Queen Mary University of London

January Examination Period 2024

ECN113: Principles of Economics *Duration: 2 hours*

YOU ARE NOT PERMITTED TO READ THE CONTENTS OF THIS QUESTION PAPER UNTIL INSTRUCTED TO DO SO BY AN INVIGILATOR

Answer ALL questions

Cross out any answers that you do not wish to be marked.

Calculators are permitted in this examination. Please state on your answer book the name and type of machine used.

Complete all rough workings in the answer book and cross through any work that is not to be assessed.

Possession of unauthorised material at any time when under examination conditions is an assessment offence and can lead to expulsion from QMUL. Check now to ensure you do not have any notes, mobile phones, smartwatches or unauthorised electronic devices on your person. If you do, raise your hand and give them to an invigilator immediately.

It is also an offence to have any writing of any kind on your person, including on your body. If you are found to have hidden unauthorised material elsewhere, including toilets and cloakrooms it will be treated as being found in your possession. Unauthorised material found on your mobile phone or other electronic device will be considered the same as being in possession of paper notes. A mobile phone that causes a disruption in the exam is also an assessment offence.

EXAM PAPERS MUST NOT BE REMOVED FROM THE EXAM ROOM

Examiner: Dr. Eileen Tipoe

PART A: LONG-ANSWER QUESTIONS

Question 1 (40 marks)

Figure A shows a game tree representation of the ultimatum game, in which the Proposer is given £100 and makes a 'take-it-or-leave-it' offer of £x to the Responder.

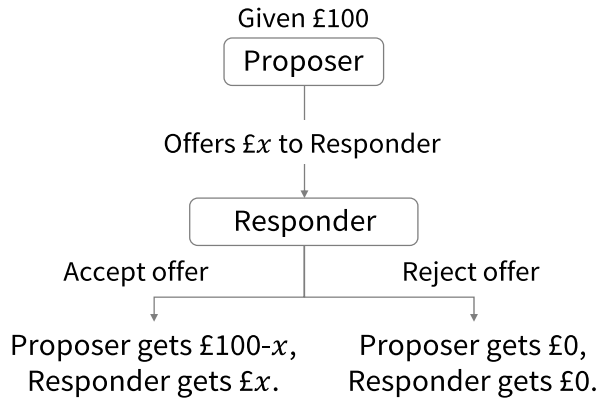

Figure A. Description of the ultimatum game.

Suppose the Responder has the following utility function: $u(x, P) = x - 0.1(P - x)^2$, where x is the amount that the Responder receives and P is the amount that the Proposer receives (so $x + P$ is the total size of the 'pie').

a) Explain which type of social preference the Responder has.

[3 marks]

b) For the game shown in Figure A, what is the minimum acceptable offer that the Responder will accept? Assume that if the Responder is indifferent between accepting and rejecting, the Responder will accept the offer. Please show your calculations and/or reasoning.

[5 marks]

Now suppose the Responder is completely selfish, and the Proposer has the utility function: $u(P, x) = P - 0.25(x - P)^2$, where P is the amount that the Proposer receives and x is the amount that the Responder receives (so $x + P$ is the total size of the 'pie').

c) How would the Proposer choose to split the £100 between himself/herself and the Responder? Your answer should state the amount the Proposer receives and the amount the Responder receives. Please show your calculations and/or reasoning.
(Hint: Write the utility function in terms of P and find the maximum point.)

[4 marks]

For the rest of this question, suppose that the Proposer is completely selfish, and the Responder has a reciprocity motive: the Responder receives a utility of $0.5(30 - x)$ from rejecting an offer of £x.

d) How much would the Proposer choose to offer the Responder? Assume that if the Responder is indifferent between accepting and rejecting, the Responder will accept the offer. Please show your calculations and/or reasoning.
(Hint: Compare the Responder's utility from accepting and rejecting an offer of £x).

[4 marks]

Consider a small population of 50 employers (Proposers) and 50 workers (Responders).

- All employers and workers have identical preferences to the Proposer and Responder (respectively) described in part d).
- Each employer is matched with one worker, and they play the ultimatum game once with each other.

e) Use your answer to part d) to calculate the income shares of the Proposers and Responders, and hence draw the Lorenz curve for this population (cumulative share of income on the vertical axis, cumulative share of the population (from poorest to richest) on the horizontal axis).
[Note: If you were unable to answer part d), you can use x = £30 to answer this question. x = £30 is not the correct answer to part d).]

[5 marks]

Consider another population with 40 employers and 80 workers.

- All employers and workers have identical preferences to the Proposer and Responder (respectively) described in part d).
- Each employer is matched with two workers, and they play the ultimatum game once.

In this game, the employer makes the same offer to both workers:

- If both workers reject the offer, everyone receives £0.
- If only one worker accepts the offer, the employer and that worker split the £100 according to the offer; the other worker receives nothing.
- If both workers accept the offer, a fair coin toss will determine which worker receives the offer. The other worker receives nothing.

f) By modifying your calculation from part d), determine how much the Proposer would offer the Responders in this game. Please show your calculations and/or reasoning.

[4 marks]

g) Use your answer to part f) to draw the Lorenz curve for this population (cumulative share of income on the vertical axis, cumulative share of the population (from poorest to richest) on the horizontal axis). Round the values to the nearest whole number where necessary.
(Hint: Remember that 40 workers receive £0).
[Note: If you were unable to answer part f), you can use x = £30 to answer this question. x = £30 is not the correct answer to part f).]

[6 marks]

h) Using the Lorenz curve diagrams from parts d) and f), calculate the Gini coefficients for each population. Round your answers to 2 decimal places where necessary.

[4 marks]

i) Use your answer to part h) to explain how institutions (the 'rules of the game') affect inequality. Provide and briefly explain another real-world example of how institutions affect inequality (you can use an example from this module or your own knowledge).

[5 marks]

Question 2 (15 marks)

A factory producing cars is located next to a care home for the elderly. The production process is noisy, which disturbs the sleep and daily activities of the care home residents. The factory is a price-taking firm that sells its cars at the market price of £320. Figure B shows how marginal private and marginal social costs vary with the number of cars produced (Q).

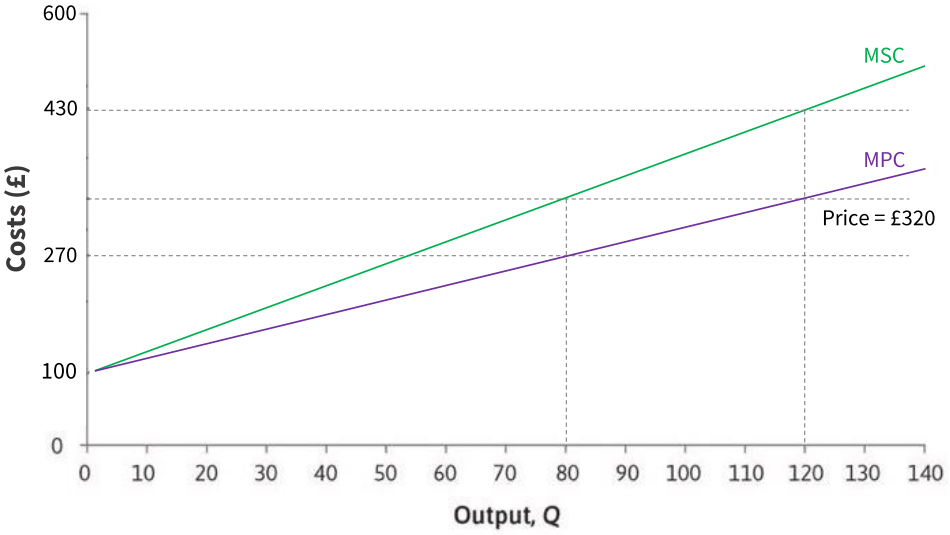

Figure B. The car factory's production decision.

a) Explain why the firm's profit-maximising choice of output is not Pareto efficient. Calculate the deadweight loss associated with this decision.

[3 marks]

Suppose the government assigns property rights to the care home residents, meaning they have the right to enjoy a peaceful environment.

b) Assuming negligible transaction costs, calculate:
i) the maximum amount that the car factory is willing to pay to resume production.
ii) The minimum amount that the care home residents are willing to accept to tolerate the noise.

[4 marks]

Now suppose the government assigns property rights to the car factory, meaning it has the right to make as much noise as it wants.

c) Assuming negligible transaction costs, calculate:
i) the maximum amount that the care home residents are willing to pay the firm to reduce production.
ii) The minimum amount the firm is willing to receive to reduce production to the socially optimal amount.

[4 marks]

d) Thinking about situations of noise pollution in the real world, explain two reasons (aside from transaction costs) why the bargaining process in parts c) and d) may fail to produce a Pareto efficient outcome.

[4 marks]

Question 3 (15 marks)

Two countries (country C and D) share a border. Figure C shows the labour market conditions that all workers in each country face.

Country C		Country D	
Wage	£20 / hr	Wage	£15 / hr
Disutility of effort	£7 / hr	Disutility of effort	£3 / hr
Unemployment benefits	£6 / hr	Unemployment benefits	£6 / hr
Disutility from unemployment	£2 / hr	Disutility from unemployment	£4 / hr
Expected # weeks unemployed	35	Expected # weeks unemployed	36
Working hours	40	Working hours	35

Figure C. Labour market conditions in Country C and Country D.

a) Show that the total employment rent of workers in Country C and Country D are the same.

[4 marks]

Now suppose that:

- In Country C, unemployment benefits decrease to £5/hr and only last for the first 25 weeks of unemployment (the unemployed then receive £0 in all future weeks).
- In Country D, labour unions become stronger and negotiate wages of £17 per hour.

b) Calculate the new employment rents in Country C and Country D, and explain why the employment rents have changed.

[7 marks]

Suppose that workers are free to move between countries with negligible migration costs, and that a proportion of workers in the country with lower employment rents migrate to the other country. Assume that all immigrants enter the labour force rather than set up their own businesses.

c) Use the wage-setting/price-setting model to analyse the effects of this immigration on equilibrium real wages and equilibrium employment in Country D. Clearly state any additional assumptions you make in your analysis (where necessary).

[4 marks]

PART B: SHORT-ANSWER QUESTIONS

For each of the statements below, determine whether it is true or false and provide a short explanation (around 1-3 sentences) of your answer. One example is given below.

Each statement is worth 3 marks: 1 mark for the correct answer, 2 marks for a valid explanation.

[Example]
Statement: A monopoly is a price-taking firm.
Answer: False
Explanation: A monopoly is a price-setting firm because it chooses price to maximise profits rather than taking the market price as given.

Question 4

According to Malthus' model of living standards and population size, a sustained increase in income per capita would be impossible.

Question 5

Consider a worker whose choice is between hours of free time and consumption. His company has now cut his wage rate.
Statement: As a result of the substitution effect, the worker would reduce his free time.

Question 6

Figure D shows some indifference curves of a consumer whose utility function is $u(x, y) = x^3y^2$.
Statement: At point B (6, 1), the slope of this consumer's indifference curve is 0.25 (in absolute value).

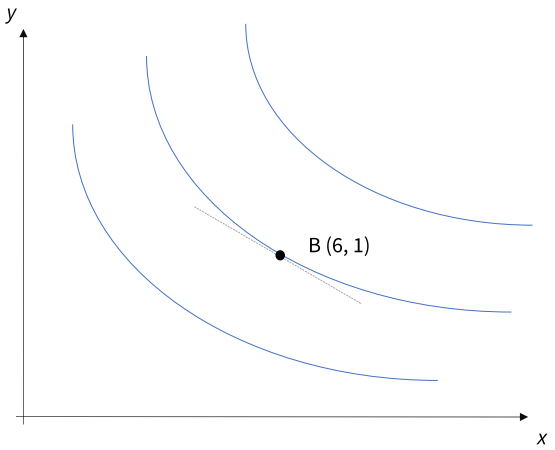

Figure D. Diagram for Question 5.

Question 7

In a market with a single price-setting firm, the equilibrium outcome can never be Pareto efficient.

Question 8

For the demand curve shown in Figure E, demand is price elastic at point A (20, 8,000).

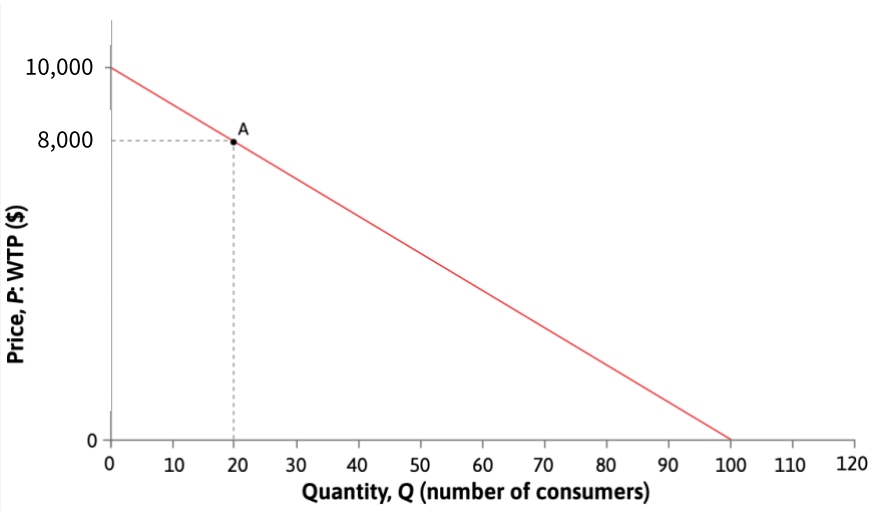

Figure E. Diagram for Question 7.

Question 9

In a market of price-taking firms, the market (inverse) supply curve is P = 2Q and the (inverse) demand curve is P = 100 – Q.
Statement: If the government imposes a per-unit tax on this market, then consumers bear more of the tax burden (effective incidence).

Question 10

In the environmental dynamics curve for sea ice shown in Figure F, there are three stable equilibria.

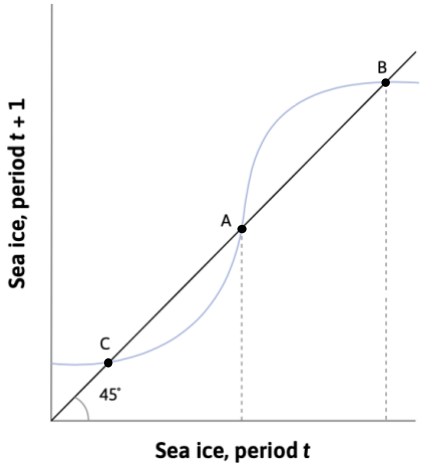

Figure F. Diagram for Question 9.

Question 11

If we observe a firm choosing 6 units of capital and 2 units of labour under one set of prices, then choosing 10 units of capital and 4 units of labour under a different set of prices, then it is possible that capital and labour are perfect complements in the firm's production function (defined over capital and labour).

Question 12

Suppose your preferences over chocolate (C) and muffins (M) are represented by the utility function $u(C, M) = 4C^{1/2} + M$. At the current prices and income, your optimal choice is 3 bars of chocolate and 2 muffins.

Statement: If you win £10 in the lottery, then your optimal consumption of both chocolate and muffins will increase.

Question 13

Figure G shows the wage-setting curve for an economy, where 80% of the working-age population are in the labour force.

Statement: At point A, the unemployment rate is 5%.

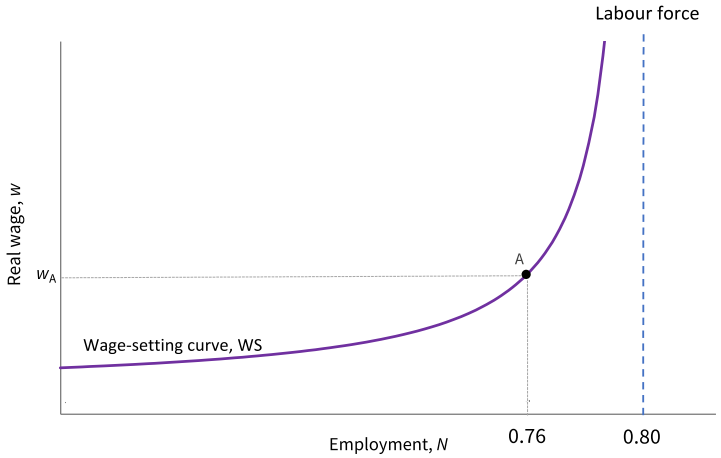

Figure G. Diagram for Question 13.

End of Paper