



ACADEMIC SEMINAR

Procurement Auction with Unspecified Quality Risk

In service procurement auction, buyers often have to deal with service quality that cannot be specified meaningfully in a bid. However, this *unspecified quality* determines, to a large extent, the success or failure of a service project. Performance in terms of unspecified quality can usually be observed/assessed ex-post and cannot be predicted ex-ante. Hence, both the buyer and supplier face risk. In practice, a contingent transfer is often used to mitigate this risk. In this study, a (specified) quality and price procurement auction model with unspecified quality being an additional non-biddable dimension is formulated. A bonus or penalty will be transferred contingent on the performance in unspecified quality. Suppliers bid in quality and price, knowing that the quality bid as well as their own unobservable efforts affect performance in terms of unspecified quality. Under the quasi-linear scoring rule, price and quality can be separately optimized as in the standard procurement auction. However, the quality bid must be jointly optimized with the effort level. Compared with the standard two-dimensional procurement auction, bidders more aggressively bid in quality and pursue greater information rents. In terms of the marginal contributions to unspecified quality revenue, the relationship between the biddable quality and the effort of a supplier can be either complementary or substitutable. In mechanism design, compared with the efficient mechanism, quality is distorted downward in the optimal mechanism as in the standard procurement auction, whereas effort is distorted upward if effort substitutes quality, and downward if it complements quality. This study also considers the case when both production parameter and effort parameter are private information of suppliers. The existence of the probability distribution of the "pseudo type" is proven. Moreover, unlike in standard procurement auctions, cost efficiency is shown to be not the only criterion for determining the winning bid. The supplier with the best combination of production and effort efficiencies is chosen. Based on its findings, this study concludes that when unspecified quality is considered, proper tradeoff between quality and effort in terms of their marginal contributions to the unspecified quality revenue determines the strength of a bidder. Thus, how a buyer values performance in terms of unspecified quality plays a key role in the supplier selection mechanism design.

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HUANG He is now a Professor of Management Science in School of Economics and Business Administration, Chongqing University. He received his Ph.D. degree in Management Science from School of Economics and Management at Tsinghua University. He was a visiting scholar in Graduate Business School, Columbia University, and a visiting faculty member at Hong Kong Polytechnic University. Now he is a visiting faculty member at Hong Kong University of Science & Technology. His publications appear in many different journals and conferences, including *Decision Support Systems*, *Electronic Commerce Research and Applications*, *Journal of Systems Science and Systems Engineering*, *Lectures Notes on Computer Science*, et al. His current research interests focus on mechanism design and economic analysis of procurement auctions, bargaining and contracts.

Date: 2 May 2012 (Wednesday)

Time: 14:00 – 16:00

Venue: SEK210, 2/F, Simon & Eleanor Bldg.

Language: English

*** All are Welcome ***