

# **Bid Manipulation in Open Procurement Auctions Extended**

## **Abstract**

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Collusion between government officials and bidders is a major cause of inefficiency in public procurement. According to international business surveys, more than 30% of firms that have participated in procurement believe that corruption has prevented them from winning. In response, many countries have opted to use open electronic tenders to curb corruption through public access to information. Procurement is a complex process; and although e-procurement may mitigate corruption at the bidding stage, it may also shift corruption to other less transparent stages, both before and after bidding.

I examine whether auctioneers abuse bid evaluation in an open electronic auction to give an unfair advantage to favored bidders. First, I formulate a new theoretical model for low-bid auctions with a corruption agreement between an auctioneer and a bidder, as realized through bid manipulation. The theoretical model contributes several new and pertinent features to existing auction models. In the model, favored bidders are aware that some competitors may be eliminated by an auctioneer at the post-bidding phase; they incorporate this knowledge and overstate procurement costs and bid higher to increase rents from procurement awards. As a result, this equilibrium response inflates the average prices of procurement. I also propose a method for model identification using data inconsistencies in auction documentation (the information on bids is often not reported). The proposed auction model can be used in other conditions where similar incentives for bid manipulation exists.

I then estimate this model using a novel dataset on public procurements to evaluate the welfare loss and rents resulting from corruption. For the model application, I have collected a large dataset containing over 2 million procurement purchases from the Russian Federation, where corruption is a known problem. I start with fixed-effects regression analysis which documents that non-reported bids are associated with 41.5–37% higher procurement prices; and although participation is considerably higher in potentially rigged auctions, the actual number of admitted bidders is 23% lower. I apply the English auction model to winning bids of auctions in which at least one bid has not been reported by an auctioneer, to empirically test for the presence of non-competitive bidding behavior. The statistical tests show that the predicted cost distribution is different from the actual distribution, thus rejecting the hypothesis of competitive bidding. After that, using the first-order conditions of the optimal bid in the model with bid manipulation, I develop a non-parametric two-stage estimator to confirm that the bidding behavior of favored firms is described according to the reduced-form facts. The statistical tests no longer reject the hypotheses of equivalence between the predicted versus actual cost distribution. In fact, the estimates show that an auction model with bid manipulation provides a 54–99% better fit than a standard English auction model in auctions with non-reported bids in 20 studied markets.