

Dynamic Auctions with Persistent Private Information

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Abstract

We consider a game between a fixed set of firms that participate in a series of procurement auctions over an infinite horizon, where bids are publicly observed and each firm receives a privately observed cost shock in each period. Although cost shocks are independent across firms, within a firm costs follow a Markov process. Firm actions do not affect the evolution of costs. We analyze the set of Markov-perfect equilibria, where firm strategies depend on history only insofar as history influences their beliefs about opponent cost types. We focus on the case of positive correlation of costs. We formulate a tractable method for calculating equilibria to this game. We show that when patience is low relative to persistence, a fully-separating equilibrium exists, but in general this equilibrium entails higher prices than the one-shot equilibrium. Paradoxically, prices tend to be highest when expected costs are lowest, when the one-shot equilibrium would entail the lowest prices. For higher levels of patience, separating equilibria do not exist, and instead information is revealed gradually over time. Similar to the case of separating equilibria, a period of very aggressive pricing, signaling low expected costs in the near future, tends to lead to higher expected prices. Rather than play a very “tough” bidding equilibrium, low-cost firms mimic high-cost firms in an effort to build a reputation for being high cost, and thus soften future play.

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