



Tender evaluation and supplier selection methods in public procurement



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ABSTRACT

The EU procurement directives stipulate that public contracts be awarded to the lowest bidder or to the bidder with the economically most advantageous tender; the latter requiring that a scoring rule be specified. We provide a simple theoretical framework, based on standard microeconomic theory, for tender evaluation (scoring and weighing) and discuss the pros and cons of methods such as highest quality (beauty contest), lowest price and price-and-quality-based evaluations. We argue that the most common method, price-to-quality scoring, is inappropriate for several reasons. It is non-transparent, making accurate representation of the procurer's preferences difficult. It is often open to strategic manipulation, due to dependence on irrelevant alternatives, and it tends to impose particular and unjustified non-linearity in bid prices. The alternative quality-to-price scoring method, where money values are assigned to different quality levels, is a better alternative. However, when the cost of quality is relatively well-known and several providers can offer optimal quality, lowest price is the preferable supplier selection method, while beauty contests may be preferred when purchasing budgets are inflexible.

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1. Introduction

Public procurement is an important government activity, with an estimated value corresponding to 15% of world GDP.¹ In the US, public procurement has traditionally been strictly regulated and procurement contracts are usually awarded to the lowest qualified bidder, although other methods have recently attracted interest (Potoski, 2008; Bajari and Lewis, 2011). In the EU, lowest price is used less frequently and instead supplier selection methods that combine price and quality into a total score are used more often.²

Drawing on standard assumptions in economic theory and some practical considerations we discuss benefits and drawbacks of using lowest price or alternative methods for supplier selection – the economically most advantageous tender, EMAT, in EU terminology – as well as the appropriate design of scoring rules. The use of EMAT normally requires the specification of a scoring rule.

It has been argued that the strict regulation of public procurement in the US and the so-called buy-low-bid rule created an atmosphere in which suppliers cut costs by offering the bare

minimum acceptable quality—sometimes acceptable only in a formal sense. The government (notably, the US Department of Defense) responded by issuing increasingly detailed and complex product specifications; a response which tended to increase transaction costs and to reduce competition. In response to these perceived problems, a US National Commission – the 1993 “Winter Commission” – proposed fundamental reforms of the procurement practices. The commission's aim was to give managers the tools to pursue public value, whether through purchasing or other means. Hence, the reform of government procurement practices can be seen as part of the wider New Public Management trend (see e.g. Kelman, 2002).

In the EU, procurement policy has moved in the opposite direction.³ The 2004 procurement directives, Directives 2004/17/EC and 2004/18/EC, articles 55 and 53, require that the call for tender specifies how bids will be evaluated in terms of a supplier selection method, giving less room for discretion while reducing the risk for discrimination.⁴ An evolution in this direction has been endorsed by the academic community (e.g., Chen, 2008;

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¹ Bajari and Lewis (2009).

² Verdeaux (2003).

³ Arrowsmith (2006) compares the two regimes from a legal perspective.

⁴ This is not to deny that a stated objective of the new directives was to increase flexibility in procurement. To this end, the new directives opened up for a dialogue-based procurement process and explicitly allowed the procurement of framework agreements.

Mateus et al., 2010; Telgen and Schotanus, 2010). The 2011 proposals for a revision of the EU Directives continue to move in the same direction by proposing that the use of EMAT should be mandatory.

An ongoing trend has also been the transformation of EU procurement rules from framework rules that gave the member states significant discretion to codify the national procurement rules that actually applies to firms—into a system of common rules (Arrowsmith, 2006). I.e., also the member states' discretion has diminished. As an example, the previous procurement rules made it possible to arrange a tender and only then, after the bids had been received, choose between giving the contract to the bidder offering the lowest price or to the economically most advantageous tender. The old directives were also in other respects less strict in requiring that the supplier selection methods and, when applied, the scoring rule to be precisely specified in advance.⁵

Using both price and quality in supplier selection can enhance the efficiency of public procurement, although it adds complexity to the procedure. However, the supplier selection methodologies and more specifically the scoring rules that are used in practice are often poorly designed. We argue that the application of simple economic principles can enhance the effectiveness of supplier selection.

The economically most advantageous tender can be the bid with the highest quality for a given price, in so-called beauty contests. It can also be the bid that achieves the highest combined price and quality score. If this approach is used, price(s) and one or more quality measures will have to be combined into a single measure. Either quality (differences) must be evaluated in *monetary* terms or price must be transformed into a score that is commensurate with the quality score.

Using the first method, quality value in excess of the minimum requirement can be subtracted from the price bid or, alternatively, the value of the quality gap relative to the maximum quality level can be added to the price bid. I.e., the supplier selection method will be quality-adjusted lowest price. Here the expression *quality-to-price scoring* will be used to describe this method.

If the second method is used, price must be transformed into a score that is added to the quality score, making the tender a price-adjusted highest-quality tender. We will refer to this as *price-to-quality scoring*.

Lowest-price tender evaluation is in principle straight-forward, while in practice it may be challenging to define effective and appropriate minimum quality requirements, as well as to weigh multiple prices into a single cost measure. *Quality-only* tender evaluations (beauty contests) can be more complicated. If quality is measured in more than one dimension, the quality measures will have to be combined (weighed) into a single overall score, but, unlike prices, they cannot simply be added together.

The main focus of the present study is the related problem of combining (weighing) quality and price into a single overall score, using either quality-to-price or price-to-quality scoring. As will become evident, the scoring rule we propose will also be useful when quality measures in different dimensions are combined into an overall quality score.

Overall, public procurement is a phenomenon that has attracted little attention from academics—much less so than private

procurement (Dini et al., 2006; Rendon and Snider, 2010). Public procurement is different from private procurement as covered extensively in Telgen and Schotanus (2007) in its stronger emphasis on rules and predictability. Since the public procurer has less discretion to select any other bidder than the one that was awarded the highest score it is more critical to use a well-designed model for tender evaluation.

Further, there appears to be a paucity of research that bridges the gaps between theoretical analyses of abstract scoring rules and the practical application of scoring rules that can be used in real procurement. One of the few exceptions is Dini et al. (2006), which offer guidance also for practitioners.⁶ For example, they emphasize the favourable properties of scoring rules that are linear in prices. Asker and Cantillon (2008, 2010) demonstrate that scoring rules dominate beauty contests, price-only auctions and menu auctions and that, when bidders have private information of a multidimensional nature and quality is contractible, scoring rules outperform bargaining models. Further, scoring rules should be designed to correspond to the utility function of the procuring entity.⁷

In practice, however, it is not apparent how to design a good scoring rule. Public procurement can be seen as a process in several steps, from the identification of needs via design of the tender process, choice of supplier selection methods and a scoring rule for evaluating bids and contract design, to ex-post control and contract enforcement mechanisms. This paper will focus on how already identified needs, in a setting with verifiable quality, can and should be expressed in a model for evaluating bids: a scoring rule. We will, independently of the legal framework, discuss supplier selection methods and scoring rules from a theoretical perspective. To facilitate the analysis, we introduce a graphical analysis of procurement when quality matters. Furthermore, we compare different procurement schemes under uncertainty, drawing on environmental economics theory.

We argue that quality-to-price scoring outperforms price-to-quality scoring. An appealing characteristic of the quality-to-price models is that they do not require explicit weights; neither weights for price and quality, nor weights for different quality criteria. The value of the different quality criteria can simply be added together and then subtracted from or added to the bid price, as appropriate. We emphasize that the supplier selection method and scoring rule should reflect the preferences of the procuring authority or its principal, the society.⁸ However, when the cost of obtaining the desired quality is known and when several firms can deliver the stipulated quality, transaction costs will be lower if lowest price is used to select supplier. In contrast, quality-only scoring may be the best method when funds are earmarked for a particular project.

We compare our theoretical results with actual procurements, as reflected in a sample of 189 Swedish public procurements of four services: elderly care, waste transport, food wholesale services and cleaning services. We find that lowest price is used in more than one-third of the procurements while supplier selection based on scoring rules that include both price and quality measures are used in more than half of the procurements.⁹ Within this latter category, the large majority relies on scoring rules that, from an economic perspective, have one or more undesirable properties, indicating that a proper understanding of

⁵ According to Verdeaux (2003) EMAT has been the most common principle in most EU member countries and the principle has been perceived as allowing wide discretion to the procuring authorities to select the winner. Results based on Swedish data from the period of the earlier regulation suggest that the authorities used the freedom the law gave them in picking the winner—possibly to an excessive degree (Hyytinen et al., 2007).

⁶ See also Chen (2008), Mateus et al. (2010), and Telgen and Schotanus (2010).

⁷ Although there may be strategic reasons to slightly distort the utility of quality downward; see Laffont and Tirole (1993), and Che (1993).

⁸ Lundberg and Marklund (2011) discuss how public procurement can reflect preferences for environmental goals and, hence, become an instrument for achieving environmental policy objectives.

⁹ Similar results are reported by Bergman et al. (2010).

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