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Do Practice Rounds Bias Experimental Auction Results?

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Selected Paper prepared for presentation at the Agricultural & Applied Economics Association's 2011 AAEA & NAREA Joint Annual Meeting, Pittsburgh, Pennsylvania, July 24-26, 2011.

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Introduction

Agricultural economists use experimental auctions to gain insight into consumer behavior, the impact of information, and more (Lusk and Shogren 2007). Part of the appeal is that experimental auctions are theoretically demand revealing. However, several recent studies find that experimental auctions may not be demand revealing in practice. Factors affecting bids include posting prices across repeated rounds (Corrigan et al. 2011), participation fees (Loureiro et al. 2003), and endowing participants with products (Corrigan and Rousu 2006).

A set of best-practices has emerged to minimize potential biases in experimental auction results. For example, most practitioners agree that auction experiments should include practice sessions. (Drichoutis et al. 2010) show that participants with extensive training bid more rationally than those without. (Rickertsen and Alfnes 2011), in a review of experimental auctions, present a list of recommendations for practitioners, including “make sure the participants understand the mechanism”. The authors suggest that one way to ensure understanding is to include practice rounds.

However, practice rounds raise their own unanswered questions. Research suggests that bids can become “anchored” to seemingly unrelated price information (e.g., Ariely et al. 2003). If so, practice bids may inadvertently affect later “real” bids. Absent anchoring, practice bids could perhaps explain some variation in real bidding. For example, free-spending bidders may place higher value on all products, while more trusting bidders may have greater faith in the auction mechanism. Either group would bid higher in both practice and real rounds.

Misunderstanding of the auction mechanism could also lead to correlation between practice and

real bids. Participants who mistakenly believe it is their best interest to underbid might do so in both practice and real rounds.

To our knowledge, no study has looked at the relationship between practice and real bids, let alone tried to determine what drives any possible correlation. We do this first, by examining results from two experimental auctions for goods with homegrown values and find a significant positive correlation between practice and real bids for unrelated products. We then use results from an experiment that uses an induced value practice auction prior to using a homegrown auction to help determine what causes this correlation. We begin by discussing the data from the homegrown auction experiments

How do practice rounds influence bidding homegrown-value auctions?

We used results from two auctions that the authors of this paper published in the past. We also looked for other datasets from other authors, both from our own experiments and by others. In other datasets we found where practice round bids were collected – the bids were never entered into the datasets. This is true both for our old datasets and others. We emailed one prominent experimental economist who works on agricultural economic issues and were told:

I pulled up three old data sets associated with various published papers. Alas, it seems I did not enter the practice round data (normally with candy bars) for any of them. In all the studies I've done, the “practice” rounds have been non-hypothetical.

This issue has been completely off the radar of experimental economists, which is odd given how much research has gone into showing how auction procedures can matter. We look at two different studies to examine how practice round bids correlate with real round bids.

Study 1: Practice bids on pens and pencils before bidding on fair trade food products

This data set comes from Corrigan and Rousu (2008). We will only present a brief overview of the experimental design here, for a more complete look at the design see Corrigan and Rousu (2008), Rousu and Corrigan (2008a,b), or Colson, Corrigan, and Rousu (2010). Participants in this field experiment bid in hypothetical practice auctions on a box of pens and a box of pencils. In real auction rounds participants placed bids on a chocolate candy bar and a bunch of bananas. The demand revealing BDM mechanism was used.

Figure 1 shows a clear positive relationship between the bids in the practice and real rounds. The regression results below (t-statistics in parentheses) show that a \$0.10 increase in a participant's average practice round bid is associated with a \$0.05 increase in average real round bid. This result is statistically significant at the 1% level.

$$\text{Real Bid} = 0.48 + 0.49 \times \text{Practice Bid}$$

(4.17) (8.17)

Study 2: Practice bids on candy bars before real round bids on cigarettes

This data set comes from Thrasher et al. (2011). Again, we only present a brief design here. Participants in this field experiment bid in hypothetical practice auctions on two candy bars. In real auction rounds participants bid on cigarettes with different types of labels. The demand revealing BDM mechanism was used.

Figure 2 again shows a clear positive relationship between the bids in the practice and real rounds. The regression results below (t-statistics in parentheses) show that a \$0.10 increase in a participant's average practice round bid is associated with a \$0.15 increase in average real round bid. This result is statistically significant at the 1% level.

$$\text{Real Bid} = 2.23 + 1.47 \times \text{Practice Bid}$$

(11.6) (6.60)

Potential explanations for why practice rounds affect real round bidding

We find clear evidence that there is a positive relationship between bids in the practice round and bids in the real round. However, there are many potential reasons for why this relationship might exist. We now outline several different theories that could potentially explain why high bidding in the practice round may be correlated with high bidding in the real rounds.

Free-Spending Effect

One participant may be more likely to bid more for all products– i.e., he or she may be more free-spending. If this is the case, we would expect that participant to bid more for all products in an auction – both practice round bids and real round bids.

Trust Effect

Some participants in an auction setting may be more skeptical of the proceedings – thinking the experimental auction may be a scam or simply not trust the procedures in the auction. If this occurs, we would expect those who bid low because of lack of trust in the practice auctions to also bid low in the real auction rounds.

Anchoring Effect

There is widespread evidence that bids can be anchored (Corrigan and Rousu 2006, Nunes and Boatwright 2004). Because of this, if a participant bids higher in a practice round, she may subconsciously anchor her bid in the real round to the bid in the practice round.

Misunderstanding Effect

Most participants in field auctions have never before participated in a 2nd price auction, nor have they used the BDM mechanism. Thus, following the state-of-the-art procedures recommending explanations and practice rounds may not be sufficient for participants to understand how the auction works.

Any of these four explanations could be driving the results, and the results from the homegrown auction alone will not let us determine which of these four explanations may be causing the correlation between practice bids and real round bids. To help gain insight into which of these explanations might be most likely, we designed and conducted an induced value auction. We now describe the auction.

Induced Value Auctions: Design and Results

Study 3: Practice bids on induced values before real round bids on coffee mugs

In order to determine whether anchoring alone is driving the positive correlation between practice and real round bids observed in the previous sections, we report the results of a study where all participants submitted practice bids for a \$1 induced value and then submitted real bids for a university-logo coffee mug. These data were collected at Iowa State University in the spring of 2002 and are described in Corrigan (2005). The experiment consisted of four experimental units—two WTP and two WTA—each with thirty participants, for a total of 120 participants.

Each experimental treatment had six steps. (1) Subjects were read an introduction to the experiment and an explanation of the random nth-price auction mechanism. (2) Subjects submitted bids in a hypothetical auction for a dollar bill. (3) The monitor explained that the next two auction rounds would be for a university-logo coffee mug and that only one of the two rounds would be binding.¹ (4) Subjects inspected the mug and, depending on the treatment, submitted bids indicating their WTP or WTA. Participants then completed and submitted a socioeconomic survey. (5) Subjects submitted a second bid indicating either their WTP or WTA. (6) The monitor determined and announced the binding round and random nth price, and any transactions agreed to were carried out.

During the first step, subjects read along as the monitor read the experiment's instructions aloud. These instructions contained both a brief introduction to the experiment, as well as a detailed description of the workings of the random nth-price auction. The monitor also went over an example auction on the blackboard and administered a short quiz to test subjects' understanding of the auction mechanism.

The second step was a non-binding practice auction for a dollar bill. Depending on whether subjects in a given round had been assigned the role of buyers or sellers, they bid to buy or sell a dollar bill. Bids were collected and ranked on the blackboard. The monitor randomly selected and announced the nth price, then informed that, had this been a real round, anyone who submitted a bid above (below) the cut-off price would buy (sell) a dollar bill.

During step three, the monitor informed subjects that the following two auction rounds would be for a university-logo coffee mugs, but that only one of the two rounds would be

¹ The results from the second potentially binding auction round were used as part of a different study focusing on how auction values are affected by information about the extent of the resale market and are not reported here.

binding, and that the binding round would be determined by a coin flip after both rounds had been completed. This was done to eliminate demand-curve effects.

In step four, subjects were given the chance to inspect the mugs being auctioned off and to submit a bid indicating their maximum willingness to pay (minimum willingness to accept compensation in exchange for) for such a mug. After submitting their bids, subjects completed a survey designed to collect data on their age, gender, and income. Upon completion, the monitor collected these surveys.

During step five, subjects submitted a second bid indicating their maximum willingness to pay (minimum willingness to accept compensation in exchange) for the mug.

In step six, the binding mug round was determined by flipping a coin. After announcing the result of the coin flip, the bids from that round were ranked on the blackboard. The cut-off bid was determined at random and was announced along with the cut-off price. Subjects were informed that if they had submitted a bid above (below) this cut-off price, they would purchase (sell) a mug at that price. Subjects were then paid \$15 for their participation, and any transactions agreed to were carried out.

In order to solicit subjects' valuations, we used a variation of the random nth-price auction mechanism developed by Shogren *et al.* (2001). Specifically, the market price is chosen at random from the bids submitted by market participants. In the buyer case, one of the bids submitted by potential buyers is chosen at random as the cut-off price. Anyone who submitted a bid higher than that price buys the good at the cut-off price. Anyone who submitted a bid at or below the cut-off price buys nothing. Thus, by separating what subjects bid from what they pay if they win the auction, the random nth-price auction mechanism preserves the demand-revealing properties of the Vickrey auction. Shogren *et al.* (2001) show that the random nth-price auction

does in fact outperform the Vickrey auction mechanism when it comes to motivating off-margin bidders to bid their true valuation in an auction for induced value tokens.²

Figure 3 shows the positive correlation between the practice bid for a dollar bill and the real bid for a coffee mug from the combined treatments. The following regression analysis confirms that there is indeed a positive and statistically significant relationship between practice bids and real bids. Note that t-statistics are in parentheses.

$$\text{Real Bid} = 0.92 + 2.78 \times \text{Practice Bid}$$

(0.92) (2.75)

These results suggest that a 10¢ increase in the practice bid results in roughly a 28¢ increase in the real bid that follows.³ Again, because the “induced value” in the practice round did not vary across participants, anchoring cannot explain this correlation. The correlation must instead be the result of trust, free spending, or misunderstanding. Unfortunately, this data set does not allow us to distinguish which of these three possible explanations is primarily responsible for the correlation between practice bids and real bids.

Conclusion

The use of practice auction rounds to ensure participant understanding is now standard in experimental auctions. The effect of practice round bids, however, has been ignored. In this paper we compare practice round and real round bids from three auction experiments and find a positive and statistically significant relationship in each case. We then discuss four potential

² It can be argued that the random nth-price auction mechanism’s endogenous determination of market price is actually a weakness. For example, an altruistic potential buyer might submit a zero bid in the hope that her bid would be chosen as the cut-off price, thus yielding the highest possible surplus for her fellow bidders.

³ Focusing on WTP or WTA in isolation yields results that are qualitatively similar though not statistically significant at conventional levels. We also excluded data for an individual who submitted a \$4 bid for the dollar bill in the practice round. Including this individual’s bids does not qualitatively change our results but does reduce their statistical significance.

reasons for this relationship: the free spending effect, the trust effect, the misunderstanding effect, and the anchoring effect.

While we cannot determine which of these four effects is the primary determinant of the correlation between practice and real bids, the results from our induced value auction show that the correlation is not simply the results of anchoring. Future research involving more induced value experiments is needed to help determine which of these effects is causing the positive correlation between practice round bids and real round bids.

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Figure 1: Relationship between practice and real bids in the fair trade study

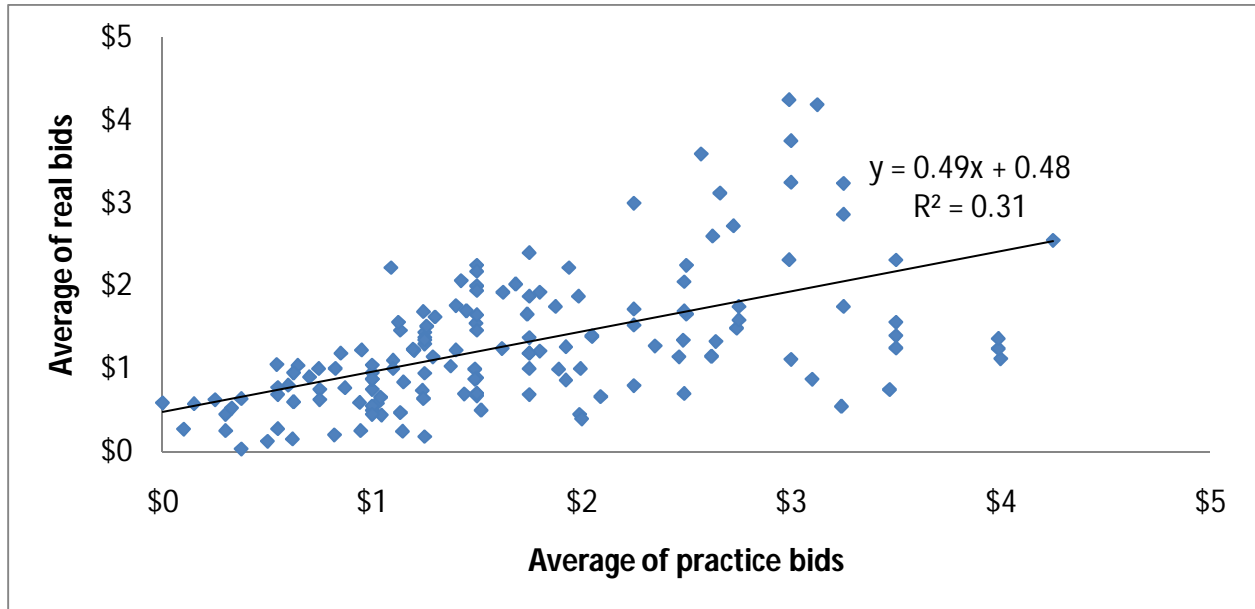


Figure 2: Relationship between practice and real bids in the cigarette labeling study

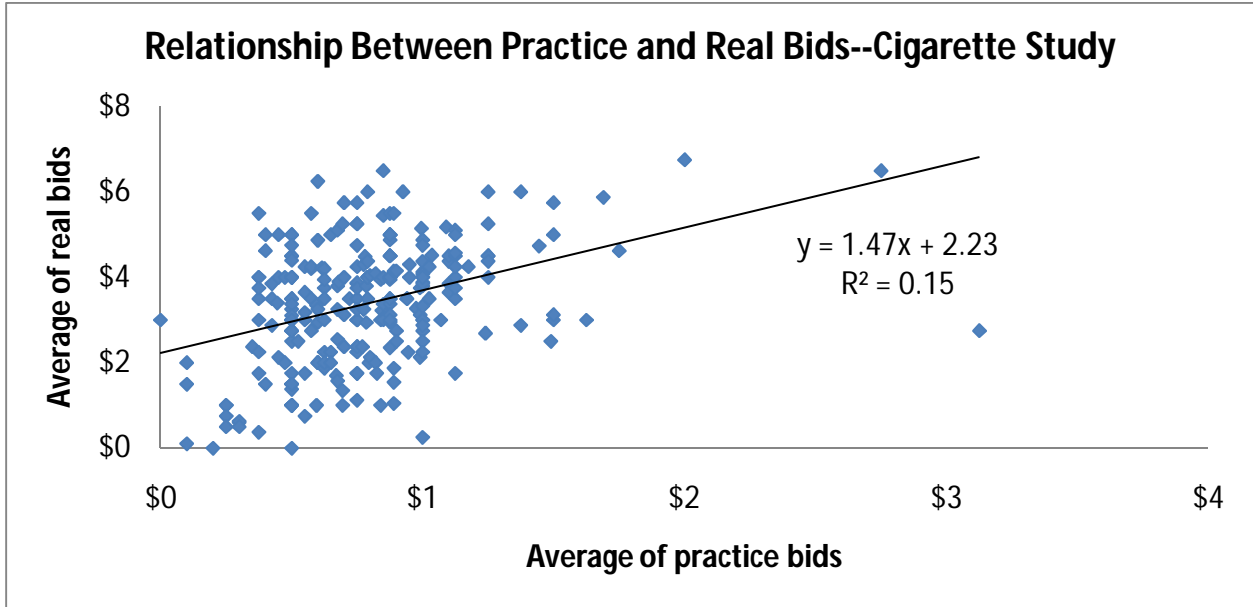


Figure 3: Relationship between practice and real bids in the induced value study

