

## Chapter 11 Calculating costs, revenues and profits

### Key terms

**Business activity** Looking at the level of goods and services the business is providing. Businesses can operate through a range of activities from supplying no goods at all up to their maximum capacity.

**Fixed costs** Costs that do not change with the level of business activity. A fixed cost would still exist, and must be paid, even if the business produced and sold nothing.

**Variable costs** Costs that change in direct relation to the level of business activity undertaken. The more the business does, the higher the variable costs become.

**Loss** A loss is made when the business's total costs are greater than the amount of revenue it made from selling its products.

**Profit** A profit will be made by a business if it is able to earn more revenue from selling its goods or services than the total costs generated at that level of business activity.

**Revenue** The amount of income a business makes from selling its goods or services to customers. This is sometimes called sales revenue or total revenue as well.

**Total costs** All the costs (fixed and variable) the business has to meet added together at any particular level of activity.

The aim of this chapter is to provide an understanding of the different types of costs a business faces in its day to day activities, and how these costs and the price the business charges affect the business's ability to generate **revenue** and make **profits**.

### Fixed, variable and total costs

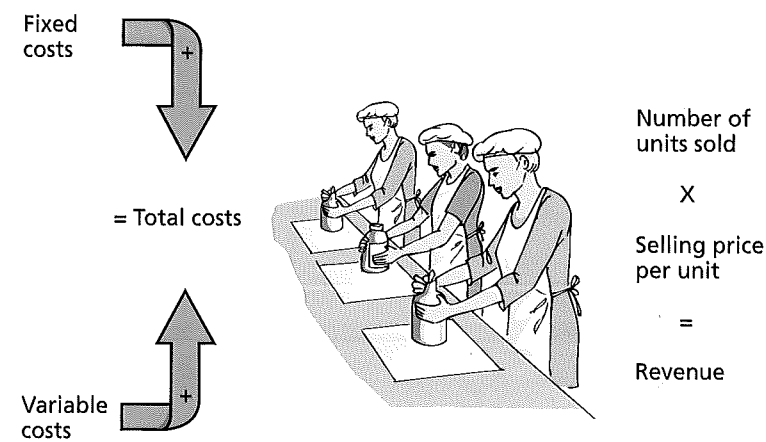


Figure 11.1 Business costs and revenue

If a business does not know how much it costs to produce a product, how does it know how much to sell it for? For any business organisation that has the aim of making a profit, it must be able to calculate how much any level of **business activity** would cost and what revenue it could potentially make from sales. If the business cannot sell its goods or services for an amount greater than the total cost of providing them, then the business will incur a **loss**.

It is vitally important that any business is able to control and manage its costs to try and prevent a loss from happening. To do this effectively, many businesses divide their costs into different categories: **fixed costs** and **variable costs**.

As fixed and variable costs behave differently in relation to the amount of output production or activity the business is engaged in, dividing costs into separate types enables managers to measure the impact of the different costs more easily.

This in turn makes it simpler to assess what level of profit, if any, is likely to be made at different levels of activity.

### Fixed costs

Costs that do not vary in the short term in relation to the level of output or business activity are called fixed costs. This does not mean that these

costs never change, but rather that if the business increases or decreases its volume of production or sales, these costs will not be affected.

Consider a small business like a sandwich shop. An example of a fixed cost might be the rent or mortgage payments on the business's premises. The same amount of rent or mortgage payment has to be paid each month, no matter how many customers the shop has or how many sandwiches are made. In the short term the business faces a fixed cost – a cost that has to be paid no matter what the level of business activity is.

Figure 11.1 shows that it does not matter if the business produces and sells 400 sandwiches, 200 or none at all; it must pay the same £300 at each and every level of output.

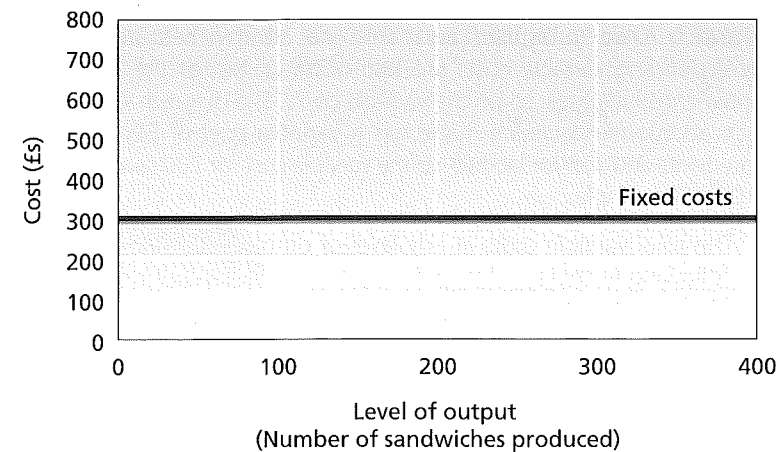


Figure 11.2 Fixed costs diagram

Other fixed costs that a business might have to pay could include business rates, insurance costs or the monthly salaries of managers. It is important to note that fixed costs only remain fixed for the short-term; in the longer term a business may well need to expand its premises or managers will want a pay rise which would lead to increases in the level of fixed costs.

### Variable costs

Variable costs are the total opposite of fixed costs. This type of cost does vary in direct relation to the level of output or activity. So if, in our example, the sandwich shop started to produce and sell more sandwiches every day, these costs would increase as the number of sandwiches made increased.

Variable costs include items such as raw materials or the wages paid to staff. So in the production of a sandwich, the variable costs would include the cost of the ingredients for that sandwich and the employee's time taken to make it. Obviously, the more sandwiches that are made, the more ingredients and labour time that are required in order to make them, and thus the variable costs rise as the output of sandwiches also rises.

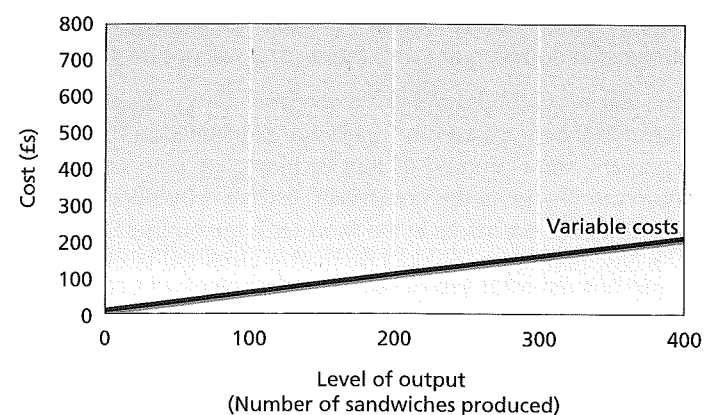


Figure 11.3 Variable costs diagram

The variable costs diagram (see Figure 11.3) demonstrates that if the sandwich shop produced and sold no sandwiches at all, the corresponding variable costs are also nothing, but as the output of sandwiches increases, so do the variable costs. The diagram shows that each additional sandwich made has a variable cost of 50p (40p for ingredients and 10p for labour), so the variable cost for 200 sandwiches = £100, for example.

The total variable costs at any level of output can be found using the following formula.

$$\text{Total variable costs} = \frac{\text{Variable costs per unit}}{\text{The number of units produced}}$$

So in the sandwich shop, for example, the total variable costs for making 400 sandwiches would be:

$$50p \times 400 = \text{£}200.$$

### Total costs

The **total costs** for any level of output can be calculated by simply adding the variable costs at that level of output to the fixed costs.

$$\text{Total costs} = \text{Total variable costs} + \text{Total fixed costs}$$

The total cost of production is an important piece of information. Owners and managers need to know the value of total costs at different levels of output so they can take decisions on how many to produce and the resources required to do so.

Figure 11.4 demonstrates how total costs for the sandwich shop are found by adding fixed and variable costs together.

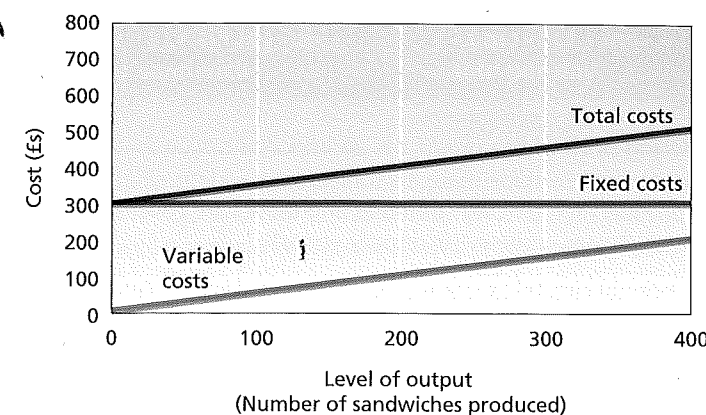


Figure 11.4 Total costs diagram

They can also use the total costs figure to calculate the total costs per unit, in other words, how much each individual product cost to make. This is done using the formula:

$$\text{Total costs per unit} = \frac{\text{Total costs}}{\text{Number of units produced}}$$

### Activity

Activon manufacture quality recordable DVDs from their factory in Bristol that they then sell to computer retail outlets. The table below lays out

their monthly production and cost schedule for different levels of output.

Monthly production of DVDs	Monthly fixed costs	Monthly variable costs	Total costs
0	£20,000	0	£20,000
20,000	£20,000	£1,600	
40,000	£20,000	£3,200	
60,000	£20,000	£4,800	
80,000	£20,000	£6,400	
100,000	£20,000		
120,000			
140,000			
160,000	£20,000	£12,800	£32,800
180,000			
200,000	£20,000	£16,000	£36,000

- 1 Complete the costs data for Activon's monthly production schedule.
- 2 Calculate the variable costs of producing one DVD.
- 3 Calculate the total costs per unit (total costs of manufacturing *one* DVD) at 20,000, 140,000 and 200,000 units of output.

## Price, total revenue and profit

### Price

The selling price of the product is an important issue in any business. Businesses will examine many factors when deciding what price to sell their products for. (Pricing strategies and tactics are covered in detail in Chapter 32 or by visiting the bized website).

In normal circumstances if a business reduces its selling price it can expect demand to increase and to sell more of its product. Similarly, a rise in price can be expected to reduce sales. The size of the rise or fall in sales will depend upon many factors, influencing the demand for that product including:

- the loyalty of customers
- competitors' prices
- the quality of the product in question.

The big issue that businesses face, however, is how the price they choose to sell their product at affects their total revenue.

### Total revenue

A business's total revenue is its income or earnings over a period of time. You may also come across the terms sales revenue or turnover which have the same meaning. Businesses calculate their revenue from the sales of their products using the formula:

$$\text{Total (sales) revenue} = \text{selling price per unit} \times \text{quantity sold}$$

\*Where a business sells a range of different products at varying prices, average selling price per unit is used.

Total revenue therefore also rises in relation to the number of products made and sold. Figure 11.5 demonstrates this for the sandwich shop. Assuming an average selling price per sandwich of £2.00, it can be seen that should the shop make and sell zero amount of sandwiches, then correspondingly the total revenue gained is also zero and that this rises proportionally as each additional sandwich is sold.

Thus for the sandwich shop:

- At 100 sandwiches total revenue (TR) would equal £200.
- At 200 sandwiches total revenue (TR) would equal £400.
- At 400 sandwiches total revenue (TR) would equal £800.

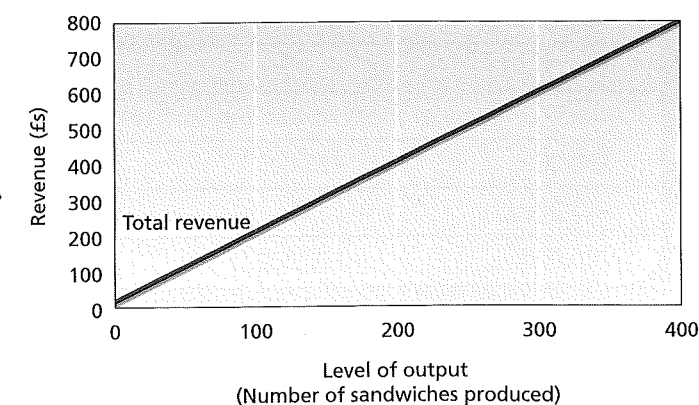


Figure 11.5 Total revenue diagram

Average selling price per sandwich	Number of sandwiches sold per day	Total revenue earned per day
£1.00	650	£650
£2.00	400	£800
£3.00	190	£570

Figure 11.6 Impact of price changes on revenue

Continuing the example of the sandwich shop, Figure 11.6 shows how the selling price of a product can affect the quantity of sandwiches sold and the knock-on effect to the total revenue earned.

If the average price of a sandwich increases from £2.00 to £3.00, the level of sales decreases significantly. This shows that demand for sandwiches is sensitive to price, perhaps because the sandwich shop faces a lot of competition from alternative outlets or products. In this case, increasing the price does not lead to the company making more revenue overall as it loses too many customers in the process.

Similarly if the shop reduces its price from £2.00 for each sandwich to only £1.00, the fall in price does not attract enough new customers into the shop to compensate for the amount of revenue lost from each sale at the lower price. This may be because either the real or perceived quality of the sandwiches provided also decreases.

Some businesses attempt to maximise their revenue by setting a low price and then trying to sell as much as possible. This makes sense in markets where consumers are trying to find the lowest possible price and are not loyal to any particular products or brands. For example, the market for basic foodstuffs is very price-competitive and many supermarkets have adopted a price-cutting approach in recent years to increase their sales and revenues.

On the other hand, some businesses sell products which are unique, currently in fashion or regarded as highly desirable. Some designer clothes producers such as Dior or D&G (right) can charge high prices and generate higher revenues than they might achieve with lower prices. Even though by charging very high prices some sales may be lost, not enough customers are deterred from buying overall as they seek the exclusivity, prestige or status of owning such products.

However, even if a business makes higher total revenue, this does not mean that increased profits are bound to follow.



## Profit

Profit is one of the most important business objectives. It is the profit motive that drives many people towards starting their own business in the first place.

Business owners and managers want to know how successful they have been or how successful their business idea might be. The degree of profit (or loss) made is one of the main ways in which this can be determined. Profit is measured by:

$$\text{Profit} = \text{total revenue} - \text{total costs}$$

So the key to making a profit is how much the business manages to produce (and at what cost), compared to how much the business manages to sell (and at what price).

### COMPARING THE FIGURES

By being able to classify their costs into fixed, variable and total costs, and measure these against the revenues generated at different levels of selling price and quantity, businesses are able to discover some very valuable information. For example:

- How much should they charge?
- How many do they have to sell to cover their costs and avoid losing money?
- How many do they need to sell to make an acceptable level of profit?
- At the forecast level of potential demand, is this sufficient to enable a new business to make a profit at all?
- If things change, how much can they afford to drop the selling price by, or let costs rise, before they start losing money?

Consider the information so far on our sandwich shop as shown in Figure 11.7.

Number of sandwiches sold per day	Average selling price per sandwich	Total revenue earned per day	Total costs (fixed+variable)	Profit/(Loss)
650	£1.00	£650	£300 + (650 x 50p) = £625	£25
400	£2.00	£800	£300 + (400 x 50p) = £500	£300
190	£3.00	£570	£300 + (190 x 50p) = £395	£175

Figure 11.7 Comparison of costs, revenue and profit

Producing a table or chart such as Figure 11.7 allows owners or managers to see the relationship between costs, revenues and profits at different levels of output and selling price, and so make informed decisions on how to run their business, or even in some cases, if it was worth setting one up in the first place.

For example, using Figure 11.7, the owner of our sandwich shop would be able to see that even though the total revenue gained from selling sandwiches at £1.00 is greater than that generated when the sandwiches are sold for £3.00 overall, at a selling price of £1.00 each the business would only make £25. Thus they would be able to know even before they started that they potentially need to sell their sandwiches at around the £2.00 level and can now assess their probable level of custom at this price.



Further material and resources relating to this section can be found at [www.collins.bized.co.uk](http://www.collins.bized.co.uk). Keep checking for updates.

## Calculating costs, revenues and profits:

### Summary

- Fixed costs are those such as rent, which remain unchanged when the level of business activity (output) alters. Variable costs, by contrast, alter in direct relation to changes in the level of activity.
- Revenue is determined by the price charged by the business for its product and the level of sales generated at that price.
- Profits are calculated by deducting total costs (fixed costs + variable costs) from the total revenue.

### Summary questions

- 1 Explain the difference between a fixed and a variable cost with the aid of examples.
- 2 Calculate the total cost of manufacturing 70,000 units of output when fixed costs = £43,000 and variable costs = £2 per unit for labour and £1.25 per unit for materials.
- 3 Calculate the cost per unit when:
  - fixed costs are £3,000
  - variable costs per unit are £10
  - current output and sales equal 500 units.
- 4 Calculate total revenue when 2,500 units are sold for £6 each. Show the formula and your workings.
- 5 Explain why raising the selling price of a product does not always mean more revenue will be made overall.
- 6 (a) A business sells 20,000 MP3 players per year at an average selling price of £45. Its variable costs are £25 per unit and its annual fixed costs are £24,000. What is the total cost of producing the 20,000 units and what profit would it make if it sold all the units produced?  
 (b) Calculate the effect on profits if the business raised its selling price to £50 per MP3, but the amount made and sold fell to 16,000 units.

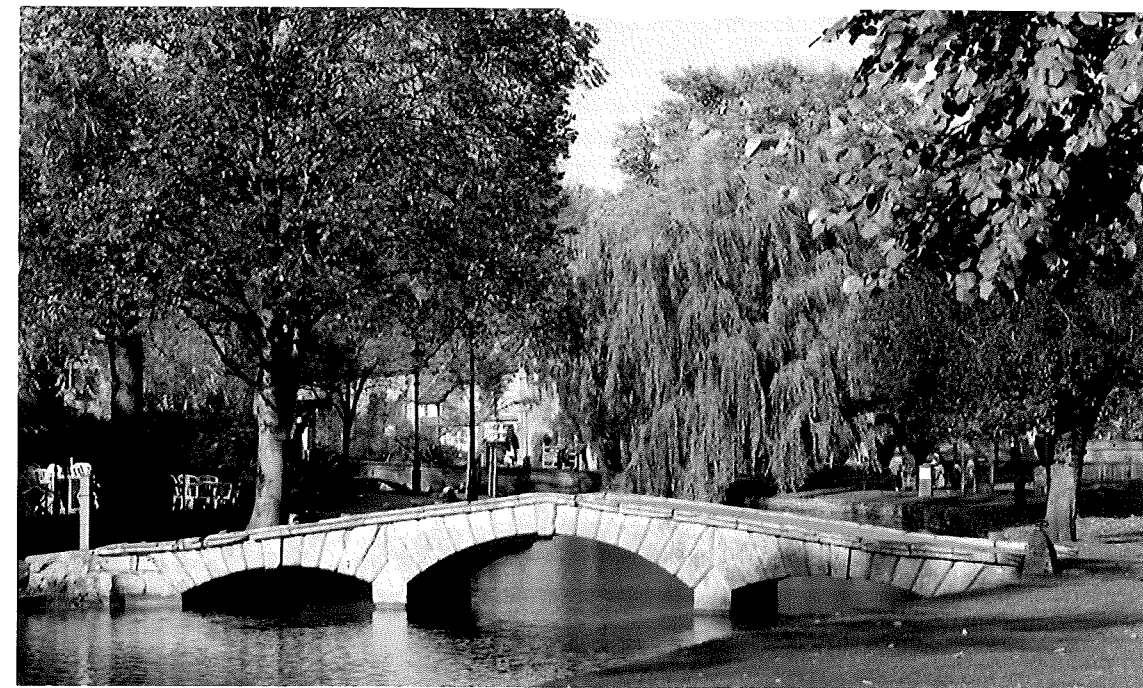
### Points for discussion

- Discuss the reasons why raising prices might not result in higher revenue or profits for a business.
- Examine if owners/managers have more control over fixed costs or variable costs.

### Exam practice

Mary and Jack Tweddle own and run the Cotswold Hotel in Bourton-on-the-Water, Gloucestershire. They rely on the summer tourist trade to generate most of their profit. Their fixed costs are £12,000 per month. Their variable costs amount to £10 per customer per night. They currently charge £40 per customer per night. They can accommodate 20 customers at a time, totalling a maximum of 600 customers during a month. From June through to August, the hotel is completely full. On average, the hotel is only half full for the rest of the year. Mary and Jack are keen to find ways to increase the profitability of their business and are considering a range of options:

- increasing their charge to £55 per customer per night
- seeking to reduce the variable cost per customer per night to £8
- building additional rooms to increase the hotel's capacity to 800 customers per month
- raising the hotel's profile with an extensive marketing campaign.



Bourton-on-the-Water

- 1 Define the terms:
  - fixed costs
  - variable costs. (5 marks)
- 2 Calculate the current level of yearly profit made by the Cotswold Hotel. (10 marks)
- 3 Analyse the possible effect a change in price to £55 per customer per night might have on the level of total revenue generated by the Cotswold Hotel. (10 marks)
- 4 Evaluate the possible courses of action available to Mary and Jack for increasing the profitability of their business. (15 marks)

Total: 40 marks