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Auction versus Negotiation in Public Procurement: Looking for Empirical Evidence

Eshien Chong[♣], Carine Staropoli[♦] and Anne Yvrande-Billon[♠]

July 2010

Abstract

The relative efficiency of auctions and negotiations is still a puzzle in the literature. While auctions are the prescribed procedures and the most used ones for public procurement, in the private sector, where buyers are free to choose their purchasing method, competitive tendering is far from being their preferred option (Bajari *et al.* 2009). In addition, recent empirical studies (Estache *et al.* 2009, Bajari *et al.* 2009) highlight some failures of auction procedures and identify conditions under which negotiation is more efficient. In particular, they show that auctions perform poorly when projects are complex.

In this paper, our aim is to contribute to this debate by providing an empirical analysis of how awarding mechanisms are chosen in public procurement in France. To this end, we examine a comprehensive database of 76,188 observations corresponding to the entire set of public procurement work contracts awarded between 2005 and 2007 in the construction sector. We find empirical regularities regarding the choice of awarding procedures by public buyers. However, most of these regularities do not coincide with what the theoretical literature considers as transaction-cost minimizing behaviours. In particular, the size of the construction projects as well as the length of contracts do not appear as key determinants of the choice of awarding procedures, which translates into costly renegotiations.

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1. Introduction

Public procurement refers to the public authorities' activities of purchasing goods, works and services. These purchases range from simple items such as pens and paper clips through to complex goods or construction works. Hence public procurement markets represent a major part of economic activities. For instance, in the European Union, total public procurement is estimated at about 17% of EU GDP (€2000 billion) in 2007[1], while in France it represents 16.6% of GDP.[2]

Procurement policy also plays an important role in addressing social and environmental problems (EU, 2005) and in developing the private sector in general and specific segments of the industry (SME notably). Additionally, in the European context, an effective public procurement policy is fundamental to improve the functioning of the Internal Market and enable the EU to reap the full benefits from an enlarged Internal Market. For that purpose, community rules on public procurement have been set up (Directives 2004/18/EC and 2004/17/EC).

As in the US, the rules organizing public procurement in Europe strongly advocate the use of auctions to award contracts and select final providers of goods and services to public entities while the circumstances when negotiation can be used are strictly restricted. Such preference for competitive tendering over negotiated procedures in public procurement is justified by the assumption that auctions allow finding supply sources at the cheapest price and at acceptable quality. Auctions are also favoured because they are seen as a way to prevent favouritism and ensure equal opportunity to potential suppliers. As a matter of fact, auctions remain the dominant award mechanism for public procurement contracts. Thus, in France, from 2005 to 2007, auctions were used to award 70% of the procurement contracts in the public works sector while in Europe they correspond to 82% in 2008 (Internal Market Scoreboard, 2009).

Yet, recent empirical and theoretical contributions show that auctions are not a *panacea,* as already pointed out by Williamson (1976). Interestingly, while public and private procurement share the same essential purpose of obtaining the lowest price without loss of quality, the practices of each sector are different. Thus, as documented by Bajari *et al.* (2009), "*from 1995 to 2000, almost half of private sector non-residential building construction projects in Northern California were procured using negotiations, while the rest were procured with some form of competitive bidding. Only eighteen percent were procured using unrestricted open competitive bidding, which is what FAR dictates for the public sector*" (ibid, p. 1). In other words, while auctions are the prescribed procedures and the most used ones for public procurement, in the private sector - where buyers are free to choose their purchasing method - competitive tendering is far from being their preferred option.

In addition, as shown by several recent empirical works (Guasch 2004, Guasch *et al.* 2008, Estache *et al.* 2009), public procurement contracts awarded via competitive tendering are frequently renegotiated, which generates significant additional costs and questions the efficiency of the procedure itself. Thus for instance, Guccio *et al.* (2008), in a study of public works procurement contracts in Italy in 2005, estimate that, for about a quarter of all works, adaptation costs consecutive to renegotiations increase the original costs by 10%. Additionally, the main argument justifying the use of auctions for public procurement (to prevent collusive practices and corruption) is severely called into question. Numerous theoretical developments indeed show that competitive tendering procedures are not immune to corruption, collusion and/ or favoristism (Compte *et al.* 2005, Lambert-Mogiliansky and Sonin 2006, Auriol *et al.* 2009).

These paradoxical observations regarding the use of auctions and negotiation in public procurement are the starting point of our paper which aims at empirically investigating the

[1] Internal Market Scoreboard, n°19, July 2009.

[2] Source: http://ec.europa.eu/internal_market/publicprocurement/docs/public-proc-market-final-report_en.pdf.

determinants of award procedures. For this purpose, we use an exhaustive dataset of 76,188 French public works contracts attributed at various levels of decisions (central government, including agencies, universities, hospitals etc., and local governments) between 2005 and 2007. Based on these data, our paper highlights empirical regularities on what motivates public buyers when choosing a given procedure. In line with recent developments in the transaction cost literature, our work contributes to the discussion on the relative merits of alternative awarding mechanisms in a context where the will to implement competition to avoid corruption and favoritism should favor auctions, while the effective governance for complex and sometimes unique work should be "relational contracting" or negotiations. From a theoretical perspective, this debate has received a lot of attention since the seminal papers by Demsetz (1968) and Williamson (1976) who expressed opposite views on the efficiency of franchise bidding for natural monopolies. However, very few empirical works have been done to confront their propositions with facts, which is precisely what motivates the present work.

The paper is organized as follows. Section 2 summarizes the theoretical arguments developed in the procurement literature regarding the respective merits of auction and negotiation. This survey allows us to identify the conditions under which auctions are more efficient than negotiation procedures. Section 3 presents public procurement practices in the construction sector in France thereby emphasizing the nature of the transactions and the governance problems that characterize the construction process. Section 4 is devoted to empirically investigate the main determinants of the choice of procedure in the French construction sector. We first deal with the impact of buyer's experience and expertise on the choice of award procedure. Then, we assess the role of projects' size and contracts' duration. Section 5 is dedicated to the analysis of the renegotiations that have occurred which is a first step towards an efficiency analysis of the trade-off between auction and negotiation. Section 6 concludes on the economic rationale behind the choice of awarding procedures.

2. Auction versus negotiation: the theoretical debate

Besides the traditional literature on auctions which emphasizes the efficiency properties of such attribution mechanisms as means to introduce competition and prevent corruption (Bulow and Klemperer 1996), a growing body of the procurement literature supports the promotion of alternative award procedures (more particularly negotiation) or at least questions the conditions under which auctions can efficiently be used. The arguments put to the front to qualify the efficiency of auctions echo the ones used by the proponents of the Transaction Cost Economics' view in the now classical 'franchise bidding of natural monopolies' debate which opposed, in the 1970's, Demsetz (1968), on the one hand, to Williamson (1976) and Goldberg (1976, 1977), on the other hand. While Demsetz (1968) considered that competitive tendering was the ideal mechanism to regulate natural monopolies, Williamson (1976) and Goldberg (1976, 1977) highlighted the failures of auction procedures, arguing that in the presence of relationship-specific investments and high uncertainty the contractual disabilities of the parties mitigate the efficiency of the franchise bidding mechanism and militate in favour of the use of alternative coordination devices, like utilities regulation.[3]

In the broader context of public procurement, the trade-off between regulation and franchise bidding translates into a trade-off between negotiation and auction. While regulation and franchise bidding are two ways to select and/or control a natural monopoly, the literature on procurement, in its recent developments, views auction and negotiation as alternative ways to select a provider of goods and services, each one presenting its own advantages and limits (Manelli and Vincent 1995, Bajari *et al.* 2009).

[3] See Priest (1993) or Crocker and Masten (1996) for a detailed review of the debate.

In a nutshell, while auctions are supposed to ensure transparency, selection of the lowest cost bidders by benefiting from competition and prevent biased awarding of contracts, it may have some undesirable self-selection consequences and fail to respond optimally to *ex post* adaptation. On the contrary, negotiations may easily be suspected of corruption and favouritism but in the same time these "relational" contracting modes allow public buyers and suppliers to spend more time discussing *ex ante* the characteristics of the project to be delivered, and the appropriate design of the contract thereby reducing the risk of *ex post* opportunistic haggling. Hence, according to this literature, the trade-off between auctions and negotiations in public procurement is assumed to depend on *(1)* the buyers' level of expertise and competencies regarding the organization of competitive tendering, *(2)* the potential for competition, and *(3)* the level of complexity of the project to be procured. In what follows, we present the theoretical arguments regarding these three aspects. In the next session, we investigate whether we can find empirical regularities suggesting that these aspects influence French public buyers' decision regarding the choice of an award procedure for works contracts.

2.1. Buyers' competencies

A first challenge buyers have to face is to define the characteristics of the work to be procured. This task may be particularly difficult when buyers have no clear preferences or lack the technical expertise (e.g. knowledge of construction techniques, materials, process) required to describe the project. In such circumstances of limited capabilities of the buyers, negotiation should be the preferred awarding procedure because it allows the buyers to discuss the project with the potential suppliers and hence improve its design and specification before work begins. Conversely, experienced buyers, because they build more frequently and/ or have competent technicians and engineers in-house are expected to use auctions more frequently, all else held constant (Goldberg 1977; Bajari *et al.* 2009).

The second challenge linked to buyers' competencies concerns the organization of the awarding procedure itself. Many public procurement processes are carried out by municipalities or small agencies which may have neither the experience nor the knowledge of how to organize an efficient award procedure that is respectful of the rather complex and changing legislation and may then be afraid of being suspected of favouritism or corruption. Furthermore, the increasing number of recourses notably by eliminated candidates increases the fear of being suspected of favouritism or any kind of discretionary power.[4] In order to avoid such suspicions, public buyers are inclined to choose auction. This last argument echoes the one developed by Spiller (2008) on the incidence of public scrutiny on the choices made by public contractors. In particular, he argues that the pressure exerted by interested third-parties (e.g. political competitors) might lead public bodies to avoid negotiation and relational contracting and prefer rigid procedural processes such as auctions.

2.2. Potential for competition

There are critical pitfalls in auction design since, depending on the circumstances, auctions are very vulnerable to collusion and may deter entry into the auction (Porter and Zona 1993; Klemperer 2002). The benefits for auctioning may thus be reduced if not totally cancelled in case of collusive market since there might not be enough bidders to assure that the winning

[4] For instance, the European Court of Justice has published 200 judgements and orders containing the keywords "public procurement" and "award" between 1997 and 2009. 27.5% of these judgements were made between 1997 and 2003, 72.5% of these judgements were made between 2004 and 2009. Moreover the recent EU Directive 2007/66/EC seeks to allow potential candidates to legally contest award decisions made by public buyers. Therefore, the legal risks supported by public buyers can be expected to become higher.

price will differ significantly from the monopoly price. Among the various circumstances that participate to increasing the risks that participants may explicitly or tacitly collude, the number of potential respondents to the competitive tender is a crucial determinant for the success of auctioning. In a nutshell, if the market is highly concentrated - few potential respondents - auction may be less attractive than negotiation.

2.3 Complexity

The variable that has undoubtedly deserved the most attention in the literature on public procurement is the complexity of the goods/works to be procured. Defined as the difficulty to provide a rather complete set of plans and contingencies of a project, complexity is considered in the literature as a key determinant of the choice of an awarding procedure. More precisely, negotiation is advocated when the project is complex that is when *ex ante* design is hard to complete and *ex post* adaptations are expected. By contrast, competitive tendering is the recommended awarding mechanism for projects and services that are simple to describe and for which there are no objective reasons for *ex post* adaptations (Mougeot and Naegelen 1988, Bajari *et al.* 2009). Auctions are thus an effective way of determining the lowest cost supplier where the price of the project being procured is the buyer's only concern.

But auctions work less well for complex projects or services for which a vector of prices is to be determined and/or for which the buyer highly cares about other attributes of procurement like quality or reliability (Manelli and Vincent 1995). In such cases, the selection principles of the winning bidder are indeed difficult to determine. Although multidimensional auctions theoretically appear as a natural practical solution to deal with such circumstances, they are very often too complex to implement in practice because of their lack of transparency and their greater vulnerability to corruption and favouritism (Burguet and Che 2004, Estache *et al.* 2009).

Another risk incurred when auctions are used for complex projects is the increase of the bidding costs. Indeed, if the buyer fails to specify the subject matter of the bid with precision then uncertainties will result, costs of bidding will be increased, and applicants will be discouraged. The number of bidders being limited, the expected benefits of competitive tendering would consequently be affected. Or, as shown by Bajari *et al.* (2007), the number of bidders may not be limited but, since they anticipate future renegotiation due to contractual incompleteness, their bid may incorporate high risk *premia* for them to be able to recover potential adaptation costs.[5]

Finally, if the description of the project is not sufficiently clear, competitive tendering may also lead to situations of adverse selection and end up with the selection of the most opportunistic bidder (Bajari *et al.* 2009). If contractual design is incomplete and service is complex, auction may indeed lead to choosing the bidder who is the most aware of the contractual blanks he could exploit, that is to say the one who is able to determine where contracts will fail. Anticipating that he will be able to take advantage of situations that are unforeseen in the contract by renegotiating the initial arrangement, this strategic candidate will not hesitate to propose an unrealistically low price. This type of bidding behaviour (low-balling strategy) jeopardizes allocative efficiency, which is the most important objective of tendering.

To sum up the propositions derived from the literature, the trade-off between auction and negotiation in public procurement is assumed to depend on (1) the competencies of public buyers regarding the design of the project and the organization of competitive tendering, (2) the potential for competition, (3) the level of complexity of the project to be procured. Moreover, it has been argued theoretically that auction-based procedures are more likely to lead to *ex post* adjustments, and these adjustments are potentially more costly. In the next section, we intend to identify and document such regularities in the French public procurement practices using data on public procurement work contracts. To this end, we first investigate the determinants of

[5] In their study of highway construction and maintenance contracts in California, Bajari *et al.* (2007) estimate these risk *premia* to represent, in average, 10% of the value of the contract.

award procedures using variables that may serve as proxies for the three classes of determinants identified above. In a second subsection, we look into the occurrence of contract amendments to understand whether *ex post* adjustments occur as the theory predicts.

3. Public procurement in the construction sector in France

3.1. Work contracts

Our study focuses on works contracts, which represent 35% of the procurement contracts in 2007 in France. Given the definition provided by the EU Directive works cover the whole range of construction works from site preparation, complete or part construction and civil engineering utility sectors, building installation (electrical, plumbing and sanitary, mechanical etc.) and building completion. This diversity translates into various situations regarding the level of complexity, coordination problems, uncertainty or potential opportunistic behaviors from contracting parties.

Thanks to the rich and exhaustive data provided by the Economic Observatory of Public Procurement of the French Ministry of Finance *(OEAP*), we have been able to build a comprehensive database covering the public work procurement activities undertaken by public buyers during three consecutive years, from 2005 to 2007. More precisely, the database contains information on some characteristics of the projects (e.g. type of work) and their afferent contract (e.g. value, duration, identity of contractors, awarding procedure, price, number of subcontractors, renegotiation). During this period, a total of 76,188 procurement contracts have been passed by 8,216 public buyers in France. However, for motives of coherence and robustness, we had to reduce our sample to 72,283 procurement contracts on public works.

3.2. Buyers

Buyers can be distinguished between central administrations (i.e., ministries, museums, universities, hospitals and other bodies governed by public law, or associations formed by one or more of such authorities or bodies governed by public law) and local administrations (e.g. regions, *départements*, municipalities, etc.). For simplicity, we will refer to the former as "central buyers" and the latter as "local buyers".

There are 7,645 local buyers and 517 central buyers who have awarded at least one procurement contract on public work during the 3 years of our sample. Over this period, the bulk of procurement activities stems from local buyers (90.1% of total procurement contracts). However, the average number of procurement contracts per central buyer is 13.83 and only 8.5 per local buyer. Procurement activities as measured by the value of contracts are more important on the whole for local buyers, even if the average value of a public work contract is more important for central buyers (the average contract for a central buyer amounts to about 508,898€ while for a local buyer it is about 407,949€). In terms of contract duration, the average duration for a public work contract is about 12.21 months long.

3.3. Procedures

The French Public Procurement Code holds that public buyers may choose among 8 formalized awarding procedures for work contracts between € 4,000 net of VAT and € 5,150,000 net of

VAT[6]. These procedures differ in various dimensions including publication rules, openness to effective competition, selection criteria and process.

In order to stick to the literature, we focus on 5 procedures that can be grouped into two main categories: "auction", which gathers the open and restricted auction procedures, and "negotiation", which gathers the three procedures for which selection is made after consultation of the candidates and negotiation of contracts' conditions.

Open competitive tender is by far the favorite choice of French public buyers and, altogether, open and restricted auctions are used for about 72% of public work contracts over the three years 2005-2007. Even if the use of negotiated procedures is somehow restricted to specific situations, it still represents about 17% of award procedures, negotiation with prior publication and call for competition being by far the most popular negotiated procedure.

Along the years, there has been a slight evolution in the type of procedure used by public buyers. Indeed, over the period 2005-2007, there is a decrease in the use of competitive tender procedures on the overall: while this procedure accounts for 73% of total procurement contracts in 2005, this ratio falls to 63% in 2007. Thus, despite the growing emphasize in the EU directives on the merits of competitive tendering, there seems to be a drift in France towards less competitive procedures, namely negotiated procedures. The remainder of this paper helps assessing this evolution.

4. Auctions versus negotiations: an empirical analysis

4.1 The determinants of award procedures for French public work procurement contracts

In the following, we investigate how various determinants may impact the public buyer's choice of award procedure by examining correlations between the observed award procedures and proxies for each of the identified determinants using simple statistics and/or distribution graphs.

4.1.1 Public buyer's expertise

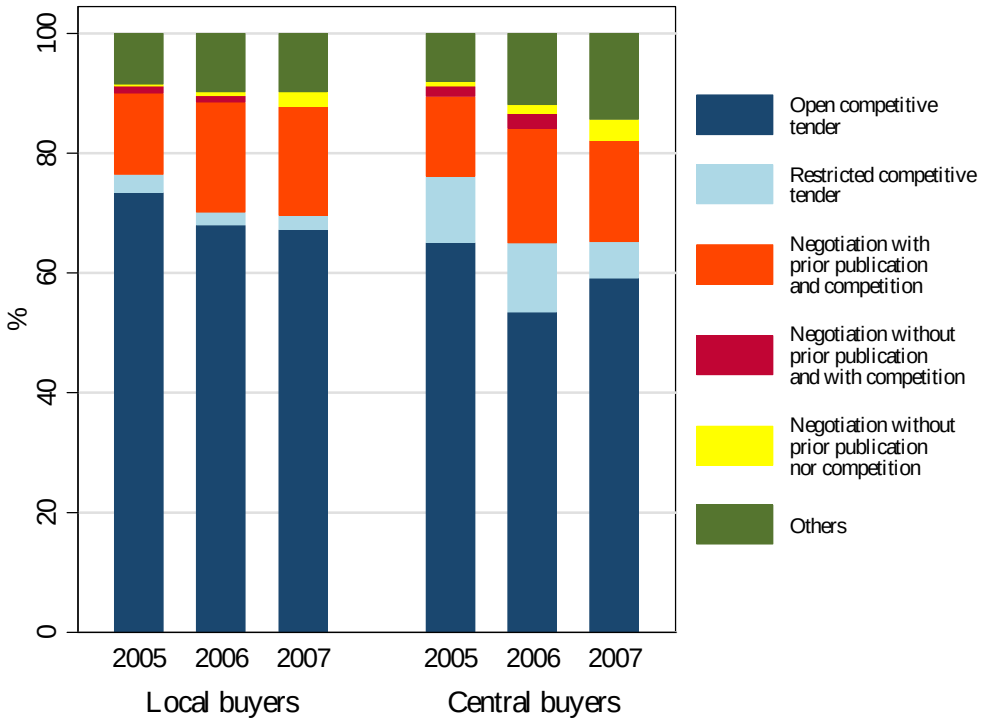
To explore the incidence of buyers' capabilities on the choice of award procedures, we rely on two different proxies. Firstly, we compare award procedures used by central and local buyers, and secondly, we rely on the number of public work contracts previously awarded as a measure of the buyer's experience. The former variable may reflect buyer's expertise as central buyers are usually better staffed than local ones (OECD 1999). Therefore, one may expect central buyers to be more competent in defining their projects. The latter variable captures potential learning effects that a buyer could acquire by frequently dealing with public work procurement contracts. Based on our theoretical discussion, we expect central buyers to rely more on auction based procedures.

Figure 1 shows the use of various award procedures by central and local buyers. It reveals no great differences in the choices made by these two categories of buyers: both use competitive tendering and negotiation in the same proportions. The only noticeable difference concerns the use of restricted competitive tendering which is much more frequent for central buyers. This may be explained by the size of the projects launched by central buyers which requires them to

[6] These threshold are those used in 2007; they have been slightly modified in 2010, the upper threshold being € 4,845,00.

restrict the number of bidders. This is consistent with the results obtained by Bajari *et al.* (2007) and Ye (2007) who find that, for projects involving large bidding costs, buyers should restrict competition in order to give qualified bidders an incentive to participate by maximizing their chance to win the project.

Figure 1. Evolution of award procedures according to the administrative level of public buyers



As a measure of buyers' experience, we use the cumulative sum of public works contracts awarded by a buyer (up to a given year) and check whether more experienced buyers tend to rely more on auctions.

Table 1 shows that more experienced buyers tend to use competitive tendering more frequently.[7] On average, the contractual experience of buyers who choose open auctions is significantly higher than the experience of those who choose restricted auctions (resp. 78.05 contracts and 71.51 contracts). This result corroborates that auction is chosen by public buyers that have the highest experience in terms of cumulative number of contracts.

[7] We conducted a test of Student to check whether the mean public buyer's experience when competitive tendering is used is significantly different from the mean public buyer's experience for the three types of negotiation-based procedures. The test statistic is -5.6002, indicating that the difference in means is significant at less than 1%.

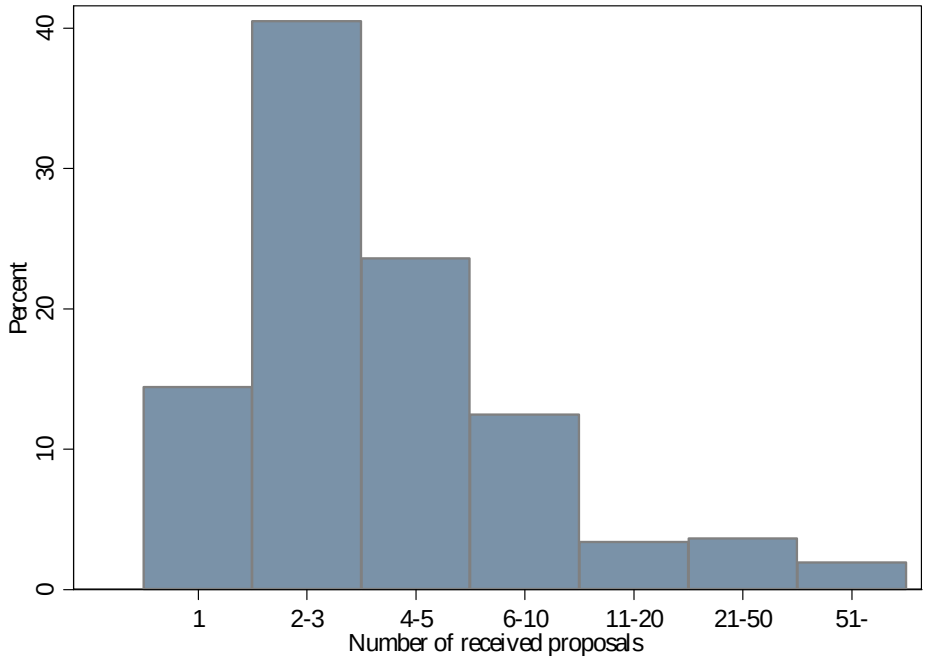
Table 1. Award procedure and contractual experience

Awarding procedures chosen at year t	Public buyer's contractual experience (cumulative sum of public works contracts signed up to year t)	
	Mean	Standard deviation
Open auctions	78.05	126.33
Restricted auction	71.51	108.74
Negotiation with prior publicity and competition	68.50	114.36
Negotiation without prior publicity and with competition	66.67	87.30
Negotiation without prior publicity nor competition	112.65	156.50
Others	62.34	131.79
Total	**75.09**	**124.77**

4.1.2 The potential for competition

A second determinant of buyers' choices relates directly to competitive pressure. If available, we would use the number of potential respondents per tender, as well as various measures of industrial concentration and barriers to entry to explore the link between the potential for competition and the chosen award procedure. Unfortunately, we do not have information on the pertinent market and consequently on these various measures. Still, for each contract attributed in 2007 we have data on the number of proposals received by buyers. Even if it cannot be considered as a concentration index, this variable still gives some indications on the intensity of competition and thereby might affect the relative efficiency of award procedures. Indeed, fewer propositions submitted in a tender may either reflect a lack of potential candidates (and thus a concentrated market), or the fact that potential candidates refuse to submit or consider the tender as unsuited to them. Such refusals may be due to real or supposed entry barriers linked to the bidding costs imposed to bidders or to suspicions of favouritism by the buyer towards a particular competitor (reducing the expectation to be selected). It may also reflect collusive or entry-deterring behaviours from competitors.

Figure 2. Distribution of the number of proposals received per contract (2007)



Our data reveal that the intensity of competition is moderate (Figure 2): in about 40% of the cases, public buyers have received two to three propositions, which may reflect limited competition, and in about 25% of the cases they have received 4 or 5 propositions. Cases with more than 11 propositions represents 12% of the cases, while cases where buyers received only one proposition - which by definition reflects a lack of competition – represents 15%. A more detailed analysis also reveals that the picture is relatively similar for both local and central buyers even if the market seems to be more competitive at the local level.

It is also worth noting that on average the number of propositions received under negotiation with prior publication and call for competition and under open competitive tenders are almost the same (6.3 and 6.6 respectively) (Table 2). This suggests that even with negotiated procedures, competition may not be altogether absent.

Table 2. Number of propositions received by awarding procedures (2007)

Procedures	**N**	**Mean**
Open auctions	10,091	6.60
Restricted auctions	395	4.55
Negotiation with prior publication and competition	2,670	6.30
Negotiation without prior publication nor competition	298	2.85
Others	1,542	3.66
Total	**14,996**	**6.12**

4.1.3 The complexity of a procurement project

As explained below, we would expect that more complex projects are associated with negotiation-based procedures.

Complexity is difficult to measure, especially given the vast amount and the wide diversity of contracts we have in the database. As such, we use contract's value and duration as proxies for complexity in our empirical analysis: arguably, both dimensions are closely related the complexity of a project and this is consistent with previous works on the subject (e.g. Bajari *et al.* 2007). Indeed, considering that complex projects often involve a higher number of tasks and more collaborators, one may assume that more complex projects are more expensive. Moreover, as uncertainty is a key determinant of complexity and as the former increases with time, one may consider that long-term projects are likely to be complex. Figure 3 plots the distribution of contract duration by categories of contract value. It illustrates that longer contracts are often associated with a higher initial contract value. This positive correlation between contract value and duration may be driven the same underlying process—the degree of complexity.

Figure 3: Distribution of contract duration and contract value

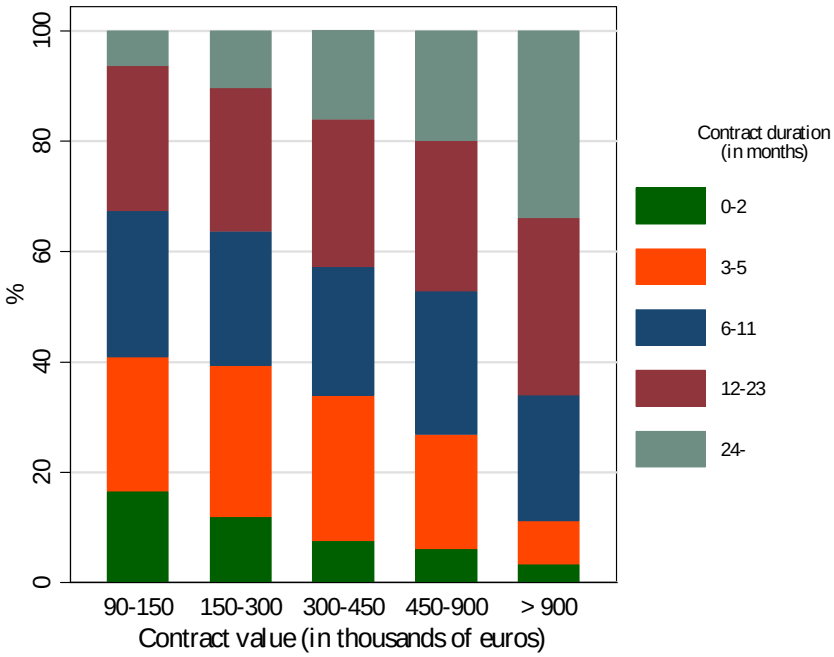


Table 3 shows simple statistics on contracts' value and contracts' duration according to the various award procedures. These statistics do not corroborate the proposition according to which complex projects are more likely to be awarded via negotiated procedures. Indeed, contracts awarded via auctions are longer and more expensive on average than contracts awarded via negotiation with prior publication and competition. Furthermore, contracts' value and duration are highest on average when restricted competitive tendering is used. Lastly, auctioned contracts are on average longer than contracts awarded through negotiated procedures.

Table 3. Contracts value and duration by award procedures

Procedures	Contract value (€)	Contract duration (months)
	Mean	Mean
Open auctions	447,963	12.86
Restricted auctions	670,536	15.40
Negotiation with prior publicity and competition	361,323	11.62
Negotiation without prior publicity and with competition	461,808	11.95
Negotiation without prior publicity nor competition	451,731	11.93
Others	206,784	7.52
Total	**417,934**	**12.21**

Figures 4 and 5 respectively show the share of award procedures used for different categories of contract value and contract duration. Unsurprisingly, for all categories of contract values and durations, open auctions seem to be the favoured procedure. However, what is interesting is that the share of auctioned contracts increases with contract value. In terms of duration, one may observe a surge in the use of auction-based procedures for contracts longer than 24 months. On the overall, even when we break down award procedures according to contracts' value and duration, higher contract values and longer contracts are more often associated with auction-based procedures.

Figure 4: Distribution of award procedures for different categories of contract value

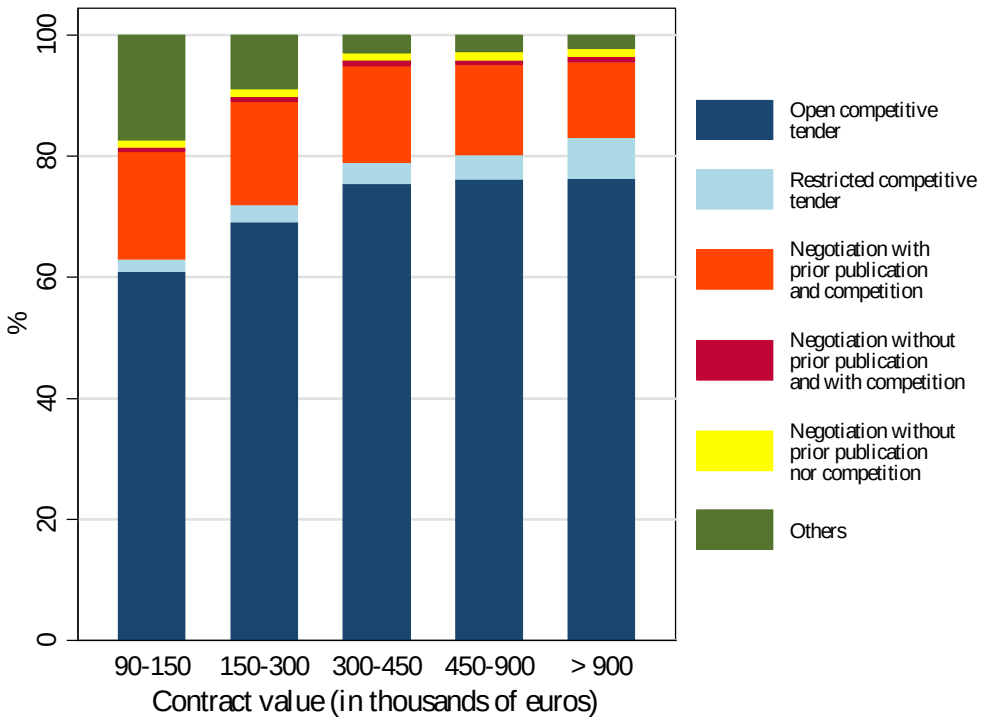
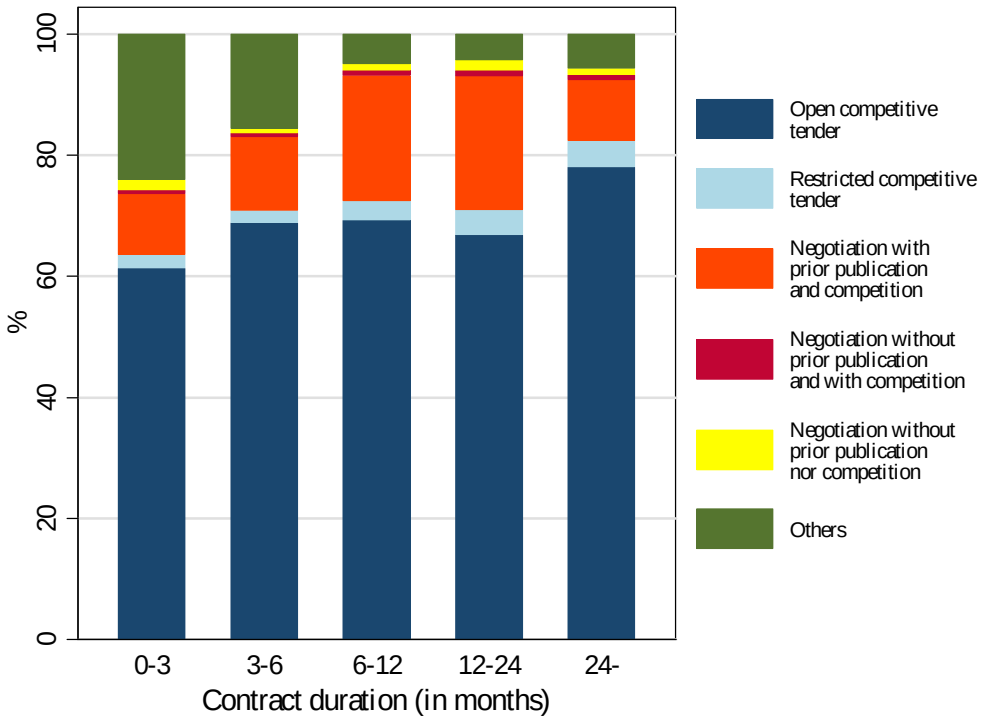


Figure 5: Distribution of award procedures for different categories of contract duration



If contract value and duration can be taken as an indication of project complexity, then our statistics indicate that more complex projects are associated with auction procedures. Such an observation, however, is the opposite of what the theoretical literature predicts and departs from the procurement practices observed in the private sector (Bajari *et al.* 2007). A plausible explanation may be driven by a specific characteristic of public procurement: the need to avoid suspicions of corruption or favouritism. Expensive and long-term projects may be particularly prone to such suspicions, and the need for a public buyer to show that the contract is awarded fairly may therefore be stronger. For such projects, auctions may be favoured by public buyers as these procedures are commonly seen as instigating greater transparency and fair competition.

5. Award procedures and contract amendments

A second set of predictions put to the forefront in the recent economic literature is the relation between *ex post* coordination and award procedures. In particular, it has been argued that contracts awarded through auction-based procedures are more prone to *ex post* adaptations (Guasch 2004; Bajari et al. 2007 etc.). This leads us to empirically investigate *ex post* modifications to the initial contracts in the public works procurement.

Using our data, we assess whether auction-based procedures actually lead to more *ex post* modifications, and whether, these modifications are more costly. These aspects may be captured in our database by the number of amendments to the initial contracts and by the outcome of these amendments. Economic theory leads us to expect a higher occurrence of contract amendments and more important changes in amended value and/or duration to the initial contract associated with auction-based procedures.

A total of 9,264 amendments to the initial contracts have been made between 2005 and 2007, representing about 13% of total procurement contracts within these three years.[8] Such contractual amendments may lead to a change in contract value. The total amount of amendments to contract's value represents about 15% of the total value of public works contracts. This is significant and suggests that public works procurement contracts are not renegotiation-proof.

Table 4 provides some statistics on contract amendments according to award procedures. One can observe that about 73% of amended contracts were awarded using open competitive tenders, while about 11% of amended contracts were awarded via a negotiation-based procedure with prior publication and competition. This may be due to the fact that auction procedures are more widely used than negotiation based procedures. However, if we compare these figures to the share of each procedure used to award public work procurement contracts, the frequency of amendments when contract is awarded through an open competitive tender tends to be higher than the share of initial contracts awarded through this procedure (69% of total initial contracts), and the share of amendments to contracts awarded through negotiation with prior publication and competition tends to be lower than the share of initial contracts awarded through this procedure (16% of total initial contracts). The frequency of amendments for contracts awarded through various other available procedures seems to reflect the share of their use according. Thus, our statistics on the occurrence of amendments seem to be consistent with findings from the economic literature. They suggest that negotiation-based procedures allow a public buyer to better specify a project *ex ante*. In turn, this leads to a lower need to *ex post* adjustments for these projects.

Table 4. Award procedures and contractual amendments

Award procedure of the initial contract	Number of amendments	%	Total value (millions €)	%	Mean value (millions €)
Open auction	6,746	72.82%	5,228	81.17%	0.775
Restricted auction	503	5.43%	531	8.25%	1.056
Negotiation with publication and competition	992	10.71%	380	5.91%	0.383
Negotiation without publication and with competition	46	0.50%	56	0.88%	1.237
Negotiation without publication nor competition	152	1.64%	98,067	1.52%	0.645
Others	825	8.91%	146	2.27%	0.177
Total	**9,264**	**100%**	**6,442**	**100%**	**0.695**

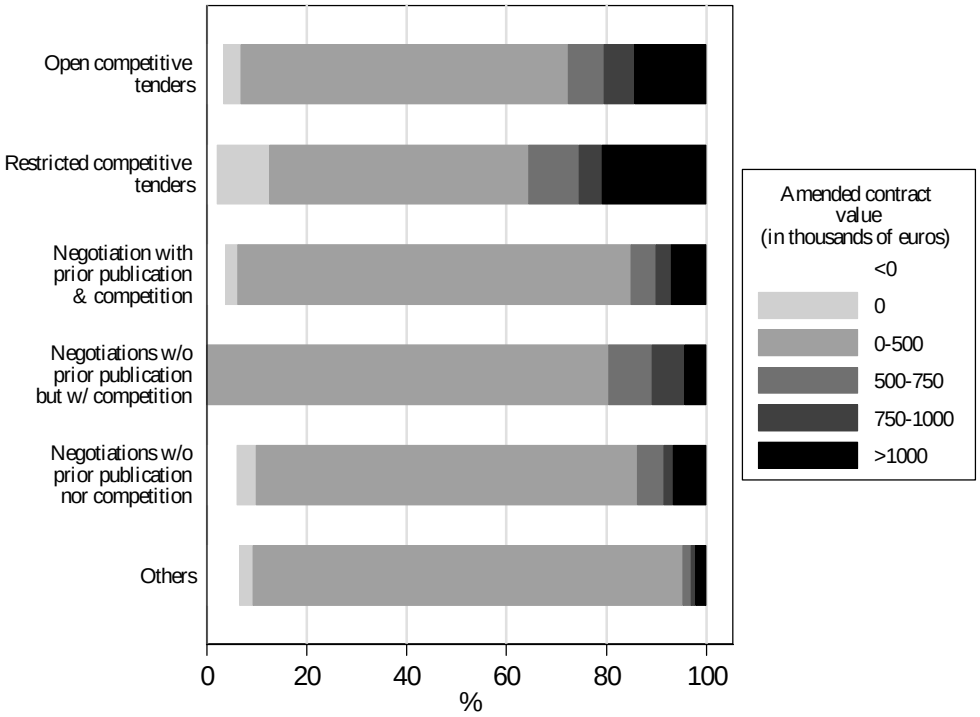
The impact of amendments on contracts' value also seems to be consistent with the general economic literature. From table 4, one may indeed conclude that such amendments generally result in an increase in the contract's value, even if some amendments also lead to a reduction of the initial amount of projects. Yet, this latter case tends to be quite marginal. When we break down the modification to contracts' value according to the award procedure used, one finds that open competitive tenders induce more costly renegotiations. Indeed, table 4 shows that 81% of the total amount induced by amendments concern contracts that were awarded using open

[8] Relative frequencies are computed with respect that *all* procurement contracts in our database between 2005 and 2007 i.e., accounting for contracts whose initial value is beyond the legal threshold of 5,150,000,000€.

competitive tenders, whereas only 6% of the renegotiated amounts stem from contracts that were awarded using negotiations with prior publication and competition. Interestingly, contracts awarded through restricted competitive tenders account for about 8% of total amended value, whereas such a procedure is used to award only 3.2% of initial procurement contracts.

Figure 6 looks at the distribution of amended contract values for each type of procedures. The figure shows that most amendments lead to increases in the contract's value. More importantly, the figure also shows that the share of auction-based procedures in our sample is associated with more contracts whose amendments increase substantially the value of the initial contracts. About 25% of amended contracts awarded using open auction result in an increase of over 500,000€. This concern about 35% of amended contract awarded through restricted competitive tenders. In contrast, the share of amended contracts which result in an increase of over 500,000€ of the contracts' initial value represents less than 20% of the contracts awarded through negotiation with prior publication and competition.[9]

Figure 6. Distribution of amendments to contract values according to award procedures



This observed difference between the amended values of contracts awarded under different procedures corroborates the main insights from the economic literature: firstly, amendments to contracts awarded under auction procedures may result in a greater change in contracts' value because renegotiations may be more costly on the overall.[10] One plausible explanation to the higher amended value associated with auction procedures may therefore reflect more costly renegotiations when contracts were initially awarded using such procedures. Such an observation is also consistent with the hypothesis of opportunistic *ex post* renegotiations. Secondly, amended values of contracts awarded using auction-based procedures may be higher

[9] We have conducted the same exercise distinguishing between central buyers and local buyers and found the same result i.e. the share of contractual amendments leading to a change of more than 500,000€ of the contracts' initial value is larger when the amended contracts were initially auctioned.

[10] This is because rents are dissipated during the initial auction procedure. Hence, *ex post* adaptations to the initial contracts are met with more resistance (Bajari *et al.* 2007; Bajari *et al.* 2009).

simply because such contracts involve more complicated projects from the outset. As mentioned before, higher contract value may mean more complex projects, and since such contracts are more likely to be awarded using an auction procedure, it is not surprising that there are more amendments to these contracts.

In a nutshell, statistical observations suggest that there is a link between contract amendments and award procedures. Furthermore, these statistical observations do not provide strong evidence against the major insights from economic literature: a majority of amended contracts were awarded using auction-based procedures, and contracts awarded through auction-based procedures seem to be associated with higher amended values.

5. Concluding remarks

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. Yet, theoretical academic papers and regulations are full of recommendations regarding the way to organize such markets. Their advices can be summed up shortly as they largely emphasize the use of auctions to manufacture these markets.

However, a recent literature, mostly relying on transaction cost theory, highlights the potential difficulties (public) buyers may encounter if they systematically choose competitive tendering to award their procurement markets. More precisely, this literature points out the inefficiency of auction procedures to select providers of complex goods or services for which contracting is often subject to renegotiations.

What we intended to do in this article is to describe the practices of French public buyers and try to find empirical regularities in the way they attribute procurement contracts. Our study is based on an original database gathering the entire set of public works procurement contracts in France over the period 2005-2007. The results of our preliminary statistical investigations question the efficiency of the French public buyers' choices. Indeed we show that their choices of awarding procedures are independent of their level of expertise, which, in line with Spiller (2008), can be interpreted as a consequence of third-party opportunism. We also point out that public buyers decisions are not rational as they appear to depend neither on the value of the projects nor on their length although these variables are crucial determinants of projects' complexity. More precisely, auction-based procedures happen to be largely favored, whatever the characteristics of the project to be procured, and our data reveal that this translates into costly renegotiations. However, whether these renegotiations could have been avoided through the use of negotiation instead of auction is still an open question.

Further investigations are to be done to distinguish between "needed" and opportunistic contractual renegotiations and to deepen the analysis of the determinants of renegotiations. However, given the values at stake and the quasi-absence of rationale behind the buyers' choices, one can reasonably bet that changes in the way procurement markets are manufactured may lead to significant savings.

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