Comment to the Instructions:

To avoid expressing payoffs as fractions, the profit function for the one-stage treatments was scaled up by a factor of 225. The currency conversion rate was then adjusted accordingly, such that 30`000 points equal 1 CHF.

For Bertrand treatments, we thus asked the players to maximize

$225\ \Pi_i = 225\ (p_i - c + Y_i)D(p_i, p_j) - 225\ k\ Y_i^2$ rather than solving the original equilibrium problem $\Pi_i = (p_i - c + Y_i)D(p_i, p_j) - k\ Y_i^2$ with k= 3 (see Section 3.2).

For Cournot treatments we changed the original payoff for I=2 from

$\Pi_i = (\frac{\alpha + 2\ Y_i - Y_j}{3})^2 - k\ Y_i^2$ with k= 3 (see Section 3.2) to
$225\ \Pi_i = 25(\alpha + 2\ Y_i - Y_j)^2 - 225\ k\ Y_i^2$
and for I=4 from $\Pi_i = (\frac{\alpha + 4\ Y_i - \sum_{i \neq j} Y_j}{5})^2 - k\ Y_i^2$ with k= 3 (see Section 3.2) to
$225\ \Pi_i = \ 9(\alpha + 4\ Y_i - \sum_{i \neq j} Y_j)^2 - 225\ k\ Y_i^2$.

In order to get back to the original profit function which is more convenient for the two-stage treatments, we adjusted the currency conversion rate:

(30000 points / 225) ≈ 133 points = 1 CHF.

INSTRUCTIONS (Bertrand, I=2, one-stage)[1]

The experiment in which you will now participate serves to investigate individual investment decisions. If you read the instructions carefully and take decisions accordingly, you can earn more or less money, depending on your decisions.

The gains and losses that result from your decisions will be booked to an account, and you will receive your earnings as cash payment in CHF at the end of the experiment. Your income during the experiment will be calculated in points. At the end of the experiment, each point will be exchanged to CHF according to the rule

30'000 points = 1 CHF.

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The session will be organized as follows:

a) Instructions: You and all other participants will read these instructions and answer control questions at the end. The control questions serve to make sure that you have understood the instructions.

b) Experiment: You will carry out the experiment described in the instructions 20 times.

c) Questionnaire after the experiment: You will complete a short questionnaire.

1. What is the experiment about?

You will take part in an experiment, in which you will interact with **one** other participant in a group of **two**. We shall call the decisions that the participants will be taking, "investments". You will soon understand why.

The experiments consists of **20** periods. **After each period you will be randomly assigned to a new group**. Neither you nor the other participants will be told who interacted in one group. The assignment to groups will not give an advantage to any of the participants.

In the next two sections we will explain the decisions during each period individually, and for the sequence of 20 periods.

[1] The treatment specification in parantheses was not on the instructions used in the experiment.

1.1. Your decision in each period

In each period you can invest. The highest possible investment in each period is **9** units, the lowest possible investment is **0** units.

a) **Investments above zero are costly.** The investment costs are shown in the **cost table**. As you can see from the cost table, costs grow more than proportionately with investments.

b) **However, investments also are useful because they increase your revenue**. You can see this from the **revenue table**. The rows contain all possible levels of your investments. The columns contain all possible investments of the other participant. As long as you invest less or as much as the other participant, you earn a revenue of zero. If you invest more than the other, you obtain a positive revenue. For instance, if you invest 3 units in any of the 20 periods and the other participant invests 2 units, you obtain a payoff of 7'200 points in this period. However, if the investments of the other player are 3 or more units, and you still invest 3 units, you obtain a revenue of 0 points in this period.

c) **Earnings in each period**: The earnings are determined by your investment decisions and those of the other participant. Your investments and those of the other participant determine your revenue according to the revenue table. From this, your earnings are determined by subtracting investment costs as follows

earnings = revenue – investment costs .

If your earnings in a period are negative, they will be deduced from your previous earnings.

1.2. The course of the 20 periods

You and the other participants start in the first period with the same endowment of 35 CHF (1'050'000 points). The investments determine earnings in each period, which can be positive or negative. The total earnings in the experiment are the sum of your endowment and all earnings.

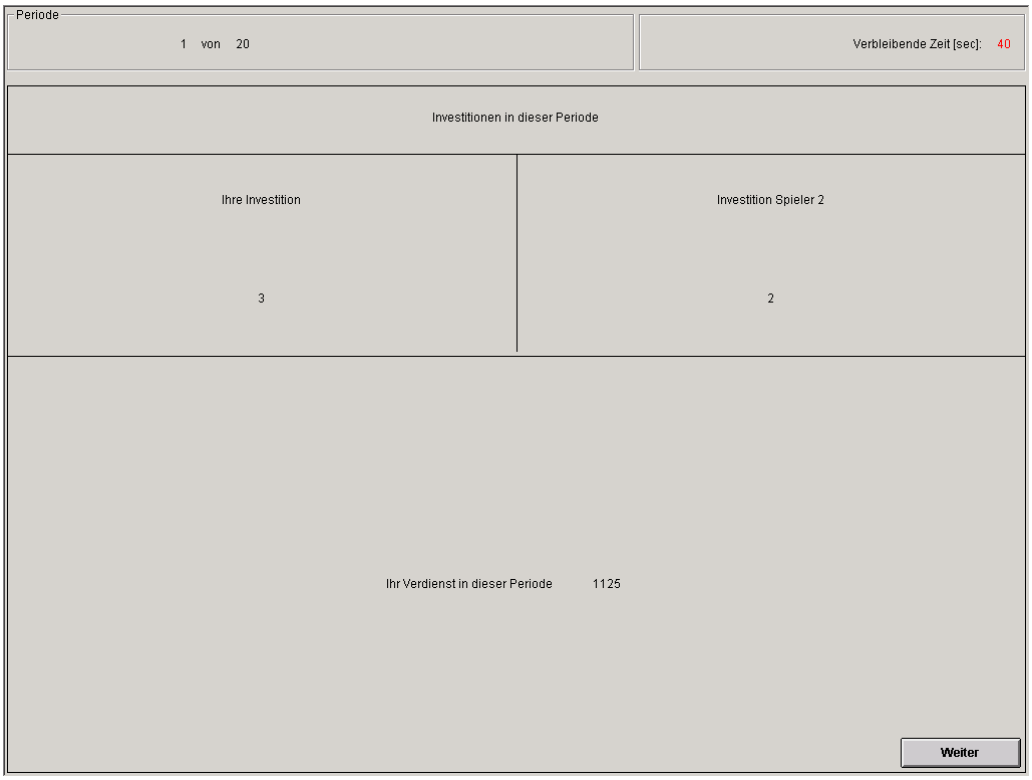
total earnings = endowment + all earnings .

2. What will you do?

During the experiment you will take your decisions at a computer using one of the screens depicted below.

In each period, you take your investment decisions on the following decision screen. In the upper field, please insert how much you expect the other player to invest. In the field below, please insert how much you will invest yourself. You have **60 seconds** to take the decision.

After all participants have taken their definite investment decisions, you will see an information screen at the end of each period. It will inform you of your own investment decision and those of the other members of your group. In addition, the screen will show your period earnings. When you are ready to continue to the next period, click “continue”. After **60 seconds**, you will be asked to click “continue”.



3. The control questions

Before the experiment starts we ask you to carry out a few control questions. You have to answer **all** the questions below **correctly**; otherwise you are not allowed to start the experiment. When you answer the questions, please state **how you arrived** at the answer. The questions merely serve to understand the rules of the experiment. Wrong answers have **no** consequences.

3.1.) Consider the following example: In one of the 20 periods, your investments are 4 units. The investments of the other player are 3 units.

a) How high is your revenue?

b) How high are your investment costs?

c) How high are your earnings in the period under consideration?

3.2.) Consider the following example: In one of the 20 periods, your investments are 2 units. The investments of the other player are 1 units.

a) How high is your revenue?

b) How high are your investment costs?

c) How high are your earnings in the period under consideration?

3.3.) Consider the following example: In one of the 20 periods, your investments are 6 units. The investments of the other player are 8 units.

a) How high is your revenue?

b) How high are your investment costs?

c) How high are your earnings in the period under consideration?

3.4.) Is the following statement correct or false?

In any one of the 20 periods, if your investments are lower than those of the other player, and you invest at least one unit, then you will definitely obtain negative earnings in the period under consideration.

correct	*false*

3.5.) Is the following statement correct or false?

In any one of the 20 periods, if your investments are higher than those of the other player, then you will definitely obtain positive earnings in the period under consideration.

correct	*false*

3.6.) Is the following statement correct or false?

In any one of the 20 periods, as long as revenues are positive, the higher your investments, the higher your revenue, and the higher the investments of the other player, the lower your revenue.

correct	*false*

Cost Table

Investment	Costs
0	0
1	675
2	2700
3	6075
4	10800
5	16875
6	24300
7	33075
8	43200
9	54675

Revenue Table

		Investment of the Other Player									
		0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
	0	0	0	0	0	0	0	0	0	0	0
	1	6750	0	0	0	0	0	0	0	0	0
	2	13500	6975	0	0	0	0	0	0	0	0
	3	20250	13950	7200	0	0	0	0	0	0	0
Own	**4**	27000	20925	14400	7425	0	0	0	0	0	0
Investment	**5**	33750	27900	21600	14850	7650	0	0	0	0	0
	6	40500	34875	28800	22275	15300	7875	0	0	0	0
	7	47250	41850	36000	29700	22950	15750	8100	0	0	0
	8	54000	48825	43200	37125	30600	23625	16200	8325	0	0
	9	60750	55800	50400	44550	38250	31500	24300	16650	8550	0

INSTRUCTIONS (Bertrand, I=4, one-stage) [1]

The experiment in which you will now participate serves to investigate individual investment decisions. If you read the instructions carefully and take decisions accordingly, you can earn more or less money, depending on your decisions.

The gains and losses that result from your decisions will be booked to an account, and you will receive your earnings as cash payment in CHF at the end of the experiment. Your income during the experiment will be calculated in points. At the end of the experiment, each point will be exchanged to CHF according to the rule

30'000 points = 1 CHF.

All the information that you now obtain is for your private use only. It is strictly forbidden to communicate this information to other participants. Also, note that communication during the experiment is strictly forbidden. If you have a question concerning the experiment, please tell us. We will answer your question individually.

The session will be organized as follows:

a) Instructions: You and all other participants will read these instructions and answer control questions at the end. The control questions serve to make sure that you have understood the instructions.

b) Experiment: You will carry out the experiment described in the instructions 20 times.

c) Questionnaire after the experiment: You will complete a short questionnaire.

1. What is the experiment about?

You will take part in an experiment, in which you will interact with **three** other participants in a group of **four**. We shall call the decisions that the participants will be taking, "investments". You will soon understand why.

The experiments consists of **20** periods. **After each period you will be randomly assigned to a new group**. Neither you nor the other participants will be told who interacted in one group. The assignment to groups will not give an advantage to any of the participants.

In the next two sections we will explain the decisions during each period individually, and for the sequence of 20 periods.

[1] The treatment specification in parantheses was not on the instructions used in the experiment.

1.1. Your decision in each period

In each period you can invest. The highest possible investment in each period is **9** units, the lowest possible investment is **0** units.

a) **Investments above zero are costly.** The investment costs are shown in the **cost table**. As you can see from the cost table, costs grow more than proportionately with investments.

b) **However, investments also are useful because they increase your revenue**. You can see this from the **revenue table**. The rows contain all possible levels of your investments. The columns contain the *maximal* investments of the other participants. As long as you invest less or as much as the others, you earn a revenue of zero. If you invest more than the others, you obtain a positive revenue. For instance, if you invest 3 units in any of the 20 periods and the highest investment of the other participants is 2 units, you obtain a payoff of 7'200 points in this period. However, if the highest investments of the other players are 3 or more units, and you still invest 3 units, you obtain a revenue of 0 points in this period.

c) **Earnings in each period**: The earnings are determined by your investment decisions and those of the other participants. Your investment and the highest investment of the other players determine your revenue according to the revenue table. From this, your earnings are determined by subtracting investment costs as follows

earnings = revenue – investment costs .

If your earnings in a period are negative, they will be deduced from your previous earnings.

1.2. The course of the 20 periods

You and the other participants start in the first period with the same endowment of 35 CHF (1'050'000 points). The investments determine earnings in each period, which can be positive or negative. The total earnings in the experiment are the sum of your endowment and all earnings.

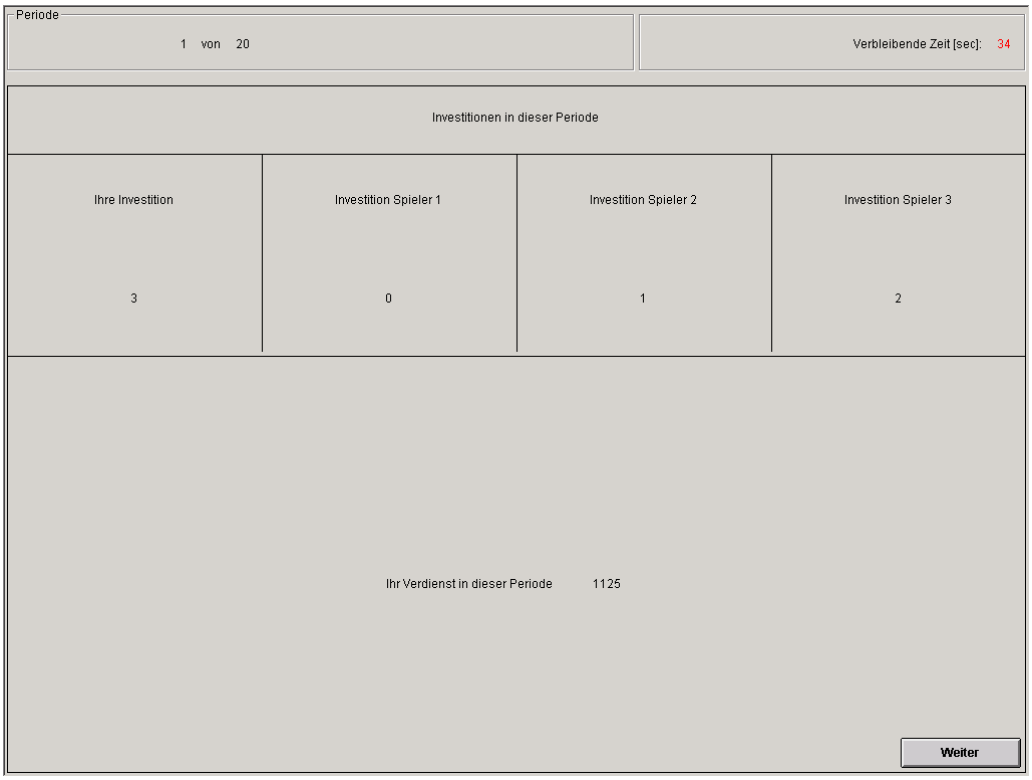
total earnings = endowment + all earnings .

2. What will you do?

During the experiment you will take your decisions at a computer using one of the screens depicted below.

In each period, you take your investment decisions on the following decision screen. In the upper field, please insert how much you expect the highest investment of the other players to be. In the field below, please insert how much you will invest yourself. You have **60 seconds** to take the decision.

After all participants have taken their definite investment decisions, you will see an information screen at the end of each period. It will inform you of your own investment decision and those of the other members of your group. In addition, the screen will show your period earnings. When you are ready to continue to the next period, click “continue”. After **60 seconds**, you will be asked to click “continue”.



3. The control questions

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3.1.) Consider the following example: In one of the 20 periods, your investments are 4 units. The highest investment of the other players is 3 units.

a) How high is your revenue?

b) How high are your investment costs?

c) How high are your earnings in the period under consideration?

3.2.) Consider the following example: In one of the 20 periods, your investments are 2 units. The highest investment of the other players is 1 unit.

a) How high is your revenue?

b) How high are your investment costs?

c) How high are your earnings in the period under consideration?

3.3.) Consider the following example: In one of the 20 periods, your investments are 6 units. The highest investment of the other players is 8 units.

a) How high is your revenue?

b) How high are your investment costs?

c) How high are your earnings in the period under consideration?

3.4.) Is the following statement correct or false?

In any one of the 20 periods, if the highest investment of the other players is higher than your investment, and you invest at least one unit, then you will definitely obtain negative earnings in the period under consideration.

correct	*false*

3.5.) Is the following statement correct or false?

In any one of the 20 periods, if your investment is higher than the highest investment of the other players, then you will definitely obtain positive earnings in the period under consideration.

correct	*false*

3.6.) Is the following statement correct or false?

In any one of the 20 periods, as long as revenues are positive, the higher your investments, the higher your revenue, and the higher the investments of the other players, the lower your revenue.

correct	*false*

Cost Table

Investment	Costs
0	0
1	675
2	2700
3	6075
4	10800
5	16875
6	24300
7	33075
8	43200
9	54675

Revenue Table

		Highest Investment of the Others									
		0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
	0	0	0	0	0	0	0	0	0	0	0
	1	6750	0	0	0	0	0	0	0	0	0
	2	13500	6975	0	0	0	0	0	0	0	0
	3	20250	13950	7200	0	0	0	0	0	0	0
Own	**4**	27000	20925	14400	7425	0	0	0	0	0	0
Investment	**5**	33750	27900	21600	14850	7650	0	0	0	0	0
	6	40500	34875	28800	22275	15300	7875	0	0	0	0
	7	47250	41850	36000	29700	22950	15750	8100	0	0	0
	8	54000	48825	43200	37125	30600	23625	16200	8325	0	0
	9	60750	55800	50400	44550	38250	31500	24300	16650	8550	0

INSTRUCTIONS (Cournot, I=2, one-stage)[1]

The experiment in which you will now participate serves to investigate individual investment decisions. If you read the instructions carefully and take decisions accordingly, you can earn more or less money, depending on your decisions.

The gains and losses that result from your decisions will be booked to an account, and you will receive your earnings as cash payment in CHF at the end of the experiment. Your income during the experiment will be calculated in points. At the end of the experiment, each point will be exchanged to CHF according to the rule

30'000 points = 1 CHF.

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b) **However, investments also are useful because they increase your revenue**. You can see this from the **revenue table**. The rows contain all possible levels of your investments. The columns contain all possible investments of the other participant. For instance, if you invest 3 units in any of the 20 rounds and the other participant invests 2 units, you obtain a payoff of 28'900 points in this period. However, if the investments of the other player are 4 units, and you still invest 3 units, you obtain a revenue of 25'600 points in this period.

c) **Earnings in each period**: The earnings are determined by your investment decisions and those of the other participant. Your investments and those of the other participant determine your revenue according to the revenue table. From this, your earnings are determined by subtracting investment costs as follows

earnings = revenue – investment costs .

If your earnings in a period are negative, they will be deduced from your previous earnings.

1.2. The course of the 20 periods

You and the other participants start in the first period with the same endowment of 35 CHF (1'050'000 points). The investments determine earnings in each period, which can be positive or negative. The total earnings in the experiment are the sum of your endowment and all earnings.

total earnings = endowment + all earnings .

2. What will you do?

During the experiment you will take your decisions at a computer using one of the screens depicted below.

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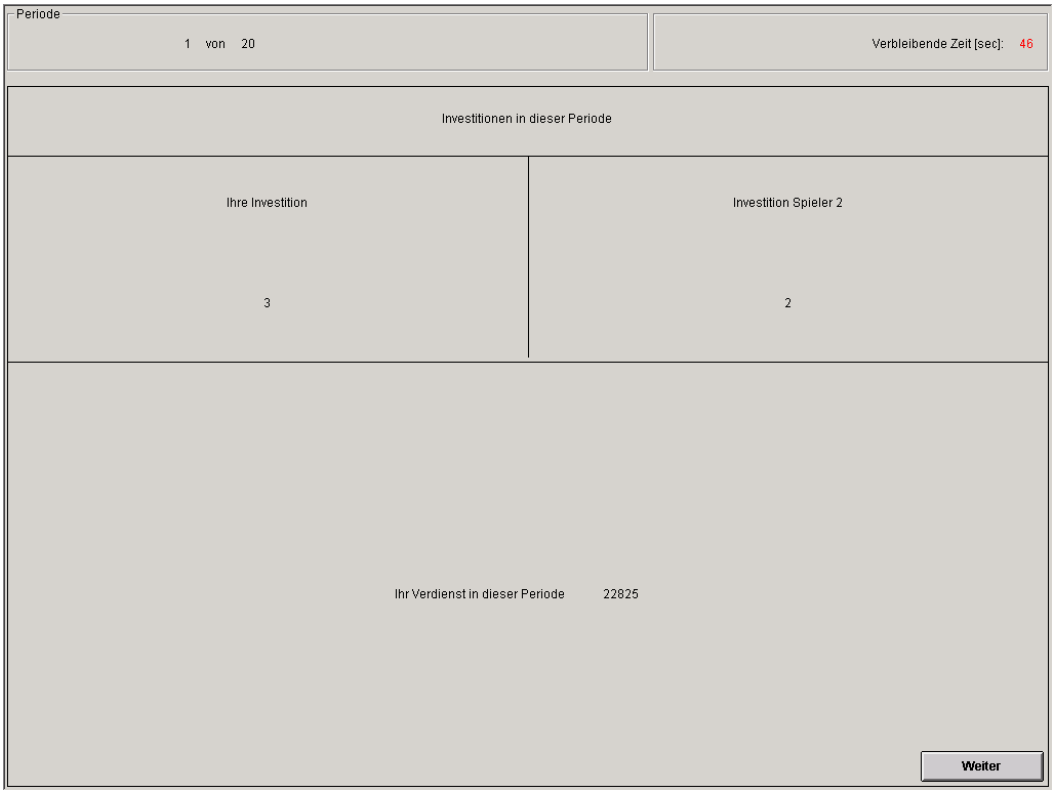

3. The control questions

Before the experiment starts we ask you to carry out a few control questions. You have to answer **all** the questions below **correctly**; otherwise you are not allowed to start the experiment. When you answer the questions, please state **how you arrived** at the answer. The questions merely serve to understand the rules of the experiment. Wrong answers have **no** consequences.

3.1.) Consider the following example: In one of the 20 periods, your investments are 4 units. The investments of the other player are 3 units.

a) How high is your revenue?

b) How high are your investment costs?

c) How high are your earnings in the period under consideration?

3.2.) Consider the following example: In one of the 20 periods, your investments are 2 units. The investment of the other player is 1 unit.

a) How high is your revenue?

b) How high are your investment costs?

c) How high are your earnings in the period under consideration?

3.3.) Consider the following example: In one of the 20 periods, your investments are 6 units. The investments of the other player are 8 units.

a) How high is your revenue?

b) How high are your investment costs?

c) How high are your earnings in the period under consideration?

3.4.) Is the following statement correct or false?

In any one of the 20 periods, the higher your investments, the higher is your revenue, and the higher the investments of the other player, the lower is your revenue.

correct	*false*

3.5.) Is the following statement correct or false?

In any one of the 20 periods, if your investments are higher than those of the other player than you will definitely obtain positive earnings in the period under consideration.

correct	*false*

Cost Table

Investment	Costs
0	0
1	675
2	2700
3	6075
4	10800
5	16875
6	24300
7	33075
8	43200
9	54675

Revenue Table

		Investment of the Other Player									
		0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
	0	22500	21025	19600	18225	16900	15625	14400	13225	12100	11025
	1	25600	24025	22500	21025	19600	18225	16900	15625	14400	13225
	2	28900	27225	25600	24025	22500	21025	19600	18225	16900	15625
	3	32400	30625	28900	27225	25600	24025	22500	21025	19600	18225
Own	**4**	36100	34225	32400	30625	28900	27225	25600	24025	22500	21025
Investment	**5**	40000	38025	36100	34225	32400	30625	28900	27225	25600	24025
	6	44100	42025	40000	38025	36100	34225	32400	30625	28900	27225
	7	48400	46225	44100	42025	40000	38025	36100	34225	32400	30625
	8	52900	50625	48400	46225	44100	42025	40000	38025	36100	34225
	9	57600	55225	52900	50625	48400	46225	44100	42025	40000	38025

INSTRUCTIONS (Cournot, I=4, one-stage)[1]

The experiment in which you will now participate serves to investigate individual investment decisions. If you read the instructions carefully and take decisions accordingly, you can earn more or less money, depending on your decisions.

The gains and losses that result from your decisions will be booked to an account, and you will receive your earnings as cash payment in CHF at the end of the experiment. Your income during the experiment will be calculated in points. At the end of the experiment, each point will be exchanged to CHF according to the rule

30'000 points = 1 CHF.

All the information that you now obtain is for your private use only. It is strictly forbidden to communicate this information to other participants. Also, note that communication during the experiment is strictly forbidden. If you have a question concerning the experiment, please tell us. We will answer your question individually.

The session will be organized as follows:

a) Instructions: You and all other participants will read these instructions and answer control questions at the end. The control questions serve to make sure that you have understood the instructions.

b) Experiment: You will carry out the experiment described in the instructions 20 times.

c) Questionnaire after the experiment: You will complete a short questionnaire.

1. What is the experiment about?

You will take part in an experiment, in which you will interact with **three** other participants in a group of **four**. We shall call the decisions that the participants will be taking, "investments". You will soon understand why.

The experiments consists of **20** periods. **After each period you will be randomly assigned to a new group**. Neither you nor the other participants will be told who interacted in one group. The assignment to groups will not give an advantage to any of the participants.

In the next two sections we will explain the decisions during each period individually, and for the sequence of 20 periods.

[1] The treatment specification in parantheses was not on the instructions used in the experiment.

1.1. Your decision in each period

In each period you can invest. The highest possible investment in each period is **9** units, the lowest possible investment is **0** units.

a) **Investments above zero are costly.** The investment costs are shown in the **cost table**. As you can see from the cost table, costs grow more than proportionately with investments.

b) **However, investments also are useful because they increase your revenue**. You can see this from the **revenue table**. The rows contain all possible levels of your investments. The columns contain the *average* investments of the other participants. For instance, if you invest 3 units in any of the 20 periods and the other participants invest 2 units on average, you obtain a revenue of 11'664 points in this period. However, if the average investments of the other player are 4 units, and you still invest 3 units, you obtain a revenue of 8'100 points in this period.

c) **Earnings in each period**: The earnings are determined by your investment decisions and those of the other participants. Your investments and the average investments of the participants determine your revenue according to the revenue table. From this, your earnings are determined by subtracting investment costs as follows

earnings = revenue – investment costs.

If your earnings in a period are negative, they will be deduced from your previous earnings.

1.2. The course of the 20 periods

You and the other participants start in the first period with the same endowment of 35 CHF (1'050'000 points). The investments determine earnings in each period, which can be positive or negative. The total earnings in the experiment are the sum of your endowment and all earnings.

total earnings = endowment + all earnings .

2. What will you do?

During the experiment you will take your decisions at a computer using one of the screens depicted below.

In each period, you take your investment decisions on the following decision screen. In the upper field, please insert how much you expect the other players to invest on average. In the field below, please insert how much you will invest yourself. You have **60 seconds** to take the decision.

After all participants have taken their definite investment decisions, you will see an information screen at the end of each period. It will inform you of your own investment decision and those of the other members of your group. In addition, the screen will show your period earnings. When you are ready to continue to the next period, click “continue”. After **60 seconds**, you will be asked to click “continue”.

3. The control questions

Before the experiment starts, we ask you to answer a few control questions. You have to answer **all** the questions below **correctly**; otherwise you are not allowed to start the experiment. When you answer the questions, please state **how you arrived** at the answer. The questions merely serve to understand the rules of the experiment. Wrong answers have **no** consequences.

3.1.) Consider the following example: In one of the 20 periods, your investments are 4 units. The average investments of the other player are 3 units.

a) How high is your revenue?

b) How high are your investment costs?

c) How high are your earnings in the period under consideration?

3.2.) Consider the following example: In one of the 20 periods, your investments are 2 units. The average investment of the other players is 1 unit.

a) How high is your revenue?

b) How high are your investment costs?

c) How high are your earnings in the period under consideration?

3.3.) Consider the following example: In one of the 20 periods, your investments are 6 units. The average investments of the other players are 8 units.

a) How high is your revenue?

b) How high are your investment costs?

c) How high are your earnings in the period under consideration?

3.4.) Is the following statement correct or false?

In any one of the 20 periods, the higher your investments, the higher is your revenue, and the higher the investments of the other players, the lower your revenue.

correct	*false*

3.5.) Is the following statement correct or false?

In any one of the 20 periods, if your investments are higher than the average investments of the other players, then you will definitely obtain positive earnings in the period under consideration.

correct	*false*

Cost Table

Investment	Costs
0	0
1	675
2	2700
3	6075
4	10800
5	16875
6	24300
7	33075
8	43200
9	54675

Revenue Table

		Average Investment of the Others									
		0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
	0	8100	6561	5184	3969	2916	2025	1296	729	324	81
	1	10404	8649	7056	5625	4356	3249	2304	1521	900	441
	2	12996	11025	9216	7569	6084	4761	3600	2601	1764	1089
	3	15876	13689	11664	9801	8100	6561	5184	3969	2916	2025
Own	**4**	19044	16641	14400	12321	10404	8649	7056	5625	4356	3249
Investment	**5**	22500	19881	17424	15129	12996	11025	9216	7569	6084	4761
	6	26244	23409	20736	18225	15876	13689	11664	9801	8100	6561
	7	30276	27225	24336	21609	19044	16641	14400	12321	10404	8649
	8	34596	31329	28224	25281	22500	19881	17424	15129	12996	11025
	9	39204	35721	32400	29241	26244	23409	20736	18225	15876	13689

INSTRUCTIONS (Bertrand, I=2, two-stage) [1]

The experiment in which you will now participate serves to investigate individual investment decisions. If you read the instructions carefully and take decisions accordingly, you can earn more or less money, depending on your decisions.

The gains and losses that result from your decisions will be booked to an account, and you will receive your earnings as cash payment in CHF at the end of the experiment. Your income during the experiment will be calculated in points. At the end of the experiment, each point will be exchanged to CHF according to the rule

133 points = 1 CHF.

All the information that you now obtain is for your private use only. It is strictly forbidden to communicate this information to other participants. Also, note that communication during the experiment is strictly forbidden. If you have a question concerning the experiment, please tell us. We will answer your question individually.

The session will be organized as follows:

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1. What is the experiment about?

You will take part in an experiment, which will consist of **20 periods**. You will interact with **one** other participant in a group of **two**. **After each period you will be randomly assigned to a new group**. Neither you nor the other participants will be told who interacted in one group. The assignment to groups will not give an advantage to any of the participants.

Each period consists of two stages. We shall call the decisions that the participants will be taking *in the first stage* "*investments*". The decisions *in the second stage* will be called *price* decisions. In the next two sections we will explain the decisions during each period individually, and for the sequence of 20 periods.

[1] The treatment specification in parantheses was not on the instructions used in the experiment.

1.1. Your decision in each period

Each period consists of two stages. We will now describe each stage.

Stage 1: The participants in this experiment represent firms who produce the same product on a market. The production of a unit of each product leads to costs that we call **unit costs** and which are at most **20**. In the first stage of a period, you can invest. The highest possible investment is **9** units. The lowest possible investment is **0**. By **investing** you reduce unit costs. The following table gives the relation between investments and unit costs:

Unit costs *before* Stage 1	**Investments**	**Unit costs *after* Stage 1**
20	0	20
20	1	19
20	2	18
20	3	17
20	4	16
20	5	15
20	6	14
20	7	13
20	8	12
20	9	11

Investments above zero are costly. The investment costs are shown in the **cost table**. As you can see from the cost table, costs grow more than proportionately with investments.

Stage 2: In the second stage of each period you choose the price that you want to set. The highest possible price is **20**. The lowest possible price is **11**. Your choice of price and those of the other participant in your group influence the quantity that you can sell in the market. If you set a price that is **greater** than the price set by the other player, you will **not** be able to sell **anything**. If you set a price that is **smaller** or **equal** than the price set by the other player, you will sell a **positive** quantity. The relation between prices and your quantity is shown in the attached **quantity table**.

In the rows of the quantity table, you can see your possible price choices. In the columns, you see the possible prices of the other participant. If, for instance, you choose a price of 14 and the price of the other participant is 16, then your quantity is 36 in this period. If the price of the other participant is also 14, your quantity is 18 in this period. However, if the price of the other participant is 12, and you still choose a price of 14, your quantity is 0 in this period.

Earnings in each period: The earnings in each period are determined by your investment and price decision and those of the other participant. Your earnings are determined as follows

earnings = (price - unit costs after stage 1)*quantity – investment costs .

Note: If the quantity resulting from the price decisions is positive, and your price is smaller than the unit costs, you will definitely have negative earnings in the period under consideration.

1.2. The course of the 20 periods

You and the other participants start in the first period with the same endowment of 35 CHF (4655 points). The investments in stage 1 and the prices in stage 2 determine earnings in each period, which can be positive or negative. The total earnings in the experiment are the sum of your endowment and all earnings.

total earnings = endowment + all earnings .

2. What will you do?

During the experiment you will take your decisions at a computer using one of the screens depicted below.

In the first stage of each period, you take your investment decisions on the following decision screen. In the upper field, please insert how much you expect the other player in your group to invest. In the field below, please insert how much you will invest yourself. You have **30 seconds** to take the decision.

After the participants have taken their definite investment decisions, you will see an information screen at the end of the first stage of each period. It will inform you of your own investment decision and those of the other participant of your group. When you are ready to continue to the **next stage**, click “continue”. After **30 seconds**, you will be asked to click “continue”.

Your price decision will be taken in the second stage of each period on the following decision screen. In the upper field, please insert what you think the price set by the other player will be. In the lower field, please insert the price you want to set yourself. You have **30 seconds**.

After the participants have taken price decisions, an information screen will appear at the end of the second stage of each period. It informs you of your own price decision and those of the other participant of the group. Also, your quantity and the period earnings will be shown.

When you are ready to continue to the **next period**, click “continue”. After **60 seconds**, you will be asked to click “continue”.

3. The control questions

Before the experiment starts, we ask you to answer a few control questions. You have to answer **all** the questions **correctly**; otherwise you will not be allowed to start the experiment. When you answer the questions, please state **how you arrived** at the answer. The questions merely serve to understand the rules of the experiment. Wrong answers have **no** consequences.

3.1.) Consider the following example: In the *first stage* you invest 3 units.

a) How high are your unit costs after stage 1? And your investment costs?

In the *second stage* you choose a price of 18. The price of the other player is 19.

b) How high is your quantity?

c) How high are your earnings?

3.2) Consider the following example: In the *first stage* you invest 6 units.

a) How high are your unit costs after stage 1? And your investment costs?

In the *second stage* you choose a price of 16. The price of the other player is 12.

b) How high is your quantity?

c) How high are your earnings?

3.3.) Consider the following example: In the *first stage* you invest 4 units.

a) How high are your unit costs after stage 1? And your investment costs?

In the *second stage* you choose a quantity of 20. The quantity of the other player is also 20.

b) How high is your quantity?

c) How high are your earnings?

3.4.) Consider the following example: In the *first stage* you invest 8 units.

a) How high are your unit costs after stage 1? And your investment costs?

In the *second stage* you choose a price of 14. The price of the other player is 17.

b) How high is your quantity?

c) How high are your earnings?

3.5.) Is the following statement correct or false?

In any one of the 20 periods, if you set a price that is higher than your unit costs after stage 1, you will definitely earn a positive profit in that period.

correct	*false*

Cost Table

Investment	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Costs	0	3	12	27	48	75	108	147	192	243

Quantity Table

		Price of the Other Player									
		11	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
Own Price	**11**	19.5	39	39	39	39	39	39	39	39	39
	12	0	19	38	38	38	38	38	38	38	38
	13	0	0	18.5	37	37	37	37	37	37	37
	14	0	0	0	18	36	36	36	36	36	36
	15	0	0	0	0	17.5	35	35	35	35	35
	16	0	0	0	0	0	17	34	34	34	34
	17	0	0	0	0	0	0	16.5	33	33	33
	18	0	0	0	0	0	0	0	16	32	32
	19	0	0	0	0	0	0	0	0	15.5	31
	20	0	0	0	0	0	0	0	0	0	15

INSTRUCTIONS (Bertrand, I=4, two-stage)[1]

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The gains and losses that result from your decisions will be booked to an account, and you will receive your earnings as cash payment in CHF at the end of the experiment. Your income during the experiment will be calculated in points. At the end of the experiment, each point will be exchanged to CHF according to the rule

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Each period consists of two stages. We shall call the decisions that the participants will be taking *in the first stage "investments"*. The decisions *in the second stage* will be called *price decisions*. In the next two sections we will explain the decisions during each period individually, and for the sequence of 20 periods.

[1] The treatment specification in parantheses was not on the instructions used in the experiment.

1.1. Your decision in each period

Each period consists of two stages. We will now describe each stage.

Stage 1: The participants in this experiment represent firms who produce the same product on a market. The production of a unit of each product leads to costs that we call **unit costs** and which are at most **20**. In the first stage of a period, you can invest. The highest possible investment is **9** units. The lowest possible investment is **0**. By **investing** you reduce unit costs. The following table gives the relation between investments and unit costs:

Unit costs *before* Stage 1	**Investments**	**Unit costs *after* Stage 1**
20	0	20
20	1	19
20	2	18
20	3	17
20	4	16
20	5	15
20	6	14
20	7	13
20	8	12
20	9	11

Investments above zero are costly. The investment costs are shown in the **cost table**. As you can see from the cost table, costs grow more than proportionately with investments.

Stage 2: In the second stage of each period you choose the price that you want to set. The highest possible price is **20**. The lowest possible price is **11**. Your choice of price and those of the other participants in your group influence the quantity that you can sell in the market. If you set a price that is **greater** than the *lowest* price set by the other players, you will **not** be able to sell **anything**. If you set a price that is **smaller** or **equal** than the *lowest* price set by the other players, you will sell a **positive** quantity. The relation between prices and your quantity is shown in the attached **quantity table**.

In the rows of the quantity table, you can see your possible price choices. In the columns, you see the possible prices of the other participants. If, for instance, you choose a price of 14 and the lowest price of the other participants is 16, then your quantity is 36 in this period. If, however, the lowest price of the other participants is also 14, then your quantity is 36/i with i standing for the number of players with the lowest price. That is, if you and one other player set the lowest price, your quantity is 36/2=18. If you and two other participants set the lowest price, your quantity is 36/3=12. If all 4 participants set the lowest price, your quantity is 36/4=9. However, if the lowest price of the other participants is 12, and you still choose a price of 14, then your quantity is 0 in this period.

Earnings in each period: The earnings in each period are determined by your investment and price decision and those of the other participants. Your earnings are determined as follows

earnings = (price - unit costs after stage 1)*quantity – investment costs .

Note: If your quantity resulting from the price decisions is positive, and your chosen price is smaller than your unit costs after stage 1, you will definitely have negative earnings in the period under consideration.

1.2. The course of the 20 periods

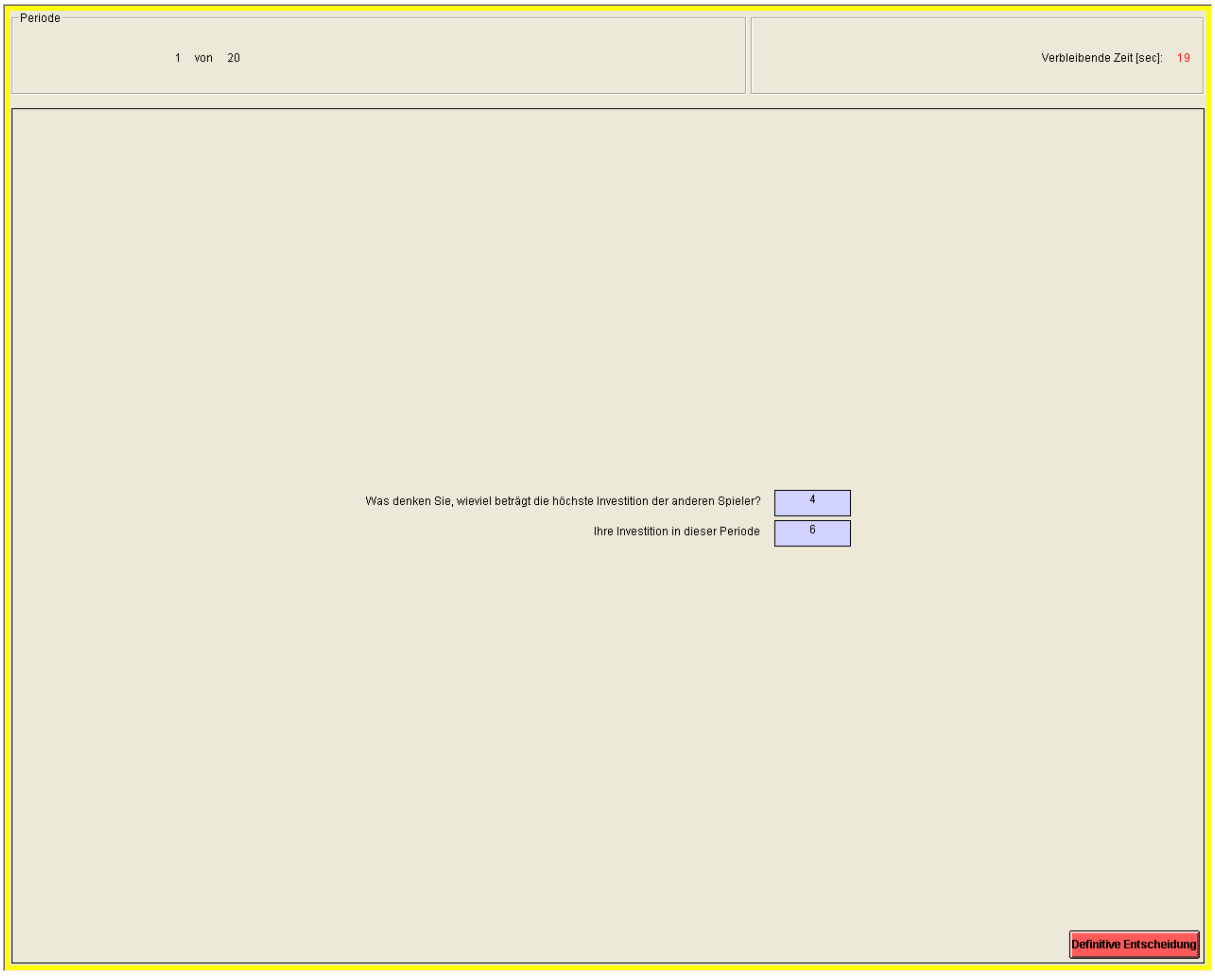
You and the other participants start in the first period with the same endowment of 35 CHF (4655 points). The investments in stage 1 and the prices in stage 2 determine earnings in each period, which can be positive or negative. Your total earnings in the experiment are the sum of your endowment and all earnings.

total earnings = endowment + all earnings .

2. What will you do?

During the experiment you will take your decisions at a computer using one of the screens depicted below.

In the first stage of each period, you take your investment decisions on the following decision screen. In the upper field, please insert how high you think the highest investment of the other players in your group is. In the field below, please insert how much you will invest yourself. You have **30 seconds** to take the decision.



After the participants have taken their definite investment decisions, you will see an information screen at the end of the first stage of each period. It will inform you of your own investment decision and those of the other members of your group. When you are ready to continue to the **next stage**, click “continue”. After **30 seconds**, you will be asked to click “continue”.

Your price decision will be taken in the second stage of each period on the following decision screen. In the upper field, please insert what you think the lowest price of the other players will be. In the lower field, please insert the price you want to set yourself. You have **30 seconds**.

After the participants have taken their price decisions, an information screen will appear at the end of the second stage of each period. It informs you of your own price decisions and those of the other members of your group. Also, your quantity and the period earnings will be shown.

When you are ready to continue to the **next period**, click “continue”. After **60 seconds**, you will be asked to click “continue”.

3. The control questions

Before the experiment starts, we ask you to answer a few control questions. You have to answer **all** the questions **correctly**; otherwise you will not be allowed to start the experiment. When you answer the questions, please state **how you arrived** at the answer. The questions merely serve to understand the rules of the experiment. Wrong answers have **no** consequences.

3.1.) Consider the following example: In the *first stage* you invest 3 units.

a) How high are your unit costs after stage 1? And your investment costs?

In the *second stage* you choose a price of 19. The lowest price of the other players is 20.

b) How high is your quantity?

c) How high are your earnings?

3.2) Consider the following example: In the *first stage* you invest 6 units.

a) How high are your unit costs after stage 1? And your investment costs?

In the *second stage* you choose a price of 16. The lowest price of the other players is 12.

b) How high is your quantity?

c) How high are your earnings?

3.3.) Consider the following example: In the *first stage* you invest 2 units.

a) How high are your unit costs after stage 1? And your investment costs?

In the *second stage* all players choose a price of 18.

b) How high is your quantity?

c) How high are your earnings?

3.4.) Consider the following example: In the *first stage* you invest 8 units.

a) How high are your unit costs after stage 1? And your investment costs?

In the *second stage* you choose a price of 14. The lowest price of the other players is 17.

b) How high is your quantity?

c) How high are your earnings?

3.5.) Is the following statement correct or false?

In any one of the 20 periods, if you set a price that is higher than your unit costs after stage 1, you will definitely earn a positive profit in that period.

correct	*false*

Cost Table

Investment	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Costs	0	3	12	27	48	75	108	147	192	243

Quantity Table

		Lowest Price of the Other Players									
		11	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
Own Price	**11**	39/i	39	39	39	39	39	39	39	39	39
	12	0	38/i	38	38	38	38	38	38	38	38
	13	0	0	37/i	37	37	37	37	37	37	37
	14	0	0	0	36/i	36	36	36	36	36	36
	15	0	0	0	0	35/i	35	35	35	35	35
	16	0	0	0	0	0	34/i	34	34	34	34
	17	0	0	0	0	0	0	33/i	33	33	33
	18	0	0	0	0	0	0	0	32/i	32	32
	19	0	0	0	0	0	0	0	0	31/i	31
	20	0	0	0	0	0	0	0	0	0	30/i

Note: i is standing for the number of players with the lowest price

INSTRUCTIONS (Cournot, I=2, two-stage)[1]

The experiment in which you will now participate serves to investigate individual investment decisions. If you read the instructions carefully and take decisions accordingly, you can earn more or less money, depending on your decisions.

The gains and losses that result from your decisions will be booked to an account, and you will receive your earnings as cash payment in CHF at the end of the experiment. Your income during the experiment will be calculated in points. At the end of the experiment, each point will be exchanged to CHF according to the rule

133 points = 1 CHF.

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You will take part in an experiment, which will consist of **20 periods**. You will interact with **one** other participant in a group of **two**. **After each period you will be randomly assigned to a new group**. Neither you nor the other participants will be told who interacted in one group. The assignment to groups will not give an advantage to any of the participants.

Each period consists of two stages. We shall call the decisions that the participants will be taking *in the first period* "*investments*". The decisions *in the second stage* will be called *sales quantities* or *quantities*. In the next two sections we will explain the decisions during each period individually, and for the sequence of 20 periods.

[1] The treatment specification in parantheses was not on the instructions used in the experiment.

1.1. Your decision in each period

Each period consists of two stages. We will now describe each stage.

Stage 1: The participants in this experiment represent firms who produce the same product on a market. The production of a unit of each product leads to costs that we call **unit costs** and which are at most **20**. In the first stage of a period, you can invest. The highest possible investment is **9** units. The lowest possible investment is **0**. By **investing** you reduce unit costs. The following table gives the relation between investments and unit costs:

Unit costs *before* Stage 1	Investments	Unit costs *after* Stage 1
20	0	20
20	1	19
20	2	18
20	3	17
20	4	16
20	5	15
20	6	14
20	7	13
20	8	12
20	9	11

Investments above zero are costly. The investment costs are shown in the **cost table**. As you can see from the cost table, costs grow more than proportionately with investments.

Stage 2: In the second stage of each period you choose the quantity that you want to sell. The highest possible quantity is **12**. The lowest possible quantity is **0**. Your choice of quantity and those of the other participant in your group influence the price that you can charge in the market. **The higher the total quantity of the two participants, the lower is your price.** The influence of the chosen quantities on your price is shown in the attached **price table**.

In the rows of the price table, you can see your possible quantity choices. In the columns, you see the possible choices of the other participant. If, for instance, you choose a quantity of 5 and the quantity of the other participant is 7, then your price is 38 in this period. If, however,

the quantity of the other participant is 10 and you still choose a quantity of 5, then your price is 35 in this period.

Earnings in each period: The earnings are determined by your investment and quantity decisions and those of the other participant. Your earnings are determined as follows

earnings = (price - unit costs after stage 1)*own quantity – investment costs .

1.2. The course of the 20 periods

You and the other participants start in the first period with the same endowment of 35 CHF (4655 points). The investments in stage 1 and the quantities in stage 2 determine earnings in each period, which can be positive or negative. The total earnings in the experiment are the sum of your endowment and all earnings.

total earnings = endowment + all earnings .

2. What will you do?

During the experiment you will take your decisions at a computer using one of the screens depicted below.

In the first stage of each period, you take your investment decisions on the following decision screen. In the upper field, please insert how much you expect the other player in your group to invest. In the field below, please insert how much you will invest yourself. You have **30 seconds** to take the decision.

After the participants have taken their definite investment decisions, you will see an information screen at the end of the first stage of each period. It will inform you of your own investment decision and those of the other participant of your group. When you are ready to continue to the **next stage**, click “continue”. After **30 seconds**, you will be asked to click “continue”.

Your quantity decision will be taken in the second stage of each period on the following decision screen. In the upper field, please insert what you think the other player will sell. In the lower field, please insert how much you want to sell. You have **30 seconds**.

After the participants have taken their quantity decisions, an information screen will appear at the end of the second stage of each period. It informs you of your own quantity decisions and those of the other participant of the group. Also, your price and the period earnings will be shown.

When you are ready to continue to the **next period**, click “continue”. After **60 seconds**, you will be asked to click “continue”.

3. The control questions

Before the experiment starts, we ask you to answer a few control questions. You have to answer **all** the questions **correctly**; otherwise you will not be allowed to start the experiment. When you answer the questions, please state **how you arrived** at the answer. The questions merely serve to understand the rules of the experiment. Wrong answers have **no** consequences.

3.1.) Consider the following example: In the *first stage* you invest 4 units.

a) How high are your unit costs after stage 1? And your investment costs?

In the *second stage* you choose a quantity of 6. The quantity of the other player is 8.

b) How high is your price?

c) How high are your earnings?

3.2) Consider the following example: In the *first stage* you invest 9 units.

a) How high are your unit costs after stage 1? And your investment costs?

In the *second stage* you choose a quantity of 10. The quantity of the other player is 5.

b) How high is your price?

c) How high are your earnings?

3.3.) Consider the following example: In the *first stage* you invest 3 units.

a) How high are your unit costs after stage 1? And your investment costs?

In the *second stage* you choose a quantity of 4. The quantity of the other player is 9.

b) How high is your price?

c) How high are your earnings?

3.4.) Consider the following example: In the *first stage* you invest 6 units.

a) How high are your unit costs after stage 1? And your investment costs?

In the *second stage* you choose a quantity of 2. The quantity of the other player is 4.

b) How high is your price?

c) How high are your earnings?

3.5.) Is the following statement correct or false?

In any one of the 20 periods, for a given quantity of the other player, the higher your own quantity, the lower is your price.

correct	*false*

Cost Table

Investment	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Costs	0	3	12	27	48	75	108	147	192	243

Price Table

		Quantity of the Other Player												
		0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
Own Quantity	**0**	50	49	48	47	46	45	44	43	42	41	40	39	38
	1	49	48	47	46	45	44	43	42	41	40	39	38	37
	2	48	47	46	45	44	43	42	41	40	39	38	37	36
	3	47	46	45	44	43	42	41	40	39	38	37	36	35
	4	46	45	44	43	42	41	40	39	38	37	36	35	34
	5	45	44	43	42	41	40	39	38	37	36	35	34	33
	6	44	43	42	41	40	39	38	37	36	35	34	33	32
	7	43	42	41	40	39	38	37	36	35	34	33	32	31
	8	42	41	40	39	38	37	36	35	34	33	32	31	30
	9	41	40	39	38	37	36	35	34	33	32	31	30	29
	10	40	39	38	37	36	35	34	33	32	31	30	29	28
	11	39	38	37	36	35	34	33	32	31	30	29	28	27
	12	38	37	36	35	34	33	32	31	30	29	28	27	26

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1.1. Your decision in each period

Each period consists of two stages. We will now describe each stage.

Stage 1: The participants in this experiment represent firms who produce the same product on a market. The production of a unit of each product leads to costs that we call **unit costs** and which are at most **20**. In the first stage of a period, you can invest. The highest possible investment is **9** units. The lowest possible investment is **0**. By **investing** you reduce unit costs. The following table gives the relation between investments and unit costs:

Unit costs *before* Stage 1	**Investments**	**Unit costs *after* Stage 1**
20	0	20
20	1	19
20	2	18
20	3	17
20	4	16
20	5	15
20	6	14
20	7	13
20	8	12
20	9	11

Investments above zero are costly. The investment costs are shown in the **cost table**. As you can see from the cost table, costs grow more than proportionately with investments.

Stage 2: In the second stage of each period you choose the quantity that you want to sell. The highest possible quantity is **12**. The lowest possible quantity is **0**.

Your choice of quantity and those of the other participants in your group influence the price that you can charge in the market. **The higher the total quantity of the four participants, the lower is your price.** The influence of the chosen quantities on your price is shown in the attached **price table**.

In the rows of the price table, you can see your possible quantity choices. In the columns, you see the possible average choices of the other three participants in your group. If, for instance,

you choose a quantity of 5 and the average quantity of the other participants is 7, then your price is 24 in this period. If, however, the average quantity of the other participants is 10 and you still choose a quantity of 5, then your price is 15 in this period.

Earnings in each period: The earnings are determined by your investment and quantity decisions and those of the other participants. Your earnings are determined as follows

earnings = (price - unit costs after stage 1)*own quantity – investment costs .

Note: If your price is smaller than your unit costs after stage 1, you will definitely have negative earnings in the period under consideration.

1.2. The course of the 20 periods

You and the other participants start in the first period with the same endowment of 35 CHF (4655 points). The investments in stage 1 and quantities in stage 2 determine earnings in each period, which can be positive or negative. The total earnings in the experiment are the sum of your endowment and all earnings.

total earnings = endowment + all earnings .

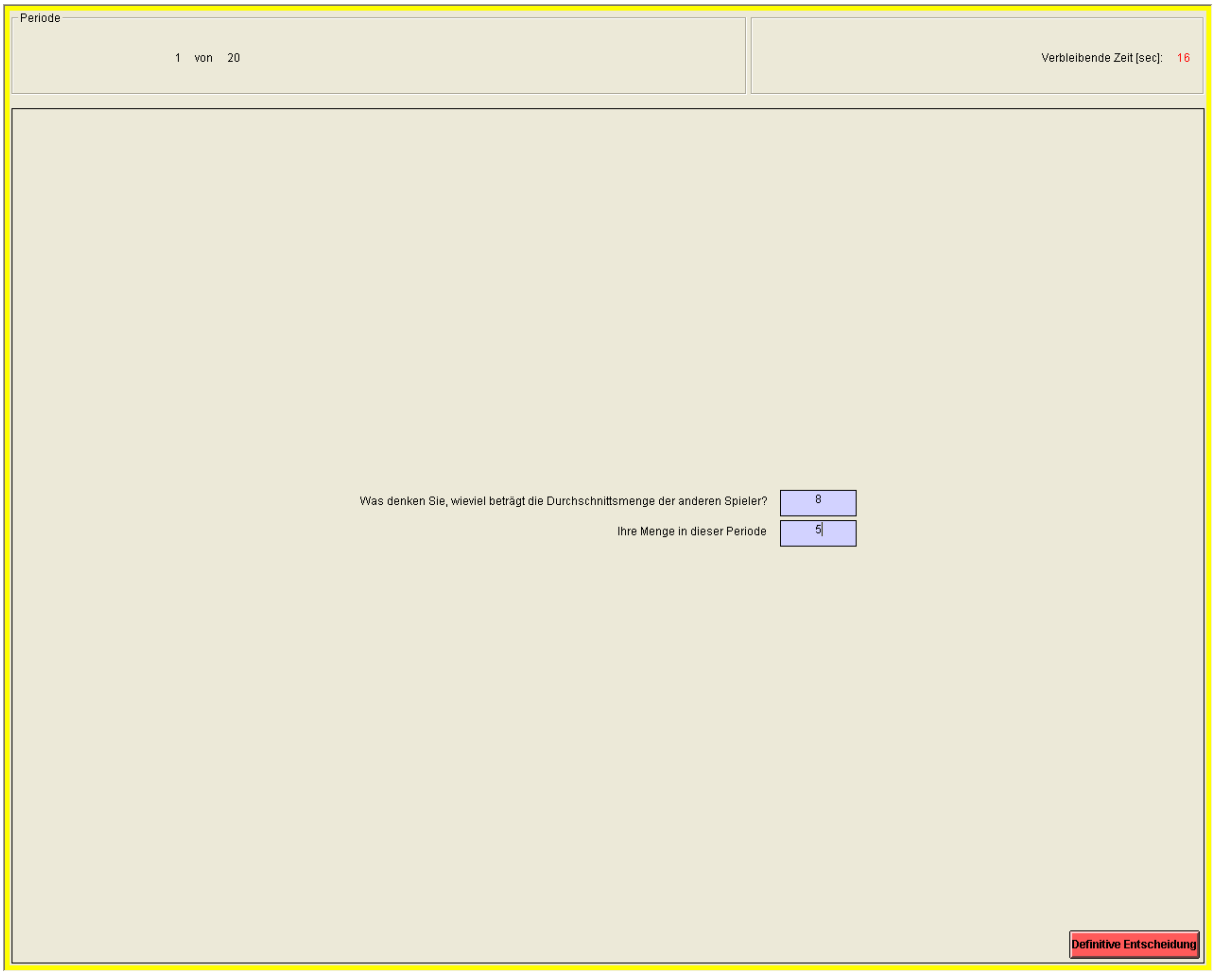
2. What will you do?

During the experiment you will take your decisions at a computer using one of the screens depicted below.

In the first stage of each period, you take your investment decisions on the following decision screen. In the upper field, please insert how much you expect the other three players to invest on average. In the field below, please insert how much you will invest yourself. You have **30 seconds** to take the decision.

After the participants have taken their definite investment decisions, you will see an information screen at the end of the first stage of each period. It will inform you of your own investment decision and those of the other members of your groups. When you are ready to continue to the **next stage**, click “continue”. After **30 seconds**, you will be asked to click “continue”.

Your quantity decision will be taken in the second stage of each period on the following decision screen. In the upper field, please insert what you think the other three players in your group will sell on average. In the lower field, please insert how much you want to sell. You have **30 seconds**.



After the participants have taken their quantity decisions, an information screen will appear at the end of the second stage of each period. It informs you of your own quantity decisions and those of the other three participants of your group. Also, your price and your period earnings will be shown.

When you are ready to continue to the **next period**, click “continue”. After **60 seconds**, you will be asked to click “continue”.

3. The control questions

Before the experiment starts, we ask you to answer a few control questions. You have to answer **all** the questions **correctly**; otherwise you will not be allowed to start the experiment. When you answer the questions, please state **how you arrived** at the answer. The questions merely serve to understand the rules of the experiment. Wrong answers have **no** consequences.

3.1.) Consider the following example: In the *first stage* you invest 2 units.

a) How high are your unit costs after stage 1? And your investment costs?

In the *second stage* you choose a quantity of 4. The average quantity of the other players is 8.

b) How high is your price?

c) How high are your earnings?

3.2) Consider the following example: In the *first stage* you invest 7 units.

a) How high are your unit costs after stage 1? And your investment costs?

In the *second stage* you choose a quantity of 10. The average quantity of the other players is 5.

b) How high is your price?

c) How high are your earnings?

3.3.) Consider the following example: In the *first stage* you invest 3 units.

a) How high are your unit costs after stage 1? And your investment costs?

In the *second stage* you choose a quantity of 5. The average quantity of the other players is 6.

b) How high is your price?

c) How high are your earnings?

3.4.) Consider the following example: In the *first stage* you invest 6 units.

a) How high are your unit costs after stage 1? And your investment costs?

In the *second stage* you choose a quantity of 3. The average quantity of the other players is 4.

b) How high is your price?

c) How high are your earnings?

3.5.) Is the following statement correct or false?

In any one of the 20 periods, for a given average quantity of the other players, the higher your own quantity, the lower is your price.

correct	*false*

Cost Table

Investment	**0**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Costs	0	3	12	27	48	75	108	147	192	243

Price Table

Own Quantity	Average Quantity of the 3 Other Players												
	0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**
0	50	47	44	41	38	35	32	29	26	23	20	17	14
1	49	46	43	40	37	34	31	28	25	22	19	16	13
2	48	45	42	39	36	33	30	27	24	21	18	15	12
3	47	44	41	38	35	32	29	26	23	20	17	14	11
4	46	43	40	37	34	31	28	25	22	19	16	13	10
5	45	42	39	36	33	30	27	24	21	18	15	12	9
6	44	41	38	35	32	29	26	23	20	17	14	11	8
7	43	40	37	34	31	28	25	22	19	16	13	10	7
8	42	39	36	33	30	27	24	21	18	15	12	9	6
9	41	38	35	32	29	26	23	20	17	14	11	8	5
10	40	37	34	31	28	25	22	19	16	13	10	7	4
11	39	36	33	30	27	24	21	18	15	12	9	6	3
12	38	35	32	29	26	23	20	17	14	11	8	5	2