Multi-unit common value auctions: Theory and experiments

av

Joakim Ahlberg

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Nationalekonomiska institutionen, Lunds universitet

Örebro universitet
Handelshögskolan

701 82 ÖREBRO

Abstract

Research on auctions that involve more than one identical item for sale was almost non-existing in the 90's, but has since then been getting increasing attention. External incentives for this research have come from the US spectrum sales, the European 3G mobile-phone auctions, and Internet auctions. The policy relevance and the huge amount of money involved in many of them have helped the theory and experimental research advance. But in auctions where values are equal across bidders, *common value auctions*, that is, when the value depends on some outside parameter, equal to all bidders, the research is still embryonic.

This thesis contributes to the topic with three studies. The first uses a Bayesian game to model a simple multi-unit common value auction, the task being to compare equilibrium strategies and the seller's revenue from three auction formats; the discriminatory, the uniform and the Vickrey auction. The second study conducts an economic laboratory experiment on basis of the first study. The third study comprises an experiment on the multi-unit common value uniform auction and compares the dynamic and he static environments of this format.

The most salient result in both experiments is that subjects overbid. They are victims of the winner's curse and bid above the expected value, thus earning a negative profit. There is some learning, but most bidders continue to earn a negative profit also in later rounds. The competitive effect when participating in an auction seems to be stronger than the rationality concerns. In the first experiment, subjects in the Vickrey auction do somewhat better in small groups than subjects in the other auction types and, in the second experiment, subjects in the dynamic auction format perform much better than subjects in the static auction format; but still, they overbid.

Due to this overbidding, the theoretical (but not the behavioral) prediction that the dynamic auction should render more revenue than the static fails in the second experiment. Nonetheless, the higher revenue of the static auction comes at a cost; half of the auctions yield negative profits to the bidders, and the winner's curse is more severely widespread in this format. Besides, only a minority of the bidders use the equilibrium bidding strategy.

The bottom line is that the choice between the open and sealed-bid formats may be more important than the choice of price mechanism, especially in common value settings.

Keywords: Multi-Unit Auction; Common Value Auction; Laboratory Experiment; Game Theory