

INSTRUCTIONS

This is an experiment in the economics of market decision making. Various research organizations have provided funds for conducting this research. The instructions are simple, and if you follow them carefully and make good decisions, you may earn a **CONSIDERABLE AMOUNT OF MONEY** which will be **PAID TO YOU IN CASH** at the end of the experiment.

In this experiment, we will create a market in which you will act as bidders in a sequence of auctions.

In each auction:

1. Each bidder will be assigned values for two (2) units of a commodity they wish to purchase. These values represent the value of the good to you - what we will pay you for any items purchased.
2. Each bidder bids for each of the two (2) items to be assigned to him/her.
3. Each of you will be bidding in a separate market consisting initially of 4 bidders - yourself along with three (3) other bidders. Each of the other 3 bidders is assigned values for two (2) units in the same way that your values were assigned. The particular values assigned to the other 3 bidders will typically be different from yours. Thus, in the auction there will be a total of 8 values and 8 bids (2 of yours and 6 by the other bidders).
4. Values for all bidders will be randomly drawn from the interval \$0.0 to \$7.50. Any value within this interval has an equally likely chance of being drawn and being assigned as a value. New values will be drawn before each auction.
5. There will be two (2) units for sale in each auction.

Assignment rules and profit calculations:

Items will be allocated using the following procedure:

The auction will consist of 2 rounds:

Round 1: Everyone submits a bid for each of the two units they control. These bids are ranked from highest to lowest, the 4 lowest bids are announced, and the bidders controlling these units are no longer permitted to bid on those units. (Note, if one of your two bids is among the 4 lowest and one is among the 4 highest, it is only the unit associated with your low bid that is dropped from the bidding.)

Round 2: Bidders submit new bids on the items they are still active on. Those who get to earn units and the prices they pay are based on this second round of bids. You are free to change your bid between rounds with the restriction that your second round bid must be equal to or greater than the highest drop out bid in the first round.

In determining who earns an item in the second round and what they pay the computer employs a "clinch" algorithm. How does the clinching algorithm work? It works just like in a football, baseball, or basketball league when a team clinches a spot in the playoffs, only that here clinching involves earning an item, and paying the price for the item, with the number of units supplied representing the number of slots open in the "playoffs."

How the auction works is best explained by some examples.

Example 1:

Round 1 bids are as follows

Value	Bid
A1	xxxx
A2	xxxx
B1	xxxx
B2	xxxx
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C1	3.33
D1	2.50
C2	1.67
D2	.83

Note bids have been sorted from highest to lowest, bidder values are represented by A1 (value for A of unit 1), A2 (value for A of unit 2), B1 (value for B of unit 1), etc. No one sees the bids (or ranks) of the four highest bids but everyone does see the four lowest bids ranked from highest to lowest.

So in round 2 both A and B are eligible to bid on two units. No units have been clinched yet since there is supply of 2 units and 4 units still eligible to be bid on. The lowest permitted bid in round 2 is 3.33.

Now suppose the bids in round 2 are as follows:

Value	Bid
A1	\$7.00
A2	\$6.29
B1	\$5.00
B2	\$4.25

The clinching algorithm that the computer employs to determine who earns an item and what they pay is as follows: First, it drops the lowest of the four remaining bids. (In this case the B2 bid of \$4.25.) Having dropped the lowest of the remaining 4 bids A is assured of earning (has clinched) at least 1 unit as there are 2 units for sale and 3 bids remaining 2 of which are A's bids. The unit clinched is unit A1 since it is the highest of A's two bids. The price paid is the bid price of the unit that was dropped that assured A of clinching a unit – in this case \$4.25. Thus, earnings for A on this unit would be the value of unit A1 less \$4.25.

The computer then takes the remaining bids (units not clinched and not deleted in the previous step of the algorithm) and repeats the process.

Value	Bid
A2	\$6.29
B1	\$5.00

Dropping the lowest remaining unit, unit B1, A is assured of earning (has clinched) one more unit (unit A2) and pays the clinching price of \$5.00 for it. Thus, earnings for A on this unit would be the value of unit A2 less \$5.00.

(Of course if B had bid \$6.29 on unit B1 and A had bid \$5.00 on unit A2 as shown below

Value	Bid
A1	\$7.00
B1	\$6.29
A2	\$5.00
B2	\$4.25

then B would have clinched the 2nd available unit and paid \$5.00 for it.)

The outcome of the auction would yield profits for A of: $(A1 + A2 - \$4.25 - \$5.00)$ where A1 and A2 represent the value of A's two units. In cases where the cost is less than the value of the items, a bidder makes positive profits. However, in case the cost is greater than the value of the items purchased, a bidder makes losses, which would be subtracted from his/her capital balance, and/or earnings from other auctions.

Example 2:

Value	Bid
A1	xxxx
C1	xxxx
A2	xxxx
B1	xxxx
<hr/>	
B2	3.33
D1	2.50
C2	1.67
D2	.83

So in round 2 A is eligible to bid on two units and B and C are eligible to bid on units B1 and C1 respectively. No units have been clinched yet since there is supply of 2 units and 4 units still eligible to be bid on. The lowest permitted bid in round 2 is 3.33.

Now suppose the bids in round 2 are as follows:

Value	Bid
A1	\$7.00
C1	\$6.29
B1	\$5.00
A2	\$4.25

The algorithm drops the lowest bid – A2 bid of \$4.25 in this case which leaves total demand of 3 units and supply of 2 but since each of three different bidders has one of the remaining bids none of them are assured of clinching anything and the algorithm continues.

This now leaves the following situation:

Bidder	Bid amount
A1	\$7.00
C1	\$6.29
B1	\$4.25

When the lowest bid - B1 bid of \$4.25 is dropped, there is supply of 2 units and demand for 2 units so that both A and C are each assured of earning a single unit and pay the clinching price of \$4.25 for that unit.

This would yield profits for A of $(A1 - \$4.25)$ and for C of $(C1 - \$4.25)$.

Additional Remarks:

1. You are free to bid whatever you think will bring you the most earnings. In thinking about bidding, earning an item is of no intrinsic value. Your sole objective should be to maximize your earnings.
2. You will all be given a starting capital balance of \$8.00. Any losses will be subtracted from this balance, any profits added to it. Your final balance will be paid to you in cash at the end of the experiment.
3. In each auction period there will be two markets with 4 bidders each operating at the same time. Assignments to each market are made randomly and will change randomly from one auction to the next.
4. In each round, if there are two or more low bids at the same price, their relative rank is determined randomly. If there are ties for having clinched an item, these are settled randomly by the computer.
5. We will conduct 2 dry runs to familiarize you with the procedures and accounting rules. This will be followed by 36 periods played for cash.

Are there any questions?

(To be read to subjects - they do not have a copy of this.)

Housekeeping details: This is a dry run. Don't do anything yet, just look at the right hand side of your computer screens. **(Transparency 1)** At the top of the screen next to "Bidders" we report the number of bidders in each market (4). Next is the "Supply" - the number of items for sale in each market (2). Next is "Demands" - the total number of units bid on in the market (8 = your 2 units + 6 from the other 3 bidders). Next is "balance" - your starting cash balance. Next is "auction fee" - this is the cost of participating in the auction (there is no cost - ignore this). Next is shown the upper and lower bound of the uniform distribution from which values are drawn - \$7.50 and \$0.

Next is shown the value of your first item. Further down is the value of your second item. In the blank spaces below your values you will put your bid. After 1st round bids have been submitted, the computer broadcasts 4 low drop-out bids to all bidders in your market. **(Transp.2)** If you drop from bidding on one (or both) of your units, it will be indicated on the screen next to this unit information. After 2nd round bids have been submitted and pricing determined, everyone will see the outcome of the auction **(Transp.3)**. When an item is clinched in your market the clinching price is reported just above the sequence of dropout prices.

Are there any questions at this point?

OK you can **place your round 1 bids now, click to confirm and wait**. You see 4 low bids of the first round. The bids in the second stage have to be at least as much as the highest drop-out bid. Are there any questions? (Please ask questions as we go along – we want everyone to know what's going on and if you have a question others probably do as well.)

OK – lets continue to round 2. Both markets are closed now. **(Transp.3)**

Look just to the left of where your values were first reported. We have reported back to you the outcomes for your market: Shown above the solid line are the values of the bidders who have clinched an item. If you have clinched an item there is a * next to the item. The bids at which these units were clinched are shown next to the value of the item.

Below the solid line are shown the values for those who did not clinch an item. Note that there are letters assigned to other bidders drop-out bids, with each letter representing one other bidder. These letters will change randomly from one auction to another so that no one can be identified across auctions.

Profits of the items you have been bidding on are shown to the right of your screens as the last entry for each item. If you have clinched an item, "price" shows the bid at which you clinched the item and below this the profits earned on the item equal to value minus "price".

If you dropped out without clinching an item on the "your bid" line the computer shows the bid at which you dropped out and that you earned zero profits on that item.

At the very bottom right hand side of your screen you will see total profits - the sum of the profits on your 2 units. Just below this is a net profit - total profits less the auction fee. Note, the auction fee will always be 0, so this number will be the same as total profits.

Finally, your cash balance will be updated following each auction period - positive profits added to it, negative profits subtracted from it.

Are there any questions?

You all have record sheets. You must fill these in during the dry runs so that we can check if you understand the pricing rules and the profit calculations. (The better you understand the pricing rules and profit calculations the more money you are likely to make). After the dry runs we recommend you continue to keep these records but do not require that you do so.

Please feel free to ask questions as we go along. Let us assure you, if you have a question about what's going on, you can bet that there are at least two other bidders who have the same or a similar question in mind. Please direct all of your comments to me or one of the assistants. You are not permitted to talk to each other until the experiment is over.

Before continuing with the next dry run let me ask and answer some questions others have asked in this experiment:

1. How much money can I earn? We don't know exactly since your earnings depend in part on how you and the other three bidders in your market bid and in part on luck (the values you draw and the values others in your market draw). All we can tell you is that most of our subjects elect to return for additional experiments.

2. How much should I bid? You can bid whatever amount you like. Recall that your value is what you will get for any items earned, and your profit (if you clinch an item) is value minus drop out bid. If we knew exactly how you should behave we would not have to run the experiment.

(Start experiment)

1 2 3 4 5 6 7 8 9 10 11 12

(After "real" round 12– **change parameters: supply=3 for rounds 15-26**)

Before round 13: There is a change in parameters. Now the supply of items in each market is 3. The number of bids in the second round is 5, so 3 low bids are dropped in the first round. Everything else remains the same and clinching works just like it did before. Are there any questions? We now start round 13 of the experiment.

13 14 15 16 17 18 19 20 21 22 23 24

(After real round 24 – **change parameters: supply=2 for rounds 27-38**)

Before round 25: There is a change in parameters. Now the supply of items in each market is 2. 4 low bids are dropped in the 1st round. Everything else remains the same and clinching works just like it did before. Are there any questions? We now start round 25 of the experiment.

25 26 27 28 29 30 31 32 33 34 35 36