1.2 Market failure and government intervention

AQA 7136 · Calculator allowed · about 115 minutes · Write-in edition

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

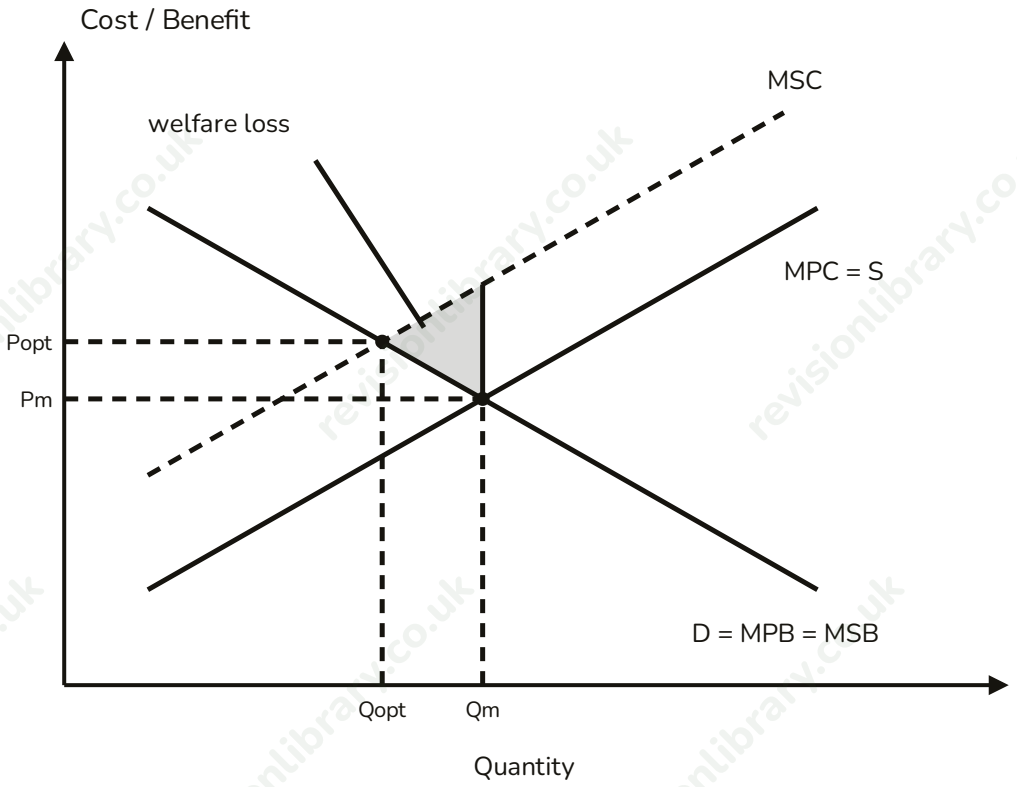
1 A government is deciding how to reduce traffic congestion in a large city, a negative externality of driving: each additional driver imposes time delays on other road users.

(a) Explain why traffic congestion is an example of a negative externality. **(3)**

(b) Evaluate whether a congestion charge (a tax on drivers entering the city centre) or improved public transport provision (a form of subsidy/state provision) is likely to be more effective at reducing traffic congestion. **(5)**

(Total for Question 1 is 8 marks)

2 The diagram shows the market for a good whose production creates a negative externality. MPC (=S) is the marginal private cost curve faced by firms; MSC is the marginal social cost curve, which lies above MPC because it also includes the external cost imposed on third parties. D = MPB = MSB shows both marginal private and marginal social benefit (there is no externality in consumption).



(a) Identify the free market equilibrium quantity (Qm) and the socially optimal quantity (Qopt) shown on the diagram, and state which is larger. **(2)**

(b) Explain why, in the presence of a negative production externality, the free market equilibrium at Qm does not represent the socially efficient level of output. **(4)**

(c) Using the diagram, identify and explain the welfare loss (deadweight loss) resulting from this externality. **(4)**

(Total for Question 2 is 10 marks)

3 Asymmetric information in the market for second-hand cars.

(a) Define asymmetric information. **(2)**

(b) Using the market for second-hand cars as an example, explain how asymmetric information can lead to adverse selection. **(4)**

(c) State and explain one government policy that could help to reduce this information gap. **(2)**

(Total for Question 3 is 8 marks)

4 A government wants to correct the negative externality from a factory that emits pollution while producing chemical Z. Without intervention, the market produces 800 units per week at a price of £40. The socially optimal output is 650 units per week, and the marginal external cost is constant at £15 per unit.

(a) Calculate the total external cost (in GBP) at the market equilibrium output of 800 units. **(2)**

(b) The government imposes a specific tax of £15 per unit on the factory, equal to the marginal external cost, to correct the externality (a Pigouvian tax). Explain how this tax is intended to move the market towards the socially optimal output of 650 units. **(4)**

(c) Evaluate two limitations of using a Pigouvian tax to correct this externality. **(4)**

(Total for Question 4 is 10 marks)

5 Tradable pollution permits as an alternative corrective policy.

(a) Explain how a system of tradable pollution permits could be used to reduce a negative externality such as carbon emissions from industry. **(4)**

(b) Compare tradable permits with a Pigouvian tax as methods of correcting a negative externality, identifying one advantage of tradable permits over a tax. **(4)**

(Total for Question 5 is 8 marks)

6 Evaluate the view that imposing a specific tax is always the most effective way for a government to correct a negative externality of production.

(Total for Question 6 is 25 marks)

7 Government failure.

(a) Define government failure. **(2)**

(b) State and briefly explain four possible causes of government failure. **(4)**

(Total for Question 7 is 6 marks)

Mark scheme · 1.2 Market failure and government intervention

Question 1

(a) driving imposes a cost (time delay, additional pollution) on other road users/third parties who are not part of the individual driver's decision to travel **M1**

(a) this cost is not reflected in the private cost the driver faces (e.g. fuel, time), so the marginal social cost of an additional journey exceeds its marginal private cost **A1**

(a) as a result, the free market (with no intervention) leads to a greater volume of traffic than the socially optimal level, causing a welfare loss (excess congestion) **A1**

(a) Answer: Driving imposes uncompensated delay costs on other road users, so MSC exceeds MPC and the market over-provides journeys.

(b) a congestion charge directly raises the private cost of driving, giving an immediate price incentive for some drivers to reduce or retime journeys or switch mode, and can be varied by time of day to target peak congestion **M1**

(b) improved public transport provision increases the availability of a substitute for driving, potentially achieving a more lasting change in behaviour without penalising drivers who have no practical alternative **M1**

(b) a congestion charge alone may be less effective if demand for car travel into the city is inelastic (e.g. commuters with no nearby public transport), since many drivers may simply pay the charge rather than change behaviour **A1**

(b) evaluative point: the two policies are likely to be most effective when COMBINED - the charge reduces the incentive to drive while improved public transport provides the alternative needed for the policy to actually change behaviour, rather than just raise revenue **A1**

(b) (allow any other well-justified line of reasoning consistent with the scenario, e.g. on equity, funding, or time lags in building new transport capacity) **A1**

(b) Answer: Likely most effective combined: the charge raises the private cost of driving while better public transport gives drivers a genuine alternative.

Question 2

(a) correctly identifies Qm as the intersection of MPC and D, and Qopt as the intersection of MSC and D **B1**

(a) states that Qm is larger than Qopt (the market produces more than the socially optimal quantity) **B1**

(a) Answer: Qm (market) > Qopt (social optimum): the market over-produces.

(b) the free market equilibrium occurs where marginal private cost (MPC) equals marginal private benefit (D = MPB), ignoring the external cost imposed on third parties **M1**

(b) marginal social cost (MSC) = MPC + the external (marginal) cost, so MSC lies above MPC at every quantity **M1**

(b) the socially efficient quantity occurs where MSC = MSB (= D here), which is at the lower quantity Qopt, not the market quantity Qm **A1**

(b) at Qm, MSC exceeds MSB, so the units produced beyond Qopt cost society more than the benefit they provide, meaning the market over-allocates resources to this good **A1**

(b) Answer: The market equates MPC to MPB, not MSC to MSB, so it over-produces relative to the social optimum Qopt.

(c) the welfare loss is shown by the shaded triangle between Qopt and Qm, bounded by the MSC and D (=MPB) curves **M1**

(c) it represents the extent to which the social cost of the output produced between Qopt and Qm exceeds its social benefit **M1**

(c) this area is a net loss to society, since resources are used to produce units that do not deliver a benefit equal to their true (social) cost **A1**

(c) the welfare loss is eliminated only at the socially optimal output Qopt, where MSC = MSB **A1**

(c) Answer: The shaded triangle between Qopt and Qm (bounded by MSC and D) is the deadweight welfare loss.

Question 3

(a) a situation where one party to an economic transaction (e.g. buyer or seller) has more or better information than the other party **B1**

(a) leading to an imbalance that can distort decision-making in the market **B1**

(a) Answer: One party to a transaction has more/better information than the other.

(b) sellers of second-hand cars typically know more about a car's true quality/faults than buyers do (information asymmetry) **M1**

(b) buyers, unable to distinguish good cars from poor-quality cars, are only willing to pay an average price reflecting the average expected quality **M1**

(b) this average price is too low to persuade owners of good-quality cars to sell, so they leave the market, while owners of poor-quality cars remain more willing to sell at this price **A1**

(b) over time, this adverse selection process can reduce the average quality of cars traded in the market, and in extreme cases cause the market to shrink or collapse (allow reference to Akerlof's 'lemons' problem) **A1**

(b) Answer: Buyers cannot tell good cars from bad ones, so only an average price is offered, driving good-quality cars out of the market (adverse selection).

(c) compulsory vehicle history/condition disclosure (e.g. MOT test records) required before sale **B1**

(c) explains briefly why it helps: it gives buyers access to information they previously lacked, reducing the asymmetry **B1**

(c) Answer: Compulsory disclosure of a vehicle's service/accident history, reducing the information gap.

Question 4

(a) total external cost = marginal external cost x quantity = 15 x 800 **M1**

(a) = £12,000 **A1**

(a) Answer: £12,000.

(b) the tax raises the factory's marginal private cost by £15 per unit, so its marginal private cost curve shifts up to equal marginal social cost **M1**

(b) the factory will now only produce output up to the point where its (higher, post-tax) marginal cost equals marginal (private) benefit **M1**

(b) this internalises the externality, since the factory now faces the full social cost of production in its own decision-making **A1**

(b) if the tax is set correctly (equal to the marginal external cost), the new market equilibrium output should fall towards the socially optimal level of 650 units **A1**

(b) Answer: The £15 tax raises MPC to MSC, so the factory's profit-maximising output falls towards the socially optimal 650 units.

(c) it is difficult for the government to accurately measure/value the external cost, so the tax may be set too high or too low (allow: firms may relocate abroad to avoid the tax, causing 'carbon leakage'; monitoring and enforcement costs) **M1**

(c) developed explanation: e.g. if the tax is set below £15, output remains above 650 units, so the externality is only partially corrected **A1**

(c) second valid limitation: monitoring output and enforcing the tax impose administrative costs on the government **M1**

(c) developed explanation linking back to the scenario: measuring the factory's taxable output and checking that the tax is paid use resources, reducing the net welfare gain from correcting the pollution externality **A1**

(c) Answer: Limitations include uncertainty when measuring the external cost, which can lead to an incorrectly set tax, and monitoring and enforcement costs, which reduce the net welfare gain.

Question 5

(a) the government sets a maximum total quantity (a 'cap') of pollution allowed, consistent with (or below) the target level, and issues permits totalling this amount **M1**

(a) firms that can reduce emissions cheaply have an incentive to do so and sell their spare permits to firms for whom reducing emissions is more costly **M1**

(a) this creates a market price for pollution, giving all firms a financial incentive to cut emissions, since permits cost money (or represent an opportunity cost if unused) **A1**

(a) the overall cap ensures the total quantity of pollution is limited/reduced over time, regardless of how permits are traded between firms **A1**

(a) Answer: A capped, tradable permit market prices pollution and lets low-cost abaters sell spare permits to high-cost polluters, cutting total emissions at least cost.

(b) a tax fixes the PRICE of pollution per unit but leaves the total QUANTITY of pollution uncertain, whereas a permit scheme fixes the total QUANTITY (the cap) but leaves the price of permits to be set by the market **M1**

(b) advantage: where the goal is a specific, guaranteed reduction in total pollution (e.g. to meet a climate target), tradable permits give more certainty over the quantity outcome than a tax does **A1**

(b) permits can also generate government revenue (through auctioning), similar to a tax, while allowing the cap to be tightened progressively over time to phase in reductions **M1**

(b) developed conclusion: this makes permits well suited to long-term environmental targets, though a tax may be simpler and cheaper to administer **A1**

(b) Answer: Tax fixes price, uncertain quantity; permits fix quantity, uncertain price - permits give more certainty for a fixed pollution target.

Question 6

Level 5 Thorough understanding of how a specific (Pigouvian) tax AND at least one alternative policy (e.g. regulation, tradable permits, subsidy, or the provision of information) could correct a negative production externality. Applies relevant economic theory clearly and consistently to the context, using accurate terminology throughout. Provides well-developed chains of analysis, showing clear cause-and-effect reasoning for both the case for and the case against taxation as the most effective policy. Reaches a well-substantiated, logically supported judgement on whether a tax is always the most effective policy, explicitly weighing the criteria used (e.g. effectiveness, cost of implementation, ease of measurement, political acceptability) to reach a conclusion. **21-25**

Level 4 Good understanding of taxation and at least one alternative corrective policy, applied appropriately to the context. Clear chains of analysis for more than one point, covering both the strengths of taxation and its limitations or the merits of alternatives. Attempts an evaluative judgement, but the reasoning supporting it may be less developed, or the weighing of criteria less explicit, than at Level 5. **16-20**

Level 3 Reasonable understanding of taxation as a corrective policy, with some reference to at least one alternative. Some analysis is present but chains of reasoning may be incomplete or one-sided (focusing mainly on either the case for or against taxation). An evaluative comment is offered but may be asserted rather than justified. **11-15**

Level 2 Basic or descriptive knowledge of taxation and/or externalities, with limited application to the specific context. Analysis is limited, mostly identifying points without developing chains of reasoning. Little or no evaluation, or evaluation is a simple, unsupported assertion. **6-10**

Level 1 Isolated or largely inaccurate statements about tax or externalities. Little or no relevant application, analysis or evaluation. **1-5**

Level 0 No relevant content, or a response that does not address the question. **0**

Indicative content:

- FOR (a specific tax is effective): a specific tax equal to the marginal external cost (a Pigouvian tax) internalises the externality by raising the firm's marginal private cost to equal marginal social cost, moving output towards the socially optimal quantity (link to the diagram/welfare-loss reasoning in Question 2 and the numerical example in Question 4).
- FOR: taxation also raises government revenue, which could be earmarked (hypothecated) to fund clean-up, compensate third parties, or subsidise cleaner alternatives.
- FOR: a tax provides a continuous financial incentive for firms to innovate and find cheaper ways to reduce the externality, since firms pay per unit of the externality-causing activity, and works through the price mechanism to let the market determine where abatement is cheapest.
- AGAINST/limitations: it is very difficult for governments to accurately value external costs (e.g. the social cost of carbon, or the health costs of pollution), so a tax risks being set too low (externality persists) or too high (output falls below the social optimum, imposing an unnecessary welfare loss of its own).
- AGAINST: if demand for the good is price inelastic, a tax largely raises price with little reduction in quantity/output, so the externality is barely reduced even though consumers bear a heavy burden (link to PED reasoning).
- AGAINST: firms may relocate production to countries with weaker environmental regulation to avoid the tax ('carbon leakage'), so global externalities such as carbon emissions may be displaced rather than reduced.
- ALTERNATIVES: regulation (e.g. banning or capping a polluting activity, minimum standards) can directly guarantee a maximum quantity of the externality, which may be more certain and easier to enforce than relying on a price signal, especially where the externality is severe or irreversible.
- ALTERNATIVES: tradable pollution permits (Question 5) fix the quantity of the externality directly via the cap while still using market forces to achieve this at least cost, which may better guarantee a specific environmental target than a tax.
- ALTERNATIVES: information/education campaigns or persuasion policies can shift the demand curve (MPB) itself by changing preferences, complementing or in some cases substituting for taxation, without the equity concerns of a regressive tax.
- Government failure is a risk with ANY form of intervention: administration, monitoring and enforcement of a tax are costly, and taxes may be politically unpopular or weakened by successful lobbying from affected firms.
- Justified evaluation: a tax can be an effective, administratively efficient tool where the external cost can be reasonably estimated and demand is not highly inelastic, but it is not always the MOST effective policy - for externalities that are severe, hard to value, or where a guaranteed quantity outcome matters (e.g. a legally binding climate target), regulation or tradable permits may dominate; the strongest answers reach a conditional, criteria-based judgement rather than a blanket yes or no.

Question 7

(a) occurs when government intervention in a market leads to a net loss of economic welfare, or makes the allocation of resources less efficient than it would have been without intervention **B1**

(a) i.e. the costs of intervention outweigh the benefits **B1**

(a) Answer: Intervention that makes resource allocation less efficient than no intervention.

(b) imperfect information: governments may not have complete/accurate information to correctly value externalities or set the right tax/subsidy **B1**

(b) regulatory capture/political self-interest: policies may be influenced by lobbying or short-term electoral considerations rather than economic efficiency **B1**

(b) administrative/enforcement costs of intervention may exceed the welfare gain from correcting the market failure **B1**

(b) unintended consequences, e.g. a policy distorting incentives in an unforeseen way that creates a new inefficiency **B1**

(b) Answer: E.g. imperfect information, regulatory capture/political self-interest, administrative/enforcement costs and unintended consequences (any four valid causes with brief explanation).