

INSTRUCTIONS EXPERIMENT (instructions for treatment AMSA included for referees, other instructions will be sent upon request)

Welcome to this experiment on decision-making! You can make money in this experiment. Your choices and the choices of the other participants will determine how much money you will make. Read the instructions carefully. There is paper and a pen on your table. You can use these during the experiment. Before the experiment starts, we will hand out a summary of the instructions.

THE EXPERIMENT

You will earn points in the experiment. At the end of the experiment, your points will be exchanged in euros. Each point will yield 20 cent. You will start with a starting capital of 50 points.

The experiment consists of three parts. The three parts are linked to one another, so it is important that you understand the instructions of current part before you proceed with the experiment. Only when a part is completely finished you will receive instructions for the next part. The first part lasts for 6 periods. Your earnings in the first part will be the sum of your earnings in these 6 periods plus the starting capital. Your earnings in the experiment will equal the sum of your earnings in all three parts.

Each period you will be allocated to a group of 6 persons to whom a product is to be sold. The composition of the group varies from period to period. This means that you will be involved in an auction with different players in each period.

VALUE OF THE PRODUCT

For each participant, the product has a different value lying between 0 points and 50 points. Every number between 0 and 50 is equally likely. The value assigned to one participant does not depend on the values of the other participants. This means that your value is probably different from those of others. At the start of a period, you will be informed about your own value, which will not be revealed to the other participants. Likewise, the other participants' values are not revealed to you.

SALE OF THE PRODUCT: PHASE 1

Each period consists of two phases. In the first phase, the "temperature of a thermometer" will rise point by point. The level of the temperature indicates the price of the product. In the first phase, all six participants have the possibility to push the button "QUIT". By pushing the QUIT button, a participant indicates that he or she will not buy the product in this period. When four participants have pushed the QUIT button, the first phase is finished. The level of the temperature where the fourth bidder pushed QUIT is called the "BOTTOM PRICE". The four participants that have pushed the QUIT button in the first phase do not receive any payoff in this period.

If accidentally two (or more) participants push the QUIT button at the same time then chance will determine which one of these participants will continue. The temperature in the thermometer will never rise higher than the upper bound of the value interval: 50 points. If the thermometer reaches the upper bound, the computer will automatically push the QUIT button for you.

When a participant pushes the QUIT button in the first phase, the other participants (no matter whether they have pushed the QUIT button or not) can observe the price at which he or she chooses to quit in the current period.

SALE OF THE PRODUCT: PHASE 2

In the second phase, the two participants that have not quit will submit their "ultimate bid". The participant with the highest ultimate bid buys the product. The price that this participant pays is NOT equal to the own ultimate bid, but to the ultimate bid of the OTHER PARTICIPANT!

The ultimate bid has to be larger than or equal to the bottom price determined in phase 1. If accidentally both bidders submit the same ultimate bid, then chance will determine which of these two bidders buys the product. It is not allowed to submit an ultimate bid higher than 50.

The buyer will not literally receive a product. He or she will receive an amount equal to the value of the product minus the price of the product (in points).

SALE OF THE PRODUCT: PREMIUM

Both bidders of the second phase will receive a premium that depends on the extent to which the bottom price from the first phase is actually increased. To calculate this premium, the difference between the lowest ultimate bid in the second phase and the bottom price is determined. Each bidder of the second phase receives a premium of 30% of this difference (in points).

EXAMPLE

The procedure to sell the product will now be illustrated with an example. THE NUMBERS IN THE EXAMPLES ARE ARBITRARILY CHOSEN.

The temperature of the thermometer starts rising from 0. At a price of 22, 25, 30, the first, second, and the third bidder pushes the QUIT button respectively. The temperature keeps rising until the fourth bidder pushes the QUIT button at a price of 32. This is the end of the first phase. The two remaining bidders submit an ultimate bid higher than or equal to 32 in the second phase. Assume that the fifth bidder bids 42 and the sixth bidder bids 45, and then the results are as follows:

The sixth bidder buys the product at a price of 42. Both the fifth and the sixth bidder receive a premium of 30% of $42 - 32$ (=the lowest ultimate bid minus the bottom price): this yields an amount of 3 points to either of them.

The sixth bidder also obtains the gains from trade. The gains from the trade equal her or his value for the product minus the price paid for the product.

GAIN AND LOSS

Notice that the highest bidder in a period can make a loss. If the highest bidder pays a price higher than her or his value for the product, and if this is not compensated by the premium, he or she

makes a loss. Just as any gain is automatically added to the amount earned up to that period, any loss will automatically be subtracted.

RESULTS OF THE PERIOD

At the end of a period, the results of the period will be communicated. You will be told whether you had the highest bid and how much payoff you have earned. All bidders in a group will also be informed about the two ultimate bids submitted in the second phase.

Then a new period will be started. In the new period, again a product will be sold. Each participant receives a new value for the product. Your value for the product in the one period will not depend on your value for the product in any other period

If you are positive that you have understood the instructions, please click ‘Next’ below for the test questions.

THE NUMBERS IN THE QUESTIONS ARE ARBITRARILY CHOSEN.

(1) Assume that in the second phase your ultimate bid equals 48 while the other bidder has an ultimate bid of 46. What is the price that you will have to pay for the product?

(2) Assume that in the second phase your ultimate bid equals 46 while the other bidder's ultimate bid equals 36. The bottom price from the first phase equals 16. What is the premium for each of the bidders in the second phase?

(3) Is the following statement correct: in each period you will be matched with the same other players

END

You have reached the end of the instructions. If you wish to read some parts of the instructions again, please click ‘Finished’, then you will return to the beginning of the instructions. When you are ready to start the experiment, please push the button READY. If by then not all the participants have pushed READY, you will return to the beginning of the instructions. When all participants have pushed READY, the experiment will start. When the experiment has started, you will NOT be able to return to these instructions. Before the experiment is started, a summary of the instructions will be handed out.

If you still have questions, please raise your hand!

INSTRUCTIONS: PART 2

The second part of the experiment lasts for 8 periods. Your earnings of part 1 will be transferred to the first period of part 2. As the general rules in the second part are quite similar to those of the first part, we will focus on the differences between the two parts in the following.

At the beginning of every period in the second part, you are given AN OPTION TO VOTE FOR COOPERATION with the other players in your group at a given cost. You will know the cost of cooperation before each period starts; your value for the product will be communicated to you at the same time. The cost of cooperation differs in each period. Within a period, each player faces the same cost of cooperation. The gain or loss a participant makes in each period is immediately subtracted from or added to his or her total earnings.

DECISION TO VOTE FOR COOPERATION

ALL BIDDERS are asked if they would like to vote for the cooperation. A bidder can either click the YES button on the screen if he or she would like to cooperate with the other bidders; or click the NO button if he or she thinks otherwise. Only in the situation where all six bidders vote for the cooperation, will the group of bidders cooperate.

Also, note the bidders are obliged to pay the costs of cooperation only when the cooperation ACTUALLY takes place. That is, if one or more bidders vote against cooperation, then the group will not cooperate and consequently no bidder has to pay the costs for cooperation.

When all bidders have made their choice about cooperation, you will be informed about how many bidders have voted against cooperation and whether the cooperation will take place in your group.

COOPERATION

If a group cooperates, ONLY ONE BIDDER among the six obtains the right to enter the main auction. This bidder is called the DESIGNATED BIDDER.

The following procedure will determine who will be the designated bidder in a group: each bidder has to submit a bid for the right to be the only bidder in the main auction. For each participant, the bid submitted cannot be higher than 60 points. If the bid you submit for the right is the highest among the six, you will then become the designated bidder of your group at a price equal to your own bid. To compensate all the other five bidders who will not be present at the main auction, your payment will be EQUALLY shared by them. Likewise, if your bid is not the highest among the six, you will receive a fifth of the bid of the highest bidder. In exchange, you will not compete for the product in the main auction. The bids submitted have to be an integer between 0 and 50 points. If two or more bidders submit the same bid, then chance will determine which of these bidders will receive the product.

As the designated bidder will effectively be the only ACTIVE bidder in the main auction, we will skip the course of the main auction and directly reward the product to the designated bidder at price 0. The results will be communicated at the end of the cooperation phase. You will be told whether you have had the highest bid, how much profit you have made and how high the other five bids are. To summarize, the payoff of a designated bidder equals his or her own value minus the bid he or she submitted for the right to be the designated bidder and minus the costs of cooperation. The payoffs of the other bidders equal the designated bidder's bid by 5 minus the costs of cooperation.

NO COOPERATION

If one or more bidders vote against cooperation, then the group will not cooperate. In this case, the rules will be the SAME as in part 1. That is, all bidders will compete in the same way for the product as described in the instructions of the previous part.

EXAMPLE

The procedure to sell the product will now be illustrated with an example. THE NUMBERS IN THE EXAMPLES ARE ARBITRARILY CHOSEN.

Bidders A, B, C, D, E and F are allocated in one group for the current period. The cost of cooperation is 2; the bidders' values for the product are 0, 10, 20, 30, 40 and 50 points respectively. All six bidders choose to vote for the cooperation, so the group will cooperate.

The next step is to determine the designated bidder: bidder A, B, C, D, E and F each submits one bid for the right to be the designated bidder. Their bids are 0, 5, 15, 20, 25, and 30 respectively. Hence, bidder F gets the right to be the designated bidder at a price equal to his or her own bid, namely 30 points. Bidders A, B, C, D and E will not participate in the main auction and will equally share bidder F's payment (each bidder 6 points). After the costs of cooperation are subtracted, their pay-off is 4 points.

As the designated bidder (bidder F) will effectively be the only ACTIVE bidder in the main auction, we will skip the course of the main auction and directly reward the product to bidder F at price 0. Therefore, bidder F's payoff is equal to 50 (his value) minus 30 (his payment to the other bidders) minus 2 (the cost of cooperation), which equals 18.

OTHER ASPECTS

All other aspects of part 2 will be the same as they were in part 1. In particular, the same procedure will be used to determine the values. That is, each participant will receive in each period a different value between 0 and 50 points, and every number between 0 and 50 is equally likely.

If you are positive that you have understood the instructions, please click 'Next' below for the test questions.

THE NUMBERS IN THE QUESTIONS ARE ARBITRARILY CHOSEN.

- (1) Assume that four out of six bidders in your group push the YES button when they are asked to vote for cooperation.
- (2) Assume that four out of six bidders in your group push the YES button when they are asked to vote for cooperation. Will you pay the costs for cooperation?
- (3) Assume that your group cooperates; your bid for the right to buy the product at a price of 0 equal to 28 while the other bidders' values are 20, 24, 25, and 30. The cost for cooperating equals 2 in this period. What is your payoff in this period?

(4) Assume that your group cooperates; your bid for the right to buy the product at a price of 0 equals 30 while the other two bids equal 20, 24, 26, and 28. The cost for cooperating equals 2 in this period. Your value for the product equals 40. What is your expected earnings?

INSTRUCTIONS: PART 3

The third part of the experiment lasts for 10 periods. Your earnings of parts 1 and 2 will be transferred to the first period of part 3. As the rules in the third part of the experiment are quite similar to the rules in the second part, we will focus on the differences between part 2 and 3 in the following instructions. An important aspect where part 3 differs from part two is that TWO TYPES of roles are assigned to the participants: the role of STRONG BIDDER and the role of WEAK BIDDER.

STRONG AND WEAK BIDDERS

The role of each type of bidder is determined by chance at the start of each period. Hence, a participant who receives the role as weak bidder in one period may be asked to play as a strong bidder in the next period and vice versa. In part 3, each group consists of three players who receive the role of the strong bidders and three players who receive the role of weak bidders. Like in parts 1 and 2, players will be re-matched into a different group when a new period starts.

VALUE OF THE PRODUCT

In the third part of the experiment, the strong bidders and the weak bidders have different intervals from which the values are drawn. For the strong bidders, the value of the product lies between 70 points and 120 points, and every number between 70 and 120 is equally likely. For the weak bidders, the value of the product lies between 0 and 50 points, and every number between 0 and 50 is equally likely.

Again, the value assigned to one participant does not depend on the values of the other participants. Hence, your value is probably different from those of the others. At the start of a period, you will be informed about your own role and your own value, which will not be revealed to the other participants. Likewise, the other participants' values and roles are not revealed to you.

DECISION TO VOTE FOR COOPERATION IN PART 3

Different from part 2, the option of cooperation is offered to the STRONG BIDDERS ONLY. The costs of cooperation are the same for each strong bidder but they differ from period to period; the weak bidders never have to bear such costs because they are excluded from cooperation. Both the strong bidders and the weak bidders will be informed about the strong bidders' costs of cooperation before each period begins.

In the third part of the experiment, all participants who receive the roles as strong bidders are asked to vote for the cooperation with the other two strong bidders in the same group. Each strong bidder can either click the YES button on the screen if he or she would like to cooperate with the other strong bidders; or click the No button if he or she thinks otherwise.

Only in the situation where all three strong bidders vote for cooperation, will the strong bidders of a group cooperate. Strong bidders pay for the costs of cooperation only when cooperation ACTUALLY takes place. In other words, if one or more strong bidders vote against cooperation, cooperation will not take place and consequently no bidder has to pay the costs for cooperation. The results of voting are communicated after all three strong bidders in the group have made their choice (Yes or No). The strong bidders will be informed about how many of them have voted against cooperation and whether the cooperation will take place. The weak bidders will not receive this information.

COOPERATION AMONG STRONG BIDDERS

If the strong bidders cooperate, ONLY ONE STRONG BIDDER among the three obtains the right to enter the main auction, bidding against the three weak bidders for the product. This strong bidder is called the DESIGNATED BIDDER.

Apart from bidding for his or her own, the designated bidder also bid on behalf of his or her fellow strong bidders in the same group, who according to the rules, are not allowed to participate in the main auction.

The following procedure will determine who will be the designated bidder in a group: each strong bidder submits a bid (number of points) for the right to be the designated bidder. The strong bidder with the highest bid will be the designated bidder (in case of ties among the highest bidders, the winner is selected by chance from them). The designated bidder will pay an amount equal to the own bid to compensate the other two strong bidders in the group. This amount will be EQUALLY shared by the other two strong bidders. Bids to become the designated bidder have to be at least 0 points and they cannot exceed 120 points. When all strong bidders submitted their bids, the results will be communicated. All strong bidders will be informed about if they have submitted the highest bid, and how high all three bids submitted are. (Weak bidders will not receive this information.)

SALE OF THE PRODUCT WITH COOPERATING STRONG BIDDERS: PHASE 1

Unlike part 2, there are altogether four active bidders involved in the main auction: the designated bidder and the three weak bidders, who will bid for the product for sale in a similar way as introduced in part 1. The difference is that the designated bidder has to bid on all three strong bidders' behalf in the third part. The designated bidder is free to set the bids for the other two strong bidders in any way that he or she likes, as long as these bids do not exceed his or her own bid (so the strong bidders who are not present will not become the winner of the auction). That is, when bidding in the first phase, a designated bidder must push the QUIT button for the other two strong bidders before he or she pushes his or her own QUIT button. Notice that the designated bidder may push the QUIT button for the other two strong bidders at a price of 0, but he or she may also decide to wait before letting one or two of the other strong bidders quit.

In the third part, the temperature of the thermometer may rise until 120 points before the computer will automatically push the QUIT button for any bidder who has not pushed the button then. When a participant pushes the QUIT button in the first phase, the other participants in the same group (including the strong bidders who are NOT ACTIVE in the main auction) will not only observe the QUIT price of this participant like in the first two parts, but also the role of this bidder (i.e. a weak bidder or a strong bidder). If a strong bidder pushes the QUIT button, all the other bidders will observe a blue colored bid together with the letter "b" next to the thermometer. If a

weak bidder pushes the QUIT button, all the other bidders will observe the yellow colored bid together with a letter “w” next to the thermometer. From this, both of the remaining bidders in phase 2 can infer the other bidder’s role.

SALE OF THE PRODUCT WITH COOPERATING STRONG BIDDERS: PHASE 2

In the second phase, the two participants that have not quit in the first phase will submit their "ultimate bid" for the product. The participant with the higher ultimate bid between the two buys the product at a price equal to the lower ultimate bid. An ultimate bid in phase 2 has to be an integer between the bottom price determined in phase 1 and 120 points. This restriction holds for both weak bidders and strong bidders, which means that for the weak bidders whose value is between 0 and 50, the upper limit of bids is higher in part 3 (120 points) than in part 1 and 2 (50 points).

Both bidders who enter the second phase earn a premium that is determined in the same way as in the previous parts. It is possible that a designated bidder enters the second phase with one of the other strong bidders on whose behalf the designated bidder is bidding for (when all the weak bidders quit before the designated bidder lets the second strong bidder quit). In such a case, we will SKIP the course of the second phase (so the designated bidder DOES NOT have to submit any ultimate bid) and directly reward the designated bidder with the product at the bottom price. In other words, we equate the lower ultimate bid (which is the product price for the winner in the second phase) to the bottom price. As a result, no premium is rewarded to both bidders (i.e. the designated bidder and the strong bidder the designated bidder bids for). Therefore, the designated bidder’s gains from trade in this period equals his or her value minus the bottom price determined in the first phase minus the price paid for the right to be the designated winner minus the cost of cooperation of this period.

NO COOPERATION

If one or more strong bidders vote against cooperation, then the strong bidders will not cooperate. In this case, all bidders will compete in the same way for the product for sale as described in the instructions of part 1. The only difference is that from now there are weak and strong bidders, and that both types of bidders may bid higher than they were allowed in parts 1 and 2 (up to a maximum of 120 points). When a participant pushes the QUIT button, the other participants in the same group can observe the QUIT price of the participant and the role of this bidder (i.e. a weak bidder or a strong bidder). Note that you get the same information as in the case that strong bidders vote for cooperation.

EXAMPLE

The following example illustrates the procedure. THE NUMBERS IN THE EXAMPLE ARE ARBITRARILY CHOSEN.

Strong bidders A, B and C and weak bidders D, E, and F are allocated in one group for the current period. The cost of cooperation is 10. The strong bidders A, B, C’s values are 80, 90 and 110, respectively. The weak bidders D, E, F’s values are 10, 30 and 50, respectively. When asked to vote for cooperation, all three strong bidders (bidders A, B and C) vote ‘yes’. Hence, the strong bidders cooperate.

Next, the three strong bidders submit a bid for the right to be the designated bidder. Bidders A, B and C bid 10, 20 and 30, respectively. As a result, bidder C receives the right and pays a price

equal to 30 (the own bid). This amount is shared by bidders A and B: each receives an amount of 15 points. In total, bidders A and B make: 15 (share) $- 10$ (cost cooperation) $= 5$ each.

Weak bidders do not observe the results of cooperation.

In the main auction, bidder C has to bid for him or herself as well as for bidders A and B. Assume that in the first phase the weak bidders D, E and F push the QUIT button at prices of 8, 31 and 49, respectively. The strong bidder pushes the QUIT button at 50 for one of the other strong bidders. This terminates the first phase. Because all weak bidders quit in the first phase, the second phase is skipped. The result is that bidder C buys the product at a price of 50. In total, her or his payoff equals 110 (value) $- 50$ (price product) $- 30$ (own bid for designated bidder) $- 10$ (cost cooperation) $= 20$. The weak bidders do not earn any payoff in this example.

If you are positive that you have understood the instructions, please click ‘Next’ below for the test questions.

(1) Assume that you are a weak bidder in the current period. Are you going to have the option to cooperate with the other weak bidders?

(2) Assume that the cost of cooperating equals 5 points and that all strong bidders vote for cooperation. You are a strong bidder who bids 16 to become the designated bidder, while the other two bids submitted are 8 and 18. What is your payoff in this period?

(3) Assume that the cost of cooperating equals 5 points and that all strong bidders vote for cooperation. You are a strong bidder who bids 20 to become the designated bidder, while the other two bids submitted are 8 and 16. You become the designated bidder who competes against the weak bidders for the product. You push the QUIT button for one other strong bidder at a price of 10. Then the three weak bidders push the QUIT button at prices of 40, 60 and 65. Thus the bottom price is 65. You are told the second phase is to be skipped. What is your payoff in this period if your value equals 105?