Chapter 4

5. In 2003, when music downloading first took off, Universal Music slashed the average price of a CD from $21 to $15. The company expected the price cut to boost the quantity of CDs sold by 30 percent, other things remaining the same.

   a. What was Universal Music's estimate of the price elasticity of demand for CDs?

      Using the data in the question, the price elasticity of demand is 0.90. The change in the price is $6 and the average of the two prices is $18, so the percentage change in the price is ($6/$18) × 100, which equals 33.3 percent. The increase in the quantity demanded was estimated to be 30 percent. The price elasticity of demand equals (30.0 percent)/(33.3 percent), or 0.90.

   b. If you were making the pricing decision at Universal Music, what would be your pricing decision? Explain your decision.

      The demand is inelastic, so if nothing else changes the price cut leads to a decrease in Universal Music's total revenue. However, downloaded music and CDs are substitutes for each other and the quantity of downloaded music was forecast to rise substantially. Effectively, the price of downloading music fell as more people gained access to the Internet and download sites proliferated. The fall in the price of the substitute, downloaded music, decreases the demand for Universal Music's CDs, so the decision to cut prices most likely was forced as the result of the (forecasted) decrease in demand for CDs.

9. The table sets out the supply schedule of jeans.

Price (dollars per pair)	Quantity supplied (millions of pairs per year)
120	24
125	28
130	32
135	36

   a. Calculate the elasticity of supply when the price rises from $125 to $135 a pair.

      The elasticity of supply equals the percentage change in the quantity supplied divided by the percentage change in price. The percentage change in the quantity demanded equals [(36 − 28)/32] × 100, which is 25.0 percent. The percentage change in the price equals [($135 − $125)/$130] × 100, which is 7.7 percent. The elasticity of supply equals (25.0 percent/7.7 percent), which is 3.25.

   b. Calculate the elasticity of supply when the average price is $125 a pair.

      To find the elasticity at an average price of $125 a pair, change the price such that $125 is the average price—for example, a rise in the price from $120 to $130 a pair. To calculate the elasticity when the average price is $125, calculate the elasticity over the price range from $120 to $130. The percentage change in the quantity demanded equals [(32 − 24)/28] × 100, which is 28.6 percent. The percentage change in the price equals [($130 − $120)/$125] × 100, which is 8.0 percent. The elasticity of supply equals (28.6 percent/8.0 percent), which is 3.58.

   c. Is the supply of jeans elastic, inelastic, or unit elastic?

      The supply of jeans is elastic.

12. a. What happens to total revenue if the price falls from $400 to $350 a chip and from $350 to $300 a chip?

Price (dollars per chip)	Quantity demanded (millions of chips per year)
200	50
250	45
300	40
350	35
400	30

When the price of a chip is $400, 30 million chips are sold and total revenue equals $12,000 million. When the price of a chip falls to $350, 35 million chips are sold and total revenue is $12,250 million. The total revenue increases when the price falls.

When the price is $350 a chip, 35 million chips are sold and total revenue is $12,250 million. When the price of a chip is $300, 40 million chips are sold and total revenue decreases to $12,000 million. The total revenue decreases as the price falls.

b. At what price is total revenue at a maximum?

Total revenue is maximized at $350 a chip. When the price of a chip is $300, 40 million chips are sold and total revenue equals $12,000 million. When the price is $350 a chip, 35 million chips are sold and total revenue equals $12,250 million. Total revenue increases when the price rises from $300 to $350 a chip. When the price is $400 a chip, 30 million chips are sold and total revenue equals $12,000 million. Total revenue decreases when the price rises from $350 to $400 a chip. Total revenue is maximized when the price is $350 a chip.

13. At an average price of $350, is the demand for chips elastic, inelastic, or unit elastic? Use the total revenue test to answer this question.

The demand for chips is unit elastic. The total revenue test says that if the price changes and total revenue remains the same, the demand is unit elastic at the average price. For an average price of $350 a chip, cut the price from $400 to $300 a chip. When the price of a chip falls from $400 to $300, the total revenue remains at $12,000 million. So at the average price of $350 a chip, demand is unit elastic.

14. At $250 a chip, is the demand for chips elastic or inelastic? Use the total revenue test to answer this question.

The demand for chips is inelastic. The total revenue test says that if the price falls and total revenue falls, the demand is inelastic. When the price falls from $300 to $200 a chip, total revenue decreases from $12,000 million to $10,000 million. So at an average price of $250 a chip, demand is inelastic.

15. Your price elasticity of demand for bananas is 4. If the price of bananas rises by 5 percent, what is

a. The percentage change in the quantity of bananas you buy?

The quantity of bananas you buy decreases by 20 percent. The price elasticity of demand equals the percentage change in the quantity demanded divided by the percentage change in the price. Rearranging this formula shows that the percentage change in the quantity demanded equals the price elasticity of demand multiplied by the percentage change in the price. The percentage change in the quantity demanded equals 4×5 percent, which is 20 percent.

b. The change in your expenditure on bananas?

Your total expenditure decreases because your demand is elastic. The fall in expenditure is *approximately* 15 percent, the 5 percent rise in price offset by the 20 percent decrease in the quantity purchased.

Use this information to work Problems 17 and 18.

Recession Has Led To Spending On Food Falling By 8.5%, Say Researchers

Families in Britain, especially the ones with children, have altered their eating habits in the face of recession. Less is spent on fruit and vegetables and more on processed foods lacking in nutrition.

Source: *The Guardian*, November 4, 2013

17. Given the prices, is the income elasticity of demand for fruit and vegetables positive or negative? Are fruit and vegetables a normal good or an inferior good? Are processed foods a normal good or inferior good?

    As income falls in the recession, the income spent on fruits and vegetables decreases, the income elasticity of demand for fruit and vegetables is positive, so fruit and vegetables are a normal good. As income falls in the recession, the income spent on processed foods increases, the income elasticity of demand for processed foods is negative, so processed foods are an inferior good.

18. Are fruits and vegetables and processed foods substitutes? Explain.

    Fruits and vegetables and processed foods are substitutes as food is a necessity. The article points out that in the face of the recession which began in 2008, families in Britain were substituting processed foods for fruits and vegetables. However, to be sure that they are substitutes, the cross price elasticity of demand should be calculated. In this case, prices are not given, so it cannot be computed.

19. When Alex's income was $3,000, he bought 4 bagels and 12 donuts a month. Now his income is $5,000 and he buys 8 bagels and 6 donuts a month. Calculate Alex's income elasticity of demand for (a) bagels and (b) donuts.

    a. The income elasticity of demand equals the percentage change in the quantity demanded divided by the percentage change in income. The change in income is $2,000 and the average income is $4,000, so the percentage change in income equals 50 percent. The change in the quantity demanded is 4 bagels and the average quantity demanded is 6 bagels, so the percentage change in the quantity demanded equals 66.67 percent. The income elasticity of demand for bagels equals (66.67 percent)/(50 percent), which is 1.33.

    b. From part (a), the percentage change in income is 50 percent. The change in the quantity demanded is −6 donuts and the average quantity demanded is 9 donuts, so the percentage change in the quantity demanded is −66.67 percent. The income elasticity of demand for donuts equals (−66.67 percent)/(50 percent), which is −1.33.

26. **Mobile Merger Set for Poor Reception from Users If Prices Rise**
Hutchinson Whampoa, owner of Three, UK's fastest growing mobile network, has started exclusive talks to buy Telefónica's O2 for £10.25 billion. This has caused price-rise concerns among British phone users.

Source: *The Financial Times*, January 23, 2015

a. If the prices of telecom services rise because of the deal, how will this influence the supply of telecom services?

The new clip points out that the deal has caused price-rise concerns among the users. It is likely that the deal will lead to higher prices for mobile tariffs and as a result will cause the overall supply to increase. As the price of telecom services rises, the quantity supplied of telecom services will increase. The supply of telecom service will not change.

b. Given your answer to part (a), explain why Hutchison Whampoa can afford to raise mobile tariffs?

Hutchison Whampoa can afford to raise their prices for mobile tariffs because it assumes that the deal will leave fewer players in an essential market like the telecoms so users will not have many alternatives to choose from. This is because when consumers have less substitutes, their elasticity of demand for telecom services will be inelastic. When demand is inelastic, a price rise will increase Hutchison Whampoa's total revenue.

c. What can you say about the price elasticity of demand for services in the UK telecoms market with respect to the deal between Hutchinson Whampoa and Telefónica?

The price elasticity of demand for services in the UK telecoms market will become more inelastic as the deal would mean fewer available substitutes.