APPENDIX: INSTRUCTIONS

In the following we present representative instructions, in this case for a worker (seller) from the treatment T-Barrier. Instructions for firms (buyers) and for participants in other treatments are exactly the same, except for including explanation of the option for firms to pay bonuses in the case of T-Barrier-Bonus and T-Bonus, or excluding the final section explaining the dismissal barrier institution in the case of T-Bonus and T-Baseline.

Instructions for Sellers

You are now taking part in an economic experiment. Please read the following instructions carefully. Everything that you need to know to participate in this experiment is explained below. Should you have any difficulties in understanding these instructions please notify us. We will answer your questions at your cubicle.

At the beginning of the experiment you will receive an initial sum of **8 Euro**. During the course of the experiment you can earn a further amount of money by gaining **points**. The amount of points that you gain during the experiment depends on your decisions and the decisions of other participants.

All points that you gain during the course of the experiment will be exchanged into Euro at the end of the experiment. The exchange rate will be:

1 point = 4 Cents

At the end of the experiment you will receive the sum of money that you earned during the experiment in addition to your 8 Euro initial sum.

The experiment is divided into periods. In each period you have to make decisions which you will enter in a computer. There are 18 periods in all.

Please note that communication between participants is strictly prohibited during the experiment. In addition we would like to point out that you may only use the computer functions which are required for the experiment. Communication between participants and unnecessary interference with computers will lead to exclusion from the experiment. In case you have any questions we shall be glad to assist you.

Prior to the experiment the 17 participants were divided into 2 groups: buyers and sellers. In this experiment there are 10 sellers and 7 buyers.

You shall be a seller for the entire course of the experiment. All participants have received an identification number, which they will keep for the entire experiment. Your identification number is stated on the documentation sheet in front of you.

An Overview of the Experiment Procedures

In each period of the experiment every buyer can trade a product with one seller. The seller earns a profit through the trade when he sells the product at a price that exceeds his production costs. The buyer earns a profit through the trade when the price he pays for the product is less than what it is worth to him. How high the production costs are for the traded product, and how much it is worth to the buyer, depends on the quality of the product.

The experiment lasts 18 periods. In each period the procedures are as follows:

1. Each period commences with a **trading phase,** which lasts 150 seconds. During this phase buyers can submit trade offers, which can be accepted by sellers.
   When submitting an offer a buyer has to specify **three things**:
   - which price he offers to pay,
   - which product quality he desires,
   - and finally, which seller he wants to submit the offer to. Hereby, buyers can submit two types of offers; private offers and public offers. **Private offers are submitted to one seller only** and can only be accepted by that seller. **Public offers are submitted to all sellers** and can be accepted by any seller.

   Buyers can submit as many offers as they like in each period. Submitted offers can be accepted constantly. **Each buyer and each seller can only enter one trade agreement in each period.** As there are 10 sellers and 7 buyers, several sellers will not trade in each period.

2. Following the trading phase each seller who has entered a trade agreement determines which quality of product he will supply to his buyer. Hereby, **the seller is not obliged to supply the product quality desired by his buyer.**

Please note: If the same buyer has made private offer to the same seller in two consecutive periods, and if the seller has accepted these two offers, the seller enjoys the "right to get an offer". This means that the buyer has to make this seller an offer in the next period. If the seller accepts, this "right to get an offer" continues to exist. If he rejects, the buyer is free to make an offer to any seller.

Once every seller has chosen which product quality to supply, incomes gained by each participant in that period are determined and reported on the screen. After this the next

period commences. The points gained from all 18 periods will be summed up at the end of the experiment, exchanged into Euros and paid together with your initial sum of money in cash.

Procedures in Detail

There are 7 buyers and 10 sellers in the experiment. You are a seller for the entire course of the experiment. During the experiment you will enter your decisions on the computer. In the following we describe in detail how you can make your decisions in each period.

1. The Trading Phase

Each period commences with a trading phase. During the trading phase each buyer can enter into a trading agreement with one seller. In order to do this the buyers can submit trade offers to the sellers. As a seller you can accept one of the offers submitted to you in each period. During the trading phase you will see the following screen:

Seller trading screen

- In the top left corner of the screen you will see the current period of the experiment. In the top right corner of the screen you will see the time remaining in this trading phase, displayed in seconds. **The trading phase in each period lasts 150 seconds.** When this time is up the trading phase is over. Hereafter, no further offers can be submitted or accepted for this period.

- Once you see the above screen displayed the trading phase commences. As a seller you can now accept offers, which buyers have submitted to you. There are two types of offers which you can accept:

    - **Private offers to you**

  Each buyer has the opportunity to submit private offers to you. **You alone will be informed of these offers and you alone can accept them**. No other seller or buyer is informed of these offers. If you receive private offers, they will appear on the left side of your screen, below the title "private offers to you". The offer of a buyer will contain the following information: the identification number of the buyer who submitted the offer, the price which he offers for the product, and which product quality he desires. If you want to accept a private offer, you click first on the respective row in which the offer is displayed. When you do this, the offer will be highlighted. If you are sure you want to accept the offer you then click on the button "accept" which is situated in the bottom left corner of the screen. As long as you do not click "accept" you can alter your choice.

- **Public offers**

Each buyer also has the possibility to submit public offers. All sellers are informed of these offers and **any seller can accept them**. If a buyer submits a public offer it will appear on the right side of your screen, below the title "public offers". The offer of a buyer again contains the identification number of the buyer who submitted the offer, the price which he offers for the product and which product quality he desires. This information is also displayed to all other sellers and all buyers. If you want to accept a public offer you follow the same procedures as with private offers. You first click on the respective row in which the offer is displayed. When you are sure that you want to accept the offer you then click on the button "accept" which is situated in the bottom right corner of the screen. As long as you do not click "accept" you can alter your choice.

- As soon as you have pressed the "accept" button you will see which offer you have accepted in the bottom row of your screen.

- **Each seller can enter only one trade agreement in each period**. Once you have accepted one offer you cannot accept any further offers.

All buyers have to observe the following rules when submitting trade offers:

- The price offered by the buyer may not be lower than 0 or higher than 100:

$$\mathbf{0 \leq price \leq 100}$$

- The **desired quality** of the buyer may not be below 1 or higher than 10:

$$\mathbf{1 \leq desired\ quality \leq 10}$$

- **As long as no offer has been accepted by a seller, the buyer can make as many public and private offers as he wishes.** Each offer submitted by a buyer can be accepted at any time during the trading phase.

- **Each buyer can enter only one trade agreement in each period.** Once an offer of a buyer has been accepted he will be notified which seller accepted it. As each buyer can enter only one trade agreement in each period all other offers of the buyer will be automatically cancelled. Also, he will not be able to submit any further offers.

- Once all 7 buyers have entered a trade agreement or after 150 seconds have elapsed, the trading phase is over.

- No buyer is obliged to submit trade offers, and no seller is obliged to accept a trade offer.

2. Determination of the Product Quality

- Following the trading phase, all sellers who have entered a trade-agreement then determine which product quality they will supply to their respective buyers. **The product quality desired by your buyer is not binding for you as a seller.** You can choose the exact quality desired by your buyer, but also a higher or lower product quality. If you have entered a trade agreement during a trading phase, the following screen will appear for you to enter the product quality:

Seller quality choice screen

In order to choose the actual product quality, you enter the value for the quality in the field "Determine the actual product quality" and press the "ok" button to confirm your choice. As long as you have not pressed "ok" you can alter your choice.

- The product quality that you choose must be an integer between 1 and 10.

$1 \leq$ actual product quality ≤ 10

How are the incomes calculated?

<u>Your income:</u>

- If you have **not entered a trade agreement** during a trading phase you gain an income of **5 points** for that period.

- If you have accepted a trade offer your income depends on the price you accepted and the product quality you chose to deliver. Your income will be calculated as follows:

Your income = Price - production costs

- Your production costs are higher, the higher the quality of the product you chose to deliver. The production costs for each product quality are displayed in the table below:

Quality	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Production-cost	0	1	2	4	6	8	10	12	15	18

- Your income is therefore higher, the lower your chosen product quality. Furthermore, your income is higher the higher is the price offered by the buyer.

The income of your buyer:

- If a buyer does not enter a trade agreement during a trading phase he gains an income of 0 points for that period.

- If one of his trade offers is accepted, his income depends on which price he offered and which product quality was supplied to him. The income of your buyer will be determined as follows:

Income of your buyer = 10 * product quality - price

- As you can see from the above formula the income of your buyer is higher, the higher is the product quality actually supplied by you. At the same time his income is higher, the lower the price he paid for the product.

The income of all buyers and sellers are determined in the same way. **Each buyer can therefore calculate the income of his seller and each seller can calculate the income of his buyer.** Furthermore, each buyer and seller is informed of the identification number of his trading partner in each period.

Please note that buyers and sellers can incur losses in each period. These losses have to be paid from your initial sum of money or from earnings in other periods.

You will be informed of your income and the income of your buyer on an "**income screen**". On the screen (see below) the following will be displayed:

- Which buyer you traded with
- Which price he offered
- The desired quality of your buyer
- The product quality supplied by you
- The income of your buyer in this period
- Your income in this period.

Seller income screen

Please enter all the information in the documentation sheet supplied to you. After the income screen has been displayed, the respective period is concluded. Thereafter the trading phase of the following period commences. Once you have finished studying the income screen please click on the "next" button.

The buyers also view an income screen, which displays the above information. They see the ID of their trading partner, the price, desired and supplied product quality as well as both incomes.

"Right to get an offer"-Rule

There is one more rule to consider. If the same buyer has made two private offers to the same seller in two consecutive periods, and both offers were accepted so that they each lead to a trade agreement, the seller enjoys the "right to get an offer" in the next period. This is the case, e.g., if buyer 1 makes seller 2 private offers, one in period 3 and one in period 4, which are both accepted by seller 2. Starting from period 5, seller 2 then enjoys the "right to get an offer".

The right to get an offer is thus established when a buyer has traded at least twice with the same seller, and if these trades came about through private offers. If trade comes about based on a public offer, the right to get an offer is not established. Thus the buyer himself can decide whether he wants to enter a relationship with or without the right to get an offer.

In other words the "right to get an offer" means that in the next period the buyer must make the seller an offer that is available as soon as soon as the trading phase begins. This offer consists of a price and desired quality. **The price must be at least as high as in the previous period.**

If the same buyer has offered you two times in a row a private offer, which you accepted, you enjoy the right to get an offer. This means "your" buyer must make you an offer in the next period. In this case the trading phase begins with the following screen.

Modified trading phase screen

This is the same screen as on page 3 with the only difference that on the upper right corner you now see the offer of your buyer. In addition you also see the other public and private offers, which have been offered to you and the other sellers. **You can accept the offer of "your" buyer or any other offer that has been made (private or public) by other buyers.**

As long as you have not yet decided, "your" buyer cannot make another offer to you or another seller. This means that you can accept the offer of "your" buyer as long as you have not declined it (and trading time has not yet elapsed).

Your buyer will be informed about your decision. If you reject his offer or if you accept another buyer's offer, "your" buyer is free to make offers to other sellers. As long as you have not yet decided, all "your" buyer can do is wait and observe the market.

If you accept the offer of "your" buyer, he will also make you an offer in the next period. Only if you reject his offer or if you accept the offer of another buyer, the right to get an offer expires. **This means that the right to get an offer can only be terminated by yourself**.

An example concerning the right to get an offer: Suppose buyer 1 and seller 2 have traded in periods three and four, based on two private offers. Starting from period 5 seller 2 then enjoys the right to get an offer. This means that buyer 1 has to make seller 2 an offer in the fifth period before the trading period begins. If seller 2 accepts, the relation remains and buyer 1 will make seller 2 an offer also in period 6. If seller 2 rejects, the relation is terminated and buyer 1 can thereafter make offers to all sellers (public and private).

The experiment will not commence until all participants are completely familiar with all procedures. In order to secure that this is the case we kindly ask you to solve the exercises below.

In addition we will conduct **a training trial of the trading phase**, so that you can get accustomed to the computer. This trial phase will not be added to the result of the experiment and therefore not remunerated. Following the trial phase we will begin the experiment, which will last for 18 periods.

Exercises

Please solve the following problems including the solution approach. If you have any questions please ask the experimenter. Wrong answers have no consequences whatsoever.

Problem 1:
You have not accepted any offer during a trading period. What is your income in this particular period?

Your income =

Problem 2:
You have accepted an offer, containing a price of 60 and a desired quality of 9. You choose an actual quality of 9.

Your income =

Income of your buyer =

Problem 3:
You have accepted an offer, containing a price of 60 and a desired quality of 9. You choose an actual quality of 4.

Your income =

Income of your buyer =

Problem 4:
You have accepted an offer, containing a price of 40 and a desired quality of 2. You choose an actual quality of 5.

Your income =

Income of your buyer =

Problem 5:
You have accepted an offer, containing a price of 10 and a desired quality of 6. You choose an actual quality of 6.

Your income =

Income of your buyer =

Problem 6:
Suppose you have accepted a private offer from a particular buyer in period 5. In period 6 you accept a public offer coming from the same buyer. Do you enjoy the right to get an offer starting from period 7?

- Yes
- No