

The Law of Small Numbers:
Investigating the Benefits of Restricted Auctions for Public
Procurement

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Abstract

A commonly accepted view in the academic literature is that mitigating competition may solely be beneficial when tendering complex contracts. Yet, according to an OECD-report, restricted auctions are frequently used among EU-member states to procure small contracts. In this paper, we suggest to further investigate this paradox. First, regarding some *public* buyers' particularities, we argue that the systematic use of open auctions may lead them to spend most of their resources on a small part of their overall activity. Second, using an original dataset of 180 contracts, attributed between 2006 and 2009 by a local public buyer of social housing, we show that discretion during the invitation of bidders may enable to limit the comparison of offers to the most efficient bidders. To do so, we investigate the rationale behind the determinants of bidders' invitation; then, using a two-step Heckman model, we show that this invitation phase enables the buyer to receive more competitive bids - without loss of quality. As far as we know, we are the first to shed light on the advantages of using restricted auctions to tender small contracts.

JEL Codes: D44, L22, D21

Key words: Auctions, Competition, Public Procurement

Introduction

Although public procurement markets represent a major stake for economic activity and a large part of public spending, few empirical works have been made so far to investigate the procurement practices of public buyers. Despite the fact that theoretical academic papers as well as regulations are full of recommendations on the way to organize such markets, their advices can be summed up shortly as they largely emphasize the use of open auctions to manufacture these markets for this type of procedure is transparent and provides strong incentives to bidders to reveal their private information (Bulow and Klemperer (1996)). A commonly accepted view in the academic literature is indeed that a large pool of suppliers has to be attracted in order to obtain economically advantageous conditions.

Yet, as highlighted for instance by Heijboer and Telgen (2002) or Bajari, McMillan, and Tadelis (2009), some buyers deliberately choose to restrict competition or even to engage in negotiated procedures with a single candidate, which suggests that more competition may not always be desirable. The main reason given to explain such choice is that free entry, that is open auctions, may lead to inefficient outcomes when the good or service to be procured is technically complex and/or hardly contractible (see, e.g., Bajari, McMillan, and Tadelis (2009), Bajari and Tadelis (2001), Levin and Smith (1994)). But, we point out that this view only partially explain the actual public buyers' practices: a recent report from OECD (OECD (2010)) analysis the awarding procedures used among the EU-member states below the EU-thresholds and we can observe that auctions with a limited number of invited bidders are frequent. Given that small contracts are generally considered as rather simple contracts (Bajari, McMillan, and Tadelis (2009), Chong, Staropoli, and Yvrande (2011)), these practices are paradoxical regarding the previous literature which recommends limiting their use to complex contracts.

In this paper, we suggest to further investigate this paradox: why restricting competition to tender small contracts in public procurement? Drawing an analogy between the restricted procedures and the hybrid form in the organization theory (Riordan and Williamson (1985)), we argue that these procedures may enable to save on *ex ante* transaction costs while (potentially) maintaining part of the competition. Therefore, one first issue is to understand why *ex ante* transaction costs are actually a burden to tender small contracts in public procurement. And a second issue is to understand whether the organization of the competition - which is now left to buyer's discretion in charge of inviting the bidders - will be used to improve economic efficiency or will result in abuses in corruption?

Given both that public buyers have to precisely justify winner's selection and that small contracts are numerous but account for few in value, their tendering through an open auction is likely to lead public buyers to spend most of their resources on a small part of their overall activity; which is not efficient. In such context, restricted auctions may be seen as a hybrid form, between the two polar cases (auctions and negotiations), to tender

contracts: it enables to keep part of the competitive pressure while saving on the ex ante transaction costs incurred by the buyer, through the limitation in the number of offers to be compared.

However, one feared issue with restricted auctions is that they allocate a discretionary power to the buyer, when choosing the firms invited to post an offer: this discretion may be used to improve economic efficiency by optimizing the relationships with firms (which are primarily small and medium enterprises (SMEs) in the particular case of small contracts¹); but another potential explanation is that restricted auctions might be seen as a way to manipulate market attribution, considering that public buyers may be corrupted (see, e.g., Burguet and Che (2004), Ohashi (2009)). Thus, in a second time, we disentangle between these two scenarii by assessing the determinants of the choice of invited bidders and the effect of this invitation on the posted bids. To do so, we use an original data set of 180 contracts, attributed via restricted auctions between 2006 and 2009 in Paris by a local public buyer of social housing. These contracts deal with services attached to construction works and are associated with short-lived, simple² and recurrent transactions. The attribution procedure is a restricted auction, with three to six invited bidders, selected among a list of pre-qualified candidates. For each contract and tendering procedure, we have information on 1) all the pre-qualified firms and their characteristics, 2) the bids of each invited bidder, 3) the winner of the auction. Hence, we can assess the impact of the characteristics of invited bidders on the level and competitiveness of the final bids.

A first main result is that bidders are not invited randomly. The fact that small contracts' suppliers are primarily SMEs, with especially constrained material capacities (Marion (2007), Kim, Knotts, and Jones (2008), Nooteboom (1993)) and widely varying performances (Nooteboom (1993)) is taken into account: the buyer indeed shares out its contracts among well-reputed firms. This public buyer's strategy may be interpreted as a way to promote SMEs' participation, which is especially supposed to be a matter of concern since the "Small Business Act" for Europe³. Moreover, each contract is managed by one particular buyer's employee and we find that an employee who has frequently interacted with a particular firm during the past will be more prone to invite it again. To assess whether this strategy reflects the private information of the buyer's employee about the particular abilities of a firms to propose credible offers or the capture of this employee, we secondly use a Heckman selection model (Heckman (1979)) in order to evaluate the invitation phase's effect on the posted bids. As a second main result, we show that inviting bidders according to these criteria leads to significant costs savings. Therefore, our results point out that limiting competition may also be efficient for simple repeated transactions

¹See, for instance, this extract from a EU document: "study confirms that the higher value the contract, the less the likelihood of SMEs winning the contract. The value threshold above which SMEs are seemingly disadvantaged is at around 300,000 euro" (EU (2010))

²The contracts we study are small (43 234€ on average) and rarely renegotiated

³<http://ec.europa.eu/enterprise/policies/sme/business-environment/public-procurement/>

as it allows reducing ex ante transaction costs while limiting the comparison of offers to the most efficient bidders.

In the particular context of EU-directives' revision, our findings participate to the ongoing debate on procurement mechanisms. Contrary to the few other empirical studies on restricted auctions (Coviello et al. [2011], Bucciol et al. [2011]) - which aim more at assessing the benefits of restricted auctions compared to alternative mechanisms - we are the first to shed light on the advantages of limiting competition to tender small contracts and to investigate both its organization and the effect of this organization on outcomes. Moreover, we show that leaving more discretion to public buyers, which is still a widely debated issue in public procurement (Spagnolo (2012)), may be beneficial. In our case, it enables to tackle SMEs' singularities. Their participation to public procurement have give rise to numerous reports and recommendations, but also to academic papers. In particular, the efficiency of the previously studied "bids preferences" programs are still unclear (see, e.g., Marion (2007), Krasnokutskaya and Seim (2011)). Nevertheless, restricted auctions appear more as a complementary solution than a substitute: we are indeed not dealing with SMEs disadvantages due to cost asymmetries when facing larger firms; we consider a framework, where SMEs compete each other, and we investigate a new way to enhance this competition.

The paper is organized as follows. In section 1, we investigate the rationale behind the choice of restricted to tender small contracts. Section 2 is dedicated to the presentation of our data set and our empirical strategy. In section 3, we present our results and discuss the effect of reducing competition on final bids. Conclusions follow.

1. Why restricting competition to tender small contracts?

There is a general argument developed by Hallwood (1996) that candidates compete more seriously as the number of bidders is restricted because their perceived chance of winning the contract is higher than when entry is free. But, the previous literature focuses more specifically on the ability of less competitive awarding procedures to tender complex contracts, either because the dialogue between parties may enable to decrease the contractual incompleteness (Bajari, Houghton, and Tadelis (2006)) or because it favors the implementation of relational contracts (Kim (1998), Doni (2006), Calzolari and Spagnolo (2009)). In such cases, the origins of inefficiencies come from the inability and/or the dearth of the buyer to well-specify the contract. As they are considered as rather simple (Bajari, McMillan, and Tadelis (2009), Chong, Staropoli, and Yvrande (2011)), small

contracts are less prone to lead to specifications issues and to generate *ex post* transaction costs. Therefore, it is surprising to frequently observe their tendering through restricted auctions.

1.1 Awarding procedures and transactions costs

One of the main results of the neoclassical theory is that pure and perfect competition is always desirable because it leads to efficient allocation of the resources. Yet, the pioneer works of Coase (1937), later re-elaborated by Williamson (1975) through the TCE (Transaction Costs Economics), have emphasized the difficulty to reach this ideal. When dealing with the “make-or-buy” decision, a firm must actually take into account two types of costs: the traditional production costs, but also the transaction costs. When considering only production costs, the market is always more efficient; but, when considering also transaction costs, integrating the activity can be more advantageous. Therefore, the trade-off between the two polar ways to produce a good or a service depends on the sum of both types of costs (Riordan and Williamson (1985)). Naturally, between these two extreme possibilities, there is a continuum of intermediary solutions, called the hybrid forms: they enable to save on transaction costs while maintaining some of the competitive incentives.

An analogy may be easily drawn between this make-or-buy decision and the trade-off between auctions and negotiations. On the one side, open auctions are indeed one polar way to procure contracts; it is mainly based on competitive incentives⁴. On the other side, direct negotiations with one single supplier are the polar opposite way, which is more appropriated when transactions costs are high. In this framework, restricted auctions correspond to a hybrid form, as it enables to keep part of the competitive incentives while saving on the transactions costs.

Yet, theoretical works (Bajari and Tadelis (2001); Manelli and Vincenti (1995)) as well as empirical studies (Bajari, Houghton, and Tadelis (2006), Bajari, McMillan, and Tadelis (2009)) emphasize the benefits of mitigating the degree of competition in order to tackle contractual incompleteness and thus, to decrease the *ex post* transaction costs. This issue is less likely to be pregnant in the case of small contracts, which are perceived as rather simple contracts. The capacity of less competitive procedure to also decrease *ex ante* transaction costs has been far less investigated by previous literature and, to our knowledge, it has never been pointed out has a central issue.

Given that public buyer have to precisely compare the offers in order to be able to justify winner’s selection (which is a legal constraint), lots of time and administrative resources have to be dedicated to tender a contract through an open auctions, whatever its value. Moreover, this process may be especially complicated when both price and quality matter: quality is not always easy to evaluate, and therefore the more the number of offers to be

⁴See, for instance, the articles of Demsetz (1968) or Bulow and Klemperer (1996) which formalize the benefits of competition for the market

compared, the more complicated the classification. In addition, we interestingly notice that the major efficiency indicators of our buyer’s legal department are the number of treated contract and the time dedicated to a procedure. Therefore ex ante transaction costs are a concern in our case and we see no reasons why it won’t be shared by other public buyers⁵. Moreover, knowing that small contracts are numerous but account for few in value⁶, the legal department is likely to spend most its time and resources on a small part of its overall activity; which is obviously not efficient. To sum up, the gains associated to additional competitors may not be sufficient to compensate the transaction costs associated to their administrative treatments.

Therefore, the use of restricted auctions may be rational from the public buyer’s perspective. However, when using restricted auctions, one challenge is the organization of the competitive phase: from now on, it is left to the buyer’s discretion which in charge of the invitation of bidders.

1.2 Public buyers’ discretion as a way to promote SMEs’ participation

SMEs’ participation to public procurement is supposed to be a matter of concern for public buyers: beyond the fact that more and more regulations encourage public buyers to find solutions to promote SMEs’ participation in public procurement⁷, this concern may spontaneously pre-exist if the buyer is worried about optimizing its purchases. Small contracts indeed primarily attract SMEs according to EU-reports (and this is also what we observe in our data). Thus, knowing that the literature and the regulation point out some specific constraints when interacting with these types of suppliers, one way to organize the competition is to deal with these constraints in order to make converging firms’ strategy and public procurement’s efficiency.

Nooteboom (1993) studies the SMEs’ advantages and disadvantages through the lens of transactions costs theory and reaches the following conclusion: “*Compared with large firms, small firms have potential advantages and disadvantages. Generally, their advantages are behavioural (in human resources) and their disadvantages lie in material resources.[...] These potential advantages are in fact realized depends on the motivation and orientation of the entrepreneur, which vary widely.*”

The constrained capacities of SMEs have been already pointed out as mitigating SMEs’ efficiency in public procurement (Saussier (2007)) and some insights have been explored in order to alleviate these barriers. In particular, the bid preferences programs which consist, for instance, in offering a bid discount to “weak” firms (which can correspond to SMEs) have led to several academic researches (see, e.g, Marion (2007), Krasnokutskaya and Seim

⁵Given the competitiveness of the sectors we study, this issue is likely to be particularly relevant

⁶For instance, according the annual report of Paris Habitat-OPH in 2008, contracts below the EU-thresholds account for 55.7% of its activity in number, but only 3.6% in value

⁷See, for instance, the “Small Business Act” [2008] for Europe

(2011)). Nevertheless, the scope of these researches differs from our concern which is not to improve the participation of SMEs when they are facing large firms: conceding that SMEs are small contracts' main suppliers (and therefore, they do not compete much against large firms), how to optimize repeated interactions with especially constrained suppliers which are competing each other? The constrained capacities result in a limited flexibility of firms in order to efficiently meet buyer's (frequent) needs. So as to tackle this issue, the buyer may be worried about not always inviting the same firms to post a bid.

Regarding the varying performances of SMEs, the literature on firms cooperation and alliances recognizes that one way to deal with potentially opportunistic partners is to take their cumulative past behavior as a guide to their future behavior, or—when such information is unavailable—to use reputation as a proxy for future opportunistic intentions (Parkhe (1993)). Moreover, reputation is often considered as a mean to increase cooperation between economic partners, because it can be a substitute for costly monitoring devices (Kogut (1989)). It is indeed in the interest of bidders to maintain and foster a good reputation (i.e. a reputation for high reliability) as it allows increasing the value of their ongoing relationships and improving their chance of developing future business opportunities. In practice, each partner's reputation can act as a hostage by securing the on-going relationship (Williamson (1983)) and avoiding mutual distrust prompted by fears of opportunistic intentions. Knowing that one major concern of SMEs is basically their survival (Kim, Knotts, and Jones (2008)), this “hostage effect” is likely to be particularly relevant: SMEs may indeed be interested in entering in secured and repeated relations; they are typically enabled by restricted auctions (Coviello et al. [2011]). Moreover, the relational dimension of the contractual relationship are especially reinforced in our procedure (with a pre-qualification phase) : it send a clear signal to short-listed firms that future business is possible as the buyer commits to pick-up firms for the near future only in this pool⁸.

To sum up, the efficient organization of a restricted auction procedure may lead buyers to use the information resulting from past interactions in order to invite the most efficient bidders; moreover, so as to simultaneously tackle SMEs' constrained capacities and concerns about their survival, the buyer may be worried about sharing out its contract among pre-qualified candidates. However, the literature point out that discretion can also be used to favor firms without any concerns regarding economic efficiency.

1.3 Public buyers' discretion as a way to manipulate market attribution

A well-known issue is that discretion in public procurement, and particularly in the awarding process, may lead to costly abuses in corruption or favoritism. Beyond doubt,

⁸An additional advantage of this pre-qualification phase is particularly appropriated to SMEs. According to reports from EU-commission, administrative requirements are perceived as a strong burden by SMEs: “less paperwork” would be their second claim . Given that the administrative documents about the candidature analysis are pooled in one phase instead of being repeated for each contract, it naturally alleviates the firms' administrative burden.

corruption rather systematically decreases procurement efficiency; but the effect of favoritism is still unclear.

On the one side, the lack of transparency regarding the market access' conditions (Ohashi (2009), Evenett and Hoekman [2005]), as well as the possibility to manipulate the scoring rules when prices and quality matter (Burguet and Che (2004)), have been identified as rooms for abuses in discretion; on the other side, Kelman (1990) already argued that rigid procurement rules may be responsible for poor contract enforcement, which is corroborated by recent theoretical (Calzolari and Spagnolo (2009); Albano, Cesi, and Iozzi (2011)) and empirical works (Bandiera, Prat, and Valletti (2009); Brosig and Heinrich (2011)). Nevertheless, in line with the previous literature which analyzes the benefits of limiting the number of bidders, these works focus on the ability of discretion to enhance the reputational forces, when dealing with complex transactions (Spagnolo (2012)). The previous part of our argumentation shows there was also a room for using discretion in order to enhance the tendering of small contracts. The question to know whether this room will result in the buyer's capture or in the improvement of the procurement efficiency is rather difficult to anticipate given that the literature suggests any clear-cut answer. Yet, some insights, based on previous literature, are explored in conclusion so as to understand our findings.

2. Data and empirical strategy

2.1 Institutional framework and suitability of the question.

Paris Habitat-OPH is the main local public operator in social housing in Paris, awarding around 500 contracts a year. It manages 119 294 residential units, 3 895 commercial premises and 40 885 parking spaces. It is also the first social landlord in Europe⁹.

Public procurement is organized according to the French Public Procurement Code which defines the rules public buyers have to respect when organizing their purchases. In line with the common wisdom that more competition is always desirable, the traditional open call for tenders is still the reference mechanism: among the formalized procedures allowed beyond a legal threshold¹⁰, it is the most frequently used¹¹. Yet, for few years (since 2004 and the new French Code that was aligned to the European rules), notable evolutions have limited the mandatory application's area of the formalized procedures and public buyers have now a lot of freedom to organize their purchases, as long as they respect

⁹Paris Habitat-OPH's annual report 2009

¹⁰Since 2004 this threshold is around 200Keuros. Since 2008, it is defined each year at the European level

¹¹According to the French "Observatory of Public Procurement", open auction are used to tender 70% of the contracts in 2010.

the three main principles of the Code: transparency, equal treatment of candidates and freedom of access to public contracts. New procurement tools are therefore available for French public buyers and more widely for European countries that already implemented European rules. Our purpose is to analyze one of them which is likely to reflect the practices of other EU-member states. It is outstanding that several states use the freedom below the EU-thresholds to limit bidders' participation and/or decrease the *ex ante* transaction costs. Despite the fact that the OECD report (OECD (2010)) does not detail the exact procedures, here is, for instance, a list of the countries where the use of restricted procedures is explicitly mentioned : Austria, Denmark, Estonia, Hungary, Italy, Luxemburg, the Netherlands, Poland, Romania, Slovak Republic, Spain, Sweden. Moreover, it is frequently noticed that some states use "simplified" procedures, which is also likely to be in line with buyers' willingness to decrease the *ex ante* transactions costs. To our knowledge, the use of restricted auctions and/or simplified procedures to tender small contracts has neither never been pointed out as a subject of matter, nor studied in the academic literature.

2.2 Presentation of the contracts and the procedure

The data used in this paper deals with 180 service contracts attributed by Paris Habitat-OPH (the buyer) through a restricted auction procedure between January 2006 and December 2009. More precisely, studied contracts are short-lived, recurrent and deal with small architectural activities¹². The average estimated value¹³ of studied projects is 46 336 euros, the average duration is around one year and the value of renegotiations only account for 0.7% of the contracts' estimated value which is low, reflecting the fact that we are dealing with simple transactions; Yet, one dimension we measure is likely to capture contract's complexity: it is the fact that a contract may deal with multiple site (see the variable *Multisite*). Nevertheless, the literature identifies "complex" contracts as those leading to contractual incompleteness, that is, in general, large and/or long term contracts likely to be widely renegotiated (Chong, Staropoli, and Yvrande (2011); Bajari, McMillan, and Tadelis (2009); Bajari, Houghton, and Tadelis (2006)); these features are clearly far from the contracts we study.

¹²for example, woodworking, isolation,...

¹³For each project, the buyer makes his own estimation.

Figure 1: The Restricted Auction Procedure

PHASE 1	1 - Publicity	Firms are informed the buyer wants to constitute a pool of candidates
	2 - Pre-qualification phase	A stable pool of candidates is constituted
PHASE 2	3 - Invitation phase	For each contract, at least three firms are invited to post a bid
	4 - Reception phase	Invited firm's offers are received by the buyer
	5 - Selection of the winner	The contract is awarded to the candidate posting the most economically advantageous offer

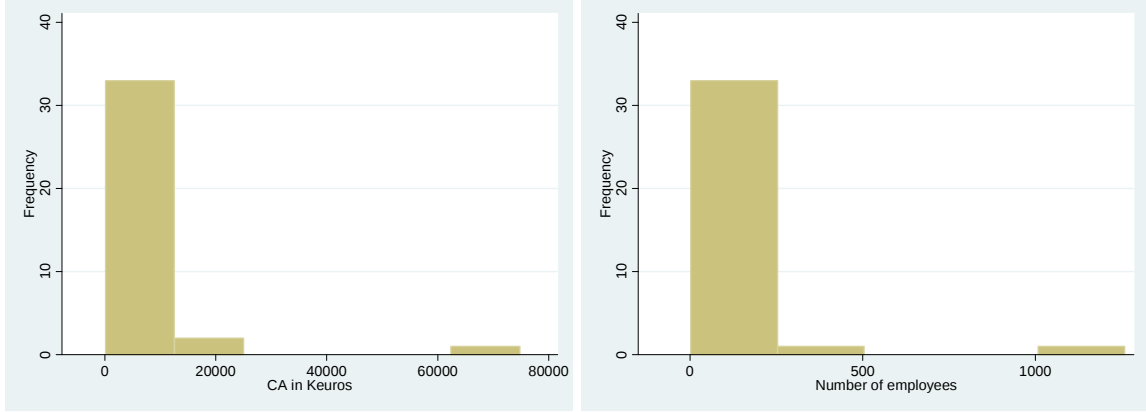
In our case, the buyer restricts the access to the auctions in the following way. Firstly, for each kind of transactions, the buyer pre-qualifies candidates that will belong to a pool of short-listed suppliers for a fixed term (it is renewed about every two years). On average, the buyer receives 24.3 propositions from firms wanting to belong to a pool and 10 firms are actually pre-qualified, that is the number of potential suppliers is divided by more than two. Candidates are pre-qualified according to various criteria: for instance, their references, their competences, their past performances (if they have already interacted with the buyer) or their quality of listening. Several pools are put in place simultaneously by the buyer, mainly depending on activities¹⁴ for which the buyer is looking for future contracts. We know the identity of the pre-qualified firms, but we do not have any exhaustive information regarding their structural characteristics. Regarding the 35 firms - among the 108 firms we study - for which the information is available, the average turnover is 4134Keuros and the average number of employees is 62. Figure 2 reports the distribution of these two features. According to EU-reports¹⁵, a firm is classified as an SME if its turnover is below 50 000Keuros and the employee number is below 249. With the exception of two firms (which are a bit beyond these limits), it is outstanding that the vast majority of pre-qualified firms are SMEs.

We call “phase 1” this pre-qualification phase, and we call “phase 2”, the steps which are then repeated for each contract. Thus, in a second phase, for each contract, at least three candidates are invited to post a bid. The number of invited candidates varies from

¹⁴10 categories of activities are distinguished by Paris Habitat-OPH. Finally, we study 24 different pools ; there are on average 9 contracts by pool and 18 contracts by category of activity.

¹⁵See, Evaluation of SMEs' Access to Public Procurement Markets in the EU (2010)

Figure 2: Pre-qualified firms' turnover and number of employees



3 to 6, but, on average, only 3.4 candidates are invited (See *Nb_Candidates* in table1). And finally, the winner is the “best” offer, according to price and quality criteria. Thus, the lowest bid regarding price is not necessarily the winning bid (See Figure 1).

We are interested in understanding whether buyers' discretion during inviting bidders is used to enhance competition or result in buyer's capture. In order to discriminate between this two scenarii, our main interest concerns phase 2: what determines the probability of a given firm to be invited in a given call for tenders? Which impact of the invitation process on final bids received by the buyer?

2.3 Empirical strategy

How Candidates are Invited?

According to the previously described scenarii, bidders should be efficiently invited to make an offer depending on their past successes and failures. We herein use the following probit model, which estimates the probability of selecting one firm:

$$Selected_{it} = 1 [Selected_{it}^* = X_{it}\gamma_1 + C\gamma_2 + e_{it} < 0] \quad (1)$$

where 1 is the indicator function, which takes a value of 1 whenever the statement in brackets is true, and 0 otherwise; $Selected_{it}$ is the binary variable that indicates whether firm i is selected or not at time t ; X_{it} is the vector of characteristics concerning past performances of candidate i at time t and γ_1 is its associated vector of parameters; e_{it} is the error term. C includes several fixed effects capturing specificity of the year the contract is attributed, specificity of the candidates, buyer's employee abilities and specificity of the constituted pools.

Used Variables

We have information about short-listed firms that have been invited to post a bid at least one time on the studied period, that is from January 2006 to December 2009. More precisely, for each pre-qualified firm, we know the number of invitation to bid, the bids' value, the number and the value of the successful bids, the number of bids that were disqualified for technical reasons, the number of time the invited firm voluntarily decides to decline and post no bid. We also have information about contracts' characteristics and about the identity of the Paris Habitat-OPH's employee that organizes each auction. This allows us to construct a set of variables in relation with the possible previously described scenarii. They are presented in table 1.

We have no precise information about the reasons leading the buyer to short list a firm or not (that is to say, about phase 1). Given that the buyer has the possibility to disqualify firms depending on their past performances when building the pools, pre-qualified firms' past performances should be rather equally satisfying. Therefore, we assume that, once the pool is renewed, all the firms belonging to a pool have the same probability to be invited to post a bid. This means we make the assumption that, whatever the reasons why the buyer selected firms within one pool, all firms are set on an equal line at the beginning of the pool (*i.e.* we assume for example that each firm has the same reputation and we do not consider firms' past performances outside of the pool life).

Buyer's Willingness to tackle SMEs' constrained capacities - To assess the determinants of bidders' invitation, we first use the variable *Market_Share* that is considering the value current of contracts won by a firm in comparison with the whole value of contracts within one pool. Two aspects have to be simultaneously considered in order to understand the rationale behind this variable. The first argument is that the buyer has to deal with firms' constrained capacities; as a consequence, he cannot always invite the same firm - whatever its efficiency - and he should keep a set of potential suppliers which are able to meet its (frequent) needs. The second argument is related to the first argument - that is firms constrained capacities - but also to firms' survival concerns. The buyer has to keep a set of potential supplier (this is the result of our first argument) ; one way to reach this purpose is to enhance the perspective of future business when belonging to a pool (that is, enhance the relational dimensions); this argument may be especially incitative in the case of SMEs, which are worried about their survival and may desire to enter in secured/repeated interactions. Therefore, so as to enhance the relational dimensions and tackle SMEs' limited capacities, the buyer might be worried about sharing out its contracts among pre-qualified firms. In other words, it is not excluded that very successful firms - that is firms with high market shares - will not be repeatedly invited, both to avoid reaching their maximal capacities and to keep some of the relational incentives with the

other firms. Therefore, we expect the higher the market share of a given firm, the lower its probability to be invited.

Firms’ Reputation - Two additional variables are built to assess the determinants of bidders’ invitation: *NoResponse_Rate* and *Rate_Insufficient*. The first one, *NoResponse_Rate*, captures the fact that short-listed firms that are allowed to post a bid may refuse to do so conducing them to have a low answer rate. As some firms are explicitly disqualified during the pool’s constitution because of having frequently turn down invitation¹⁶, we argue that a firm having a low answer rate may have a bad reputation ; hence she may be less frequently invited to bid. The second variable, *Rate_Insufficient*, is measuring the fact that a firm is frequently proposing low but technically insufficient bids that are disqualified by the buyer. Aggressive bidding is an issue frequently pointed out in the literature on public procurement; it can be deliberated or not, that is it may be a firm’s strategy to maximize its chance to win the contract (see, e.g., Guasch (2004)) or it may derive from an insufficient degree of information about the “true” contract’s value (Hong and Shum (2002); De Silva, Kosmopoulou, and Lamarche (2009)). Given that the studied contracts are rather simple, this issue should not be a matter of concern. Nevertheless, 10% of the contracts we study are not awarded to the lowest bidder, leading us to conclude that low and unsatisfying bids are still frequent. One explanation would be that some SMEs do not keep enough free capacities to satisfyingly investigate about the contract’s value or to efficiently meet buyer’s needs, leading them to frequently propose unadapted bids. Whatever the explanation, we argue that firms frequently posting unsatisfactory low bids may send a negative signal to the buyer: they are repeatedly unable to meet its need; therefore, these firms may have a bad reputation and may be less frequently invited to post a bid.

Firms’ Reputation or Employee’s capture - We know the identity of the buyer’s employee in charge of managing the contract. We created the variable *Employee_Rate* taking care of past experiences of the buyer’s employee with each candidate within each pool, at the bidding stage. Past interactions between a given firm and a given employee enable to decrease their coordination costs (Gil and Marion (2009)); they also enable the employee to collect information regarding particular abilities of this firm to propose credible offers. Yet, another explanation would be that frequent past interactions between an employee and a firm reflect the capture of this employee (Ohashi (2009)); in other words, it may highlight that the employee’s discretionary power result in corruption abuses or at least unfruitful favoritism. Whatever the motive - that is economic efficiency or capture of the employee -, we expect that the more an employee interact with a candidate during one

¹⁶This is an information we have only for the most recently constituted pools

pool life, deciding to lead access to a big fraction of his procured contracts in the past, the more probably the firm is to be selected again.

Control Variable and Fixed Effects - As already mentioned, we have no information about the way pools are constituted. To control for the unobserved bias due to pool's constitution, we added a fixed effect for each pool. For instance, some pools may be constituted by more reputed firms than others. In addition, we added fixed effects for years, firms and buyer's employees.

Table 2 also contains information about contracts' characteristics. Given that our first concern is to assess the impact of firms' characteristics on the probability to be invited to post a bid, contracts' characteristics are excluded from the invitation phase estimation. Moreover, integrating contracts' characteristics in the selection phase does not significantly affect neither the invitation phase, nor our main findings regarding its impact on the bidding phase. This is not surprising: contracts are indeed rather simple (and therefore, complexity must not be a major determinant during bidders' invitation) and, for each tendering, bidders face the same contract's characteristics (that is, contracts' characteristics does not enable to discriminate among bidders). Yet, one alternative specification would be to cross bidders' characteristics and contracts' characteristics, but for simplicity and because it is beyond the scope of this article, we prefer to simply not take into account contracts' characteristics during the invitation phase.

Invitation Process and Received Bids?

In addition with the question of how the buyer invites firms that are allowed to bid, another issue we are interested in is the impact of the selection process at stake on the quality of final offers received by the buyer. In order to assess the competitiveness of a received bid, we use the variables *Relative_Bid* and $\log(Bid)$ respectively measuring the offer relative to the estimation made *ex ante* by the buyer and the logarithm of the received offers. We argue that these indicators may actually capture the overall quality of the awarding process. Over the 180 studied contracts, the average value of renegotiations indeed only accounts for 0.7% of the contracts' estimated value. In other words, renegotiations are not a major issue and low bids are more likely to reflect competitiveness than opportunism (additional specifications are run and explained below regarding the quality of low bids).

Our strategy is to assess whether received bids are competitive or not, *given* the selection process at stake. However, we can only observe bids of invited firms. We have no idea of the offers that non invited firms would have made. To take care of self selection, we used a two-step Heckman method Heckman (1979) and we estimate the following model:

$$Relative_Bid_{ijt} = W_{it}\beta_1 + Z_j\beta_2 + C\beta_3 + \epsilon_{ijt} < 0 \mid Selected_{ijt} = 1 \quad (2)$$

where W_{it} is a vector of characteristics concerning past performances of candidate i at time t ; Z_j is a vector of variables capturing the characteristics of the contract j ; ϵ_{ijt} is the error term; and β_1 and β_2 are the vectors of the parameters that correspond to W_{it} and Z_j respectively. We also added some fixed effects and control variables C like in our selection estimates.

A noted difference with the selection process is the adding of control variables for each contract (See Z_j). On the one hand, some observable contracts' characteristics are likely to impact the competitiveness of received bids. Thus, we controlled for contracts' estimated value, contracts' duration and we tried to capture contracts' complexity through the variable *Multisite*. On the other hand, we added a control variable to capture the effect of a higher number of invited firms (see the variable *Nb_Candidates*) on the level of received offers.

Moreover, we used the variable *Employee_Rate* as an instrument (not included in W_{ij} but in X_{ij}). It indeed reflects past interactions between each employee and each firm. This information is known by the employee at the selection stage, but not by the firm at the bidding stage. If the employee has already widely interacted with a particular firm, he will be probably inclined to interact again in the future. Because firms have no information about the identity of the employee that is organizing the auction¹⁷, they are not supposed to adapt their bids to employee's identity. That is why this variable is a valid instrument impacting on the selection process but not on the final received bids.

3. Results and discussion

3.1 How Candidates are Invited?

Results concerning the way candidates are invited are presented in Table 2. Results are consistent whatever the specification retained and suggest that the buyer is not inviting firms that are allowed to post a bid randomly.

Firstly, our results suggest the buyer cares about sharing out its contracts among pre-qualified firms : firms with high market shares are less likely to be selected. Yet, the coefficient is not significant without fixed effects. Indeed, this is solely once we notably control for firms' identity that *Market_Share* is significant : having high market shares does not matter; what matters is to have an increase of the market share *given* (notably) the firm's identity. Therefore, one interpretation would be that the buyer share out its

¹⁷Paris Habitat-OPH practitioners maintain that firms may not know the identity of buyer's employees, because they are (rather) randomly affected to contracts.

contracts by taking into account firms' capacities : firms with higher capacities may have higher market share, but once they have reach a certain level of market share, they will be less frequently invited to post a bid.

Secondly, our result suggest that firms past failures actually impact on the buyer's choice. The fact that a firm frequently did not post an offer while it has been selected or has a high rate of past offers declared unsuccessful impact negatively, as expected, on its probability to be selected for a given contract.

Thirdly, we observe that the more a buyer's employee interact with a given firm, the more probably it will be selected. As it was previously mentioned, two interpretations are possible to explain this result: it may suggest that past experience between partners increase their willingness to cooperate together for economic concerns, but it may also reflect the capture of the buyer's employee.

To sum up, the buyer shares out its contracts among well-reputed firms; this may be put in line with its willingness to optimize relationships with SMEs. Yet, employee' discretion is used and we are not able, at this point, to determine for which motive. Therefore, a natural question that arises then is to see to what extend, this active behavior of the buyer in favor of the reduction of competition is beneficial or not through its impact on the final received bids.

3.2 The competitiveness of received offers

Table 4 presents results concerning the competitiveness of received offers. The first two models are simple OLS, whereas the four other models take into account the selection bias through a two-step Heckman model. The dependent variable is the *Relative_Bid* in Model 7, 9 and 11, whereas $\log(Bid)$ is estimated in Model 8, 10 and 12. Model 7, 8, 9 and 10 run on the entire set of received offers, whereas regressions of Model 11 and 12 run on the set of "sufficient" received offers (in other words, bids that have been disqualified by the buyer are excluded *i.e.* if the variable *Insufficient* is equal to 1). We indeed replicate the estimations of models 7 and 8 after dropping the insufficient offers to check if the decrease of bids is not due to an increase of low quality bids. In other words, if the selection process leads to select more candidates that propose the lowest but technically insufficient offers, the decrease of prices is driven by a decrease of the quality of proposed bids instead of reflecting competitiveness of received offers.

We first observe that the coefficients of our explanatory variables are weakly affected by the selection bias. Yet, an interesting findings concerns the impact of the invitation phase on the competitiveness of received offers: the mills ratio is (generally) significant and its negative sign shows that the selection process leads to lower bids, whatever the specification. Our results thus suggest that the selection process enables to obtain more competitive bids.

Moreover, our results suggest that valuable current contracts of one firm lead this firm to post higher bids (see *Market_Share*): the rationale behind buyer's decision to implement a rotation in market access appears even more justified with this result. On the one hand it preserves future competition; on the other hand it permits to stimulate present competition.

Also, contracts' characteristics naturally affect posted bids. More valuable contracts attract lower (relative) bids (see model 7 and 9). We can also see that long duration contracts and contracts dealing with multiple sites lead to higher bids. This is probably because these variables are a proxy of contract's complexity. Thus, following Bajari, McMillan, and Tadelis (2009), such contracts might include a risk premium reflected in posted bids.

4. Conclusion

Our purpose in this article was to understand a paradox we observed, that is public buyers' decision to use restricted auctions to tender small contracts. We found evidence that this paradox is not anecdotal; in fact, it is widely shared by other public buyers among EU-member states (OECD (2010)). Therefore, we suggested to further investigate what could be "the law of small numbers".

The previous literature advises to enhance the competitive incentives in order to efficiently tender small contracts: they are generally rather simple and, as a consequence, *ex post* transactions costs, resulting from contractual incompleteness, should not be a matter of concerns (Bajari and Tadelis (2001)). Nevertheless, regarding some public buyers' characteristics, we show that the systematic use of open auctions may lead them to spend most of their resources on a very limited fraction of their overall activity. Indeed, in the particular case of small contracts, the costs saved when comparing numerous offers may not be sufficient to compensate their administrative treatment. Therefore, one first motive of restricted auctions is to save on *ex ante* transactions costs through the limitation in the number of offers to be compared.

Yet, the organization of the competition is now left to buyer's discretion. The question to know whether this discretion should be enhanced or not is highly debated in the academic literature (Spagnolo (2012)), but also among lawmaker (see, for instance, the Green Paper related to EU-directives' revision): on the one side, it tends to favor costly behaviors, like corruption, favoritism or even collusion practices (Ohashi (2009)); on the other side, the lack of discretion may be responsible for poor contract enforcement (Kelman (1990)). Contract enforcement is certainly not a major issue in the particular case of small contracts; but we argue that the enhancement of competition between SMEs still leaves a room to

advantageously use it. Naturally, this efficient way is challenged by an other scenario, that is using discretion for costly abuses. So as to discriminate between these scenarios, we use a data set of 180 contracts attributed through restricted auctions between January 2006 and December 2009. A first econometrical result suggests that the buyer's strategy is to share out its contracts among well-reputed pre-qualified firms: using the literature on SMEs, we argue that it enables to simultaneously tackle their constrained capacities and their widely varying performances. However, we also find evidence that repeated interactions between one given buyer's employee and one given firm significantly affect the probability of a given firm to be invited to post a bid.

In order to determine whether it reflects a particularly fruitful relationship or a capture issue, we then use a two-step Heckman model (Heckman (1979)). We indeed aim at assessing the influence of the invitation phase on received bids; to do so, we run our regressions either by considering the whole sample of received offers or after dropping the insufficient offers; we want to make sure that our findings are not driven by changes in the quality of received bids. In both configurations, the negative and (generally) significant effect of the invitation phase confirms the rationality of our buyer's strategy: a well-organized restricted auction enables to limit the comparison of offers to the most efficient bidders. Therefore, one additional contribution of this paper is to investigate and to find evidence regarding a new way to enhance competition between SMEs. Their participation to public procurement has give rise to numerous reports and recommendations at the US and EU-level and to several academic papers. But they focus more on solutions to promote SMEs' participation when facing larger firms. As we are considering a framework where SMEs compete each other (which is likely to be relevant when tendering small contracts), we shed light on a complementary solution to enhance their participation in public procurement.

Yet, there is still one major question we do not especially deal with: why discretion does not result in costly abuses? The literature argues that one way to limit discretion's adverse effects is to increase the transparency of awarding procedures (See, for instance, Boehm and Olaya (2006); Amaral, Saussier, and Yvrande-Billon (2009)). Assuming this statement is true, two main arguments explain the beneficial effects of discretion we observe. Firstly, the new latitudes left to public buyers go with higher transparency requirements: in particular, the 2004's reform of the French Public Procurement Code, corresponding to the implementation of EU-directives, drastically increased the obligations of public buyers regarding, for instance, the information they have to communicate to loosing candidates. Secondly, our buyer's legal department is ISO-9001 certified: it means that independent auditors evaluated that the quality of internal procedures were satisfyingly transparent and well-organized. These features probably explicate the way discretion is used. It is not surprising that both a well-structured buyers - a buyer having clear, transparent and traceable internal processes - and the growing possibility of firms to be able to challenge the probity of the awarding process decrease the occurrence of abuses in discretion; they

are more likely to be detected. In other words, the increase in freedom and discretion may be compensated by an increase in accountability. Nor is transparency not a panacea: clearer “rules of the game” are known to facilitate collusion among firms (Conseil de la concurrence [2000], Ishii (2007)).

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Table 1: DESCRIPTION OF OUR VARIABLES

Variable	Definition	Mean	Std. Dev.	Min	Max	N
SELECTIONS AND AUCTIONS' OUTCOMES						
$Selected_{ijt}$	Equals 1 if the candidate i is invited to post a bid for contract j at time t , 0 otherwise	0.25	0.43	0	1	2476
Bid_{ijt}	Posted bid of candidate i for contract j at date t (in euros)	45014	42283	2250	404500	530
$Relative_Bid_{ijt}$	Posted bid of candidate i for contract j at date t / buyer's estimated value	1.00	0.36	0.1	4	530
$Insufficient_{ijt}$	Equals 1 if posted bid by candidate i is the lowest for contract j and considered as technically insufficient at date t , 0 otherwise	0.1	0.30	0	1	530
CONTRACTS' CHARACTERISTICS						
$Estimate_{jt}$	Buyer's estimated value of the contract j (in euros)	46336.39	42576.55	2500	204300	180
$Duration_{jt}$	Buyer's estimated duration of the contract j (in months)	12.57	7.40	1	36	180
$Multisite_{jt}$	Equals 1 if the contract deals with more than one site, 0 otherwise	0.09	0.28	0	1	180
$Nb_Candidates_{jt}$	Number of firms invited to post a bid for contract j	3.4	0.62	3	6	180
FIRMS' PAST PERFORMANCES						
$NoResponse_Rate_{it}$	Number of past call for tenders for which the candidate i has not posted a bid at time t / number of time the candidate has been selected	0.07	0.22	0	1	2476
$Rate_Insufficient_{it}$	Number of past technically insufficient low bids of the candidate i at time t / number of past offers	0.06	0.18	0	1	2476
$Market_Share_{it}$	Value of on-going* contracts won by candidate i at time t / Overall (past and future) value of contracts attributed in the pool	0.02	0.06	0	0.69	2476
$Employee_Rate_{it}$	Value (in euros) of contracts a given employee gave a candidate i access to / value of contracts this employee procured in sectors candidate i is short listed (in euros)	0.10	0.27	0	1	2476

As previously mentioned, the variables $NoResponse_Rate_{it}$, $Rate_Insufficient_{it}$, $Market_Share_{it}$ and $Employee_Rate_{it}$ are calculated independently for each pool.

* We assume contracts are completed linearly day by day

Table 2: THE SELECTION OF CANDIDATES

	MODEL 1 ROBUST PROBIT <i>Selected</i>	MODEL 2 ROBUST PROBIT <i>Selected</i>
<i>Rate_Insufficient</i>	-0.003** (0.002)	-0.004** (0.002)
<i>NoResponse_Rate</i>	-0.003** (0.001)	-0.008*** (0.002)
<i>Market_Share</i>	0.543 (0.442)	-0.986* (0.584)
<i>Employee_Rate</i>	0.738*** (0.124)	0.763*** (0.138)
<i>Yearsfixedeffect</i>	No	YES
<i>Employeesfixedeffect</i>	No	YES
<i>Firmsfixedeffect</i>	No	YES
<i>Poolsfixedeffect</i>	No	YES
<i>Intercept</i>	-0.710*** (0.033)	-0.238 (0.756)
<i>McFaddenR2</i>	0.02	0.13
<i>N</i>	2458	2458

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

The number of observations N is reduced to 2458 (compared to the 2476 observations presented in table 2) because the adding of fixed effects in Model 2 sometimes generates a perfect colinearity (18 observations are dropped). In order to make our estimations of model 1 and 2 on the same sample, the 18 observations automatically dropped from model 2 are also voluntarily dropped from model 1.

Table 3: POSTED BIDS AND SELECTION'S EFFECT

	MODEL 7	MODEL 8	MODEL 9	MODEL 10	MODEL 11	MODEL 12
	OLS	OLS	HECKMAN	HECKMAN	HECKMAN	HECKMAN
	<i>Relative_Bid</i>	<i>log(Bid)</i>	<i>Relative_Bid</i>	<i>log(Bid)</i>	<i>Relative_Bid</i>	<i>log(Bid)</i>
					‡	‡
<i>log(Estimate)</i>	-0.124*** (0.029)	0.889*** (0.024)	-0.127*** (0.023)	0.887*** (0.018)	-0.137*** (0.024)	0.879*** (0.018)
<i>log(Duration)</i>	0.090** (0.043)	0.070** (0.035)	0.096** (0.039)	0.073** (0.031)	0.099** (0.040)	0.073** (0.031)
<i>Multisite</i>	0.050 (0.048)	0.069+ (0.043)	0.051 (0.049)	0.070* (0.040)	0.056 (0.051)	0.068* (0.039)
<i>Nb_Candidates</i>	-0.031 (0.032)	-0.048+ (0.029)	-0.036 (0.032)	-0.050* (0.026)	-0.024 (0.039)	-0.040 (0.030)
<i>Rate_Insufficient</i>	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)	0.000 (0.001)
<i>NoResponse_Rate</i>	0.000 (0.001)	0.000 (0.001)	0.001 (0.001)	0.000 (0.001)	0.001 (0.001)	0.000 (0.001)
<i>Market_Share</i>	0.193 (0.247)	0.162 (0.195)	0.277 (0.229)	0.207 (0.179)	0.447* (0.248)	0.325* (0.185)
<i>Yearsfixedeffect</i>	YES	YES	YES	YES	YES	YES
<i>Employeesfixedeffect</i>	YES	YES	YES	YES	YES	YES
<i>Firmsfixedeffect</i>	YES	YES	YES	YES	YES	YES
<i>Poolsfixedeffect</i>	YES	YES	YES	YES	YES	YES
<i>Intercept</i>	2.239*** (0.436)	1.253*** (0.362)	2.483*** (0.418)	1.384*** (0.328)	3.106*** (0.493)	1.889*** (0.370)
<i>Mills Lambda</i>			-0.135* (0.079)	-0.072 (0.061)	-0.175** (0.088)	-0.095+ (0.065)
<i>N</i>	530	530	530	530	477	477
<i>Adj.R2</i>	0.39	0.94				

‡ Regressions on sufficient received offers only

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