

# Appendix A

## Experiment Instructions

### A.1 Instructions from Chapter 2

#### Experiment Overview

[All Treatments]

You are about to participate in an experiment in the economics of decision making. If you listen carefully and make good decisions, you could earn a considerable amount of money that will be paid to you in cash at the end of the experiment.

You have been paired with four other individuals in the room. In each period, each of you will be given an amount of cash, denominated in francs. This will be denoted by the letter  $E$ , for "Endowment." Your group will participate in a process in which the level of some good  $Y$  will be chosen by the collective decisions of your group members. Each of you has a value for  $Y$  that depends on how much  $Y$  is chosen by your group. This will be called  $V(Y)$ . You may not have the same value for a given level of  $Y$  as anyone else in your group. Furthermore, your decision in the process may result in you being charged some number of francs  $T$ . This number

$T$  may be determined by your decision, the decisions of the others in your group, and the level of  $Y$  chosen by your group.

At the end of each period, you will be paid for the number of francs you have earned for the period, which is equal to your value for  $Y$  plus your initial endowment of francs minus the amount  $T$  that you paid. Mathematically, you will be paid based on

$$\text{earnings in francs} = V(Y) + E - T$$

At the end of the experiment, your total earnings in francs will be converted to dollars using a pre-specified exchange rate, which will be told to you by the experimenter.

The rules for the experiment are as follows. No talking or communicating with other participants. If you are using a computer, do not use any software other than that explicitly required by the experiment. Feel free to ask questions by raising your hand or signalling to the experimenter.

The process will now be explained in detail.

## The Process

### [Voluntary Contribution Treatment]

The process through which your group will choose the level of  $Y$  is as follows. Each of you will choose how many units of  $Y$  you would personally like to add to the total. For example, let person 1 choose  $A_1$ , person 2 choose  $A_2$ , and so on. At the

end of the period, the total level of  $Y$  will be given by

$$Y = A1 + A2 + A3 + A4 + A5$$

In each period, each person can add anywhere from 0 to 6 units of  $Y$ . You may add “partial” units, such as 3.45 units, for example.

Each unit of  $Y$  costs 100 francs in this experiment, so you will be charged 100 francs for each unit you add to the total. For example, if you are person 1 and you choose to add  $A1 = 5$  units, then your payment will be  $100 * A1 = 500$  francs. This payment corresponds to “ $T$ ” from the above instructions. Therefore,  $T = 500$  for person 1 in this example period.

$$T = 100 * \textit{Addition}$$

At the end of the period, the total level of  $Y$  will be given by  $Y = A1 + A2 + A3 + A4 + A5$  and you will earn  $V(Y) + E - T$ .

This process is computerized. In each period, you will input your decision into a computer program that will calculate  $Y$  and determine your payment and your earnings based on the decisions of your group. The computer will also keep track of your earnings and the results of all previous periods for your reference. The computer interface includes a tool called the “What-If Scenario Analyzer.” This is a special calculator adapted to help you figure out how much you would earn in certain hypothetical scenarios. Feel free to use this tool to help you make decisions. If you

have any questions about the computer interface at any time, please raise your hand.

Questions?

### [Proportional Tax Treatment]

The process through which your group will choose the level of  $Y$  is as follows. Each of you will choose how many units of  $Y$  you would personally like to add to the total. For example, let person 1 choose  $A_1$ , person 2 choose  $A_2$ , and so on. At the end of the period, the total level of  $Y$  will be given by

$$Y = A_1 + A_2 + A_3 + A_4 + A_5$$

In each period, each person can add anywhere from 0 to 6 units of  $Y$ . You may add “partial” units, such as 3.45 units, for example.

Each unit of  $Y$  costs 100 francs in this experiment, and the total cost of  $Y$  will be split evenly among the 5 members of your group. For example, if the total level of  $Y$  is 10 units, then the total cost is 1,000 francs. Dividing this cost evenly means each person must pay  $1000/5 = 200$  francs. This payment corresponds to “ $T$ ” from the above instructions. Therefore,  $T = 200$  for each person in the group for this example period.

$$T = \frac{100 * Y}{5}$$

At the end of the period, the total level of  $Y$  will be given by  $Y = A_1 + A_2 + A_3 + A_4 + A_5$  and you will earn  $V(Y) + E - T$ .

This process is computerized. In each period, you will input your decision into

a computer program that will calculate  $Y$  and determine your payment and your earnings based on the decisions of your group. The computer will also keep track of your earnings and the results of all previous periods for your reference. The computer interface includes a tool called the “What-If Scenario Analyzer.” This is a special calculator adapted to help you figure out how much you would earn in certain hypothetical scenarios. Feel free to use this tool to help you make decisions. If you have any questions about the computer interface at any time, please raise your hand.

Questions?

### [Groves-Ledyard Treatment]

The process through which your group will choose the level of  $Y$  is as follows. Each of you will choose how many units of  $Y$  you would personally like to add to the total. For example, let person 1 choose  $A_1$ , person 2 choose  $A_2$ , and so on. At the end of the period, the total level of  $Y$  will be given by

$$Y = A_1 + A_2 + A_3 + A_4 + A_5$$

In each period, each person can add anywhere from  $-4$  to  $6$  units of  $Y$ . You may add “partial” units, such as  $3.45$  units, for example. A negative addition implies that you want to take units away from the total of  $Y$ .

The payment each person must make is dependent upon the average of the other 4 additions and the variance of those other 4 additions. Specifically, let  $S$  be the average of the other 4 messages and  $V$  be the variance of the other 4 messages. For

person 2, these would be calculated by the formulas

$$S_2 = \frac{A1 + A3 + A4 + A5}{4}$$

$$V_2 = \frac{(A1 - S_2)^2 + (A3 - S_2)^2 + (A4 - S_2)^2 + (A5 - S_2)^2}{3}$$

Roughly speaking,  $V$  measures how “spread out” the other 4 messages are.

The payment each person must make is as follows. First, we calculate the total cost of  $Y$  per person. Each unit of  $Y$  costs 100 francs, so the total cost is  $100 * Y$  francs. This is then divided equally among the 5 people, so the cost per person is  $(100 * Y) / 5$ . Second, we calculate the additional payment each person must make based on their  $S$  and  $V$ . This extra payment is determined by how far away your addition is from the average of everyone else’s and on the variance of everyone else’s messages. Putting it all together, if a person adds  $A$  units to the level of  $Y$ , then the payment each person must make is given by

$$T = \left( \frac{100 Y}{5} \right) + (40 (A - S)^2 - 50 V)$$

Note that if  $V$  were large and  $(A - S)$  were small, then the second half of your payment could be negative. This means that you may end up paying more or less than  $1/5$  of the total cost, and this all depends on your decision and the decisions of the others in your group.

At the end of the period, the total level of  $Y$  will be given by  $Y = A1 + A2 + A3 + A4 + A5$  and you will earn  $V(Y) + E - T$ .

This process is computerized. In each period, you will input your decision into a computer program that will calculate  $Y$  and determine your payment and your earnings based on the decisions of your group. The computer will also keep track of your earnings and the results of all previous periods for your reference. The computer interface includes a tool called the “What-If Scenario Analyzer.” This is a special calculator adapted to help you figure out how much you would earn in certain hypothetical scenarios. It allows you to enter values of  $S$ ,  $V$ , and  $A$  just to see what you would earn if that was the real outcome of the period. Feel free to use this tool to help you make decisions. If you have any questions about the computer interface at any time, please raise your hand.

Questions?

### [Walker Mechanism Treatment]

The process through which your group will choose the level of  $Y$  is as follows. Each of you will choose how many units of  $Y$  you would personally like to add to the total. For example, let person 1 choose  $A_1$ , person 2 choose  $A_2$ , and so on. At the end of the period, the total level of  $Y$  will be given by

$$Y = A_1 + A_2 + A_3 + A_4 + A_5$$

In each period, each person can add anywhere from  $-10$  to  $15$  units of  $Y$ . You may add “partial” units, such as  $3.45$  units, for example. A negative addition implies that you want to take units away from the total of  $Y$ .

The payment  $T$  each person must make is dependent upon the total level of  $Y$  chosen by the group as well as the individual proposals of two other people in the group. This is calculated by the following procedure. First, we calculate the total cost of  $Y$  per person. Each unit of  $Y$  costs 100 francs, so the total cost is  $100 * Y$  francs. This is then divided equally among the 5 people, so the cost per person is  $(100 * Y) / 5$ . Second, each person pays an additional amount based on the difference in proposals of two other players in the following way. Each of you has been given a Player number of the form PLR#. Take for example PLR3. Since PLR4 has the next-highest Player number, we refer to PLR4 as the player “above” PLR3 and we refer to PLR2 as the player “below” PLR3. Similarly, PLR3 is above PLR2 and PLR1 is below PLR2. Since there is no PLR0 or PLR6, we say that PLR5 is below PLR1 and PLR1 is above PLR5. The additional amount that a given person must pay is the proposal of the player below them minus the proposal of the player above them, all multiplied by the total of the proposals  $Y$ .

Combined, the total payment  $T$  that PLR3 must make, for example, will be given by

$$T = \frac{100Y}{5} + (PLR2\text{'s proposal} - PLR4\text{'s proposal}) * Y$$

The table at the end of these instructions gives the formula for  $T$  for all 5 players, to avoid confusion.

Recall that at the end of the period, the total level of  $Y$  will be given by  $Y = A1 + A2 + A3 + A4 + A5$  and you will earn  $V(Y) + E - T$ .

This process is computerized. In each period, you will input your decision into



a computer program that will calculate  $Y$  and determine your payment and your earnings based on the decisions of your group. The computer will also keep track of your earnings and the results of all previous periods for your reference. The computer interface includes a tool called the “What-If Scenario Analyzer.” This is a special calculator adapted to help you figure out how much you would earn in certain hypothetical scenarios. It allows you to enter values of  $S$ ,  $V$ , and  $A$  just to see what you would earn if that was the real outcome of the period. Feel free to use this tool to help you make decisions. If you have any questions about the computer interface at any time, please raise your hand.

Questions?

Player #	Payment Calculation
1	$\frac{100Y}{5} + (PLR5\text{'s proposal} - PLR2\text{'s proposal}) * Y$
2	$\frac{100Y}{5} + (PLR1\text{'s proposal} - PLR3\text{'s proposal}) * Y$
3	$\frac{100Y}{5} + (PLR2\text{'s proposal} - PLR4\text{'s proposal}) * Y$
4	$\frac{100Y}{5} + (PLR3\text{'s proposal} - PLR5\text{'s proposal}) * Y$
5	$\frac{100Y}{5} + (PLR4\text{'s proposal} - PLR1\text{'s proposal}) * Y$

**[cVCG Treatment]**

All five people in your group value the level of  $Y$  by the formula  $V(Y) = -CY^2 + DY$ . However, people in your group may have different values of  $C$  and  $D$ . Check your private information slip for your values of  $C$  and  $D$ . In each period, all players in the group tell the central computer two *non-negative* numbers:  $A$  and  $B$ . The central computer will assume that each player’s value for  $Y$  is given by  $-AY^2 + BY$

and will then choose the level of  $Y$  that maximizes the combined value of all five players. Notice that if everyone submits  $A = C$  and  $B = D$  to the central computer, then the central computer will maximize the true combined value of all five players. On the other hand, if some players submit  $A \neq C$  or  $B \neq D$ , then the computer will choose a different level of  $Y$ . Since  $A$  and  $B$  cannot be negative, if you enter negative values into the central computer, it will treat them as zeros.

In addition to choosing the level of  $Y$ , the computer will also choose how much each person must pay for the chosen level of  $Y$ . In total, every unit of  $Y$  costs 100 francs. Thus, the group must pay a *total* of at least  $100 * Y$  francs. Each person will pay an equal share of the total cost plus an additional amount depending on the values of  $A$  and  $B$  chosen by all the members of the group. The additional amount each person must pay is given by the following process used by the computer:

1. Assume that everyone's  $V(Y)$  is given by  $-AY^2 + BY$  (the computer does *not* know the true  $C$  or  $D$  for any player.)
2. Calculate the  $Y$  that maximizes the sum of the reported values, net of costs. This is given by  $Y^* = \frac{(B1+B2+B3+B4+B5)-100}{2*(A1+A2+A3+A4+A5)}$ .
3. For each person, calculate the sum of everyone else's value in the group for the amount  $Y^*$ , minus  $\frac{4}{5} * 100 * Y^*$ , which represents how much of the cost of  $Y^*$  the other four must pay. Call this amount  $U^{-i}(Y^*)$ .
4. For each person, calculate the level of  $Y$  that maximizes the sum of *everyone else's value*, net of costs. We'll call this value  $Z^*$ . For example, for player 2,

this is given by  $Z^* = \frac{(B1+B3+B4+B5)-100}{2*(A1+A3+A4+A5)}$ .

5. For each person, calculate the sum of everyone else's value in the group for the amount  $Z^*$ , minus  $\frac{4}{5} * 100 * Z^*$ , which represents how much of the cost of  $Z^*$  the other four must pay. Call this amount  $U^{-i}(Z^*)$ .
6. Each person must pay  $U^{-i}(Z^*) - U^{-i}(Y^*)$ .

In words, each person must pay the difference between everyone else's value if that person weren't playing the game ( $U^{-i}(Z^*)$ ) and everyone else's value if that person was playing the game ( $U^{-i}(Y^*)$ ). This payment can be summarized by the phrase, "you must pay the change in everyone else's value that occurred because of your presence." Remember that the computer makes the above calculation based on the values of  $A$  and  $B$  that are reported and *not* on the actual values  $C$  and  $D$ .

In total, the amount each person must pay is  $T = \frac{100*Y}{5} + [U^{-i}(Z^*) - U^{-i}(Y^*)]$ . This process is guaranteed to collect at least enough money to cover the cost of  $Y$ . However, it is often the case that it collects more money than is needed to cover the cost of  $Y$ . If an excess is collected, the extra money is not refunded or used in any way.

At the end of the period, you receive your value for the level of  $Y$  chosen (which is  $-CY^2 + DY$ ) plus  $E$  minus  $T$ .

This process is computerized. In each period, you will input your decision into a computer program that will calculate  $Y$  and determine your payment and your earnings based on the decisions of your group. The computer will also keep track of your earnings and the results of all previous periods for your reference. The

computer interface includes a tool called the "What-If Scenario Analyzer". This is a special calculator adapted to help you figure out how much you would earn in certain hypothetical scenarios. Feel free to use this tool to help you make decisions. If you have any questions about the computer interface at any time, please raise your hand.

Questions?

## **A.2 Instructions from Chapter 4**

### General Instructions

**[All Treatments]**

The experiment you will participate in is part of a research project used to analyze the decision behavior in markets. The instructions are simple, and if you read them carefully and make appropriate decisions, you can earn a considerable amount of money. At the end of the whole experiment, all the profits you have made by your decisions will be added up and paid to you in cash. The experiment you will participate in consists of two stages. In the first stage six of you act as buyers, and nine of you as sellers. In the second stage, the sellers will determine the value of the goods for the buyers (for details of the second stage see below). We have distributed two kinds of instructions – information for the buyers, and information for the sellers, respectively. This information is for private use only – you are not allowed to reveal this information to anyone. Furthermore, you will find at the end of these instructions a second sheet (your record sheet) that is used to document your decisions. Insert your buyer or seller number there, as well as your name and the

date.

## Specific Instructions for Buyers

### [HRA Treatment]

At the market, a good is traded, and each seller sells the same good. A seller can sell this good to any buyer, and a buyer can buy it from any seller. The market is organized in the following way: we open the market for a trading period (a “trading day”), and each trading day lasts three minutes. As a buyer you can offer a price that must be divisible by 5, for example, prices like 15, 60, 80, 275 are allowed, but prices like 48, 67, 124, 83 are not. These offers will be announced to the sellers by us over the telephone. The sellers will not know your identity, that is, your buyer number; they will only know the price offered. If a seller accepts your offer, all buyers are informed about this acceptance. In this case, an agreement is concluded, and the good is bought by you at the offered price. During each trading day you can buy one unit of the good. Therefore, a trading day ends for you when your offer is accepted. Note also that each seller can sell one unit of the good per day at most. If your offer is not accepted, you are free to change your offer, that is, to make a new offer. But the new price you offer must be higher than all the prices that have not been accepted. Each seller may accept an offer or not, but he cannot make a counteroffer.

After three minutes the day ends, and you cannot buy any more of the good. Then the second stage of the experiment will be conducted. After this, a new trading day is opened. On the whole, there will be twelve trading days. In the second stage of the experiment, the seller who has sold the good to you on this day can fix the value

that the good will have for you. You as a buyer get a certain amount of experimental money (reselling price) from us for each unit you have bought. This reselling price is noted in the upper part of sheet 2. Your profit (measured in experimental money) is the difference between the reselling price and the price at which you have bought the good. If you bought the good for 20 and the reselling price is 30, you make a profit of  $30 - 20 = 10$  (measured in experimental money). How much one unit of experimental money is worth to you depends on “your” seller. By the choice of a conversion rate, he decides how much real money you receive from us for one unit of experimental money. Which conversion rates he is allowed to choose are noted on the lower part of sheet 2. If he chooses, for example, the rate 0.5, you will get \$5 for 10 units of experimental money.

Sellers have two kinds of costs: production costs and decision costs. The latter are associated with the decision about the conversion rate. Production costs are noted in the middle of sheet 2, and decision costs on the lower part of sheet 2. As you can see from sheet 2, the higher the conversion rate “your” seller chooses, the greater are his decision costs. The profit of the sellers paid in dollars is given by the formula:  $\text{profit} = (\text{price} - \text{production costs} - \text{decision costs})$ . Suppose, for example, that you have bought the good for 75. The production costs of the seller are 60, and he chooses a conversion rate of 0.6 (which is associated with decision costs of 5), the profits of “your” seller are given by  $75 - 60 - 5 = \$10$ . Do you have any questions?

### [HRP Treatment]

At the market, a good is traded, and each seller sells the same good. A seller can

sell this good to any buyer, and a buyer can buy it from any seller. The market is organized in the following way: we open the market for a trading period (a “trading day”), and each trading day lasts three minutes. As a buyer you can offer a price that must be divisible by 5, for example, prices like 15, 60, 80, 275 are allowed, but prices like 48, 67, 124, 83 are not. These offers will be announced to the sellers by us over the computer and displayed at the front of the room. The sellers will see your identity, that is, your buyer number, and the price you offered. If a seller accepts your offer, all buyers are informed about this acceptance. In this case, an agreement is concluded, and the good is bought by you at the offered price. During each trading day you can buy one unit of the good. Therefore, a trading day ends for you when your offer is accepted. Note also that each seller can sell one unit of the good per day at most. If your offer is not accepted, you are free to change your offer, that is, to make a new offer. But the new price you offer must be higher than all the prices that have not been accepted. Each seller may accept an offer or not, but he cannot make a counteroffer.

After each transaction, the seller who has sold the good to you on this day can fix the value that the good will have for you. You as a buyer get a certain amount of experimental money (reselling price) from us for each unit you have bought. This reselling price is noted in the upper part of your record sheet. Your profit (measured in experimental money) is the difference between the reselling price and the price at which you have bought the good. If you bought the good for 20 and the reselling price is 30, you make a profit of  $30 - 20 = 10$  (measured in experimental money).

How much one unit of experimental money is worth to you depends on “your” seller. By the choice of a conversion rate, he decides how much money you receive from us for one unit of experimental money. Which conversion rates he is allowed to choose are noted on the lower part of the record sheet. If he chooses, for example, the rate 0.5, you will get \$5 for 10 units of experimental money. Note that the conversion rate choice and the ID number of the seller will be visible by all buyers.

Sellers have two kinds of costs: production costs and decision costs. The latter are associated with the decision about the conversion rate. Production costs are noted in the middle of sheet 2, and decision costs on the lower part of sheet 2. As you can see from sheet 2, the higher the conversion rate “your” seller chooses, the greater are his decision costs. The profit of the sellers paid in dollars is given by the formula:  $\text{profit} = (\text{price} - \text{production costs} - \text{decision costs})$ . Suppose, for example, that you have bought the good for 75. The production costs of the seller are 60, and he chooses a conversion rate of 0.6 (which is associated with decision costs of 5), the profits of “your” seller are given by  $75 - 60 - 5 = \$10$ .

At the end of the experiment, you (and the sellers) will be paid for your earnings at a rate of 12-to-1, meaning every 12 dollars you earn in the experiment is worth 1 actual dollar that will be paid to you at the end of the experiment.

After three minutes the trading day ends, and you cannot buy any more of the good. After this, a new trading day is opened. On the whole, there will be twelve trading days. Do you have any questions?

**[LRP Treatment]**



At the market, a good is traded, and each seller sells the same good. A seller can sell this good to any buyer, and a buyer can buy it from any seller. The market is organized in the following way: we open the market for a trading period (a “trading day”), and each trading day lasts three minutes. As a buyer you can offer a price that must be divisible by 5, for example, prices like 15, 60, 80, 275 are allowed, but prices like 48, 67, 124, 83 are not. These offers will be announced to the sellers by us over the computer and projected in their room along with the buyers’ ID numbers. If a seller accepts your offer, all buyers are informed about this acceptance and the ID number of the seller who accepted it. At that point, the seller then chooses a number ‘ $x$ ’ that affects how valuable the good is to you. Higher values of ‘ $x$ ’ make the good more valuable, but cost the seller more money. This choice is then transmitted, along with the seller’s ID number, back to this room and the transaction is concluded. The good is bought by you at the offered price and your value is affected by ‘ $x$ ’. You have to note the accepted price and the seller’s choice of ‘ $x$ ’ on your record sheet.

During each trading day you can buy one unit of the good. Therefore, a trading day ends for you when your offer is accepted. Note also that each seller can sell one unit of the good per day at most. If your offer is not accepted, you are free to change your offer, that is, to make a new offer. But the new price you offer must be higher than all the prices that have not been accepted. Each seller may accept an offer or not, but he cannot make a counteroffer. After three minutes the day ends, and you cannot buy any more of the good. After this, a new trading day is opened. On the whole, there will be twelve trading days.

Your profit is the fixed value of the good (which is shown on your record sheet,) multiplied by the number ' $x$ ' that your seller will determine, minus the price you pay to buy the good. Mathematically, your profit is given by the formula

$$\text{buyer profit} = \text{value} * x - \text{price}.$$

The seller's profit is the price they get for the good, minus a fixed production cost, minus an 'additional cost' based on their choice of ' $x$ '. The formula for their profit is

$$\text{seller profit} = \text{price} - \text{production cost} - \text{additional cost}.$$

Your record sheet lists the value of the good to the buyers, the production cost to the sellers, and what the 'additional cost' for the seller is for each choice of ' $x$ '. The higher the choice of ' $x$ ', the greater are the 'additional costs.'

If, for example, your value for the good is 400, the seller chooses ' $x$ ' to be 0.49, then your value times ' $x$ ' equals 196. If the price you paid was 175, then your profit is  $196 - 175 = 21$ . If the seller's production cost is 100 and his additional cost from choosing  $x = 0.49$  is 6, then the seller's profit is  $175 - 100 - 6 = 69$ . This example appears on your record sheet.

At the end of the experiment, your earnings will be converted to dollars at a rate of \_\_\_\_\_. Do you have any questions?

## Specific Instructions for Sellers

**[HRA Treatment]**

At the market, a good is traded, and each seller sells the same good. A seller can sell this good to any buyer, and a buyer can buy it from any seller. The market is organized in the following way: we open the market for a trading period (a “trading day”), and each trading day lasts three minutes. Every buyer can offer a price that will be relayed to us by telephone. We list these offers on the blackboard, and you can accept one of these offers. If, e.g., a price of 50 is offered and you as seller number 5 want to accept this offer, you just say: “Number 5 sells for 50.” In this case, the transaction is concluded. The good is sold to the buyer who made the offer of 50. The buyer will not know your identity. He will just know that his offer is accepted. You have to note your accepted price on sheet 2.

You can sell one unit of the good on each trading day. Therefore, the trading day ends for you after the acceptance of an offer. Note also that each buyer can buy, at most, one unit of the good per trading day. Each seller may accept an offer or not, but the sellers cannot make counteroffers. After three minutes the trading day ends, and the second stage of the experiment is conducted. After this, a new trading day is opened. In total there will be twelve trading days. At the second stage of the experiment, you can fix the value the good will have for the buyers. Buyers receive a certain amount of experimental money (reselling price) from us for each unit that they have bought. This reselling price is noted in the middle of sheet 2.

The profit of a buyer (measured in experimental money) is the difference between the reselling price and the price at which he has bought the good from you. If “your” buyer has bought the good for 20 and the reselling price is 30, he makes a

profit of  $30 - 20 = 10$  (measured in experimental money.) How much one unit of experimental money is worth for “your” buyer depends on you. By the choice of a conversion rate, you decide how much real money “your” buyer gets from us for one unit of experimental money. If you choose, e.g., the rate 0.5, your buyer gets \$5 for 10 units of experimental money. Which conversion rates you are allowed to choose, is noted on the lower part of sheet 2. You have to write down your decision on the upper part of sheet 2. Do not announce your decision publicly.

You, as a seller, have two kinds of costs: production costs and “decision costs.” The latter are associated with your decision about the conversion rate. Of course, you incur costs only in the case of a deal. If you do not trade on a certain day, your costs are zero for this day. Production costs are noted on the upper part of sheet 2. Decision costs depend on your choice of the conversion rate. The higher the conversion rate you decide to give “your” buyer, the greater are your decision costs. The costs, which are associated with the conversion rate, are noted in the lower part of sheet 2.

Your profit paid in dollars is given by the formula  $\text{profit} = \text{price} - \text{production costs} - \text{decision costs}$ . If, for example, you sell your good for 75, while your production costs are 60, and you choose a conversion rate of 0.6 which leads to a decision cost of 5, your profit is given by  $75 - 60 - 5 = \$10$ . Do you have any questions?

### [HRP Treatment]

At the market, a good is traded, and each seller sells the same good. A seller can sell this good to any buyer, and a buyer can buy it from any seller. The market is

organized in the following way: we open the market for a trading period (a “trading day”), and each trading day lasts three minutes. Every buyer can offer a price that will be relayed to us by computer and displayed at the front of the room. We list these offers on the screen, along with buyer ID numbers, and you can accept one of these offers. If, e.g., a price of 50 is offered and you as seller number 5 want to accept this offer, you just say: “5 sells for 50.” In this case, the transaction is concluded. The good is sold to the buyer who made the offer of 50. The buyers will see your decision and your ID number. You have to note your accepted price on the record sheet.

You can sell one unit of the good on each trading day. Therefore, the trading day ends for you after the acceptance of an offer. Note also that each buyer can buy, at most, one unit of the good per trading day. Each seller may accept an offer or not, but the sellers cannot make counteroffers.

After each transaction, you can fix the value the good will have for the buyers. Buyers receive a certain amount of experimental money (reselling price) from us for each unit that they have bought. This reselling price is noted in the middle of the record sheet. The profit of a buyer (measured in experimental money) is the difference between the reselling price and the price at which he has bought the good from you. If “your” buyer has bought the good for 20 and the reselling price is 30, he makes a profit of  $30 - 20 = 10$  (measured in experimental money.) How much one unit of experimental money is worth for “your” buyer depends on you. By the choice of a conversion rate, you decide how much money “your” buyer gets from us for one unit

of experimental money. If you choose, e.g., the rate 0.5, your buyer gets \$5 for 10 units of experimental money. Which conversion rates you are allowed to choose, is noted on the lower part of the record sheet. You have to write down your decision on the upper part of the record sheet.

You, as a seller, have two kinds of costs: production costs and “decision costs.” The latter are associated with your decision about the conversion rate. Of course, you incur costs only in the case of a deal. If you do not trade on a certain day, your costs are zero for this day. Production costs are noted on the upper part of the record sheet. Decision costs depend on your choice of the conversion rate. The higher the conversion rate you decide to give “your” buyer, the greater are your decision costs. The costs, which are associated with the conversion rate, are noted in the lower part of the record sheet.

Your profit is given by the formula  $\text{profit} = \text{price} - \text{production costs} - \text{decision costs}$ . If, for example, you sell your good for 75, while your production costs are 60, and you choose a conversion rate of 0.6 which leads to a decision cost of 5, your profit is given by  $75 - 60 - 5 = \$10$ .

At the end of the experiment, you (and the buyers) will be paid for your earnings at a rate of 12-to-1, meaning every 12 dollars you earn in the experiment is worth 1 actual dollar that will be paid to you at the end of the experiment.

After three minutes the trading day ends, and the second stage of the experiment is conducted. After this, a new trading day is opened. In total there will be twelve trading days. Do you have any questions?

**[LRP Treatment]**

At the market, a good is traded, and each seller sells the same good. A seller can sell this good to any buyer, and a buyer can buy it from any seller. The market is organized in the following way: we open the market for a trading period (a “trading day”), and each trading day lasts three minutes. Every buyer can offer a price (in multiples of 5) that will be relayed to us by computer and projected at the front of the room, along with the ID number of the buyer. We list these offers on the screen, and you can accept one of these offers. If, e.g., a price of 50 is offered and you as seller number 5 want to accept this offer, you just say: “Seller 5 sells for 50.” At that point, you then choose a number ‘ $x$ ’ that affects how valuable the good is to the buyer. Higher values of ‘ $x$ ’ make the good more valuable to the buyer, but cost you more money. This choice is then transmitted, along with the your ID number, back to the buyers and the transaction is concluded. The good is sold by you at the offered price and you pay an additional cost for your choice of ‘ $x$ ’. You have to note your accepted price and your choice of ‘ $x$ ’ on your record sheet.

During each trading day you can sell one unit of the good. Therefore, a trading day ends for you when you accept an offer. Note also that each buyer can buy one unit of the good per day at most. If a buyer’s offer is not accepted, the buyer is free to change his offer, but the new price must be higher than all the prices that have not been accepted. Each seller may accept an offer or not, but you cannot make a counteroffer. After three minutes the day ends, and you cannot accept any offers. After this, a new trading day is opened. On the whole, there will be twelve trading

days.

The profit of a buyer is the buyer's fixed value of the good (which is shown on your record sheet,) multiplied by the number ' $x$ ' that you will determine, minus the price they pay to buy the good. Mathematically, the buyer's profit is given by the formula

$$\text{buyer profit} = \text{value} * x - \text{price}.$$

Your profit is the price you get for the good, minus a fixed production cost, minus an 'additional cost' based on your choice of ' $x$ '. The formula for your profit is

$$\text{seller profit} = \text{price} - \text{production cost} - \text{additional cost}.$$

In the second stage of the experiment, your job is to choose the value ' $x$ ', and your 'additional cost' depends on this decision. Your record sheet lists the value of the good to the buyers, your production cost, and what the 'additional cost' is for each choice of ' $x$ '. The higher the choice of ' $x$ ', the greater are your 'additional costs'.

If, for example, you sell your good for 175, while your production costs are 100, and you choose the value of ' $x$ ' as 0.49 which leads to a decision cost of 6, your profit is given by  $175 - 100 - 6 = 69$ . This example appears on your record sheet.

At the end of the experiment, your earnings will be converted to dollars at a rate of \_\_\_\_\_. Do you have any questions?



Buyer Number:			Name:			Date & Time:		
Period	Selling Price (1)	Price (2)	Exp. Money Profit (3)=(1)-(2)	Conv. Rate "CR" (4)	Profit (5)=(3)x(4)	Total Profit		
Example	405	205	200	0.5	100	100		
1	126							
2	126							
3	126							
4	126							
5	126							
6	126							
7	126							
8	126							
9	126							
10	126							
11	126							
12	126							

Production Cost of Sellers: 26

Seller Profit = Price - Production Cost - Decision Cost "DC"

<b>CR</b>	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
<b>DC</b>	0	1	2	4	6	8	10	12	15	18

Figure A.1: Record Sheet: Buyers, HRA and HRP Treatments

Seller Number:		Name:			Date & Time:		
Period	Conversion Rate "CR"	Price (1)	Production Cost (2)	Decision Cost "DC"	Profit (4)=(1)-(2)-(3)	Total Profit	
Example	0.6	175	100	5	70	70	
1			26				
2			26				
3			26				
4			26				
5			26				
6			26				
7			26				
8			26				
9			26				
10			26				
11			26				
12			26				

Reselling Price of Buyers: 126  
 Buyer Profit = (Reselling Price - Price) x Conversion Rate "CR"

<b>CR</b>	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
<b>DC</b>	0	1	2	4	6	8	10	12	15	18

Figure A.2: Record Sheet: Sellers, HRA and HRP Treatments

Buyer Number:		Name:			Date & Time:		
Period	Value (1)	"x" (2)	Value * "x" (3)=(1)*(2)	Price (4)	Profit (5)=(3)-(4)	Total Profit	
Example	400	0.49	196	175	21	21	
1	126						
2	126						
3	126						
4	126						
5	126						
6	126						
7	126						
8	126						
9	126						
10	126						
11	126						
12	126						

  

Production Cost of Sellers: 26										
Seller Profit = Price - Production Cost - Additional Cost "AC"										
<b>AC</b>	0	3	6	12	18	24	30	36	45	54
<b>x</b>	0.35	0.42	0.49	0.57	0.64	0.71	0.78	0.86	0.93	1.00

Figure A.3: Record Sheet: Buyers, LRP Treatment

Seller Number:		Name:			Date & Time:		
Period	Price (1)	Prod'n Cost (2)	Additional Cost "AC" (3)	"x" (4)	Profit (4)=(1)-(2)-(3)	Total Profit	
Example	175	100	6	0.49	69	69	
1		26					
2		26					
3		26					
4		26					
5		26					
6		26					
7		26					
8		26					
9		26					
10		26					
11		26					
12		26					

  

Value to Buyers: 126																						
Buyer Profit = Value * x - Price																						
<table border="1"> <tr> <td>AC</td> <td>0</td> <td>3</td> <td>6</td> <td>12</td> <td>18</td> <td>24</td> <td>30</td> <td>36</td> <td>45</td> <td>54</td> </tr> <tr> <td>x</td> <td>0.35</td> <td>0.42</td> <td>0.49</td> <td>0.57</td> <td>0.64</td> <td>0.71</td> <td>0.78</td> <td>0.86</td> <td>0.93</td> <td>1.00</td> </tr> </table>	AC	0	3	6	12	18	24	30	36	45	54	x	0.35	0.42	0.49	0.57	0.64	0.71	0.78	0.86	0.93	1.00
AC	0	3	6	12	18	24	30	36	45	54												
x	0.35	0.42	0.49	0.57	0.64	0.71	0.78	0.86	0.93	1.00												

Figure A.4: Record Sheet: Sellers, LRP Treatment