Title: Bid Shading in Dynamic Auctions/Dynamic Bidding in Second Price Auctions

We develop a dynamic model of bidding where agents' values follow a joint Markov process. Agents can bid at different times in the auction. The paper considers a baseline case where an exogenous random process gives bidding times and in addition a simplified scenario with endogenous rebidding and menu costs. For the case of exogenous rebidding, we prove that equilibrium exists and is unique, providing a recursive representation and algorithm to solve for bids as a function of time and values. The equilibrium bid equals the expected final value conditional on being the bidder's final one: either there is no further rebidding opportunity or the bidder chooses not to increase this bid if given the option. This results in adverse selection with respect to a bidder's own future values, and as a result bids are shaded. This is true in spite of values being independent across bidders. Under mild conditions, desired bids increase as time increases and the close of the auction is approached. We consider the identification of the model and estimate parameters with a set of moments. The resulting distribution of winning bids in the model is considerably skewed towards the later part of the auction, as is also found in the data. Our results are consistent with repeated bidding and sniping, two puzzling observations in eBay auctions. We consider a series of counterfactuals.

Note: Last year we presented at SED a very preliminary version containing part of this paper. However, there are quite a number of substantial differences and additions, summarized in the following points:

1. We now have general proofs for a recursive representation.
2. We consider identification and estimate the model based on these moments. In addition we plan to have a section on non-parametric identification.
3. We analyze implications for the timing of bids and compare to data.
4. We consider the case of correlated values in addition to the independent values case that was considered in the preliminary draft.
5. We have results on endogenous rebidding with menu costs that are

also completely new as the preliminary draft only considered exogenous rebidding times.

We are in the process of including some of these new results/extensions in a new paper we are currently writing, called “Bid Shading in Dynamic Auctions.” We attach the revised the latest slides for “Dynamic Bidding in Second Price Auctions”, both because it highlights the basic approach and also contains some of the new results indicated above. This should serve as a guideline to the content and methodology of our current research.