

## 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 a number of rounds. You are counted as actively bidding on an item in any round until you have been dropped from the bidding or have “clinched” an item (clinching will be explained below). Once you have been dropped from bidding for an item you can no longer bid on that item. Once you have clinched an item, it is yours and you pay the “clinching” price.

We first discuss “dropping out.”

In each round of the auction everyone submits a bid for the items they are still active on. These bids are ranked from highest to lowest, the low bid is announced, and that bidder is dropped from bidding for that item. Then, if no items have been clinched, everyone submits new bids on the items they are still active on; the process repeats itself until all the items have been clinched. You are free to change your bid between rounds with the restriction that at each round your bid must be equal to or greater than the drop out bid in the previous round.

How does Clinching work? Clinching 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.”

Once you have clinched an item it is yours and the price you pay is the drop-out bid which assured you of clinching the item.

How the auction works is best explained by some examples:

Example 1:

There are 4 bidders each with two units to bid on so that there are 8 units being bid on (in total) and there is a supply of 2 units.

Bidder	A	B	C	D	Supply = 2
# units dem.	2	2	2	2	Total Demand = 8

In round 1 everyone submits a bid on all items. Lets assume that the lowest bid was .75 and was placed by bidder D. Then D's bid of .75 is announced and D is dropped from bidding on that item. There are now 7 active bids and 2 units for sale so no one is assured of earning (clinching) anything yet, and the lowest bid allowed in round 2 is \$0.75

Bidder	A	B	C	D	Supply = 2
# units dem	2	2	2	1	Total Demand = 7

Bidders place bids again. Suppose the lowest bid is 1.50, is placed by bidder C, who is dropped from bidding on that unit. There are now 6 active bids and 2 units for sale so no one is assured of clinching anything yet, and the lowest bid allowed in the next round is \$1.50.

Bidder	A	B	C	D	Supply = 2
# units dem.	2	2	1	1	Total Demand = 6

In round 3 suppose bidder D is dropped from bidding on her 2<sup>nd</sup> unit with a bid of \$2.50. And in the round 4, C is dropped from bidding on her 2<sup>nd</sup> unit with a bid of 3.50. Still no units are clinched as there is supply of 2 units and active bids on 4 units. The lowest allowed bid in the fifth round is 3.50.

Bidder	A	B	C	D	Supply = 2
# units dem.	2	2	0	0	Total Demand = 4

Now suppose that B has the lowest bid of \$4.25 and is dropped from bidding on her 2<sup>nd</sup> unit.

Bidder	A	B	C	D	Supply = 2
# units dem.	2	1	0	0	Total Demand = 3

This leaves A bidding on 2 units and B bidding on 1 unit with supply of 2 units so that A is assured of earning at least 1 unit. With clinching you pay the drop-out bid which assured you of clinching the item -- \$4.25 in this case. So A would clinch one unit at the price of 4.25 in round 5. (Our convention is that the first unit clinched by a bidder is always the bidder's highest valued unit.) Thus, earnings for bidder A will be the value of her highest valued unit less the clinching price of \$4.25.

The situation after A has clinched her one unit \$4.25 is

Bidder	A	B	C	D	Supply = 1
# units dem.	1	1	0	0	Total Demand 2

Now there is a single unit left for sale with both A and B still active on one unit each. They place bids for the last unit (with the minimum bid being \$4.25). Lets assume that B drops out on her 2nd unit with a low bid of \$5.00. Then A clinches the remaining unit and pays the clinching price of \$5.00 for it. Thus, earnings for A on this unit would be the value of the second unit less \$5.00. (Of course if A had dropped before B, B would have clinched the 2nd unit and paid A's drop out bid.)

This 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 (i.e. the bids) 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.

Drop-out bids will be broadcast to everyone in your market at every stage, as well as clinching prices.

#### Example 2:

There are 4 bidders each with two units to bid on so that there are 8 units being bid on (in total) and there is a supply of 2 units.

Once again, suppose that D and C drop-out at in the first and second rounds respectively, each on a single unit, followed by D dropping out on her 2<sup>nd</sup> unit in round 3, and followed by A dropping on her first unit in round 4. There are 4 units still being bid on and supply is 2 so no one has clinched a purchase yet. The situation is now:

Bidder	A	B	C	D	Supply = 2
# units dem.	1	2	1	0	Total Demand = 4

Suppose now that B drops out on her lowest valued unit with the bid \$3.50 in round 5. Now there is total demand of 3, supply of 2 and no one is assured of earning anything yet so no one has clinched a purchase yet. The situation is now:

Bidder	A	B	C	D	Supply = 2
# units dem.	1	1	1	0	Total Demand = 3

There are 3 units being bid on, 1 each by A, B and C and the minimum allowed bid is \$3.50. Suppose that the lowest bid in stage six is \$4.25 by B and she drops out of the bidding.

Bidder	A	B	C	D	Supply = 2
# units dem.	1	0	1	0	Total Demand = 2

Now 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 bid at the same price all of these bids are dropped from the bidding. Further, 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. **(Transp.2)** If you drop out or clinch an item, the computer automatically computes any profits earned and updates your cash balance in real time as the auction proceeds. **(Transp.3)** Also reported on your computer screen will be the dropout bids in your market at every stage (just to the left of where your values are reported). When an item is clinched in your market the clinching price is reported just above the sequence of dropout prices. Notice that as units are clinched, supply drops along with the number of units being bid on. Once an item is clinched it is no longer available for anyone else to earn.

Are there any questions at that point?

OK you can **place your round 1 bids now**. Notice that the low bid is reported to the left of where your values are. Does everyone see that? Also, the person placing that low bid is not permitted to bid in the next round. 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 the next round and subsequent rounds. Remember, the low drop out price is reported after each round and clinched items are reported in red just below the sequence of dropout prices.

(After the market is closed:)

OK, both markets have closed now. **(Transp.4)**

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 along with the corresponding drop-out prices. These are listed with the last drop-out bid first, and the first drop-out bid last. 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.

After 1st dry run - add the following:

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. 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. 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