Principles of Economics I

Aalto University School of Business

Juuso Välimäki

Sample Exam

You have three hours to complete the examination. The six questions have equal weight and are designed to take 30 minutes each.

1. Determine if the following claims are true or false. Explain the terms in italics and justify each answer you give with at most three sentences.

   (a) The feasible set can be determined once you know total resources and the *marginal rate of transformation*.

   (b) If the total revenue of a monopolist firm is the same for all prices, then the demand for its product is *inelastic*.

   (c) In a competitive market, the *marginal cost* of all firms is equal to the market price, and as a result, the firms earn equal profits.

   (d) If an outcome is *Pareto-efficient*, then there is no alternative outcome that is more desirable for the society.

   (e) If a good is freely traded in the world market, then charging an *import tariff* imposes no *deadweight losses*.

   (f) If consumers in a country benefit from joining a free trade agreement, then producers in the country are hurt by the agreement.

2. Two students Ann and Bob witness a robbery when exiting from a bar. The perpetrator has features that make it easy for the police to make an arrest if the crime is reported and a full report on the crime is filed. Both Ann and Bob prefer the robber to be caught rather than let free. The robber is caught if Ann or Bob (or both) report the crime. Because it is already late at night, reporting is costly. Denote the benefit from catching the robber by b and the cost of reporting by c and assume that $b > c$.

(a) Draw the game matrix for this game.

(b) Explain the meaning of Dominant strategy equilibrium and Nash equilibrium. Does the game have dominant strategy equilibria or Nash equilibria?

(c) Suppose Ann and Bob do not know each other and do not talk to each other after the incident. Are Nash equilibria of the game the only outcomes in the game that make sense?

3. A chain of sushi bars considers entering a small town. As the only sushi bar in its market, it would have market power, i.e. to sell larger quantities, it would have to set lower prices.

(a) The demand curve for sushi portions is $P = 20 - \frac{1}{10}Q$ for $Q \leq 200$ and $P = 0$ for $Q > 200$ where P denotes number of portions sold per day. Draw the demand curve for the sushi bar in the (Q, P) co-ordinates (Q on horizontal axis). How many portions of sushi can be sold at $P = 13$?

(b) The ingredients for a single sushi portion cost EUR 10 and it costs EUR 150 per day to hire a sushi chef. The chef can prepare up to 100 portions per day. Draw the marginal cost curve, and the average cost curve of the sushi bar.

(c) Draw the marginal revenue curve in the picture and determine the optimal price of portions to sell in this market.

(d) Suppose that another sushi chef offers his services at the price of EUR 3 per portion and without any fixed daily fee. Which chef should a profit maximizing sushi chain hire? Compare the optimal prices and quantities in the two cases.

4. Alex chooses how much to work each day on a farm that he owns. He enjoys both leisure (i.e. time not spent on working) and the food that he gets from the farm.

(a) Draw the feasible set for Alex' choices of leisure and food if his marginal product of labor is decreasing in the number of hours that he works.

(b) Draw indifference curves between leisure and food consumption for Alex under the assumption that he needs more food to give up a unit of leisure at lower levels of leisure. Find the optimal amount of food and leisure graphically.

(c) Assume next that Barry owns the farm and Alex is a hired worker. Suppose that Barry takes half of the farm output leaving the other half to Alex. Draw the new feasible set for Alex' food and leisure consumption in the same picture with the old one.

(d) Will Alex work for more when hired by Barry or when working as an independent farmer? What about his food consumption?

5. Consider a model of trade between two countries, Domestic (D) and Foreign (F). Manufacturing labor is cheaper in F than in D and as a result, the equilibrium price of large appliances is EUR 80 lower in F than in D if there is no foreign trade. All appliances regardless of the country where they are produced are considered to be equally good by all buyers (no home bias).

(a) Draw the demand and supply diagrams for the two countries in two graphs that allows you to compare the price levels (as in the lecture notes). Assume that the two countries start trading, but the cost of transporting goods is EUR 60 per appliance. Consider the resulting equilibrium prices in the two countries after allowing free trade. Explain how the prices are different if the buyers in D pay the transportation cost versus if the producers pay the cost to get to the market in D.

(b) Suppose another country (S) exactly similar to D joins in the free trade area. The cost of transportation between any two countries is EUR 60. What happens to equilibrium prices? What can you say about the producer and consumer surplus in (D) as a result of (S) joining the free trade area.

6. There are two types of individuals: students and trust fund kids. Students work hard at their studies and earn 100 in period 2 when they

are old. Unfortunately since they study in period 1, they have no income in that period. Trust fund kids get an inheritance of 200 and they conclude that they do not have to study. As a result, they have no labor income in period 2. Denote consumptions in the two periods by c_1 and c_2.

(a) Since both types of individuals like to consume on both periods, they realize that a market for borrowing and loans might be a good idea. Suppose that there is a market rate for lending and borrowing at r so students can borrow c_1 for consumption when young in exchange of paying $(1+r)c_1$ back when old. We require that $c_2 = 100 - c_1 \geq 0$ so that any amount borrowed can be paid back. Similarly the trust fund kids may save s when young to get back $(1+r)s$ for consumption when old. Draw the budget sets for the two types of individuals.

(b) Draw indifference curves to the two types of buyers that reflect the fact that the MRS between consumption in period 1, c_1 and consumption in period 2, c_2 is given by the ratio of the two consumptions: $MRS = \frac{c_2}{c_1}$. Find the optimal savings s for the trust fund kids and optimal borrowing c_1 for the students in the graphs.

(c) Use the budget constraint and the requirement that MRS = MRT to solve algebraically the optimal savings and borrowings.

(d) Determine the effect of an increase in r on the optimal savings and borrowings graphically. Show the income and substitution effects in the graphs.