COORDINATION GAME: INVESTMENT

STUDENT INSTRUCTIONS

You will be put into groups of two and assigned as either a red player (the red player 🔴) or a green player (the green player 🟢). You will both simultaneously decide whether to invest or not. Your return on investment depends on the decision taken by the other player as shown in the matrix in Figure A.

Rows show the available options for the red player 🔴, and columns the available options for the green player 🟢. The cells show the respective payoffs for both players according to their decision. For example, in the first row and first column you can find the payoffs if both invest. The following combinations are possible:

- If the red player 🔴 and the green player 🟢 both invest, both get 10.
- If the red player 🔴 and the green player 🟢 both do not invest, both get 5.

		🟢	
		Invest	Do not invest
🔴	Invest	🟢 10 / 🔴 10	🟢 5 / 🔴 0
	Do not invest	🟢 0 / 🔴 5	🟢 5 / 🔴 5

Figure A Matrix summarizing the payoffs.

- If the red player 🔴 invests, but the green player 🟢 does not, the red player 🔴 gets 0 and the green player 🟢 gets 5.
- If the red player 🔴 does not invest, but the green player 🟢 does, the red player 🔴 gets 5 and the green player 🟢 gets 0.

Once the experiment has been started, the decision screen appears on your device (see Figure B for an example). In the top row, you can see whether you are the red player 🔴 or the green player 🟢. You can make your decision by pressing the button 'Invest' or 'Do not invest'. The decision is executed immediately so think carefully before making your decision.

Once all participants have made their decision, the instructor ends the experiment and the feedback is shown on your screen. Figure C shows an example.

In Figure C, you can see your decision in the first row (for example, here 'Do not invest') together with your payoff. In the second row, you can see the decision and the respective payoff of the other player.

How to interpret the payoffs

Here we provide some information on how to interpret the payoffs, but you can skip this information as it is not necessary to play the game.

The payoffs in the game can be justified by thinking of two firms who want to invest into a new technology that will only be successful if both firms invest. Otherwise there will not be enough demand for the new product nor will it be worth building up the infrastructure to deploy the products. They have an endowment of 5. If only one firm invests but the other does not, the product is not successful and the firm who invested loses its endowment. The firm therefore ends up with a payoff of 0. The firm who did not invest keeps its original endowment of 5. The same is true if they both keep their endowment.

Figure B Decision screen

Figure C Example of a feedback screen when no player invests.

HOMEWORK QUESTIONS

1. Explain the following concepts, referring to your experience from the game played in class:
   (a) Multiple equilibria in a coordination game.
   (b) How the attractiveness of investments depends on the investments of others.
   (c) The role of expectations in decision making.
2. Your instructor shared with you the results for the investment game that you played.
   (a) What equilibria are there in the game? How do expectations regarding the other player's decision affect one's own investment decision?
   (b) In the lecture, the participants were given private information. This information does not change the payoffs in the game. Nevertheless, it turns out that investments are more frequent in some circumstances. Explain this result. How can the results help to explain that investments are volatile in an economy?
   (c) Critically discuss the fact that the game has been run in your home country.
3. Figure D (Figure 13.17 from *The Economy*) shows the payoffs in an investment game.
   (a) Explain how the payoffs in the game relate to the investment decisions of two firms.
   (b) What are the Nash equilibria in the game? Define the concept of Nash equilibrium as well. How do expectations regarding the other player's decision affect one's own investment decision?
   (c) Given your experience of the game in class, how would the theoretical solution differ from the expected outcome if the game were played by students?
   (d) Imagine the game is played with a value of 10 instead of the -40. What changes do you expect in the behaviour of participants? Why?
   (e) Describe other factors, besides the investment decision of other firms, that investment decisions are based on.

		B's profit	
		B invests	B does not invest
A's profit	A invests	100 / 100	80 / −40
	A does not invest	−40 / 80	10 / 10

Figure D Figure 13.17 from *The Economy*, showing payoffs in a coordination game.

4. Think back to the investment game that you played in class.
   (a) What factors can help to stabilize investment decisions within a country?
   (b) What is the role of the government and of industrial representatives here?

FURTHER READING

- Akerlof, G. and Shiller, R.J. *Animal spirits: How human psychology drives the economy, and why it matters for global capitalism*. 9th edition. Princeton University Press, 2010, pp. 131-148.
- Barrera, C. *Blockchain and Coordination Games: Failures and Focal Points* (https://tinyco.re/8746523). 2018.
- CORE *The Economy*, Sections 13.7 (https://tinyco.re/5485622), 4.13 (https://tinyco.re/6452011) and 21.3 (https://tinyco.re/5552366).
- CORE *Economy, Society, and Public Policy*, Section 2.12 (https://tinyco.re/2365588).
- Mielke, J. and Steudle, G.A. *Green Investment and Coordination Failure: An Investors' Perspective*, Ecological Economics, 150, 2018, pp. 88-95.
- Soskice, D. and Carlin, W. *Macroeconomics: Institutions, Instability, and the Financial System*. Oxford University Press, 2014, pp. 29-32.