## Online Appendix

## 1. Instructions ${ }^{1}$

## Introduction

You are about to participate in a decision-making experiment. The experimental session in which you will participate today includes three activities. At the end of the session, you will be paid cash for your participation. Different participants can earn different amounts of money. What you earn will depend on the decisions you make during the experiment as well as the decisions of the other participants.

In this experiment, you will participate in a market. The interaction among the participants (a process of "negotiation" to buy and sell) will take place through the computer terminals against which you are sitting. It is important that you do not speak or otherwise communicate with other participants in this experiment. If you break the rules, we will have to ask you to leave the experiment.

We will begin with a brief description of the experiment, and then we will give more details on how to enter your decisions on the computer.

If you have any questions while we explain in detail the experiment and the software, please raise your hand. If any difficulties arise after the experiment has begun, raise your hand in silence and an attendant will come and help you.

## General description of the experiment

[^0]In today's experiment, participants in the room are divided into groups of eight members each. The experiment consists of three activities.

The first two activities consist of a number of periods in which you are a producer of a fictitious good and must decide how many units of this good to produce. Each unit produced generates an income. So the more units you produce the more income you receive.

You can produce as many units as you want of this fictitious good. However, you need a permit for each unit you produce. Otherwise, you could face a fine. At the beginning of each period, you will receive a number of free permits and during the period, you may buy additional permits or sell permits, as deemed appropriate. Finally, the controller monitors the production permits tenure through inspections and fines.

In the third and final experiment activity today, you must answer a questionnaire.

## Description of the experiment first activity

In the first experiment activity today, you are one of eight participants. The activity is divided into a number of periods of five minutes each. At the beginning of each period, you will receive an initial amount of permits for free. Additionally, you will begin the series of periods that make up the first activity today with an initial capitalization (or cash on hand) of \$E 525 (five hundreds and twenty-five experimental pesos).

During each period, you may:
(1) Produce units of the fictitious good, and
(2) Buy or sell permits in a market for permits.

In each period, you can produce as many units as possible within your capacity. For every unit you produce, you earn a certain amount of money, expressed in "experimental pesos" (\$ E). The more units you produce, the greater your income in \$ E.

However, you must have a permit for each unit of the good that you produce. Otherwise, you could face a fine. To be fined, apart from producing an amount greater than the permissions you have, you must be inspected. You could see on your screen the "probability of being inspected", i.e. the "chance" that you face of being inspected in each period. This value remains fixed throughout the periods.

If you are inspected, the computer will compare the units you decided to produce in that period with the number of permits that you have. If your level of production in that period is greater than the number of permits, you will be fined. The total value of the fine, also in experimental pesos (\$ E), depends on the number of units you produced in excess of the number of permits. The greater the difference between your production level and the number of permits the greater the penalty. If, however, upon inspection, the computer finds that you produced a number of units of th fictitious good that is below or equal to the number of production licenses you own, then you will not be fined.

Finally, if you are not inspected you will not be fined (even if you are producing above the number of licenses you own). This is because you have to be inspected for the computer to see how many units of fictitious good you are producing, and compare them with the amount of permits.

In sum, in each of the periods, you can make money in two ways:

1. Producing units of a fictitious good. For every unit you produce, you will earn a certain amount of money that will be added to your cash balance.
2. Selling permits in the permits market. The sale price received by each of the permits that you sell will be added to your cash balance.

In addition, money is deducted from your balance in cash if:

1. You choose to buy additional permits. The purchase price you pay for each of the permissions that you purchase will be deducted from your cash balance.
2. You are inspected, it is found that the total number of units produced exceeds the number of licenses you own, and you are fined. The total amount of the fine will be deducted from your cash balance.

In short, your net profit for each period is calculated as follows:

+ Revenues from the production of the fictitious good
+ Proceeds from sale of permits
- Expenditure from buying permits
- The corresponding fines, if you produce over the number of permits, and you are inspected
$=$ Total Profit for the period

The total profit of each period is added to your initial capital and profits from previous periods to comprise the accumulated earnings up to that period.

The earnings accumulated in this experimental activity in experimental pesos (\$E) will be converted to Uruguayan pesos (\$U) at an exchange rate of a Uruguayan peso (U.S. \$ 1) for forty experimental pesos (\$ E 40). That is, $\$ \mathrm{E} 40=\$ \mathrm{U} 1$. These gains in Uruguayan pesos will be part of your real earnings that you will receive at the end of experiment.

However, it is important that you keep in mind that in the case where you get negative earnings in a given period, you cannot continue to participate in the activity. In this case you will see a screen like the one shown in Figure 1 below with the message: "Please wait until the experiment continues." You will have to wait for the next task of the experiment sat silently at your post.

## Figure 1



Let's see now how to enter your decisions on the computer.

## Entering your decisions on the computer

On the next page you can see a purely hypothetical example of the main screen you will see during this experiment. The screen is divided into several parts. Here we will explain each of these parts.

## Period

At the top left, where the blue arrow points, you can see the number of the current period of the experiment and the total periods. (See blue arrow in Figure 2). In this hypothetical example, it is reported that you are in period 1 and the total periods is 1 .

Figure 2


## Production Gains

As explained previously, during each period you will have the opportunity to produce units of a fictitious commodity. In the case shown in Figure 3, you can produce a minimum of 1 unit and a maximum of 18 units. For every unit you produce, you earn a certain amount of money in "experimental pesos" (\$ E). Therefore, the more units produced, the greater your income in \$ E. The amount of experimental pesos you get for each unit produced is shown in the left quadrant in the center of your screen. (See Figure 3).

Every unit you produce generates profits automatically. You can think of this as a "sale" of the units you produce to the researcher / experimenter. This "sale" is performed automatically as soon as the production of each unit is completed. We will refer to this income as "Earnings of Production."

Figure 3


See Figure 3. Let's say you decide to produce 3 units. You will receive $\$ \mathrm{E} 18$ for the first unit produced, plus $\$ \mathrm{E} 17$ for the second unit, plus $\$ \mathrm{E} 16$ for the third unit. Total revenues for the three production units are \$E $51(=18+17+16)$.

If you decide to produce a fourth unit you will receive additional \$E 15, and a total of \$E 66 for the four units $(51+15)$.

Note that you may receive a different amount of money for each unit produced.

Remember that these values are hypothetical and may not look anything like the values that you see during the experiment.

## The choice of the number of units to produce

Now that we have shown how to calculate the amount of money you get from the production, we will show how to choose your level of production. This is done as follows. On the screen where the blue arrow points in Figure 4, you can see a cell next to the title "Number of units to produce." In that cell, you must enter the number of units that you decide to produce.

The number of units you can enter must be between 1 and the maximum production capacity, which is 18 in this hypothetical example.

## Fines for non-compliance

On the right side of the screen, you will see another table (see Figure 5). This table tells you the amount of money (in experimental pesos) that you must pay for each unit of production for which you do not have a permit, if inspected.

Figure 4


Figure 5


In this hypothetical example you pay $\$ \mathrm{E} 20$ for the first unit produced without a permit, $\$ \mathrm{E} 20$ for the second, \$ E 20 for the third. As your production capacity is 18 units, this table considers up to 18 units.

The total fine you pay is the sum of the fines for each unit of produced without a permit. An example: Suppose you decide to produce 5 units, and you have three permits. Your deficit is 2 permits. If you are inspected, you will be penalized $\$ 20$ for the first unit missing permit, and $\$ 20$ for the second unit of permits deficit. Therefore, the total fine of a deficit of 2 permits is $\$ 40$. If you are not inspected, you will not be fined.

The probability of being inspected

Immediately above the table of fines, you will see the "probability of being inspected." (see Figure 6 below).

Figure 6


This is a number between zero and one ( 0 and 1 ) indicating the likelihood that you are inspected.
If the number is zero (0), you would never be inspected. If the number is one (1), you would be inspected for sure in each period.

In the hypothetical example of Figure 7 above, the probability of being inspected is 0.74 . This means that you face a $74 \%$ chance of being inspected in each period.

The possibility of being inspected materializes or not according to the following procedure: at the end of each five-minute period, after you and the rest of the subjects participating in the experiment
have decided their level of production and purchase or sell of permits for that period, the computer will produce a random number between zero and one for each of the participants. If the number that the computer throws is less than your "probability of being inspected," then you will be inspected. If the number the computer throws is higher than your "probability of being inspected," you will not be inspected.

You will be informed if you are inspected or not.
If you are inspected, the computer compares the units you decided to produce in that period with the number of licenses that you own at the end of the period.

There are two possible outcomes of the inspection:

1. If your level of production in that period is greater than the number of permits you have at the end of each period, you will be fined.
2. If, however, upon inspection the computer finds that you produced a number of units of the fictitious good that is below or equal to the number of licenses that you own at the end of each period, then you will not be fined.

If you are not inspected you will not be fined even if you produced above the number of licenses you own. This is because you have to be inspected for the computer to see how many units of the fictitious good you produce, and compare it with the number of permits you have in each period.

## Permit Market

This section describes the permits market where you can buy and sell permits.
In the center of the screen, next to the words "number of permits in your possession", you can see the number of permits that you possess at any time during the period. See Figure 7 below. At the
beginning of each period, this amount is equal to the initial free allocation of permits that you receive. During the period, this amount will be updated automatically as you buy / sell permits.

In the Permits Market you can do four things:

1. Make a bid to purchase a permit,
2. Make an ask to sale a permit,
3. Buy a permit at the Selling Price,
4. Sell a permit Buying Price.

Now we will show how to do each of these things.

Suppose that you decide you want to sell one of their permits for $\$ 17$.

To enter your ask to sale, type " 17 " in the cell that is located at the bottom left of the screen, along with the caption "Your selling price." This cell is indicated by a blue arrow in Figure 8.

Figure 7


Figure 8


Then enter the price at which you want to sell, click the red utton located below the cell with the caption "Enter".

When you enter your selling price of $\$ 17$, if there is no lower selling price, your price of $\$ 17$ is shown I the "Selling Price" column (see Figure 9), turning into the selling price of the marketThis information is shown for all subjects that form your group in the experiment.

Figure 9


Suppose know that someone decides to put a bid for a permit for $\$ 10$.
The bids are introduced similarly to the sales offers. To do this, you enter the price at which you want to buy in the cell under the caption "Your buying price" at the bottom right of the screen and click on the red button marked "Submit" (see Figure 10).

This buyer's bid of $\$ 10$ is now shown to the entire market in the "Buying Price" (see Figure 11).
At any time, only the lowest ask and the highest bid will be active in the market. These are the lowest value that you can see in the "Selling Price" column and the highest value that you can see in the "Buying Price" column.

Any bid must be higher than the maximum "Buying Price". Similarly, any ask must be lower than the minimum "Selling Price".

In this hypothetical example, any bid that is higher than $\$ 10$ will become the new buying price.
Any new ask that is lower than $\$ 17$ will become the new selling price.

You can only enter bids or asks in whole numbers (no decimal). Your bids or asks are shown in blue.

Suppose you decide you're willing to accept the buyer's bid of $\$ 10$ for a permit. To sell your permit for this price, click on the 'Sell' button.

Figure 10


Figure 11


Once the exchange is done, the "number of permits in your possession" is automatically updated to reflect this transaction. If the initial allocation of permits in your possession was 4 units, as shown in Figure 11, this amount will now be 3 units since you sold a permit. Keep attention on this cell because it is not always obvious when you close a transaction.

Finally, the price of \$ 10 will appear in the middle column under "transaction prices". This column shows the price history at which permits were traded during the period.

After exchange occurs the selling price and the buying price go back to zero and the price negotiation process begins again. In other words, one permit at a time is traded in the market.

## Time left

At the top right of the screen, where the blue arrow points in Figure 12 (see below), you can see the remaining time, in seconds, for the end of the period. In this hypothetical example illustrated in Figure 12, you are left with 291 seconds to decide the number of units that will produce.


In each period of the activity, you will have a total of 5 minutes ( 300 seconds) to make your decisions. Once past the 300 seconds, the timer will stop at 0 and below the timer a warning in red will appear, flashing, that will tell you to finish the decision making.

Once you have decided how many units to produce and how many permits to buy / sell, you must press the red button marked "Continue", located below the screen to move to the next stage of the experiment.

## Revenue in the period

After the inspection stage is complete, you will receive a summary of your income for the period. This summary is provided in a new screen that opens when you press the "Continue" button. A hypothetical example of this screen is shown below in Figure 13.

Figure 13


This second screen has two parts. In the center of the screen, it tells you:
(A) the number of units you decided to produce in the period (to the right of the words "Production"),
(B) The number of permits you possess at the end of the period (to the right of the caption "Permits"),
(C) The results for this period of the random process (described above) by which the computer decides whether you are inspected or not (to the right of the caption "Were you inspected?" And (D) The number of permits you hold below your production level and for which you are fined, if you are fined in the period (to the right of the caption "Fines"), and
(D) Your profit in the period in experimental pesos.

In the hypothetical example shown in Figure 13 above, you produced 5 units, had 4 permits, were inspected and fined for one permit. Your profit in the period was $\$ 60 \mathrm{E}$.

Further down in the same Figure 13, you can see a table. This table tells, for the last period (and earlier): the number of the period, the level of production, the benefits of the period and finally, the accumulated profits up to that period.

In the first period, the accumulated profits differ from profits in the first period in an amount equal to the initial working capital with which you began the experiment (in the hypothetical example of Figure 13, in the first period earnings were E \$ 60, but its benefits are accrued \$ E 110 , the sum of $\$ 60$ plus a working capital of $\$ 50)$.

Finally, this screen will be active for a period of 25 seconds, after which it automatically closes and the main screen where you must choose the level of production and the number of licenses you want to own opens again and the next period begins.

This process is repeated for a certain number of periods.

Your "Earnings per Production", the initial amount of permits at the beginning of the period, the "probability of being inspected," and the amount of "fines for permit deficits" are constant during all periods.

Calculator, pen and paper
In case you need it, we have provided you with a calculator, two sheets of paper and a pencil. We have reached the end of the explanation of the first activity of the experiment. We summarize the key aspects of it.

Summary of the first activity of the experiment

- The first activity of the experiment is a series of periods in each of which you must decide how many units of a good fictional produce.
- For every unit you produce, you will earn a certain amount of money, expressed in "experimental pesos" (\$ E). The more units you produce, the higher your profits.
- The table "Earnings per production" tells you how much you will earn per unit produced.
- You can produce as many units as you want, regardless of the number of licenses you own, but you could face a fine if you do not have a permit for each unit produced.
- You will be given the opportunity to buy and / or sell permits in the permits market.
- Once you and the other individuals involved in this experiment decide how much to produce in the period and how many permits to possess, the computer produces a random number to decide whether or not you will be inspected. To be inspected the number between 0 and 1 randomly generated by the computer must be less than the "probability of being inspected" that you see on your screen.
- If are inspected and produced more units than the number of permits held, you will be fined under according to the fines table that you can see at the right of your monitor.
- If you are inspected and produced less or an amount equal to the number of permits in your possession, you will not be fined.
- You will not be fined if you are not inspected.
- Your net profit for each period is calculated as follows:
+ Revenues from the production of the fictitious good
+ Proceeds from the selling of permits
- Expenditures for buying permits
- The corresponding fines, if you produce over the number of permits, and you are inspected
$=$ Total Profit for the period
- The earnings of each period are added to the working capital and earnings of prior periods to comprise the earnings accumulated up to that period.
- The earnings accumulated in this activity expressed in experimental pesos (\$ E) will be converted to Uruguayan pesos $(\$ \mathrm{U})$ at an exchange rate of a Uruguayan peso (U.S. \$ 1) for each experimental forty dollars (\$E40). That is, $\$ \mathrm{E} \$ 40=\mathrm{U} 1$. These gains in Uruguayan pesos were part of your actual earnings paid to you at the end of experiment.

We reviewed all components of the first activity of the experiment. If you have a question, please do so at this time, otherwise it will start the first activity.

## A2.1.2 Second experiment activity

We will now explain the second experimental activity.

The second activity of the experiment is exactly equal to the first activity, except that the second activity you may face different values of the following variables:

- "probability of being inspected"
- "The initial amount of permits you receive for free"

Gains derived in this second experimental activity will accumulate to determine the total amount of cash (Uruguayan pesos) that you will be paid after completion of all the experimental activities.

If you have a question, please do so at this time, otherwise it will start the second activity.

## A2.1.3 Third experiment activity

The third activity of the experiment consists of answering a questionnaire.
Some of these questions involve additional decisions by which you can also make money.

## A2.2 End of Experiment

Upon completion of the questionnaire, a screen will tell you the amount of total earnings in the experiment in Uruguayan pesos. We will tell you how to proceed to collect the money immediately.

We have completed the explanation of the fourth experimental activity. If you have a question, please do so at this time, otherwise we will start the fourth activity.

## 2. Questionnaire of eliciting the participant's risk preferences

The following instructions were read to participants:
At this point we will ask you to choose between two options (option A and option B) 10 times.
These options differ in the following manner:
Option A: always pays 800
Option B: it has two possible payments, a HIGH payment (1300) and a LOW payment (300).

The definition of whether option B pays the HIGH or LOW payment will be randomly determined by drawing a ball from an urn with 10 balls. Once all participants have finished this questionnaire, one of you is going to be selected randomly to get paid the correspondent amount according to the answers to this point. The payment will be determined in the following way: once the subject is selected, one of the ten games will be selected randomly and the person will be paid according to the decision made in that game. For example, if you are the selected person and the lottery selected is number 2, you will be paid 800 if you chose option A, and if you chose option B we will draw a ball from the urn. If the number of the ball ranges from 1 to 8, we will pay you 300, and if the number is 9 or 10 we will pay you 1300 .

For the next following games please choose option A or B.
$\left.\begin{array}{|l|l|l|}\hline \text { Game 1 } & \begin{array}{l}\text { Option A } \\ \$ 800\end{array} & \begin{array}{l}\text { Option B } \\ 300 \$-\text { If the number drawn ranges from } 1 \text { to } 9 \\ \$ 1.300 \text { if the number is } 10\end{array} \\ \hline \text { Game 2 } & \begin{array}{l}\text { Option A } \\ \$ 800\end{array} & \begin{array}{l}\text { Option B } \\ \$ 300-\text { If the number drawn ranges from } 1 \text { to } 8 \\ \$ 1.300 \text { if the number is } 9 \text { or } 10\end{array} \\ \hline \text { Game 3 } & \begin{array}{l}\text { Option A } \\ \$ 800\end{array} & \begin{array}{l}\text { Option B } \\ \$ 300-\text { If the number drawn ranges from } 1 \text { to } 7 \\ \$ 1.300 \text { if the number ranges from } 8 \text { to } 10\end{array} \\ \hline \text { Game 4 } & \begin{array}{l}\text { Option A } \\ \$ 800\end{array} & \begin{array}{l}\text { Option B } \\ \$ 300-\text { If the number drawn ranges from } 1 \text { y } 6 \\ \$ 1.300 \text { if the number ranges from } 7 \text { to } 10\end{array} \\ \hline \text { Game 5 } & \begin{array}{l}\text { Option A } \\ \$ 800\end{array} & \begin{array}{l}\text { Option B } \\ \$ 300-\text { If the number drawn ranges from } 1 \text { y } 5 \\ \$ 1.300 \text { if the number ranges from } 6 \text { to } 10\end{array} \\ \hline \text { Game 6 } & \begin{array}{l}\text { Option A } \\ \$ 800\end{array} & \begin{array}{l}\text { Option B } \\ \$ 300-\text { If the number drawn ranges from } 1 \text { y } 4 \\ \$ 1.300 \text { if the number ranges from } 5 \text { to } 10\end{array} \\ \hline \text { Game 7 } & \begin{array}{l}\text { Option A } \\ \$ 800\end{array} & \begin{array}{l}\text { Option B } \\ \$ 300-\text { If the number drawn ranges from } 1 \text { y } 3 \\ \$ 1.300 \text { if the number ranges from } 4 \text { to } 10\end{array} \\ \hline \text { Game 9 } & \begin{array}{l}\text { Option A } \\ \$ 800\end{array} & \begin{array}{l}\text { Option B } \\ \$ 300-\text { If the number drawn ranges from } 1 \\ \$ 1.300 \text { if the number ranges from } 2 \text { to } 10\end{array} \\ \hline \text { Game 8 } & \begin{array}{l}\text { Option A } \\ \$ 800\end{array} & \begin{array}{l}\text { Option B } \\ \$ 300-\text { If the number drawn ranges from } 1 \text { y } 2 \\ \$ 1.300 \text { if the number ranges from } 3 \text { to } 10\end{array} \\ \hline \$ 800\end{array} \begin{array}{l}\text { Option B } \\ \$ 1.300 \text { if the number ranges from } 1 \text { to } 10\end{array}\right\}$


[^0]:    ${ }^{1}$ We thank Jim Murphy and John Stranlund for supplying their set of instructions for (Murphy and Stranlund 2006), on which this set is built on.

