

Past-paper walk-through

Price Elasticity of Supply ■ 2.4

eXercise

Questions in this set

- 2016 Q1
- 2014 Q3

Reading the mark scheme

- **B1** a mark that stands on its own – the point is either made or not.
- **M1** a *method* mark: the right approach, even if the number is wrong.
- **A1** an *answer* mark, and it usually needs its M mark first.
- **C1** a working mark on the way to the answer.
- **//** separates answers the examiner accepts equally.
- **ecf** = error carried forward: a later part is marked on your own earlier answer.
- **owtte** = “or words to that effect” – the wording need not match.

Question 1

2016 ■ Q1

MICROECONOMICS

Section II

Total Time—60 minutes

Reading Period—10 minutes

Writing Period—50 minutes

Directions: You are advised to spend the first 10 minutes reading all of the questions and planning your answers. You will then have 50 minutes to answer all three of the following questions. You may begin writing your responses before the reading period is over. It is suggested that you spend approximately half your time on the first question and divide the remaining time equally between the next two questions. Include correctly labeled diagrams, if useful or required, in explaining your answers. A correctly labeled diagram must have all axes and curves clearly labeled and must show directional changes. Use a pen with black or dark blue ink.

1. The markets for bananas, muffins, and coffee are interrelated, and each market is perfectly competitive.

Question 1

- (a) In the market for bananas, the equilibrium price is \$1.00 per pound, and the equilibrium quantity is 1,000 pounds per week. Suppose the government imposes a price floor on bananas at \$1.20 per pound, causing the quantity supplied to increase to 1,500 pounds per week.
- (i) Would the price floor result in a shortage, a surplus, or neither? Explain.
 - (ii) Calculate the price elasticity of supply if the price increases from \$1 to \$1.20. Show your work.
 - (iii) Between \$1 and \$1.20, is the supply elastic, unit elastic, or inelastic? Explain.
- (b) Bananas are an input for muffins.
- (i) Draw a correctly labeled graph of the market for muffins indicating the equilibrium price and quantity, labeled P_0 and Q_0 , respectively.
 - (ii) On the graph drawn in part (b)(i), show the impact of an increase in the price of bananas on the muffin market, labeling the new equilibrium price and quantity P_1 and Q_1 , respectively.
 - (iii) On the same graph, completely shade the area that represents the **change** in the consumer surplus caused by the increase in the price of bananas.

Question 1

- (c) In the market for coffee, the equilibrium price is \$3.00 per cup and the equilibrium quantity is 100 cups per week. The cross-price elasticity of coffee with respect to muffins is -2 .
- (i) Are coffee and muffins normal goods, inferior goods, complementary goods, or substitute goods?
 - (ii) Assume the supply of coffee is perfectly elastic. Using the equilibrium price and quantity given above, draw a correctly labeled graph for the coffee market, and show the impact of an increase in the price of muffins on the coffee market.
 - (iii) Given the original quantity of 100 cups of coffee per week, if the increase in the price of muffins is 10%, calculate the new equilibrium quantity in the coffee market. Show your work.

Solution 1

(a)(i)

Mark scheme

- Surplus. At the price floor of 1.20 (*above the* 1.00 equilibrium), the price floor is binding/effective, so quantity supplied (1,500 lb/week) exceeds quantity demanded — this excess of Q_s over Q_d is a surplus, not a shortage.

Solution 1

(a)(ii)

Mark scheme

- Price elasticity of supply 2.2–2.5 (either the midpoint or point method earns the point). Midpoint formula: $\% \Delta Q = (1500 - 1000) / 1250 = 0.4 = 40\%$; $\% \Delta P = (1.20 - 1.00) / 1.10 = 0.182 = 18.2\%$; $E = 40\% / 18.2\% = 2.2$. (Equivalently with the point method using the original base: $\% \Delta Q = 500 / 1000 = 50\%$, $\% \Delta P = 0.20 / 1.00 = 20\%$, $E = 50\% / 20\% = 2.5$.) Any correctly-worked elasticity value from a valid formula (2, 2.2, or 2.5) earns the point.

Solution 1

(a)(iii)

Mark scheme

- Elastic. Since the price elasticity of supply calculated above is greater than 1 (the percentage change in quantity supplied exceeds the percentage change in price), supply over this range is elastic.

Solution 1

(b)(i)

Mark scheme

- A correctly labeled graph of the muffin market: Price on the vertical axis, Quantity on the horizontal axis, an upward-sloping supply curve S and a downward-sloping demand curve D intersecting at the initial equilibrium, with the equilibrium price and quantity labeled P_0 and Q_0 respectively (dashed lines dropping to the axes).

Solution 1

(b)(ii)

Mark scheme

- Because bananas are an input to muffins, the rise in the price of bananas raises muffin producers' costs, shifting the muffin supply curve LEFT from S to S_1 . The new intersection with demand D occurs at a higher price and lower quantity, labeled $P_1 (> P_0)$ and $Q_1 (< Q_0)$.

Solution 1

(b)(iii)

Mark scheme

- The area representing the decrease in consumer surplus is the trapezoid bounded above by the new price line P_1 , below by the original price line P_0 , on the left by the price (vertical) axis, and on the right by the (unchanged) demand curve D between the points (Q_1, P_1) and (Q_0, P_0) — i.e., the whole shaded band between P_0 and P_1 under the demand curve, out to Q_0/Q_1 , must be completely shaded.

Solution 1

(c)(i)

Mark scheme

- Complementary goods. The cross-price elasticity of coffee with respect to muffins is negative ($-2 < 0$): a rise in the price of muffins decreases the quantity demanded of coffee, which is the defining property of complements.

Solution 1

(c)(ii)

Mark scheme

- Correctly labeled coffee-market graph: Price on the vertical axis, Quantity on the horizontal axis,
a perfectly elastic (horizontal) supply curve S drawn at $P = 3$, and a downward-sloping demand curve D with initial equilibrium quantity 100 cups/week. Because coffee and milk are substitutes, the demand curve shifts rightward, while the equilibrium quantity falls (to 80 cups/week, from part (c)(iii)).

Solution 1

(c)(iii)

Mark scheme

- $\% \Delta Q = \% \Delta P(\text{muffins}) \times \text{cross-price elasticity} = 10\% \times (-2) = -20\%$.
New equilibrium quantity $= 100 - (0.20 \times 100) = 100 \times (1 - 0.20) = 80$
cups per week. (Using the midpoint formula to back out the same $-20\%/80$
result is also acceptable.)

Question 3

2014 ■ Q3

3. Assume that gasoline is sold in a competitive market in which demand is relatively inelastic and supply is relatively elastic.
- (a) Draw a correctly labeled graph of the gasoline market. On your graph show the equilibrium price and quantity of gasoline, labeled P_E and Q_E .
 - (b) Suppose the government imposes a \$2 per unit tax on the producers of gasoline. On your graph from part (a), show each of the following after the tax is imposed.
 - (i) The price paid by buyers, labeled P_B
 - (ii) The after-tax price received by sellers, labeled P_S
 - (iii) The quantity, labeled Q_T
 - (c) Using the labeling on your graph, explain how to calculate the total tax revenue collected by the government.

STOP

END OF EXAM

Solution 3

(a)

Mark scheme

- Draw a correctly labeled supply-and-demand graph of the gasoline market — downward-sloping demand (D), upward-sloping supply (S) — with their intersection labeled as the equilibrium price P_E and quantity Q_E .

Solution 3

(b)(i)

Mark scheme

- After the \$2 per-unit tax on producers shifts the supply curve up/left to $S + \text{Tax}$, show the new price paid by buyers, P_B , above P_E — read off the original demand curve (D) at the new quantity Q_T .

(b)(ii)

Mark scheme

- Show the after-tax price received by sellers, P_S , below P_E — read off the original supply curve (S) at the new quantity Q_T (equivalently, $P_S = P_B - \$2$, the size of the tax).

Solution 3

(b)(iii)

Mark scheme

- Show the new (post-tax) equilibrium quantity, Q_T , at the intersection of $S + \text{Tax}$ and demand (D); Q_T is less than the original equilibrium quantity Q_E , since the tax raises the buyer price and reduces quantity transacted. (Drawing the $S + \text{Tax}$ curve is not required — a 'tax wedge' approach between the demand and supply curves at Q_T is also acceptable.)

Solution 3

(c)

Mark scheme

- Total tax revenue = tax per unit $\times$ after-tax quantity = $(P_B - P_S) \times Q_T = 2 \times Q_T$ (equivalently written as $(P_B \times Q_T) - (P_S \times Q_T)$, or $\text{Tax} \times Q_T$), using the buyer price, seller price, and post-tax quantity labeled on the graph.

Solution 3

(d)

Mark scheme

- The tax burden falls more on buyers and less on sellers, because demand is more inelastic (steeper/less price-responsive) than supply — the side of the market with the less elastic response bears the larger share of a per-unit tax, and here buyers reduce their quantity demanded less than sellers reduce quantity supplied.