

Chapter 6 Elasticity

Answers to Knowledge checks

- 6.1** The *PED* is always negative because the demand curve is downward sloping, so that an increase in price will result in a fall in quantity demanded (and vice versa).
- 6.2** A *PED* of -0.3 indicates that demand is relatively inelastic.
- 6.3** When demand is relatively elastic, an increase in price will lead to a fall in total revenue, as the percentage fall in quantity demanded will more than offset the increase in price per unit.
- 6.4** The *YED* in this case would be -2 .
- 6.5** A negative *XED* would indicate that the goods were complements.
- 6.6** The *PES* is positive because the supply curve is upward sloping — firms in a competitive market will be prepared to supply more output at a higher price.
- 6.7** The supply curve is likely to be more elastic in the long run because the firm has more time to adjust to a changing market environment.

Answers to Exercises and Case studies

Exercise 6.1

- a** See Figure A6.1.

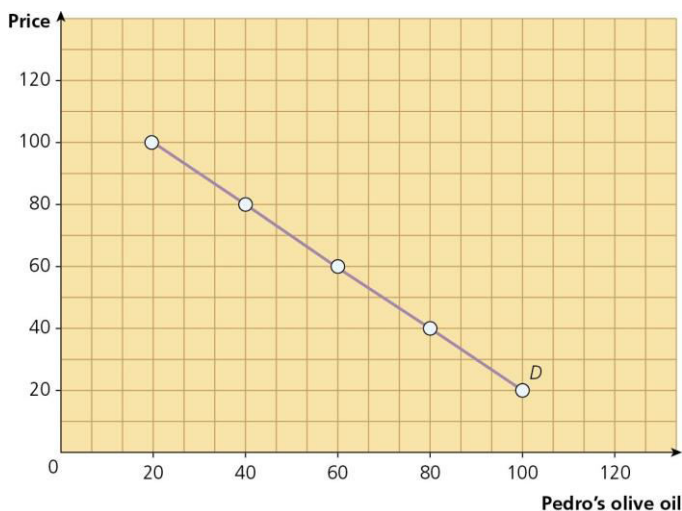


Figure A6.1 The demand for Pedro's olive oil

- b** The elasticity is calculated as the percentage change in quantity demanded divided by the percentage change in price. When the price rises from £8 to £10, the quantity demanded falls from 40 to 20. The percentage change in quantity is therefore $100 \times -20/40$, and the percentage change in price is $100 \times 2/8$. Therefore, the elasticity is $-50/25 = -2$.
- c** An increase in price from £6 to £8 (which is an increase of 33.3%) leads to a decrease in the quantity demanded from 60 to 40 (which is -33.3%), so the elasticity is -1 .
This is because we are starting at the mid-point of the demand curve, which is the point at which we observe unit elasticity.
- d** An increase in price from £4 to £6 (which is an increase of 50%) leads to a decrease in the quantity demanded from 80 to 60 (which is -25%), so the elasticity is -0.5 .

This demonstrates the way in which the price elasticity of demand varies along a straight-line demand curve, being elastic at relatively high prices and inelastic when price is relatively low. Unit elasticity occurs at the mid-point.

Exercise 6.2

- a An increase in the quantity demanded from 150 to 165 is an increase of 10%, so the income elasticity of demand (*YED*) is $10/5 = +2$. This is an elastic normal good.
- b *YED* is -0.5 . This is an inelastic inferior good.
- c *YED* is $+0.4$. This is an inelastic normal good.
- d *YED* is -4 . This is an elastic inferior good.
- e If the quantity demanded does not change, the *YED* is zero: there is no relationship between income and quantity demanded.

Exercise 6.3

- a If the quantity demanded of a good increases from 200 to 260 following a 15% increase in the price of another good, the cross elasticity of demand (*XED*) is calculated as the percentage change in quantity demanded (30% in this case) divided by the percentage change in the price of the other good. In this case the *XED* is $+2$, so the two goods are (elastic) substitutes.
- b The *XED* is -1.5 : the goods are (elastic) complements.
- c The *XED* is $+0.8$: the goods are (inelastic) substitutes.
- d The *XED* is -0.4 : the goods are (inelastic) complements.
- e If the quantity demanded does not change, the *XED* is zero: the goods are unrelated (neither substitutes nor complements).

Exercise 6.4

- a If the quantity supplied increases from 500 to 800 (60%) following an increase in price of 20%, the price elasticity of supply (*PES*) is $+3$: supply is price-elastic.
- b The *PES* is $+0.5$: supply is price inelastic.
- c The *PES* is 0: supply is perfectly inelastic.

Exercise 6.5

First of all, notice that your company is making a loss, so you need to take some action. The first piece of information you look at is the *PED*, where you see that you face elastic demand, with the price elasticity being -1.58 . So if you were to increase your fares by 10% (and if your company faced the same elasticity as the average for the market), you would expect to see a fall in demand of 15.8%, and a fall in revenues. On the other hand, if you were to reduce your fares by 10%, revenue would increase following a 15.8% increase in demand.

However, you need to be aware of market conditions. The economy is heading into a recession, and you are faced with a *YED* that is strongly negative (-2.43). In other words, bus travel is an inferior good. This is good news for you as it means that, as incomes fall in the recession, more people will use the buses, and you will enjoy an increase in demand.

Whether the cross-price elasticity will be helpful to you depends on what is happening in the market for rail travel. If you happen to know that rail fares are about to increase, then again this is good news for you, as bus travel is a strong substitute for rail travel. For a 10% increase in train fares, there will be a 22.1% increase in the demand for bus travel.

These elasticities therefore help you to make a reasoned decision on pricing, depending on what is happening in the economy as a whole, and in the markets for close substitutes, such as rail

travel. The *PES* is less helpful to you. It tells you how you would respond to a change in price — but you probably know that anyway.

Case study 6.1

Rice

- a** The demand for rice is likely to be price inelastic.
- b** In the passage, we read that rice is a staple food, and a part of the daily diet of many people in Southeast Asia. This suggests that the demand for rice is likely to be inelastic. Another way of interpreting the fact that a commodity is a staple food is to say that there are no substitutes that people find acceptable for it: they perceive rice to be a necessity. This being the case, demand is likely to be highly inelastic. An increase in the price of rice will not have a substantial effect on demand, as people will continue to demand it. This is further supported in the passage, which describes how some households have reduced their consumption of other commodities such as meat in order to be able to maintain their consumption of rice.
- c** Will government intervention to control the price be effective? A full answer to this question takes us into Chapter 10, which will explain how the price of a good comes to be set in a market when the government decides to intervene. However, you may well have begun to anticipate this discussion. If there is not enough rice to go round, then no action by the government to control the price can reach the heart of the problem. Indeed, we may view price as one way of trying to ration a limited amount of a commodity. If the quantity of the commodity is limited, then some form of rationing is needed. If not price, then some other way is needed.

Case study 6.2

Bicycles

- a** One important reason for the change in the pattern of traffic between cars and bicycles in China over the period described is likely to have been the increase in real incomes of households. With higher incomes, more households may be able to afford to buy cars, rather than relying on bicycles or public transport. It is also possible that cars have become more available in China as part of the economy's transformation to a more diversified structure. However, the passage does not tell us about this.
- b** It is quite possible that the income elasticity of demand for bicycles in China could be negative — at least in the urban areas. In other words, bicycles could be an example of an inferior good, whereby as incomes rise, more people demand cars, and therefore reduce their demand for bicycles.
- c** On the other hand, the income elasticity of demand for cars is likely to be positive, and perhaps strongly so. Here we have an example of a normal good, possibly even a luxury good (a good for which the income elasticity of demand is greater than 1).

Case study 6.3

Fish

- a** Once the fishermen have returned from their fishing, the supply of fish is fixed, so supply is likely to be perfectly inelastic on that day. Fish cannot have been stored from the previous day, as this is not possible. The supply curve is vertical.
- b** If there is a record catch of fish, the supply will be far to the right. With demand unaffected, the result will be that price will be much lower. You can see this in Figure A6.2.

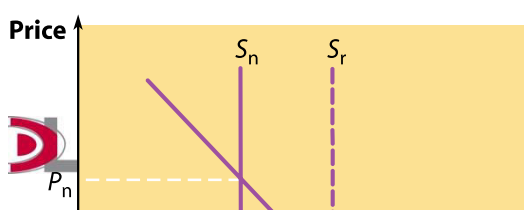


Figure A6.2 The market for fish

Here, S_n represents supply on a 'normal' day and D represents the demand curve. The equilibrium price is P_n . When there is a record catch, supply is to the right at S_r , and with demand unchanged the equilibrium price falls to P_r .

- c** On the next day, it is possible that some fishermen will be so discouraged by the fall in the price of fish that they will not think it worthwhile to go out fishing. If this is the case, they may choose to do something else the next day, and this will mean the supply curve is likely to be further to the left. Another way of interpreting this is that the long-run supply curve is more elastic than that in the short run.
- d** A technological advance that reduces the cost of catching fish (e.g. in terms of the opportunity cost of other activities) will shift the supply curve to the right.
- e** One way of looking at this change is that the size of the market has increased, as fish can now be sold to the neighbouring island as well as 'at home'. This would be seen as a shift of the demand curve, which (*ceteris paribus*) would result in a higher equilibrium price. In the longer term, this may lead more islanders to engage in fishing, therefore shifting the supply curve also.

Answers to end-of-chapter questions

A Multiple-choice questions

- 1** c. The responsiveness of quantity demanded to a change in price
- 2** a. -5
- 3** d. A superior service
- 4** a. An increase in quantity supplied of 2%

B Knowledge and understanding questions

- 5** $\text{£}5 - \text{£}4 = \text{£}1$ (decrease)

$$-\text{£}1/\text{£}5 \times 100 = -20\% \text{ – change in price}$$

$$500 \text{ units} - 400 \text{ units} = 100 \text{ units (increase)}$$

$$100 \text{ units}/400 \text{ units} \times 100 = +25\% \text{ – change in quantity demanded}$$

$$+25\%/-20\% = -1.25 \text{ (answer)}$$

Note: Allow 1 mark for an answer that makes one error in calculation under the own figure rule

Correct answer (with or without working)	2 marks
Correct calculation of change in price AND correct calculation of percentage change in	1 mark

quantity demanded	
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- 6 Current sales revenue is $200 \times £0.60 = £120$ (1 mark)

Change in price is $£0.63 - £0.60 = £0.03$ (increase) $£0.03/£0.60 \times 100 = +5\%$ (1 mark)

Therefore the change in QD must be -2.5% (1 mark)

2.5% of 200 is 5 chocolate bars, so new demand is 195 chocolate bars

New sales revenue is $195 \times £0.63 = £122.85$

Therefore the change in sales revenue is **£2.85 (answer)** (1 mark) = (4 marks total)

Each correct stage of the calculation (own figure rule applies for errors within stages of the calculation)	1 mark up to max 4 marks
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- 7 Factors may include:

- If the hairdresser has spare capacity in his or her salon
- How long it takes to cut/style a customer's hair
- How quickly the hairdresser can recruit (or make redundant) new labour
- How quickly the hairdresser can expand or reduce the capacity of the salon
- Access to capital

Two factors explained	4 marks
One factor explained AND one factor identified	3 marks
One factor explained OR two factors identified	2 marks
One factor identified	1 mark

C Stimulus response question

- 8 a Cross elasticity of demand is a measure of the sensitivity of quantity demanded of a good or service to a change in the price of some other good or service.

A full explanation of cross elasticity of demand	2 marks
A vague or partial explanation of cross elasticity of demand	1 mark

- b $£800 - £600 = £200$ (decrease)

$-£200/£800 \times 100 = -25\%$ – change in price

80,000 phones – 40,000 phones = 40,000 phones (decrease)

$-40,000 \text{ phones} / 80,000 \text{ phones} \times 100 = -50\%$ – change in quantity demanded

$-50\% / -25\% = +2$

Note: Allow 1 mark for an answer that makes one error in calculation under the own figure rule

Correct answer (with or without working)	2 marks
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Correct calculation of change in price AND correct calculation of percentage change in quantity demanded	1 mark
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C A cross elasticity of demand of -2 means that the goods are complements (1 mark). This means that the price of the contract and the quantity demanded for the phone have an inverse relationship (1 mark).

D Essay question

9

AO1 Knowledge	3 marks
AO2 Application	4 marks
AO3 Analysis	6 marks
AO4 Evaluation	7 marks

Knowledge (3 marks) is likely to include:

- Income
- Income elasticity of demand
- Normal/superior/luxury goods

Application (4 marks) is likely to include:

- Application to the market for overseas holidays

Analysis (6 marks) is likely to include:

Analysis of the effects of a fall in income on the market for holidays overseas, for example:

- An explanation of the effects of a fall in income on a luxury/superior product — as income decreases demand also decreases
- A graph showing the effects of a fall in income on the demand curve, leading to a fall in the equilibrium price and quantity

Evaluation (7 marks) is likely to include:

Evaluation that demand for overseas holidays may not decrease, for example:

- Overseas holidays may not be a superior good
- The price of domestic holidays may be increasing more, leading to consumers substituting overseas holidays for domestic ones — so demand does not decrease

Evaluation that the effects may not be as substantial as expected, for example:

- The supply of overseas holidays increases, leading to no change in the quantity demanded, only a fall in price
- The change in income may be insignificant

A judgement of the extent to which a fall in income will always lead to lower sales of holidays overseas