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Politics and procurement: Evidence from cleaning contracts

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Abstract

We study the effects of politics on public procurement in Swedish municipalities in 1990-98 when they had high degrees of freedom in designing procurements, using data on cleaning services. We aim to explain why the lowest bidder does *not* win 58% of the time and conditional on the lowest bid not winning the municipalities pay 43% more than the lowest bid. We find that leftwing municipalities are more price-sensitive; in rightwing municipalities, the effect of price depends on the number of bidders; the municipalities take into account the multi-object aspect of the procurements; and that in leftwing municipalities, the bids are endogenous and related to favoritism.

JEL Classification: H57, D44, P16.

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1 Introduction

Public procurement constitutes a large - 15% by OECD estimates (OECD, 2005) - and increasing part of economic activity. Intrigued by this, economists have turned to study different procurement procedures and determinants of procurement costs.¹ Our aim is to contribute to this literature by studying public procurement auctions of a clearly defined low-tech product, (internal) cleaning service contracts, using data from Swedish municipalities in the 1990s. The procurement law of the time allowed the municipalities high degrees of freedom in organizing procurement in Sweden, where public procurement continues to create controversy even today.² Our aim is to understand why, in our data, the lowest bidder does *not* win 58% of the time, and conditional on the lowest bid not winning, the municipalities end up paying on average 43% more than the lowest bid.

A number of potential explanations suggest themselves. First, the lowest bid may not win if municipalities care, say for political reasons, about bid(der) attributes other than price.³ A municipality may for example resort to a scoring auction, which balances the quality of the bid(der) and price, or a to “beauty contest”, in which no scoring rule is announced (Che 1993, Asker and Cantillon 2006).⁴

Second, “bid preference programs” may explain the data. These programs award a contract to the lowest preferred bidder, provided that its bid is close

¹ The existing empirical research on public procurement has studied, for example, bidder (mis)behavior (e.g., Porter and Zona 1993), the effects of procurement procedure on production costs (e.g., Szymanski 1996), implications of affirmative action programs (e.g., Bates and Williams 1996), social costs of procurement design (Eklöf 2005), and the cost effectiveness of public versus private provision (Christoffersen, Paldam and Würtz 2007).

² E.g. one of the leading Swedish daily newspapers, Dagens Nyheter, has in 2007 had several articles on the functioning of and alleged misconduct in public procurement.

³ An example is the locality of the firm, if the local politicians care about the firm’s profits. Other such positive externalities include income taxes and employment (see Vagstad 1995).

⁴ Bajari, McMillan and Tadelis (2003) compare auctions and negotiations in procurement. They stress the tradeoffs between hard-to-observe quality and price when objects are complex and contractual design incomplete.

enough to the lowest bid of the non-preferred bidders (e.g., McAfee and McMillan 1989, Krasnokutskaya and Seim 2006, Marion 2007). These programs typically give “disadvantaged” firms preferential treatment either because it is politically desirable (e.g., affirmative action) or because it is a means to enhance competition between asymmetric bidders (McAfee and McMillan 1989).

Third, the multi-object nature of the data may explain observed behavior. In many instances, a municipality procured cleaning services for several premises simultaneously. To minimize immediate procurement costs, the municipalities should have awarded each contract to the lowest bidder. In a multi-object context such a procedure may however be a source of inefficiency (e.g. Jehiel and Moldovanu 2003). The municipalities may thus have taken an aggregate of the bids into account to reduce transaction costs or to balance the tension between cost minimization and efficiency even if the rules instructed the firms to submit bids object-by-object.

Finally, if the buyer has to delegate the organization of procurement auctions to an agent, as in our data, favoritism and even corruption can emerge in equilibrium.⁵ In Burguet and Che (2004), for example, the lowest bid does not always win because the procurement agent may manipulate a dimension of the submitted bid to favor a high bidder in exchange for a bribe (see also Laffont and Tirole 1991, Compte, Lambert and Verdier 2005, and Menezes and Monteiro 2005). In a recent interesting paper addressing this possibility, Bandiera, Pratt and Valletti (2007) find that most of the waste in their data on Italian procurement is “passive” (bad decisions) rather than “active” (generating utility to the procurer).

⁵ Sweden is regularly rated as one of the least corrupt societies. Yet, Transparency International (2006) states that “The Nordic countries dominate the top scores in the 2006 Corruption Perceptions Index for the European Union and other Western European countries. But they have no grounds for complacency as scandals in recent years have shown that there is sadly no such thing as a corruption-free zone.”

To study the merits of the above explanations, we build and estimate a random utility model of procurement choices. Because the Swedish procurement law of the 1990s allowed a great deal of room (and definitely more than the current law) for politics to affect bureaucrats' procurement behavior, the model allows explicitly for the possibility that the award decisions were subject to political ideology considerations.⁶ We ask three specific questions: i) Is the weight that the municipalities attach on price a function of political ideology? ii) Do the award decisions reflect efficiency considerations, such as the degree of competitiveness or the multi-object feature of the auction? And iii), are the decisions (in)consistent with outright favoritism? The random utility framework is useful, because it forces us to spell out our specification and identification assumptions explicitly. It also proves helpful in revealing how to think about and control for unobservables.

This paper focuses on politics in public procurement, because the relation between political ideology and micro-level government behavior is not well understood. Indeed, while there is some evidence that rightwing economies have had a faster long-term rate of growth (Bjornskov 2005), that they hand out more state-aid (Röller and Neven, 2000), and that politics affect firm value (Knight 2007), evidence of the effects of political ideology on bureaucrat behavior in public procurement is scant.

We report four main results. First, the weight put on price varies with political ideology: Leftwing councils are more price-sensitive. Second, rightwing councils' price-sensitivity increases in the number of bidders. This finding is consistent with them using McAfee-McMillan type bid-preference programs to enhance

⁶ Here we follow McFadden (1975, 1976), who to our knowledge was the first to apply a random utility framework to bureaucrat decision making. This is in contrast to the burgeoning empirical literature on auctions (Hong and Paarsch 2005), for our interest is not in uncovering the type (distribution) of bidders, but in estimating the determinants of buyer behavior, something usually assumed to be cost minimization in procurement auctions.

competition. Third, the municipalities may try to take, regardless of political ideology and against the established practice of firms submitting one bid per object, the multi-object aspect of the procurements into account. Finally, we find some evidence that in leftwing municipalities the bids are endogenous and that there thus is some sort of favoritism in these municipalities.

In the following section, we describe in detail the legal and institutional environment, the product(s) (i.e., the objects of bidding) and the data. In section three, we develop and specify the model and present the results. We devote section four for conclusions.

2 Institutional environment and data

2.1 Institutional environment and procurement law

Our data come from the period 1990-1998, and more than 90% of the data is from the latter half of the period. During the latter half, public procurement in Sweden was governed by the Public Procurement Act (LOU 1992:1528). While the law was not yet in force in 1990-1993, the rules that applied then were essentially the same as under the Public Procurement Act. This law specified the environment in which the Swedish municipalities and bidding firms acted.

From the point of view of this paper the following features of the law are central: *First*, while the law allowed a municipality to arrange simultaneous procurement auctions, combinatorial bidding was not applied (i.e., the procurement rules instructed firms to submit one bid per object and the municipality should accordingly have made decisions “object-by-object”). *Second*, only sealed bids were allowed. *Third*, the lowest bidder should have won. *Fourth*, there was an exception to the “lowest bid wins” -rule: A municipality had the freedom to deem that some other bid was “most advantageous economically” when quality, environ-

mental aspects, service and maintenance etc. were also taken into account. The non-price criteria should have been posted in advance, but the weight attached to each criterion in the evaluation was (in the procurements studied here) in general unknown to the bidders prior to the bidding.⁷ In other words, municipalities did not (have to) use any explicit scoring rules during our observation period.⁸ Interestingly, the law did not explicitly mention locality of the bidder as an allowable dimension, but seems not to have ruled it out either. Under the current rules, it is illegal.

It is illustrative of the atmosphere of the time that the freedom allowed by the law to deviate from choosing the lowest bid was seen as beneficial. The following quote from a book by a public sector lawyer testifies to this:

“The tender having the lowest price offered should be accepted. If it has been stated in the advertisement that the most economically advantageous tender will be accepted, factors specified therein can be taken into consideration in the assessment of tenders. The factors can be stated according to a degree of priority (LOU 1 ch. 22§), *however this is not a requirement. On the contrary, it can be advantageous to state in the advertisement that such factors are non-prioritized, since this increases the possibility of being able to choose the contractor.*” (Löfving 1994, pp. 65; our translation and italics).

Besides having the freedom to deviate from choosing the lowest bid, the municipalities were allowed to make two other decisions: To procure or to produce in-house, and conditional on deciding to procure, whether to allow open entry or not. We take a municipality’s decision to procure and the number of cleaning service

⁷ An example of a typical contract notice is found in the Appendix.

⁸ This has changed after our observation period, partly because of EU wide directives that dictate that as a general rule, explicit scoring has to be used. However, it is important to keep in mind that the clear purpose of the Public Procurement Act of 1992 was that if the lowest bidder is not awarded the contract, this has to be because along some well-specified (and ex ante notified) dimensions, some higher bid is “more economically advantageous”.

contracts that it procured, as well as their characteristics, as given.⁹ As for the mode of entry, the law allowed for four types of procurement mechanisms.¹⁰ The main difference between these is that two (Simplified, Open) allowed free entry while two (Restricted, Negotiated¹¹) did not. We utilize the mode of entry in a robustness test.

Another important aspect of the institutional environment is that we study decision making in Swedish municipalities. This means, first, that decision making is delegated: The principals are the inhabitants of the municipality and the agent the municipal council, or more concretely, the civil servants working under the council's management (e.g., the personnel of municipal procurement units/offices). Second, the members of Swedish councils are members of political parties. The decision making in the Swedish councils is influenced by political bargaining and thinking, making the award decisions in public procurement auctions subject to political ideology considerations.

2.2 Description of the procurements, auction objects and bidders

Our bidding and procurement data come from a survey, administered to all Swedish municipalities asking them for procurement documents regarding internal cleaning services. The documents are contract notice, technical specification, list

⁹ It is of course entirely possible that some municipalities decided to procure cleaning services for, say, some of their schools while keeping the cleaning of others in-house. For a study of the behavior and market orientation of the municipalities of a neighboring Scandinavian country (Denmark), see Christoffersen and Paldam (2003).

¹⁰ The law specified a threshold value of procurement (200 000€), below which Simplified and Direct were allowed, and above which Open, Restricted or Negotiated were required. The question if procurement mechanisms with restricted entry can be empirically motivated with high implementation costs is analyzed in Lundberg (2005). Using the same data as in the present paper Lundberg finds no evidence of such relation.

¹¹ While negotiations were allowed in Simplified and Negotiated procurements (see chapter 5, "Procurement of services", in the Public Procurement Act, LOU 1992:1528), they were not used in the procurements that we study.

of bidders, bids, and the decision protocol stating the winner of the contract. We don't know if all the Swedish municipalities that organized procurement auctions in cleaning services are in our data: 59 of the 229 municipalities that replied to the survey organized at least one procurement auction in cleaning services during 1990-98. The response rate was 79.5 percent. We have supplemented this data with municipality characteristics, obtained from Statistics Sweden (SCB).

Table 1 describes how the procurements in our data are organized. Procurement is an instance where a municipality purchases cleaning services for one or more "objects" through a joint procurement procedure. The objects are the premises to be cleaned and the bidders are Swedish firms. This feature of the data means that the event of procurement can consist of one or more "auctions". While a separate, non-combinatorial auction is run for each object, there is an element of sealed, pay-your-bid "multi-object auctions" to these procurements. As the column titled "All" shows the number of procurements in our data is 131 and the total number objects is 758, of which 721 are included in our analysis.¹² The number of objects per procurement varies from one (single-unit) to 74, and the number of bids per object from one to 37. Some 50 objects obtain at most 3 bids, half the objects 4-7 bids, and another 200 8-11 bids. We observe a total of 5926 bids. The frequency at which the various procurement mechanisms were used is also reported. Entry was open (i.e., classified either open or simplified in the table) for 48% of the objects.

[TABLE 1 HERE]

Table 1 also describes the municipalities who organize the procurements. We have data (as of the date of the procurement) on the unemployment rate ($unemp_m$),

¹² The remaining 37 contracts are excluded from the analysis, because there was one procurement in which each contract had multiple winners (i.e., the contracts were "framework agreements").

population density ($popdens_m$), average income ($income_m$), and a measure of political ideology. Following earlier work with Swedish municipal level data (e.g. Aronsson and Wikström 1996), our measure of political ideology is council composition. We define red_m to be an indicator for the median voter of council m , i.e., it is equal to one if there is a leftwing majority ($redprop_m > 50\%$) and zero otherwise.¹³ This indicator is a parsimonious way to capture the main division in Swedish politics.¹⁴ Leftwing majority councils auctioned 454 objects, rightwing councils 267.

Table 2 describes the objects. The vast majority of them are schools or day-care centers. The objects vary according to the characteristics we observe: size (in square meters), contract length, prolongation period, and required cleaning frequency. The contract length is the stated contract period and the prolongation period states the period that the contract can be extended with if the current holder of the contract has performed well after the contract period has expired. The prolongation period is normally one or two years. The cleaning frequency is the number of days during a year the object should be cleaned.

[TABLE 2 HERE]

The bidders in the procurements are Swedish cleaning service firms. There are in total 322 firms in our data. They can be divided roughly into four categories. First, there are 4 firms that operate nationally (“National”). This group includes the largest, and some medium sized firms. For confidentiality reasons we have labeled these national firms “ N_s ”, $s = a, b, c, d$. The largest national firms “ Na ”

¹³ Following earlier work, we categorize as leftwing council members those belonging to either the Left Party or the Social Democratic Party, while members of the Conservative Party, the Center Party, the Liberal Party, and the Christian Democratic Party are categorized as rightwing.

¹⁴ E.g. Aronsson, Lundberg and Wikström (2000, pp. 192) write: “These two variables [based on council decomposition into leftwing (socialist) and rightwing (non-socialist)] are assumed to control for the widespread belief that socialists and non-socialists usually have different views about public spending and that a fragmented parliament might find it hard to hold back public spending.”

and “*Nb*” submit bids for most objects, whereas “*Nc*” and “*Nd*”, two other national firms, submit bids for 6-10% of objects. Second, there are mid-size firms that are active regionally (“Regional”). According to our classification, 70.5% of the firms are regional. The third group consists of small local firms that only bid in one or a couple of municipalities (“Local”). 27.5% of the firms are local. The final group consists of firms that used to be the cleaning department of a municipality, but have at some point been transformed into a company that still is owned by the municipality (“In-house production”). An in-house municipal production unit participates in bidding for almost 40% of objects.

[TABLE 3 HERE]

Table 3 describes the bidding level data for the estimation sample. It shows that bids are on average 160 Swedish krona per sq.m. (circa 15€/sq.m.). Almost three fifths of the bids (58%) were submitted in auctions with open entry (categorized as open or simplified). The table also shows that most of our data (88%) is from years (1994-1998) when the Public Procurement Act was in force. Regional firms submit most of the bids (41%), followed by the few national firms (30%) and local firms (21%). Inhouse firms submit 8% of the bids.

2.3 Bids and winners

On average, there were 7.45 bidders in the auctions. In right- (left) wing councils there were 8.2 (6.1) bidders. For almost 58% of the 721 objects, the municipalities did not choose the lowest bid. In right- (left)wing councils, the probability of the lowest bid *not* winning is 62.3% (49.8%). The difference is significant at 1% level. Moreover, some municipalities never award an object to the lowest bidder. Conditional on the lowest bid not winning, the average difference is 42.9% and higher in right- (46.5%) than leftwing (35.2%) councils, but the difference is sta-

tistically insignificant.¹⁵ These numbers and tests suggest that rightwing councils award the contract more often to a bidder other than the lowest but conditional on doing so, they do *not* pay on average a larger premium over the lowest bid.

The raw correlation between the lowest bid not winning and the number of entrants (bids) is 0.17 (significant at 5% level).¹⁶ This correlation is entirely due to leftwing councils (correlation 0.30 and significant at 5% level), as the correlation is only 0.06 (insignificant at 5% level) in rightwing councils. This indicates that not choosing the lowest bid is positively correlated with the number of bids in leftwing municipalities.

It is not easy to interpret these findings. We therefore develop next a random utility model that allows encompassing all of them within a single empirical framework. The model enables us to provide a more coherent interpretation of the data also because it forces us to be explicit about our assumptions of municipal behavior.

3 Empirical analysis of municipal behavior

3.1 Econometric framework

The random utility model

We adopt the random utility model (McFadden 1974). Let the municipalities be indexed by m , $m = 1, \dots, M$, objects to be cleaned by i , $i = 1, \dots, I_m$, and bidders (firms) by j , $j = 1, \dots, J_{mi}$. The indirect utility of municipality m from choosing bidder j to clean object i is:

¹⁵ Over all objects/auctions, the average difference between the winning and lowest bids is 24.7%. In rightwing municipalities the average is higher (29%) than in leftwing ones (17.6%), the difference being significant at 5% level.

$$U_{mij} = \psi_{mi} - \eta_{mi} \times bid_{mij} + q_{mij} + mup_{mij} + f_{mij} + \varepsilon_{mij}, \quad (1)$$

where ψ_{mi} refers to the additively separable effects of municipal/procurement/object characteristics, bid_{mij} to the bid (price) of firm j for object i in municipality m (in 10 000 kronor per square meter), q_{mij} to ‘quality’, mup_{mij} to ‘multi-object procurement’ effects, f_{mij} to ‘favoritism’ effects and ε_{mij} to an error term. We next discuss the interpretation and specification of these six terms.

S1: Municipal/procurement/object characteristics (ψ_{mi})

Let $\psi_{mi} \equiv \psi_m^1 + \psi_{mi}^2$, where ψ_m^1 is the mean utility of municipality m from having its premises cleaned and ψ_{mi}^2 is the object-specific deviation from this. ψ_m^1 captures all additively separable effects of observable and unobservable municipal characteristics on municipal utility, e.g., regional structure, demographics, income distribution, voter preferences, and propensity to procure services. ψ_{mi}^2 refers to (un)observable object characteristics, such as the type, size, location, etc. of the object. It captures differences in the indirect utility derived, e.g., from having a clean health center as compared to having clean sports facilities. It also controls for the additively separable effects on the utility of those characteristics of the procurement event that do not vary over the bidding firms, such as whether or not entry to the auction was open and whether or not the object was auctioned as a part of a multi-object procurement. The assumed additive separability of these effects and the distributional (logit) assumption on the error term (see **S6** below) allow us to condition both ψ_m^1 and ψ_{mi}^2 out in the estimation.

¹⁶ The lowest bid won in 51% of open entry auctions, and only in 25% of auctions with restricted entry.

S2: The bid ($\eta_{mi} \times bid_{mij}$)

The second term in (1) specifies the effect of a submitted bid on the choice, with η_{mi} measuring the weight given to the bid. We specify the weight to be a function of the political ideology of the local government and the number of firms entering a given auction, $\eta_{mi} \equiv \eta(red_m, J_{mi}) = \eta_1 \times red_m + \eta_2 \times J_{mi} + \eta_3 \times red_m \times J_{mi}$. This formalization captures the possibility that the procurement auctions may have been a ‘beauty contest’, in which other features of the bid besides the price matter, even though the weights are not announced. The specification allows us to test for example whether the weight on price depends on political ideology due to, say, some group of (possibly disadvantaged) firms having been given a preferential treatment. Also, awarding a procurement contract to a lowest ‘preferred bidder’, provided that its bid is close enough to the lowest bid of the non-preferred bidders, is a means to enhance competition between asymmetric bidders (McAfee and McMillan 1989). The weight put on the bid (price) should in that case be an *increasing* function of the *number* of participating firms, because the more there are bidders, the weaker is the incentive to resort to such a mechanism.

S3: Quality (q_{mij})

We write the quality term as $q_{mij} \equiv q_{mij}^1 + q_{mij}^2$. The term q_{mij}^1 allows for the possibility that municipalities care about the quality of cleaning of a *particular object* for which firms are bidding (i.e., ex ante object-level quality differences) and q_{mij}^2 captures the possibility that there are *firm-specific*, as opposed to object-specific, quality differences (i.e., ex ante corporate-level quality differences). The extensive documentation available to us on i) the technical specifications of the pro-

curements and ii) the specifics of the bids suggest that $q_{mij}^1 \equiv 0$, i.e., that there are *no ex ante* quality differences at the object-level. That is, conditional on the corporate identity of the bidders, there are no *ex ante* discernible quality differences *between the bids for a specific object*. The most compelling support for this claim is provided by the technical specifications of the procurement instructions. We obtained the procurement instructions of all the objects (premises) in the data. These are in general *very* detailed - an example of a typical technical specification can be found in the Appendix. Besides including a detailed description of the premises to be cleaned, the frequency of cleaning, cleaning method, cleaning substances that are preferred, and cleaning equipment that is to be employed, they also go into much more minute detail.¹⁷ In addition, the submitted bids reveal that firms almost without exception only detail i) the object for which the firm is bidding, ii) the name and contact information of the bidder, iii) and the price, despite the forms providing space for additional information (see the Appendix for an example of a typical bid). If such information is provided, it is invariably uninformative as to potential quality differences.¹⁸ Further supporting evidence comes from interviews that we conducted and especially the type of service we are studying.¹⁹

¹⁷ For example, it is common to state requirements as to the professional education of cleaning staff to be used. Similarly, the monitoring of cleaning is often specified in detail, and it is standard to require the firm to inform the municipality on several features of the working process, to provide records of hours of work, workforce and machinery employed etc.. As if this wasn't enough, in several instances the procurement instructions go into great detail as to how each space (e.g. classroom, toilet) is to be cleaned. All this suggests that it is very hard to differentiate one-self quality-wise.

¹⁸ A typical piece of extra information is that the firm j plans to use certain substance S in cleaning, say, school i . The procurement instructions however always dictate in detail the environmental aspects of the substances to be used, and the extra information provided by firm j is that substance S fulfills these criteria. This also suggests that the firms were not able to differentiate themselves quality-wise in the bids.

¹⁹ We interviewed a (former) civil servant who used to be in charge of public procurement, and three industry representatives. While the former civil servant maintained that local firms provide higher quality through better local presence, he also mentioned a nationally operating firm as pro-

Even if there are no object-level differences in the quality of the bids, there may have been corporate-specific quality differences (i.e., $q_{mj}^2 \neq 0$). Indeed, the only piece of information in the bids in which the firms were able to ‘differentiate themselves’ (besides the price) is the corporate identity of the bidder. To capture this, we let $q_{mj}^2 \equiv \sum_{k=1}^K X_{jk} \alpha_{mk}$, where the coefficients α_{mk} are a function of municipality characteristics $\alpha_{mk} \equiv \alpha_{k0} + \sum_{l=1}^L \alpha_{kl} Z_{ml}$, where X_{jk} denote the k^{th} observable characteristics of firm j (e.g., firm type, $k = 1, \dots, K$) and where Z_{ml} are the l^{th} observable characteristic of municipality m (e.g., council composition, unemployment, $l = 1, \dots, L$). This specification allows X_{jk} and Z_{ml} to have a multiplicative effect on the indirect utility.²⁰

viding similar quality. The three firm representatives were unanimous in stating that all firms provide equal quality in public procurements. (One of them, a local operator, maintained that they provide higher quality in *private* procurement.) They also mentioned that procurement instructions in public procurement are so well-defined that there is no room for (large) quality-differences. Our final support for the claim of no quality differences at the object-level is based on the type of service we are studying. The literature on the relative merit of negotiation versus auctions (e.g. Bajari, McMillan and Tadelis 2003 and the literature cited therein) is - for good reasons - mainly interested in “customized goods such as new buildings, fighter jets or consulting services” (Bajari, McMillan and Tadelis 2002, pp. 1). We take a completely opposite track by studying internal cleaning services. Our, admittedly layperson view of (good or bad) cleaning is that “you cannot describe it, but you know it when you see it”. Cleaning is a labor-intensive, low-tech service, the quality of which is easily monitored, for which the requisite skills are relatively easily acquired and are wide-spread, and cleaning services is an industry in which barriers to entry are relatively low.

²⁰ It is worth point out two things about this specification: First, the econometric model already conditions on ψ_{mi} , i.e., on the (direct) effects of municipal/procurement/object characteristics on the indirect utility. Second, when X_{jk} includes firm (type) dummies, $\alpha_{k0} X_{jk}$ captures fixed firm (firm type) characteristics. These terms control for the effect on choice of permanent quality differences between firms that are valued similarly by all municipalities. Together with the bids, these terms thus allow controlling e.g. for the presence of a bid/price preference program in which *all* municipalities run a *similar*, biased procurement auction that award contracts to the lowest preferred bidders (say, to local firms), provided that their bids are close enough to the lowest bid of the non-preferred bidder.

S4: Multi-object features (mup_{mij})

There are no combinatorial bids in the data, and by the procurement rules, decisions should have been made object-by-object. However, it is possible that municipalities tried to reduce transaction costs or balance the tension between cost minimization and efficiency present in many multi-object auctions (see, e.g., Jehiel and Moldovanu 2003). We therefore include $mup_{mij} \equiv \sigma_1 \times avgbid_{mij} + \sigma_2 \times red_m \times avgbid_{mij} + \sigma_3 \times rat_{mij}$ in the specification. The term $avgbid_{mij}$ refers to the weighted average bid (10 000 kronor/sq.m.) of firm j (weighted by object size) that it submitted for the objects that were auctioned simultaneously with object i , rat_{mij} refers to the fraction of objects for which firm j submitted a bid (also measured using sq.m.) in the procurement in which object i was auctioned, and σ_1 , σ_2 and σ_3 are parameters. The underlying assumption is that, after having conditioned out additively separable multi-object features that are constant over firms within an object and a procurement, the weighted average of the submitted bids is a proxy for any multi-object feature in the decision-making. The specification allows us to test for the possibility that the municipalities gave weight to the ‘aggregate bid’ and that this weight is a function of political ideology.

S5: Favoritism (f_{mij})

The term f_{mij} is included to allow for the possibility of some sort of favoritism/corruption. Because the Swedish procurement law allowed the municipal procurement offices high degrees of freedom in choosing the winner, the procurement offices may have found it relatively easy to manipulate a dimension of the submitted bid (e.g., quality assessment) to favor a high bidder (see also Laffont

and Tirole 1991, and Compte, Lambert and Verdier 2004, Burguet and Che 2004).²¹

Understanding the role of f_{mij} requires identifying the sources of variation that it incorporates: Let ξ_j denote the degree to which bidder j is prone to look for favoritism. We treat this as a fixed but unobservable corporate attribute that does not vary over municipalities or auctions. Thus bidder j is equally prone to look for a favor in all municipalities. We then write $f_{mij} \equiv v_{mi}\xi_j$, where v_{mi} measures how prone the procurement office(s) of municipality m is to give a favor in auctioning object i . We assume that v_{mi} is i.i.d. over the municipalities and observable to the participants. This means that the vulnerability of municipality m to favoritism provides no information about the vulnerability of the other municipalities and, if present, favoritism has been common knowledge among all the participants. The bidding firms were therefore able to condition their bids on favoritism opportunities, making the bids endogenous if such opportunities existed.

S6: Error term (ε_{mij})

ε_{mij} is a stochastic term that captures intrinsic randomness in municipality decision making. It allows for idiosyncrasies decision-making that resulted every now and then in the lowest bidder not winning. These idiosyncrasies may have been driven in part by lack of established procurement practices and by the flexible legislative procurement framework of the 1990s. We assume that ε_{mij} was unobservable to bidders and distributed i.i.d. type I extreme value.

²¹ Because the procurement officer could pick any bid, we can exclude ‘magic number favoritism’ wherein the corrupt procurement bureaucrat revises the bid of the favored bidder, or provides an

3.2 Choice probability and estimation

Choice probability

Given **S1-S6**, the probability that bidder w wins in a procurement auction for object i organized by municipality m is (McFadden 1974):

$$\Pr[y_{mi} = w] = \frac{\exp\{-\eta(\text{red}_m, J_{mi}) \times \text{bid}_{miw} + q_{mw}^2 + \text{mup}_{miw} + f_{miw}\}}{\sum_{j=1}^{J_{mi}} \exp\{-\eta(\text{red}_m, J_{mi}) \times \text{bid}_{mij} + q_{mj}^2 + \text{mup}_{mij} + f_{mij}\}} \quad (2)$$

where

$$\eta(\text{red}_m, J_{mi}) = \eta_1 + \eta_2 \times \text{red}_m + \eta_3 \times J_{mi} + \eta_4 \times \text{red}_m \times J_{mi}$$

$$q_{mj}^2 = \sum_{k=1}^K X_{jk} \left(\alpha_{k0} + \sum_{l=1}^L \alpha_{kl} Z_{ml} \right)$$

$$\text{mup}_{mij} = \sigma_1 \times \text{avgbid}_{mij} + \sigma_2 \times \text{red}_m \times \text{avgbid}_{mij} + \sigma_3 \times \text{rat}_{mij}.^{22}$$

Estimation and testing

We first estimate (2) under the assumption of no favoritism (i.e., $f_{mij} \equiv 0$). The model then corresponds to the standard conditional/mixed logit model of McFadden (1974) and can be estimated by maximum likelihood.

Second, we test for $f_{mij} = 0$ using the control function method of Petrin and Train (2005, 2006).²³ Applying their method to (2) requires that municipalities'

opportunity for this bidder to do so after all the other bids have been opened (see, e.g., Compte, Lambert and Verdier 2004).

²² It is worth pointing out that things that do not vary within an auction (e.g. ψ_{mi}) drop out. One implication of this is that the mixed logit should be relatively immune to sample selection bias. This would be the case as long as the decision to procure the cleaning services, the choice of the entry mode, and the choices related to the particular object are independent of the individual bidders/bids. As many of those choices are made prior to firms submitting their bids, this seems a plausible assumption.

²³ These papers consider characteristic-based discrete choice models of demand in a situation when not all relevant product attributes are observed by the econometrician. In that set-up, the price of the product can be correlated with the unobserved part of consumers' utility. This is likely, if con-

‘willingness to pay’ for a cleaning contract is increasing in the degree of favoritism (f_{mij}). This implies that firms who know that they will be favored can bid higher and still expect to win. We implement the test as a Wald test, which corresponds to a generalized method of moments over-identification test. We recover a proxy, $\hat{f}_{mij} = bid_{mij} - \hat{E}[bid_{mij} | W_{mij}]$, where W_{mij} includes all other factors but f_{mij} that the firms take into account when submitting bids.²⁴ We estimate the conditional expectation using cross-municipality variation in the bid data and include the proxy, \hat{f}_{mij} , directly into the random utility specification.²⁵

Note that the test is biased *against* finding that the bids are endogenous: If there is no heterogeneity in how prone bidders are to look for favors, $v_{mi}\xi_j = v_{mi}\xi_w \equiv f_{mi}$. This simplifies to f_m if the vulnerability of a municipality to favoritism does not vary over objects (i.e., $v_{m1} = v_{m2} = \dots v_{mI_m} \equiv v_m$). Because the econometric model already conditions out the additively separable effects of municipal/procurement/object characteristics (see **S1**), this means that the bids are endogenous only if there is sufficient variation in ξ_j (see **S5**). The same applies if there is no heterogeneity in the vulnerability of the municipalities to favoritism,

sumers’ willingness to pay for product is increasing in the unobserved product attribute. The analogy of this to our approach is immediate.

²⁴ Assuming that firms increase their bids when they expect to get a favor, the bids are monotonically increasing in f_{mij} . This implies that the bids are a function of the unobserved attribute and that they are invertible in it.

²⁵ To generate an instrument for the bid of firm j for object i in municipality m , we regress the bids on municipality and object characteristics and firm dummies excluding all bids in municipality m . We then predict how firm j would bid for object i in municipality m to obtain a Hausman-type instrument for bid (price). By assumption S5, the instrument is independent of the vulnerability of municipality m to favoritism. Using the entire sample of bids, we then recover the expect bid function by regressing the bids on municipality and object characteristics, firm dummies, and the instrument. Finally, we compute the proxy, include it in the utility specification (interacted with red_m and J_{mi}) and test whether the parameters on the proxy are significant. We generate a similar instrument and proxy for the ‘aggregate bid’, $avgbid_{mij}$. The 1st stage p -values for our instruments are 0.07 in the bid equation and <0.01 in the average bid equation.

i.e., if $v_{mi}\xi_j = v_{sk}\xi_j \equiv f_j$. The reason is that the econometric model conditions on the firm-type/fixed effects. The bids can thus be endogenous only if there is sufficient variation in v_{mi} . We are therefore able to detect evidence for favoritism only if there are appropriate matches in the data, i.e. if firms that look for a favor meet procurement officers who are vulnerable to meet that demand.

3.3 Results

Table 4 displays the estimation results: In panel A, the estimations assume that the bids are exogenous, whereas in panel B, we test and allow for their endogeneity. In all columns, the regressors include bid_{mij} , $red_m \times bid_{mij}$, $J_{mi} \times bid_{mij}$, $red_m \times J_{mi} \times bid_{mij}$, $avgbid_{mij}$, $red_m \times avgbid_{mij}$ and rat_{mij} . For column (1), we additionally include $X_j \times Z_m$, i.e., the four firm type -dummies and the interactions between them and red_m . For column (2) we add the interactions between the firm type -dummies and $income_m$, $unemp_m$ and $popdens_m$. In column (3), we replace the firm-type dummies with dummies for all firms with at least 20 bids, leading to 53 firm dummies.²⁶ Each column displays the results of Wald-tests for the null hypotheses that (a) the coefficient of the bid is zero, using $J_{mi} = 2$ and 7, and (b) the weight attached to the bid is a function of the number of firms, separately for the municipalities with rightwing ($red_m = 0$) and leftwing ($red_m = 1$) majorities. We also report the Wald-tests for the null hypotheses that the control variables are jointly zero. In Panel B, we report Wald-tests for the null hypotheses of the exo-

²⁶ There are 322 firms in the sample, some of which only have a few bids. There are 172 firms with less than 10 bids; of these, 92 have 1 bid, 32 2 bids, 10 3 bids, 13 4 bids, and 25 5-9 bids. We have re-estimated our model with exogenous bids, and implemented the endogeneity tests, using 10 bids as the threshold. This yielded 42 extra firm dummies, with no changes in the qualitative results.

generosity of the bids. The results across the different specifications are close to each other. As the tests indicate that the fullest specification is supported by the data, we concentrate on it.

While the bid coefficient is always positive, the effect of a (change in a) bid on probability of winning (or equivalently, on municipal utility) is always negative within our sample when the effects of the interaction terms between the bid and other explanatory variables is taken into account. The Wald-tests in Panel A show that the weight put on price varies with political ideology. Leftwing municipalities put more weight on the bids. For example, using the mean of J_{mi} (= 7) and the estimation results from column (3), the coefficient of the bid is -157 in the rightwing municipalities (Wald test statistic = 57.28, p -value < 0.01), whereas it is -294 in the leftwing municipalities (Wald test statistic = 68.78, p -value < 0.01). Second, in rightwing (but not in leftwing) municipalities the weight is more negative, the more there are bidders. In column (3), for example, the coefficient of $J_{mi} \times bid_{mij}$ is -42.60 (Wald test statistic = 33.30, p -value < 0.01), whereas the sum of the coefficients of $J_{mi} \times bid_{mij}$ and $red_m \times J_{mi} \times bid_{mij}$ is positive (57.75-42.60 = 15.15) and insignificant (Wald test statistic = 2.28, p -value = 0.13). This suggests that in the municipalities in which the median council voter comes from a rightwing party, the data is consistent with the use of a McAfee-McMillan-type bid preference program.

The municipalities have also taken into account the multi-object aspect of the procurements, even though the procurement rules suggested they should have not. The coefficient of the average bid ($avgbid_{mij}$) is negative and significant. We cannot reject the null hypothesis that left- and rightwing councils are similar in this respect (p -value = 0.31 in column (3)). As for the control variables, they are

jointly significant in each column. In particular, the firm dummies are highly jointly significant in column (3).

To evaluate the economic importance of changes in council composition, we calculated the answer to the following question: by how much should firm j change its bid in order to keep the value of the estimated index function constant when we the council changes from a rightwing majority to a leftwing majority and everything else is kept the same? Depending on the specification (and type of firm),²⁷ firm j should lower its bid by 50-60% when the council majority changes from right- to leftwing. The differences between the types of firms are minuscule. If one were willing to make the assumption that other firms do not change their bids when council composition changes, the above calculation would tell that a 50-60% bid decrease is needed to keep the probability of winning constant.²⁸

[TABLE 4 HERE]

The results reported in Panel B mostly echo the above findings. While there is some variation across the columns, the Wald-tests show that in general, the bids are not endogenous in the rightwing municipalities, but they may be so in the leftwing municipalities. Focusing again on column (3) and using the mean of J_{mi} (= 7), the Wald statistic testing the joint significance of \hat{f}_{mij} and the associate interaction terms is 15.29 (p -value < 0.01) in the leftwing municipalities, while it is

²⁷ To perform the calculation for other firms than our “base” firms (local firms) we need to make an assumption of the level of the bid. The results are not sensitive to this as the change in bid coefficient completely dominates the value of firm-type dummies’ coefficients in right- and leftwing councils.

²⁸ Here one should note that we have neither specified (estimated) the game the bidders (and procurers) play, nor backed out the bidders’ types.

For what they are worth, it is noticeable that reduced form bid estimates using a linear specification and including object, procurement and municipality characteristics and year and firm dummies indicate that first, bids do not vary by council composition (coeff. of leftwing majority

only 0.04 (p -value = 0.82) in the rightwing municipalities. This result suggests that the bids are endogenous in the leftwing municipalities and that this endogeneity is related to favoritism. We also have a prediction for the *direction* of the bias in the coefficient of the bid: If there is favoritism in the leftwing municipalities, the bids should be positively correlated with f_{mij} . This leads to an upward biased estimate for the weight on price. This is what the data bear out: Using $J_{mi}=7$ and the endogeneity-corrected estimates from column (3), the coefficient of the bid is -302 in the leftwing municipalities. This is slightly more negative than what was reported above (-294), using the coefficients from Panel A.

A comparison of the results from the random utility model to the discussion of the raw data (Section 2.3) points out the dangers of jumping to conclusions on the basis of conditional descriptive statistics. Our random utility model allows us to condition out or control for many variables and effects that may bias the inference based descriptive statistics. While the raw data suggested more suspect behavior on the part of rightwing councils (more often not choosing the lowest bid, difference between winning and lowest bid higher than in leftwing councils), our econometric results explain these mostly as an effort to increase competition through McAfee-McMillan-type bid preference programs.

3.4 Robustness tests

Our first robustness test utilizes the fact that municipalities chose also the mode of entry: It was either free or restricted (i.e. by invitation). While we are agnostic as to why a municipality would restrict entry (a possible explanation being fly-by-night / near-bankrupt firms), variation in entry mode allows the following test: If

dummy -0.0006, p -value .090) and second, values of the winning bid do not vary either (coeff. 0.0007, p -value .274).

the (expected) number of bidders is smaller in a restricted-entry auction, firms may bid less aggressively, creating a need for McAfee-McMillan type mechanisms to increase competition. The propensities to not choose the lowest bid and to restrict entry should then be positively correlated. We estimate a bivariate probit model where the dependent variables are entry mode (= 1 if restricted entry, = 0 otherwise) and winner type (= 1 if not the lowest bidder, = 0 otherwise), separately for left- and rightwing municipalities.²⁹ We find that for rightwing municipalities, these decisions are positively correlated conditional on observables (corr. coeff. = 0.42, s.e. = .09), lending support to the above story and thus to our finding in the conditional logit estimations. In contradiction with the above explanation, we find a negative correlation (-0.67, s.e. = .13) for leftwing councils.

In the second robustness test we try to control for the effects of fly-by-night firms who bid (very) low but are known to provide (very) poor quality, leading to municipalities not choosing the lowest bid. We test for the presence of such firms by excluding from the sample all objects for which the difference between the lowest and 2nd lowest bid is in the 95th percentile. Re-estimating the conditional logit model(s) reproduces the results reported above with minor quantitative changes.

4 Conclusions

We study public procurement of cleaning service contracts in Swedish municipalities over a period when the law allowed the municipalities high degrees of freedom in designing and running procurements. Our aim has been to understand

²⁹ We include as controls municipality characteristics (mean income, population density, unemployment rate), object type dummies, the number of objects in the procurement, and various different time controls.

why, in this institutional environment, the lowest bidder does *not* win 58% of the time, and conditional on the lowest bid winning, the municipalities end up paying on average 43% more than the lowest bid. In particular, we have examined the effects of political ideology on procurement outcomes.

Our analysis yields four main findings. First, the weight put on price varies with political ideology, with leftwing councils being more price-sensitive. This effect is economically large. Second, in rightwing (but not in leftwing) municipalities the weight put on price is more negative, the more there are bidders. These findings suggest that politics matters and affect the bureaucrats' incentives to allocate procurement contracts. In particular, they are consistent with the rightwing municipalities using McAfee-McMillan type efficient bid preference programs. Third, the municipalities have taken into account the multi-object aspect of the procurements, even though the procurement rules instructed firms to submit one bid per object only. Finally, we find some evidence that the bids are endogenous in municipalities with leftwing councils, suggesting some sort of favoritism.

Our results show that if the institutional procurement environment leaves room for discretion, the outcome may well be what we observe in our data: the lowest bidder wins rarely, and the choice of the winner is subject to political considerations. It cannot consistently and entirely be explained by quality differences or efficiency considerations, despite us studying data from one of the least corrupted countries in the world. This paper's result on favoritism through the endogeneity of bids in leftwing councils adds specifically to the anecdotal accounts and qualitative descriptions of a small number of alleged cases of favoritism in public procurement, bearing directly on the worry that public procurement is "highly exposed to corruption" (OECD 2005). It also adds to the recent research

on corruption that has provided evidence of the extent and mechanisms of graft in developing countries (e.g. Svensson 2003).

Finally, the findings of this paper point to the importance of understanding better bureaucrat behavior and incentives in public procurement, especially in auctions in which the non-price attributes of bid(der)s are allowed to be a determinant of the award decision.

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Table 1. Description of how the procurements are organized.
Descriptive statistics and frequencies

		Allocation mechanism					
		Simplified	Open	Restricted	Negotiated	All	
# procurements		60	32	24	15	131	
# objects		129	315	255	59	758	
Variable	Statistic						
# objects	Mean	2.2	9.8	10.6	4.5	5.9	
	Stand. dev.	3.9	10.7	16.3	8.1	10.1	
	Maximum	27	37	74	29	74	
	Minimum	1	1	1	1	1	
# bids on each object	Mean	7.1	8.9	7.4	5.5	7.8	
	Stand. dev.	3.9	4.3	3.3	2.5	3.9	
	Maximum	37	25	16	22	37	
	Minimum	1	1	2	2	1	
# bids in each procurement	Mean	6.1	8.1	7.8	6.3	6.9	
	Stand. dev.	4.6	5.4	4.0	4.9	4.8	
	Maximum	37	25	16	22	37	
	Minimum	1	1	2	2	1	
Contract period	Mean	1.5	2.0	1.6	1.7	1.7	
	Stand. dev.	0.6	0.6	0.6	0.8	0.7	
	Maximum	3.0	4.0	3.0	3.0	4.0	
	Minimum	0.2	0.5	0.8	0.5	0.2	
Prolongation period	Mean	0.7	0.8	0.8	0.3	0.7	
	Stand. dev.	0.6	0.5	0.7	0.5	0.6	
	Maximum	2.0	2.0	2.0	1.0	2.0	
	Minimum	0	0	0	0	0	
<i>Municipal characteristics</i>							
Density	Mean						297.85
	Stand. dev.						611.00
	Maximum						2808.02
	Minimum						4.60
Red	Mean						0.46
	Stand. dev.						0.11
	Maximum						0.67
	Minimum						0.18
Unemployment	Mean						7.89
	Stand. dev.						2.23
	Maximum						13.96
	Minimum						1.76
Average income	Mean						148.80
	Stand. dev.						20.90
	Maximum						217.80
	Minimum						109.60

Table 2. Objects

Type	Frequency	Percent
Schools	319	42.1
Day care centers	302	39.9
Medical health centers	27	3.6
Purifying plants	2	0.3
Office	65	8.6
Sport centers	16	2.1
Libraries	16	2.1
Others	12	1.6

Table 3. Bid level descriptive statistics

Variable	Mean	Std. dev.	Min	Max
Bid/sq.m. Swedish krona (SEK)	160.242	94.088	11	2174
Open	0.419	0.494	0	1
Restricted	0.411	0.492	0	1
Negotiated	0.061	0.240	0	1
Simplified	0.169	0.375	0	1
Local	0.209	0.406	0	1
Regional	0.408	0.492	0	1
Inhouse	0.080	0.272	0	1
National	0.304	0.460	0	1
t91	0.003	0.056	0	1
t92	0.055	0.228	0	1
t93	0.055	0.228	0	1
t94	0.143	0.350	0	1
t95	0.419	0.493	0	1
t96	0.254	0.435	0	1
t97	0.099	0.298	0	1
t98	0.020	0.139	0	1

NOTES: Sample is 5374 bids submitted for the 721 objects used in the estimation. Sample statistics using all 5926 bids submitted for the 758 objects are close to those reported.

Table 4, Panel A. Results from mixed/conditional logit

Variable	(1)	(2)	(3)
Bid	24.00 (41.49)	50.55 (42.44)	143.48*** (53.74)
Bid × red	-434.08*** (89.14)	-483.62*** (89.76)	-540.03*** (96.35)
Bid × #firms	-18.21*** (5.002)	-21.02*** (5.10)	-42.98*** (7.389)
Bid × red × #firms	33.63*** (10.95)	40.16*** (10.90)	57.65*** (12.364)
Avgbid	-6.634*** (1.173)	-6.022*** (1.218)	-5.440*** (1.568)
Avgbid × red	3.543** (1.477)	3.311** (1.542)	2.357 (2.336)
Ratio	1.930 (2.809)	-0.554 (2.958)	-4.211 (3.182)
Controls			
Firm-type dummies	yes	yes	no
Firm-type - red interactions	yes	yes	yes
Firm type - municipal characteristic interactions	no	yes	yes
Firm dummies	no	no	yes
Firm-type dummies	yes	yes	no
Joint tests of coefficient vectors			
Bid and bid × #firms with 2 bids (firms)	.702	.798	.154
Bid, bid × red and bid × red × # firms with 2 bids	.000	.000	.000
Difference between right- and left-wing councils with 2 bids	.000	.000	.000
Bid and bid × #firms with 7 bids (firms)	.000	.000	.000
Bd, bid × red and bid × red × # firms with 7 bids	.000	.000	.000
Difference between right- and left-wing councils with 7 bids	.000	.000	.001
All RHS variables	.000	.000	.000
All municipal characteristic - firm type interactions	-	.000	.000
Firm dummies	-	-	.000
Nobs.	7352	7352	7352
LogL.	-1025.511	-963.693	-808.721

NOTES: Numbers reported are coefficient and s.e. ***, **, and * denote significance at 1, 5, and 10% level. Tests of joint significance are otherwise Wald tests, but the test for joint significance of all RHS variables for specification (3) is an LR-test. Reported number for all tests is p-value.

Table 4, Panel B. Results from mixed/conditional logit

Variable	(1)	(2)	(3)
Bid	48.13 (73.31)	105.43 (82.34)	160.19 (132.96)
Bid × red	-481.72*** (153.44)	-556.39*** (163.81)	-531.99*** (196.72)
Bid × #firms	-19.49*** (7.95)	-23.25*** (8.960)	-46.30*** (18.06)
Bid × red × #firms	32.64** (14.76)	39.266*** (15.952)	56.16*** (22.72)
Avgbid	-7.658*** (1.714)	-6.717*** (1.780)	-3.723 (3.174)
Avgbid × red	4.947** (2.225)	5.141** (2.351)	-2.070 (5.434)
Ratio	1.401 (4.545)	-1.098 (4.900)	-4.157 (5.416)
Controls			
Firm-type dummies	yes	yes	no
Firm-type - red interactions	yes	yes	yes
Firm type - municipal characteristic interactions	no	yes	yes
Firm dummies	no	no	yes
Endogeneity tests			
Bids of right-wing councils with 2 bids (firms)	.415	.099	.745
Bids of left-wing councils with 2 bids	.000	.000	.001
Bids of right-wing councils with 7 bids	.343	.032	.818
Bids of left-wing councils with 7 bids	.000	.000	.000
Avgbids of right-wing councils	.001	.087	.134
Avgbids of left-wing councils	.845	.313	.294
Joint tests of coefficient vectors			
Bid and bid × #firms with 2 bids (firms)	.878	.377	.506
Bid, bid × red and bid × red × # firms with 2 bids	.000	.000	.004
Difference between right- and left-wing councils with 2 bids	.000	.000	.009
Bid and bid × #firms with 7 bids (firms)	.001	.127	.005
Bd, bid × red and bid × red × # firms with 7 bids	.000	.000	.001
Difference between right- and left-wing councils with 7 bids	.004	.001	.187
All RHS variables	.000	.000	.000
All municipal characteristic - firm type interactions	-	.000	.065
Firm dummies	-	-	.000
Nobs.	7352	7352	7352
LogL.	-1018.535	-958.555	-805.170

NOTES: Numbers reported are coefficient and bootstrapped (1000 replications) s.e. ***, **, and * denote significance at 1, 5, and 10% level. The endogeneity tests are Wald-tests on the joint significance of the relevant control function parameters. Tests of joint significance are otherwise Wald tests, but the test for joint significance of all RHS variables for specification (3) is an LR-test. Reported number for all tests is p-value.

Appendix. Procurement documents: contract notice, technical specification, and bid.

Figure 1A. Example of typical contract notice.

	2
Förbrukningsmaterial	Förbrukningsmaterial enligt V00-V02 (toapapper, pappershanddukar, tvål, engångsmuggar etc) anskaffas och betalas av B.
Kompletterande förfrågningsunderlag	Finner anbudsgivare att förfrågningsunderlaget i något avseende är oklart, ska eventuell förfrågan ställas till B:s ombud under anbudstiden. Endast skriftlig kompletterande uppgift, lämnad av B:s ombud under anbudstiden, är bindande för både B och anbudsgivare. B förutsätter att anbudsgivare skaffar kompletterande uppgifter på platsen, för bedömning av arbetets omfattning för komplett anbud.
Ändringar eller tilläggsarbeten	Ändrings- eller tilläggsarbeten ska anses beordrade först sedan de skriftligt beställts av B:s ombud under entreprenadtiden.
Ersättning för ändrings- eller tilläggsarbeten	Avgående eller tillkommande arbeten ska i första hand prissättas enligt avtalat timpris. I andra hand genom förhandlingar.
<u>Kvalitetskontroll</u>	Kvalitetskontroll, där representanter för B och E deltar, ska på E:s initiativ ske en gång per månad varvid protokoll ska föras.
Anbudets form och innehåll	Anbud ska för att gälla vara lämnat enligt bifogat anbudsformulär. Avgivet anbud ska avse år 1 (12 månader) med rätt till indexuppräkning för resterande del av avtalstiden.
Indexreglering	Entreprenad månadsförändras från juni 1997.
Kontraktshandling	Kontrakt ska
Ansvarig arbetsledning	E ska tillhandahålla fullt yrkeskunnig arbetsledning.
Skada	E ersätter skador på egendom och person, som kan uppstå på grund av entreprenadens utförande.
Betalningsplan	E utställer faktura med 1/12 av entreprenadsumman per år i
Bes	sidosättande ot vad som ulle E brista i gör sitt
Städutrymmen	Tillhandahålls av Arvika kommun.
Referenser	Referensobjekt anges i anbudet.
<u>Anbudsbedömning</u>	Arvika kommun kommer att anta det anbud som är totalekonomiskt mest fördelaktigt med hänsyn till pris, kvalitet, kompetens och seriositet. Kriterierna är inte rangordnade. Anbud kan komma att antas utan föregående förhandling.

“Quality monitoring: Documented quality monitoring, with representatives from B and E, should on the initiative from E take place once a month.”

“Evaluation of tender/bid: Arvika Municipality will accept the bid considered to be the most advantageous economically with respect to price, quality, competence, and seriousness. The evaluation criteria are not ranked. Bids can be accepted without negotiation.”

Figure 2A. Extract from a typical technical specification.

012	Torrreppning, fri yta	01 Torrreppning fri yta Förutsättningar: Torrreppning av hela golvytan med dustolin, maskin eller hygienduk förutsätter viss kvalitet på ytan (50-130 cm mopp).
013	Våtmoppning, fri yta	01 Våtmoppning fri yta Förutsättningar: Färdig städning av hela golvytan med våta moppgarn. I tiden ingår tvättning eller avpolning av använda moppgarn.
021	Maskinskurning	01 Maskinskurning Förutsättningar: Skurning med skur- eller kombimaskin inkl. förberedelser och avslutning. Tiden gäller stora ytor över 200 m ² . Små mindre ytor skuras med maskin bör tiden höjas på grund av stifttiden.
022	Moppning med moped	01 Moppning med moped Förutsättningar: Moppning med moped på stora ytor som gymnastiksal, långa och breda korridorer. I tiden ingår manuell moppning av ytor som ej är lämpliga med moped.
023	Golvsård (High-Speed)	01 Golvsård (High-Speed)
061	Inredning	01 Tvättning av inredning i entré, kappman, korridorer. I tiden ingår att avfläcka glaspartier, torkning av lister, radiatorer, avfläckning av väggar, speglar m.m.

“Mop with moped. Mop with moped. Conditions: Mop with moped in easy to access spaces such as gymnasiums and broad and long hallways. Estimated time includes manual mop in difficult to access spaces.”

Figure 3A. Extract from a typical technical specification.

KommunTeknik KOMMUNTEKNIK		ÅTGÄRDSLISTA			REPAB Fastighetsystem 95-05-31 Sida 1	
Kärvnr:	1	KOMMUNTEKNIK			Rapporttyp:	Lista
Objekt:	1307	NYA ADMETERBERGSKOLAN			Varianter:	Utan öv. o kostn.
Byggnad:	A	KVÄDDYGDONAD				
Åtgärd	Åtgärdsbeskr.	Mängd	Vecka	Frekvens		Enl. grad
--- Rum:	1001	SKOL	SKOLFÖRVALTNING		Lokaltyp:	L
					Rumstyp:	ENTRÉ
O13	Vårrengöring, flyta	14,2 m ²	1	52 1 gång per vecka		1,00
O01	Inrednings tvättning	14,2 m ²	1	52 1 gång per vecka		1,00
--- Rum:	1002	TORGET			Rumstyp:	CAFÉ
M13	Tvättning av papperskorgar	3,0 m ²	1	52 5 gånger per vecka		1,00
O01	Maskinsugning	341,0 m ²	1	52 3 gånger per vecka		1,00
O02	Mopning med moped	341,0 m ²	1	52 3 gånger per vecka		1,00
O01	Inrednings tvättning	341,0 m ²	1	52 1 gång per vecka		1,00
--- Rum:	1003	TRAPPA			Rumstyp:	TRÅ
O12	Torrrengöring, flyta	19,7 m ²	1	52 4 gånger per vecka		1,00
O13	Vårrengöring, flyta	19,7 m ²	1	52 1 gång per vecka		1,00
--- Rum:	1004	TRAPPA			Rumstyp:	TRÅ
O12	Torrrengöring, flyta	12,2 m ²	1	52 4 gånger per vecka		1,00
O13	Vårrengöring, flyta	12,2 m ²	1	52 1 gång per vecka		1,00
--- Rum:	1005	BIBLJOTEK			Rumstyp:	BIBL
M12	Torrrengöring, möblerad yta	73,9 m ²	1	52 4 gånger per vecka		1,00
M13	Vårrengöring, möblerad yta	73,9 m ²	1	52 1 gång per vecka		1,00
M01	Tvättning inredn och invent	73,9 m ²	1	52 1 gång per vecka		1,00
VX9	Tvättning av papperskorgar	3,0 m ²	1	52 5 gånger per vecka		1,00
--- Rum:	1006	ARBETSRUM			Rumstyp:	KON
M12	Torrrengöring, möblerad yta	8,5 m ²	1	52 1 gång per vecka		1,00
M13	Vårrengöring, möblerad yta	8,5 m ²	1	52 1 gång per vecka		1,00
M01	Tvättning inredn och invent	8,5 m ²	1	52 1 gång per vecka		1,00
VX9	Tvättning av papperskorgar	3,0 m ²	1	52 5 gånger per vecka		1,00
--- Rum:	1007	ELEVBAR			Rumstyp:	GRUPP
M12	Torrrengöring, möblerad yta	8,0 m ²	1	52 varannan dag		1,00
M13	Vårrengöring, möblerad yta	8,0 m ²	1	52 1 gång per vecka		1,00
M01						
VX9						
--- Rum:						
M12						
M13						
M01						
--- Rum:						
M12						
M13						
M01						
--- Rum:						
O01	Maskinsugning	42,4 m ²	1	52 2 gånger per vecka		1,00
O02	Mopning med moped	42,4 m ²	1	52 2 gånger per vecka		1,00
--- Rum:	1012	UPPSTÄLLN.PL. HÖP.FORDON			Rumstyp:	POR
M12	Torrrengöring, möblerad yta	22,1 m ²	1	52 1 gång per vecka		1,00
M13	Vårrengöring, möblerad yta	22,1 m ²	1	52 1 gång per vecka		1,00
--- Rum:	1013	TRAPPA			Rumstyp:	TRÅ
O11	Dammrengöring, flyta	3,8 m ²	1	52 3 gånger per år		1,00
O13	Vårrengöring, flyta	3,8 m ²	1	52 2 gånger per år		1,00

Workroom:
M12 Dry mop, furnished space 8.5m² Once a week
M13 Wet mop, furnished space 8.5m² Once a week
M01 Dust/wash furnishing and inventories 8,5 m² Once a week
VX9 Empty waster-paper basket Five times a week.

Figure 4A. Example of typical bid.

ANBU DSFORMULÄR

Procuring entity

Arvika kommun
Ekonomiavdelningen
671 81 ARVIKA

ANBU DS NR 941026
Offert 24

The object for which firm *j* is bidding

Studentreprenad - nya Agnetebergsskolan

Undertecknad erbjuder sig härmed att utföra städer
anbudsinbjudan och PM daterade 1994-08-17 till e

562000.....kr/år år 1.

The bid in Swedish kronor (SEK). Annual price.

Andrings- eller tilläggsarbeten debiteras medKronor per timme (år 1).

År 2 och 3 regleras i ead daterad 1994-08-17.

I ovanstående priser ilagstadgad mervärdeskatt tillkommer.

Space for extra information

Vårt företag har F-skattsedel.

Övrigt:.....

Identity of firm *j* and contact information. The identity is deleted due to that strict confidence was assured when the data was collected.

Behörig firmatecknare

Firmans namn

Firmans adress

Firmans postadress

Telefon

Fax