Measuring the Benefits to Sniping on eBay: Evidence from a Field Experiment

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What *is* sniping in online auctions?

- Sniping is a strategy of bidding at the last minute, so that rivals can't respond to your final bid.
- This strategy emerges from two institutional features of the eBay auction mechanism:
  - Proxy bidding
    - Automatically enters bids on behalf of bidders up to their pre-stated maximum willingness to pay
    - "Vickrifies" the English auction in a way that bidders can understand (see Lucking-Reiley, JEP 2000)
  - Hard close rule: auction ends at one particular second, specified in advance.

Roth and Ockenfels (AER, 2002) found prevalent sniping in eBay auctions.

- How prevalent?
  - In auctions typically lasting seven days, 20% of all last bids were submitted in the last hour.
  - 40% of computer auctions and 59% of antiquities auctions had a last bid in the last five minutes.
  - Out of 240 auctions, 89 had bids in the last minute and 29 in the last 10 seconds.
- Key result: the amount of sniping varied with the rules of the auction institution.
  - In Amazon auctions, with a “soft close” rule, sniping happened much less often.
  - As bidders gained experience, they tended to snipe more often on eBay but less often on Amazon.

Why do bidders snipe?

- Several theories:
  - A low-revenue bidding equilibrium supported by the fact that last-minute bids sometimes don't get through. (Roth & Ockenfels)
  - Expert bidders don't want to reveal their superior signals of value by bidding early.
  - Some naïve bidders don't understand proxy bidding, and sophisticated bidders can take advantage of them by sniping.
  - Some late bids (last hour, etc.) aren't really "sniping": with many similar items on eBay at once, I tend to want to bid on the auction that's closest to ending.
- Lab experiment: Ariely, Ockenfels, and Roth (2003)
  - Successfully reproduced sniping in a laboratory setting
  - Found that more experienced bidders are more likely to place late bids
  - Results did not depend on the probability of a late bid not getting through, thus providing evidence against the first theory.
  - "Sniping may also be a best response to incremental bidding that is observed both in the field and in our experimental setting."

Our research question: Can we measure the benefit to sniping?

- Since bidders often prefer to snipe both in the field and in the lab, they likely profit from doing so.
- Alternatively, they may have false beliefs about the benefits of sniping, or they may snipe because they think it's fun.
  - Note that there is a cost to sniping: pay for a service, risk of forgetting to bid, risk of Internet congestion causing the bid not to be received.
- Our field experiment involves submitting our own bids on eBay auctions to see how much better we do when we snipe.

Our experiment involves bidding on identical pairs of items on eBay.

- Some sellers frequently auction identical items at different times on the same day.
- Identical item description, seller feedback, auction length, etc.
- Experimental treatment: early versus late bids
  - Early bids: at least three days before the end of the auction.
  - Late bids: last ten seconds, using eSnipe.com
  - Control and treatment for each pair of items.
- Submit a very high bid in each auction, so that we are likely to win both items. Check to see how much cheaper we get the item when we snipe.

How did we select our auctions?

- We looked for sellers who auctioned identical items on the same day. End times differed typically by hours, sometimes by seconds.
- Browsing by most recently listed auctions allowed us to find auctions that had enough time remaining to place an early bid.
- We looked at categories where we could estimate resale value easily, to help us set a “high bid” without risking huge losses.
- Some categories (DVDs) had higher numbers of bidders per auction, and some (Xbox games) had lower numbers of bidders.
- Categories:
  - US coin proof sets (10 pairs)
  - DVDs (10 pairs)
  - Hot Wheels diecast cars (10 pairs)
  - Xbox video games (10 pairs)
  - Game Boy Advance video games (10 pairs)
  - Playstation 2 video games (20 pairs)

How did we set the bid amount?

- High prices best: want to win both auctions.
  - But not high enough to bankrupt us.
- We used public reference prices - eBay winning bids are generally much lower.
  - Values for video games and DVDs determined by the Wal-Mart (usually lowest “brick and mortar” retailer
  - Values for (mint condition) coins determined by Professional Coin Grading Service guide
  - Values for (mint condition) Hot Wheels determined by Hallsguide.com price guide

Some data ended up being unusable.

- Removal of pairs from data sample
  - Pairs in which we were outbid in one or both auctions were removed
    - 3 pairs of coin proof sets
    - 1 pair of Playstation 2 games
    - 2 pairs of DVDs
    - We were no more likely to have won the sniped item than the early-bid item, so no bias introduced.
  - eBay administrators removed the auctions
    - 5 pairs of Game Boy Advance games, because the seller was suspected of pirating them.
- In all, we were left with 59 pairs of auctions whose data we could analyze.

Result: Sniping does not give much benefit.

- Tests of difference of means between sniping prices and early-bid prices.
- In percentage terms
  - Sniping auctions had final prices that were 2.54% lower on average than their matching early bid auctions
  - t= 0.74, so not significant at the 5% level
- In absolute terms
  - Sniping auctions finished $0.50 lower on average than their matching early bid auctions
  - t= 1.09; also not significant at the 5% level

Result continued: No significant benefit to sniping.

- Tests of proportions: For what fraction of pairs does sniping yield a lower price than early bidding does?
- Since prices are sometimes equal across treatments, we try two possible null hypotheses.
  - Reject the null that at least 50% of the pairs had sniping strictly favored (t=2.21).
  - Don’t reject the null that at most 50% of the pairs had early bidding strictly favored (t=1.17).
- In the aggregate, there appears to be no significant benefit to sniping.

Is sniping more valuable with fewer rival bidders?

- Tests by number of bidders
  - 59 pairs ranked with respect to number of bidders
  - Divided this ranked list into two groups of 29 pairs (middle pair removed to maintain equal numbers in both groups)
  - Low group had an average of 2.62 bidders
  - High group had an average of 6.28 bidders

- No significant differences found between sniping and early bids in either of the groups

Is sniping just as prevalent today as reported by Roth/Ockenfels?

- We passively observed 60 auctions of laptop computers.
- The incidence of last-hour bids is similar.
- The incidence of last-minute bids is lower.

Proportion of Bids Occurring Within a Given Interval				
	Last hour	Last 5 min	Last 1 min	Last 10 sec
Ockenfels & Roth	70%	46.7%	36.7%	11.7%
Gray & Reiley	84%	9%	5%	2%

Are our categories unusual?

- We sampled bid-timing data for 20 other auctions in three of our categories.
- Somewhat less last-hour bidding, but more last-minute bidding than in laptops.

Proportion of Bids Occurring Within a Given Interval				
Item	Last hour	Last 5 min	Last 1 min	Last 10 sec
Laptops	*84%*	*9%*	*5%*	*2%*
US coin proof sets	25%	20%	5%	0%
DVDs	50%	20%	10%	0%
Playstation 2 games	60%	45%	30%	5%

Conclusions

- Previous research had implied benefits to sniping.
- We tried to substantiate this implication through bidding on paired eBay auctions
- We found that sniping on average **reduced** selling price by 2.54%, though not statistically significant.
- Statistical significance of this result may be found with a larger data set (Ely & Hossain working on one).
- Our analysis weakly suggests that sniping may be more useful with fewer rival bidders.
- There may be less sniping now than there was a few years ago, perhaps because bidders know that the bidding pool has gotten more sophisticated?