Anticipated Regret During Auctions: Empirical Evidence from Ebay

Abstract: It is not uncommon to regret one's own bidding decision at the end of an online auction. Whether this emotion is about regretting for giving up too easily on a bidding war or regretting for losing self-control and bidding too high, bidders often feel discomfort about their final bids. We consider two types of regret that are studied in the auction literature. A bidder may feel winner regret when she wins an auction and feels she paid too much, since her winning is the result of being the most optimistic bidder (among all auction participants) about the market value of the auctioned item and/or the honesty of the seller. Similarly, a bidder may feel loser regret when she loses an auction in which the winning bid turns out to be less than her valuation of the auctioned item. Clearly, both types of regret are realized when the bidders bid naively (or strategically) instead of bidding their true valuations of the items. Intuitively, anticipation of winner (resp., loser) regret should make the bidders lower (resp., increase) their bids. Several studies use lab experiments to show that the anticipation of both types of regret significantly affects the bidding behaviors in various auction settings.

To study the impact of regret feeling on the bidder's bidding behaviors and, ultimately, on the revenue of auction platforms, we collected a sample data set of eBay auctions that took place during May 2014. Auction platforms such as eBay act as a two-sided market by connecting sellers and bidders without taking ownership of the auction item and they use notification policies to affect its customers' bidding behaviors. Empirical evidence of significant (winner and/or loser) regret of bidders might invoke using similar notification policies as well. For example, notifications containing information about similar auction items, such as the highest bids, paid amounts, and number of bidders in those auctions can help influence the regret of bidders.
Similarly, more granular information about the sellers might help with the trust issues, which again can affect the regret level.

Auctions—particularly in online platforms—involve a vast amount of different sellers, bidders, and products in different categories, and hence they exhibit a high level of heterogeneity in bidding behavior. The auction literature suggests that heterogeneity in bidders' behavior can be explained by measures of their experience levels and learning. To provide a viable explanation of such auction platforms, we asked the following questions: Can we design a computationally tractable system to estimate bidders' bidding behaviors in an online auction platform? To what extent do bidders anticipate winner and loser regret and how such anticipation varies in bidders' experience and learning behavior? What is the effect of the aforementioned notification policies that mitigate bidders' regret on the auction platform's revenue?

To answer these questions, we develop a structural model that captures fundamental aspects of bidders' behaviors that are shown to be significant in the auction literature. In particular, (i) we account for the emotionally laden context of auctions in which, in addition to the regret anticipation, the bidders do not know the product's market value and learn it during the bidding process, for example, by gaining additional information about the auction item or resolving some of the uncertainties about the seller or about their own needs. (ii) We also consider the fact that bidders tend to bid incrementally in online auctions, and (iii) have different levels of experience which affect their bidding behaviors. In addition, (iv) we take into account both common and private value components of the auction item (i.e., affiliated value), and (v) what a bidder learns from the current highest bid during the bidding process.

We estimated the parameters of our model over an eBay data set that we crawled and scraped from the web in May 2014. We use the following estimation strategy to identify the regret
parameters of our model: First, at each bidding epoch during the bidding process, we model the utility of a bidder consisting of her expected profit, i.e., the difference between her valuation and bid, and her anticipated winner and loser regrets. Second, assuming the observed bid at each period is the one that maximizes the bidder's utility for a given valuation level, we derive –using the first order condition for the utility function– the bidder's revealed latent valuation for the auction item at that time period. Finally, we assume that this derived latent valuation (which is now a function of the bidder regret, among others) consists of a common value, a private value, and a component consisting of bidder's learning the value of the auction item from the highest observed bid. Equating these two approaches allows us to derive the required identifying equations for the regret parameters. More specifically, starting from prior distributions for the bids, number of bidders, and bidders' learning and regret, we update these distributions' parameters at each bidding epoch using these derived identifying equations and the observed data.

The estimation results show that, in all auction categories, both winner and loser regrets are significant and we find a positive relationship between winner and loser regret. We also find that those who are more regretful stick to status quo, i.e., they update their valuations less frequently and learn less from others. Furthermore, we find that experience can explain the heterogeneity in the bidders' learning, updating, and regretting behavior.

The estimated model enables us to analyze a counterfactual scenario in which the auction platform shuts down the bidders' winner regret. This analysis shows that, if an auction platform can shut down winner regret by its notification policies, it can increase its revenue by 24%. We also observe that shutting down winner regret can cause the highest bid to increase two to four folds in some auctions.