

The full set of instructions for experiments one and two, reported in *Voluntary Disclosure Under Imperfect Competition: Experimental Evidence* (by L.F. Ackert, B.K. Church, and M.R. Sankar), are presented on the following pages. The order, including specific treatments, in which the instructions are presented is as follows.

1. Experiment one (industry-wide uncertainty) with $q=100\%$,
2. Experiment one (industry-wide uncertainty) with $q=90\%$,
3. Experiment one (industry-wide uncertainty) with $q=70\%$,
4. Experiment two (firm-specific uncertainty) with $q=100\%$,
5. Experiment two (firm-specific uncertainty) with $q=90\%$, and
6. Experiment two (firm-specific uncertainty) with $q=70\%$.

1.

GENERAL INSTRUCTIONS

This experiment will be conducted over several periods. In the experiment, you will be a producer. You will make decisions about the number of units to be produced each period. All units that are produced will be sold to the experimenter. The type of currency used in this experiment is francs. So, production costs and selling prices will be in terms of francs. In turn, your earnings will be computed in terms of francs. **Each franc is worth \$0.0625 to you. In other words, \$1 = 16 francs.** At the end of the experiment your francs will be converted to dollars at this rate, and you will be paid in dollars. Notice that the more francs you earn the more dollars you earn.

Experimental Role

Throughout the course of the experiment, one half of you will take the role of Player A and the other half will take the role of Player B: you will be assigned the same role for the entirety of the experiment. Player roles will be assigned randomly after the instructions have been completed.

Players A and B are both producers. **Each period, Player A/Player B pairs will be assigned.** The pairs represent producers who are competing against each other. At the beginning of each period, Player A and Player B will independently determine the number of units that they are going to produce. However, **each Player cannot produce more than 10 units per period.**

Selling Price of Goods

The experimenter will buy all goods that are produced each period, but the selling price will not be determined until the goods are produced. **The selling price per unit depends on the total number of units that are produced in a period: i.e., Player A's production plus Player B's production.** The selling price will be determined as follows.

$$\text{Selling Price in francs} = 20 - \text{Total Units Produced}$$

Thus, the selling price will decrease as the total number of units produced increases.

Cost of Producing Goods

Players A and B will incur production costs. **Production costs may vary between periods; however, the costs do not vary between players (i.e., within a period all players incur the same costs).** Production costs may be 2 francs per unit, 4 francs per unit, or 6 francs per unit. **Each cost has an equal chance of occurring.** So if the experiment were to last an infinite number of periods, each cost would occur, on average, 33 1/3 out of every 100 periods. The cost per unit each period has been determined previously by the experimenters.

Player A's Signal

At the beginning of each period, Player A will receive a signal from the experimenter, which will indicate the cost per unit.

Each period, there is a 100% chance that the signal will be the cost per unit. The signal per period has been determined previously by the experimenters.

Sending a Message

Each period Player A, after receiving a signal and deciding on the number of units to produce, sends Player B a message. The message may be the cost per unit or ?. If the message is ?, the cost per unit will not be revealed until the end of the period. After receiving the message, Player B determines the number of units that he or she will produce. No other communication is permitted between Player A/Player B pairs.

Conducting the Experiment

After the instructions have been completed, you will be assigned a player role. Those assigned the role of Player B will complete the experiment in another room.

At the beginning of each period, the experimenter in each room will shuffle a deck of four cards numbered 1, 2, 3, and 4. One card will be distributed to each participant. **The card received represents your reference number for the period.** The reference numbers will be used to assign Player A/Player B pairs each period. Participants who receive the same numbered card will be paired with each other. For example, a participant taking the role of Player A and receiving a card numbered 2 will be paired with the participant taking the role of Player B and receiving the same numbered card.

Players located in different rooms will be referred to by their reference numbers each period. Thus, you will be unable to identify the person with whom you are paired in a particular period.

At the beginning of each period, Player A will receive a signal: a large index card will be displayed by the experimenter indicating the signal. Subsequently, Player A will decide on the number of units to produce. Player A also will decide on the message to send to Player B. After the signal is displayed, Player A will be provided with a small index card, which will be used to send a message to Player B. The index card will indicate the period and Player A/Player B pairing. An example of the information contained on an index card is shown at the top of the next page.

Period 6: 4		
<u>Message</u>	<u>B's Production</u>	<u>Price</u>

The above card will be used to send a message in Period 6 from Player A assigned reference number 4 to Player B assigned the same reference number. As explained below, Player B will record his or her production on this card and the experimenter will record the selling price per unit.

Each Player A records the message (either the cost per unit or ?) on the left-hand side of the card. An experimenter will collect the index cards and take them to the room where the Player B pairs are located. The cards will be distributed according to Player A/Player B pairs (i.e., 1, 2, 3, 4). Upon receiving an index card, each Player B will decide on the number of units that he or she is going to produce. This number will be recorded in the middle of the index card. An experimenter will collect the index cards once again and determine the selling price for each Player A/Player B pair.

Specific Instructions

Each period, Player A will be allowed 45 seconds to send a message to Player B. Player A also must decide on the number of units to produce within this time frame. Place your index card face down in front of you after making these decisions.

After collecting the index cards, the experimenter will copy the number of units that you decided to produce.

Player B will be allowed 30 seconds to decide on the number of units to produce. Place your index card face down in front of you after making this decision.

The experimenter will collect the index cards and determine the selling price per unit for each Player A/Player B pair based on the production levels for the pair. The selling price will be recorded on the right-hand side of the index card and returned to Player B. In addition, the experimenter will display a large index card indicating the cost per unit for the period.

The experimenter in the other room will inform Player A of the selling price.

Record Sheet

Two record sheets are included on the last two pages of these materials: one for Player A and one for Player B. You will only use the record sheet that corresponds to your assigned role.

Please refer to the record sheet for Player A. Each period Player A will record his or her reference number in column (2), the signal that is received in column (3), the message that is sent to Player B in column (4), the number of units that are produced in column (5), the selling price per unit in column (6) and the cost per unit in column (7). In column (8), compute your earnings per unit for the period: i.e., your selling price per unit minus your cost per unit. In column (9), compute your total earnings for the period: i.e., your earnings per unit multiplied by the number of units produced. Finally, in column (10), compute your cumulative earnings: i.e., your earnings for the current period plus your cumulative earnings from the prior period. Please note that you are initially provided with an endowment of 30 francs for participating in this experiment.

Now please refer to the record sheet for Player B. Each period Player B will record his or her reference number in column (2), the message that is received from Player A in column (3), the number of units that are produced in column (4), the selling price per unit in column (5), and the cost per unit in column (6). In column (7), compute your earnings per unit for the period: i.e., your selling price per unit minus your cost per unit. In column (8), compute your total earnings for the period: i.e., your earnings per unit multiplied by the number of units produced. Finally, in column (9), compute your cumulative earnings: i.e., your earnings for the current period plus your cumulative earnings from the prior period. Please note that you are initially provided with an endowment of 30 francs for participating in this experiment.

Example

At this point, an example will be provided.

Suppose that Player A receives a signal of 6 francs per unit. In this case, the message that Player A sends to Player B must be either 6 or ?. Further suppose that Player A decides to produce 1 unit and Player B decides to produce 10 units. With a total production of 11 units ($10 + 1$), the selling price will be $20 - 11 = 9$ francs per unit, and each players' earnings per unit will be $9 - 6 = 3$ francs. Player A's total earnings for the period will be $3 * 1 = 3$ francs, and Player B's total earnings for the period will be $3 * 10 = 30$ francs.

Assigning Participants to Groups

At this point, we will assign each of you to a group. Each participant will be provided with a card. One half of the cards contain an even number and the other half contain an odd number. Participants receiving an even-numbered card will be assigned the role of Player A and will complete the experiment in the present room. Participants receiving an odd-numbered card will be assigned the role of Player B and will complete the experiment in another room.

After you are separated into two rooms, it is important that you do not talk among yourselves. Please refrain from talking to other participants throughout the remainder of this experiment.

Are there any questions?

Experimental Code

Player A's Record Sheet

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Period	Reference Number	Signal	Message to Player B	# of Units to Produce	Selling Price	Cost Per Unit	Earnings Per Unit (6)-(7)	Total Earnings (8)*(5)	Cumulative Earnings
Endowment	---	---	---	---	---	---	---	---	30
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
Earnings in dollars (multiply cumulative earnings by 0.0625)									

Experimental Code

Player B's Record Sheet

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Period	Reference Number	Message from Player A	# of Units to Produce	Selling Price	Cost Per Unit	Earnings Per Unit (5)-(6)	Total Earnings (7)*(4)	Cumulative Earnings
Endowment	---	---	---	---	---	---	---	30
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
Earnings in dollars (multiply your cumulative earnings by 0.0625)								

Experimental Code: _____

Post-Experiment Questionnaire

This questionnaire is designed to collect general information. Such information may help us better understand differences found between participants in this experiment.

1. What year are you in university (e.g., 1st year, 2nd year, 3rd year, 4th year)? _____

2. What department are you in? (e.g., business, economics) _____

3. What is your sex? (check one) male _____ female _____

4. What is your age? (in years) _____

5. How interesting did you find this experiment? (circle the appropriate number)

Not very interesting	-----	-----	-----	-----	-----	-----	Very interesting
	1	2	3	4	5	6	7

6. Compared to the amount of money available to you for daily living expenses, how would you characterize the amount of money earned for participating in this experiment? (circle the appropriate number)

Nominal amount	-----	-----	-----	-----	-----	-----	Considerable amount
	1	2	3	4	5	6	7

7. How would you characterize your attitude toward risk while participating in the market experiment? (**circle the appropriate number**)

Very risk averse	-----	-----	-----	-----	-----	-----	Very risk taking
	1	2	3	4	5	6	7

8. How many economics courses have you had in university? _____

2.

GENERAL INSTRUCTIONS

This experiment will be conducted over several periods. In the experiment, you will be a producer. You will make decisions about the number of units to be produced each period. All units that are produced will be sold to the experimenter. The type of currency used in this experiment is francs. So, production costs and selling prices will be in terms of francs. In turn, your earnings will be computed in terms of francs. **Each franc is worth \$0.0625 to you. In other words, \$1 = 16 francs.** At the end of the experiment your francs will be converted to dollars at this rate, and you will be paid in dollars. Notice that the more francs you earn the more dollars you earn.

Experimental Role

Throughout the course of the experiment, one half of you will take the role of Player A and the other half will take the role of Player B: you will be assigned the same role for the entirety of the experiment. Player roles will be assigned randomly after the instructions have been completed.

Players A and B are both producers. **Each period, Player A/Player B pairs will be assigned.** The pairs represent producers who are competing against each other. At the beginning of each period, Player A and Player B will independently determine the number of units that they are going to produce. However, **each Player cannot produce more than 10 units per period.**

Selling Price of Goods

The experimenter will buy all goods that are produced each period, but the selling price will not be determined until the goods are produced. **The selling price per unit depends on the total number of units that are produced in a period: i.e., Player A's production plus Player B's production.** The selling price will be determined as follows.

$$\text{Selling Price in francs} = 20 - \text{Total Units Produced}$$

Thus, the selling price will decrease as the total number of units produced increases.

Cost of Producing Goods

Players A and B will incur production costs. **Production costs may vary between periods; however, the costs do not vary between players (i.e., within a period all players incur the same costs).** Production costs may be 2 francs per unit, 4 francs per unit, or 6 francs per unit. **Each cost has an equal chance of occurring.** So if the experiment were to last an infinite number of periods, each cost would occur, on average, 33 1/3 out of every 100 periods. The cost per unit each period has been determined previously by the experimenters.

Player A's Signal

At the beginning of each period, Player A will receive a signal from the experimenter, which *may* indicate the cost per unit. **The signal will indicate either the cost per unit or ?**. If the signal is ?, the cost per unit will not be revealed until the end of the period.

Each period, there is a 90% chance that the signal will be the cost per unit and a 10% chance that the signal will be ?. So if the experiment were to last an infinite number of periods, the signal would reveal the cost per unit, on average, 90 out of every 100 periods. The signal per period has been determined previously by the experimenters.

Sending a Message

Each period Player A, after receiving a signal and deciding on the number of units to produce, sends Player B a message. The message may be the cost per unit or ?. **If Player A's signal is the cost per unit, the message may be the cost per unit or ?**. **If Player A's signal is ?, the message must be ?**. After receiving the message, Player B determines the number of units that he or she will produce. No other communication is permitted between Player A/Player B pairs.

Conducting the Experiment

After the instructions have been completed, you will be assigned a player role. Those assigned the role of Player B will complete the experiment in another room.

At the beginning of each period, the experimenter in each room will shuffle a deck of four cards numbered 1, 2, 3, and 4. One card will be distributed to each participant. **The card received represents your reference number for the period**. The reference numbers will be used to assign Player A/Player B pairs each period. Participants who receive the same numbered card will be paired with each other. For example, a participant taking the role of Player A and receiving a card numbered 2 will be paired with the participant taking the role of Player B and receiving the same numbered card.

Players located in different rooms will be referred to by their reference numbers each period. Thus, you will be unable to identify the person with whom you are paired in a particular period.

At the beginning of each period, Player A will receive a signal: a large index card will be displayed by the experimenter indicating the signal. Subsequently, Player A will decide on the number of units to produce. Player A also will decide on the message to send to Player B. After the signal is displayed, Player A will be provided with a small index card, which will be used to send a message to Player B. The index card will indicate the period and Player A/Player B pairing. An example of the information contained on an index card is shown at the top of the next page.

	Period 6: 4	
<u>Message</u>	<u>B's Production</u>	<u>Price</u>

The above card will be used to send a message in Period 6 from Player A assigned reference number 4 to Player B assigned the same reference number. As explained below, Player B will record his or her production on this card and the experimenter will record the selling price per unit.

Each Player A records the message (either the cost per unit or ?) on the left-hand side of the card. An experimenter will collect the index cards and take them to the room where the Player B pairs are located. The cards will be distributed according to Player A/Player B pairs (i.e., 1, 2, 3, 4). Upon receiving an index card, each Player B will decide on the number of units that he or she is going to produce. This number will be recorded in the middle of the index card. An experimenter will collect the index cards once again and determine the selling price for each Player A/Player B pair.

Specific Instructions

Each period, Player A will be allowed 45 seconds to send a message to Player B. Player A also must decide on the number of units to produce within this time frame. Place your index card face down in front of you after making these decisions.

After collecting the index cards, the experimenter will copy the number of units that you decided to produce.

Player B will be allowed 30 seconds to decide on the number of units to produce. Place your index card face down in front of you after making this decision.

The experimenter will collect the index cards and determine the selling price per unit for each Player A/Player B pair based on the production levels for the pair. The selling price will be recorded on the right-hand side of the index card and returned to Player B. In addition, the experimenter will display a large index card indicating the cost per unit for the period.

The experimenter in the other room will inform Player A of the selling price. Also, if Player A's signal was ?, the cost per unit will be displayed at this point.

Record Sheet

Two record sheets are included on the last two pages of these materials: one for Player A and one for Player B. You will only use the record sheet that corresponds to your assigned role.

Please refer to the record sheet for Player A. Each period Player A will record his or her reference number in column (2), the signal that is received in column (3), the message that is sent to Player B in column (4), the number of units that are produced in column (5), the selling price per unit in column (6) and the cost per unit in column (7). In column (8), compute your earnings per unit for the period: i.e., your selling price per unit minus your cost per unit. In column (9), compute your total earnings for the period: i.e., your earnings per unit multiplied by the number of units produced. Finally, in column (10), compute your cumulative earnings: i.e., your earnings for the current period plus your cumulative earnings from the prior period. Please note that you are initially provided with an endowment of 30 francs for participating in this experiment.

Now please refer to the record sheet for Player B. Each period Player B will record his or her reference number in column (2), the message that is received from Player A in column (3), the number of units that are produced in column (4), the selling price per unit in column (5), and the cost per unit in column (6). In column (7), compute your earnings per unit for the period: i.e., your selling price per unit minus your cost per unit. In column (8), compute your total earnings for the period: i.e., your earnings per unit multiplied by the number of units produced. Finally, in column (9), compute your cumulative earnings: i.e., your earnings for the current period plus your cumulative earnings from the prior period. Please note that you are initially provided with an endowment of 30 francs for participating in this experiment.

Examples

At this point, two examples will be provided.

Suppose Player A receives a ? signal. In this case, the message that Player A sends to Player B must be ?. Further suppose that Player A decides to produce 10 units and that Player B decides to produce 1 unit. With a total production of 11 units ($10 + 1$), the selling price will be $20 - 11 = 9$ francs per unit. If Player A's cost is 2 francs per unit, his or her earnings per unit will be $9 - 2 = 7$ francs. Player A's total earnings for the period will be $7 * 10 = 70$ francs. By comparison, Player B's earnings per unit will be $9 - 2 = 7$ francs, and his or her total earnings for the period will be $7 * 1 = 7$ francs.

As another example, suppose that Player A receives a signal of 6 francs per unit. In this case, the message that Player A sends to Player B must be either 6 or ?. Further suppose that Player A decides to produce 1 unit and Player B decides to produce 10 units. With a total production of 11 units ($10 + 1$), the selling price will be $20 - 11 = 9$ francs per unit, and each players' earnings per unit will be $9 - 6 = 3$ francs. Player A's total earnings for the period will be $3 * 1 = 3$ francs, and Player B's total earnings for the period will be $3 * 10 = 30$ francs.

Assigning Participants to Groups

At this point, we will assign each of you to a group. Each participant will be provided with a card. One half of the cards contain an even number and the other half contain an odd number. Participants receiving an even-numbered card will be assigned the role of Player A and will complete the experiment in the present room. Participants receiving an odd-numbered card will be assigned the role of Player B and will complete the experiment in another room.

After you are separated into two rooms, it is important that you do not talk among yourselves. Please refrain from talking to other participants throughout the remainder of this experiment.

Are there any questions?

Experimental Code

Player A's Record Sheet

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Period	Reference Number	Signal	Message to Player B	# of Units to Produce	Selling Price	Cost Per Unit	Earnings Per Unit (6)-(7)	Total Earnings (8)*(5)	Cumulative Earnings
Endowment	---	---	---	---	---	---	---	---	30
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
Earnings in dollars (multiply cumulative earnings by 0.0625)									

Experimental Code

Player B's Record Sheet

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Period	Reference Number	Message from Player A	# of Units to Produce	Selling Price	Cost Per Unit	Earnings Per Unit (5)-(6)	Total Earnings (7)*(4)	Cumulative Earnings
Endowment	---	---	---	---	---	---	---	30
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
Earnings in dollars (multiply your cumulative earnings by 0.0625)								

Experimental Code: _____

Post-Experiment Questionnaire

This questionnaire is designed to collect general information. Such information may help us better understand differences found between participants in this experiment.

1. What year are you in university (e.g., 1st year, 2nd year, 3rd year, 4th year)? _____

2. What department are you in? (e.g., business, economics) _____

3. What is your sex? (check one) male _____ female _____

4. What is your age? (in years) _____

5. How interesting did you find this experiment? (circle the appropriate number)

Not very interesting	-----	-----	-----	-----	-----	-----	Very interesting
	1	2	3	4	5	6	7

6. Compared to the amount of money available to you for daily living expenses, how would you characterize the amount of money earned for participating in this experiment? (circle the appropriate number)

Nominal amount	-----	-----	-----	-----	-----	-----	Considerable amount
	1	2	3	4	5	6	7

7. How would you characterize your attitude toward risk while participating in the market experiment? (**circle the appropriate number**)

Very risk averse	-----	-----	-----	-----	-----	-----	Very risk taking
	1	2	3	4	5	6	7

8. How many economics courses have you had in university? _____

3.

GENERAL INSTRUCTIONS

This experiment will be conducted over several periods. In the experiment, you will be a producer. You will make decisions about the number of units to be produced each period. All units that are produced will be sold to the experimenter. The type of currency used in this experiment is francs. So, production costs and selling prices will be in terms of francs. In turn, your earnings will be computed in terms of francs. **Each franc is worth \$0.0625 to you. In other words, \$1 = 16 francs.** At the end of the experiment your francs will be converted to dollars at this rate, and you will be paid in dollars. Notice that the more francs you earn the more dollars you earn.

Experimental Role

Throughout the course of the experiment, one half of you will take the role of Player A and the other half will take the role of Player B: you will be assigned the same role for the entirety of the experiment. Player roles will be assigned randomly after the instructions have been completed.

Players A and B are both producers. **Each period, Player A/Player B pairs will be assigned.** The pairs represent producers who are competing against each other. At the beginning of each period, Player A and Player B will independently determine the number of units that they are going to produce. However, **each Player cannot produce more than 10 units per period.**

Selling Price of Goods

The experimenter will buy all goods that are produced each period, but the selling price will not be determined until the goods are produced. **The selling price per unit depends on the total number of units that are produced in a period: i.e., Player A's production plus Player B's production.** The selling price will be determined as follows.

$$\text{Selling Price in francs} = 20 - \text{Total Units Produced}$$

Thus, the selling price will decrease as the total number of units produced increases.

Cost of Producing Goods

Players A and B will incur production costs. **Production costs may vary between periods; however, the costs do not vary between players (i.e., within a period all players incur the same costs).** Production costs may be 2 francs per unit, 4 francs per unit, or 6 francs per unit. **Each cost has an equal chance of occurring.** So if the experiment were to last an infinite number of periods, each cost would occur, on average, $33 \frac{1}{3}$ out of every 100 periods. The cost per unit each period has been determined previously by the experimenters.

Player A's Signal

At the beginning of each period, Player A will receive a signal from the experimenter, which *may* indicate the cost per unit. **The signal will indicate either the cost per unit or ?.** If the signal is ?, the cost per unit will not be revealed until the end of the period.

Each period, there is a 70% chance that the signal will be the cost per unit and a 30% chance that the signal will be ?. So if the experiment were to last an infinite number of periods, the signal would reveal the cost per unit, on average, 70 out of every 100 periods. The signal per period has been determined previously by the experimenters.

Sending a Message

Each period Player A, after receiving a signal and deciding on the number of units to produce, sends Player B a message. The message may be the cost per unit or ?. **If Player A's signal is the cost per unit, the message may be the cost per unit or ?.** **If Player A's signal is ?, the message must be ?.** After receiving the message, Player B determines the number of units that he or she will produce. No other communication is permitted between Player A/Player B pairs.

Conducting the Experiment

After the instructions have been completed, you will be assigned a player role. Those assigned the role of Player B will complete the experiment in another room.

At the beginning of each period, the experimenter in each room will shuffle a deck of four cards numbered 1, 2, 3, and 4. One card will be distributed to each participant. **The card received represents your reference number for the period.** The reference numbers will be used to assign Player A/Player B pairs each period. Participants who receive the same numbered card will be paired with each other. For example, a participant taking the role of Player A and receiving a card numbered 2 will be paired with the participant taking the role of Player B and receiving the same numbered card.

Players located in different rooms will be referred to by their reference numbers each period. Thus, you will be unable to identify the person with whom you are paired in a particular period.

At the beginning of each period, Player A will receive a signal: a large index card will be displayed by the experimenter indicating the signal. Subsequently, Player A will decide on the number of units to produce. Player A also will decide on the message to send to Player B. After the signal is displayed, Player A will be provided with a small index card, which will be used to send a message to Player B. The index card will indicate the period and Player A/Player B pairing. An example of the information contained on an index card is shown at the top of the next page.

Period 6: 4		
<u>Message</u>	<u>B's Production</u>	<u>Price</u>

The above card will be used to send a message in Period 6 from Player A assigned reference number 4 to Player B assigned the same reference number. As explained below, Player B will record his or her production on this card and the experimenter will record the selling price per unit.

Each Player A records the message (either the cost per unit or ?) on the left-hand side of the card. An experimenter will collect the index cards and take them to the room where the Player B pairs are located. The cards will be distributed according to Player A/Player B pairs (i.e., 1, 2, 3, 4). Upon receiving an index card, each Player B will decide on the number of units that he or she is going to produce. This number will be recorded in the middle of the index card. An experimenter will collect the index cards once again and determine the selling price for each Player A/Player B pair.

Specific Instructions

Each period, Player A will be allowed 45 seconds to send a message to Player B. Player A also must decide on the number of units to produce within this time frame. Place your index card face down in front of you after making these decisions.

After collecting the index cards, the experimenter will copy the number of units that you decided to produce.

Player B will be allowed 30 seconds to decide on the number of units to produce. Place your index card face down in front of you after making this decision.

The experimenter will collect the index cards and determine the selling price per unit for each Player A/Player B pair based on the production levels for the pair. The selling price will be recorded on the right-hand side of the index card and returned to Player B. In addition, the experimenter will display a large index card indicating the cost per unit for the period.

The experimenter in the other room will inform Player A of the selling price. Also, if Player A's signal was ?, the cost per unit will be displayed at this point.

Record Sheet

Two record sheets are included on the last two pages of these materials: one for Player A and one for Player B. You will only use the record sheet that corresponds to your assigned role.

Please refer to the record sheet for Player A. Each period Player A will record his or her reference number in column (2), the signal that is received in column (3), the message that is sent to Player B in column (4), the number of units that are produced in column (5), the selling price per unit in column (6) and the cost per unit in column (7). In column (8), compute your earnings per unit for the period: i.e., your selling price per unit minus your cost per unit. In column (9), compute your total earnings for the period: i.e., your earnings per unit multiplied by the number of units produced. Finally, in column (10), compute your cumulative earnings: i.e., your earnings for the current period plus your cumulative earnings from the prior period. Please note that you are initially provided with an endowment of 30 francs for participating in this experiment.

Now please refer to the record sheet for Player B. Each period Player B will record his or her reference number in column (2), the message that is received from Player A in column (3), the number of units that are produced in column (4), the selling price per unit in column (5), and the cost per unit in column (6). In column (7), compute your earnings per unit for the period: i.e., your selling price per unit minus your cost per unit. In column (8), compute your total earnings for the period: i.e., your earnings per unit multiplied by the number of units produced. Finally, in column (9), compute your cumulative earnings: i.e., your earnings for the current period plus your cumulative earnings from the prior period. Please note that you are initially provided with an endowment of 30 francs for participating in this experiment.

Examples

At this point, two examples will be provided.

Suppose Player A receives a ? signal. In this case, the message that Player A sends to Player B must be ?. Further suppose that Player A decides to produce 10 units and that Player B decides to produce 1 unit. With a total production of 11 units ($10 + 1$), the selling price will be $20 - 11 = 9$ francs per unit. If Player A's cost is 2 francs per unit, his or her earnings per unit will be $9 - 2 = 7$ francs. Player A's total earnings for the period will be $7 * 10 = 70$ francs. By comparison, Player B's earnings per unit will be $9 - 2 = 7$ francs, and his or her total earnings for the period will be $7 * 1 = 7$ francs.

As another example, suppose that Player A receives a signal of 6 francs per unit. In this case, the message that Player A sends to Player B must be either 6 or ?. Further suppose that Player A decides to produce 1 unit and Player B decides to produce 10 units. With a total production of 11 units ($10 + 1$), the selling price will be $20 - 11 = 9$ francs per unit, and each players' earnings per unit will be $9 - 6 = 3$ francs. Player A's total earnings for the period

will be $3 * 1 = 3$ francs, and Player B's total earnings for the period will be $3 * 10 = 30$ francs.

Assigning Participants to Groups

At this point, we will assign each of you to a group. Each participant will be provided with a card. One half of the cards contain an even number and the other half contain an odd number. Participants receiving an even-numbered card will be assigned the role of Player A and will complete the experiment in the present room. Participants receiving an odd-numbered card will be assigned the role of Player B and will complete the experiment in another room.

After you are separated into two rooms, it is important that you do not talk among yourselves. Please refrain from talking to other participants throughout the remainder of this experiment.

Are there any questions?

Experimental Code

Player A's Record Sheet

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Period	Reference Number	Signal	Message to Player B	# of Units to Produce	Selling Price	Cost Per Unit	Earnings Per Unit (6)-(7)	Total Earnings (8)*(5)	Cumulative Earnings
Endowment	---	---	---	---	---	---	---	---	30
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
Earnings in dollars (multiply cumulative earnings by 0.0625)									

Experimental Code

Player B's Record Sheet

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Period	Reference Number	Message from Player A	# of Units to Produce	Selling Price	Cost Per Unit	Earnings Per Unit (5)-(6)	Total Earnings (7)*(4)	Cumulative Earnings
Endowment	---	---	---	---	---	---	---	30
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
Earnings in dollars (multiply your cumulative earnings by 0.0625)								

Experimental Code: _____

Post-Experiment Questionnaire

This questionnaire is designed to collect general information. Such information may help us better understand differences found between participants in this experiment.

1. What year are you in university (e.g., 1st year, 2nd year, 3rd year, 4th year)? _____

2. What department are you in? (e.g., business, economics) _____

3. What is your sex? (check one) male _____ female _____

4. What is your age? (in years) _____

5. How interesting did you find this experiment? (circle the appropriate number)

Not very interesting	----- ----- ----- ----- ----- -----	Very interesting
	1 2 3 4 5 6 7	

6. Compared to the amount of money available to you for daily living expenses, how would you characterize the amount of money earned for participating in this experiment? (circle the appropriate number)

Nominal amount	----- ----- ----- ----- ----- -----	Considerable amount
	1 2 3 4 5 6 7	

7. How would you characterize your attitude toward risk while participating in the market experiment? (**circle the appropriate number**)

Very risk averse	----- ----- ----- ----- ----- -----	Very risk taking
	1 2 3 4 5 6 7	

8. How many economics courses have you had in university? _____

4.

GENERAL INSTRUCTIONS

This experiment will be conducted over several periods. In the experiment, you will be a producer. You will make decisions about the number of units to be produced each period. All units that are produced will be sold to the experimenter. The type of currency used in this experiment is francs. So, production costs and selling prices will be in terms of francs. In turn, your earnings will be computed in terms of francs. **Each franc is worth \$0.0625 to you. In other words, \$1 = 16 francs.** At the end of the experiment your francs will be converted to dollars at this rate, and you will be paid in dollars. Notice that the more francs you earn the more dollars you earn.

Experimental Role

Throughout the course of the experiment, one half of you will take the role of Player A and the other half will take the role of Player B: you will be assigned the same role for the entirety of the experiment. Player roles will be assigned randomly after the instructions have been completed.

Players A and B are both producers. **Each period, Player A/Player B pairs will be assigned.** The pairs represent producers who are competing against each other. At the beginning of each period, Player A and Player B will independently determine the number of units that they are going to produce. However, **each Player cannot produce more than 10 units per period.**

Selling Price of Goods

The experimenter will buy all goods that are produced each period, but the selling price will not be determined until the goods are produced. **The selling price per unit depends on the total number of units that are produced in a period: i.e., Player A's production plus Player B's production.** The selling price will be determined as follows.

Selling Price in francs = 20 - Total Units Produced

Thus, the selling price will decrease as the total number of units produced increases.

Cost of Producing Goods

Players A and B will incur production costs. **Player A's costs may vary between periods, such that the costs may be 2 francs per unit, 4 francs per unit, or 6 francs per unit. Each cost has an equal chance of occurring.** So if the experiment were to last an infinite number of periods, each cost would occur, on average, $33 \frac{1}{3}$ out of every 100 periods. Player A's cost per unit each period has been determined previously by the experimenters.

Player B's cost per unit will always be 4 francs.

Player A's Signal

At the beginning of each period, Player A will receive a signal from the experimenter, which will indicate Player A's cost per unit.

Each period, there is a 100% chance that the signal will be Player A's cost per unit. The signal per period has been determined previously by the experimenters.

Sending a Message

Each period Player A, after receiving a signal and deciding on the number of units to produce, sends Player B a message. The message may be Player A's cost per unit or ?. If the message is ?, Player B's costs will not be revealed until the end of the period. After receiving the message, Player B determines the number of units that he or she will produce. No other communication is permitted between Player A/Player B pairs.

Conducting the Experiment

After the instructions have been completed, you will be assigned a player role. Those assigned the role of Player B will complete the experiment in another room.

At the beginning of each period, the experimenter in each room will shuffle a deck of four cards numbered 1, 2, 3, and 4. One card will be distributed to each participant. **The card received represents your reference number for the period.** The reference numbers will be used to assign Player A/Player B pairs each period. Participants who receive the same numbered card will be paired with each other. For example, a participant taking the role of Player A and receiving a card numbered 2 will be paired with the participant taking the role of Player B and receiving the same numbered card.

Players located in different rooms will be referred to by their reference numbers each period. Thus, you will be unable to identify the person with whom you are paired in a particular period.

At the beginning of each period, Player A will receive a signal: a large index card will be displayed by the experimenter indicating the signal. Subsequently, Player A will decide on the number of units to produce. Player A also will decide on the message to send to Player B. After the signal is displayed, Player A will be provided with a small index card, which will be used to send a message to Player B. The index card will indicate the period and Player A/Player B pairing. An example of the information contained on an index card is shown at the top of the next page.

Period 6: 4		
<u>Message</u>	<u>B's Production</u>	<u>Price</u>

The above card will be used to send a message in Period 6 from Player A assigned reference number 4 to Player B assigned the same reference number. As explained below, Player B will record his or her production on this card and the experimenter will record the selling price per unit.

Each Player A records the message (either Player A's cost per unit or ?) on the left-hand side of the card. An experimenter will collect the index cards and take them to the room where the Player B pairs are located. The cards will be distributed according to Player A/Player B pairs (i.e., 1, 2, 3, 4). Upon receiving an index card, each Player B will decide on the number of units that he or she is going to produce. This number will be recorded in the middle of the index card. An experimenter will collect the index cards once again and determine the selling price for each Player A/Player B pair.

Specific Instructions

Each period, Player A will be allowed 45 seconds to send a message to Player B. Player A also must decide on the number of units to produce within this time frame. Place your index card face down in front of you after making these decisions.

After collecting the index cards, the experimenter will copy the number of units that you decided to produce.

Player B will be allowed 30 seconds to decide on the number of units to produce. Place your index card face down in front of you after making this decision.

The experimenter will collect the index cards and determine the selling price per unit for each Player A/Player B pair based on the production levels for the pair. The selling price will be recorded on the right-hand side of the index card and returned to Player B. In addition, the experimenter will inform Player B of Player A's cost per unit.

The experimenter in the other room will inform Player A of the selling price.

Record Sheet

Two record sheets are included on the last two pages of these materials: one for Player A and one for Player B. You will only use the record sheet that corresponds to your assigned role.

Please refer to the record sheet for Player A. Each period Player A will record his or her reference number in column (2), the signal that is received in column (3), the message that is sent to Player B in column (4), the number of units that are produced in column (5), the selling price per unit in column (6) and the cost per unit in column (7). In column (8), compute your earnings per unit for the period: i.e., your selling price per unit minus your cost per unit. In column (9), compute your total earnings for the period: i.e., your earnings per unit multiplied by the number of units produced. Finally, in column (10), compute your cumulative earnings: i.e., your earnings for the current period plus your cumulative earnings from the prior period. Please note that you are initially provided with an endowment of 30 francs for participating in this experiment.

Now please refer to the record sheet for Player B. Each period Player B will record his or her reference number in column (2), the message that is received from Player A in column (3), the number of units that are produced in column (4), and the selling price per unit in column (5). The cost per unit of 4 is already recorded in column (6) of all rows. In column (7), compute your earnings per unit for the period: i.e., your selling price per unit minus 4. In column (8), compute your total earnings for the period: i.e., your earnings per unit multiplied by the number of units produced. Finally, in column (9), compute your cumulative earnings: i.e., your earnings for the current period plus your cumulative earnings from the prior period. Please note that you are initially provided with an endowment of 30 francs for participating in this experiment.

Example

At this point, an example will be provided.

Suppose that Player A receives a signal of 6 francs per unit. In this case, the message that Player A sends to Player B must be either 6 or 7. Further suppose that Player A decides to produce 1 unit and Player B decides to produce 10 units. With a total production of 11 units ($10 + 1$), the selling price will be $20 - 11 = 9$ francs per unit. Player A's earnings per unit will be $9 - 6 = 3$ francs, and his or her total earnings for the period will be $3 * 1 = 3$ francs. On the other hand, Player B's earnings per unit will be $9 - 4 = 5$, and his or her total earnings for the period will be $5 * 10 = 50$ francs.

Assigning Participants to Groups

At this point, we will assign each of you to a group. Each participant will be provided with a card. One half of the cards contain an even number and the other half contain an odd number. Participants receiving an even-numbered card will be assigned the role of Player A and will complete the experiment in the present room. Participants receiving an odd-numbered card will be assigned the role of Player B and will complete the experiment in another room.

After you are separated into two rooms, it is important that you do not talk among yourselves. Please refrain from talking to other participants throughout the remainder of this experiment.

Are there any questions?

Experimental Code

Player A's Record Sheet

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Period	Reference Number	Signal	Message to Player B	# of Units to Produce	Selling Price	Cost Per Unit	Earnings Per Unit (6)-(7)	Total Earnings (8)*(4)	Cumulative Earnings
Endowment	---	---	---	---	---	---	---	---	30
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
Earnings in dollars (multiply cumulative earnings by 0.0625)									

Experimental Code

Player B's Record Sheet

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Period	Reference Number	Message from Player A	# of Units to Produce	Selling Price	Cost Per Unit	Earnings Per Unit (5)-(6)	Total Earnings (7)*(4)	Cumulative Earnings
Endowment	---	---	---	---	---	---	---	30
1					4			
2					4			
3					4			
4					4			
5					4			
6					4			
7					4			
8					4			
9					4			
10					4			
11					4			
12					4			
13					4			
14					4			
15					4			
16					4			
17					4			
18					4			
19					4			
Earnings in dollars (multiply your cumulative earnings by 0.0625)								

Experimental Code: _____

Post-Experiment Questionnaire

This questionnaire is designed to collect general information. Such information may help us better understand differences found between participants in this experiment.

1. What year are you in university (e.g., 1st year, 2nd year, 3rd year, 4th year)? _____

2. What department are you in? (e.g., business, economics) _____

3. What is your sex? (check one) male _____ female _____

4. What is your age? (in years) _____

5. How interesting did you find this experiment? (circle the appropriate number)

Not very interesting	-----	-----	-----	-----	-----	-----	Very interesting
	1	2	3	4	5	6	7

6. Compared to the amount of money available to you for daily living expenses, how would you characterize the amount of money earned for participating in this experiment? (circle the appropriate number)

Nominal amount	-----	-----	-----	-----	-----	-----	Considerable amount
	1	2	3	4	5	6	7

7. How would you characterize your attitude toward risk while participating in the market experiment? (**circle the appropriate number**)

Very risk averse	-----	-----	-----	-----	-----	-----	Very risk taking
	1	2	3	4	5	6	7

8. How many economics courses have you completed in university? _____

5.

GENERAL INSTRUCTIONS

This experiment will be conducted over several periods. In the experiment, you will be a producer. You will make decisions about the number of units to be produced each period. All units that are produced will be sold to the experimenter. The type of currency used in this experiment is francs. So, production costs and selling prices will be in terms of francs. In turn, your earnings will be computed in terms of francs. **Each franc is worth \$0.0625 to you. In other words, \$1 = 16 francs.** At the end of the experiment your francs will be converted to dollars at this rate, and you will be paid in dollars. Notice that the more francs you earn the more dollars you earn.

Experimental Role

Throughout the course of the experiment, one half of you will take the role of Player A and the other half will take the role of Player B: you will be assigned the same role for the entirety of the experiment. Player roles will be assigned randomly after the instructions have been completed.

Players A and B are both producers. **Each period, Player A/Player B pairs will be assigned.** The pairs represent producers who are competing against each other. At the beginning of each period, Player A and Player B will independently determine the number of units that they are going to produce. However, **each Player cannot produce more than 10 units per period.**

Selling Price of Goods

The experimenter will buy all goods that are produced each period, but the selling price will not be determined until the goods are produced. **The selling price per unit depends on the total number of units that are produced in a period: i.e., Player A's production plus Player B's production.** The selling price will be determined as follows.

Selling Price in francs = 20 - Total Units Produced

Thus, the selling price will decrease as the total number of units produced increases.

Cost of Producing Goods

Players A and B will incur production costs. **Player A's costs may vary between periods, such that the costs may be 2 francs per unit, 4 francs per unit, or 6 francs per unit. Each cost has an equal chance of occurring.** So if the experiment were to last an infinite number of periods, each cost would occur, on average, $33 \frac{1}{3}$ out of every 100 periods. Player A's cost per unit each period has been determined previously by the experimenters.

Player B's cost per unit will always be 4 francs.

Player A's Signal

At the beginning of each period, Player A will receive a signal from the experimenter, which *may* indicate Player A's cost per unit. **The signal will indicate either the cost per unit or ?**. If the signal is ?, Player A's costs will not be revealed until the end of the period.

Each period, there is a 90% chance that the signal will be Player A's cost per unit and a 10% chance that the signal will be ?. So if the experiment were to last an infinite number of periods, the signal would reveal Player A's costs, on average, 90 out of every 100 periods. The signal per period has been determined previously by the experimenters.

Sending a Message

Each period Player A, after receiving a signal and deciding on the number of units to produce, sends Player B a message. The message may be Player A's cost per unit or ?. **If Player A's signal is his or her cost per unit, the message may be the cost per unit or ?**. **If Player A's signal is ?, the message must be ?**. After receiving the message, Player B determines the number of units that he or she will produce. No other communication is permitted between Player A/Player B pairs.

Conducting the Experiment

After the instructions have been completed, you will be assigned a player role. Those assigned the role of Player B will complete the experiment in another room.

At the beginning of each period, the experimenter in each room will shuffle a deck of four cards numbered 1, 2, 3, and 4. One card will be distributed to each participant. **The card received represents your reference number for the period**. The reference numbers will be used to assign Player A/Player B pairs each period. Participants who receive the same numbered card will be paired with each other. For example, a participant taking the role of Player A and receiving a card numbered 2 will be paired with the participant taking the role of Player B and receiving the same numbered card.

Players located in different rooms will be referred to by their reference numbers each period. Thus, you will be unable to identify the person with whom you are paired in a particular period.

At the beginning of each period, Player A will receive a signal: a large index card will be displayed by the experimenter indicating the signal. Subsequently, Player A will decide on the number of units to produce. Player A also will decide on the message to send to Player B. After the signal is displayed, Player A will be provided with a small index card, which will be used to send a message to Player B. The index card will indicate the period and Player A/Player B pairing. An example of the information contained on an index card is shown at the top of the next page.

Period 6: 4		
<u>Message</u>	<u>B's Production</u>	<u>Price</u>

The above card will be used to send a message in Period 6 from Player A assigned reference number 4 to Player B assigned the same reference number. As explained below, Player B will record his or her production on this card and the experimenter will record the selling price per unit.

Each Player A records the message (either Player A's cost per unit or ?) on the left-hand side of the card. An experimenter will collect the index cards and take them to the room where the Player B pairs are located. The cards will be distributed according to Player A/Player B pairs (i.e., 1, 2, 3, 4). Upon receiving an index card, each Player B will decide on the number of units that he or she is going to produce. This number will be recorded in the middle of the index card. An experimenter will collect the index cards once again and determine the selling price for each Player A/Player B pair.

Specific Instructions

Each period, Player A will be allowed 45 seconds to send a message to Player B. Player A also must decide on the number of units to produce within this time frame. Place your index card face down in front of you after making these decisions.

After collecting the index cards, the experimenter will copy the number of units that you decided to produce.

Player B will be allowed 30 seconds to decide on the number of units to produce. Place your index card face down in front of you after making this decision.

The experimenter will collect the index cards and determine the selling price per unit for each Player A/Player B pair based on the production levels for the pair. The selling price will be recorded on the right-hand side of the index card and returned to Player B. In addition, the experimenter will inform Player B of Player A's cost per unit.

The experimenter in the other room will inform Player A of the selling price. Also, if Player A's signal was ?, the cost per unit will be displayed at this point.

Record Sheet

Two record sheets are included on the last two pages of these materials: one for Player A and one for Player B. You will only use the record sheet that corresponds to your assigned role.

Please refer to the record sheet for Player A. Each period Player A will record his or her reference number in column (2), the signal that is received in column (3), the message that is sent to Player B in column (4), the number of units that are produced in column (5), the selling price per unit in column (6) and the cost per unit in column (7). In column (8), compute your earnings per unit for the period: i.e., your selling price per unit minus your cost per unit. In column (9), compute your total earnings for the period: i.e., your earnings per unit multiplied by the number of units produced. Finally, in column (10), compute your cumulative earnings: i.e., your earnings for the current period plus your cumulative earnings from the prior period. Please note that you are initially provided with an endowment of 30 francs for participating in this experiment.

Now please refer to the record sheet for Player B. Each period Player B will record his or her reference number in column (2), the message that is received from Player A in column (3), the number of units that are produced in column (4), and the selling price per unit in column (5). The cost per unit of 4 is already recorded in column (6) of all rows. In column (7), compute your earnings per unit for the period: i.e., your selling price per unit minus 4. In column (8), compute your total earnings for the period: i.e., your earnings per unit multiplied by the number of units produced. Finally, in column (9), compute your cumulative earnings: i.e., your earnings for the current period plus your cumulative earnings from the prior period. Please note that you are initially provided with an endowment of 30 francs for participating in this experiment.

Examples

At this point, two examples will be provided.

Suppose Player A receives a ? signal. In this case, the message that Player A sends to Player B must be ?. Further suppose that Player A decides to produce 10 units and that Player B decides to produce 1 unit. With a total production of 11 units ($10 + 1$), the selling price will be $20 - 11 = 9$ francs per unit. If Player A's cost is 2 francs per unit, his or her earnings per unit will be $9 - 2 = 7$ francs. Player A's total earnings for the period will be $7 * 10 = 70$ francs. By comparison, Player B's earnings per unit will be $9 - 4 = 5$ francs, and his or her total earnings for the period will be $5 * 1 = 5$ francs.

As another example, suppose that Player A receives a signal of 6 francs per unit. In this case, the message that Player A sends to Player B must be either 6 or ?. Further suppose that Player A decides to produce 1 unit and Player B decides to produce 10 units. With a total production of 11 units ($10 + 1$), the selling price will be $20 - 11 = 9$ francs per unit. Player A's earnings per unit will be $9 - 6 = 3$ francs, and his or her total earnings for the period will be $3 * 1 = 3$ francs. On the other hand, Player B's earnings per unit will be $9 - 4 = 5$, and his or her total earnings for the period will be $5 * 10 = 50$ francs.

Assigning Participants to Groups

At this point, we will assign each of you to a group. Each participant will be provided with a card. One half of the cards contain an even number and the other half contain an odd number. Participants receiving an even-numbered card will be assigned the role of Player A and will complete the experiment in the present room. Participants receiving an odd-numbered card will be assigned the role of Player B and will complete the experiment in another room.

After you are separated into two rooms, it is important that you do not talk among yourselves. Please refrain from talking to other participants throughout the remainder of this experiment.

Are there any questions?

Experimental Code

Player A's Record Sheet

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Period	Reference Number	Signal	Message to Player B	# of Units to Produce	Selling Price	Cost Per Unit	Earnings Per Unit (6)-(7)	Total Earnings (8)*(4)	Cumulative Earnings
Endowment	---	---	---	---	---	---	---	---	30
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
Earnings in dollars (multiply cumulative earnings by 0.0625)									

Experimental Code

Player B's Record Sheet

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Period	Reference Number	Message from Player A	# of Units to Produce	Selling Price	Cost Per Unit	Earnings Per Unit (5)-(6)	Total Earnings (7)*(4)	Cumulative Earnings
Endowment	---	---	---	---	---	---	---	30
1					4			
2					4			
3					4			
4					4			
5					4			
6					4			
7					4			
8					4			
9					4			
10					4			
11					4			
12					4			
13					4			
14					4			
15					4			
16					4			
17					4			
18					4			
19					4			
Earnings in dollars (multiply your cumulative earnings by 0.0625)								

Experimental Code: _____

Post-Experiment Questionnaire

This questionnaire is designed to collect general information. Such information may help us better understand differences found between participants in this experiment.

1. What year are you in university (e.g., 1st year, 2nd year, 3rd year, 4th year)? _____

2. What department are you in? (e.g., business, economics) _____

3. What is your sex? (check one) male _____ female _____

4. What is your age? (in years) _____

5. How interesting did you find this experiment? (circle the appropriate number)

Not very	-----	-----	-----	-----	-----	-----	-----	Very
interesting	1	2	3	4	5	6	7	interesting

6. Compared to the amount of money available to you for daily living expenses, how would you characterize the amount of money earned for participating in this experiment? (circle the appropriate number)

Nominal	-----	-----	-----	-----	-----	-----	-----	Considerable
amount	1	2	3	4	5	6	7	amount

7. How would you characterize your attitude toward risk while participating in the market experiment? (**circle the appropriate number**)

Very risk	-----	-----	-----	-----	-----	-----	-----	Very risk
averse	1	2	3	4	5	6	7	taking

8. How many economics courses have you completed in university? _____

6.

GENERAL INSTRUCTIONS

This experiment will be conducted over several periods. In the experiment, you will be a producer. You will make decisions about the number of units to be produced each period. All units that are produced will be sold to the experimenter. The type of currency used in this experiment is francs. So, production costs and selling prices will be in terms of francs. In turn, your earnings will be computed in terms of francs. **Each franc is worth \$0.0625 to you. In other words, \$1 = 16 francs.** At the end of the experiment your francs will be converted to dollars at this rate, and you will be paid in dollars. Notice that the more francs you earn the more dollars you earn.

Experimental Role

Throughout the course of the experiment, one half of you will take the role of Player A and the other half will take the role of Player B: you will be assigned the same role for the entirety of the experiment. Player roles will be assigned randomly after the instructions have been completed.

Players A and B are both producers. **Each period, Player A/Player B pairs will be assigned.** The pairs represent producers who are competing against each other. At the beginning of each period, Player A and Player B will independently determine the number of units that they are going to produce. However, **each Player cannot produce more than 10 units per period.**

Selling Price of Goods

The experimenter will buy all goods that are produced each period, but the selling price will not be determined until the goods are produced. **The selling price per unit depends on the total number of units that are produced in a period: i.e., Player A's production plus Player B's production.** The selling price will be determined as follows.

$$\text{Selling Price in francs} = 20 - \text{Total Units Produced}$$

Thus, the selling price will decrease as the total number of units produced increases.

Cost of Producing Goods

Players A and B will incur production costs. **Player A's costs may vary between periods, such that the costs may be 2 francs per unit, 4 francs per unit, or 6 francs per unit. Each cost has an equal chance of occurring.** So if the experiment were to last an infinite number of periods, each cost would occur, on average, $33 \frac{1}{3}$ out of every 100 periods. Player A's cost per unit each period has been determined previously by the experimenters.

Player B's cost per unit will always be 4 francs.

Player A's Signal

At the beginning of each period, Player A will receive a signal from the experimenter, which *may* indicate Player A's cost per unit. **The signal will indicate either the cost per unit or ?**. If the signal is ?, Player A's costs will not be revealed until the end of the period.

Each period, there is a 70% chance that the signal will be Player A's cost per unit and a 30% chance that the signal will be ?. So if the experiment were to last an infinite number of periods, the signal would reveal Player A's costs, on average, 70 out of every 100 periods. The signal per period has been determined previously by the experimenters.

Sending a Message

Each period Player A, after receiving a signal and deciding on the number of units to produce, sends Player B a message. The message may be Player A's cost per unit or ?. **If Player A's signal is his or her cost per unit, the message may be the cost per unit or ?**. **If Player A's signal is ?, the message must be ?**. After receiving the message, Player B determines the number of units that he or she will produce. No other communication is permitted between Player A/Player B pairs.

Conducting the Experiment

After the instructions have been completed, you will be assigned a player role. Those assigned the role of Player B will complete the experiment in another room.

At the beginning of each period, the experimenter in each room will shuffle a deck of four cards numbered 1, 2, 3, and 4. One card will be distributed to each participant. **The card received represents your reference number for the period**. The reference numbers will be used to assign Player A/Player B pairs each period. Participants who receive the same numbered card will be paired with each other. For example, a participant taking the role of Player A and receiving a card numbered 2 will be paired with the participant taking the role of Player B and receiving the same numbered card.

Players located in different rooms will be referred to by their reference numbers each period. Thus, you will be unable to identify the person with whom you are paired in a particular period.

At the beginning of each period, Player A will receive a signal: a large index card will be displayed by the experimenter indicating the signal. Subsequently, Player A will decide on the number of units to produce. Player A also will decide on the message to send to Player B. After the signal is displayed, Player A will be provided with a small index card, which will be used to send a message to Player B. The index card will indicate the period and Player A/Player B pairing. An example of the information contained on an index card is shown at the top of the next page.

	Period 6: 4	
<u>Message</u>	<u>B's Production</u>	<u>Price</u>

The above card will be used to send a message in Period 6 from Player A assigned reference number 4 to Player B assigned the same reference number. As explained below, Player B will record his or her production on this card and the experimenter will record the selling price per unit.

Each Player A records the message (either Player A's cost per unit or ?) on the left-hand side of the card. An experimenter will collect the index cards and take them to the room where the Player B pairs are located. The cards will be distributed according to Player A/Player B pairs (i.e., 1, 2, 3, 4). Upon receiving an index card, each Player B will decide on the number of units that he or she is going to produce. This number will be recorded in the middle of the index card. An experimenter will collect the index cards once again and determine the selling price for each Player A/Player B pair.

Specific Instructions

Each period, Player A will be allowed 45 seconds to send a message to Player B. Player A also must decide on the number of units to produce within this time frame. Place your index card face down in front of you after making these decisions.

After collecting the index cards, the experimenter will copy the number of units that you decided to produce.

Player B will be allowed 30 seconds to decide on the number of units to produce. Place your index card face down in front of you after making this decision.

The experimenter will collect the index cards and determine the selling price per unit for each Player A/Player B pair based on the production levels for the pair. The selling price will be recorded on the right-hand side of the index card and returned to Player B. In addition, the experimenter will inform Player B of Player A's cost per unit.

The experimenter in the other room will inform Player A of the selling price. Also, if Player A's signal was ?, the cost per unit will be displayed at this point.

Record Sheet

Two record sheets are included on the last two pages of these materials: one for Player A and one for Player B. You will only use the record sheet that corresponds to your assigned role.

Please refer to the record sheet for Player A. Each period Player A will record his or her reference number in column (2), the signal that is received in column (3), the message that is sent to Player B in column (4), the number of units that are produced in column (5), the selling price per unit in column (6) and the cost per unit in column (7). In column (8), compute your earnings per unit for the period: i.e., your selling price per unit minus your cost per unit. In column (9), compute your total earnings for the period: i.e., your earnings per unit multiplied by the number of units produced. Finally, in column (10), compute your cumulative earnings: i.e., your earnings for the current period plus your cumulative earnings from the prior period. Please note that you are initially provided with an endowment of 30 francs for participating in this experiment.

Now please refer to the record sheet for Player B. Each period Player B will record his or her reference number in column (2), the message that is received from Player A in column (3), the number of units that are produced in column (4), and the selling price per unit in column (5). The cost per unit of 4 is already recorded in column (6) of all rows. In column (7), compute your earnings per unit for the period: i.e., your selling price per unit minus 4. In column (8), compute your total earnings for the period: i.e., your earnings per unit multiplied by the number of units produced. Finally, in column (9), compute your cumulative earnings: i.e., your earnings for the current period plus your cumulative earnings from the prior period. Please note that you are initially provided with an endowment of 30 francs for participating in this experiment.

Examples

At this point, two examples will be provided.

Suppose Player A receives a ? signal. In this case, the message that Player A sends to Player B must be ?. Further suppose that Player A decides to produce 10 units and that Player B decides to produce 1 unit. With a total production of 11 units ($10 + 1$), the selling price will be $20 - 11 = 9$ francs per unit. If Player A's cost is 2 francs per unit, his or her earnings per unit will be $9 - 2 = 7$ francs. Player A's total earnings for the period will be $7 * 10 = 70$ francs. By comparison, Player B's earnings per unit will be $9 - 4 = 5$ francs, and his or her total earnings for the period will be $5 * 1 = 5$ francs.

As another example, suppose that Player A receives a signal of 6 francs per unit. In this case, the message that Player A sends to Player B must be either 6 or ?. Further suppose that Player A decides to produce 1 unit and Player B decides to produce 10 units. With a total production of 11 units ($10 + 1$), the selling price will be $20 - 11 = 9$ francs per unit. Player A's earnings per unit will be $9 - 6 = 3$ francs, and his or her total earnings for the period will be $3 * 1 = 3$ francs. On the other hand, Player B's earnings per unit will be $9 - 4 = 5$, and his or her total earnings for the period will be $5 * 10 = 50$ francs.

Assigning Participants to Groups

At this point, we will assign each of you to a group. Each participant will be provided with a card. One half of the cards contain an even number and the other half contain an odd number. Participants receiving an even-numbered card will be assigned the role of Player A and will complete the experiment in the present room. Participants receiving an odd-numbered card will be assigned the role of Player B and will complete the experiment in another room.

After you are separated into two rooms, it is important that you do not talk among yourselves. Please refrain from talking to other participants throughout the remainder of this experiment.

Are there any questions?

Experimental Code

Player A's Record Sheet

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Period	Reference Number	Signal	Message to Player B	# of Units to Produce	Selling Price	Cost Per Unit	Earnings Per Unit (6)-(7)	Total Earnings (8)*(4)	Cumulative Earnings
Endowment	---	---	---	---	---	---	---	---	30
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									
14									
15									
16									
17									
18									
19									
Earnings in dollars (multiply cumulative earnings by 0.0625)									

Experimental Code

Player B's Record Sheet

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Period	Reference Number	Message from Player A	# of Units to Produce	Selling Price	Cost Per Unit	Earnings Per Unit (5)-(6)	Total Earnings (7)*(4)	Cumulative Earnings
Endowment	---	---	---	---	---	---	---	30
1					4			
2					4			
3					4			
4					4			
5					4			
6					4			
7					4			
8					4			
9					4			
10					4			
11					4			
12					4			
13					4			
14					4			
15					4			
16					4			
17					4			
18					4			
19					4			
Earnings in dollars (multiply your cumulative earnings by 0.0625)								

Experimental Code: _____

Post-Experiment Questionnaire

This questionnaire is designed to collect general information. Such information may help us better understand differences found between participants in this experiment.

1. What year are you in university (e.g., 1st year, 2nd year, 3rd year, 4th year)? _____

2. What department are you in? (e.g., business, economics) _____

3. What is your sex? (check one) male _____ female _____

4. What is your age? (in years) _____

5. How interesting did you find this experiment? (circle the appropriate number)

Not very interesting	-----	-----	-----	-----	-----	-----	Very interesting
	1	2	3	4	5	6	7

6. Compared to the amount of money available to you for daily living expenses, how would you characterize the amount of money earned for participating in this experiment? (circle the appropriate number)

Nominal amount	-----	-----	-----	-----	-----	-----	Considerable amount
	1	2	3	4	5	6	7

7. How would you characterize your attitude toward risk while participating in the market experiment? (**circle the appropriate number**)

Very risk averse	-----	-----	-----	-----	-----	-----	Very risk taking
	1	2	3	4	5	6	7

8. How many economics courses have you completed in university? _____