Corruption in delegated public procurement auctions

Krishnendu Ghosh Dastidar [a,*,1], Diganta Mukherjee [b,2]

[a] Centre for Economic Studies and Planning, School of Social Sciences, Jawaharlal Nehru University, New Delhi 110067, India
[b] Sampling and Official Statistics Unit, Indian Statistical Institute, 203 B T Road, Kolkata 700108, India

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ABSTRACT

In this paper we theoretically analyse effects of corruption in public procurements within a scoring-auction framework. A corrupt politician, who acts on behalf of the public sector, receives a kickback from the winning bidder. The politician selects the scoring rule. The paper shows that such corruption always leads to lower quality and lower price. Given a level of corruption, a higher bargaining power of the politician in extracting bribes does not affect the quality but leads to higher price.

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1. Introduction

In the modern world Government contracts are typically awarded by procurement auctions, which are also often used by firms subcontracting work or buying services and raw materials. In OECD (2011) it is reported that the procurement of public services accounts for approximately 17% of GDP of EU countries. Clearly public procurements constitute a significant part of the economic activities in many countries (see Koning and Meerendonk, 2013).

The theory of auction provides the necessary analytical framework to study such procurements. However, it may be noted that the benchmark model of auctions is really a *price-only* auction where all other characteristics of provision are assumed to be identical for all potential vendors. Thus, in the traditional theory of standard procurement auctions (where the auctioneer is the buyer), the auctioneer cares only about the price of the object, but not the other attributes. However, in many procurement situations, *the buyer cares about attributes other than price* when evaluating the offers submitted by suppliers.[3] Non-monetary attributes that buyers care about include quality — sometimes along several observable/verifiable dimensions and time to completion. For example, in the contract for the construction of a new aircraft, the specification of its airworthiness and other characteristics is probably as important as its price. Under these circumstances, auctions are usually multidimensional. The essential element of such multi-dimensional auctions is a *scoring rule*. In the *scoring auction*, bidders are asked to submit multidimensional bids that include price and some non-price attributes, such as

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* Corresponding author at: Centre for Economic Studies and Planning, School of Social Sciences, Jawaharlal Nehru University, New Delhi 110067, India.
  E-mail addresses: krishnendu.dastidar@gmail.com, kgd12@yahoo.com (K.G. Dastidar), digantam@hotmail.com (D. Mukherjee).
[1] Tel.: +91 11 2670 4448.
[2] Tel.: +91 33 2575 2306.
[3] "For public funds to be spent efficiently and effectively, value for money is the key principle in public procurement. Low-price auctions have been widely used to allocate contracts as a competitive, transparent, and accountable mechanism. However, costs are not the sole indicator in assessing the best value-for-money contract. More and more procurement buyers, thus, introduce awarding mechanisms with which relevant prices and qualities of proposals in the whole procurement cycle are assessed" (Section 1 in Nakabayashi and Hirose, 2013).

quality. The bids are then transformed into a score by an ex ante publicly announced scoring rule, and the bidder whose score is the highest is awarded the contract.

There are many real life examples of such scoring auctions. For example, the Department of Defence in the USA often relies on competitive source selection to procure weapon systems. Each individual component of a bid of the weapon system is evaluated and assigned a score, these scores are summed to yield a total score, and the firm achieving the highest score wins the contract (see Che, 1993). Many state departments of transportation in the US use "A + B bidding" for highway construction work in the United States, where the highway procurement authorities evaluate offers on the basis of their costs as well as time to completion, weighted by a road user cost. A similar mechanism is used in auctions for electricity reserve supply (see Asker and Cantillon, 2008). Ministry of Land, Infrastructure and Transportation in Japan allocates most of the public construction project contracts through scoring auctions based on quality-over-price ratio rules (see Hanazono et al., 2013).

1.1. A brief literature review of scoring auctions

Che (1993) is a pioneer in analysing such scoring auctions. In his model both the quality and the bidder's types are single-dimensional, types are identically and independently distributed and the scoring rule is quasilinear. Branco (1997) analyses the properties of optimal mechanisms when types are single-dimensional but correlated. Asker and Cantillon (2008) analyses the case when both quality and types are multidimensional and the scoring rule is quasilinear. Asker and Cantillon (2010) analyses optimal mechanisms with one-dimensional quality and two-dimensional discrete types. Nishimura (2012) computes optimal mechanisms with multidimensional quality and single-dimensional types that are identically and independently distributed. Very recently scoring auctions with non-quasilinear scoring rules have been analysed by Hanazono et al. (2013) and Dastidar (2014).

None of the papers mentioned above deal with the issue of delegation within a scoring auction framework. We now proceed to say a few words on this aspect.

1.2. Delegation in scoring auction

Delegation, or empowering one to act on behalf of another, is pervasive in the modern firm. Shareholders delegate strategic decisions to managers; delegation is efficient when managers allocate resources, including their own efforts, in ways that do not divert from owners' objectives. However, that separation in decision making also gives rise to conflicts among the actors involved. A rather impressive body of work has developed on related topics, including agency theory (Dalton et al., 2007; Gibbons, 2005; Prendergast, 1999), organizational controls systems (Goold and Quinn, 1990), organizational structure (Keats and O'Neill, 2001), strategic leadership (Finkelstein et al., 2008), strategic commitment theory (Ghemawat, 1991; Schelling, 1960), and the role of irreversibility in competitive interaction (Chen and MacMillan, 1992; Chen et al., 2002). For a recent excellent survey, see Sengul et al. (2012).

Apart from the abovementioned papers two recent contributions deserve mention. In an experimental study Vetter (2013) examines some aspects of delegating decision rights for future rewards as an alternative to corruption. The study finds that even the pure anticipation of future rewards from a lobbying party suffices to bias a decision-maker in favour of this party, even though it creates negative externalities to others. In a rent-seeking model Hessami (2014) examines the relationship between political corruption and the composition of public spending.

It may be noted that the impact of corruption on procurement auctions may be huge in terms of efficacy of the project and thus merits discussion. Surprisingly, none of the papers in the literature on scoring auction has touched upon this aspect. As such, we endeavour to fill up this gap in the literature.

The literature so far has not dealt with the case where a corrupt, politically appointed government representative acts on behalf of the government agency and chooses the rules of the scoring auction. This situation is quite common in many countries. For example, in emerging economies like India, large infrastructure projects (roads, airports) are often commissioned by public sector organisations. The contracts for such projects are typically awarded through an auction and often some form of scoring auction is used (for example the construction of the new international airport in Delhi).[4] The public sector is typically controlled by politicians, who act as public representatives and thus often have substantial say in this procurement process. Consequently, they have significant influence on the design of the scoring rules also. Problem arises when a public sector is saddled with a politician who is not honest.[5] A typical corrupt politician receives a bribe from the winning bidder.[6]

In short, the politician has the power to act on behalf of the public sector and he decides on the rules of the auction. In particular, he has a say in the selection of the scoring rule to be used, which need not reflect the true utility of the public sector or representative voter of the region. The scoring rule so selected is geared towards increasing the utility of the corrupt politician.

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[4] In the mechanism for award of contract for the New Delhi Airport each firm was asked to submit a document called a technical bid that included the firm's design of the airport as well as the firms' characteristics. It also had to simultaneously submit a financial bid which represented the percentage of revenue that the supplier was willing to share with the Government.

[5] A few years back in the 2G spectrum auction in India, a minister allegedly changed the rules of the game to benefit some particular bidders. The Supreme Court of India later cancelled all licences allocated in this auction. Subsequently, the government was forced to conduct a new set of 2G spectrum auctions.

[6] In India, for example, it's often the case that if the winning bidder does not pay the bribe, he will not be awarded the contract. The politician may create technical hassles to block the award of contract and consequently, winners are forced to pay the bribe.