

3.1 Market failure and equity

Name: _____ Class: _____ Date: _____

Total: 23 marks

KEY WORDS externality • public good

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Objective

Diagnose externalities with the MSC/MSB model, explain public goods and common pool resources, and measure inequality with the Lorenz curve and Gini coefficient (syllabus 2.8–2.9, 2.12).

1 Key knowledge and worked examples

Market failure toolkit. $MSC = MPC + \text{external cost}$; $MSB = MPB + \text{external benefit}$; the social optimum sits where $MSB = MSC$. With external cost 6 the market (100, 20) over-produces to the optimum (92, 24) – welfare loss $\frac{1}{2} \times 8 \times 6 = 24$; with external benefit 6 the optimum is (108, 16) – under-consumption of 8. Public goods: non-rival + non-excludable → free-riders → non-provision. Common pool resources: rival + non-excludable → over-use. Gini from quintile shares $5/10/15/20/50 = 0.40$.

2 Practice

2.1 Define an externality and give one negative and one positive example. [2]

2.2 State the two properties of a public good and name the problem they create for private provision. [2]

2.3 Distinguish a common pool resource from a public good by rivalry and excludability. [2]

2.4 Write the MSC and MSB relationships and state the social-optimum condition. [2]

2.5 Quintile income shares are 5, 10, 15, 20 and 50 percent. State the Lorenz curve's cumulative points and compute the Gini coefficient. [4]

3 Exam-style questions

3.1 (*Original.*) With demand $P = 70 - Q/2$, supply $P = Q/4 - 5$ and an external cost of 6 per unit produced: find the market equilibrium and the social optimum, size the over-production, and calculate the welfare loss. [5]

3.2 (*Original.*) Explain the policy response to a positive consumption externality of 6 per unit in this market, and calculate the new equilibrium under the correct instrument. [3]

3.3 (*Original, equity.*) Explain why an efficient market outcome may still fail the equity test, naming one instrument that trades the two against each other. [3]

Solutions

2.1 An externality is a cost or benefit of a transaction falling on a third party not involved in it (1). Negative: pollution from production (1). Positive: vaccination protecting others (1).

2.2 Non-rival and non-excludable (1). They create the free-rider problem – no one can be made to pay, so private firms cannot provide the good profitably (1).

2.3 A common pool resource is RIVAL but non-excludable (each fish caught is gone); a public good is non-rival AND non-excludable (lighting for one is lighting for all).

2.4 $MSC = MPC + \text{external cost}$; $MSB = MPB + \text{external benefit}$; the social optimum is where $MSB = MSC$.

2.5 Cumulative points (0, 0), (20, 5), (40, 15), (60, 30), (80, 50), (100, 100). Area under the Lorenz = $50 + 200 + 450 + 800 + 1500 = 3000$ of 10000, so Gini = $1 - 2 \times 0.30 = 0.40$.

3.1 Market: $70 - Q/2 = Q/4 - 5$ gives $75 = 0.75Q$, so $Q = 100$, $P = 20$. Social: $MSC = Q/4 + 1$ meets MSB at $70 - Q/2 = Q/4 + 1$, so $69 = 0.75Q$, $Q = 92$, $P = 24$. Over-production = $100 - 92 = 8$ units. Welfare loss = $\frac{1}{2} \times 8 \times 6 = 24$ per day – for every unit between 92 and 100 society's cost exceeded its benefit.

3.2 A positive consumption externality calls for a SUBSIDY of 6 per unit (equal to the marginal external benefit): supply in consumer prices becomes $Q_s = 4P + 44$ -equivalent – i.e. $P = Q/4 - 11$ – and setting $70 - Q/2 = Q/4 - 11$ gives $81 = 0.75Q$, so $Q = 108$, $P = 16$: output rises to the social optimum, price falls, and the government pays $6 \times 108 = 648$ per day.

3.3 The price mechanism answers “for whom?” by willingness AND ability to pay, so it rewards resource ownership, not need: an allocation can be Pareto-efficient while leaving the poor without basics (equity failure, not market failure). One instrument with its trade-off: progressive taxation with transfers buys equity but may weaken work incentives (the efficiency-equity trade-off); or minimum wages raise pay at the possible cost of jobs.

Local review guidance: externality answers show BOTH equilibria and the shaded triangle, not just the direction; the Gini shows the trapezium areas before the final figure; (R1 3.3) the instrument named with BOTH sides of its trade-off. This is authored classroom guidance.