When More Discretionary Power Improves Public Procurement Efficiency : An Empirical Analysis of French Negotiated Procedures *

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Abstract

The new European legislative proposals on public procurement suggest widening the possibility for public buyers to use negotiated procedures with publication, that is multilateral negotiations after an auction phase. Such procedures have been available to French public buyers for contracts up to 5 million euros since 2004. We use an original and comprehensive database from Paris Habitat-OPH, the largest social housing constructor in Europe, to empirically assess the impact of negotiated procedures on price. As offers are evaluated according to price and quality criteria, we use technical rankings created by our public buyer to account for differences in quality across offers. After satisfyingly dealing with the endogeneity issue associated with the use of negotiated procedures, we find that such procedures significantly decreased the received bids by close to 26%. If anything, similar results are found when analysing the amount of the winning bids. Some drivers of the positive effects we observe are highlighted, enabling us to derive practical implications of these results for public policies.

Keywords: Public Procurement, Multilateral Negotiations, Auctions

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1 Introduction

Public procurement is an important part of a developed country's economy. [1] Improving procurement efficiency should therefore be high on a legislator's agenda. In this respect, the European Commission adopted its new proposals aiming at modernising public procurement legislation at the end of 2011. These proposals include the revision of the 2004/18/EC Directive. In particular, they suggest to "improve the flexibility of procurement to better respond to purchasing needs of authorities" by allowing public buyers broader use of negotiated procedures with publication. [2]

In 2004 and 2008, reforms of the French public procurement code respectively introduced and widened the possibility, for public buyers, to use negotiated procedures with publication up to around 5.000.000€ (see Table 1 in Section 2 for the successive thresholds between 2001 and 2010). These procedures consist of an open auction followed by a multilateral negotiation phase. [3] However, their impact on procurement efficiency is still to be assessed. While, according to the European Commission, this procedure should allow public buyers to get a "better match between their desired procurement outcome and solutions offered by the market" as well as a decreased probability of collusive practices between bidders, some drawbacks are still highlighted. [4] In particular, this procedure may increase the risk of favouritism and corruption and is thought of being "less efficient in generating savings than the open and restricted procedures". [5] These pro-auction and pro-negotiation arguments from the European Commission reflect the still open debate in the economic literature concerning their relative efficiency. [6]

In this paper, we aim at empirically assessing the potential benefits of these negotiated procedures with publication on efficiency. We study the effect of using such procedures on the amounts of the received bids as well as on the amount of the winning bid. Their impact is compared with those of the open auction, the most used procedure at the European level. [7] The implications will be twofold. First, we intend to contribute to the ongoing debates in the economic literature surrounding

1. European Commission, European code of best practices facilitating access by SMEs to public procurement contract, 2008, SEC(2008) 2193.

2. European Commission, Impact assessment accompanying the document "Proposal for a Directive of the European Parliament and of the Council on Public Procurement", 2011, SEC(2011) 1585 final.

3. See Section 4 for additional details on the different procedures

4. Ibid.

5. Ibid.

6. See our literature review in Section 2.

7. European Commission, Internal Market Scoreboard Edition 19, July 2009.

the efficiency of alternative tendering procedures. Second, we aim at finding out whether this new proposed reform of the European Commission is going in the right direction and therefore provide strong public policy recommendations.

In order to do so, we have constructed an original database using information on 427 public-work contracts tendered by Paris Habitat-OPH, the largest social housing constructor in Europe, between January 2004 and December 2009. We have gathered data on every construction contract available and expired at the time of coding. Available information include, for each contract, the type of awarding procedure used, the estimated contract costs and duration, the number of candidates and bidders, the amounts of received bids as well as their technical grades and the total amount of renegotiations.

Following the recommendations of the European Commission, all studied contracts are awarded to the best offerer (i.e. according to both price and quality criteria). Since our primarily interest in on price, we need to control for changes in quality across offers. In order to do so, we use two indicators designed by our public buyer and capturing the quality of the technique associated with each offer. After controlling for various motives which may drive the choice of using negotiated procedures, we show that the use of such procedures has a significant negative impact on the amount of the received bids as well as on the winning bid, though our results are less significant for the latter. We estimate that their use may lead a decrease in the bids by close to 26%. We argue that negotiated procedures enable public buyers to benefit from both the competitive effect of open procedures and the dissipation of uncertainty that occurs during the negotiation phase. Moreover, we suspect that collusive behaviours, in particular those making use of complementary bids, may be more difficult to sustain with negotiated procedures are used as bidders may be asked to justify any part of their offers during the negotiation phase. This argument is supported by simple statistic tests using Benford's Law. Finally, in accordance with Amaral, Saussier and Yvrande-Billon [2009], we believe that part of the positive effects we observe were made possible by the transparency-enhancing reforms that took place simultaneously to the introduction of these negotiated procedures and that may have played a great role in limiting erratic behaviours from public buyers. [8] Practical implications of these results for public policies are then discussed.

This paper is organised as follows. Section 2 presents the debates of the economic literature on the potential advantages and drawbacks of negotiated pro-

8. Examples of these transparency-enhancing reforms are available in our Institutional Framework section.

cedures. The ongoing debates prevent us from making clear-cut predictions regarding the outcomes of this study. A discussion on the institutional framework as well as its recent changes is available in Section 3. In Sections 4 and 5, we respectively, present our buyer's practices and the data we have gathered. Our empirical methodology and results are exposed in Section 6. Section 7 discusses the results. A final section concludes with practical implications for public policies.

2 Literature review

A common view in the economic literature is that more competition is always desirable as it gives strong incentives to firms to be efficient and to reveal their private costs (Bulow and Klemperer [1996]). This theoretical result is corroborated by a recent empirical study: using data from the railway industry in Germany and after controlling for the endogeneity of the choice of procurement mode, Lalive and Schmutzler [2011] show that the use of open auctions is more efficient than direct negotiations with the former supplier. [9] Moreover, open auctions are considered to be the most transparent procedure and thus less sensitive to corruption or favouritism. These beliefs widely explain why they are often the only available mechanism to award large contracts in public procurement. [10]

However, some recent contributions pin down their limits: competitive incentives may not always be sufficient to reach procurement efficiency and open auctions' rigidities would sometimes generate more costs than benefits. When dealing with complex transactions, buyers may indeed have difficulties in precisely specifying their needs: this leads to incomplete contracts which may give rise to costly ex post adaptations. The literature provides many examples of situations where public contracts have been renegotiated (Guasch, Laffont and Straub [2008]). These renegotiations may typically open the way to opportunistic behaviours because of the "fundamental transformation" that happens between parties (Williamson [1979]). Moreover, the harmful effects of renegotiations also occur at the ex ante stage. Indeed, using procurement data from Caltrans, Bajari, Houghton and Tadelis [2011] show that bidders anticipate when adaptations will be required at the execution stage. In order to compensate for this uncertainty, candidates extract a higher rent at the bidding stage. With these results in mind, negotiated procedures are suspected to be more suitable, as they would reduce

9. Open auctions increase, on average, the frequency of the service by 16% and decrease the procurement price by 25%.

10. In particular, this is the case in French Public Procurement (as discussed in Section 3).

the degree of uncertainty regarding the execution of the contract. Private buyers seem to be aware of this issue as they use significantly less open auction procedures when a complex transaction is at stake (Bajari, McMillan and Tadelis [2009]).

An open auction is one way to select a provider while direct negotiations with one chosen firm is the polar opposite: the former is supposed to provide the strongest ex ante incentives but to imply costly renegotiations, while opposite results are expected when using the latter (Bajari and Tadelis [2001]). Between these two polar cases, other awarding procedures are sometimes available, even for legally constrained public buyers. For example, buyers may only negotiate with some invited experienced bidders (Chever, Saussier and Yvrande-Billon [2013], Coviello, Guglielmo and Spagnolo [2013]) or go to a multilateral negotiation phase after an open call for tender, which is the case we study. This dialogue phase might be important since it allows parties to make sure that the proposed offers meet the buyer's needs, in situations where the firm's offers or the buyer's needs are not defined precisely enough.

By experimentally comparing auctions to multilateral negotiations, Thomas and Wilson [2002] find multilateral negotiations to be more efficient with four sellers (i.e. four firms in the case of public procurement) and equivalent to auctions with only two sellers. Although the study does not deal with the endogeneity issue associated with the use of negotiated procedures, Vellez [2011] also finds that multilateral negotiations decrease prices by close to 25% compared to open auctions and that these benefits increase with the number of bidders.

However, fruitful negotiations between the buyer and the firms require parties to dedicate time and resources to the discussions. Therefore, adding a negotiation phase increases ex ante transaction costs and lengthen the procedures. Increased transaction costs on the firm's side should be taken into account in the bids. Still, results from empirical studies on negotiations should be taken cautiously as they generate unaccounted for transaction costs on the buyer's side.

Given that increasing ex ante communication between parties may generate some opacity, negotiated procedures are also suspected to leave rooms for abuses in discretion. Discretion in public procurement has been the subject of a particular attention in the academic literature (Burguet and Che [2004], Compte, Lambert-Mogiliansky and Verdier [2005]). Public procurement efficiency may indeed be dramatically mitigated if it is used to support the personal interests of the organisers. In particular, some organisers of public procurement are politi-

cians, whose main concern may be re-election.[11] In this case, public purchasing may be diverted from its initial purpose in two opposite - but still costly - directions. On the one side, politicians may be corrupted (or may favour some firms) and influence the supplier's selection so as to obtain favours which are unrelated to procurement efficiency.[12] On the other side, public buyers may be incited to use some rigid and faster procedures - like open auctions - to help politicians both demonstrating their integrity and having the fastest possible results. Hence, politicians are likely to influence the awarding tool because of their fear of being under the scrutiny of political opponents: these last can behave as opportunistic third-parties (Spiller and Moszoro [2011]) by abusively denouncing the use of long and opaque procedures. Chong, Staropoli and Yvrande-Billon [2011] show that French public buyers do not properly align the awarding procedure on the transaction's characteristics when selecting a supplier for work contracts (they tend to favour open auctions to procure complex contracts). The authors attribute this misalignment to the fear of being suspected of favouring some firms. Thus, to avoid being discredited by a third-party, French public authorities would tend to routinely favour more traditional and consensual procedures - like open auctions - instead of using procedures inspired by the private sector. The political agenda may influence this tendency.

Using excessively rigid rules may also be put in line with the literature on the "red tape" (Bozeman [1993], Pandey and Scott [2002]), which points out that public organisations focus more on organisations and processes than results. This functioning is supposed to prevent from abuses with public funds – from politicians, for instance. Therefore, given public organisations' tendency to focus on rigid rules, the ability of politicians to influence the choice of the awarding process is competing with the routines implemented by the buyer.

To sum up, the choice of the appropriate awarding procedure should mainly depend on the transaction's characteristics: more complex contracts should be efficiently tendered through a negotiated procedure. However, public buyers' tendency to choose the right procedure may be mitigated by the rigidity of their internal routines. It may also depend on the decision makers' willingness to demonstrate her integrity or to obtain faster results: the prominence of these

11. We discuss in Section 4 the strong links between our public buyer, which is supposed to be independent, and the Paris city hall.

12. For instance, it is well-know that public procurement has already been used to finance electoral campaigns. See French Competition Authority Decision of 9 may 2007 "relative à des pratiques mises en oeuvre dans les marchés publics relatifs aux lycées d'Ile-de-France", 07-D-15. See Coviello and Gagliarducci [2010] also on the link between potential abuses from politicians and public procurement.

two last purposes might depend on the political agenda. Therefore, the impact of the procurement mode on outcomes might depend on the leading reason driving the choice of the awarding procedure: the will to align the procedure on the transaction's characteristics, the will to follow the usual rules or the will to satisfy political interests.

3 Institutional Framework

French public buyers have to follow the French Public Procurement Code. While its constitutional principles [13] are invariant and written in the first article of the Code since 2001, the Code has occurred major changes during the last decade, encouraged by European legislation. [14] They notably concern the allowed awarding procedures and they globally bring more and more freedom to public buyers in the organisation of their purchases, particularly regarding work contracts. The evolutions regarding the possibility of using the various types of procedures and the dates of the threshold changes are reported in Table 1.

Table 1: **Successive thresholds between 2001 and 2010**

Date of change	Possibility of using non-formalised procedures	Possibility of using formalised procedures with a negotiation phase	Open auction (formalised procedure)
Before March 2001	$<$ 38 200€	-	$>$ 38 200€
March 2001	$<$ 90 000€	-	$>$ 90 000€
January 2004	$<$ 230 000€	$>$ 230 000€ and $<$ 5 900 000€	$>$ 5 900 000€
January 2005	$<$ 210 000€	$>$ 210 000€ and $<$ 5 270 000€	$>$ 5 270 000€
January 2008	$<$ 206 000€	$>$ 206 000€ and $<$ 5 150 000€	$>$ 5 150 000€
December 2008	$<$ 5 150 000€	$<$ 5 150 000€	$>$ 5 150 000€
January 2010	$<$ 4 845 000€	$<$ 4 845 000€	$>$ 4 845 000€

A first major change is the tendency to reduce formalism. The allowed awarding procedures can indeed be divided into two groups, the formalised procedures and the non-formalised procedures; the area of the non-formalised procedures having clearly been enlarged, especially for work contracts. These non-formalised procedures enable the public buyer to adapt some key-dimensions of the procedure to its needs but also to add a negotiation phase. Conversely, formalised procedures

13. These constitutional principles are: freedom of access to public contracts, equal treatment of the candidates and transparency of the procedure.

14. European Parliament and Council, Directive 2004/18/EC on the coordination of procedures for the award of pubic works contracts and public service contracts, OJ 2004, L134.

are strictly defined and do not stand adaptations. Before 2001, formalised procedures were mandatory as soon as the estimated value of the contract reached 38 200€. For work contracts, this threshold reached 90 000€ after the 2001 reform, 230 000€ after the 2004 reform and 5 150 000€ at the end of 2008.[15] Therefore, before 2004, only formalised procedures were available beyond 38 200€, whereas they are now mandatory only over 5 150 000€ since the end of 2008 for work contracts.

A second major change for work contracts is on available formalised procedures. The 2004 reform of the Code introduced the possibility of using a formalised procedure (without any particular dispensation) which allows a multilateral negotiation phase after the open call for tender. Nevertheless, this possibility is forbidden for contracts exceeding around 5 000 000€ (the threshold has been changed three times; see Table 1); in these cases, a simple open call for tender is mandatory.

Beside these evolutions, the 2004 reform aims at increasing the transparency in public procurement. It appears to be the new paradigm of the French Public Procurement Code: the simultaneous increase of discretion and transparency.[16]

To sum up, the 2004 reform introduced the possibility of adding a negotiation after an open call for tender, even for quite large work contracts. This possibility is allowed either through a non-formalised or through a formalised procedure, depending on the size of the contract and the time it is awarded. This greater freedom results from the transposition of the EU-Directive at the French level.[17] However, the transposition of the Directive may vary from one country to another, which means that negotiated procedures are not uniformly available in European countries.

4 Paris Habitat-OPH practices

We have comprehensive data on the 427 works contracts tendered by Paris Habitat-OPH between January 2004 and December 2009.[18] Paris Habitat-OPH is a local public buyer and the main constructor of social housing in Paris. It pro-

15. Only major changes are described here; see Table 1 for more details about the successive thresholds.

16. For instance, public buyers have more obligations towards the information they have to communicate to the losing candidates or the increasing obligation to weight the selection criteria of the offers.

17. European Parliament and Council, Directive 2004/18/EC on the coordination of procedures for the award of pubic works contracts and public service contracts, OJ 2004, L134.

18. Only purely fixed-price contracts are taken into account.

cures around 500 contracts every year. It is an independent office, since it has its own board of direction. Nevertheless, it has relationships with the Paris City Hall: for instance, its President is a deputy mayor of Paris and some other members of the board belong to the council of Paris, which gathers elected representatives of the city. [19]

4.1 Characteristics of used awarding procedures

Between January 2004 and December 2009, three different types of procedures are used by Paris Habitat-OPH. The main characteristics regarding the organisation of these procedures are reported in Table 2.

Table 2: **Characteristics of the three awarding procedures used**

Open auction (formalised procedure)	Publicity	Reception of the candidatures AND the offers	Selection of the candidates		Analysis of the offers			Selection of the winner
Formalised procedure with a negotiation phase	Publicity	Reception of the candidatures	Selection of the candidates	Reception of the offers	Analysis of the offers	Negotiation phase	Second offer analysis	Selection of the winner
Non-formalised procedures	Publicity	Reception of the candidatures AND the offers	Selection of the candidates		Analysis of the offers	Negotiation phase or not	Second offer analysis	Selection of the winner

The first procedure is the traditional open call for tender. The buyer publicly publishes its need to procure goods in order to inform potential suppliers. Then, he receives firms' candidatures, which are made up of various administrative documents, past references and a list of the firms' competencies, and firms' offers. First, the buyer analyses the candidatures. Then, if a candidature is satisfactory, the buyer analyses the associated offer. Finally, he chooses the winner according to price and quality criteria.

As it is used by Paris Habitat-OPH to tender work contracts, the non-formalised procedure (with or without a negotiation phase) is rather close to the traditional open call for tender. The first main difference is the possibility to complete competition with a negotiation phase. However, this negotiation phase has to be previously announced in the publicity. The second main difference is its "smoothness": the buyer has, for example, more liberty about delays in the organisation of the procedure.

The last procedure used by Paris Habitat-OPH to procure work contracts is the formalised procedure with a negotiation phase. There are similarities with the

19. Other members of the board of direction are tenants representative, different types of specialists (e.g., city planners), etc.

two previously described procedures. Like the open call for tender, this procedure is strictly defined (no "smoothness") whereas the possibility of using a negotiation phase is similar to non-formalised procedures. Nevertheless, the formalised procedure with a negotiation phase has its specificity: the buyer must separate the reception of candidatures and the reception of offers in two phases. During the first phase, the buyer receives the candidatures and analyses them. Project specifications are communicated to firms who submitted a satisfactory candidature. During the second phase, the buyer receives the offers and analyses them.

Our buyer negotiated all received offers when a negotiation phase was used. In accordance with the French Public Procurement Code, this negotiation phase cannot result in re-defining the buyer's needs. It aims at verifying that the buyer's needs are properly understood by the bidders – in case of imprecise specifications, for instance – and, conversely, it enables the buyer to ask precisions regarding the received offers. These precisions might be about the duration and the organisation of the works, the quality of the used material, the price of some tasks, etc. In other words, discussions are about the technical but also the financial aspects of the offers, so as to make sure that offers cover the needs. After this negotiation phase, firms are free to adapt the price and the quality of their proposal. Any negotiation, whatever its form (email, letter or meeting), is traceable since it gives rise to a detailed report.

Moreover, some easily accessible statistics corroborate our suspicion that the adding of a negotiation phase is likely to lengthen procedures. According to the annual reports of our buyer's legal department, the median duration of the traditional open call for tenders varies from 163 days to 216 days between January 2008 and December 2009 (these medians are calculated by month), whereas it varies from 252 days to 298 days for the formalised procedure with a negotiation phase. Since the organisation of the competition phase also distinguishes the two procedures, these figures are just pieces of evidence since this gap cannot be directly attributed to the negotiation between parties.

4.2 Buyer's practices

We have information about the decision whether to negotiate the contracts and about the awarding procedure used to select the provider. This information is illustrated in Table 3 (regarding the buyer's choice to use a negotiation phase or not) and Table 4 (regarding the buyer's choice to use an awarding procedure

or another).

To negotiate or not to negotiate ?

Contracts launched before 2004 are naturally procured through an open auction, that is without any negotiation phase, which reflects French public buyers' legal obligations at the time. Then, contracts are more and more awarded after a negotiation phase: this is the result of a progressive implementation of the 2004 reform of the Code and a change in the terms of the buyer's routines.

Table 3: **Number of contracts, use of a negotiation phase and year of publicity**

	2003	2004	2005	2006	2007	2008	2009	Total
No negotiation	27	47	31	18	15	6	5	149
phase	100%	58.75%	31.31%	22.78%	24.59%	10.00%	23.81%	34.89%
Negotiation	0	33	68	61	46	54	16	278
phase	0%	41.25%	68.69%	77.22%	75.41%	90.00%	76.19%	65.11%
Total	27	80	99	79	61	60	21	427
	100%	100%	100%	100%	100%	100%	100%	100%

Disentangling the use of a negotiation phase from the procedure's particularities

From 2004 to 2009, negotiations may be used either through a formalised procedure or a non-formalised procedure. Both of these procedures may be associated with a negotiation phase or not, though formalised procedures are more rarely used without any negotiation phase (respectively around 2% and 34% of the formalised and non-formalised procedures are used without any negotiation phase). As a consequence, we are able to separately assess the impact of a negotiation phase from the impact of the other awarding procedures' particularities. We indeed argue that studying the prominent characteristics of the procedures - rather than specific awarding procedures themselves – is probably more interesting so as to discuss policy implications: it enables to disentangle which key-features have to be encouraged.

Table 4: **The decision to negotiate depending on the awarding procedure**

	Open auction (formalized)	Formalized procedure with negotiation	Non-formalized procedures	Total
No negotiation phase	99	4	50	153
Negotiation phase	0	192	82	274

5 Data

The descriptive statistics of the 427 contracts attributed by Paris Habitat-OPH between January 2004 and December 2009 are presented in Table 6, shown in the appendix.

5.1 Contract characteristics and bidder characteristics

Our buyer received 1578 bids for the 427 contracts we study. These bids come from 416 different firms. We have constructed the variable *Utilisation Rate* to control for differences in terms of available capacities across bidders (e.g. Ohashi [2009]).

The buyer calculates his own estimation of the contracts. The average contract's estimated value is 1 220 696€. Considering the fact that it is not communicated to candidates, this estimation appears to be a rather good prediction of the value of the contract we study: the variable *Norm. bid*, i.e. the posted bids divided by the buyer's estimation, is indeed equal to 1.06. Therefore, we expect that the variable *Estimate* is a good exogenous way to control for the costs of the contracts. Additional information enables us to control for heterogeneity across contracts. We know the expected contract *Duration*, which is 8.27 months on average. On the one hand, longer contracts make it easier to compensate on the long run the occurrence of unpredicted bad events and may lead to lower bids. On the other hand, the longer the contract, the higher the uncertainty; bidders are likely to compensate this higher uncertainty by including a risk premium in their bids (Bajari et al. [2011]). Therefore, the effect of *Duration* on bids is uncertain. We also have information on the volume of contract delegated to subcontractors. According to practitioners [20], a more subcontracted contract is likely to be more complex. Thus, *Subcontracted* is presumably associated with a lower efficiency. Finally, we added the variable *Index*, which captures the evolution of prices in the construction sector; it accounts for changes of the economical conditions at the

20. But also to academics, see Chong, Staropoli and Yvrande-Billon [2013].

time the contract is awarded.

5.2 Awarding procedure characteristics

65% of the contracts are procured using a negotiation phase; this fraction increases over time (as shown in Table 3). 31% of the contracts are procured through non-formalised procedures. This rather low rate reflects the fact that this possibility only appears at the end of the studied period for more valuable contracts. Another change related to awarding procedures and due to legal evolutions is likely to affect auctions' outcomes. Before 2004, public buyers had no obligation to specify the weightings of the selection criteria in the publicity of the call for tenders. [21] They only had to specify that offers would be evaluated according to price and/or technical criteria. But since 2004, the Code imposes on the buyer to stipulate the weights associated with each of the two dimensions. In our dataset, all the contracts are tendered without any precisions regarding weights before February 2005 (i.e. the variable *Criteria* is equal to 0). After September 2005, the weightings are systematically specified (i.e. the variable *Criteria* is equal to 1 and the observed *Technical Weight* is on average 43.34%). During the transition period (from February 2005 to September 2005), the variable *Criteria* takes the value 0 or 1. Given that this change will become systematic, it can be considered exogenous.

When *Criteria* is equal to zero, the buyer still ranks the offers according to their technical valuation. It is reported in the variable *Ranking*, which takes the value 1 if the offer was considered as the best technical offer; the variable *Ranking* takes the value 2 if the offer was considered as the second best offer from a technical point of view, and so on. It happened that the buyer judged that the offers were equally satisfying from a technical point of view. In this situation, the variable *Ranking* equals 1 for all the posted offers. When *Criteria* is equal to one, the buyer gives a technical rating of the offer, on a scale from 0 to 100. It is captured in the variable *Technical Mark*.

21. Paris Habitat-OPH awarded all studied contract to the best offerer (i.e. according to price and quality criteria).

5.3 Level of competition

We have information on the number of candidates (*Nb candidates*) and the number of received offers (*Nb bidders*) for each tendered contract. At first view, these two variables could enable to appreciate the level of competition. However, there are very strong disparities in the number of candidates between the procedure organised in two phases (the reception of candidatures and then the reception of offers) and the procedures organised in a single phase (candidatures and offers are received simultaneously). In the first case, the ratio *Nb bidders / Nb candidates* is equal to 0.33, whereas in the second case it is equal to 0.80 (See Table 5). Indeed, the costs incurred to prepare a candidature are indeed extremely low compared to the costs of preparing an offer. Therefore, the buyer receives far more candidatures when the procedure is organised in two phases. Whereas we cannot exclude a correlation between the number of received offers and the procurement mode, the disparities are widely lower. Thus, we choose to use *Nb bidders* to control for the level of competition.

Table 5: **Number of candidates and number of bidders depending on the awarding procedure**

	(1) Open auction (formalized)	(2) Non formalized procedures	(3) Formalized procedure with a negotiation phase	Average (1) and (2)
Nb candidates	5.4	4.7	11.5	5.0
Nb bidders	4.1	3.8	3.4	4.0
Nb bidders/Nb candidates	0.76	0.88	0.33	0.80

Following Bajari et al. [2011], we control for the level of free capacities of the rival candidates. These authors use the utilisation rate of the second lowest bidders to tackle it. As the second lowest bidders is not necessarily, in our case, the second "best" bidder according to price and quality criteria, we prefer using the variable *Rivals Utilisation Rate*, which measures the average utilisation rate of all other candidates.

6 Empirical strategy and results

6.1 Econometric method

We aim at exploring the impact of the decision to use a negotiation phase on the received bids submitted by firm i for contract n as well as on the winning bid

submitted for contract n. Thus, we first estimate the following models:

$$Norm\ Bid_{ni} = \beta_0 + Nego_n\beta_1 + Z_n\beta_2 + W_{ni}\beta_3 + V_{ni}\beta_4 + X_{ni}\beta_5 + Index_n\beta_6 + C\beta_7 + \epsilon_{ni} \quad (1)$$

$$Winning\ Bid_n = \beta_0 + Nego_n\beta_1 + Z_n\beta_2 + W_n\beta_3 + V_n\beta_4 + X_n\beta_5 + Index_n\beta_6 + C\beta_7 + \epsilon_n \quad (2)$$

Where β_1 is the coefficient associated with the variable we are primarily interested in. Z_n is a vector of control variables related to contract n's characteristics (*Estimate*, *Duration*, *Criteria*, *Technical Weight*, *Less Formalism* and *Subcontracted*) and β_2 its associated vector of coefficients.Wni is a vector of variables containing characteristics related to firm i when bidding for contract n (*Utilisation Rate*) and V_{ni} is a vector controlling for the heterogeneity in the degree of competition firm i faces when bidding for contract n (*Rivals Utilisation Rate*, *Nb bidders*) with, respectively, β_3 and β_4 their associated vector of coefficients. X_{ni} is a vector that controls for the quality of the offer submitted by firm i on contract n (*Technical Mark* and *Ranking*) with β_5 its vector of coefficients. β_6 is the coefficient associated with our price index in the construction industry at the time the contract n was tendered. Finally, C includes several fixed effects to control for unobserved variations in time (IDmonth and IDyear) with β_7 their vector of coefficients. ϵ_n is the error term.

Concerning our variable of interest, *Nego*, we are likely to face an omitted variable bias. Indeed, the decision to use a negotiated procedure may be driven by the buyer's expectations on the outcomes. For instance, the buyer may rationally use a negotiated procedure because he expects to receive less competitive bids due to a more complex contract. We choose to deal with this endogeneity issue by using a 2SLS regressor. In order to do so, we have constructed three instruments (*Politics*, *Politics2* and *Routines*). To be valid, each of these instruments needs to fulfil two conditions: relevance and exogeneity.

Our first two instruments (*Politics* and *Politics2*) are related to the political cycle. Although Paris Habitat-OPH is officially an independent structure, we cannot root out its strong political links. Most notably, the chairman of Paris Habitat-OPH's board is the current deputy mayor of Paris in charge of housing. In addition, other members of the board are also serving in elected offices at the municipal level. As we have discussed in Section 2, the choice of a procedure by a public buyer is likely to be influenced by the fear of being suspected of favouritism or corruption (Chong et al. [2011]). In particular, we believe that awarding procedures that allow some discretion from public buyers (notably negotiated procedures) will less likely be used during the time immediately preceding

and following municipal elections to avoid being challenged by a political opponent. Indeed, during this gap of time, politicians may be under higher scrutiny than during the rest of their mandate. In addition, this gap of time may also be the one where politicians put more pressure on public buyers to increase the speed of projects in order to send a positive signal to voters right before and after the election takes place. In this case, buyers may choose to award contracts through the open call for tenders rather than the negotiated procedure that is both lengthier and less transparent. Politics measures the time in months that separates the call for tender from the next Parisian municipal election while *Politics2* is the square of *Politics*. According to our discussion, we believe that *Politics* should have a significant positive impact on the decision to use a negotiated procedure (the closer to the next election, the smaller *Politics* and therefore the less negotiated procedures are used) while *Politics2* should have significant negative impact on the decision to use a negotiated procedure (contracts far from the next election, that is contracts tendered right after an election, will less likely be awarded through a negotiated procedure). In addition, we rule out any influence of our instruments on unobservable parts of our outcomes: the election dates are exogenous discontinuities and the changes in political pressure they are likely to induce regarding the choice of the awarding procedure would not be related to any expectations regarding the competitiveness of the received bids, satisfying the exogeneity condition.

Our third instrument (*Routines*) is related to our public buyer's internal routines concerning the choice of a procedure. According to the literature on "Red tape", as well as to our descriptive statistics, we expect that public buyers are traditionally more prone to use some procedures (the open call for tenders in the case of France) rather than others. We notice that newly available procedures such as negotiated procedures may take time in being "adopted" by the different departments of our buyer. Moreover, we suspect a spillover effect: the choice of procedure of a given department of our buyer is likely to be influenced by past choices of procedures from other departments of Paris Habitat-OPH either through internal discussions between the different departments or through the observation of other departments' practices. Our third instrument is constructed to capture this spillover effect. *Routines* is defined as the ratio of contracts that were awarded by other departments using a negotiated procedure during that last quarter divided by the ratio of contracts that were awarded by other departments using a negotiated procedure before the last quarter. It captures how the use of negotiated procedures has evolved in other departments during the last

quarter compared to the past. If negotiated procedures were more used by other departments during the last quarter than before that, we would expect a given department to more likely use such procedures to tender its current contract. According to our discussion, *Routines* should therefore have a significant positive impact on the choice of using a negotiated procedure. Furthermore, we believe that past choices of procedures in other departments will have no impact on the outcomes of the current procedure other than through the choice of the procedure, therefore satisfying the exogeneity condition of our instrument.

6.2 Estimation results

6.2.1 Estimation on the received bids

In this section, we aim at exploring the effect of the negotiation phase on the whole sample of received bids.

Our results are presented in Table 7. In Models 1, 3 and 5 the dependent variable is the normalised received bids and we use, respectively, an OLS and two 2SLS regressors. In Models 2 and 4, we present the first stage regressions of the choice of using a negotiated procedure associated with the 2SLS regression shown, respectively, in Models 3 and 5 using our three instruments (Politics, Politics2 and Routines). All specifications include fixed effects by months and year to respectively account for Paris Habitat-OPH's internal agenda as well as unobservable economic differences over the studied period. In Models 4 and 5, we add fixed effects by departments of our buyers to account for disparities across them. All regressions include heteroskedasticity-robust standard errors.

In our OLS regression (Model 1), *Nego*, our variable of interest, is associated with a positive yet non-significant coefficient. The use of a negotiation phase therefore seems not to have a significant impact on the amounts of the received bids. We surprisingly find that an increase in the number of bidders leads to significantly higher posted bids. This finding is conflicting with results from the literature, which find that the construction sector may be closest to the independent private value framework (Bajari and Ye [2003]). One issue is thus to investigate whether this result comes from a misspecification due to the presence of endogeneity. Results related to contracts' characteristics may be put in line with previous works. Longer as well as more subcontracted contracts are associated with less competitive bids. Indeed, these types of contracts are generally

considered as more complex contracts (Chong et al. [2013], Bajari et al. [2009]). Non-surprisingly, we also find that bids significantly and positively depend on our price index in the construction sector. However, the sign and significance of the coefficient associated with our variable *Technical Weight* is puzzling as contracts for which public buyers put more weight on technique attract significantly lower offers. This result may be due to an inappropriate use of this tool by the buyer or to an over-estimation of the contract value when the contract involves highly technical transactions.

Models 2 and 4 present the first stage regression of the decision to use a negotiated procedure. All three of our instruments are statistically significant and have the predicted sign. Statistics reported throughout Table 7 tell us that we need not worry about a weak instrument issue (F-Stat) and that we cannot reject that our three instruments are exogenous provided that at least one of them is (J-test for overidentifying restrictions). Once we have satisfyingly accounted for this endogeneity issue, we find in Model 3 and 5 that the decision to use a negotiated procedure is associated with significantly lower prices of the received offers. We believe that this difference is due to the fact that negotiated procedures are used for shorter, yet more complex contracts where competition seems to be an issue (see, respectively, the signs and significance of the variables *Duration Subcontracted* and *Nb bidders* in Models 2 and 4) which is rather close to recommendations from the economic literature. [22] The coefficient associated with *Nego* indicates that, once accounting for the choice of using a negotiated procedure, the normalised received bids are decreased by close to 26% when such a procedure is used. Overall, our other results are very close to those presented in Model 1. In other words, the correction of the endogeneity issue does not affect the outcome equation. Yet, there is a notable exception: the impact of the number of bidders is no more significant. Therefore, our previous (unexpected) finding regarding the fact that more bidders lead to less competitive bids was probably driven by misspecification issues.

6.2.2 Estimation on the winning bids

In this section, we aim at exploring the effect of the negotiation phase on the winning bids.

22. The fact that shorter contracts are significantly more procured using negotiated procedures might come from the thresholds defined in the French Public Procurement Code that prevent the use of these procedures for high-valued contracts (which may be longer to execute).

Our results are presented in Table 8. In Models 1 and 3 the dependent variable is the normalised winning bid and we use, respectively, an OLS and a 2SLS regressor. In Model 2, we present the first stage regression of the choice of using a negotiated procedure associated with the 2SLS regression shown in Model 3 using our three instruments (Politics, Politics2 and Routines). All specifications include fixed effects by months to account for Paris Habitat-OPH's yearly agenda as well as fixed effects by months to control for unobservable economic differences over the studied period. Our sample size being more limited than in the previous estimations, we are unable to correctly estimate a 2SLS specification including fixed effects by directions of our public as our model would be lacking degrees of freedom and thus be over-fit. All shown regressions include heteroskedasticity-robust standard errors.

As in our first regressions, in our OLS regression (Model 1), *Nego*, our variable of interest, is associated with a positive coefficient though statistically significant here. The use of a negotiation phase therefore seems to increase the winning bids. Unsurprisingly, we find that an increase in the number of bidders leads to a lower winning bid. This finding is again in accordance with results from the literature linking the construction sector to the independent private value framework. More subcontracted contracts are associated with higher winning bids, which can be put in line with the fact that more subcontracted contracts are suspected to be more complex. However, we surprisingly find that the expected duration of the contract is associated with a non significant yet negative coefficient. The signs and significances from our variables *Ranking* and *Technical Mark* tell us that the amounts of the winning bids increase with quality. Expected results are found concerning our variables *Index* and *Rivals Utilisation Rate*. However, we again find a puzzling sign associated with our variable *Technical Weight* : contracts for which public buyers put more weight on technique attract significantly lower offers.

Model 2 presents the first stage regression of the decision to use a negotiated procedure. All three of our instruments are statistically significant and have the expected sign. Statistics reported in Table 8 tell us that we need not worry about a weak instrument issue (F-Stat) and that we cannot reject that our three instruments are exogenous given that at least one of them is (J-test for overidentifying restrictions). Once we have satisfyingly accounted for this endogeneity issue, we find in Model 3 that the decision to use a negotiated procedure is associated with a lower price for the contracts though the coefficient is barely significant. This indicates that, once accounting for the choice of using a negotiated procedure, the

normalised *ex ante* contract price seems to decrease by close to 26% when such a procedure is used. Overall, our other results are very close to those presented in Model 1 with the exception of the expected duration of the contract which now has the expected sign and is statistically significant.

7 Discussion

7.1 Why do negotiated procedures decrease the bids?

The discussion of the details of both the project and the offers that occurs during the negotiation phase leads to a decrease in the asymmetry of information for the two parties at stake. As argued in Section 2, when transactions are complex, buyers may have difficulties in correctly specifying their needs in the call for tenders. If buyers' needs are imprecisely specified, then bidders will compensate for the resulting uncertainty by extracting a higher rent at the bidding stage (Bajari et al. [2011]). Discussing the details of the project will lead to a decreased level of uncertainty for the firms and therefore a decrease in the rents extracted. In addition, discussing the details of an offer directly with the firm may lower the asymmetry of information on the buyer's side. The buyer may then be more able to evaluate what specific part of the offer may allow room for negotiations on price, therefore leading to a further reduction in the overall rent extracted by bidders.

Furthermore, our public buyer uses negotiated procedures in appropriate cases. Indeed, negotiated procedures would exhibit better results notably when used for complex projects with a low degree of competition (Bajari et al. [2009]). In our first stage regressions, we have shown that Paris Habitat-OPH used more negotiated procedures when contracts were more complex and where the level of competition was likely to be rather low (a lower number of bidders). Therefore, we cannot rule out that part of the positive effects we observe in this study comes from the fact that our public buyer chooses a negotiated procedure in accordance with specific recommendations of the economic literature.

The negotiation phase may also stimulate another pro-competitive channel. The buyer indeed has some freedom to decide on the content of the negotiations which prevents bidders from being able to perfectly anticipate the rules of the game. Maintaining some degree of uncertainty might make any ex ante coordi-

nation between bidders much harder to achieve. As a consequence, the decline in price we observe may also be driven by a decrease in collusive strategies - which are likely to be especially pregnant in the public work sector (Moore [2011]). We run simple statistic tests based on Benford's Law to support this argument. [23] We compare the first two digits of the amount of the winning bids by distinguishing open auctions and negotiated procedures. [24] Results are shown in Figure 1 and Table 9. Observation and results from the goodness of fit tests tell us that collusion may have occurred in open auctions but not in negotiated procedures. Since thresholds from the French Public Procurement Code regarding the use of negotiated procedures may harm our results, we perform additional tests on the distance between the winning bid and the estimation, which should allow us to circumvent this problem. Results are shown in Figure 2 and Table 9. Again, we find that collusion is likely to have taken place in auctions but not in negotiated procedures.

Finally, negotiated procedures increase the level of discretionary power of the public buyer. This increase in discretionary power may in turn lead to an increase in erratic behaviours of the buyer (i.e. favouritism and/or corruption). However, simultaneously to the introduction of the possibility of having recourse to negotiated procedure, the 2004 reform of the French public procurement code significantly raised the levels of transparency and accountability of public buyers. Most notably, since the application of the reform, the weights on which the offers will be evaluated have to be specified in the call for tenders. Moreover, public buyers are required to inform evicted firms of the specific reasons motivating the rejection of their offers. We believe that such a raise in the levels of transparency and accountability will put public buyers under more scrutiny from third parties (notably, from evicted firms). Hence, if public buyers are more likely to have their decisions challenged through increased transparency, they may in result be less prone to exhibit erratic behaviours (Amaral et al. [2009]).

23. Benford's Law gives us the reference frequency distribution that should be observed in real-life data (if not tampered with) of single digit numbers according to their position in a figure. It is based on the observation that the number 1 occurs more often than the number 2 as a first digit. The number 2 itself occurs more often than the number 3 as a first digit, and so on. Benford's Law has been repeatedly used to detect fraud or collusion in many settings (Abrantes-Metz and Bajari [2009]). One popular application has been to detect manipulation of the Libor rate (Abrantes-Metz, Villas-Boas and Judge [2011], Abrantes-Metz, Kraten, Metz and Seow [2012]). Benford's Law has also previously been used to check for collusion in public procurement (Vellez [2011]).

24. When looking at negotiated procedures, we use the amounts of the bids received prior to the negotiation phase to avoid the tampering that may come from the negotiation phase.

7.2 How realistic is our coefficient?

This study finds that the use of negotiated procedures may lead to a decrease in the normalised received offers and winning bids by close to 26%. We believe that, although this coefficient may appear high, several arguments point to the fact that this coefficient is actually very likely to be accurate. First, the sole rent extracted by bidders due to high uncertainty at the bidding stage could represent up to 14.6% of value of the contract (Bajari et al. [2011]). As we have argued, discussing the details of the project during the negotiation phase may lead to a decrease of this rent. Second, based on our previous discussion, we know that these negotiated procedures were used in the best possible setting. That is, Paris Habitat-OPH appropriately chose when to use these procedures and the increase in transparency and accountability prevented public buyers such as ours from having recourse to erratic behaviours. In addition, the previously discussed decrease in collusive practices may also lower the received bids. In his analysis, Connor [2010] finds the mean cartel overcharge in public procurement to be slightly above 23%. Finally, Lalive and Schmutzler [2011] as well as Vellez [2011] find figures close to ours when comparing the price paid by a public buyer in two alternative awarding procedures.

7.3 Limits of the study

One additional interesting issue we do not deal with would be to estimate the impact of negotiated procedures on the total cost of the contracts (i.e. including renegotiations). For this dimension, it is indeed well known in the procurement literature that low bids are not systematically a good signal: aggressive bidding can be a deliberate strategy aiming at winning the contracts and then strongly push for renegotiations. Simple descriptive statistics seem to disqualify this view: on average, renegotiations lead to an increase of the winning bid by 4.39% for the 278 negotiated contracts, as opposed to a 3.76% increase for the 149 non-negotiated contracts, the difference being statistically non-significant. Evidently, further investigations should be led to take into account heterogeneities across contracts.

In addition, we do not account for the increased transaction costs incurred by the public buyer when using negotiated procedures. Indeed, as underlined in Section 2, negotiated procedures require parties to dedicate time and resources to the discussions, therefore raising transaction costs. Firms are likely to compensate

these additional costs by increasing the level of their offers. However, the unaccounted for supplementary costs incurred by public buyers are clear limitations to any positive result found on such procedures. Further results should try to take into account estimations of these increased transaction costs on the buyer's side.

8 Conclusion and implications for public policy

In this paper we aim at investigating the impact of using a negotiated procedure on the whole sample of bids as well as on the winning bids received by a major French public buyer. This issue should be at the top of the agenda since a similar procedure may be soon equally available in all European countries. The current European reform proposal in public procurement indeed explicitly suggests introducing or widening the possibility to negotiate the offers after a competition phase.

First, contrarily to the view expressed in the impact assessment of the new European proposals [25], our results point to the fact that those procedures may lead to price decreases when properly used. With this result in mind, specific guidelines informing public buyers when negotiated procedures are appropriate should go hand in hand with the new Directive. Second, we interpret part of this beneficial effect of the discretion margin as the result of a satisfying level of transparency, which puts public buyers under third party scrutiny. In this regard, a high level of transparency should be maintained in the new Directive. Fortunately, the new reform proposal aims at compensating the greater freedom by an increase in public buyers' accountability. [26] We may therefore hope to observe similarly positive effects of negotiated procedures with the application of the new Directive.

Nevertheless, some legitimate fears, which are specific to negotiations, are still to be empirically addressed. As underlined in the assessment of the new European legislative proposals of the European Commission, public buyers will have to acquire the appropriate expertise to properly handle negotiations as they

25. Indeed, the assessment underlines that negotiated procedures are thought of being "less efficient in generating savings than the open and restricted procedures". European Commission, Impact assessment accompanying the document "Proposal for a Directive of the European Parliament and of the Council on Public Procurement", 2011, SEC(2011) 1585 final.

26. According to the CE : new rules "should aim at making life easier for CAEs and firms whilst at the same time continuing to guarantee a high level of transparency and efficient safeguards for equal treatment of bidders." Ibid.

are not in the culture of public purchasing.[27] It is likely that this expertise will have to be gained on the job. In this respect, deeper investigations should be led about the dynamic impact of negotiations: do learning-by-doing effects lead to better outcomes or do they progressively encourage erratic behaviours on the buyer's side?

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27. "CAE' staff would have to acquire higher expertise to validly conduct negotiations." Ibid.

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Annexes

Table 6: **Descriptive statistics**

Variable	Description	Mean	Std. dev.	Min	Max	N
	Across Contracts					
Estimate	Contract's estimated value (in euros)	1 220 969	2 552 604	15 000	22 600 000	427
Duration	Contract's estimated duration (in months)	8.27	6.15	1	38	427
Subcontracted	Volume of work delegated to subcontractors (in euros)	411 126.3	1 372 275	0	22 107 794	427
Nb candidates	Number of candidates for the contract	7.97	5.40	1	28	427
Nb bidders	Number of bidders for the contract	3.70	2.08	1	18	427
Nego	Takes the value 1 if the a negotiation phase is used, 0 otherwise	0.65	0.48	0	1	427
Less formalism	Takes the value 1 if the awarding procedure is a non-formalised one, 0 otherwise	0.31	0.46	0	1	427
Criteria	Takes the value 1 if the weight of technical and price criteria are specified, 0 otherwise	0.64	0.48	0	1	427
Technical Weight	Technical weight to evaluate bidder's offers (in%) - reported if *Criteria*=1	43.34	11.48	20	80	274
Index	Monthly construction price index, created by the National Institute of Statistics (INSEE)	733.75	48.32	646.8	815.5	427
	Across Bidders					
Bid	Final price submitted by the bidder (in euros)	1 216 931	2 571 441	9645.21	24 037 048	1578
Norm. bid	Bid / Estimate	1.06	0.40	0.15	4.68	1578
Utilisation Rate[28]	Remaining value of contracts won but not yet completed (in euros) divided by the Maximum value of contracts won but not yet completed experienced by the bidder (in euros)	0.16	0.28	0	1	1578
Rivals Utilisation Rate[29]	Average *Utilisation Rate* of rivals candidates (in euros)	0.14	0.14	0	1	1578
Ranking[30]	Position of the offer in the technical ranking made by the buyer (if *Criteria*=0)	1.59	1.20	1	9	586
Technical Mark[31]	Technical value of the offer from the buyer's point of view on a scale of 0 to 100 (if *Criteria*=1)	68	21	0	100	992

28. We use information related to the contracts attributed in 2003 to build this variable.
29. We use information related to the contracts attributed in 2003 to build this variable.
30. If there is a negotiation phase, this is the final ranking (or rating) of the offer.
31. We use information related to the contracts attributed in 2003 to build this variable.

Table 7: Awarding procedures and received bids

	Model 1	Model 2	Model 3	Model 4	Model 5
	OLS	1st Stage	2SLS	1st Stage	2SLS
	Norm. bid	*Nego*	*Norm. bid*	*Nego*	*Norm. bid*
Nego	0.005		-0.281***		-0.250**
	(0.035)		(0.098)		(0.112)
Less Formalism	0.040	-0.042	0.021	-0.024	0.059*
	(0.034)	(0.031)	(0.035)	(0.033)	(0.036)
Criteria	0.052	-0.188**	-0.055	-0.174*	-0.014
	(0.096)	(0.092)	(0.104)	(0.095)	(0.104)
Technical Weight	-0.005***	-0.004***	-0.006***	-0.003***	-0.004***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Technical Mark	0.033	0.062	0.050	0.058	0.005
	(0.058)	(0.054)	(0.059)	(0.054)	(0.059)
Ranking	0.016	-0.025**	0.007	-0.024**	0.010
	(0.013)	(0.012)	(0.014)	(0.011)	(0.013)
Nb Bidders	0.007+	-0.040***	-0.004	-0.043***	-0.001
	(0.005)	(0.004)	(0.006)	(0.004)	(0.006)
Utilisation Rate	0.026	0.040	0.036	0.027	0.035
	(0.043)	(0.033)	(0.044)	(0.033)	(0.042)
Rivals Utilisation Rate	0.057	0.066	0.066	0.021	0.045
	(0.084)	(0.081)	(0.086)	(0.079)	(0.082)
Duration	-0.004**	-0.018***	-0.009***	-0.017***	-0.015***
	(0.002)	(0.002)	(0.003)	(0.002)	(0.003)
Log(Subcontracted)	0.007***	0.006***	0.010***	0.005***	0.010***
	(0.002)	(0.002)	(0.003)	(0.002)	(0.003)
Index	0.005***	0.015***	0.007***	0.015***	0.008***
	(0.002)	(0.001)	(0.002)	(0.001)	(0.002)
Politics		0.059***		0.054***	
		(0.006)		(0.007)	
Politics2		-0.001***		-0.001***	
		(0.000)		(0.000)	
Routines		0.077***		0.069***	
		(0.016)		(0.017)	
Constant	-2.464**	-10.378***	-4.579***	-10.959***	-4.726***
	(1.083)	(0.861)	(1.412)	(0.863)	(1.570)
Month FE	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES
Direction FE	NO	NO	NO	YES	YES
Adjusted R2	0.061	0.438	-0.011	0.462	0.072
N	1578	1578	1578	1578	1578
F-Stat		52.74		39.77	
Hansen J Stat Chi-sq(2) P-Value			0.35		0.53

Note: Robust standard errors in parentheses. Significance levels: +0.15, * 0.10, ** 0.05, *** 0.01.

Table 8: Awarding procedures and winning bids

	Model 1	Model 2	Model 3
	OLS	1st Stage	2SLS
	Norm. bid	*Nego*	*Norm. bid*
Nego	0.055*		-0.262+
	(0.032)		(0.163)
Less Formalism	-0.011	-0.108*	-0.052
	(0.034)	(0.060)	(0.041)
Criteria	-0.196*	-0.340*	-0.368***
	(0.101)	(0.192)	(0.143)
Technical Weight	-0.002*	-0.003	-0.003*
	(0.001)	(0.003)	(0.001)
Technical Mark	0.123*	0.094	0.168**
	(0.073)	(0.114)	(0.080)
Ranking	-0.089***	-0.200***	-0.160***
	(0.033)	(0.059)	(0.052)
Nb Bidders	-0.016**	-0.030***	-0.025***
	(0.006)	(0.010)	(0.009)
Utilisation Rate	-0.035	-0.045	-0.046
	(0.041)	(0.075)	(0.048)
Rivals Utilisation Rate	0.186+	0.290*	0.277**
	(0.124)	(0.150)	(0.138)
Duration	-0.002	-0.019***	-0.008**
	(0.002)	(0.005)	(0.004)
Subcontracted	0.012***	0.004	0.013***
	(0.003)	(0.004)	(0.003)
Index	0.003*	0.014***	0.007**
	(0.002)	(0.002)	(0.003)
Politics		0.048***	
		(0.013)	
Politics2		-0.001***	
		(0.000)	
Routines		0.071**	
		(0.034)	
Constant	-1.380	-9.731***	-3.814**
	(1.237)	(1.572)	(1.930)
Month FE	YES	YES	YES
Year FE	YES	YES	YES
Adjusted R2	0.207	0.378	-0.006
N	427	427	427
F-Stat		10.10	
Hansen J Stat Chi-sq(2) P-Value			0.74

Note: Robust standard errors in parentheses.
Significance levels: +0.15, * 0.10, ** 0.05, *** 0.01.

Figure 1: Benford's Law and Winning Bids

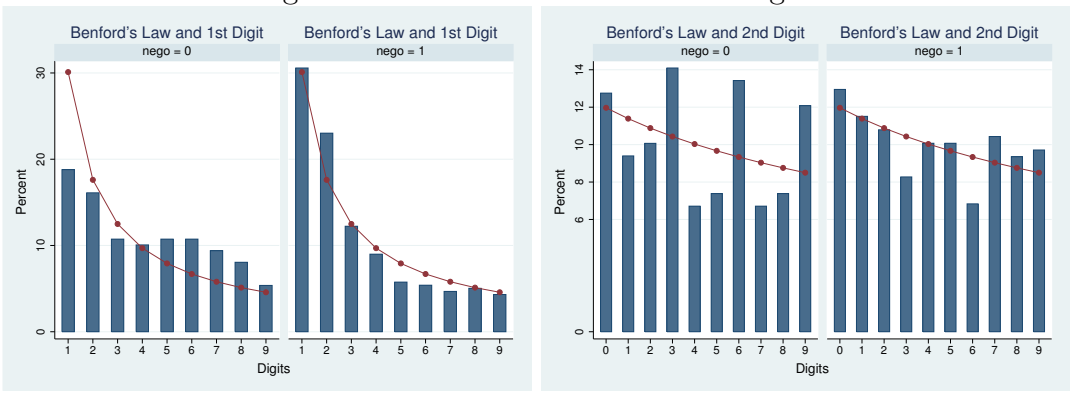

Figure 2: Benford's Law and Distance to Estimation

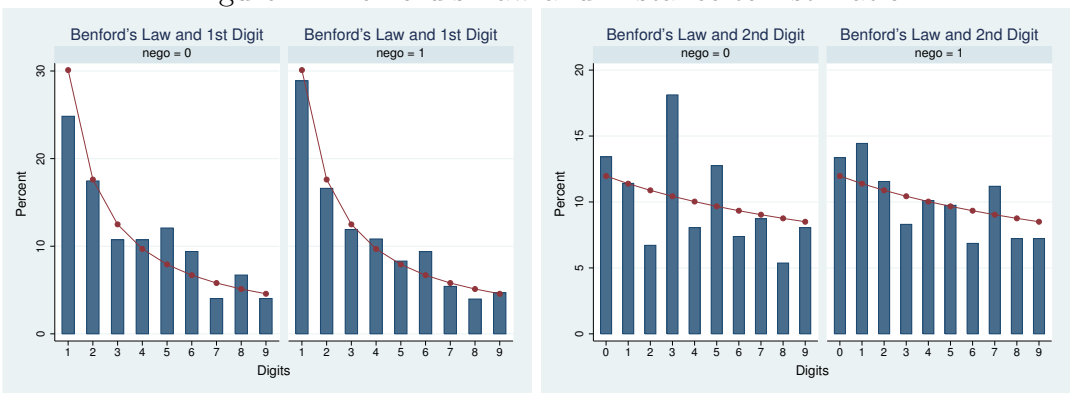

Table 9: **Goodness of Fit Tests for Benford's Law**

First Significant Digit of Winning Bids

Test	P-Value for Auctions	P-Value for Negotiations
Pearson's X2	0.0205	0.4540
Log likelihood ratio	0.0256	0.4682

Second Significant Digit of Winning Bids

Test	P-Value for Auctions	P-Value for Negotiations
Pearson's X2	0.2645	0.8694
Log likelihood ratio	0.2881	0.8507

First Significant Digit of Distance to Estimation

Test	P-Value for Auctions	P-Value for Negotiations
Pearson's X2	0.3912	0.8015
Log likelihood ratio	0.4392	0.8296

Second Significant Digit of Distance to Estimation

Test	P-Value for Auctions	P-Value for Negotiations
Pearson's X2	0.0724	0.4787
Log likelihood ratio	0.0951	0.4733