Theoretical and experimental investigation of performance of keyword auction mechanisms*

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Abstract

Two keyword auction mechanisms were compared theoretically and experimentally. The first is the Generalized Second Price Auction (GSP), which is widely used in practice. The other is the Vickrey-Clarke-Groves mechanism (VCG), which is not used in practice. However, the VCG has a dominant strategy equilibrium where all the participants bid their true values. Theoretically, by applying "locally envy-free Nash equilibrium," defined by Edelman et al. (2007), to the VCG, we found that the upper and lower bounds of the auctioneer's revenue among all the locally envy-free Nash equilibria coincide in the two mechanisms. However, in the laboratory experiment, revenues were higher in the GSP than in the VCG, both of which were relatively close to the lower bound. In addition, efficient allocations and the Nash equilibrium bid profiles were more frequently observed in the VCG than in the GSP.

Keywords: keyword auction, Generalized Second Price Auction, Vickrey-Clarke-Groves Mechanism, Laboratory Experiment
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