

3 Production, costs and revenue — answers

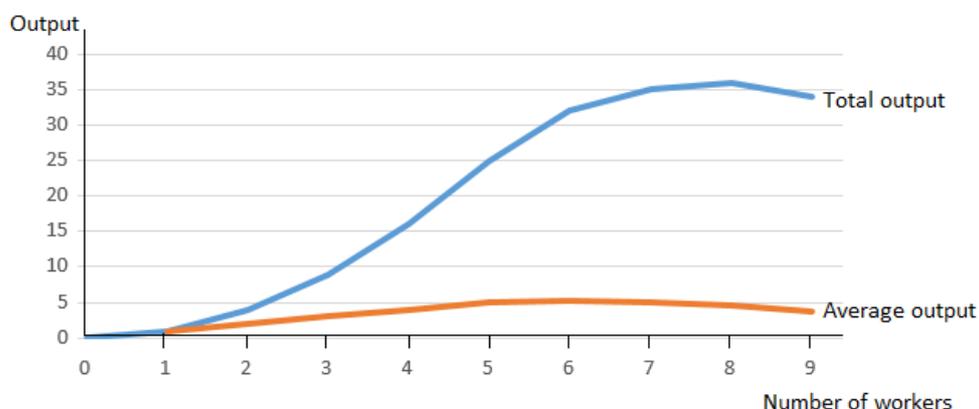
Test yourself

Test yourself 3.1

The average output of cars is shown in the completed table below:

Number of workers	0	1	2	3	4	5	6	7	8	9
Total output of cars	0	1	4	9	16	25	32	35	36	34
Average output of cars	—	1	2	3	4	5	5.33	5	4.5	3.78

Plotted on a piece of graph paper, the total and average output of cars looks like this:

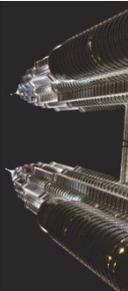


Total and average output of cars at different sizes of labour force

Test yourself 3.2

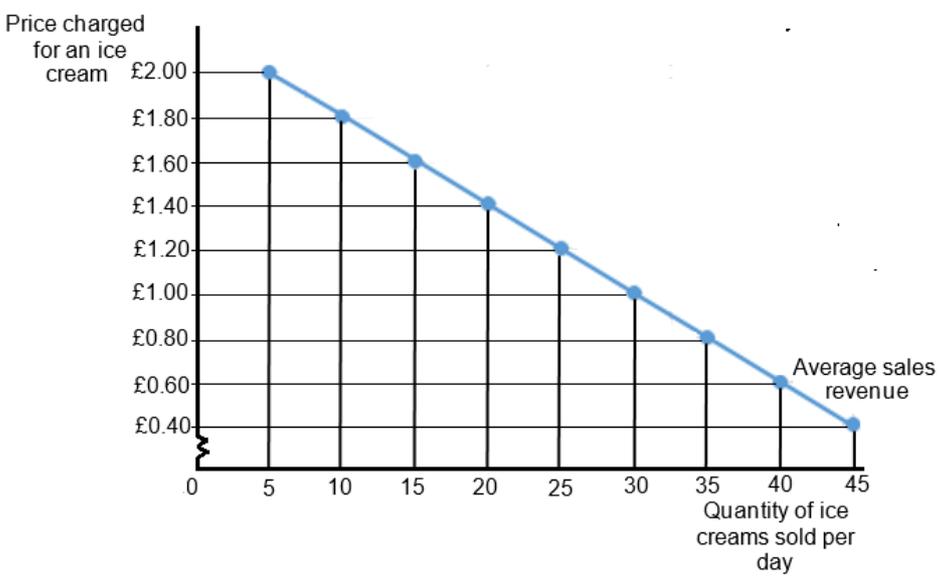
Total revenue at each level of sales, which is calculated by multiplying the quantity of ice creams sold by the price being charged for each ice cream, is shown in column 3 of the completed table below.

Average revenue at each level of sales, which is calculated by dividing total revenue shown in column 3 by the quantity of ice creams sold, is shown in column 4 of the table. What you should notice is that the average sales revenue per ice cream is exactly the same as the price charged for an ice cream. You could simply have copied the data in column 1 into column 4!



(1) Price charged for an ice cream	(2) Quantity of ice creams sold per day	(3) Total sales revenue per day	(4) Average sales revenue per ice cream
£2.00	5	£10.00	£2.00
£1.80	10	£18.00	£1.80
£1.60	15	£24.00	£1.60
£1.40	20	£28.00	£1.40
£1.20	25	£30.00	£1.20
£1.00	30	£30.00	£1.00
£0.80	35	£28.00	£0.80
£0.60	40	£24.00	£0.60
£0.40	45	£18.00	£0.40

Plotted on a piece of graph paper, the shop's daily average revenue curve looks like this:



It is useful also to understand that if the number of ice creams sold at each price is the same as the number demanded at each price, the average revenue curve is in fact the demand curve for ice cream sold by the shop on a particular day.

Case studies

Case study 3.1

- 1 In the UK, the technical or official definition of a recession is a period of falling real GDP (or a period of negative economic growth) extending for 6 months or more.
- 2 A flexible labour market is one in which employers can hire and fire workers easily, in which new employers and workers can enter the market easily, and in which wage rates move up or down easily in response to changing labour market conditions.

Case study 3.2

- 1 Dividing production into a number of tasks, with each task performed by a separate person or group of persons. On a car assembly line, different workers will assemble car engines, steering systems and gear boxes etc. until eventually a complete car is assembled.

- 2 The division of labour enables large-scale production to take place and productive efficiency to be gained. These will often result in economies of scale, or falling long-run average costs.

Case study 3.3

- 1 A *moving assembly line*, which is enabled by the division of labour, involves a good which is in the process of being assembled, moving on a conveyor belt past different workers, each of whom performs a different assembly task.

Mass production involves a very large number of units of a good being produced. In the car industry, for example, Ford Mondeo cars are mass produced, whereas Ferrari sports cars are not mass produced. Instead, they are hand-built and individually produced, at a much higher average cost than a mass-produced car.

Market fragmentation involves the separation of a market that is relatively uniform in character into different segments to produce slightly differentiated goods which are aimed at different types of customer.

A *production run* refers to the number of units of a good that the manufacturer aims to produce. Mass production involves long production runs; by contrast, craft industries usually have short-production runs, sometimes as low as 1 unit.

Capital-intensive factories manufacture goods using large amounts of capital (in the form of machinery) but relatively little labour. The most capital-intensive factories use automated production methods, e.g. robots building cars.

- 2 Three of the economies of scale that have contributed to lower average costs in the car industry are: bulk-buying of components to achieve lower average production costs; designing a range of cars which are manufactured using the same components, e.g. Audi, VW, Skoda and Seat mid-range cars are all built on the same floor pans; and sharing research facilities with rival motor manufacturers. In the UK, all the mass-producing car plants are overseas-owned, often benefiting from research and development (R&D), design and product testing undertaken in the overseas plants of the parent companies.

Case study 3.4

- 1 For Transport for London (TfL), the advantages of bendy buses included labour saving (only one driver needed) and much greater carrying capacity than a traditional bus. Both of these advantages mean that TfL was benefiting from economies of scale. The disadvantages for TfL included the fact that London's narrow and windy roads meant that bendy buses could only be used on relatively few routes, more 'fare dodging' than on traditional buses, and higher litigation costs because bendy buses caused more accidents than traditional buses.

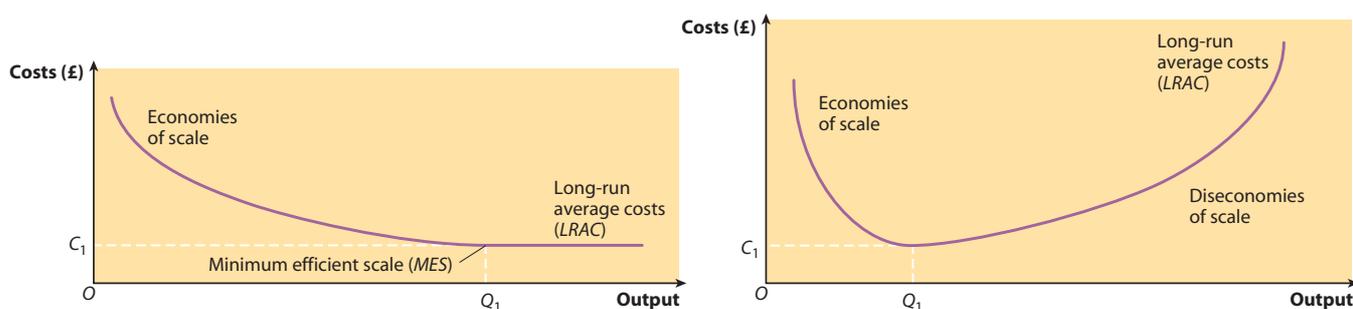
For ordinary members of the general public, there was no stair climbing (this particularly benefited disabled passengers), less likelihood of being turned away from an already full bus, and although unethical, the general public could benefit from 'fare dodging' with less chance of being caught. Disadvantages included the fact that pedestrians and cyclists were more likely to be hurt or killed in accidents caused by bendy buses turning corners.

Case study 3.5

- 1 The disadvantages of super-tankers include the fact that they can only dock in a limited number of ports and they often cannot take advantage of shipping short-cuts, e.g. they are too big to use the Suez and Panama canals. The oil tanker industry could be organised to reduce these disadvantages by building more deep-water ports, by using technologies that allow super-tankers to take on board or discharge oil via flexible pipe lines when anchored off-shore, and by investing in smaller tankers capable, first, of taking on board oil first transported by super-tanker, and second, of using shipping short-cuts.

Questions

- The chapter provides several examples of economy of scale, but here are three others: (i) Until quite recently, in the UK supermarket industry, size seemed to offer all kinds of advantages, particularly the ability to force down the prices paid to UK farmers and economies in the logistical delivery system. However, with regard to the former, purchasing economies of scale gave supermarkets such as Tesco a bad name. They were accused of using their market power to exploit their suppliers. Customers have also rebelled to some extent against shopping at large superstores located on out-of-town sites. (ii) A second example of economies of scale is provided by tap water. Provision of tap water requires water utility companies to invest in a huge network of water pipes stretching from reservoirs often located in mountainous areas to the big cities where their customers are located. It makes sense to invest in just one water distribution network in an area such as the Thames Valley to bring costs down through the economies of scale that result. (iii) Economies of scale also benefit restaurant chains such as Côte Restaurants. Not only can Côte bulk-buy the ingredients for the restaurant meals it sells, but also its large size has enabled the company to establish a very good reputation throughout the UK. Côte's managers know that if they open a new restaurant in a town previously without a Côte restaurant, the company's established reputation will give the new outlet a ready supply of new customers. This is sometimes called the 'Waitrose effect' — residents of a town without a Waitrose, but with substantial middle-class populations, constantly pester the company to locate in their communities!
- The left-hand panel of the diagram below shows an industry in which there are economies of large-scale production. Unless firms have reached the minimum efficient scale (*MES*) of production, they will suffer from high long-run average costs. But firms producing at or beyond *MES* will gain the full advantages of economies of scale. The left-hand panel depicts an industry in which economies of scale mean that firms will be large in size. By contrast, the right-hand panel of the diagram shows an industry with economies of small-scale production. Firms growing beyond output Q_1 suffer from diseconomies of scale. The right-hand panel depicts an industry in which the early onset of diseconomies of scale means that firms will be small in size.



- Just as question 2 at the end of Chapter 2 contains the 'weasel word' *inevitability*, so this question contains a similar 'weasel word', *always*. This means that although large firms will *often* be more productively efficient than small firms, this is *not* always the case. As the answer to question 2 in this chapter explains, when there are economies of small-scale production, large firms are less productively efficient than small firms. The productively efficient level of output in any industry occurs where long-run average costs are minimised. This is shown below the lowest point on the *LRAC* curve for that industry.
- A country suffers from a productivity gap when output per worker is less than that in competitor countries. This means that its average costs of production are higher than in competitor countries. It follows that output per worker must increase sufficiently to cut

average costs of production and thereby close the productivity gap if international competitiveness is to be restored.

- 5 As the answer to Test Yourself 2.10 states, total revenue is price multiplied by quantity sold. But unless costs of production are zero, positive costs of production must mean that profit is less than total sales revenue. Remember, total profit = total revenue – total costs.

