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**Attachment D**  
***Instructions***

## 3 Instructions

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

10  
11 The type of currency we will use throughout the session is Experimental Currency Units  
12 (ECUs). Participants completing the session do not risk losing any money. At the end of  
13 the experiment all your earnings will be converted to US Dollars. You will be paid in  
14 cash when you finish the experiment.

### 15 **General Procedure:**

16  
17  
18 You will be participating in several rounds of auctions. In each round you will be bidding  
19 against your fellow participants. The same set of participants will be in each auction.

20  
21 In a given auction, each bidder holds an object and aims to sell it to the buyer  
22 (represented by a computer program). The precise rules of each auction are explained  
23 below.

24  
25 When a round starts, you will privately observe your cost of the object. If you sell the  
26 object to the buyer for more than this amount, the difference represents a profit to you.  
27 Your cost will be an integer number randomly selected from 10 to 110 ECUs. All  
28 numbers are drawn independently from other bidders' cost and from draws in other  
29 rounds. The other bidders participating in this auction receive their private cost for their  
30 object in the same manner. Each bidder will know only his/her cost.

31  
32 There are 16 participants in each auction, each holding a single object every round. The  
33 buyer wishes to purchase 8 objects in each auction.

34  
35 You will compete in three different types of auctions. Each type will have approximately  
36 15 rounds.

37  
38 For each type of auction, you will be paid based on the sum of two randomly selected  
39 rounds.

40  
41 [End of welcome instructions. Subjects will now read the instructions for the first  
42 auction that they will participate in, which is not necessarily Auction 1. All subjects in a  
43 given session will read the same instructions in the same order, but subjects in different

44 sessions will read - and participate in - auction instructions in different orders. This  
45 prevents *learning effects*, i.e. the effect of becoming generally more adept at  
46 participating auctions, from being confounded with true differences between auctions.]  
47  
48

49 **Auction 1:**

50

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

55

56

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

57

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

62

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

66

67 Example:

68 Suppose there are three bidders with their corresponding objects and with costs equal  
69 40, 53, and 55 ECUs, respectively for bidders 1, 2 and 3. The buyer in this case agrees to  
70 purchase two objects. Price caps are 45, 57 and 58 ECUs and bidders submit offers for  
71 44, 57 and 56, respectively. Since the lowest two offers are 44 and 56 of bidders 1 and 3,  
72 those bidders get to sell their objects. Finally, profit for bidder 1 equals  $44 - 40 = 4$  ECUs;  
73 for bidder 2, who does not sell his/her object, profit equals 0; and for bidder 3, profit  
74 equals  $56 - 55 = 1$ .

75

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

80

81 **Auction 2:**

82

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

85

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

86

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

89

90

91 **Auction 3:**

92

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

95

96

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

97

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

99

100 At the beginning of the round, each bidder learns both his/her cost and *reference price*.

101 Then, each bidder submits a bid and the computer calculates each bidder's score as:

102 SCORE = bidder's bid DIVIDED BY bidder's reference price (that is,  
103  $SCORE = bid / reference$ ), plus reference price DIVIDED BY a constant  $c$ . That is:

104

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

105

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

109

110 Finally, the buyer will accept the 8 bids with the lowest scores to purchase, and will  
111 reject the remaining bids.

112

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

116

117

118 **Example:**

119 Suppose there are three bidders with their corresponding objects and with costs equal  
120 40, 53, and 55 ECUs, respectively for bidders 1, 2 and 3. The buyer in this case agrees to  
121 purchase 2 objects. Reference prices are 45, 57 and 58 ECUs and bidders submit offers  
122 for 44, 57 and 56, respectively. The resulting scores for each bidder are 5.47, 6.7, and  
123 6.76. Bidders 1 and 2 are selected to sell their items, as their scores are lowest (even  
124 though bidder 2 actually made a *higher* offer to sell than bidder 3). Finally, profit for  
125 bidder 1 equals 44-40=4 ECUs; for bidder 2 profit equals 57-53=3 ECUs; and for bidder 3,  
126 who does not sell his/her object, profit equals 0.

127

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

130

131 **Auction 4:**

132

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

135

136 1. At the beginning of the round, the computer generates a noisy estimate of each  
137 seller/bidders cost. This cost estimate equals the actual cost PLUS a random  
138 number between -5 and +5. That is,

139 
$$\text{Cost Estimate} = \text{Cost} + \text{Random number} \in [-5, +5].$$

140 2. Then all bidders are sorted according to this estimate, and bidders are compared  
141 to their four nearest neighbors in terms of *Cost Estimate*. That is, each  
142 participant is evaluated compared to a group of similar bidders.

143 3. The computer sets for each bidder a reference price that is equal to the average  
144 bid within his/her group.

145 4. Each bidder score is calculated as bidder's bid DIVIDED BY the reference price.  
146 That is,

147 
$$\text{SCORE} = \frac{\text{bid}}{\text{reference}}.$$

148 5. Finally, the buyer will accept the 8 bids with the lowest scores to purchase, and  
149 will reject the remaining bids.

150

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

154

155 Example:

156 1. Suppose there are two bidders that belong to different groups (A and B) and  
157 they both submit bids of 0.60 ECUs.

158 2. Suppose that average bids in those groups A and B are 0.50 and 0.75 ECUs,  
159 respectively.

160 3. For bidder in group A, her score is  $0.60/0.50 = 1.2$ .

161 4. For bidder in group B, his score is  $0.60/0.75 = 0.8$ .

162 5. Since  $0.8 < 1.2$  the bidder in group B will sell his object first if demand is high  
163 enough.

164

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

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170

171 **Auction 5:**

172

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

176

177 1. At the beginning of the round, each bidder is assigned randomly to either Group  
178 A or Group B. Each group has 8 bidders.

179 2. Each bidder learns his *cost* and *group* and then submits a bid.

180 3. The buyer will accept the 8 lowest bids to purchase, unless doing so causes the  
181 buyer to accept more than the maximum number of objects allowed from a  
182 given group (6 objects). If the buyer is prevented from purchasing an object  
183 because of the group limit, the buyer will select for purchase the eligible object  
184 with the next-lowest bid.

185

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

189

190 Example:

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

193 From Group A sellers submit: \$1, 2, 3, 4, 5, 6, 7, and 8.

194 From Group B sellers submit: \$7, 8, 9, 10, 11, 12, 13, and 14.

195

196

197 In a "regular" auction (where simply the 8<sup>th</sup> lowest bids win) the following bids would be  
198 accepted:

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

200 From Group B: Bid of \$7. (Total = 1)

201

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

203 From Group A: Bids of \$1, 2, 3, 4, 5, and 6 (Total = 6)

204 From Group B: Bids of \$7, and 8 (Total = 2)

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

207

208