**General Instructions**

**General Information:**

The purpose of this experiment is to study how people make decisions in an environment in which there is a shared resource that may be competitively produced while also be produced in a way that benefits all. From now and until the end of the experiment any verbal or written communications with other participants is not permitted. If you have a question, please wait until all instructions have been read. If you have a question after the instructions have been read, please raise your hand and the experimenter will be with you as soon as available.

You will receive $7.00 for showing up on time for the experiment. In addition, you will have an opportunity to earn more money during the experiment. All currency in this experiment will be denominated in Experimental Currency Units (ECU’s). At the end of the experiment, those ECU’s will be translated into U.S. currency at the rate of 180 (ECUs)= $1.00. At the end of the experiment you will be paid, in cash, the sum of your show-up fee and earnings from the experiment. You will be paid privately and we will not disclose any identifiable information about your decisions or payment to other participants in the experiment. For ease of payment, all earnings will be rounded up to the nearest quarter to keep loose change to a minimum.

**Groups and Rounds:**

Today, you will be placed into a group with 3 other participants. The decisions of the groups are completely independent in each round. That is to say, nothing Group 1 does will affect the other groups at any point of the experiment, and vice versa.

Today’s experiment will consist of 20 independent “*rounds”,* each lasting no longer than 3 minutes. These *rounds* are the screens where you will be making decisions that will be described in the next section. Once again, independent here means that any decision made in one *round* will not affect what happens in any other *round.* You will not be able to see the *individual* decisions of your fellow group members, however at the end of each round you will see the overall outcome for your group, as well as your earnings from that specific round.

At the end of the experiment, after the 20th *round* you will see a payoff screen that tells you how many ECU’s you have earned from each round, and what your final total payoff is in U.S. currency.

**Description of Decisions, Accounts, and Payoffs:**

*Decisions:* In each round, you and your group will be tasked with making investment decisions in three different accounts: a *production account*, a *public account*, and a *private account.*

Each of you will be given an endowment of 11 tokens for each round to use as a budget. These tokens are what you will use to invest in each of the three accounts. When you invest your tokens, the computer will tally up your and your group members’ investments and convert your tokens into an ECU payment. You **cannot** exceed this budget. If you attempt to invest more than 11 tokens, the computer will give you a message box reminding you of this constraint.

*Production Account:* The production account is an account where you and your group may invest your tokens to produce a pile of ECUs, that will be split amongst you and your group according to how much you invested relative to the rest of your group. Mathematically, the return on this account is equal to:

The return on investment from the production account is also described in **Table 2**. The columns of table 2 show your return for the production account based on how many tokens you invest, while the rows show your return based on how many tokens the rest of your group invests. For example, column 3 row 9 shows you how much you would earn from this account if you invest 3 tokens and the other 3 members of your group invest a total of 9 tokens to the production account.

*Public Account:* The public account is an account where you and your group may donate your tokens to produce ECUs for **everyone in your group**. Each token donated to the public account will increase your group’s earnings by 2 ECUs. Mathematically this is equivalent to:

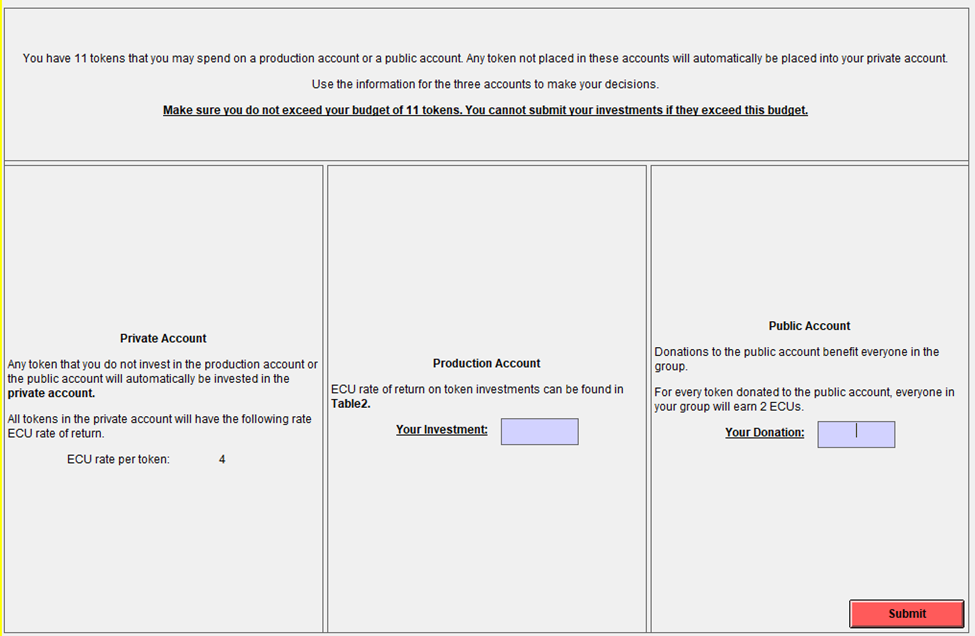
.

This means every token that is donated benefits the group as a whole. Every token I donate to the public account increases my earnings by 2 ECUs, and also increases my group members’ earnings by 2 ECUs as well.

*Private Account:* The private account is an account where you can save any tokens you would not like to invest in either the production account or public account. As the name suggests, the private account is entirely private, therefore any token you save will go towards your earnings alone. Each token that is saved in the private account will be converted into 4 ECUs at the end of the round. So, if I were to save 5 of my 11 tokens, then I would earn 20 ECUs from the private account at the end of the round.

You do not actively place tokens in the private account. From your budget of 11 tokens, your private account savings are simply determined to be however many of the 11 tokens you have not placed in either the production or public accounts. As an example, suppose I invest 4 tokens in the production account, and donate 2 tokens towards the public account. My private account savings would then be calculated based on my leftover tokens, i.e. the 5 tokens I have not invested or donated.

Because any token not invested or donated into the production or public accounts is automatically placed in the private account, if you choose to not invest or donate any tokens, your entire endowment will automatically be saved in the private account. Similarly, if you do not submit your investment decisions within the 3-minute time period, your entire endowment will be placed in the private account as well. Even if you have typed some investment decisions into the account boxes, if you do not hit the submit button in the lower right corner of the screen, your entire endowment will go to the private account.



**Account Spillovers**:

In each round, there will be *spillovers* between the production and public accounts based on your investment decisions. These spillovers are triggered if and only if your group’s investment decisions in either account exceed a certain threshold. These spillovers are effects from one account that affects another, i.e., production account influencing the public account and vice versa.

*Production spillovers*: If your group’s token investment in the production account exceeds a total of 14 tokens, then any additional token invested in the production account will reduce the public account balance by 1 token.

For example, suppose my group’s investment in the production account is 15 tokens. With the threshold of 14 tokens, that means the 15th token that is spent, reduces the balance of tokens we’ve donated to the public account by 1.

Keep in mind, this also means that the public account can turn negative depending on how much you invest in the production and public accounts.

*Public spillovers:* If your group’s public account balance is at least 14 tokens, then the production account will become more productive.

The new production function that is applied when this spillover is triggered is:

The return on your investment on this more productive account can be found in **Table 3**. This table can be read in the same way as table 2. As you can see in table 3, each cell has a higher payoff than the corresponding cell from table 2.

Keep in mind how these spillovers are defined. While the public account spillover makes the production account more productive, the production account spillover reduces how many tokens are in the public account. This means that for every token invested in the production account beyond the threshold of 14, you will need an additional token invested in the public account to trigger the public account spillover.

An example of this, suppose my group has chosen to donate exactly 14 tokens in the public account and 15 tokens in the production account. Because we exceeded the production account threshold by 1 token, this means the tokens in the public account decrease by 1, due to the spillover from the production account. This means we will need yet another additional token donated to the public account in order to trigger the public account’s spillover.

**Production Account Licenses:**

For rounds 1-10 today only, two people in each group will receive licenses for the production account. These licenses determine whether or not you may invest in the production account. If you are not one of these two group members that have a license, for rounds 1-10 you will not be allowed to invest in or earn ECUs from the production account. You will know you did not receive a license if the production account box does not appear on your computer screen for rounds 1-10.

The two members that do receive licenses for the production account will have the exclusive ability to invest in and earn ECUs from the production account. However, these licenses also have an investment cap. Each of the members with a production account license cannot invest more than 7 of their own tokens in the production account per round.

There will be no difference to the private account or the public account in rounds 1 through 10 today. The production account licenses only apply to investment in the production account, and do not place any limits on the other two accounts. Subject to your constraint of 11 tokens, you may invest however many tokens you wish in the public account or private account, regardless of whether or not you have one of the production account licenses.

After game 10, there will no longer be any production account licenses. This means all four members of your group may invest in the production account, and there will no longer be a cap on investment to the production account. Each group member may invest any amount of tokens in any account, subject to their 11 token budget.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | **Your tokens invested in production account** | | | | | | | | | | | |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| **Tokens invested by group members in production account** | 0 | 0 | 13.5 | 26 | 37.5 | 48 | 57.5 | 66 | 73.5 | 80 | 85.5 | 90 | 93.5 |
| 1 | 0 | 13 | 25 | 36 | 46 | 55 | 63 | 70 | 76 | 81 | 85 | 88 |
| 2 | 0 | 12.5 | 24 | 34.5 | 44 | 52.5 | 60 | 66.5 | 72 | 76.5 | 80 | 82.5 |
| 3 | 0 | 12 | 23 | 33 | 42 | 50 | 57 | 63 | 68 | 72 | 75 | 77 |
| 4 | 0 | 11.5 | 22 | 31.5 | 40 | 47.5 | 54 | 59.5 | 64 | 67.5 | 70 | 71.5 |
| 5 | 0 | 11 | 21 | 30 | 38 | 45 | 51 | 56 | 60 | 63 | 65 | 66 |
| 6 | 0 | 10.5 | 20 | 28.5 | 36 | 42.5 | 48 | 52.5 | 56 | 58.5 | 60 | 60.5 |
| 7 | 0 | 10 | 19 | 27 | 34 | 40 | 45 | 49 | 52 | 54 | 55 | 55 |
| 8 | 0 | 9.5 | 18 | 25.5 | 32 | 37.5 | 42 | 45.5 | 48 | 49.5 | 50 | 49.5 |
| 9 | 0 | 9 | 17 | 24 | 30 | 35 | 39 | 42 | 44 | 45 | 45 | 44 |
| 10 | 0 | 8.5 | 16 | 22.5 | 28 | 32.5 | 36 | 38.5 | 40 | 40.5 | 40 | 38.5 |
| 11 | 0 | 8 | 15 | 21 | 26 | 30 | 33 | 35 | 36 | 36 | 35 | 33 |
| 12 | 0 | 7.5 | 14 | 19.5 | 24 | 27.5 | 30 | 31.5 | 32 | 31.5 | 30 | 27.5 |
| 13 | 0 | 7 | 13 | 18 | 22 | 25 | 27 | 28 | 28 | 27 | 25 | 22 |
| 14 | 0 | 6.5 | 12 | 16.5 | 20 | 22.5 | 24 | 24.5 | 24 | 22.5 | 20 | 16.5 |
| 15 | 0 | 6 | 11 | 15 | 18 | 20 | 21 | 21 | 20 | 18 | 15 | 11 |
| 16 | 0 | 5.5 | 10 | 13.5 | 16 | 17.5 | 18 | 17.5 | 16 | 13.5 | 10 | 5.5 |
| 17 | 0 | 5 | 9 | 12 | 14 | 15 | 15 | 14 | 12 | 9 | 5 | 0 |
| 18 | 0 | 4.5 | 8 | 10.5 | 12 | 12.5 | 12 | 10.5 | 8 | 4.5 | 0 | 0 |
| 19 | 0 | 4 | 7 | 9 | 10 | 10 | 9 | 7 | 4 | 0 | 0 | 0 |
| 20 | 0 | 3.5 | 6 | 7.5 | 8 | 7.5 | 6 | 3.5 | 0 | 0 | 0 | 0 |
| 21 | 0 | 3 | 5 | 6 | 6 | 5 | 3 | 0 | 0 | 0 | 0 | 0 |
| 22 | 0 | 2.5 | 4 | 4.5 | 4 | 2.5 | 0 | 0 | 0 | 0 | 0 | 0 |
| 23 | 0 | 2 | 3 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 24 | 0 | 1.5 | 2 | 1.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 25 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 26 | 0 | 0.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 27 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 28 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 31 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 32 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 33 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

**Table 2: Baseline ECU Earnings From Production Account Based on Tokens Invested.**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | | **Your tokens invested in production account** | | | | | | | | | | | |
| 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
| **Tokens invested by group members in production account** | 0 | 0 | 23.2 | 44.8 | 64.8 | 83.2 | 100 | 115.2 | 128.8 | 140.8 | 151.2 | 160 | 167.2 |
| 1 | 0 | 22.4 | 43.2 | 62.4 | 80 | 96 | 110.4 | 123.2 | 134.4 | 144 | 152 | 158.4 |
| 2 | 0 | 21.6 | 41.6 | 60 | 76.8 | 92 | 105.6 | 117.6 | 128 | 136.8 | 144 | 149.6 |
| 3 | 0 | 20.8 | 40 | 57.6 | 73.6 | 88 | 100.8 | 112 | 121.6 | 129.6 | 136 | 140.8 |
| 4 | 0 | 20 | 38.4 | 55.2 | 70.4 | 84 | 96 | 106.4 | 115.2 | 122.4 | 128 | 132 |
| 5 | 0 | 19.2 | 36.8 | 52.8 | 67.2 | 80 | 91.2 | 100.8 | 108.8 | 115.2 | 120 | 123.2 |
| 6 | 0 | 18.4 | 35.2 | 50.4 | 64 | 76 | 86.4 | 95.2 | 102.4 | 108 | 112 | 114.4 |
| 7 | 0 | 17.6 | 33.6 | 48 | 60.8 | 72 | 81.6 | 89.6 | 96 | 100.8 | 104 | 105.6 |
| 8 | 0 | 16.8 | 32 | 45.6 | 57.6 | 68 | 76.8 | 84 | 89.6 | 93.6 | 96 | 96.8 |
| 9 | 0 | 16 | 30.4 | 43.2 | 54.4 | 64 | 72 | 78.4 | 83.2 | 86.4 | 88 | 88 |
| 10 | 0 | 15.2 | 28.8 | 40.8 | 51.2 | 60 | 67.2 | 72.8 | 76.8 | 79.2 | 80 | 79.2 |
| 11 | 0 | 14.4 | 27.2 | 38.4 | 48 | 56 | 62.4 | 67.2 | 70.4 | 72 | 72 | 70.4 |
| 12 | 0 | 13.6 | 25.6 | 36 | 44.8 | 52 | 57.6 | 61.6 | 64 | 64.8 | 64 | 61.6 |
| 13 | 0 | 12.8 | 24 | 33.6 | 41.6 | 48 | 52.8 | 56 | 57.6 | 57.6 | 56 | 52.8 |
| 14 | 0 | 12 | 22.4 | 31.2 | 38.4 | 44 | 48 | 50.4 | 51.2 | 50.4 | 48 | 44 |
| 15 | 0 | 11.2 | 20.8 | 28.8 | 35.2 | 40 | 43.2 | 44.8 | 44.8 | 43.2 | 40 | 35.2 |
| 16 | 0 | 10.4 | 19.2 | 26.4 | 32 | 36 | 38.4 | 39.2 | 38.4 | 36 | 32 | 26.4 |
| 17 | 0 | 9.6 | 17.6 | 24 | 28.8 | 32 | 33.6 | 33.6 | 32 | 28.8 | 24 | 17.6 |
| 18 | 0 | 8.8 | 16 | 21.6 | 25.6 | 28 | 28.8 | 28 | 25.6 | 21.6 | 16 | 8.8 |
| 19 | 0 | 8 | 14.4 | 19.2 | 22.4 | 24 | 24 | 22.4 | 19.2 | 14.4 | 8 | 0 |
| 20 | 0 | 7.2 | 12.8 | 16.8 | 19.2 | 20 | 19.2 | 16.8 | 12.8 | 7.2 | 0 | 0 |
| 21 | 0 | 6.4 | 11.2 | 14.4 | 16 | 16 | 14.4 | 11.2 | 6.4 | 0 | 0 | 0 |
| 22 | 0 | 5.6 | 9.6 | 12 | 12.8 | 12 | 9.6 | 5.6 | 0 | 0 | 0 | 0 |
| 23 | 0 | 4.8 | 8 | 9.6 | 9.6 | 8 | 4.8 | 0 | 0 | 0 | 0 | 0 |
| 24 | 0 | 4 | 6.4 | 7.2 | 6.4 | 4 | 0 | 0 | 0 | 0 | 0 | 0 |
| 25 | 0 | 3.2 | 4.8 | 4.8 | 3.2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 26 | 0 | 2.4 | 3.2 | 2.4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 27 | 0 | 1.6 | 1.6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 28 | 0 | 0.8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 29 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 31 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 32 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 33 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

**Table 3: ECU Earnings From Production Account Based on Tokens Invested with Spillover.**