All-Pay Auctions with Regret

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Abstract

Extensive experimental literature on first-price auctions documents bidding deviating from risk-neutral Nash equilibrium and bidder regret has been proposed as a possible explanation for these observations. Recent experimental literature on all-pay auctions reveals that bidders often deviate from risk-neutral Nash equilibrium bidding. We construct and study models of (first-price) all-pay auctions with n bidders that anticipate regret from winning and paying more than necessary (winner regret) and regret from losing at a price they would be willing to beat ex post (loser regret). We characterize symmetric Nash equilibria in such auctions for both complete information and incomplete information (independent private values) environments. Under complete information, the unique symmetric Nash equilibrium is in mixed strategies. We also establish the existence of a continuum of asymmetric equilibria for auctions with $n > 2$ bidders. Relative to the symmetric risk-neutral Nash equilibrium, increased winner regret leads to less aggressive bidding (in the sense of first-order stochastic dominance), increased loser regret leads to more aggressive bidding (FOSD), and if bidders weight equally winner and loser regret the equilibria coincide. The implications of regret for auction revenue follow immediately from these comparative static

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results. For the independent private values case, we characterize a symmetric Bayes-Nash equilibrium and find that the implications of regret for bidding and revenue carry over to this environment.

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