Threshold versus Exposure in Simultaneous Ascending Auctions

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Abstract

We consider environments where a single global bidder interested in only the package that contains all items competes with local bidders interested in only a single item. This environment creates a severe "exposure problem" for the global bidder in the simultaneous ascending auction (SAA) where competition takes place on an item-by-item basis. We derive the Bayes-Nash equilibrium for this setup and illustrate the degree to which efficiency and revenue are suppressed as a result of the exposure problem. We also consider a variant of the simultaneous ascending auction that allows for package bidding (SAAPB). Our environment creates a severe "threshold" or free-riding problem for the local bidders since all that matters is that as a *group* they outbid the global bidder. We derive the Bayes-Nash equilibrium for the SAAPB and illustrate the extent to which efficiency and revenue are suppressed as a result of the threshold problem. We also report the results of experiments in which two or five local bidders compete with a single global bidder in either the SAA or SAAPB. While the experimental results closely match the theoretical predictions for SAA, we find little evidence for the threshold problem under SAAPB. As a result, the SAAPB performs equally well as the SAA in an environment where it is supposed to do much worse. These findings can be explained by considering the feedback effects of deviations from the Bayes-Nash equilibrium: in the SAAPB, the naive bidding strategy of bidding up to ones value is an "almost equilibrium." In contrast, when the global bidder deviates from the Bayes-Nash equilibrium in the SAA, there are no feedback effects for the local bidders who follow a simple dominant strategy.

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