(10.20)	(76.18)	(92.65)	(0.130)	(0.316)	(0.162)	(0.355)
Observations	2,025	3,314	2,392	2,014	1,620	2,163	2,349	1,850	1,310
Average	0.0889	12.88	14.13	376.8	137.3	0.136	0.567	0.0957	0.479
Bandwidth	0.730	1.836	0.864	0.726	0.585	0.780	0.847	0.775	0.572

Notes: The table reports estimates for discretion from regressions, which include linear (quadratic) [cubic] {quartic} polynomial in the difference of the reserve price from the 300,000 euro threshold and Fixed Effect for work type and years 2000-2005.|Local linear regressions (LLR) include the difference of the reserve price from the 300,000 euro threshold, an interaction between this variable and an indicator variable for discretion and Fixed Effect for work type and years 2000-2005.| Panel A, rows 1 (3) [5] {7} |9| and 2 (4) [6] {8} |10|, report the estimates of the Coefficient and SEs (in parenthesis) of the regression of the outcomes on an indicator variable equal to one if the reserve price is below 300,000 euro (ITT effects). Panel B, rows 11 (13) [15] {17} |19| and 12 (14) [16] {18} |20|, report the IV-LATE estimates of the effects of discretion on the outcomes (*Trattativa Privata*), which use the indicator variable equal 1 if the reserve price is below 300,000 euro as instrument (Fuzzy-RDD). The dependent variables are: in column 1, *Trattativa Privata*, a dummy equal to one for works assigned with a more discretionary procedure; in column 2, *Winning Rebate*, the percentage discount over the reserve price; in column 3, the number of bidders; in column 4, *Work Length*, the number of days from the first day of work until the effective end of the project, which represent the effective duration of the works; in column 5, *Delay*, the difference in days between the effective end of the project and the contractual deadline; in column 6, *Cost Overrun*, the ratio between the difference in the final cost and the awarding cost (reserve price discounted by the winning rebate) and the awarding cost; in column 7, *Local Winner*, a dummy equal to one if the winning firm is located in the same province of the public buyer; in column 8, *Incumbent Winner*, a dummy equal to one for a winner that has won at least one other auction held by the same buyer within a year from the current auction; in 9 column, *S.R.L* a dummy equal to one if the winning firm is a limited liability firm. *Observations* reports the number of observations; *Average* reports the average value of the dependent variables; *Bandwidth* reports the optimal bandwidth calculated using the Imbens and Kalyanaraman (2012) procedure, and it is used to estimate the effects of discretion for the sample of works with reserve price within this bandwidth. SEs are adjusted for heteroskedasticity. Significance at the 10% (*), at the 5% (**), and at the 1% (***).
Source: Statistics for all the public construction works tendered between 2000 and 2005, with reserve price $y \in [2, 5]$, in 100,000 euro (2005 equivalents). The number of observations is smaller compared the full sample described in Table 1, because we restrict the analysis the optimal bandwidth sample, as in Imbens and Kalyanaraman (2012).

Table A.11: Work Type and Region-Year Fixed Effects

Dep. Variables	(1) Trattativa	(2) Rebate	(3) N. Bidders	(4) Work Leng.	(5) Delay	(6) C. Over.	(7) Local W.	(8) Inc. W.	(9) S.R.L.
				Panel A: Intention-to-Treat					
Linear	0.137***	-0.166	-1.269	-16.31	-9.749	0.0128	-0.0123	0.0489**	0.107*
	(0.0273)	(0.396)	(1.219)	(9.787)	(11.72)	(0.0177)	(0.0440)	(0.0215)	(0.0584)
Quadratic	0.125***	-0.243	-1.203	-8.772	-6.991	0.0131	-0.0108	0.0447**	0.105*
	(0.0257)	(0.379)	(1.369)	(10.53)	(10.06)	(0.0156)	(0.0463)	(0.0206)	(0.0585)
Cubic	0.173***	-0.175	-2.900***	-11.60	28.31**	-0.00244	-0.00183	0.0879**	0.0869
	(0.0407)	(0.475)	(0.947)	(18.19)	(11.97)	(0.0303)	(0.0701)	(0.0347)	(0.0600)
Quartic	0.164***	-0.490	-2.407**	-1.694	32.46**	0.000256	0.00737	0.0919**	0.0840
	(0.0369)	(0.432)	(1.013)	(20.45)	(12.95)	(0.0309)	(0.0691)	(0.0367)	(0.0542)
LLR	0.123***	-0.219	-1.129	-7.657	-6.496	0.0138	-0.00917	0.0444**	0.106*
	(0.0247)	(0.375)	(1.355)	(10.77)	(10.18)	(0.0156)	(0.0465)	(0.0201)	(0.0577)
				Panel B: Fuzzy-RDD					
Linear		-1.480	-9.649	-118.5	-63.89	0.0953	-0.0898	0.329*	0.625
		(3.413)	(9.472)	(79.17)	(82.46)	(0.126)	(0.330)	(0.156)	(0.444)
Quadratic		-1.852	-9.626	-70.26	-50.45	0.105	-0.0832	0.322*	0.688
		(2.803)	(10.96)	(86.33)	(76.05)	(0.120)	(0.367)	(0.162)	(0.496)
Cubic		-1.299	-18.05**	-66.91	171.6*	-0.0149	-0.0118	0.497**	0.486
		(3.494)	(6.401)	(104.9)	(80.89)	(0.186)	(0.456)	(0.228)	(0.383)
Quartic		-3.337	-16.64**	-10.34	197.4**	0.00168	0.0526	0.558**	0.466
		(3.003)	(6.743)	(124.8)	(87.29)	(0.203)	(0.488)	(0.256)	(0.343)
LLR		-1.819	-9.478	-119.3*	-82.72	0.0997	-0.0873	0.328*	0.493
		(2.683)	(10.16)	(64.40)	(95.27)	(0.120)	(0.338)	(0.156)	(0.413)
Observations	2,025	3,314	2,392	2,014	1,620	2,163	2,349	1,850	1,310
Average	0.0889	12.88	14.13	376.8	137.3	0.136	0.567	0.0957	0.479
Bandwidth	0.730	1.836	0.864	0.726	0.585	0.780	0.847	0.775	0.572

Notes: The table reports estimates for discretion from regressions, which include linear (quadratic) [cubic] {quartic} polynomial in the difference of the reserve price from the 300,000 euro threshold and Fixed Effect for work type and Fixed Effect for each region-year pair (20 regions and years 2000-2005). |Local linear regressions (LLR) include the difference of the reserve price from the 300,000 euro threshold, an interaction between this variable and an indicator variable for discretion and Fixed Effect for work type and Fixed Effect for each region-year pair (20 regions and years 2000-2005).| Panel A, rows 1 (3) [5] {7} |9| and 2 (4) [6] {8} |10|, report the estimates of the Coefficient and SEs (in parenthesis) of the regression of the outcomes on an indicator variable equal to one if the reserve price is below 300,000 euro (ITT effects). Panel B, rows 11 (13) [15] {17} |19| and 12 (14) [16] {18} |20|, report the IV-LATE estimates of the effects of discretion on the outcomes (*Trattativa Privata*), which use the indicator variable equal 1 if the reserve price is below 300,000 euro as instrument (Fuzzy-RDD). The dependent variables are: in column 1, *Trattativa Privata*, a dummy equal to one for works assigned with a more discretionary procedure; in column 2, *Winning Rebate*, the percentage discount over the reserve price; in column 3, the number of bidders; in column 4, *Work Length*, the number of days from the first day of work until the effective end of the project, which represent the effective duration of the works; in column 5, *Delay*, the difference in days between the effective end of the project and the contractual deadline; in column 6, *Cost Overrun*, the ratio between the difference in the final cost and the awarding cost (reserve price discounted by the winning rebate) and the awarding cost; in column 7, *Local Winner*, a dummy equal to one if the winning firm is located in the same province of the public buyer; in column 8, *Incumbent Winner*, a dummy equal to one for a winner that has won at least one other auction held by the same buyer within a year from the current auction; in 9 column, *S.R.L* a dummy equal to one if the winning firm is a limited liability firm. *Observations* reports the number of observations; *Average* reports the average value of the dependent variables; *Bandwidth* reports the optimal bandwidth calculated using the Imbens and Kalyanaraman (2012) procedure, and it is used to estimate the effects of discretion for the sample of works with reserve price within this bandwidth. SEs are clustered at region level. Significance at the 10% (*), at the 5% (**), and at the 1% (***).
Source: Statistics for all the public construction works tendered between 2000 and 2005, with reserve price $y \in [2, 5]$, in 100,000 euro (2005 equivalents). The number of observations is smaller compared the full sample described in Table 1, because we restrict the analysis the optimal bandwidth sample, as in Imbens and Kalyanaraman (2012).

Table A.12: Cotrolling for Region-Year Fe, Category FE and Judicial Efficiency

Dep. Variables	(1) Trattativa	(2) Rebate	(3) N. Bidders	(4) Work Leng.	(5) Delay	(6) C. Over.	(7) Local W.	(8) Inc. W.	(9) S.R.L.
				Panel A: Intention-to-Treat					
Linear	0.137***	-0.183	-1.278	-16.17	-9.416	0.0129	-0.0125	0.0489**	0.107*
	(0.0271)	(0.395)	(1.230)	(9.598)	(11.56)	(0.0175)	(0.0442)	(0.0215)	(0.0572)
Quadratic	0.125***	-0.286	-1.174	-8.770	-6.751	0.0130	-0.0102	0.0447**	0.105*
	(0.0256)	(0.374)	(1.377)	(10.46)	(9.969)	(0.0157)	(0.0464)	(0.0206)	(0.0565)
Cubic	0.173***	-0.176	-2.941**	-11.54	27.85**	-0.00234	-0.00253	0.0879**	0.0927
	(0.0406)	(0.481)	(0.983)	(18.20)	(12.17)	(0.0300)	(0.0700)	(0.0347)	(0.0577)
Quartic	0.164***	-0.513	-2.420**	-1.644	31.95**	0.000390	0.00713	0.0920**	0.0891
	(0.0368)	(0.442)	(1.052)	(20.48)	(13.18)	(0.0306)	(0.0693)	(0.0367)	(0.0520)
LLR	0.0311	-0.260	-1.097	-7.654	-6.268	0.0137	-0.00856	0.0444**	0.106*
	(0.0348)	(0.371)	(1.361)	(10.70)	(10.10)	(0.0156)	(0.0466)	(0.0201)	(0.0559)
				Panel B: Fuzzy-RDD					
Linear		-1.631	-9.720	-117.4	-61.55	0.0955	-0.0909	0.328*	0.623
		(3.387)	(9.553)	(77.22)	(80.84)	(0.125)	(0.332)	(0.155)	(0.437)
Quadratic		-2.171	-9.395	-70.25	-48.61	0.104	-0.0788	0.322*	0.693
		(2.732)	(11.05)	(85.66)	(75.02)	(0.121)	(0.367)	(0.162)	(0.485)
Cubic		-1.309	-18.29**	-66.57	169.4*	-0.0143	-0.0164	0.496**	0.520
		(3.535)	(6.581)	(104.9)	(82.47)	(0.184)	(0.455)	(0.227)	(0.377)
Quartic		-3.491	-16.72**	-10.03	195.2**	0.00255	0.0509	0.557**	0.495
		(3.084)	(7.040)	(125.0)	(89.15)	(0.200)	(0.489)	(0.254)	(0.336)
LLR		-2.202	-9.374	-118.8*	-80.50	0.0997	-0.0876	0.328*	0.476
		(2.607)	(10.07)	(63.59)	(94.07)	(0.120)	(0.339)	(0.155)	(0.411)
Observations	2,025	3,314	2,392	2,014	1,620	2,163	2,349	1,850	1,310
Average	0.0889	12.88	14.13	376.8	137.3	0.136	0.567	0.0957	0.479
Bandwidth	0.730	1.836	0.864	0.726	0.585	0.780	0.847	0.775	0.572

Notes: The table reports estimates for discretion from regressions, which include linear (quadratic) [cubic] {quartic} polynomial in the difference of the reserve price from the 300,000 euro threshold, length of civil trial and Fixed Effect for work type, and Fixed Effect for each region-year pair (20 regions and years 2000-2005. |Local linear regressions (LLR) include the difference of the reserve price from the 300,000 euro threshold, an interaction between this variable and an indicator variable for length of civil trial and Fixed Effect for work type, and Fixed Effect for each region-year pair (20 regions and years 2000-2005.| Panel A, rows 1 (3) [5] {7} |9| and 2 (4) [6] {8} |10|, report the estimates of the Coefficient and SEs (in parenthesis) of the regression of the outcomes on an indicator variable equal to one if the reserve price is below 300,000 euro (ITT effects). Panel B, rows 11 (13) [15] {17} |19| and 12 (14) [16] {18} |20|, report the IV-LATE estimates of the effects of discretion on the outcomes (*Trattativa Privata*), which use the indicator variable equal 1 if the reserve price is below 300,000 euro as instrument (Fuzzy-RDD). The dependent variables are: in column 1, *Trattativa Privata*, a dummy equal to one for works assigned with a more discretionary procedure; in column 2, *Winning Rebate*, the percentage discount over the reserve price; in column 3, the number of bidders; in column 4, *Work Length*, the number of days from the first day of work until the effective end of the project, which represent the effective duration of the works; in column 5, *Delay*, the difference in days between the effective end of the project and the contractual deadline; in column 6, *Cost Overrun*, the ratio between the difference in the final cost and the awarding cost (reserve price discounted by the winning rebate) and the awarding cost; in column 7, *Local Winner*, a dummy equal to one if the winning firm is located in the same province of the public buyer; in column 8, *Incumbent Winner*, a dummy equal to one for a winner that has won at least one other auction held by the same buyer within a year from the current auction; in 9 column, *S.R.L* a dummy equal to one if the winning firm is a limited liability firm. *Observations* reports the number of observations; *Average* reports the average value of the dependent variables; *Bandwidth* reports the optimal bandwidth calculated using the Imbens and Kalyanaraman (2012) procedure, and it is used to estimate the effects of discretion for the sample of works with reserve price within this bandwidth. SEs are clustered at region level. Significance at the 10% (*), at the 5% (**), and at the 1% (***).
Source: Statistics for all the public construction works tendered between 2000 and 2005, with reserve price $y \in [2, 5]$, in 100,000 euro (2005 equivalents). The number of observations is smaller compared the full sample described in Table 1, because we restrict the analysis the optimal bandwidth sample, as in Imbens and Kalyanaraman (2012).

Table A.13: Days of delay divided by the contractual length, Region-Year Fixed Effects

VARIABLES	(1) Deg 1	(2) Deg 2	(3) Deg 3	(4) Deg 4	(5) LLR	(6) Deg 1	(7) Deg 2	(8) Deg 3	(9) Deg 4	(10) LLR
ITT	0.0192	0.0163	0.196**	0.199**	0.0163	0.0219	0.0194	0.209**	0.212**	0.0191
	(0.0652)	(0.0650)	(0.0851)	(0.0847)	(0.0647)	(0.0622)	(0.0520)	(0.0765)	(0.0848)	(0.0524)
Fuzzy-RDD	0.122	0.112	1.151**	1.194**	0.135	0.137	0.132	1.227***	1.268**	0.143
	(0.412)	(0.447)	(0.564)	(0.568)	(0.381)	(0.374)	(0.341)	(0.399)	(0.450)	(0.419)
Observations	1,641	1,641	1,641	1,641	1,641	1,641	1,641	1,641	1,641	1,641
Average	0.684	0.684	0.684	0.684	0.684	0.684	0.684	0.684	0.684	0.684
Bandwidth	0.593	0.593	0.593	0.593	0.593	0.593	0.593	0.593	0.593	0.593
Year FE	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No
Region-Year FE	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes

Notes: The table reports estimates for discretion on the ratio between the number of days of delay, defined as the difference in days between the end of the project and the contractual deadline, and the contractual length, defined as the number of days from the first day of work until the contractual deadline. Columns 1 and 6 report the coefficients from a model that includes linear polynomial in the difference of the reserve price from the 300,000 euro threshold. Columns 2 and 7 reports the coefficient from a model that includes quadratic polynomial in the difference of the reserve price from the 300,000 euro threshold. Columns 3 and 8 report the coefficients from a model that includes cubic polynomial in the difference of the reserve price from the 300,000 euro threshold. Columns 4 and 9 report the coefficients from a model that includes linear quartic polynomial in the difference of the reserve price from the 300,000 euro threshold. Columns 5 and 10 report the coefficients from a model which includes the difference of the reserve price from the 300,000 euro threshold and an interaction between this variable and an indicator variable for discretion. Rows 1 and 5 report the estimates of the Coefficient and SEs (in parenthesis) of the regression of the outcomes on an indicator variable equal to one if the reserve price is below 300,000 euro (ITT effects). Rows 3 and 4 report the IV-LATE estimates of the effects of discretion on the outcomes (*Trattativa Privata*), which use the indicator variable equal to one if the reserve price is below 300,000 euro as instrument (Fuzzy RDD). Row 5 reports the number of observation; row 6 *Average* reports the average value of the dependent variables; row 7 *Bandwidth* reports the optimal bandwidth calculated using the Imbens and Kalyanaraman (2012) procedure, and it is used to estimate the effects of discretion for the sample of works with reserve price within this bandwidth; row 8 reports the use of Fixed Effects for year 2000-2005; row 9 reports the use of Fixed Effect for each region-year pair (20 regions and years 2000-2005). SEs are adjusted for heteroschedasticity (clustered at region level) in columns 1-5 (6-10). Significance at the 10% (*), at the 5% (**), and at the 1% (***).
Source: Statistics for all the public construction works tendered between 2000 and 2005, with reserve price $y \in [2, 5]$, in 100,000 euro (2005 equivalents). The number of observations is smaller compared the full sample described in Table 1, because we restrict the analysis the optimal bandwidth sample, as in Imbens and Kalyanaraman (2012).

Table A.14: Work Overall Length

VARIABLES	(1) Deg 1	(2) Deg 2	(3) Deg 3	(4) Deg 4	(5) LLR	(6) Deg 1	(7) Deg 2	(8) Deg 3	(9) Deg 4	(10) LLR
ITT	-26.00	-20.13	-33.08	-25.17	-18.76	-27.33*	-19.61	-34.05	-26.34	-18.37
	(17.90)	(18.39)	(23.80)	(24.40)	(18.33)	(13.37)	(14.11)	(21.68)	(23.25)	(14.38)
Fuzzy-RDD	-186.6	-155.7	-210.1	-170.0	-202.4	-199.5*	-154.2	-216.0	-179.2	-202.3**
	(127.9)	(141.3)	(149.9)	(162.8)	(125.3)	(102.6)	(111.2)	(134.7)	(154.5)	(91.73)
Observations	2,189	2,189	2,189	2,189	2,189	2,189	2,189	2,189	2,189	2,189
Average	466.5	466.5	466.5	466.5	466.5	466.5	466.5	466.5	466.5	466.5
Bandwidth	0.799	0.799	0.799	0.799	0.799	0.799	0.799	0.799	0.799	0.799
Year FE	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No
Region-Year FE	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes

Notes: The table reports estimates for discretion on the work overall length, defined as the number of days from the awarding date until the effective date of delivery of the work. Columns 1 and 6 report the coefficients from a model that includes linear polynomial in the difference of the reserve price from the 300,000 euro threshold. Columns 2 and 7 reports the coefficient from a model that includes quadratic polynomial in the difference of the reserve price from the 300,000 euro threshold. Columns 3 and 8 report the coefficients from a model that includes cubic polynomial in the difference of the reserve price from the 300,000 euro threshold. Columns 4 and 9 report the coefficients from a model that includes linear quartic polynomial in the difference of the reserve price from the 300,000 euro threshold. Columns 5 and 10 report the coefficients from a model which includes the difference of the reserve price from the 300,000 euro threshold and an interaction between this variable and an indicator variable for discretion. Rows 1 and 5 report the estimates of the Coefficient and SEs (in parenthesis) of the regression of the outcomes on an indicator variable equal to one if the reserve price is below 300,000 euro (ITT effects). Rows 3 and 4 report the IV-LATE estimates of the effects of discretion on the outcomes (*Trattativa Privata*), which use the indicator variable equal to one if the reserve price is below 300,000 euro as instrument (Fuzzy RDD). Row 5 reports the number of observation; row 6 the average value of the dependent variables; row 6 *Average* reports the average value of the dependent variables; row 7 *Bandwidth* reports the optimal bandwidth calculated using the Imbens and Kalyanaraman (2012) procedure, and it is used to estimate the effects of discretion for the sample of works with reserve price within this bandwidth; row 8 reports the use of Fixed Effects for year 2000-2005; row 9 reports the use of Fixed Effect for each region-year pair (20 regions and years 2000-2005). SEs are clustered at region level. Significance at the 10% (*), at the 5% (**), and at the 1% (***).
Source: Statistics for all the public constructon works tendered between 2000 and 2005, with reserve price $y \in [2, 5]$, in 100,000 euro (2005 equivalents). The number of observations is smaller compared the full sample described in Table 1, because we restrict the analysis the optimal bandwidth sample, as in Imbens and Kalyanaraman (2012).

Table A.15: Baseline Model, Missing Values Not Dropped

Dep. Variables	(1) Trattativa	(2) Rebate	(3) N. Bidders	(4) Work Leng.	(5) Delay	(6) C. Over.	(7) Local W.	(8) Inc. W.	(9) S.R.L.
				Panel A: Intention-to-Treat					
Linear	0.166***	0.191	-1.464	-23.53	19.36	0.0133	0.0132	0.0513**	0.0959**
	(0.0223)	(0.520)	(1.115)	(16.26)	(13.21)	(0.0143)	(0.0368)	(0.0209)	(0.0448)
Quadratic	0.153***	0.151	-1.483	-13.63	25.76*	0.0140	0.0137	0.0571***	0.0853*
	(0.0207)	(0.525)	(1.112)	(16.33)	(13.35)	(0.0147)	(0.0377)	(0.0210)	(0.0457)
Cubic	0.187***	-0.0601	-0.430	-39.29*	5.687	0.00887	0.0170	0.0758***	0.0617
	(0.0297)	(0.686)	(1.412)	(20.64)	(16.50)	(0.0200)	(0.0489)	(0.0281)	(0.0590)
Quartic	0.178***	0.0248	-0.700	-35.54*	7.823	0.00941	0.0169	0.0673**	0.0549
	(0.0280)	(0.694)	(1.435)	(21.06)	(16.78)	(0.0208)	(0.0500)	(0.0282)	(0.0601)
LLR	0.151***	0.134	-1.470	-11.88	27.55**	0.0142	0.0133	0.0546***	0.0844*
	(0.0204)	(0.525)	(1.114)	(16.30)	(13.29)	(0.0147)	(0.0377)	(0.0208)	(0.0458)
				Panel B: Fuzzy-RDD					
Linear		1.229	-10.44	-141.6	126.5	0.0851	0.0807	0.285**	0.485**
		(3.372)	(7.811)	(96.76)	(92.90)	(0.0916)	(0.225)	(0.118)	(0.239)
Quadratic		1.042	-10.30	-89.58	178.6*	0.0965	0.0924	0.346***	0.474*
		(3.647)	(7.579)	(106.1)	(102.7)	(0.102)	(0.253)	(0.130)	(0.264)
Cubic		-0.341	-2.943	-228.9*	28.83	0.0470	0.0888	0.391***	0.307
		(3.882)	(9.584)	(121.4)	(84.52)	(0.106)	(0.255)	(0.151)	(0.301)
Cubic		-0.341	-2.943	-228.9*	28.83	0.0470	0.0888	0.391***	0.307
		(3.882)	(9.584)	(121.4)	(84.52)	(0.106)	(0.255)	(0.151)	(0.301)
LLR		1.288	-10.30	-208.2**	167.2	0.0815	0.0791	0.263**	0.502**
		(3.303)	(7.205)	(100.6)	(115.3)	(0.0911)	(0.221)	(0.125)	(0.222)
Observations	3,250	3,524	4,958	2,003	1,554	2,954	2,977	3,292	2,033
Average	0.105	12.83	15.09	380.1	139.5	0.142	0.575	0.0936	0.473
Bandwidth	0.691	0.767	1.268	0.550	0.431	0.785	0.684	0.832	0.575

Notes: The table reports estimates for discretion from regressions, which include linear (quadratic) [cubic] {quartic} polynomial in the difference of the reserve price from the 300,000 euro threshold and Fixed Effects for years 2000-2005. |Local linear regressions (LLR) include the difference of the reserve price from the 300,000 euro threshold, an interaction between this variable and an indicator variable for discretion and Fixed Effect years 2000-2005.| Panel A, rows 1 (3) [5] {7} |9| and 2 (4) [6] {8} |10|, report the estimates of the Coefficient and SEs (in parenthesis) of the regression of the outcomes on an indicator variable equal to one if the reserve price is below 300,000 euro (ITT effects). Panel B, rows 11 (13) [15] {17} |19| and 12 (14) [16] {18} |20|, report the IV-LATE estimates of the effects of discretion on the outcomes (*Trattativa Privata*), which use the indicator variable equal 1 if the reserve price is below 300,000 euro as instrument (Fuzzy-RDD). The dependent variables are: in column 1, *Trattativa Privata*, a dummy equal to one for works assigned with a more discretionary procedure; in column 2, *Winning Rebate*, the percentage discount over the reserve price; in column 3, the number of bidders; in column 4, *Work Length*, the number of days from the first day of work until the effective end of the project, which represent the effective duration of the works; in column 5, *Delay*, the difference in days between the effective end of the project and the contractual deadline; in column 6, *Cost Overrun*, the ratio between the difference in the final cost and the awarding cost (reserve price discounted by the winning rebate) and the awarding cost; in column 7, *Local Winner*, a dummy equal to one if the winning firm is located in the same province of the public buyer; in column 8, *Incumbent Winner*, a dummy equal to one for a winner that has won at least one other auction held by the same buyer within a year from the current auction; in 9 column, *S.R.L* a dummy equal to one if the winning firm is a limited liability firm. *Observations* reports the number of observations; *Average* reports the average value of the dependent variables; *Bandwidth* reports the optimal bandwidth calculated using the Imbens and Kalyanaraman (2012) procedure, and it is used to estimate the effects of discretion for the sample of works with reserve price within this bandwidth SEs are adjusted for heteroskedasticity. Significance at the 10% (*), at the 5% (**), and at the 1% (***).
Source: Statistics for all the public construction works tendered between 2000 and 2005, with reserve price $y \in [2, 5]$, in 100,000 euro (2005 equivalents). The number of observations is smaller compared the full sample described in Table 1, because we restrict the analysis the optimal bandwidth sample, as in Imbens and Kalyanaraman (2012) and works with missing values in the dependent variable are not dropped.

Table A.16: Drop Single Bidders - Just One Invited - Region-Year FE

Dep. Variables	(1) Trattativa	(2) Rebate	(3) N. Bidders	(4) Work Leng.	(5) Delay	(6) C. Over.	(7) Local W.	(8) Inc. W.	(9) S.R.L.
	Panel A: Intention-to-Treat								
Linear	0.140***	-0.287	-2.066	-21.13*	-2.789	0.00756	-0.00319	0.0421*	0.122*
	(0.0323)	(0.370)	(1.220)	(11.38)	(11.54)	(0.0170)	(0.0598)	(0.0217)	(0.0613)
Quadratic	0.129***	-0.312	-2.331	-14.33	1.133	0.00780	0.00266	0.0381*	0.113*
	(0.0299)	(0.373)	(1.409)	(11.82)	(11.43)	(0.0141)	(0.0612)	(0.0212)	(0.0626)
Cubic	0.167***	-0.163	-2.184*	-17.12	29.15*	0.00179	-0.0269	0.0808*	0.0631
	(0.0442)	(0.484)	(1.057)	(21.19)	(15.18)	(0.0249)	(0.0664)	(0.0385)	(0.0743)
Quartic	0.158***	-0.627	-1.535	-6.588	31.43*	0.00448	-0.0198	0.0893**	0.0703
	(0.0410)	(0.455)	(1.168)	(23.73)	(15.11)	(0.0259)	(0.0661)	(0.0399)	(0.0681)
LLR	0.127***	-0.324	-2.205	-13.06	1.234	0.00849	0.00358	0.0382*	0.116*
	(0.0290)	(0.347)	(1.378)	(12.20)	(11.30)	(0.0143)	(0.0614)	(0.0208)	(0.0609)
	Panel B: Fuzzy-RDD								
Linear		-2.650	-15.80	-150.5	-17.69	0.0556	-0.0232	0.266	0.722
		(3.227)	(9.106)	(93.02)	(75.31)	(0.120)	(0.438)	(0.156)	(0.487)
Quadratic		-2.406	-18.30	-110.6	7.903	0.0614	0.0212	0.261	0.732
		(2.730)	(10.85)	(95.61)	(78.89)	(0.106)	(0.483)	(0.162)	(0.530)
Cubic		-1.227	-14.28	-103.5	173.1	0.0112	-0.157	0.450	0.347
		(3.570)	(8.359)	(124.6)	(105.5)	(0.154)	(0.398)	(0.257)	(0.454)
Quartic		-4.290	-10.97	-42.15	183.8	0.0300	-0.122	0.523*	0.387
		(3.286)	(8.774)	(149.9)	(104.9)	(0.170)	(0.413)	(0.277)	(0.426)
LLR		-2.590	-18.32	-157.5*	-48.83	0.0563	-0.0285	0.266	0.685
		(2.429)	(11.63)	(86.38)	(80.83)	(0.116)	(0.427)	(0.165)	(0.471)
Observations	2,044	3,348	2,576	2,049	1,571	2,220	2,035	1,791	1,257
Average	0.0841	12.91	14.01	376.5	137.9	0.136	0.564	0.0944	0.477
Bandwidth	0.740	2.913	0.940	0.743	0.573	0.806	0.738	0.753	0.553

Notes: The table reports estimates for discretion from regressions, which include linear (quadratic) [cubic] {quartic} polynomial in the difference of the reserve price from the 300,000 euro threshold and Fixed Effect for each region-year pair (20 regions and years 2000-2005). |Local linear regressions (LLR) include the difference of the reserve price from the 300,000 euro threshold, an interaction between this variable and an indicator variable for discretion and Fixed Effect for each region-year pair (20 regions and years 2000-2005).| Panel A, rows 1 (3) [5] {7} |9| and 2 (4) [6] {8} |10|, report the estimates of the Coefficient and SEs (in parenthesis) of the regression of the outcomes on an indicator variable equal to one if the reserve price is below 300,000 euro (ITT effects). Panel B, rows 11 (13) [15] {17} |19| and 12 (14) [16] {18} |20|, report the IV-LATE estimates of the effects of discretion on the outcomes (*Trattativa Privata*), which use the indicator variable equal 1 if the reserve price is below 300,000 euro as instrument (Fuzzy-RDD). The dependent variables are: in column 1, *Trattativa Privata*, a dummy equal to one for works assigned with a more discretionary procedure; in column 2, *Winning Rebate*, the percentage discount over the reserve price; in column 3, the number of bidders; in column 4, *Work Length*, the number of days from the first day of work until the effective end of the project, which represent the effective duration of the works; in column 5, *Delay*, the difference in days between the effective end of the project and the contractual deadline; in column 6, *Cost Overrun*, the ratio between the difference in the final cost and the awarding cost (reserve price discounted by the winning rebate) and the awarding cost; in column 7, *Local Winner*, a dummy equal to one if the winning firm is located in the same province of the public buyer; in column 8, *Incumbent Winner*, a dummy equal to one for a winner that has won at least one other auction held by the same buyer within a year from the current auction; in 9 column, *S.R.L* a dummy equal to one if the winning firm is a limited liability firm. *Observations* reports the number of observations; *Average* reports the average value of the dependent variables; *Bandwidth* reports the optimal bandwidth calculated using the Imbens and Kalyanaraman (2012) procedure, and it is used to estimate the effects of discretion for the sample of works with reserve price within this bandwidth. SEs are clustered at region level. Significance at the 10% (*), at the 5% (**), and at the 1% (***).
Source: Statistics for all the public construction works tendered between 2000 and 2005, with reserve price $y \in [2, 5]$, in 100,000 euro (2005 equivalents). The number of observations is smaller compared the full sample described in Table 1, because we restrict the analysis the optimal bandwidth sample, as in Imbens and Kalyanaraman (2012) and works assigned with *Trattativa Privata*, one bidder and only one invited bidder are dropped.

Table A.17: Drop Single Bidders - Less 5 Invited - Region-Year FE

Dep. Variables	(1) Trattativa	(2) Rebate	(3) N. Bidders	(4) Work Leng.	(5) Delay	(6) C. Over.	(7) Local W.	(8) Inc. W.	(9) S.R.L.
				Panel A: Intention-to-Treat					
Linear	0.137***	-0.164	-2.007	-21.16*	-11.00	0.00669	0.00127	0.0391*	0.0930*
	(0.0317)	(0.426)	(1.234)	(11.70)	(11.28)	(0.0168)	(0.0573)	(0.0220)	(0.0472)
Quadratic	0.127***	-0.276	-2.304	-14.27	-8.253	0.00649	0.00643	0.0359*	0.101**
	(0.0296)	(0.389)	(1.435)	(12.48)	(10.66)	(0.0140)	(0.0587)	(0.0203)	(0.0451)
Cubic	0.163***	-0.338	-2.112*	-19.13	26.06*	0.00322	-0.0290	0.0805**	0.106
	(0.0445)	(0.444)	(1.052)	(20.56)	(13.96)	(0.0252)	(0.0692)	(0.0367)	(0.0784)
Quartic	0.154***	-0.627	-1.377	-7.778	31.13**	0.00628	-0.0215	0.0859**	0.0884
	(0.0409)	(0.435)	(1.136)	(23.01)	(13.27)	(0.0256)	(0.0697)	(0.0392)	(0.0775)
LLR	0.124***	-0.227	-2.167	-12.97	-7.886	0.00724	0.00775	0.0357*	0.0994**
	(0.0285)	(0.395)	(1.405)	(12.80)	(10.48)	(0.0141)	(0.0590)	(0.0200)	(0.0447)
				Panel B: Fuzzy-RDD					
Linear		-1.471	-15.50	-157.7	-73.95	0.0491	0.00942	0.257	0.567
		(3.700)	(9.334)	(98.52)	(83.83)	(0.118)	(0.425)	(0.170)	(0.386)
Quadratic		-2.153	-18.27	-115.9	-60.09	0.0511	0.0518	0.254	0.669
		(2.903)	(11.14)	(104.1)	(81.68)	(0.105)	(0.464)	(0.166)	(0.417)
Cubic		-2.557	-13.97	-112.1	150.1	0.0210	-0.178	0.457*	0.572
		(3.278)	(8.287)	(118.4)	(86.42)	(0.161)	(0.435)	(0.245)	(0.519)
Quartic		-4.307	-10.05	-47.85	184.6*	0.0435	-0.139	0.517*	0.494
		(3.121)	(8.580)	(140.5)	(86.00)	(0.172)	(0.458)	(0.270)	(0.514)
LLR		-2.010	-18.26	-159.5*	-80.97	0.0458	0.0107	0.258	0.467
		(2.804)	(12.02)	(85.69)	(82.92)	(0.120)	(0.426)	(0.176)	(0.456)
Observations	2,048	3,253	2,566	2,017	1,680	2,241	2,095	1,859	1,380
Average	0.0825	12.93	14.03	376.6	137.3	0.136	0.564	0.0941	0.487
Bandwidth	0.743	1.738	0.937	0.732	0.610	0.819	0.761	0.783	0.608

Notes: The table reports estimates for discretion from regressions, which include linear (quadratic) [cubic] {quartic} polynomial in the difference of the reserve price from the 300,000 euro threshold and Fixed Effect for each region-year pair (20 regions and years 2000-2005). |Local linear regressions (LLR) include the difference of the reserve price from the 300,000 euro threshold, an interaction between this variable and an indicator variable for discretion and Fixed Effect for each region-year pair (20 regions and years 2000-2005).| Panel A, rows 1 (3) [5] {7} |9| and 2 (4) [6] {8} |10|, report the estimates of the Coefficient and SEs (in parenthesis) of the regression of the outcomes on an indicator variable equal to one if the reserve price is below 300,000 euro (ITT effects). Panel B, rows 11 (13) [15] {17} |19| and 12 (14) [16] {18} |20|, report the IV-LATE estimates of the effects of discretion on the outcomes (*Trattativa Privata*), which use the indicator variable equal 1 if the reserve price is below 300,000 euro as instrument (Fuzzy-RDD). The dependent variables are: in column 1, *Trattativa Privata*, a dummy equal to one for works assigned with a more discretionary procedure; in column 2, *Winning Rebate*, the percentage discount over the reserve price; in column 3, the number of bidders; in column 4, *Work Length*, the number of days from the first day of work until the effective end of the project, which represent the effective duration of the works; in column 5, *Delay*, the difference in days between the effective end of the project and the contractual deadline; in column 6, *Cost Overrun*, the ratio between the difference in the final cost and the awarding cost (reserve price discounted by the winning rebate) and the awarding cost; in column 7, *Local Winner*, a dummy equal to one if the winning firm is located in the same province of the public buyer; in column 8, *Incumbent Winner*, a dummy equal to one for a winner that has won at least one other auction held by the same buyer within a year from the current auction; in 9 column, *S.R.L* a dummy equal to one if the winning firm is a limited liability firm. *Observations* reports the number of observations; *Average* reports the average value of the dependent variables; *Bandwidth* reports the optimal bandwidth calculated using the Imbens and Kalyanaraman (2012) procedure, and it is used to estimate the effects of discretion for the sample of works with reserve price within this bandwidth. SEs are clustered at region level. Significance at the 10% (*), at the 5% (**), and at the 1% (***).
Source: Statistics for all the public construction works tendered between 2000 and 2005, with reserve price $y \in [2, 5]$, in 100,000 euro (2005 equivalents). The number of observations is smaller compared the full sample described in Table 1, because we restrict the analysis the optimal bandwidth sample, as in Imbens and Kalyanaraman (2012) and works assigned with *Trattativa Privata*, one bidder and only less than 5 invited bidder are dropped.

Table A.18: Drop Single Bidders - Less 5 Invited or Missing - Region-Year FE

Dep. Variables	(1) Trattativa	(2) Rebate	(3) N. Bidders	(4) Work Leng.	(5) Delay	(6) C. Over.	(7) Local W.	(8) Inc. W.	(9) S.R.L.
				Panel A: Intention-to-Treat					
Linear	0.125***	-0.257	-1.549	-12.30	-4.243	-0.0146	-0.00884	0.0379	0.103**
	(0.0220)	(0.441)	(1.281)	(11.62)	(12.45)	(0.0123)	(0.0508)	(0.0297)	(0.0438)
Quadratic	0.118***	-0.292	-1.743	-6.144	-0.328	-0.0169*	-0.00373	0.0419	0.106**
	(0.0200)	(0.436)	(1.482)	(11.62)	(12.12)	(0.00923)	(0.0528)	(0.0286)	(0.0430)
Cubic	0.130***	-0.924	-2.289**	-19.87	27.06	-0.00559	-0.00708	0.109**	0.123
	(0.0373)	(0.537)	(0.938)	(20.85)	(16.03)	(0.0151)	(0.0718)	(0.0406)	(0.0730)
Quartic	0.120***	-0.905*	-1.524	-12.94	29.42*	-0.00150	-0.00197	0.108**	0.110
	(0.0365)	(0.480)	(1.047)	(22.58)	(16.01)	(0.0147)	(0.0724)	(0.0414)	(0.0717)
LLR	0.116***	-0.266	-1.616	-5.024	-0.251	-0.0153	-0.00298	0.0400	0.105**
	(0.0198)	(0.438)	(1.457)	(11.83)	(12.01)	(0.00989)	(0.0528)	(0.0284)	(0.0428)
				Panel B: Fuzzy-RDD					
Linear		-2.236	-12.79	-103.7	-30.51	-0.124	-0.0724	0.263	0.710
		(3.709)	(10.59)	(107.0)	(92.78)	(0.115)	(0.426)	(0.217)	(0.417)
Quadratic		-2.489	-14.68	-55.22	-2.594	-0.150	-0.0329	0.317	0.792*
		(3.577)	(12.27)	(107.8)	(95.96)	(0.0963)	(0.469)	(0.231)	(0.447)
Cubic		-7.731*	-17.43**	-138.1	190.5	-0.0425	-0.0518	0.680**	0.805
		(3.704)	(8.065)	(141.9)	(123.3)	(0.114)	(0.529)	(0.304)	(0.541)
Quartic		-7.185*	-13.08	-95.45	202.3	-0.0121	-0.0154	0.684**	0.740
		(3.384)	(8.849)	(162.5)	(121.4)	(0.118)	(0.565)	(0.298)	(0.544)
LLR		-2.480	-14.23	-93.12	-68.17	-0.132	-0.0822	0.209	0.629
		(3.470)	(13.74)	(99.79)	(95.84)	(0.109)	(0.415)	(0.228)	(0.490)
Observations	2,323	2,883	2,439	2,118	1,562	2,586	2,210	1,562	1,354
Average	0.0771	12.83	14.16	377	137.8	0.134	0.566	0.0967	0.487
Bandwidth	0.849	1.243	0.890	0.772	0.573	0.954	0.808	0.656	0.599

Notes: The table reports estimates for discretion from regressions, which include linear (quadratic) [cubic] {quartic} polynomial in the difference of the reserve price from the 300,000 euro threshold and Fixed Effect for each region-year pair (20 regions and years 2000-2005). |Local linear regressions (LLR) include the difference of the reserve price from the 300,000 euro threshold, an interaction between this variable and an indicator variable for discretion and Fixed Effect for each region-year pair (20 regions and years 2000-2005).| Panel A, rows 1 (3) [5] {7} |9| and 2 (4) [6] {8} |10|, report the estimates of the Coefficient and SEs (in parenthesis) of the regression of the outcomes on an indicator variable equal to one if the reserve price is below 300,000 euro (ITT effects). Panel B, rows 11 (13) [15] {17} |19| and 12 (14) [16] {18} |20|, report the IV-LATE estimates of the effects of discretion on the outcomes (*Trattativa Privata*), which use the indicator variable equal 1 if the reserve price is below 300,000 euro as instrument (Fuzzy-RDD). The dependent variables are:in column 1, *Trattativa Privata*, a dummy equal to one for works assigned with a more discretionary procedure; in column 2, *Winning Rebate*, the percentage discount over the reserve price; in column 3, the number of bidders; in column 4, *Work Length*, the number of days from the first day of work until the effective end of the project, which represent the effective duration of the works; in column 5, *Delay*, the difference in days between the effective end of the project and the contractual deadline; in column 6, *Cost Overrun*, the ratio between the difference in the final cost and the awarding cost (reserve price discounted by the winning rebate) and the awarding cost; in column 7, *Local Winner*, a dummy equal to one if the winning firm is located in the same province of the public buyer; in column 8, *Incumbent Winner*, a dummy equal to one for a winner that has won at least one other auction held by the same buyer within a year from the current auction; in 9 column, *S.R.L* a dummy equal to one if the winning firm is a limited liability firm. *Observations* reports the number of observations; *Average* reports the average value of the dependent variables; *Bandwidth* reports the optimal bandwidth calculated using the Imbens and Kalyanaraman (2012) procedure, and it is used to estimate the effects of discretion for the sample of works with reserve price within this bandwidth. SEs are clustered at region level. Significance at the 10% (*), at the 5% (**), and at the 1% (***).
Source: Statistics for all the public construction works tendered between 2000 and 2005, with reserve price $y \in [2, 5]$, in 100,000 euro (2005 equivalents). The number of observations is smaller compared the full sample described in Table 1, because we restrict the analysis the optimal bandwidth sample, as in Imbens and Kalyanaraman (2012) and works assigned with *Trattativa Privata*, one bidder and less than five invited bidder or the number of invited bidders is missing are dropped.

Table A.19: Nord-Center Regions - Region-Year Fixed Effects

VARIABLES	(1) Trattativa	(2) Rebate	(3) N. Bidders	(4) Work Leng.	(5) Delay	(6) C. Over.	(7) Local W.	(8) Inc. W.	(9) S.R.L.
	Panel A: Intention-to-Treat								
Linear	0.148***	-0.646*	-2.984*	-10.28	12.66	-0.00542	-0.0292	0.0550**	0.0897
	(0.0320)	(0.314)	(1.516)	(15.68)	(14.59)	(0.0166)	(0.0712)	(0.0230)	(0.0575)
Quadratic	0.136***	-0.786*	-3.006*	3.825	15.69	-0.00721	-0.0247	0.0484*	0.0989
	(0.0294)	(0.352)	(1.400)	(17.83)	(13.72)	(0.0140)	(0.0733)	(0.0218)	(0.0561)
Cubic	0.189***	-0.316	-2.716	-14.19	29.02	0.0125	-0.0198	0.0917**	0.119
	(0.0447)	(0.556)	(1.501)	(31.31)	(17.29)	(0.0219)	(0.0646)	(0.0397)	(0.0851)
Quartic	0.178***	-0.218	-2.541	-11.77	31.65*	0.0165	-0.0148	0.0966**	0.102
	(0.0404)	(0.513)	(1.444)	(33.95)	(16.30)	(0.0201)	(0.0638)	(0.0413)	(0.0845)
LLR	0.134***	-0.789	-2.984**	3.905	16.35	-0.00647	-0.0239	0.0484	0.0971
	(0.0280)	(0.492)	(1.265)	(19.23)	(14.56)	(0.0137)	(0.0499)	(0.0304)	(0.0598)
	Panel B: Fuzzy-RDD								
Linear		-4.404*	-20.94*	-64.75	71.97	-0.0380	-0.193	0.334*	0.513
		(2.057)	(10.82)	(101.8)	(79.54)	(0.119)	(0.495)	(0.154)	(0.421)
Quadratic		-5.526**	-20.61*	26.02	95.95	-0.0521	-0.178	0.312*	0.617
		(2.127)	(9.767)	(120.8)	(82.11)	(0.105)	(0.550)	(0.154)	(0.460)
Cubic		-1.972	-18.85	-74.24	170.4	0.0758	-0.104	0.463*	0.613
		(3.446)	(11.02)	(158.5)	(121.1)	(0.126)	(0.350)	(0.246)	(0.507)
Quartic		-1.512	-16.44	-64.80	185.0	0.110	-0.0823	0.525*	0.548
		(3.509)	(10.39)	(181.1)	(109.7)	(0.128)	(0.362)	(0.269)	(0.513)
LLR		-5.843*	-20.90*	-80.64	62.33	-0.0487	-0.195	0.332*	0.427
		(3.085)	(10.84)	(109.3)	(79.70)	(0.104)	(0.489)	(0.152)	(0.488)
Observations	1,714	2,147	2,561	1,481	1,156	2,196	1,683	1,624	1,196
Average	0.0986	11.25	12.32	374.7	134.4	0.126	0.550	0.101	0.506
Bandwidth	0.718	0.897	1.286	0.619	0.489	0.917	0.701	0.780	0.600

Notes: The table reports estimates for discretion from regressions, which include linear (quadratic) [cubic] {quartic} polynomial in the difference of the reserve price from the 300,000 euro threshold and Fixed Effect for each region-year pair (20 regions and years 2000-2005). |Local linear regressions (LLR) include the difference of the reserve price from the 300,000 euro threshold, an interaction between this variable and an indicator variable for discretion and Fixed Effect for each region-year pair (20 regions and years 2000-2005).| Panel A, rows 1 (3) [5] {7} |9| and 2 (4) [6] {8} |10|, report the estimates of the Coefficient and SEs (in parenthesis) of the regression of the outcomes on an indicator variable equal to one if the reserve price is below 300,000 euro (ITT effects). Panel B, rows 11 (13) [15] {17} |19| and 12 (14) [16] {18} |20|, report the IV-LATE estimates of the effects of discretion on the outcomes (*Trattativa Privata*), which use the indicator variable equal 1 if the reserve price is below 300,000 euro as instrument (Fuzzy-RDD). The dependent variables are: in column 1, *Trattativa Privata*, a dummy equal to one for works assigned with a more discretionary procedure; in column 2, *Winning Rebate*, the percentage discount over the reserve price; in column 3, the number of bidders; in column 4, *Work Length*, the number of days from the first day of work until the effective end of the project, which represent the effective duration of the works; in column 5, *Delay*, the difference in days between the effective end of the project and the contractual deadline; in column 6, *Cost Overrun*, the ratio between the difference in the final cost and the awarding cost (reserve price discounted by the winning rebate) and the awarding cost; in column 7, *Local Winner*, a dummy equal to one if the winning firm is located in the same province of the public buyer; in column 8, *Incumbent Winner*, a dummy equal to one for a winner that has won at least one other auction held by the same buyer within a year from the current auction; in 9 column, *S.R.L* a dummy equal to one if the winning firm is a limited liability firm. *Observations* reports the number of observations; *Average* reports the average value of the dependent variables; *Bandwidth* reports the optimal bandwidth calculated using the Imbens and Kalyanaraman (2012) procedure, and it is used to estimate the effects of discretion for the sample of works with reserve price within this bandwidth. SEs are clustered at region level. Significance at the 10% (*), at the 5% (**), and at the 1% (***).
Source: Statistics for all the public construction works tendered between 2000 and 2005, with reserve price $y \in [2, 5]$, in 100,000 euro (2005 equivalents). The number of observations is smaller compared the full sample described in Table 1, because we restrict the analysis the optimal bandwidth sample, as in Imbens and Kalyanaraman (2012) and works from the North and Center of Italy.

Table A.20: Performance Missing

MODEL	(1) Deg. 1	(2) Deg. 2	(3) Deg. 3	(4) Deg. 4	(5) LLR	(6) Deg. 1	(7) Deg. 2	(8) Deg. 3	(9) Deg. 4	(10) LLR
					Panel A: Missing Performance					
ITT	0.029	0.039	0.060	0.063	0.036	0.029	0.036	0.052	0.055	0.034
	(0.029)	(0.030)	(0.039)	(0.040)	(0.030)	(0.030)	(0.034)	(0.035)	(0.034)	(0.034)
Fuzzy-RDD	0.182	0.261	0.349	0.386	0.166	0.199	0.264	0.328	0.369	0.210
	(0.182)	(0.202)	(0.229)	(0.245)	(0.187)	(0.212)	(0.265)	(0.238)	(0.242)	(0.202)
Observations	4,475	4,475	4,475	4,475	4,475	4,475	4,475	4,475	4,475	4,475
Average	0.370	0.370	0.370	0.370	0.370	0.370	0.370	0.370	0.370	0.370
Bandwidth	0.951	0.951	0.951	0.951	0.951	0.951	0.951	0.951	0.951	0.951
					Panel B: Missing Incumbency					
ITT	-0.001	-0.000	-0.001	-0.001	-0.000	-0.000	-0.000	-0.001	-0.000	-0.000
	(0.001)	(0.000)	(0.001)	(0.001)	(0.000)	(0.001)	(0.000)	(0.001)	(0.000)	(0.000)
Fuzzy-RDD	-0.003	-0.002	-0.004	-0.003	-0.003	-0.003	-0.003	-0.003	-0.002	-0.003
	(0.003)	(0.002)	(0.004)	(0.003)	(0.003)	(0.004)	(0.003)	(0.003)	(0.002)	(0.004)
Observations	3,011	3,011	3,011	3,011	3,011	3,011	3,011	3,011	3,011	3,011
Average	0.162	0.162	0.162	0.162	0.162	0.162	0.162	0.162	0.162	0.162
Bandwidth	0.638	0.638	0.638	0.638	0.638	0.638	0.638	0.638	0.638	0.638
Year FE	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No
Region-Year FE	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes

Notes: The table reports estimates for discretion on an indicator variable equal to one if the delay variable, or the cost overrun variable is missing (Panel A) or the incumbency variable is missing (Panel B). Columns 1 and 6 report the coefficients from a model that includes linear polynomial in the difference of the reserve price from the 300,000 euro threshold. Columns 2 and 7 reports the coefficient from a model that includes quadratic polynomial in the difference of the reserve price from the 300,000 euro threshold. Columns 3 and 8 report the coefficients from a model that includes cubic polynomial in the difference of the reserve price from the 300,000 euro threshold. Columns 4 and 9 report the coefficients from a model that includes linear quartic polynomial in the difference of the reserve price from the 300,000 euro threshold. Columns 5 and 10 report the coefficients from a model that includes linear polynomial in the difference of the reserve price from the 300,000 euro threshold and an interaction between this variable and an indicator variable equal 1 if the reserve price is below 300,000 euro. Rows 1 (5) and 2 (6) report the estimates of the Coefficient and SEs (in parenthesis) of the regression of the outcomes on an indicator variable equal to one if the reserve price is below 300,000 euro (ITT effects). Rows 3 (7) and 4 (8) report the IV-LATE estimates of the effects of discretion on the outcomes (*Trattativa Privata*), which use the indicator variable equal to one if the reserve price is below 300,000 euro as instrument (Fuzzy RDD). Row 9 reports the number of observation; row 10 *Average* reports the average value of the dependent variables; row 11 *Bandwidth* reports the optimal bandwidth calculated using the Imbens and Kalyanaraman (2012) procedure, and it is used to estimate the effects of discretion for the sample of works with reserve price within this bandwidth; row 12 reports the use of Fixed Effects for year 2000-2005; row 13 reports the use of Fixed Effect for each region-year pair (20 regions and years 2000-2005). SEs are adjusted for heteroschedasticity (clustered at region level) in columns 1-5 (6-10). Significance at the 10% (*), at the 5% (**), and at the 1% (***).
Source: Statistics for all the public construction works tendered between 2000 and 2005, with reserve price $y \in [2, 5]$, in 100,000 euro (2005 equivalents). The number of observations is smaller compared the full sample described in Table 1, because we restrict the analysis the optimal bandwidth sample, as in Imbens and Kalyanaraman (2012) and works with missing value in the dependent variables are not dropped.

Table A.21: Placebo Test: Simulated Threshold at 400,00 euro

Dep. Variables	(1) Trattativa	(2) Rebate	(3) N. Bidders	(4) Work Leng.	(5) Delay	(6) C. Over.	(7) Local W.	(8) Inc. W.	(9) S.R.L.
				Panel A: Intention-to-Treat					
Linear	-0.00521	-1.059	-0.517	17.83	13.40	-0.00134	-0.0547	-0.0238	-0.0516
	(0.0236)	(0.661)	(1.539)	(15.27)	(12.90)	(0.0145)	(0.0478)	(0.0305)	(0.0665)
Quadratic	-0.00518	-1.153*	0.618	16.30	1.939	0.0103	-0.0610	-0.0144	-0.0516
	(0.0236)	(0.673)	(1.814)	(18.91)	(14.76)	(0.0149)	(0.0482)	(0.0318)	(0.0665)
Cubic	0.00371	-0.568	0.857	26.40	0.837	0.0118	-0.00643	0.000512	-0.0365
	(0.0326)	(0.881)	(1.908)	(20.11)	(17.46)	(0.0177)	(0.0638)	(0.0407)	(0.0889)
Quartic	0.00348	-0.623	0.583	16.88	-5.885	-7.73e-05	-0.00778	-0.0150	-0.0365
	(0.0326)	(0.903)	(2.281)	(24.85)	(20.57)	(0.0182)	(0.0644)	(0.0426)	(0.0889)
LLR	-0.00487	-1.126*	0.308	12.23	4.982	0.00723	-0.0592	-0.0193	-0.0512
	(0.0236)	(0.666)	(1.690)	(17.35)	(13.95)	(0.0146)	(0.0479)	(0.0312)	(0.0665)
				Panel B: Fuzzy-RDD					
Linear		17.70	8.063	-369.3	-181.6	0.0173	1.002	0.316	3.568
		(13.07)	(24.38)	(336.8)	(181.3)	(0.187)	(0.936)	(0.409)	(8.326)
Quadratic		23.97	-15.12	-408.0	-43.79	-0.224	1.297	0.253	3.570
		(17.88)	(43.87)	(512.5)	(335.0)	(0.332)	(1.141)	(0.562)	(8.333)
Cubic		-25.13	-16.91	-407.5	-31.49	-0.708	-0.221	0.0372	2.653
		(44.91)	(37.08)	(339.4)	(659.3)	(1.481)	(2.214)	(2.952)	(9.956)
Quartic		-48.98	132.7	-64,586	-2,614	-0.0508	-0.395	-4.845	2.632
		(113.6)	(1,009)	(6.338e+06)	(31,780)	(12.00)	(3.328)	(44.55)	(9.830)
LLR		47.08	-52.43	-317.7	314.7	-0.782	2.911	0.115	3.885
		(51.30)	(95.61)	(1,047)	(718.8)	(0.965)	(3.173)	(1.185)	(11.99)
Observations	1,149	1,813	2,546	2,848	2,300	2,238	1,748	1,622	918
Average	0.0331	13.18	15.89	403.4	149.2	0.138	0.538	0.102	0.477
Bandwidth	0.657	1.063	1.481	1.630	1.345	1.309	1.013	1.106	0.650

Notes: The table reports estimates for discretion from regressions, which include linear (quadratic) [cubic] {quartic} polynomial in the difference of the reserve price from the 400,000 euro threshold and Fixed Effects for years 2000-2005. |Local linear regressions (LLR) include the difference of the reserve price from the 400,000 euro threshold, an interaction between this variable and an indicator variable for discretion and Fixed Effect years 2000-2005.| Panel A, rows 1 (3) [5] {7} |9| and 2 (4) [6] {8} |10|, report the estimates of the Coefficient and SEs (in parenthesis) of the regression of the outcomes on an indicator variable equal to one if the reserve price is below 400,000 euro (ITT effects). Panel B, rows 11 (13) [15] {17} |19| and 12 (14) [16] {18} |20|, report the IV-LATE estimates of the effects of discretion on the outcomes (*Trattativa Privata*), which use the indicator variable equal 1 if the reserve price is below 400,000 euro as instrument (Fuzzy-RDD). The dependent variables are: in column 1, *Trattativa Privata*, a dummy equal to one for works assigned with a more discretionary procedure; in column 2, *Winning Rebate*, the percentage discount over the reserve price; in column 3, the number of bidders; in column 4, *Work Length*, the number of days from the first day of work until the effective end of the project, which represent the effective duration of the works; in column 5, *Delay*, the difference in days between the effective end of the project and the contractual deadline; in column 6, *Cost Overrun*, the ratio between the difference in the final cost and the awarding cost (reserve price discounted by the winning rebate) and the awarding cost; in column 7, *Local Winner*, a dummy equal to one if the winning firm is located in the same province of the public buyer; in column 8, *Incumbent Winner*, a dummy equal to one for a winner that has won at least one other auction held by the same buyer within a year from the current auction; in 9 column, *S.R.L* a dummy equal to one if the winning firm is a limited liability firm. *Observations* reports the number of observations; *Average* reports the average value of the dependent variables; *Bandwidth* reports the optimal bandwidth calculated using the Imbens and Kalyanaraman (2012) procedure, and it is used to estimate the effects of discretion for the sample of works with reserve price within this bandwidth. SEs are adjusted for heteroskedasticity. Significance at the 10% (*), at the 5% (**), and at the 1% (***).
Source: Statistics for all the public construction works tendered between 2000 and 2005, with reserve price $y \in [2, 5]$, in 100,000 euro (2005 equivalents). The number of observations is smaller compared the full sample described in Table 1, because we restrict the analysis the optimal bandwidth sample, as in Imbens and Kalyanaraman (2012).

Table A.22: Placebo Test: Simulated Threshold at 250,00 euro

Dep. Variables	(1) Trattativa	(2) Rebate	(3) N. Bidders	(4) Work Leng.	(5) Delay	(6) C. Over.	(7) Local W.	(8) Inc. W.	(9) S.R.L.
				Panel A: Intention-to-Treat					
Linear	-0.0103	0.793	1.250	3.150	19.55*	-0.0380**	-0.0494	-0.00627	-0.00813
	(0.0271)	(0.596)	(1.480)	(16.07)	(11.35)	(0.0172)	(0.0477)	(0.0312)	(0.0560)
Quadratic	-0.00922	0.976	1.301	3.342	19.23	-0.0377**	-0.0536	-0.00463	-0.00668
	(0.0273)	(0.647)	(1.518)	(16.16)	(11.83)	(0.0170)	(0.0478)	(0.0312)	(0.0562)
Cubic	0.0181	1.028	1.576	4.138	25.01*	-0.0417*	-0.0844	-0.0131	0.0258
	(0.0349)	(0.782)	(2.069)	(21.03)	(14.50)	(0.0222)	(0.0640)	(0.0410)	(0.0755)
Quartic	0.000479	0.831	1.901	9.123	25.75	-0.0372	-0.0799	-0.0132	0.0248
	(0.0354)	(0.907)	(2.194)	(21.22)	(15.70)	(0.0226)	(0.0640)	(0.0410)	(0.0758)
LLR	-0.0111	0.934	1.326	3.436	18.95	-0.0371**	-0.0521	-0.00483	-0.00661
	(0.0272)	(0.626)	(1.505)	(16.13)	(11.64)	(0.0170)	(0.0478)	(0.0312)	(0.0562)
				Panel B: Fuzzy-RDD					
Linear		-17.55	-53.49	-263.5	-680.2	1.907	240.4	0.460	0.229
		(14.63)	(77.22)	(1,421)	(713.3)	(2.699)	(33,796)	(2.387)	(1.589)
Quadratic		-43.91	-77.23	-310.8	-1,021	2.449	-34.33	0.376	0.207
		(54.60)	(135.8)	(1,635)	(1,555)	(4.448)	(640.5)	(2.591)	(1.750)
Cubic		74.73	64.80	185.5	1,175	-1.693	-24.06	0.444	-1.935
		(184.9)	(135.9)	(1,007)	(1,981)	(2.488)	(258.0)	(1.414)	(8.464)
Quartic		-146.6	-645.3	1,945	-5,205	25.42	-16.07	0.448	-2.441
		(893.4)	(7,575)	(15,603)	(36,955)	(611.2)	(121.9)	(1.421)	(12.79)
LLR		319.0	166.2	-5,338	585.0	2.684	15.90	0.598	0.313
		(4,339)	(1,611)	(330,300)	(7,382)	(16.94)	(192.1)	(1.641)	(0.919)
Observations	1,834	2,047	1,898	1,825	1,934	1,876	1,676	1,504	1,244
Average	0.113	12.59	13.48	352.1	128.8	0.135	0.579	0.111	0.456
Bandwidth	0.573	0.763	0.628	0.565	0.663	0.608	0.463	0.488	0.414

Notes: The table reports estimates for discretion from regressions, which include linear (quadratic) [cubic] {quartic} polynomial in the difference of the reserve price from the 250,000 euro threshold and Fixed Effects for years 2000-2005. |Local linear regressions (LLR) include the difference of the reserve price from the 250,000 euro threshold, an interaction between this variable and an indicator variable for discretion and Fixed Effect years 2000-2005.| Panel A, rows 1 (3) [5] {7} |9| and 2 (4) [6] {8} |10|, report the estimates of the Coefficient and SEs (in parenthesis) of the regression of the outcomes on an indicator variable equal to one if the reserve price is below 250,000 euro (ITT effects). Panel B, rows 11 (13) [15] {17} |19| and 12 (14) [16] {18} |20|, report the IV-LATE estimates of the effects of discretion on the outcomes (*Trattativa Privata*), which use the indicator variable equal 1 if the reserve price is below 250,000 euro as instrument (Fuzzy-RDD). The dependent variables are:in column 1, *Trattativa Privata*, a dummy equal to one for works assigned with a more discretionary procedure; in column 2, *Winning Rebate*, the percentage discount over the reserve price; in column 3, the number of bidders; in column 4, *Work Length*, the number of days from the first day of work until the effective end of the project, which represent the effective duration of the works; in column 5, *Delay*, the difference in days between the effective end of the project and the contractual deadline; in column 6, *Cost Overrun*, the ratio between the difference in the final cost and the awarding cost (reserve price discounted by the winning rebate) and the awarding cost; in column 7, *Local Winner*, a dummy equal to one if the winning firm is located in the same province of the public buyer; in column 8, *Incumbent Winner*, a dummy equal to one for a winner that has won at least one other auction held by the same buyer within a year from the current auction; in 9 column, *S.R.L* a dummy equal to one if the winning firm is a limited liability firm.*Observations* reports the number of observations; *Average* reports the average value of the dependent variables; *Bandwidth* reports the optimal bandwidth calculated using the Imbens and Kalyanaraman (2012) procedure, and it is used to estimate the effects of discretion for the sample of works with reserve price within this bandwidth. SEs are adjusted for heteroskedasticity. Significance at the 10% (*), at the 5% (**), and at the 1% (***).
Source: Statistics for all the public construction works tendered between 2000 and 2005, with reserve price $y \in [2, 5]$, in 100,000 euro (2005 equivalents). The number of observations is smaller compared the full sample described in Table 1, because we restrict the analysis the optimal bandwidth sample, as in Imbens and Kalyanaraman (2012).

Table A.23: Turin Sample FP - Full Sample

Dep. Variables	(1) Trattativa	(2) Rebate	(3) N. Bidders	(4) Work Leng.	(5) Delay	(6) C. Over.	(7) Local W.	(8) Inc. W.	(9) S.R.L.
				Panel A: Correlation					
ITT	0.0391	1.072	-3.877	-69.86***	-65.13***	0.0692*	0.0430	0.0725	0.0828
	(0.0428)	(1.352)	(3.137)	(20.19)	(14.87)	(0.0375)	(0.0567)	(0.0640)	(0.0746)
Fuzzy-RDD		24.95	-95.95	-8,143	-7,591	2.194	1.655	1.854	1.798
		(46.71)	(117.6)	(44,472)	(42,074)	(3.277)	(3.629)	(2.668)	(2.450)
				Panel B: Linear Model					
ITT	0.197***	-0.844	-3.574	-52.37	-60.49**	0.0460	-0.0176	0.189*	0.347**
	(0.0687)	(2.641)	(5.922)	(39.86)	(29.93)	(0.0734)	(0.124)	(0.114)	(0.136)
Fuzzy-RDD		-4.250	-18.14	-267.9	-309.4*	0.273	-0.0963	0.961	2.180*
		(12.91)	(29.98)	(200.4)	(184.0)	(0.433)	(0.683)	(0.714)	(1.268)
				Panel C: Category FE					
ITT	0.188**	-1.969	-7.363	-5.127	-42.95	0.0428	0.0636	0.249**	0.308**
	(0.0728)	(2.341)	(6.302)	(39.43)	(31.28)	(0.0790)	(0.126)	(0.117)	(0.147)
Fuzzy-RDD		-10.61	-39.14	-36.17	-303.0	0.312	0.319	1.326	1.787
		(11.71)	(35.70)	(272.9)	(261.1)	(0.579)	(0.633)	(0.867)	(1.157)
Observations	221	215	220	172	172	195	212	221	181
Average	0.109	28.57	17.08	370.4	102.8	0.259	0.783	0.330	0.497

Notes: The table reports estimates for discretion from regressions that includes Fixed Effects for years 2000-2005, Panel A. (linear polynomial in the difference of the reserve price from the 300,000 euro threshold and Fixed Effects for years 2000-2005, Panel B) [linear polynomial in the difference of the reserve price from the 300,000 euro threshold, Fixed Effects for years 2000-2005 and Fixed Effects for work type, Panel C]. Rows 1 (5) [9] and 2 (6) [10], report the estimates of the Coefficient and SEs (in parenthesis) of the regression of the outcomes on an indicator variable equal to one if the reserve price is below 300,000 euro (ITT effects). Rows 3 (7) [11] and 4 (8) [12], report the IV-LATE estimates of the effects of discretion on the outcomes (*Trattativa Privata*), which use the indicator variable equal to one if the reserve price is below 300,000 euro as instrument (Fuzzy RDD). The dependent variables are: in column 1, *Trattativa Privata*, a dummy equal to one for works assigned with a more discretionary procedure; in column 2, *Winning Rebate*, the percentage discount over the reserve price; in column 3, the number of bidders; in column 4, *Work Length*, the number of days from the first day of work until the effective end of the project, which represent the effective duration of the works; in column 5, *Delay*, the difference in days between the effective end of the project and the contractual deadline; in column 6, *Cost Overrun*, the ratio between the difference in the final cost and the awarding cost (reserve price discounted by the winning rebate) and the awarding cost; in column 7, *Local Winner*, a dummy equal to one if the winning firm is located in the same province of the public buyer; in column 8, *Incumbent Winner*, a dummy equal to one for a winner that has won at least one other auction held by the same buyer within a year from the current auction; in 9 column, *S.R.L* a dummy equal to one if the winning firm is a limited liability firm. *Observations* reports the number of observations; *Average* reports the average value of the dependent variables; SEs are adjusted for heteroskedasticity. Significance at the 10% (*), at the 5% (**), and at the 1% (***).
Source: Statistics for all the public procurements works tendered between 2003 and 2005 and by the county and municipality of Turin, with reserve price $y \in [2, 5]$, in 100,000 euro (2005 equivalents).

Table A.24: Incumbency and Contract Execution: Delay - With Region-Year Fixed Effects

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Delay	Delay	Delay	Delay	Delay	Delay
MODEL	FE	PSM	RW	FE	PSM	RW
			Full Sample			
	Below 300,000 euro			Above 300,000 euro		
Incumbent Winner	-17.29*	-16.75	-16.85*	-0.659	2.040	-2.025
	(9.427)	(11.52)	(8.895)	(12.16)	(14.33)	(11.28)
Observations	1,343	1,343	1,343	1,089	1,089	1,089
			Optimal Bandwidth			
	Below 300,000 euro			Above 300,000 euro		
Incumbent Winner	-10.14	-15.06	-7.785	-9.226	-8.255	-11.42
	(11.74)	(13.83)	(10.46)	(17.77)	(20.46)	(15.59)
Observations	976	976	976	440	440	440

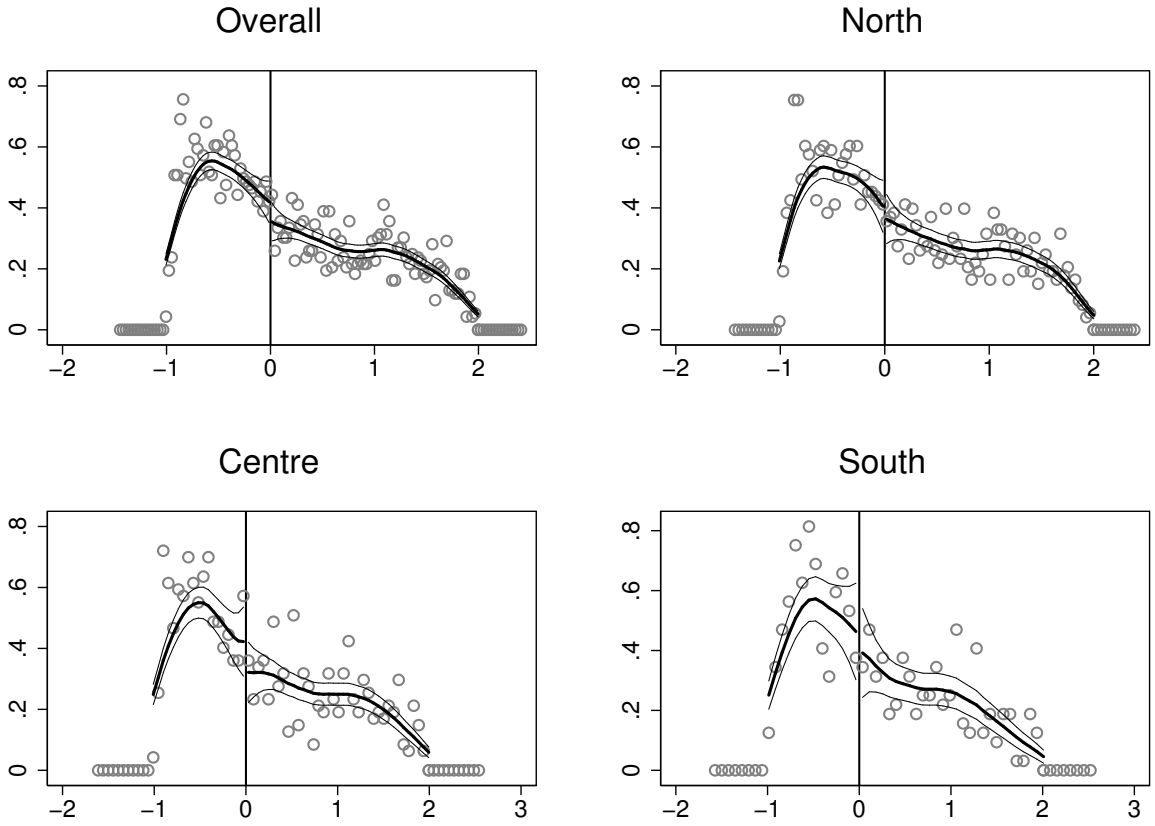
Notes: The table reports the effect of incumbency, defined as a dummy equal to one if the winning firm has won a contract with the public buyer in the past year, on days of delay, defined as the difference in days between the end of the project and the contractual deadline. Columns 1 through 3 report the results for the public works below 300,000 euros. Columns 4 through 6 report the results for the public works above 300,000 euros. Column 1 and 4 report the results of model including Fixed Effect for each province and year (110 province and years 2000-2005) and controls for the reserve price (cubic polynomial), number of bidders, contractual length, dummy for *Trattativa Privata* and winning rebate. Column 2 and 5 report the results for a Propensity Score Matching model; the project are matched using a propensity score on the reserve price (cubic polynomial), number of bidders, contractual length, dummy for *Trattativa Privata*, winning rebate and Fixed Effect for each region-year pair (20 regions and years 2000-2005). Column 3 and 6 report the results for a Propensity Score Reweigthing model; the propensity score is constructed as in the Propensity Score Matching model. *Observations* reports the number of observations. Standard Errors are adjusted for heteroskedasticity. Significance at the 10% (*), at the 5% (**), and at the 1% (***). Source: Statistics for all the public procurements works tendered between 2000 and 2005, with reserve price $y \in [2, 5]$, in 100,000 euro (2005 equivalents).

Table A.25: Incumbency and Past Performance -Region Year Fixed Effect

VARIABLES	(1) Win	(2) Win	(3) Win	(4) Win
	Full Sample			
	Below 300,000		Above 300,000	
Average Delay	-0.00141*	-0.00178**	-0.000689	-0.000891
	(0.000670)	(0.000690)	(0.000614)	(0.000650)
Observations	11,079	11,079	12,008	12,008
	Optimal Bandwidth			
	Below 300,000		Above 300,000	
Average Delay	-0.00166*	-0.00201**	-0.000685	-0.000933
	(0.000808)	(0.000863)	(0.000823)	(0.000880)
Observations	8,658	8,658	5,485	5,485

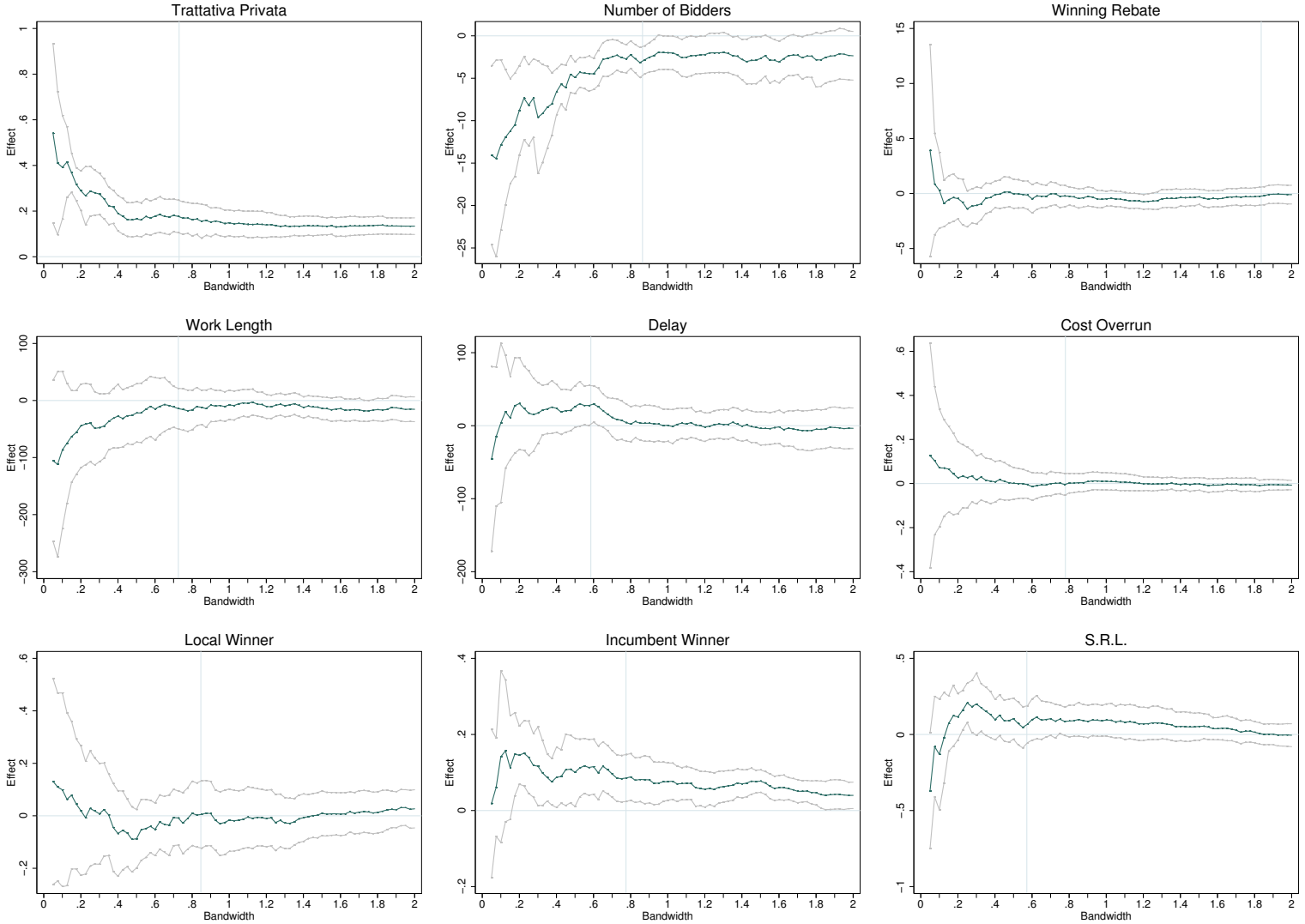
Notes: The table reports the effect of past performance, defined as the average number of days of delay in work executed in the previous year by the incumbent firm, on the probability of winning a auction today. The dependent variable is an indicator equal to one if the incumbent firm have win an auction today. Panel A (B) reports the results on the full sample (Optimal Bandwidth sample, calculated using the Imbens and Kalyanaraman (2012) procedure). Columns 1 and 2 report the results for the public works below 300,000 euros. Columns 3 through 4 reports the results for the public works above 300,000 euros. Columns 1 and 3 report the results of a model including as control region-year fixed effect (20 regions and years 2000-2005) and reserve price (cubic polynomial). Columns 2 and 4 report the results of a model that add as additional control the contracting authority experience, defined as the number of works awarded in the past year. *Observations* reports the number of observations. Standard Errors are clustered at region level. Significance at the 10% (*), at the 5% (**), and at the 1% (***). Source: Statistics for all the public construction works tendered between 2000 and 2005, with project value $y \in [2, 5]$, in 100,000 euro.

Figure A.1: Discontinuity Test of Auctions Reserve Price Around the Threshold, by macro-areas



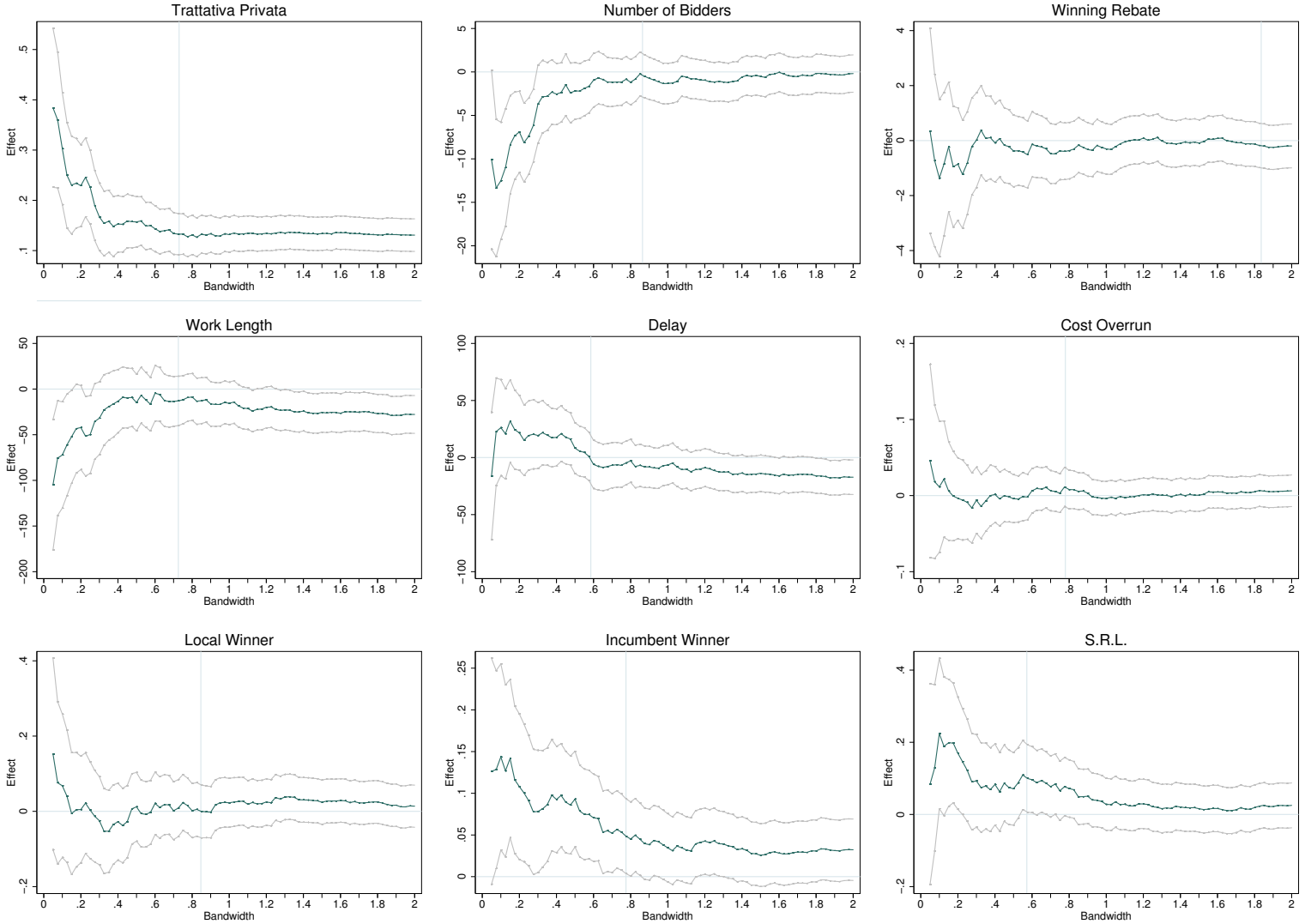
Notes: The running variable is the difference between the reserve price and the 300,000 euro threshold (vertical line). Circles are average observed values, the bold solid line is a kernel estimate (see McCrary, 2008), and the two thin lines are 95% confidence intervals. In these four sub-sample the McCrary (2008) discontinuity tests (standard errors) are: -.15 (.13) for the overall sample; -.08 (.17) for the North; -.27 (.23) for the Centre, and -.13 (.30) for the South. These tests suggests that the null hypothesis of no sorting cannot be rejected at standard statistical confidence levels.
Source: Statistics for all the public construction works tendered between 2000 and 2005, with auction value $y \in [2, 5]$, in 100,000 euros (2005 equivalents).

Figure A.2: Estimated Effects at Different Bandwidths, Region-Year Fixed Effects



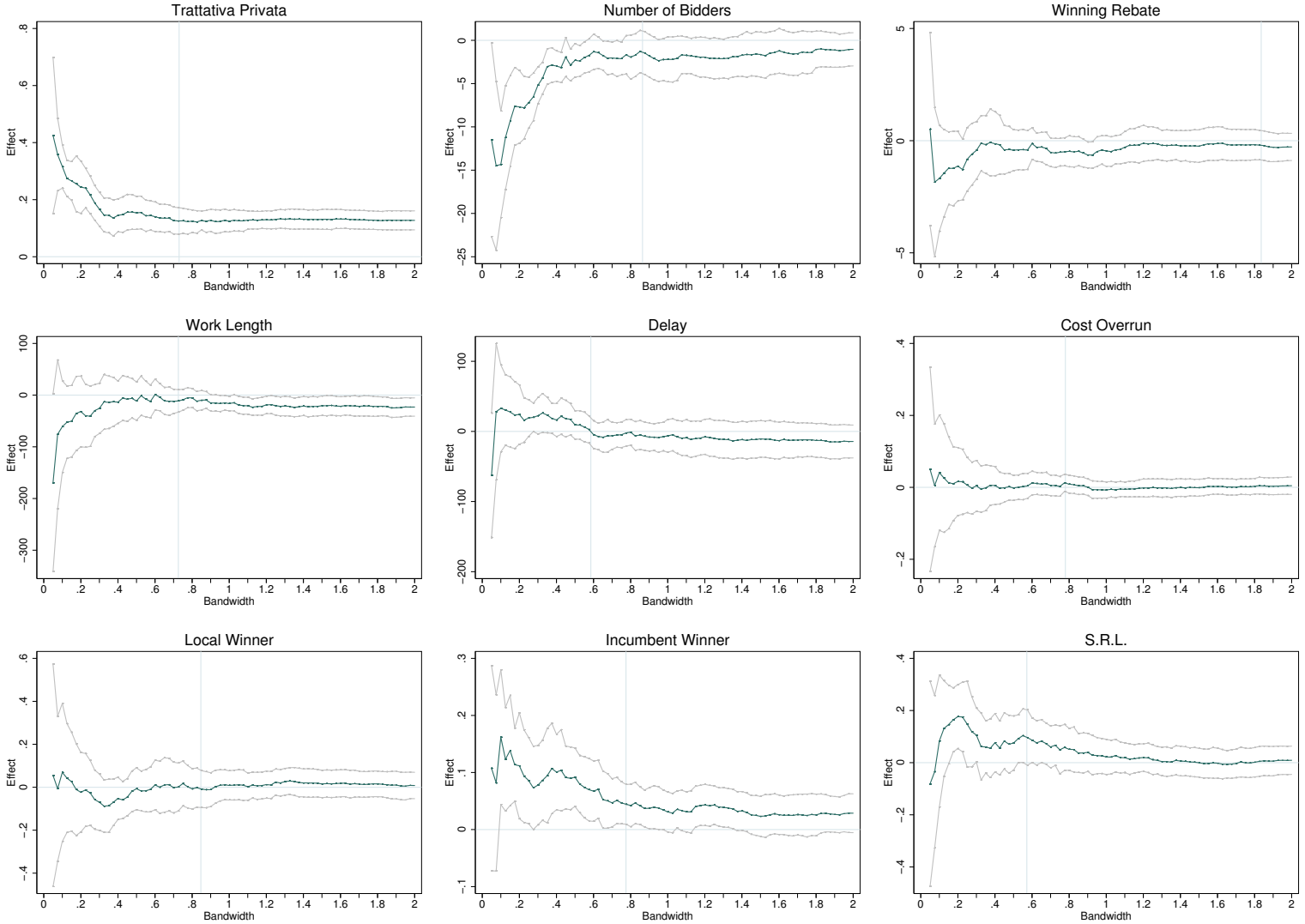
Notes: The graph report estimates for discretion from regressions, which include a cubic polynomial in the difference of the reserve price from the 300,000 euro threshold and Fixed Effect for each region-year pair (20 regions and years 2000-2005). The bold solid line reports point estimates at different bandwidths of the outcomes on an indicator variable equal to 1 if the reserve price is below 300,000 euros *(ITT effects)*, and the two thin lines are 90% confidence intervals. The vertical line denotes the optimal bandwidth computed using the Imbens and Kalyanaraman (2012) procedure, and it is used to estimate the effects of discretion for the sample of works with reserve price within this bandwidth.. *Trattativa Privata* is a dummy equal to one for works assigned with a more discretionary procedure. *Winning Rebate* is the percentage discount over the reserve price. *Work Length* the number of days from the first day of work until the effective end of the project, which represent the effective duration of the works. *Delay* is the difference in days between the effective end of the project and the contractual deadline. *Cost Overrun* is the ratio between the difference in the final cost and the awarding cost (reserve price discounted by the winning rebate) and the awarding cost. *Local Winner* is a dummy equal to one if the winning firm is located in the same province of the public buyer. *Incumbent Winner* is a dummy equal to one for a winner that has won at least one other auction held by the same buyer within a year from the current auction. $S.R.L$ is a dummy equal to one if the winning firm is a limited liability firm.
Source: Statistics for all the public construction works tendered between 2000 and 2005, with reserve price $y \in [2, 5]$, in 100,000 euros (2005 equivalents).

Figure A.3: Estimated Effects at Different Bandwidths, Local Linear Regression



Notes: The graph reports estimates for discretion from a local linear regressions, which includes the difference of the reserve price from the 300,000 euro threshold, an indicator variable equal to 1 if the reserve price is below 300,000 euros and an interaction between these two variables and Fixed Effects for years 2000-2005. The bold solid line reports point estimates at different bandwidths of the outcomes on an indicator variable equal to 1 if the reserve price is below 300,000 euros *(ITT effects)*, and the two thin lines are 90% confidence intervals. The vertical line denotes the optimal bandwidth computed using the Imbens and Kalyanaraman (2012) procedure, and it is used to estimate the effects of discretion for the sample of works with reserve price within this bandwidth.. *Trattativa Privata* is a dummy equal to one for works assigned with a more discretionary procedure. *Winning Rebate* is the percentage discount over the reserve price. *Work Length* the number of days from the first day of work until the effective end of the project, which represent the effective duration of the works. *Delay* is the difference in days between the effective end of the project and the contractual deadline. *Cost Overrun* is the ratio between the difference in the final cost and the awarding cost (reserve price discounted by the winning rebate) and the awarding cost. *Local Winner* is a dummy equal to one if the winning firm is located in the same province of the public buyer. *Incumbent Winner* is a dummy equal to one for a winner that has won at least one other auction held by the same buyer within a year from the current auction. *S.R.L* is a dummy equal to one if the winning firm is a limited liability firm.
Source: Statistics for all the public construction works tendered between 2000 and 2005, with reserve price $y \in [2, 5]$, in 100,000 euros (2005 equivalents).

Figure A.4: Estimated Effects at Different Bandwidths, Local Linear Regression with Region-Year Fixed Effects



Notes: The graph reports estimates for discretion from local linear regressions, which includes the difference of the reserve price from the 300,000 euro threshold, an indicator variable equal to 1 if the reserve price is below 300,000 euros, an interaction between these two variables and Fixed Effect for each region-year pair (20 regions and years 2000-2005). The bold solid line reports point estimates at different bandwidths of the outcomes on an indicator variable equal to one if the reserve price is below 300,000 euros *(ITT effects)*, and the two thin lines are 90% confidence intervals. The vertical line denotes the optimal bandwidth computed using the Imbens and Kalyanaraman (2012) procedure, and it is used to estimate the effects of discretion for the sample of works with reserve price within this bandwidth.. *Trattativa Privata* is a dummy equal to one for works assigned with a more discretionary procedure. *Winning Rebate* is the percentage discount over the reserve price. *Work Length* the number of days from the first day of work until the effective end of the project, which represent the effective duration of the works. *Delay* is the difference in days between the effective end of the project and the contractual deadline. *Cost Overrun* is the ratio between the difference in the final cost and the awarding cost (reserve price discounted by the winning rebate) and the awarding cost. *Local Winner* is a dummy equal to one if the winning firm is located in the same province of the public buyer. *Incumbent Winner* is a dummy equal to one for a winner that has won at least one other auction held by the same buyer within a year from the current auction. *S.R.L* is a dummy equal to one if the winning firm is a limited liability firm.
Source: Statistics for all the public construction works tendered between 2000 and 2005, with reserve price $y \in [2, 5]$, in 100,000 euros (2005 equivalents).

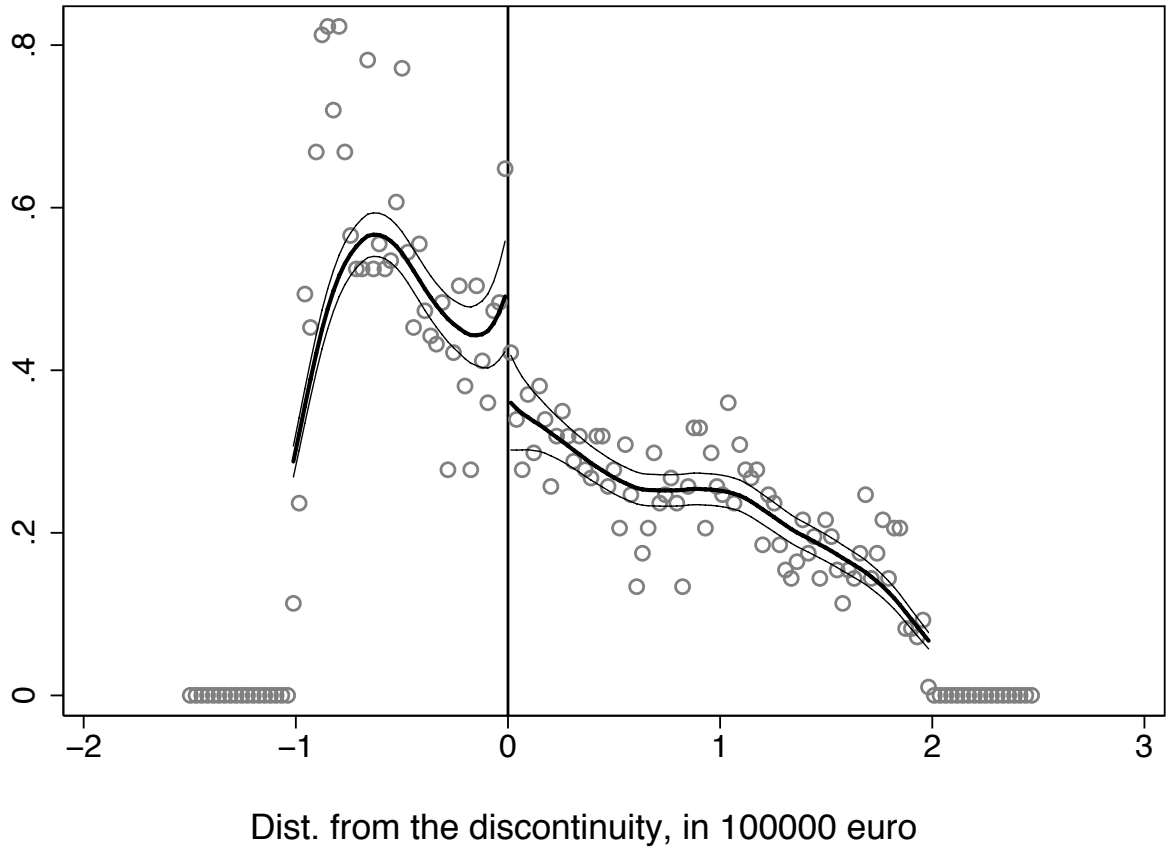
Appendix B

Table B.1: Roads Sample - Region-Year FE

Dep. Variables	(1) Trattativa	(2) Rebate	(3) N. Bidders	(4) Work Leng.	(5) Delay	(6) C. Over.	(7) Local W.	(8) Inc. W.	(9) S.R.L.
				Panel A: Intention-to-Treat					
Linear	0.232***	0.408	-0.539	-25.69	-6.649	-0.00318	0.0833*	0.0331	-0.0335
	(0.0742)	(0.427)	(2.620)	(30.11)	(12.24)	(0.0111)	(0.0403)	(0.0541)	(0.0529)
Quaratic	0.219***	0.407	-1.646	-27.97	-6.460	0.00189	0.0734	0.0413	-0.0290
	(0.0686)	(0.453)	(2.445)	(28.13)	(11.86)	(0.0107)	(0.0436)	(0.0510)	(0.0561)
Cubic	0.269***	-0.102	-5.575*	-54.39	-13.81	-0.0245	0.0842	0.0568	-0.0227
	(0.0885)	(0.601)	(3.148)	(35.79)	(16.84)	(0.0166)	(0.0554)	(0.0795)	(0.0479)
Quartic	0.255***	-0.0220	-5.251	-49.75	-13.17	-0.0195	0.0833	0.0577	-0.0181
	(0.0801)	(0.572)	(3.423)	(32.72)	(15.49)	(0.0151)	(0.0537)	(0.0812)	(0.0490)
LLR	0.213***	0.432	-1.290	-24.91	-5.742	0.00353	0.0732	0.0389	-0.0274
	(0.0642)	(0.449)	(2.497)	(26.53)	(11.28)	(0.00986)	(0.0422)	(0.0502)	(0.0566)
				Panel B: Fuzzy-RDD					
Linear		2.755	-3.423	-119.0	-42.33	-0.0143	0.359*	0.148	-0.206
		(2.606)	(16.03)	(106.5)	(68.94)	(0.0461)	(0.168)	(0.210)	(0.357)
Quadratic		2.779	-10.54	-136.7	-41.60	0.00882	0.334	0.193	-0.181
		(2.799)	(14.37)	(103.2)	(68.39)	(0.0520)	(0.207)	(0.199)	(0.373)
Cubic		-0.412	-22.47*	-207.3**	-56.53	-0.0933	0.334	0.217	-0.0895
		(2.524)	(10.76)	(84.03)	(54.16)	(0.0598)	(0.230)	(0.257)	(0.207)
Quartic		-0.0931	-22.45	-196.8**	-56.62	-0.0798	0.347	0.228	-0.0733
		(2.436)	(12.86)	(82.30)	(52.53)	(0.0602)	(0.240)	(0.272)	(0.212)
LLR		3.918	-28.09	-84.93	-25.94	0.0843	0.319	0.370	-0.0719
		(3.474)	(39.08)	(301.9)	(81.35)	(1.735)	(0.276)	(1.168)	(0.515)
Observations	1,497	2,972	2,781	1,948	2,859	1,745	1,848	1,749	2,469
Average	0.0982	12.81	33.03	304	123.9	0.110	0.566	0.157	0.507
Bandwidth	0.528	1.036	0.935	0.687	0.960	0.619	0.656	0.680	1.062

The table reports estimates for discretion from regressions, which include linear (quadratic) [cubic] {quartic} polynomial in the difference of the reserve price from the 300,000 euro threshold and Fixed Effect for each region-year pair (20 regions and years 2000-2005). |Local linear regressions (LLR) include the difference of the reserve price from the 300,000 euro threshold, an interaction between this variable and an indicator variable for discretion and Fixed Effect for each region-year pair (20 regions and years 2000-2005).| Panel A, rows 1 (3) [5] {7} |9| and 2 (4) [6] {8} |10|, report the estimates of the Coefficient and SEs (in parenthesis) of the regression of the outcomes on an indicator variable equal to one if the reserve price is below 300,000 euro (ITT effects). Panel B, rows 11 (13) [15] {17} |19| and 12 (14) [16] {18} |20|, report the IV-LATE estimates of the effects of discretion on the outcomes (*Trattativa Privata*), which use the indicator variable equal 1 if the reserve price is below 300,000 euro as instrument (Fuzzy-RDD). The dependent variables are: in column 1, *Trattativa Privata*, a dummy equal to one for works assigned with a more discretionary procedure; in column 2, *Winning Rebate*, the percentage discount over the reserve price; in column 3, the number of bidders; in column 4, *Work Length*, the number of days from the first day of work until the effective end of the project, which represent the effective duration of the works; in column 5, *Delay*, the difference in days between the effective end of the project and the contractual deadline; in column 6, *Cost Overrun*, the ratio between the difference in the final cost and the awarding cost (reserve price discounted by the winning rebate) and the awarding cost; in column 7, *Local Winner*, a dummy equal to one if the winning firm is located in the same province of the public buyer; in column 8, *Incumbent Winner*, a dummy equal to one for a winner that has won at least one other auction held by the same buyer within a year from the current auction; in 9 column, *S.R.L* a dummy equal to one if the winning firm is a limited liability firm. *Observations* reports the number of observations; *Average* reports the average value of the dependent variables; *Bandwidth* reports the optimal bandwidth calculated using the Imbens and Kalyanaraman (2012) procedure, and it is used to estimate the effects of discretion for the sample of works with reserve price within this bandwidth. SEs are clustered at region level. Significance at the 10% (*), at the 5% (**), and at the 1% (***).
Source: Statistics for all the public road works tendered between 2000 and 2005, with reserve price $y \in [2, 5]$, in 100,000 euro (2005 equivalents). The number of observations is smaller compared the full sample described in Table 1, because we restrict the analysis the optimal bandwidth sample, as in Imbens and Kalyanaraman (2012).

Figure B.1: Discontinuity Test of Auctions Reserve Price Around the Threshold for Roads



Notes: The running variable is the difference between the reserve price and the 300,000 euro threshold (vertical line). Circles are average observed values, the bold solid line is a kernel estimate (see McCrary, 2008), and the two thin lines are 95% confidence intervals.
Source: Statistics for all the public road works tendered between 2000 and 2005, with auction value $y \in [2, 5]$, in 100,000 euros (2005 equivalents).

CENTRE FOR ECONOMIC PERFORMANCE
Recent Discussion Papers

1426	Andrew B. Bernard Andreas Moxnes and Karen Helene Ulltveit-Moe	Two-sided Heterogeneity and Trade
1425	Stephen Machin Sandra McNally Martina Viarengo	"Teaching to Teach" Literacy
1424	Yatang Lin	Where does the Wind Blow? Green Preferences and Spatial Misallocation in the Renewable Energy Sector
1423	Andrew B. Bernard Valerie Smeets Frederic Warzynski	Rethinking Deindustrialization
1422	Stefano Gagliarducci Marco Manacorda	Politics in the Family: Nepotism and the Hiring Decisions of Italian Firms
1421	Jordi Blanes i Vidal Marc Möller	Team Adaptation
1420	Andrew B. Bernard J. Bradford Jensen Stephen J. Redding Peter K. Schott	Global Firms
1419	Marco Manacorda Andrea Tesei	Liberation Technology: Mobile Phones and Political Mobilization in Africa
1418	Jeremiah Dittmar Ralf R. Meisenzahl	State Capacity and Public Goods: Institutional Change, Human Capital and Growth in Early Modern Germany
1417	Holger Breinlich Swati Dhingra Gianmarco Ottaviano	How Have EU's Trade Agreements Impacted Consumers?

1416	Stefan Bender Nicholas Bloom David Card John Van Reenen Stefanie Wolter	Management Practices, Workforce Selection and Productivity
1415	Emanuel Ornelas	Special and Differential Treatment for Developing Countries
1414	Markus K. Brunnermeier Luis Garicano Philip R. Lane Marco Pagano Ricardo Reis Tano Santos David Thesmar Stijn Van Nieuwerburgh Dimitri Vayanos	The Sovereign-Bank Diabolic Loop and ESBies
1413	Antoine Dechezleprêtre Elias Einiö Ralf Martin Kieu-Trang Nguyen John Van Reenen	Do Tax Incentives for Research Increase Firm Innovation? An RD Design for R&D
1412	Luis Garicano Luis Rayo	Relational Knowledge Transfers
1411	João Paulo Pessoa	International Competition and Labor Market Adjustment
1410	Claudia Olivetti Barbara Petrongolo	The Evolution of Gender Gaps in Industrialized Countries
1409	Quoc-Anh Do Kieu-Trang Nguyen Anh N. Tran	One Mandarin Benefits the Whole Clan: Hometown Favoritism in an Authoritarian Regime

The Centre for Economic Performance Publications Unit
Tel 020 7955 7673 Fax 020 7404 0612
Email info@cep.lse.ac.uk Web site http://cep.lse.ac.uk