ECO.MIC9 Price Elasticity of Demand: Determinants and Business Applications

Total Marks

AQA 7136 · Calculators not allowed · about 110 minutes

Name: _____ Date: ____ / ____ / _____

Answer all questions. Full sentences required for extended answers and the levels-marked questions (Questions 7 and 13). Allocate most time to the final 15-mark essay. No calculator is allowed. Show working for all calculations.

1 Definition of price elasticity of demand, in the context of a retail product.

Define price elasticity of demand (PED) and give its formula as used by firms when assessing how quantity demanded responds to price changes for a retail product such as a shirt.

(Total for Question 1 is 1 mark)

---

2 Interpreting a PED coefficient for a smartphone app's demand.

State what is meant by demand being price elastic, in terms of the PED coefficient and percentage responses, with reference to a digital app product.

(Total for Question 2 is 1 mark)

---

3 Calculate PED for a bakery product using whole-number changes and classify the elasticity.

(a) A local bakery reduces the price of its sourdough loaf from GBP 4 to GBP 3.50 and daily quantity demanded rises from 100 loaves to 120 loaves. Calculate the PED using the midpoint method (arc elasticity). Show working and give the numerical value to two decimal places. **(3)**

(b) Classify the demand for the sourdough loaf from part (a) and state briefly what this implies for the bakery's pricing decisions regarding small price cuts. **(1)**

(Total for Question 3 is 4 marks)

---

4 Classify given PED coefficients for a set of goods, naming perfectly elastic and perfectly inelastic cases.

(a) For each PED coefficient below, state the correct elasticity classification and a one-word example of a good that might fit: 0.2, 1.0, infinity, 0. **(4)**

(Total for Question 4 is 4 marks)

5 Another PED calculation for a coffee shop using whole numbers and midpoint method.

(a) A coffee shop increases the price of a cappuccino from GBP 2 to GBP 3 and daily sales fall from 300 cups to 200 cups. Using the midpoint method, calculate the PED to two decimal places. Show working. **(3)**

(b) Classify the elasticity and explain briefly how total revenue for the coffee shop will change after the price rise. **(1)**

(Total for Question 5 is 4 marks)

---

6 Explain why the availability of close substitutes and the proportion of income spent affect PED, with UK consumer examples.

(Total for Question 6 is 6 marks)

---

7 Local Mart, a small supermarket chain in a UK town, records that when it reduced the price of its own-brand pasta from GBP 1 to GBP 0.80 weekly sales rose from 400 packs to 560 packs. For branded pasta, when price fell from GBP 1.50 to GBP 1.40 sales rose from 200 packs to 220 packs. Using the midpoint method, show how Local Mart can use these PED figures to decide whether to cut prices permanently on either product, and assess which product is the better candidate for a permanent price cut. Show calculations and use the data to support your analysis.

(Total for Question 7 is 8 marks)

---

8 Total revenue test for a retailer's bottled water using whole numbers.

(a) A shop sells bottled water for GBP 1 each and sells 500 per week. The shop raises price to GBP 1.20 and weekly sales fall to 450. Calculate total revenue before and after the price change and state whether demand appears elastic, inelastic or unitary using the total revenue test. **(3)**

(b) Give one reason why the total revenue test might give a different conclusion from an arc PED calculation. **(1)**

(Total for Question 8 is 4 marks)

---

9 Short classification: necessity versus luxury and time period effect.

(a) State whether demand for insulin (a life-preserving medicine) is likely to be price elastic or inelastic and give a one-sentence reason. **(1)**

(b) Explain briefly why demand for consumer electronics tends to become more elastic over time after an initial price rise. **(1)**

(Total for Question 9 is 2 marks)

10 Short calculation linking PED and margin: consider a retailer with constant marginal cost.

(a) A retailer buys a gadget at a constant marginal cost of GBP 10. If demand is price inelastic with PED = 0.5, should the retailer raise price to increase profit margin? Explain using simple reasoning about revenue and quantity effect. No precise profit calculation needed. **(3)**

(b) State one practical factor the retailer should consider before raising the price, despite the inelastic PED. **(1)**

(Total for Question 10 is 4 marks)

---

11 A short applied problem: computing arc PED and comparing revenue changes across two price moves for a clothing retailer.

(a) A clothing retailer sells a jacket at GBP 50 and sells 80 per month. The retailer trials a price cut to GBP 40 and sales rise to 140 per month. Using the midpoint method, calculate PED to two decimal places and classify the demand. **(3)**

(b) Calculate total revenue before and after the price cut and explain whether the retailer should consider making the cut permanent based on revenue alone. **(3)**

(Total for Question 11 is 6 marks)

---

12 Short applied classification: addictiveness and habit formation effect on PED.

(a) State whether nicotinegum is likely to have higher or lower PED than chocolate bars and give one reason. **(1)**

(b) Give one policy implication for governments from the low PED of addictive products. **(1)**

(Total for Question 12 is 2 marks)

---

13 Evaluate the view that firms should always raise prices for goods with inelastic demand. In your answer, consider the relationship between PED and total revenue, the role of costs and profit margins, firm objectives other than revenue maximisation, time period effects, and potential long-term changes in elasticity. Use diagrams where helpful; describe any diagram you would draw and the features to label.

(Total for Question 13 is 15 marks)

---

14 Short evaluation: should a supermarket always raise prices on inelastic basic goods during peak demand?

(Total for Question 14 is 5 marks)

Mark scheme · ECO.MIC9 Price Elasticity of Demand: Determinants and Business Applications

Question 1

- **B1** a measure of the responsiveness of quantity demanded to a change in price, with formula PED = % change in quantity demanded / % change in price
- **Answer: PED = percentage change in quantity demanded divided by percentage change in price; it measures responsiveness of quantity demanded to price changes.**

Question 2

- **B1** price elastic means PED > 1, so the percentage change in quantity demanded is greater than the percentage change in price
- **Answer: Price elastic means PED greater than 1; quantity demanded changes by a larger percentage than the price change.**

Question 3

- (a) **M1** percentage change in quantity demanded = (120 - 100) / ((120 + 100)/2) x 100 = 20 / 110 x 100 = 18.18%
- (a) **M1** percentage change in price = (3.50 - 4.00) / ((3.50 + 4.00)/2) x 100 = -0.50 / 3.75 x 100 = -13.33%
- (a) **A1** PED = 18.18% / 13.33% = 1.36 (awrt 1.36), using absolute value
- **(a) Answer: PED (arc) = 1.36 (approximately).**
- (b) **B1** demand is elastic (PED > 1); a small price cut is likely to increase total revenue since quantity demanded rises proportionally more than price falls
- **(b) Answer: Demand is price elastic (1.36), so a small price cut would likely increase the bakery's total revenue.**

Question 4

- (a) **B1** 0.2 is price inelastic (PED < 1), example one-word: salt
- (a) **B1** 1.0 is unitary elastic (PED = 1), example one-word: restaurant-meal
- (a) **B1** infinity is perfectly elastic (PED extremely large), example one-word: identical-commodity
- (a) **B1** 0 is perfectly inelastic (quantity demanded does not change as price changes), example one-word: lifesaving-drug
- **(a) Answer: 0.2 inelastic, e.g. salt; 1.0 unitary, e.g. restaurant-meal; infinity perfectly elastic, e.g. identical-commodity; 0 perfectly inelastic, e.g. lifesaving-drug.**

Question 5

- (a) **M1** percentage change in quantity = (200 - 300) / ((200 + 300)/2) x 100 = -100 / 250 x 100 = -40.00%
- (a) **M1** percentage change in price = (3 - 2) / ((3 + 2)/2) x 100 = 1 / 2.5 x 100 = 40.00%
- (a) **A1** PED = 40.00% / 40.00% = 1.00 (awrt), absolute value
- **(a) Answer: PED (arc) = 1.00.**
- (b) **B1** unitary elastic (PED = 1); total revenue remains approximately unchanged because the percentage fall in quantity equals the percentage rise in price
- **(b) Answer: Demand is unitary elastic, so total revenue will stay roughly the same after the price rise.**

Question 6

- **M1** availability of close substitutes increases price elasticity because consumers can switch to alternatives if price rises
- **A1** developed with example: a branded breakfast cereal has many close substitutes so a price rise is likely to cause consumers to switch brands, giving a high PED
- **M1** proportion of income spent affects PED because goods that take a large share of income provoke more careful purchasing decisions and are more price sensitive
- **A1** developed with example: buying a new phone is a large purchase for many households so a price rise may greatly reduce sales, implying a relatively elastic demand
- **M1** contrast with small proportion goods which tend to be price inelastic since the cost is trivial relative to income
- **A1** example: a cheap packet of chewing gum forms a small part of income so quantity demanded is less responsive to price changes, giving low PED
- **Answer: Close substitutes raise PED because switching is easy, e.g. cereal brands; a larger share of income raises PED**

Question 7

- **Level 1** (1-3): Simple calculation or basic statement about elasticity with limited use of the data. Little or no analysis of pricing strategy.
- **Level 2** (4-6): Correct calculations of PED for one or both products and a basic link to revenue implications. Some use of data to support a recommendation, but limited evaluation of other factors.
- **Level 3** (7-8): Accurate PED calculations for both products, clear explanation of revenue effects and a balanced assessment using the data. Considers practical limitations and gives a justified recommendation.
- **Indicative content:**
  - calculate PED for own-brand pasta: quantity change 160 on base 480 average => 33.33% change, price change -0.20 on base 0.90 => -22.22%, PED = 1.50 (elastic)
  - calculate PED for branded pasta: quantity change 20 on base 210 => 9.52% change, price change -0.10 on base 1.45 => -6.90%, PED = 1.38 (elastic)
  - both products show elastic demand (PED > 1), so a price cut tends to raise total revenue; compute revenue before and after for each product to compare gains
  - own-brand revenue before = 1.00 x 400 = GBP 400, after = 0.80 x 560 = GBP 448, revenue up GBP 48
  - branded revenue before = 1.50 x 200 = GBP 300, after = 1.40 x 220 = GBP 308, revenue up GBP 8
  - own-brand pasta shows a larger proportional quantity response and a larger absolute revenue gain, making it a stronger candidate for a permanent price cut
  - limitations: short-run data may reflect trial purchases, stock effects or promotions; consider competition, margin per unit and supply capacity before permanent cuts
  - recommendation should weigh revenue gain, margin, and strategic objectives such as attracting customers into the store

Question 8

- (a) **M1** initial revenue = 1.00 x 500 = GBP 500
- (a) **M1** new revenue = 1.20 x 450 = GBP 540
- (a) **A1** since revenue rose after the price increase, demand is price inelastic over this range
- **(a) Answer: Revenue rises from GBP 500 to GBP 540, so demand appears inelastic.**
- (b) **B1** total revenue test is a quick sign test and can be affected by large discrete changes, while arc PED uses percentage changes and is more precise; also differences can arise from rounding or from non-linear demand curves
- **(b) Answer: The total revenue test is a simple sign test and can differ due to rounding, discrete changes or non-linear demand; arc PED is more precise using percentage changes.**

Question 9

- (a) **B1** price inelastic because it is a necessity with few or no substitutes, so quantity demanded changes little as price changes
- **(a) Answer: Price inelastic, because it is a necessity with no close substitutes.**
- (b) **B1** over time consumers find substitutes, adjust budgets or delay purchases, and more information becomes available, making demand more responsive to price changes
- **(b) Answer: Over time consumers find substitutes and adjust behaviour, so demand becomes more responsive to price changes.**

Question 10

- (a) **M1** if PED = 0.5 (inelastic), a percentage increase in price causes a smaller percentage fall in quantity demanded
- (a) **M1** so total revenue will rise after a price increase, since price rise outweighs quantity fall
- (a) **A1** with constant marginal cost, higher revenue per unit and only a small fall in quantity suggests higher total profit, so raising price is likely profitable
- **(a) Answer: Yes: with PED 0.5, a price increase raises total revenue while quantity falls little, so with constant marginal cost profit is likely to rise.**
- (b) **B1** consider competition and potential entry of substitutes, reputational effects, or the risk of longer term elasticity increasing if consumers find alternatives
- **(b) Answer: The retailer should consider competition and the risk that consumers will switch to substitutes or that elasticity may rise over time.**

Question 11

- (a) **M1** percentage change in quantity = (140 - 80) / ((140 + 80)/2) x 100 = 60 / 110 x 100 = 54.55%
- (a) **M1** percentage change in price = (40 - 50) / ((40 + 50)/2) x 100 = -10 / 45 x 100 = -22.22%
- (a) **A1** PED = 54.55% / 22.22% = 2.45 (awrt 2.45), elastic demand
- **(a) Answer: PED (arc) = 2.45, demand is price elastic.**
- (b) **M1** initial revenue = 50 x 80 = GBP 4000
- (b) **M1** new revenue = 40 x 140 = GBP 5600
- (b) **A1** revenue rises by GBP 1600, so with elastic demand the price cut increased revenue and could be considered for permanence, subject to costs and strategic factors
- **(b) Answer: Revenue rises from GBP 4000 to GBP 5600, so based on revenue alone the price cut looks beneficial.**

Question 12

- (a) **B1** nicotine gum likely has lower PED because addiction/habit makes demand less responsive to price changes compared with discretionary goods like chocolate
- **(a) Answer: Nicotine gum likely has lower PED than chocolate bars because habit and addiction reduce responsiveness to price changes.**
- (b) **B1** governments can use taxation to reduce consumption and raise revenue because price rises have limited effect on quantity, though equity and health impacts must be considered
- **(b) Answer: Policy implication: higher taxes can reduce consumption slightly and raise government revenue because demand is relatively inelastic, but distributional concerns remain.**

Question 13

- **Level 1** (1-3): Basic statements about inelastic demand and price rises, with little development or application. Limited or no use of examples or diagrams.
- **Level 2** (4-6): Simple application of the revenue rule (increasing price raises total revenue when demand is inelastic). Some relevant examples or partial consideration of costs or objectives, but limited evaluation.
- **Level 3** (7-9): Clear explanation of why raising price can increase revenue and profit when demand is inelastic, with consideration of costs, margins and a labelled diagram described. Some evaluation of counterarguments such as competition, long-run elasticity changes and non-revenue objectives.
- **Level 4** (10-12): Developed analysis linking PED, revenue and profit, explicit discussion of the time path of elasticity, strategic reasons not to raise prices, and distributional or reputational effects. Uses examples and assesses likelihoods.
- **Level 5** (13-15): Comprehensive evaluation weighing both sides, showing that while price rises can increase revenue when demand is inelastic, firms should not always do so. Considers costs, competition, dynamic changes in elasticity, multi-product and long-term strategy, and gives a supported conclusion. Describes an appropriate diagram with labels: price, quantity, demand curve inelastic portion, revenue rectangles or TR curve.
- **Indicative content:**
  - explain the revenue rule: when PED < 1, a percentage rise in price causes a smaller percentage fall in quantity, raising total revenue
  - link to profit: if marginal cost is constant, higher revenue per unit raises profit, but must consider margin and fixed costs
  - mention firm objectives: market share, growth, penetration pricing, or corporate social responsibility may make price rises undesirable
  - time period: demand may be more inelastic in the short run but more elastic in the long run as substitutes appear or consumers adjust
  - competition: in competitive markets or online with price comparison, raising price may lose customers to rivals, increasing elasticity faced by the firm
  - dynamic responses: consumer backlash, reputational damage, and regulatory or political attention if price rises affect necessity goods
  - multi-product firms: cross-price effects, complementary goods and joint pricing may change the optimal decision
  - diagram guidance: draw demand curve and show a movement along an inelastic portion where TR rectangles increase, or show TR curve rising on inelastic segment; label axes and areas
  - conclude that while raising price for goods with inelastic demand is often profitable short term, it is not always the correct strategy once wider factors are considered

Question 14

- **M1** identifies argument for raising prices: in peak demand with inelastic demand supermarkets increase revenue and reduce shortages
- **M1** identifies argument against: reputational damage, regulatory scrutiny, fairness concerns and long-run elasticity rising as customers switch stores
- **A1** develops by weighing short-term revenue gain against long-term costs such as loss of customer loyalty and potential fines or boycotts
- **A1** provides a qualified conclusion, e.g. temporary price rises for supply-constrained items may be justified, but permanent or excessive price rises risk harm to the business
- **B1** good answer gives a clear supported judgement referencing both commercial and ethical/regulatory considerations
- **Answer: Temporary price rises may be justified to manage demand and raise revenue, but permanent or heavy price increases risk reputational damage and regulatory action, so supermarkets should not always raise prices on inelastic goods.**