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Does feedback really matter in one-shot first-price auctions?

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ABSTRACT

Does the *type* of posterior feedback affect how people decide in one-shot environments? We revisit this question in first-price auction markets. We consider three feedback types: minimal (only knowing whether winning or not), loser (also knowing the winning bid) and winner (knowing the second highest bid if winning). Filiz-Ozbay and Ozbay (2007) find that loser as opposed to minimal or winner feedback increases bids. We use three novel protocols and additionally replicate theirs. Using a sample of 624 subjects, we find that bidders' *ex ante* knowledge of posterior feedback type has no systematic effect on the average bid/value ratios.

1. Introduction

Consider a one-time decision problem under risk or uncertainty. Upon choosing one of the alternatives, a decision-maker (DM) is typically informed about payoff outcome of the chosen alternative. She may or may not receive posterior feedback about payoff outcomes of the unchosen alternative(s). (Subjective) Expected Utility Theory predicts that knowing *ex ante* whether such additional information will or will not be available *ex post* has no impact on the decision. However, several studies have proposed that availability of such information may indeed play a role through anticipated regret (Bell, 1982; Loomes and Sudgen, 1982; Engelbrecht-Wiggans, 1989).

This possibility is interesting for mechanism design. If the presence of such feedback can affect people's behavior in the direction preferred by the mechanism designer, selection of the right kind of feedback becomes an important aspect of the design.

In this paper, we investigate whether the type of posterior feedback affects bidding in one-shot first-price sealed-bid auction with private values (FPA). At the end of the auction, each bidder learns whether she has won or not (*minimal feedback*). The auctioneer may, however, give bidders additional feedback and announce this fact before the bidding starts. For example, he may publicly announce he will disclose the winning bid to all the bidders after the auction (*loser feedback*).

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Or, alternatively, he may publicly announce he will disclose the second highest bid to the winner after the auction (*winner feedback*). These are the three feedback types we focus on in this paper.

There is some existing literature on this topic. Filiz-Ozbay and Ozbay (2007) (referred to as FO hereafter) find that, in one-shot bidding, bidders bid more aggressively (higher bid/value ratios) under loser feedback as opposed to minimal or winner feedback. In particular, FO find that the average bid/value ratio in their four-bidder FPA increases from .79 (.77) under minimal (winner) feedback to .87 under loser feedback. To assess how remarkable this increase is, notice that, under the assumption of uniformly distributed values and the theoretical prediction of risk-neutral Nash equilibrium, it is roughly equivalent to the effect of increasing the number of bidders from 4 to 6. However, while increasing competition by attracting new bidders is costly (and sometimes infeasible), changing the type of feedback is easy and costless.[2]

FO connect their findings to anticipated regret. They argue that loser as opposed to minimal feedback makes bidders worried about potential posterior regret of losing and learning that they could have profitably won by bidding more than the winning bid. To reduce the likelihood of such event, they bid more. There is also an argument for why winner as opposed to minimal feedback can make bidders bid less. This is because bidders might be worried about potential posterior regret of winning and learning that they could have won with a much smaller bid. To reduce the likelihood of such event, they bid less. This latter hypothesis is not supported by FO data, though.

Given the one-shot nature of the auction, this interpretation requires that bidders must anticipate regret even though they (most likely) do not have any recent experience of it in an auction of a similar kind.[3] However, this assumption does not square well with findings of several studies that investigate repeated FPAs (Isaac and Walker, 1985; Ockenfels and Selten, 2005; Neugebauer and Selten, 2006; Neugebauer and Perote, 2008; Engelbrecht-Wiggans and Katok, 2008). These studies generally find that loser (winner) feedback leads to higher (lower) bid/value ratios compared to minimal feedback in later rounds of repeated bidding.[4] However, most of these studies find no effect of feedback in the first bidding round (Ockenfels and Selten, 2005; Neugebauer and Selten, 2006; Neugebauer and Perote, 2008). These contradictory findings have recently sparked a debate about this important market design issue (see, for instance, Neugebauer and Perote (2008)[5] and Kagel and Levin (2011)[6]). In this paper, we contribute to this debate by comprehensively testing for the presence of feedback effects in one-shot bidding environments using four different protocols involving one computerized opponent, one and three human opponents, and a replication of the protocol used by FO.

The first protocol we analyze, denoted HC, identifies feedback effects under the simplest possible non-strategic environment. In this setting, a human bidder faces a computerized opponent that draws its bid from a known uniform distribution. The second protocol, denoted 2H, is an auction with two *ex ante* symmetric human bidders. This is a natural extension of HC to the simplest possible strategic environment. In this setting, the effect of feedback operates not only through a direct preference channel, but also through an indirect channel of beliefs about how feedback might affect the bidding strategy of the opponent (plus all the higher order beliefs). The comparison with HC highlights the impact of these indirect effects. In both of these two protocols, we use all three feedback types: minimal, loser and winner.

We find that the type of feedback has no significant impact on the average bid/value ratio in either of the two protocols. Regarding the effect of winner vs. minimal feedback, this finding is consistent with the finding of FO. However, regarding the effect of loser vs. minimal feedback, our finding contradicts their conclusions.

Since FO use four human bidders, our findings from the two-bidder auctions (HC and 2H) might suggest that the effects of feedback might be sensitive to the level of bidding competition.[7] To examine this possibility, we introduce the third protocol, denoted 4H. This is an auction with four human bidders that otherwise uses the same procedure as 2H. In light of

[2] Although setting a positive reserve price is also a costless way of increasing expected revenue (Myerson, 1981; Riley and Samuelson, 1981), its effect may be limited if bidder competition is already strong, and it exposes the auctioneer to the risk of retaining the object. Moreover, setting an optimal reserve price requires fine knowledge of distributions of bidders' values and preferences, which might not be known in many applications.

[3] In addition, this interpretation requires that bidder preferences change with feedback type. In the absence of this assumption, one can use the Law of Iterated Expectations to show that feedback has no effect on equilibrium bids. Please refer to the working paper version of this study Katuščák et al. (2013) for more details.

[4] Engelbrecht-Wiggans and Katok (2008) is the only study that utilizes winner feedback. The absolute size of the effect vis-á-vis minimal feedback is smaller than the one for loser feedback.

[5] Neugebauer and Perote (2008) write in footnote 14: "The possibility of anticipating regret has been proposed by Ozbay and Filiz (in press). They report that subjects change their bid according to the anticipated feedback in a one-shot, contingent bid first price auction. However, this pattern seems difficult to reproduce in the first round of the repeated setting. Our results as well as the data reported in Neugebauer and Selten (2006) and Dufwenberg and Gneezy (2002) rather suggest that the first round bids are the same across feedback treatments." In addition, see also evidence from Fig. 1 in Ockenfels and Selten (2005). On the other hand, Fig. 1 in Isaac and Walker (1985) and Figs. 1 and 2 in Engelbrecht-Wiggans and Katok (2008) suggest that loser feedback generates the highest bid/value ratios even in the first round (Isaac and Walker (1985) compare loser with complete feedback, i.e., revealing all bids, and Engelbrecht-Wiggans and Katok (2008) compare minimal, loser, winner and full feedback, i.e., revealing the highest bid of the opponents). In neither of the two studies do the authors report any formal test results for the first round. Further, in Engelbrecht-Wiggans and Katok (2008), loser feedback includes explicit information on money left on the table and Isaac and Walker (1985) include explicit information about the identity of the bidders. Both differences hinder comparability of these two studies to our study and the other cited studies.

[6] Kagel and Levin (2011) note: "To sum up: FO's introduction of regret theory to explain bidding above the RNNE in FPSB auctions is quite innovative. However, the statistical significance of their results are suspect, and Engelbrecht-Wiggans and Katok (2008) and Neugebauer and Selten (2006) fail to replicate their results."

[7] Even though it is not *a priori* clear why market size should interact with feedback, it is worth to carry out this robustness check. In fact, within a repeated bidding environment, Neugebauer and Selten (2006) find that the effect of feedback on bidding is more pronounced in auctions against a higher number of computerized opponents.