

Instructions. Treatment B

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 by raising your hand up. We will answer your questions at your place.

At the beginning of the experiment you will receive an initial sum of **6 Euro corresponding to 200 points** . During the course of the experiment you can earn a further amount of money by gaining other 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 = 3 Cents

At the end of the experiment you will receive the sum of money that you earned during the experiment in addition to your 6 Euro initial sum .

The experiment is divided into periods. In each period you have to make decisions in different stages. Your decision 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.

At the beginning of the experiment will be divided into 2 groups: firms and workers. In this experiment there are workers and firms. **You shall be a worker or a firm for the entire course of the experiment. As all the other participants, you will have an identification number (ID), randomly assigned by the computer, which you will keep for the entire experiment, except in the trial period.** During the trial period, all participants will receive a provisional ID that will be changed as soon as the true game starts. Your ID will be displayed on the top of the screen.

An Overview of the Experiment Procedures

In each period of the experiment every worker can deal with one firm. The firm earns a profit if the effort exercised by the worker exceeds the wage and no adverse shock occurs. The worker earns a profit as long as he/she receives and accepts an offer, and the salary he/she gains covers the cost of the delivered effort.

The experiment lasts 18 periods. Every period is made of 7 stages which contain two contractual phases (in stage 1 and stage 3). Each worker and each firm can only enter one agreement in each contractual phase. Each firm can hire at most 2 workers per period, whereas a worker can conclude only one contract per period. At least 3 workers will not close any contracts in each period.

In every period, the procedures are as follows:

STAGE 1. The first contractual phase.

Each period commences with a **contractual phase**, which lasts 150 seconds. During this phase firms can submit offers, which can be accepted by workers.

When submitting an offer a firm has to specify **three things**:

- which salary the firm offers to pay,
- which level of effort it desires from the worker,
- and finally, which worker it wants to submit the offer to.

Hereby, firms can submit two types of offers; private offers and public offers. **Private offers are submitted to one worker only** and can only be accepted (and seen) by that worker. **Public offers are submitted to all workers** and can be accepted by any worker. Firms can submit as many offers as they like in each period, and are allowed to exclude up to 4 workers from a public offer. Submitted offers can be accepted constantly.

In some cases, explained further below, worker has the right to receive an obliged offer from a firm. In that case, the firm is obliged to make an offer that can be seen only from the worker to whom this offer must be addressed.

STAGE 2. Decision to hire a second worker.

Following this first contractual phase firms are asked if they want to hire a second worker. If firms wish to hire a second worker, or one worker if they do not close any contract in the previous stage, they will enter a **second contractual phase** in STAGE 3 that is identical to the contractual phase in STAGE 1. In this stage firms are also notified should they submit an obliged offer. This lasts 15 seconds.

STAGE 3. The second contractual phase.

Only firms that want to hire a second worker, that is answered yes in STAGE 2, or have to submit an obliged offer, and workers which did not conclude any contract in the first contractual phase will enter this **second contractual phase**. This stage is identical to STAGE 1, lasting 150 seconds.

During this phase firms can submit offers, which can be accepted by workers. Each offer has to specify the salary, the level of effort, as well as the worker to which the offer is submitted. Again, firms can submit private and public offers, and may be obliged to submit an offer.

*****Please note***:** If the same firm has hired the same worker in two or more consecutive periods, the worker enjoys the “right to get an offer” according to number of periods he/she worked for this firm. **The right to get an offer is the number of periods the worker must receive an offer from the same firm** with a salary at least as high as the one in the last period together, and it is equal to

Right to get an offer= number of working periods with the same firm

When the right to get an offer is equal or greater than one, the firm has to make an offer in the following period(s). Depending on the latest contractual phase together, the right to get an offer could be either in the next contractual phase 1 or 2. If the worker accepts the obliged offer (or another offer from the same firm in the same period), the “right to get an offer” continues to exist. If he rejects and/or accepts another offer from a different firm, the firm is then free to make an offer to any other worker. **Once the firm has submitted the obliged offer, the worker has 15 seconds to accept/reject the obliged offer from the firm.** After this time, the firm is also free to make offers to other workers.

Be careful! If the firm does not submit the obliged offer the computer will automatically send the obliged offer to the worker after 50 seconds with the level of wage equal to the last wage and a level of desired effort equal to zero. The worker again may either accept or reject but without any time limit.

STAGE 4. Choosing the level of effort

Following the contractual phases, each worker who has entered an agreement determines which level of effort he/she will supply to his/her firm. Hereby, **the worker is not obliged to supply the desired level of effort demanded by the firm.**

STAGE 5. Your Income

Once every worker has chosen which level of effort to supply, incomes gained by each participant in that period are determined, and reported on the screen. This stage lasts 10 seconds. The income of the firm depends on the level of the effort supplied by the worker(s) but also on the state of the economy. There is a given chance of 10% that **a negative shock will hit** the economy making some firms suffering a loss of **15 points**. The income of the worker depends on the effort he chose and the wage he received.

STAGE 6. A worker may be fired.

Each worker, after two consecutive periods with the same firm, is entitled of a right to receive an offer from that firm in the following period. At the end of each period, however, the firm that has hired some workers for two or more consecutive periods is asked if and which worker it wants to fire.

For workers who have not been fired, the right to get an offer will increase by 1 in each period with the same firm obliged to submit the offer.

For fired worker(s) protections will not add up anymore. Firms however are obliged to make an offer for a number of periods equal to worker's right to get an offer. Therefore, even if in the following periods the worker accepts an offer from that firm, these periods will not contribute anymore to the computation of the right to get an offer. The right to get an offer is kept (and can be exercised), as long as the worker accepts an offer from that firm. **Each period the fired worker receives an obliged offer, the right to get an offer decrease by 1.**

Be careful! If in the last period the worker was hired in contractual phase 1, he has the right to receive an offer in contractual phase 1. If the worker was hired in the last period in contractual phase 2, he has the right to receive an offer in contractual phase 2. However, he/she will not lose his/her right by accepting an offer from the same firms in a different phase.

STAGE 7 Notification stage.

Fired workers are notified. In this stage, workers are told if they have been fired along with their right to receive an offer.

On your screen it will appear a message informing if you are a firm or a worker, so that you can read carefully the detailed instructions either for workers or firms.

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 that will appear on your computer screen.

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.

Procedures in detail: instructions for workers

Please read carefully the following instructions if you are a worker

You are a worker for the entire course of the experiment. The experiment lasts 18 periods. Each period is made of 7 stages. In each period you can close only one contract. 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 stage of the game

STAGE 1. The first contractual phase

Each period commences with a contractual phase. During the contractual phase each worker can enter into an agreement with one firm. In order to do this the firms can submit offers to the workers. As a worker you can accept one of the offers submitted to you in each period.

During the contractual phase on your screen 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 contractual phase, displayed in seconds. **The trading phase in each period lasts 150 seconds. In the top at the centre of the screen you will see your ID.** When this time is up the contractual phase is over. Hereafter, no further offers can be submitted or accepted for this period.

As a worker you can accept offers, which firms have submitted to you. There are two types of offers which you can accept:

Private offers to you: each firm 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 worker or firm is informed of these offers. If you receive private offers, they will appear on your screen, and in the column below the title “offer” you will see “private”.

Public offers: each firm also has the possibility to submit public offers. All workers are informed of these offers and **any worker can accept them.** If a firm submits a public offer it will appear on your screen, and below the column below the title “offer” you will read “public”. However, a firm is able to exclude up to 4 workers from a public offer. As a worker, you will not see the public offer from which you have been excluded

Either public or private, the offer of a firm must contain, the salary and the desired level of effort.

To accept an offer you have to select it and then press the button “Confirm”. As soon as you have pressed the “Confirm” button you will see a screen reporting the details of the offer you have chosen: the salary you are going to receive, and the ID of your opponent firm. At the same time, the firm will be notified that you have accepted the offer and will not be able to submit any further offers

In some circumstances, you have the right to get an offer from a firm.

Obligated offers to you: if you have worked with the same firm for two or more consecutive periods, and **as long as you have a positive right to get an offer**, on the bottom of your screen a new box will appear where you will receive from that firm an “obliged offer”. The wage offered by the firm in that case must be at least as high as in your last period together. Under this box, **you can also see the level of your right to get an offer and if the firm has fired you.**

You may either “Accept” or “Reject” that offer, by pressing the relative button. Once the firm has submitted to you an obliged offer, you have to reach a decision in 15 seconds, otherwise the obliged offer will disappear. **As long as you have not yet decided, and the 15 seconds are not yet elapsed, “your” firm cannot make another offer to you or to another worker.** However, you can still

receive other offer from different firms. This means that you can accept the offer of “your” firm as long as you have not declined it (and time has not yet elapsed) or accept other offers. Your firm will be informed about your decision. **If you reject the offer or if you accept another firm’s offer, “your” firm is free to make offers to other workers and your right to get an offer from that firm will be set to zero.** However, if in the same stage you rejected the obliged offer, you accept another offer from the same firm, your right to get an offer will be kept. The same will happen if you accept the obliged offer of “your” firm. **In both cases, if you have been fired your right to get an offer will decrease by 1. Otherwise, if you have not been fired, also this period will add up to your right to get an offer.**

Only if you reject the obliged offer or if you accept the offer of another buyer, your right to get an offer expires. This means that the right to get an offer can only be terminated by yourself, either because you reject the obliged offer by pressing the “Reject” button or you do not accept it in 15 seconds, or you accept another offer from a different firm.

Each worker can conclude only one contract in each period. Once you have accepted one offer you cannot accept any further offers.

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

The offered wage by the firm may not be lower than 0 or higher than 100:

$$0 \leq \text{offered wage} \leq 100$$

Moreover, **in obliged offers**, the offered wage may not be below the wage offered in the previous period:

$$\text{previous wage} \leq \text{offered wage} \leq 100$$

The **desired effort** of the firm may not be below 1 or higher than 10:

$$1 \leq \text{desired effort} \leq 10$$

You do not have to worry about these bounds as the computer will check entries from every participants.

As long as no offer has been accepted by a worker, the firm can make as many public and private offers as it wishes. Each offer submitted by a firm can be accepted at any time during the trading phase. Once all firms have concluded a contract or after 150 seconds have elapsed, the contractual phase is over.

STAGE 2. Decision to hire a second worker.

In this stage firms are asked if they want to hire another worker. As a worker you will not enter this stage.

STAGE 3. The second contractual phase.

This stage is identical to STAGE 1. During this phase workers who have not closed any contract in the first contractual phase can enter into an agreement with one firm. You will enter this stage only if you did not close any contract in the STAGE 1, and there is a firm willing to hire a second workers or has to submit an obliged offer to you

STAGE 4. Choosing the level of effort

Following the contractual phases, you will enter this stage only if you are a worker who has closed a contract in the first or second contractual phase. On the screen, you will see the ID of your opponent firm, the wage you will receive from that firm, as well as the level of effort you are asked to supply. However, **you are not obliged to supply the desired level of effort demanded by the firm**. You can provide any level of effort ranging from 1 to 10.

$$1 \leq \text{actual level of effort} \leq 10$$

To confirm your choice press the “OK” button choice. As long as you have not pressed “ok” you can alter your choice. Once you have pressed the “OK” button, your level of effort is determined and you will leave this stage.

STAGE 5. Your income

If you have **not closed** any contracts during a trading phase, you will not gain an income for this period. Your profit will be zero.

If you closed a contract, either in first or second contractual phases, your income depends on the wage you accepted and the level of effort you chose to deliver. Your income will be calculated as follows:

$$\text{Your income} = \text{Wage} - \text{Cost of effort}$$

The higher the level of the effort you choose, the higher the cost of your effort. The costs for each level of effort are displayed in the table below:

EFFORT	1	2	3	4	5	6	7	8	9	10
COST OF EFFORT	0	1	2	4	6	8	10	12	15	18

Your income is therefore higher, the lower your level of effort. Furthermore, your income is higher the higher is the wage offered by the firm.

No firms will know with certainty the actual income and effort of workers. The firms know how much cost for a worker to deliver a precise level of effort. That is, firms know the “Effort table”. However, your income and effort will not be displayed to the firms. Moreover, **firms cannot infer from their income with certainty the level of effort you have chosen as there is a given chance of 10% that firms will be hit by a negative shock**. If a firm in a period has a lower profit, it may be either due to a negative shock or to a low level of effort exercise by his workers.

The income of your firm:

On the contrary, workers can observe the level of firm profits. In particular, as a worker you will see in every periods the profit earned by your opponent firm

If a firm does not hire any worker will get 0 points for that period.

If a firm hire a worker, its income depends on which wage it has offered and which level of effort was supplied by this worker. The income of your firm will be determined as follows:

- if it has hired only one workers

Firm income = 10* your level of Effort – your Wage – shock

- if it has hired two workers

Firm income = 8* your level of effort + 8*Effort 2nd worker – your Wage – 2nd Wage – shock

where *shock* is the **negative shock, equal to 15 points**, and the **probability of an adverse shock is equal to 10%**.

As you can see from the above formula the income of your firm is higher, the higher is the level of effort actually supplied by you and by the other worker, and the lower the wages.

Please note that workers and firms 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 on an “**income screen**”. On this screen the following will be displayed:

- Which firm you traded with
- Your wage
- The desired level of effort of your firm
- The level of effort supplied by you
- The income of your buyer in this period
- Your income in this period.

STAGE 6. Firing stage

As a worker you will not enter this stage. At the end of each period, if a firm has hired some workers for two or more consecutive periods – therefore the worker has the right to get an offer – firm are asked if and which workers they want to fire. This period lasts 20 seconds.

STAGE 7. Firing notification

Fired workers are notified. In this stage, workers are told if they have been fired in this period or in the previous, as long as their right to receive is greater or equal to zero. This period last 10 seconds.

Procedures in detail: instructions for firms

Please read carefully the following instructions if you are a firm

You are a firm for the entire course of the experiment. The experiment last 18 periods. Each period you can hire at most two workers, that is you can close two contracts per period. Each period is made of 7 stages. 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 stage of the game

STAGE 1. The first contractual phase

Each period commences with a contractual phase. During the contractual phase each worker can enter into an agreement with one firm. In order to do this the firms can submit offers to the workers. As a firm you can submit as many offers as you want, but you can close only one contract in this contractual phase.

During the contractual phase on 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 contractual phase, displayed in seconds. **The trading phase in each period lasts 150 seconds. In the top at the centre of the screen you will see your ID.** When this time is up the contractual phase is over. Hereafter, no further offers can be submitted or accepted for this period.

As a firm you can submit offers. There are two types of offers which you can submit:

☐ **Private offers to specific workers:** as a firm you have the opportunity to submit private offers to a specific worker by pressing the bottom “*new private offer*”, and entering the ID of the selected worker, along with the offered wage and desired level of effort. To confirm your choice press the button “OK”, to change it press “back”. **Only the selected worker will be informed of this offer, and only this worker alone can accept it.** No other worker or firm is informed of these offers.

☐ **Public offers:** as a firm you also have the possibility to submit public offers by pressing the bottom “*new public offer*”, and entering the offered wage and desired level of effort. To confirm your choice press the button “OK”, to change it press “Back”. All workers and firms are informed of these offers and **any (not excluded) worker can accept them.** These offers will appear on your screen in the box with the heading “CONTRACT YOU OFFERED”. You are allowed to remove these offers by selecting them, and by pressing the button “*Remove offer*”. Under the box with your public offers, there is another box with the heading “CONTRACT OTHER FIRMS OFFERED”. In that box, you will be able to see details about the public offers other firms have submitted to workers.

Worker to exclude: As a firm, you may want to exclude some workers from your public offer. You are allowed to exclude up to 4 workers from a public offer, by selecting the button “**ID to be excluded**” before pressing the “OK” button of the public offer. Once you press the “ID to exclude” button, 4 small windows will appear, with the heading 1st, 2nd, 3rd and 4th worker to exclude from the public offer. In this box you can enter the ID(s) of the worker(s) you want to exclude. You can fill in/leave blank all of them, or just enter in a few of them. The order you enter the ID(s) does not matter. To confirm all the details of your public offer, press the “OK” button.

As soon as a worker has accept one of your offer, this screen will disappear and you will be notified about the detail of the closed contract: the ID of the worker who accepted your offer, the desired level of effort you asked for, as well as the wage you are going to pay to the worker.

In some circumstances you are obliged to submit an offer.

Obligated offers to worker: if you have hired the same worker for two or more consecutive periods, and as long as he/she has a positive right to get an offer, as soon as the contractual phase starts, a box will appear where the selected ID is already filled in with the ID number of the worker. That means, you are obliged to make an offer to this worker. You can only choose the level of the wage – that in any case must be as high as in the previous period – and the desired level of effort. **As soon as you press the “OK” button, the worker has 15 seconds to accept/reject this offer. If the worker reject your offer, or the 15 seconds are elapsed without reaching a decision, you are then again free to submit offers to other workers, either public or private. In that case, worker’s right to get an offer will be set to zero.** However, if in this stage, the same worker accepts another offer from you, his/her right to get an offer will be kept. Similarly, if he accepts the obliged offer you submitted.

In both cases, for fired worker the right to get an offer will decrease by 1, whereas for those you did not fire the right increases by 1. Only if the worker does not accept any offer from you, his/her right to get an offer expires. This means that the right to get an offer can only be terminated by the worker.

Be careful! If you do not submit the obliged offer the computer will automatically send the obliged offer to the worker after 50 seconds. The level of wage will be equal to the last wage and the desired effort is set to zero. The worker again may either accept or reject the offer without any time limit.

In each contractual phase, a firm can hire only one worker. Once all 6 firms have concluded a contract or after 150 seconds have elapsed, the contractual phase is over.

STAGE 2. Decision to hire a second worker.

In each period you can hire at most two workers, that is you can conclude two contracts in each period. **In this stage you are asked if you want to hire another worker by entering a second contractual phase.** You are allowed to enter this stage even if you did not close any contract in the first contractual phase in STAGE 1.

In this stage, if this is case, you will be also notified of obliged offers you have to submit to your second worker. If you are obliged to submit an offer to your second worker, you will automatically enter STAGE 3.

STAGE 3. The second contractual phase.

This stage is identical to STAGE 1. During this phase workers who have not closed any contract in the first contractual phase can enter into an agreement with one firm. You will enter this stage only if you answer yes in STAGE 2 or you are obliged to submit an offer.

STAGE 4. Choosing the level of effort.

As a firm you will not enter this stage. In this stage workers choose the actual level of effort, that can be different from the desired level of effort you asked during the contractual phase.

STAGE 5. Your income.

If you have **not closed** any contracts during a trading phase, you will not gain an income for this period. Your profit will be zero.

Your income:

Your income depends on the wage(s) you offered and on the level(s) of effort actually supplied by your worker(s), and on the state of the economy (shock), that is :

- if you hire only one worker

$$\text{Your Income} = 10 * \text{Effort} - \text{Wage} - \text{shock}$$

- if you hire two workers

$$\text{Your Income} = 8 * \text{Effort 1}^{\text{st}} \text{ worker} + 8 * \text{Effort 2}^{\text{nd}} \text{ worker} - 1^{\text{st}} \text{ Wage} - 2^{\text{nd}} \text{ Wage} - \text{shock}$$

where *shock* is the **negative shock**, equal to **15 points**, and the **probability of an adverse shock is equal to 10%**.

As you can see from the above formula, your income is higher, the higher is the level of effort actually supplied by the worker(s), the lower the wages, and in absence of an adverse shock.

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

The income of a worker will be calculated as follows:

$$\text{Worker's Income} = \text{Wage} - \text{Cost of effort}$$

The cost of the effort for a worker is higher the higher the level of the effort he chooses. The costs for each level of effort are displayed in the table below:

EFFORT	1	2	3	4	5	6	7	8	9	10
COST OF EFFORT	0	1	2	4	6	8	10	12	15	18

However, you as a firm will not know with certainty the actual income and effort of your worker(s) as worker's income and effort will not be displayed to you.

Please also notice that you cannot **cannot infer from your income with certainty, the level of effort your workers have chosen, as there is a given chance that you might be hit by a negative shock.**

You will be informed of your income on an “**income screen**”. On this screen the following will be displayed:

- Which worker(s) were your opponent
- The wage(s) you offered
- The desired level(s) of effort you asked
- Your income in this period.

STAGE 6. Firing stage

At the end of each period, if you have hired some workers for two or more consecutive periods, you are asked if and which workers you want to fire.

STAGE 7. Firing notification

Fired workers are notified. As a firm you will not enter this stage. In this stage, workers are told if they have been fired in this period or in previous periods, as long as their right to receive is greater or equal to zero.

EXERCISES

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

Problem 1:

A contract contains a wage of 60 and a desired level of effort of 9. The worker chose an actual effort of 9.

Which is the income of the worker?

- ☐ 45
- ☐ 50
- ☐ 45 with no shock, and 30 if the shock occurs

Which is the income of the firm with only one worker?

- ☐ 30
- ☐ 45
- ☐ 30 with no shock, and 15 if the shock occurs

Problem 2:

A contract contains a wage of 50 and a desired level of effort of 8. The worker chose an actual effort of 7.

Which is the income of the worker?

- ☐ 38
- ☐ 40
- ☐ 38 with no shock, and 23 if the shock occurs

Which is the income of the firm with only one worker?

- ☐ 20
- ☐ 30
- ☐ 20 with no shock, and 5 if the shock occurs

30 with no shock, and 15 if the shock occurs

Problem 3:

Suppose the worker accepted a private offer from a particular firm in period 5. In period 6 the worker accepted a public offer coming from the same firm.

Do the worker enjoy the right to get an offer starting from period 7?

- ☐ Yes
- ☐ No

If so, it is equal to

- ☐ 0
- ☐ 1
- ☐ 2

Problem 4:

Suppose there is a worker with a current right to get an offer equal to 3 who accepted an obliged offer from the firm during the same period.

In that case, what happens to the right to get an offer if the worker was fired by this firm?

- ☐ Decrease by 1
- ☐ Increase by 1

What if the worker was not fired?

- ☐ Decrease by 1

- Increase by