Principles of Economics I

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Problem Set 3 (Due October 2, 2020)

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 prefer-
       ences?

   (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 con-
       vince 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 ev-
       idence, 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. Two players have a dollar to split between them. At the beginning of the game, both players make simultaneously demands to a share of the dollar (in cents) without knowing the other player's demand. If the demands add up to at most one dollar, each player gets as much as she demanded. If the demands add up to more than a dollar, then neither player gets anything.

   a) What are the strategies of the players and what are the outcomes?

   b) Suppose that each player only cares about the amount of money they receive in each outcome? Rather than drawing the payoff matrix, give a description of monetary payoffs to the players.

c) What are the Pareto efficient outcomes if the players only care about the monetary outcome?

d) Are there any dominant strategies in the game with monetary payoffs?

e) Are there any Nash equilibria in the game with monetary payoffs? What would you choose if you played this game and how would you reason about your choices?

f) If you played this game yourself, would your preferences be the ones given by your monetary payoffs?

4. 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) How valuable is a phone if you are the only owner of it? Is the phone more valuable to you if more people own a phone? Consider the simultaneous decision of whether to purchase a phone. Do players have dominant strategies? Will there be many different Nash equilibria?

   (b) 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.

   (c) 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?

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?