Special Session Summary  the Psychology of Auctions: Enriching Models of Bidder and Seller Behavior

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SPECIAL SESSION SUMMARY
The Psychology of Auctions: Enriching Models of Bidder and Seller Behavior
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Despite increased consumer interest in auctions and several calls for more research on this topic (e.g., Chakravarti et al. 2002, Bazerman 2001, McAfee and McMillan 1987), the marketing and consumer research literature on this topic is sparse. Therefore, developing an enhanced understanding of participants’ behavior in auctions is critically important. Both traditional and Internet auctioneers have acknowledged the importance of understanding consumer behavior, though little research has focused on this.

There is a large body of literature on the economic theory of auctions (for an overview, see Klemperer 1999). However, these are mostly normative models with restrictive assumptions regarding consumer values and bidding strategies. In fact, Rothkopf and Harstad (1994) have voiced the need to develop more realistic models of how bidders actually behave in auctions. However, little is known about how auction participants actually do behave, as opposed to how they ought to behave (Bazerman 2001). The focus of this session is therefore on several important behavioral aspects of auctions, bringing together three papers related to the psychology of auctions. These papers show how actual behavior of participants in auctions tends to differ from the predictions of normative models.

The first paper, by Subramaniam, Mittal and Inman, examines the difference in auction revenue for two different auction formats. Vickery’s landmark paper (Vickrey 1961) has shown revenue equivalence for several different auction formats. However, economists have not yet studied a new popular hybrid auction format used by eBay. Results of this study indicate that Vickery’s revenue equivalence theorem does not hold for a comparison of the English auction format (as used by Yahoo) and the hybrid strategy (as used by eBay).

The second paper, by Greenleaf, focuses on how sellers set reserve prices in auctions over time. A sequential auction experiment is used to study the anticipated effects of rejoicing (when the property sells for the reserve rather than due to competitive bidding) and regret (when the highest bid exceeds their value for the property but not the reserve) on reserve price. The results of this paper show that the impact of anticipated regret and rejoicing can be detected by observing how sellers set reserves when they learn over sequential auctions. This impact can also cause sellers’ learning to be opposite of predictions from normative models that omit regret and rejoicing.

Finally, Häubl and Popkowski Leszczyc investigate how two aspects of the intensity of competitive interaction in open ascending-bid auctions, the frequency of arrival of others’ bids and the perceived number of bidders, influence consumers’ valuations of auctioned items. Their results show that the dynamic competitive interaction among consumers in such auctions may result in bidding frenzy, a mental state characterized by a high level of arousal, a sense of competitiveness, and a strong desire to win. In contrast to normative models, the authors find that bidders’ valuations are influenced by the intensity of bidding.

The papers complement each other by studying different aspects and biases of consumer behavior in Internet auctions. Together, they enhance our understanding of consumer decision making in Internet auctions, which is becoming an increasingly important area of consumer research.

“Revenue Equivalence in Online Auctions: The Case of Yahoo and eBay”
Ramanathan Subramaniam, Vikas Mittal, and J. Jeffrey Inman, University of Pittsburgh

We compare the revenue generated in an English outcry auction to a hybrid auction. The hybrid auction combines the features of an English outcry auction and a second price sealed bid auction. In the hybrid format, the highest bidder and the second highest bid are known to all, and at the end of the auction duration the highest bidder gets the object at the second highest bid. Therefore, this hybrid is like a second price sealed bid auction with multiple rounds of bidding. This hybrid format is interesting as it is the format used in www.ebay.com. Theoretically, such a comparison is interesting as it establishes that the hybrid auction (ebay format) should yield a higher price realization than the English outcry auction even in the presence of risk aversion. In the past, it has been believed that the English Auction should generate the highest revenue when the bidders are risk averse (Milgrom and Weber 1982).

We argue that this hybrid auction has higher revenues because in such an auction the bidder has the opportunity to revise his valuation after observing rival valuations whereas in the English outcry, this revision is done after looking at the rival bids which yield less information than the valuation. Theoretically, this occurs because the hybrid being a second price auction, it is optimal for the bidder to bid his/her valuation at any point in time (if s/he chooses to bid).

We empirically examine the above hypothesis using data from two auctions: www.yahoo.com and www.ebay.com. Whereas eBay has exactly the same auction format as the hybrid described above, Yahoo has the same format as the English outcry auction with reentry. Specifically, we examine the revenue realized from auctions for 206 matched pairs of objects in yahoo.com and ebay.com. The pairs are matched with respect to the object being auctioned and the duration of the auction. We also statistically control for the presence of common values, last minute bidding, auction duration, reserve price, number of participating bidders and jump bidding (in the English outcry format).

Results show that the revenue realized from the hybrid auction is higher compared to the English outcry format in the presence of common values. We also find that jump bidding depresses revenues in the English outcry auction. Consistent with Wilcox (2000), and Roth and Ockenfels (2002), last minute bidding also negatively impacts the revenue realized. In our study, we compare the revenues from two different auction formats while accounting for last minute bidding behavior while Roth and Ockenfels (2002) specifically study the last minute bidding behavior and relate it to the rules for ending an auction. They look at www.ebay.com and www.amazon.com which have the same auction formats but differ only in their ending rules. They find last minute bidding behavior to be more pronounced in eBay than in Amazon. This result is primarily due to the ending rules in Amazon where the auction ends only if there are no bids submitted for some fixed period of time (rather than having a “hard” ending time as in eBay). Our study thus relates to this issue as we recognize and control for last minute bidding while comparing the revenues from eBay and Yahoo.

We also examine the impact of pre-emptive jump bidding in the English Outcry auction. Avery (1998) shows theoretically, that
such jump bidding behavior discourages other bidders resulting in higher payoffs for the bidder and thus reducing revenue for the seller. Our study verifies this empirically as we find that revenues from yahoo are less compared to ebay when there is last minute bidding.

In summary, by comparing the revenue from ebay and yahoo, this paper examines the revenue generated by a new auction format not studied in economic theory. This new format, that is ebay, yields higher revenue than the English outcry auction with reentry in the presence of risk aversion. Further, we are able to empirically show the effect of auction features such as jump bidding in Internet auctions. Finally, these results provide a possible reason for the popularity of the ebay format even when most bidders are risk averse. More importantly, support for this conjecture holds even when we control for last minute bidding. This suggests that the new hybrid format needs closer scrutiny on other dimensions as well.

“Reserves, Regret and Rejoicing in Open English Auctions”
Eric A. Greenleaf, New York University

One of the most important decisions that auction sellers must make is setting the reserve price, which is the lowest price at which they are willing to sell auctioned property to a bidder. If no bidder is willing to bid a price that at least equals the reserve price, the property does not sell (it is “bought in” in auction parlance) and it returns to the seller. The reserve affects the seller’s expected auction revenue. Optimal reserves have been modeled in an extensive theoretical auction literature (for reviews see Chakravarti et al. 2002; Klemperer 1999; McAfee and McMillan 1987; Rothkopf and Harstad 1994). However, there is still a need for work examines whether these auction models accurately reflect how sellers set reserves, and whether these models need to be enriched to accommodate additional aspects of seller decision making and utility.

This work proposes that anticipated regret and rejoicing (Bell 1982, 1983; Landman 1987, 1993; Larrick 1993; Loomes and Sugden 1982) affect how sellers set reserves, and whether these models need to be enriched to accommodate additional aspects of seller decision making and utility.

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We propose that the impact of regret and rejoicing can be observed by examining how sellers set reserves in a series of sequential auctions where important auction parameters are kept constant. This sequence allows sellers to learn as the auctions progress, so they can use the results they observe in the prior auction to help set their reserve in the next auction. We propose a learning model for how sellers will set reserves as they learn over sequential auctions. We show that certain aspects of learning for sellers who experience anticipated regret and rejoicing will be the opposite of learning if sellers do not experience these factors. This allows us to test for the presence of regret and rejoicing. We propose that this impact on learning will be particularly evident if sellers use a frequency heuristic (Alba and Marmorstein 1987; Alba et al. 1994; Hasher and Zacks 1984) to process information observed in prior auctions. More specifically, sellers using this heuristic will give relatively too much weight to which of four possible categorical auction outcomes occurred in the most recent auction (involving two ways that property can fail to sell, and two ways in which it can sell) and too little weight to the magnitude information which they can also observe, as embodied in the highest bid offered in the auction.

We use a laboratory auction experiment to test whether anticipated regret and rejoicing affect reserves. The 72 participants in this experiment act as auction sellers. To keep bidder behavior constant, the experiment uses simulated bidders. These bidders’ valuations and bidding strategy follow the independent private value model of bidder valuation (Vickrey 1961; Riley and Samuelson 1981). Sellers set reserves in a total of 36 consecutive auctions. These auctions contain four blocks of sequences that vary important elements of the auction - the number of bidders (3 vs. 6) and the seller’s own valuation ($2500 vs. $5500 experimental dollars) – to allow studying regret and rejoicing across a variety of auction contexts.

The results of the experiment support the impact of regret and rejoicing. We estimate the learning model using a repeated measures regression. We find that the impact of the auction outcomes proposed to cause anticipated regret, and anticipated rejoicing, have the signs consistent with those predicted for regret and rejoicing, rather than the opposite signs consistent with a learning process that does not incorporate regret and rejoicing. The results of this study suggest that anticipated regret and rejoicing should be incorporated into auction sellers’ utility functions.

“Bidding Frenzy: Intensity of Competitive Interaction Among Bidders and Product Valuation in Auctions”
Gerald Hübli and Peter T. L. Popkowski Lesczczyc, University of Alberta

This paper examines how the intensity of the competitive interaction among bidders affects their valuations of an auctioned item. The dynamic process of determining a product’s selling price in open ascending-bid auctions is characterized by a sequence of increasing bids by multiple consumers, with direct competition among bidders for “winning” the auction (Ariely and Simonson 2003; Ku, Malhorta and Murnighan 2003). We propose that, as a result of the interactive nature of such auctions, bidders may experience a mental state, which we refer to as bidding frenzy, that is characterized by a high level of arousal or excitement, a sense of competition, and a strong desire to win. Furthermore, we hypothe-
size that, all else being equal, greater levels of bidding frenzy will cause consumers to value an auctioned product more highly.

Our focus is on two key aspects of the intensity of competition in an auction on consumers’ product valuations: (1) the frequency of arrival of others’ bids and (2) the perceived total number of bidders participating in the auction. We propose that an auction participant’s experienced level of bidding frenzy increases as the pace at which others submit bids increases and as the perceived number of bidders decreases.

The effects of bidding frenzy on consumers’ product valuations were examined in five laboratory experiments. The studies used an innovative method, originally proposed by Häubl and Popkowski Leszczyc (2003), for measuring individuals’ product valuations in computer-based ascending-bid auctions. This method involves simulated auctions in which subjects are under the illusion that they are participating in an online auction with a group of other bidders.

In Experiment 1, we investigated the effect of dynamic interaction among bidders on consumers’ product valuations. To examine the net effect of being able to observe and react to others’ bids on an auction participant’s willingness to pay for a given product, we compared consumers’ bidding behavior under two auction types: open ascending-bid (English) auctions and second-price sealed-bid auctions. These auction formats are strategically equivalent, i.e., they can be shown analytically to produce the same expected selling price (Vickrey 1961). However, they differ in one important respect central to our research. While English auctions allow dynamic interaction among bidders with publicly available high bids, sealed-bid auctions do not. We find that bidders’ valuations of the auctioned product were significantly higher under the English versus the second-price sealed-bid format. Moreover, the positive effect of the interactive English-auction format on consumers’ willingness to pay is mediated by increased levels of indicators of bidding frenzy. The remaining experiments focused on English-style auctions.

Experiment 2 examines the effects of two key aspects of competitive intensity on consumers’ product valuations. Both the frequency of competitors’ arrival (the bidding machine’s bids) and the perceived number of active bidders in the online auction were manipulated independently. The results suggest that, all else being equal, higher frequency of competitors’ bids leads to higher product valuations, and that the effect is again mediated by the level of bidding frenzy.

In Experiment 3, we investigated whether the results obtained in Experiment 2 are affected by the level of the bid increment and time pressure (by varying the time till the completion of the auctions). The results show again that higher frequency of competitors’ bids leads to higher product valuations. However, the bid increment or the time pressure did not affect valuations.

In Experiment 4, we examined whether our results of bidding frenzy can be attributed to affiliation of bidders’ valuations. Milgrom and Weber (1982) proposed the affiliated-values model to accommodate notions of consumer learning, value updating and learning of bidding strategy. However, little research is available on the behavioral underpinnings of affiliation and its impact on consumer learning and strategic behavior (Chakravarti et al. 2002). The results of Experiment 4 indicate that learning about the value of an auctioned item based on the observed bidding behavior of other auction participants can be ruled out as an alternative explanation of the effects.

Finally, in Experiment 5 we tested for the importance of human interaction in the competitive bidding process. Our results indicate that a necessary condition for the experience of bidding frenzy is that an auction participant competes directly with other human bidders rather than with a pre-programmed electronic bidding agent.

The results of our five experiments provide strong support for the hypothesis that, all else being equal, both greater frequency of arrival of others’ bids and a smaller perceived number of bidders lead to higher product valuations. We also show that these effects on valuations are driven by the experienced level of bidding frenzy. These results are in sharp contrast to the normative theory of bidder behavior in auctions and represent an important building block of a behavioral theory of auctions.

References


