Public and Secret Reserve Prices in Repeated Auctions

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Abstract

I study the effect of secret and public reserve prices on the seller's revenue. In particular, I analyze the data from eBay auctions on tractors to estimate the extent of this effect.

The analysis helps to explain the following empirical facts from Ebay auctions: multiple relisting of similar items, the use of secret reserve prices, and the convergence of sale prices to buy-it-now prices.

Motivation

Sequential Auctions without Commitment

McAffee and Vincent (1997): Revenue equivalence between sequential auctions with publicly observed reserve prices and static auction without publicly observed reserve price when the time between sequential auctions goes to zero

Reserve Prices

Myerson (1981), Riley and Samuelson (1981), Xu(2010): revenue optimality of publicly observed reserve prices in independent private values environment – screening;

Milgrom and Weber (1982), Cai, Riley and Ye (2007): revenue optimality of publicly observed reserve prices in common value environment – signaling;

Theoretical conclusions

Theory predicts no repeated auctions

Theory predicts no use of secret reserve prices

Empirical Evidence

Existence of repeated auctions

Widespread use of secret reserve prices

Data and Methods

Data

The dataset of English auctions on tractors sold on Ebay between 11/17/04 and 5/30/07. The total number of observations is 39441.

Estimation Approach

Rust's (1994) nested fixed point algorithm:

Stage 1: Find revenue-maximizing choice vector (secret reserve price, public reserve price) (inner loop)

Stage 2: Use MLE to estimate expected seller revenue given the revenue-maximizing choice vector (outer loop)

Empirical Evidence from Ebay dataset

Table 1. Frequency of Relistings

Tractors	Number of tractors	number of sold tractors	% of sold tractors
1 listing	23253	13251	56.99
2 listings	4031	1448	35.92
3 listings	1069	344	32.19
4 listings	404	117	28.96
5 listings	197	60	30.46
6 listings	102	30	29.41
7 listings	61	20	32.79

Table 1.

Table 2. Use of Secret and Public Reserve Prices

Tractors with one listing	number of listings	Percent of listings
Total number of listings	23253	100.00
listings with reserve prices	10705	46.04
listings with first bids >100	15573	66.97
listings with both reserve prices and first bids	7544	32.44

Table 3. Dynamics in Sale Prices

	# of sold with buy-it-now	% of sold listings with buy-it-now price	mean of sale price as % of BIN	stde of sale price of% of BIN
1 listing	2556	19.29	90.57	20.40
2 listings	539	37.22	93.52	11.52
3 listings	134	38.95	95.41	7.46
4 listings	55	47.01	95.01	7.83
5 listings	23	38.33	96.22	6.56
6 listings	13	43.33	97.49	4.51
7 listings	9	45.00	96.99	3.68

Testable Hypotheses

Hypothesis 1: The effect of secret reserve prices on seller revenue is positive in repeated auctions and negative in single stage auctions

Hypothesis 2: The effect of public reserve prices on seller revenue is positive in repeated auctions and in single stage auctions

Hypothesis 3: The effect of buy-it-now prices on seller revenue is positive in repeated auctions when interacted with secret reserve prices.

References

Cai, H., John Riley, and Lixin Ye, (2007), "Reserve Price Signaling," *Journal of Economic Theory*, 135 (1), 253-268;

Cramton, Peter C., (1992), "Strategic Delay in Bargaining with Two-Sided Uncertainty," *Review of Economic Studies*, vol. 59(1), 205-225;

McAfee, R. Preston and Daniel Vincent, (1997), "Sequentially Optimal Auctions," *Games and Economic Behavior*, 18, 246-276;

Milgrom, P. R., and Weber, R. J., (1982), "A Theory of Auctions and Competitive Bidding," *Econometrica, 50*(5), 1089–1122;

Myerson, R. B., (1981), "Optimal auction design," *Mathematics of Operations Research, 6*, 58–73;

Riley, John, and Samuelson,W., (1981), "Optimal auctions," *The American Economic Review, 71*(3), 381–392;

Rust, J. (1994) "Structural Estimation of Markov Decision Processes." In R. F. Engle and D. L. McFadden (Eds.), Handbook of Econometrics, Volume 4, Amsterdam. North Holland.

Xu, Xiaoshu, (2010), "Optimal Sequential Auctions with the Arrival of New Bidders," PhD dissertation, Ohio State University;