Balancing the additional costs of purchasing and the vendor set dimension to reduce public procurement costs

Nicola Costantino [a], Mariagrazia Dotoli [b], Marco Falagario [a,*], Fabio Sciancalepore [a]

[a] Dipartimento di Ingegneria Meccanica e Gestionale, Politecnico di Bari
[b] Dipartimento di Elettrotecnica ed Elettronica, Politecnico di Bari

A B S T R A C T

The paper addresses the reduction of the total cost of purchasing in public procurement, focusing on tenders called for in the European Union and awarded by the Lowest Price (LP) criterion. Taking into account the main characteristic features of governmental purchasing (competition, prescribed procedures, and transparency) and building upon the related contributions in the literature, we present a probabilistic approach for evaluating and limiting the total cost of purchasing in public tenders awarded according to the LP criterion. The presented framework includes the evaluation of the so-called additional costs of purchasing (ACP), a part of the transaction cost that is typically considered in the related literature from a private organization perspective only. The approach can be applied to a generic transaction in any public tender issued according to the European legislation with the LP criterion. Considering the real case study of the public tender for maintenance works on a municipal sport facility in Bari (Italy), we take into account the costs of both transaction counterparts, i.e., the ACP regarding the contracting authority and those related to the firms involved in the tender. Applying the model to the case study, we underline the relevance of ACP for public tenders and show that, by inviting a suitable number of bidders to participate in the call, it is possible to save money both for the contracting authority and the involved competitors.

1. Introduction

1.1. Public procurement in the European union

Public procurement is defined by the European Community as "the process whereby public authorities – including all levels of government and public agencies – buy goods and services or commission work" (The European Parliament, 2004, Europa, 2010). Although the public sector sometimes relies on its in-house workforce to provide services, nowadays there are more and more goods and services that are procured from business firms (Waara, 2008). The outsourcing process has made public procurement a relevant sector for the economy of any Country. For instance, in EU public procurement accounts for about 16% of the European Community GDP (Europa, 2010).

Although governmental and private procurement share the same purpose of finding supply sources at the cheapest price and at acceptable quality (Panayiotou et al., 2004; Falagario et al., 2012), several dissimilarities arise between the two procurement

systems (Boyett et al., 1996; Bryntse, 1996; Panayiotou et al., 2004; Rahim and As-Saber, 2011; Spagnolo, 2012). First, the governmental purchasing system administrates the money that belongs "to all". Second, the number of customers (governmental agencies) and the suppliers of the governmental purchasing system is often excessive in some countries (e.g., in Italy, see the discussion in De Carolis, 2009). Third, the public market is characterized by information asymmetry, so that it often results in being uncompetitive despite the availability of numerous involved bidders: indeed, governmental purchasing is characterised by difficulties in finding information and high barriers in entering (exiting) into (from) the market for suppliers (Caldwell et al., 2005). Fourth and finally, the public sector is covered by a number of public procurement regulations, bringing legislative requirements into force. In particular, in the EU two public procurement directives are effective, covering contracts above certain thresholds, one dealing with public works, supply and service contracts, the other with the procurement procedures of entities operating in the water, energy, transport and postal services (Europa, 2010).

It is important that public procurement follows consistent and transparent business models that optimize the specific service objectives and considers the impact of such a procedure across the governmental organization. Nevertheless, in most

* Corresponding author. Tel.: +39 080 5962739; fax: +39 080 5962766.
E-mail addresses: costantino@poliba.it (N. Costantino),
dotoli@deemail.poliba.it (M. Dotoli), m.falagario@poliba.it (M. Falagario),
f.sciancalepore@poliba.it (F. Sciancalepore).

governmental areas the process of procurement may be a complex and expensive task, since often the dimension of the vendor set (i.e., the group of potential suppliers willing to bid) is large. For instance, with regard to Italy, a number of bidders larger than 10 participating to a public tender is the rule, as some of the authors experienced in their relation with public authorities. The interested reader is referred to De Carolis (2009), who shows that for public contracts worth more than € 150,000, held in the years 2000–2008, the vast majority of tenders (95%) involved more than 30 bidders on average. Moreover, decisions have to be based on simple economic evaluations, due to the transparency requisite. Referring to the European Union, the reference law for public tenders is the 2004/18/EC Directive, also called the Public Procurement Directive and enacted by the European Parliament (2004). According to such a Directive, the contract for a public tender is to be awarded on the basis of objective criteria which ensure compliance with the principles of transparency, non-discrimination, and equal treatment, while guaranteeing that tenders are assessed in conditions of effective competition. In order to reach these goals, only the application of either one of the following two award criteria is allowed: the "lowest price" (LP) and the "Most Economically Advantageous Tender" (MEAT) criterion. Typically, the LP principle is significant in case the main purpose is to save money. On the other hand, when the contract is awarded on the basis of the MEAT criterion, the contracting authority indicates multiple criteria, with an order of importance and depending on the object of the contract, against which the contract is awarded. Hence, the MEAT criterion reflects the necessity for a more complex purchasing management process, which is typical of customized service/products, taking into account also other parameters than price in the vendor selection (Lorentziadis, 2010). This paper focuses on tenders awarded by the LP criterion, which essentially takes into account the traditional purchasing concept of awarding the contract at the cheapest price as the only element differentiating offers (Piga and Zanza, 2005), so that such a criterion is typically applied when the features of the supplied product, service, or work are standardized (Lorentziadis, 2010).

Finally, we remark that in the European legislation the possibility of restricting the number of bidders is contemplated. Indeed, the recalled Public Procurement Directive states that, when calling for tenders, the public authority may choose between an open or a restricted procedure: if the first procedure is chosen then anyone may bid, otherwise the public authority checks the technical and economic competence of the bidders, by carrying out their so-called "pre-qualification". This paper takes into account both procedures and discusses how to determine the profitability of one with respect to the other.

1.2. Paper motivation and contribution

This paper addresses the problem of reducing the purchasing costs in public procurement, focusing on tenders called for in the European Union and awarded by the LP criterion. To this aim, we present a probabilistic model building upon the contributions by De Boer et al. (2000) and Heijboer and Telgen (2002). The model allows evaluating and limiting the purchasing costs in such tenders by trading off the number of bidders and the related purchasing and transaction costs thanks to the pre-qualification phase. Note that we focus on the so-called Total Cost of Purchasing (TCP), i.e., the costs connected to the purchasing phase (Costantino et al., 2012; Costantino et al., 2011; Costantino et al., 2009; Dotoli et al., 2009). We remark that, although in the sequel we specifically address the public procurement case and the related typical costs, the presented model may be modified and adapted for application to the private procurement case.

In addition, in the proposed model we divide tendering costs into costs paid by the buyer (i.e., the contracting authority) and those paid by the tendering firms. All costs are expressed as the average time the administrative employee is engaged in the task, considering as a basis reference his hourly cost, which is determined by interviews with people involved in the tender.

The main purpose of the recalled Public Procurement European Directive (The European Parliament, 2004) is increasing the competitiveness among bidders in order to reduce the public spending, while avoiding monopolistic or oligopolistic behaviours. However, just as in private procurement, also in governmental purchasing the trade-off between the (direct and indirect) costs related to the bidders participation and the costs of the best offered bids has to be determined (see De Boer et al., 2000 for a discussion). Hence, maximizing the number of bidders does not always lead to minimizing costs for the contracting authority. In this paper we underline the relevance of such a trade-off: by inviting a suitable number of bidders, it is possible to save money both for the contracting authority and the private firms participating in the tender. Hence, in order to reduce the public procurement costs, we present a probabilistic model for evaluating the total cost of purchasing in public tenders. The proposed model includes the evaluation in governmental procurement of the so-called additional costs of purchasing (ACP), an important part of the cost of any transaction that is typically considered in the related literature from a private organization perspective only. Moreover, the convenience in reducing the number of tenderers is assessed with regards to costs occurring in the pre-qualification of bidders, and we show that such a pre-qualification phase is worth for the contracting authority (and for the society) only if the savings in restricting the number of bidders are larger than the required expenses for carrying it out.

From the potential bidders' point of view, usually bidding for an LP tender requires a limited effort in formulating the bid, since such a tendering mechanism is typically adopted for products or services which cannot be characterized by relevant differences in quality from a supplier to another: this is the case of commodities, like, for instance, energy or office equipment (Carpineti et al., 2006). Hence, in a tender awarded with the LP criterion, a large number of potential suppliers may easily be involved (open procedure) or ask to be involved (restricted procedure). From the contracting authority point of view, however, involving a large number of potential suppliers in a procurement process can be a source of waste, in terms of increased costs for the bidding process, that are a part of the broader transaction costs. The waste may actually turn out to be bigger than the advantages connected to the increased competition between a large number of bidders. The waste of money can even apply not only to the contracting organization but also to the supplier. As a consequence, in the case of tenders awarded by the LP criterion, it is significant to evaluate and balance the ACP side costs, so as to reduce the overall public procurement costs (De Boer et al., 2000).

Coase (1937) first addressed these side cost phenomena connected to an exchange; later on, Williamson (1979, 1991) developed the same research, defining transactions as involving costs related to the issues of finding a business partner by choosing among a set of candidates, preparing and drawing up a contract with the chosen one and monitoring the task delivery (and enforcing it when the terms of the contract agreement are not fulfilled). These costs are both incurred by government organizations or autonomized parts of these organizations (North, 1990). Unfortunately, as Coase himself remarked (1993), numerous difficulties arise in applying the transaction costs economics theory to a quantitative study.

In the context of reducing the mentioned overall costs arising in the purchasing process, de Boer et al. (2000) calculate the