

## Economics Games - The IO Game

Welcome to the IO Game

### The Tutorial

First, start by playing the tutorial for about 20 minutes (click on « the tutorial » on this page: <https://lud.io/io> . You will also find the companion document of the tutorial here: <https://lud.io/resources/site/manual/io-economics-game-tutorial.pdf> . Be careful, there are other tutorials on other pages). It is only intended to introduce you to the structure and interface of the game, do not spend too much time thinking about your best strategies (and anyway the robots of the tutorial are not particularly smart competitors).

Just make sure that you have tried a “volume based strategy” (producing a lot and selling at a very low price) before the real game: This strategy does not perform well in this game.

### The Game

You are divided into 4 teams (you + 3 robots), that will compete on 6 completely separate markets.

#### Demand

Demand is identical from one market to another and is the same as in the tutorial. If every firm chooses the same price, then each firms will sell about:

|            |      |      |      |      |      |     |     |     |     |
|------------|------|------|------|------|------|-----|-----|-----|-----|
| Price      | 30   | 40   | 50   | 60   | 70   | 80  | 90  | 100 | 110 |
| Sales/firm | 1389 | 1280 | 1183 | 1096 | 1016 | 941 | 869 | 804 | 741 |

|            |     |     |     |     |     |     |     |     |     |
|------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Price      | 120 | 130 | 140 | 150 | 160 | 170 | 180 | 190 | 200 |
| Sales/firm | 680 | 622 | 566 | 512 | 461 | 409 | 361 | 313 | 267 |

Of course, your sales will depend on the price that is set by your competitors, which in practice will not be equal to yours, but this table can still be helpful to get an idea of how much potential customers are willing to pay for the products.

#### Costs

The technologies have the same cost structure as in the tutorial. In the beginning, techno S is not available, and an alternative technology, techno Palter, is available, but only on market 5.

| Technology    | Techno specific fixed cost (by round), $F_T$ | Unit production cost, $c_1$ | Unit distribution cost), $c_2$ | CO2 emissions (tons) per good produced |
|---------------|--|-----------------------------|--------------------------------|--|
| Techno P      | €0   | €52                         | €7                             | 0.11                                   |
| Techno S      | €0   | €15                         | €51                            | 0.11                                   |
| Techno Palter | €38000                                       | €10                         | €1                             | 0.11                                   |

Also, as in the tutorial, you will have to pay about  $F=8000\text{€}$  of fixed cost par market **each round**. You can avoid these costs only if you decide to leave a market (i.e. if you produce 0 goods).

### Different markets

The 6 markets will be slightly different from one another

- On **market 5**, as said before, an **alternative technology** is available
- On **market 4**, there is an **additional fixed cost** equal to  $\text{€}20000$  by round. Which means that on this market, if you produce something, you will have to pay  $\text{€}28000$  by round, whatever the quantity produced. Therefore, each round, your cost on this market will be  $28000+52.Q_p+7.Q_s$  instead of  $8000+52.Q_p+7.Q_s$  (and  $\text{€}0$  if you do not produce anything).
- **Market 6** is a bit special: You can produce a **maximum of 500 goods** each round (New environmental regulations limit your  $\text{CO}_2$  emissions to a maximum of 55 tons by round).

Finally, on each market, your shareholders allow you to invest up to  $\text{€}80000$  by round (For example, if you use techno P, your "investment cost" is  $52.Q_p$ , and must be lower than  $\text{€}80000$ . If you use techno Palter, your "investment cost" is  $38000+10.Q_p$ ). If you select too much production, the game will ask you to change your decision. (Be careful, you have probably seen in the tutorial that it is extremely difficult to sell 1400 goods by round: Consequently, the investment constraint imposed by your shareholder is not very stringent).

Your goal is to **maximize your firm's profit**.

### Login

To connect to the game, go to <https://lud.io/login> .

You will be able to change your password and your login, along with your team name, once connected (please note that your login and your team name are not the same).

<https://lud.io>

IO games

CO2 Emissions and Environmental Policy game

Air Transport Economics game

Energy Economics game

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# The game scenario

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## Game Scenario

Here is the scenario of the game.

Year 1 and 2

- Techno Palter is available on market 5
- 20000€ extra fixed cost on market 4
- Maximum production of 500 by round on market 6

Year 3 and 4

- Techno Palter is available on market 5.
- 20000€ extra fixed cost on market 4.
- Maximum production of 500 by round on market 6.
- 25€ unit tax on market 2
- 25€ Unit tax per good produced over 700, 25€ unit subsidy per good not produced below 700, on market 3.

Year 5

- All markets are reset (no tax, no subsidy, no techno Palter, no max quantity, no extra fixed cost).
- Techno S becomes the only available technology on even-numbered markets, Techno P is the only available technology on odd-numbered markets.
- There will be a crisis on one even-numbered market and on one odd-numbered market, and players only know which markets, after they have chosen their production (but before choosing their price).

Year 6

- Techno S and Techno P are available on all markets.
- The crisis continues on the 2 markets.
- A new, additional, robot competitor enters on one of the other markets.
- On another market (named "production precommitment"), your competitors rush to invest and produce before you. When you select your production level, they have already made their decision and can not change it. On this market, each of your 3 competitors will produce 1100 units with techno P.
- Slight change of the consumers' preferences on another market (Quantity demanded at the theoretical equilibrium price of the standard markets stays the same but demand gets less price-elastic).