

Problem Set 3 (Due October 7, 2021)

1. This exercise contains three excerpts from a British quiz show called Golden Balls. After each clip, you are asked to use the game theoretical tools you learned in Lectures 4-5 to analyze the situations. you should listen carefully to what the contestants say in. the videos (apologies for the poor sound quality in some of them). At the end of this exercise you will also be asked to listen to a short interview and then answer some questions.
 - (a) Watch this **video clip 1** until 2:20 Draw the game between Lucy and Tony as a game matrix when Lucy and Tony care only about money. Continue next until the end of the clip. Based on their words and decisions, what do you think about their real preferences?
 - (b) In the second excerpt, Sarah and Steve have collected GBP 100 000 in the pot. This **link** takes you to the point where Sarah and Steve start talking. If you want, you can rewind to see the introduction to the game again. What do you conclude about Sarah's and Steve's preferences?
 - (c) In the last excerpt, Ibrahim and Nick play for GBP 13 600. This **video** begins at the point where Ibrahim and Nick start talking. One way to interpret what is going on is that Nick wants to convince Ibrahim that part of the game matrix is no longer relevant. How would this affect Ibrahim's optimal strategy?
 - (d) The last part of the exercise is to listen to an **interview** of Ibrahim and Nick. Start listening at 13:25. Based on all the evidence, comment on what you learn from the case with Ibrahim and Nick.

2. Common-pool problems arise in resource economics. Here is a simple example of such situations. A (small) village consisting of ten families is surrounded by pastureland. The families raise sheep on this land to produce wool for the county market fair and each family keeps the income from their own sheep. There are so many different villages in the county that you can ignore the effect of the size of a flock in a single village on the price of wool. All families in the village have equal access to the pasture land known as village commons, and the villagers can freely choose how many sheep to let graze on the pastures. Unfortunately, the usage of pasture land comes at a cost. The more sheep graze this year, the more damaged the land will be and therefore the less production there will be in future years.
 - (a) Consider first the problem where a single family owns all the sheep and decides how large a flock to have. What is the benefit from adding a sheep? What is the relevant opportunity cost of adding another sheep to the flock?
 - (b) Think now about the problem of the village where each family has its own flock. All ten families decide on the number of sheep to have simultaneously. How do the benefits and costs from adding a sheep change relative to the case of a single family?
 - (c) Explain carefully why the situation gives rise to a social dilemma.
3. We talked about negative effects on other decision makers in our discussion of pollution and fossil fuel reduction. Let's be more positive for a change and discuss positive effects. These are slightly more open ended examples where insights from game theory are useful.
 - (a) Will you subscribe to a dating web site as its only user? What if the site has a large numbers of subscribers? Discuss the implications for opening a new site with possibly a superior matching algorithm and more user friendly interface.
 - (b) You get information about the quality of a new restaurant from

friends that have dined there. Will you be the first to go or would you rather wait? What can the restaurant owner do about this?

- (c) New knowledge produced in academic research is useful to firms and individuals that are not directly involved in the research leading to it. Hence we can view knowledge as a public good that is produced at costs that are borne by the researchers. Discuss the institutions that lead to quick spread of academic knowledge. Private firms also engage in scientific research and the results of their research effort may be valuable to outsiders. What institutions enhance the spread of knowledge embodied in private sector innovations?

4. Consider an economy country of 5 equal size groups i of individuals with annual income y_i for group $i \in \{1, \dots, 5\}$. Assume that the groups are ordered so that $y_1 \leq y_2 \leq \dots \leq y_5$. The Lorenz curve of this economy is given by the broken line connecting points:

$$(0, 0), \left(\frac{1}{5}, \frac{y_1}{y_1 + y_2 + y_3 + y_4 + y_5}\right), \left(\frac{2}{5}, \frac{y_1 + y_2}{y_1 + y_2 + y_3 + y_4 + y_5}\right), \\ \left(\frac{3}{5}, \frac{y_1 + y_2 + y_3}{y_1 + y_2 + y_3 + y_4 + y_5}\right), \left(\frac{4}{5}, \frac{y_1 + y_2 + y_3 + y_4}{y_1 + y_2 + y_3 + y_4 + y_5}\right), (1, 1)$$

- (a) Draw the Lorenz curve for a country where $y_i = 30$ for all $i \in \{1, \dots, 5\}$.
- (b) Draw the Lorenz curve for another country where $y_i = 10i$ for all $i \in \{1, \dots, 5\}$ (so that $y_1 = 10, y_2 = 20$, etc.)
- (c) Draw the Lorenz curve for a richer country where $y_i = 20i$ for all $i \in \{1, \dots, 5\}$ (so that $y_1 = 20, y_2 = 40$, etc.)
- (d) Draw the Lorenz curve for the case where $y_i = 15 + 5i$ for all $i \in \{1, \dots, 5\}$ (so that $y_1 = 20, y_2 = 25$, etc.)
- (e) Compare the Gini-coefficients in the above cases.
- (f) Compare the Gini-coefficients of Country A where $y_1 = y_2 = y_3 = y_4 = 15$ and $y_5 = 90$ and Country B where $y_1 = y_2 = 0$ and $y_3 = y_4 = y_5 = 50$. Which country do you think has more

inequality? What alternative measures for equality can you think of?

5. In Lecture 6, we discussed a setting where Barry owns the land and Alex works for Barry. The only determinant of farm production is the amount of work that Alex puts into the production process. We discussed various institutions for determining the sharing of the production and showed that with efficient negotiation, the working effort of Alex does not depend on whether he owns the farm or is a hired worker.
 - (a) In real world, we often see yet another institution: sharecropping. In this case, Alex pays half of the output to Barry. Draw the production possibility frontier for Alex' grain consumption in this case (taking into account that Barry takes his half).
 - (b) Compare the MRT at each level of working hours to the case where Alex owns the farm by himself.
 - (c) Will Alex work more or less as a sharecropper when compared to what he would do as an independent farmer?
 - (d) Can you think of any real world advantages to explain the emergence of an institution such as sharecropping?