Attachment D
Instructions

Instructions

Welcome to the Experimental Economics Laboratory. This study has received funding from the United Stated Department of Agriculture. In this experiment, you will participate in a series of auctions as a bidder. Please pay careful attention to the instructions as real money is at stake. Your earnings will be paid to you in cash at the end of the experiment, which is expected to last about 90 minutes. The precise rules and procedures of the auctions will be explained to you below.

The type of currency we will use throughout the session is Experimental Currency Units (ECUs). Participants completing the session do not risk losing any money. At the end of the experiment all your earnings will be converted to US Dollars. You will be paid in cash when you finish the experiment.

General Procedure:

You will be participating in several rounds of auctions. In each round you will be bidding against your fellow participants. The same set of participants will be in each auction.

In a given auction, each bidder holds an object and aims to sell it to the buyer (represented by a computer program). The precise rules of each auction are explained below.

When a round starts, you will privately observe your cost of the object. If you sell the object to the buyer for more than this amount, the difference represents a profit to you. Your cost will be an integer number randomly selected from 10 to 110 ECUs. All numbers are drawn independently from other bidders' cost and from draws in other rounds. The other bidders participating in this auction receive their private cost for their object in the same manner. Each bidder will know only his/her cost.

There are 16 participants in each auction, each holding a single object every round. The buyer wishes to purchase 8 objects in each auction.

You will compete in three different types of auctions. Each type will have approximately 15 rounds.

For each type of auction, you will be paid based on the sum of two randomly selected rounds.

[End of welcome instructions. Subjects will now read the instructions for the first auction that they will participate in, which is not necessarily Auction 1. All subjects in a given session will read the same instructions in the same order, but subjects in different

sessions will read – and participate in – auction instructions in different orders. This prevents *learning effects*, i.e. the effect of becoming generally more adept at participating auctions, from being confounded with true differences between auctions.]

***Auction 1*:**

The buyer sets a maximum bid (or *price cap*) that you can submit for your object at the auction. The maximum bid is specific to each bidder and equals bidder's cost PLUS a constant of 5 ECUs, PLUS a random number ranging between -5 to +5 (all numbers equally likely). That is:

$$Max\,Bid = Cost + 5 + Random\,number \in [-5, +5]$$

When an auction begins, you will learn both your cost and the maximum price that you can bid. Using this information, you must then decide whether and how much to bid in the auction. The buyer will accept the 8 lowest bids to purchase, and will reject the remaining bids.

If you sell your object, your profits in ECUs for the round will be the difference between your bid and your cost ($PROFIT = BID - COST$). If you do not sell any object your profits for the round will be zero ECUs.

Example:

Suppose there are three bidders with their corresponding objects and with costs equal 40, 53, and 55 ECUs, respectively for bidders 1, 2 and 3. The buyer in this case agrees to purchase two objects. Price caps are 45, 57 and 58 ECUs and bidders submit offers for 44, 57 and 56, respectively. Since the lowest two offers are 44 and 56 of bidders 1 and 3, those bidders get to sell their objects. Finally, profit for bidder 1 equals 44-40=4 ECUs; for bidder 2, who does not sell his/her object, profit equals 0; and for bidder 3, profit equals 56-55=1.

[Break. The following instructions are not to be read unless and until subjects participate in Auction treatment 2. Please note that these instructions are implemented in a software package, not handed out as hard copies. Therefore subjects only see the relevant instructions at any point in time.]

Auction 2:

Same as auction 1, except the *maximum bid* equals bidder's cost PLUS a fixed term of 15 ECUs PLUS a random number ranging between -5 and +5. That is:

$$Max\,Bid = Cost + 15 + Random\,number \in [-5, +5]$$

[Break. The instructions that follow are not to be read unless and until subjects participate in Auction treatment 3.]

Auction 3:

The buyer sets a *reference price* specific to each bidder. The reference price equals bidder's cost PLUS a random number from -5 to +5. That is:

$$Reference = Cost + Random\,number \in [-5, +5]$$

Reference prices are used to compare bids among participants as follows:

At the beginning of the round, each bidder learns both his/her cost and *reference price*. Then, each bidder submits a bid and the computer calculates <u>*each bidder's score*</u> as: SCORE = bidder's bid DIVIDED BY bidder's reference price (that is, $SCORE = bid / reference$), plus reference price DIVIDED BY a constant *c*. That is:

$$score = \frac{bid}{reference} + \frac{reference}{c}$$

The score is computed for you on the screen, so you can enter your bid – the payment you are requesting – and a score will be calculated for you before you submit. You may change your bid as many times as you like before submitting.

Finally, the buyer will accept the <u>8 bids with the lowest scores to purchase</u>, and will reject the remaining bids.

If you sell the object, your profits for the round will be the difference between your bid and your cost ($PROFIT = BID - COST$). If you do not sell the object your profits for the round will be zero ECUs.

<u>*Example:*</u>
Suppose there are three bidders with their corresponding objects and with costs equal 40, 53, and 55 ECUs, respectively for bidders 1, 2 and 3. The buyer in this case agrees to purchase 2 objects. Reference prices are 45, 57 and 58 ECUs and bidders submit offers for 44, 57 and 56, respectively. The resulting scores for each bidder are 5.47, 6.7, and 6.76. Bidders 1 and 2 are selected to sell their items, as their scores are lowest (even though bidder 2 actually made a *higher* offer to sell than bidder 3). Finally, profit for bidder 1 equals 44-40=4 ECUs; for bidder 2 profit equals 57-53=3 ECUs; and for bidder 3, who does not sell his/her object, profit equals 0.

[Break. The instructions that follow are not to be read unless and until subjects participate in Auction treatment 4.]

***Auction 4*:**

The buyer sets a *reference price* specific to each bidder. Reference prices are used to compare bids among participants as follows:

1. At the beginning of the round, the computer generates a noisy estimate of each seller/bidders cost. This cost estimate equals the actual cost PLUS a random number between -5 and +5. That is,
$$Cost\ Estimate = Cost + Random\ number \in [-5, +5].$$
2. Then all bidders are sorted according to this estimate, and bidders are compared to their four nearest neighbors in terms of *Cost Estimate*. That is, each participant is evaluated compared to a group of similar bidders.
3. The computer sets for each bidder a reference price that is equal to the average bid within his/her group.
4. Each *bidder score* is calculated as bidder's bid DIVIDED BY the reference price. That is,
$$SCORE = \frac{bid}{reference}.$$
5. Finally, the buyer will accept the 8 bids with the lowest scores to purchase, and will reject the remaining bids.

If you sell the object, your profits for the round will be the difference between your bid and your cost (PROFIT = BID – COST). If you do not sell the object your profits for the round will be zero ECUs.

Example:

1. Suppose there are two bidders that belong to different groups (A and B) and they both submit bids of 0.60 ECUs.
2. Suppose that average bids in those groups A and B are 0.50 and 0.75 ECUs, respectively.
3. For bidder in group A, her score is 0.60/0.50 = 1.2.
4. For bidder in group B, his score is 0.60/0.75 = 0.8.
5. Since 0.8 < 1.2 the bidder in group B will sell his object first if demand is high enough.

[Break. The instructions that follow are not to be read unless and until subjects participate in Auction treatment 5.]

***Auction 5*:**

In this auction, bidders are divided into two different groups and buyer sets a total quantity demanded (8 objects) as well as a maximum quantity demanded by group (6 objects).

1. At the beginning of the round, each bidder is assigned randomly to either Group A or Group B. Each group has 8 bidders.
2. Each bidder learns his *cost* and *group* and then submits a bid.
3. The buyer will accept the 8 lowest bids to purchase, unless doing so causes the buyer to accept more than the maximum number of objects allowed from a given group (6 objects). If the buyer is prevented from purchasing an object because of the group limit, the buyer will select for purchase the eligible object with the next-lowest bid.

If you sell the object, your profits for the round will be the difference between your bid and your cost (PROFIT = BID – COST). If you do not sell the object your profits for the round will be zero ECUs.

Example:
Suppose that the buyer wishes to purchase 8 total units, and will purchase a maximum of 6 from each group. The buyer receives the following bids:

From Group A sellers submit: $1, 2, 3, 4, 5, 6, 7, and 8.
From Group B sellers submit: $7, 8, 9, 10, 11, 12, 13, and 14.

In a "regular" auction (where simply the 8th lowest bids win) the following bids would be accepted:

From Group A: Bids of $1, 2, 3, 4, 5, 6, and 7 (Total = 7)
From Group B: Bid of $7. (Total = 1)

In this auction, however, the following bids would be accepted:

From Group A: Bids of $1, 2, 3, 4, 5, and 6 (Total = 6)
From Group B: Bids of $7, and 8 (Total = 2)

This happens because a maximum of six bids could be accepted from each group, precluding the acceptance of the seventh-lowest bid from Group A.