

5.5 Break-even analysis

Impact of changes in price or costs on break-even

A break-even chart can help a business determine the output needed to earn a profit. It is a useful tool for business planning. However, the environment in which businesses operate is dynamic. Changes in internal and external factors can affect total revenues and total costs, even on an hourly or daily basis. Thus, businesses must constantly adjust their break-even analyses to reflect the changes they experience.

International Mindedness

Many businesses operate in multiple countries. Changes to the external environment in those countries, including changes to international supply chains, can have a positive or negative impact on costs of production and change the break-even quantity.

The interactive charts below can help you understand how the break-even quantity can change with changes to total revenue and fixed, variable and total costs.

Changes in total revenue

Figure 1 shows the break-even chart for Divia's Driving School with the detailed figures removed for simplicity. Use the slider to change the position of the total revenue line according to the two situations below, and answer the questions.

Figure 1. Impact of changes in total revenue on the break-even point.

Situation 1

Divia has started to use social media to improve promotion. Demand increases and Divia raises her prices, but she keeps the same number of customers. As a result, the total revenue of the business increases. Use the slider in **Figure 1** to increase the total revenue and see what happens to the break-even point. Notice that the point of origin does not change, because at zero quantity, total revenue remains zero. However, all the other points for total revenue shift upwards, and the total revenue line becomes steeper.

- What happens to the break-even quantity?

Situation 2

A new driving school opens in the area and Divia lowers her prices in order to keep her customers. Her revenues fall. Use the slider in **Figure 1** to decrease the total revenue and see what happens to the break-even point. Notice that the point of origin does not change, because at zero quantity, total revenue remains zero. However, all the other points for total revenue shift downwards, and the total revenue line becomes less steep.

- What happens to the break-even quantity?

Changes in fixed costs

Changes in fixed costs will also change the break-even point. Use the slider in **Figure 2** to change the position of the fixed costs line according to the two situations below, and answer the questions.



Figure 2. Impact of changes in fixed costs on the break-even point.

Situation 1

Divia's car insurance fees, which are paid yearly and are not dependent on the amount of driving Divia does, have increased. Use the slider in **Figure 2** to increase the fixed costs and see what happens to the break-even point. Notice that the fixed cost line remains horizontal, because the fixed costs do not change depending on output.

- What happens to the break-even quantity?

Situation 2

Due to increased competition among website providers, the fees that Divia pays each year for her website have decreased. Use the slider in **Figure 2** to decrease the fixed costs again and see what happens to the break-even point. Notice that the fixed cost line remains horizontal because the fixed costs do not change depending on output.

- What happens to the break-even quantity?

Changes in variable costs

Changes in variable costs will also change the break-even point. Use the slider in **Figure 3** to change the position of the fixed cost line according to the two situations below, and answer the questions.

Figure 3. Impact of changes in total costs on the break-even point.

Situation 1

Petrol prices have increased. This means that Divia is paying more for each kilometre she drives with her students. Petrol is a variable cost because it changes with the quantity of driving lessons. So variable costs increase. This means that total costs will increase. (Assume fixed costs remain the same.) Use the slider in **Figure 3** to increase the total costs and see what happens to the break-even point. Notice that the point where the total costs intersect the y-axis does not change because fixed costs are the same. However, all the other points for total costs shift upwards, and the total cost line becomes steeper.

- What happens to the break-even quantity?

Situation 2

Petrol prices decrease again. This means that Divia needs to pay less for the petrol she uses. Variable costs and therefore total costs decrease (assuming fixed costs remain the same). Use the slider in **Figure 3** to decrease the total costs and see what happens to the break-even point. Notice that the point where total costs intersect the y-axis does not change because fixed costs are the same. However, all the other points for total costs shift downwards, and the total cost line becomes less steep.


- What happens to the break-even quantity?

Activity

Learner profile: Thinkers

Approaches to learning: Thinking skills (critical thinking)

Download and complete the table below to summarise the impacts of changes in total revenue (TR), fixed costs (FC) and variable costs.

 [Download\(https://d3vrb2m3yrmyfi.cloudfront.net/media/edusys_2/content_uploads/5.5.3_file_tables_for_download_\(1\).4a69d235be1bf72d8ce9.pdf\)](https://d3vrb2m3yrmyfi.cloudfront.net/media/edusys_2/content_uploads/5.5.3_file_tables_for_download_(1).4a69d235be1bf72d8ce9.pdf)

Case study

The impact of supply chain disruptions on bakeries

Bakeries around the world, including in many countries like Egypt – where bread is a particularly important staple product for the population – experienced supply chain disruptions from the conflict in Ukraine. Egypt imports more than half the wheat that it needs to produce bread and other products. In some years, Egypt imports more than 80% of its wheat. Restrictions on transport in the Azov Sea and port closures disrupted wheat shipments from Russia, which is the largest exporter of wheat. Economic sanctions against Russia also made it more difficult to secure wheat imports for Egypt.



Figure 4. Supply chain disruptions have increased the cost of production for bread.

Credit: Michael Zwahlen / EyeEm, Getty Images

Ukraine and Russia together supply about one-third of the global wheat supply. Ukraine banned the export of wheat during the conflict. These disruptions mean the global price of wheat increased by more than 50%. As a result, bakeries have had to increase prices to avoid operating at a loss. The increased variable costs have resulted in higher break-even points for bakeries all over the world.

Questions

1. Define break-even point/quantity. [2 marks]
2. Explain why increased variable costs of production would increase the break-even point for bakeries. [4 marks]

Exam tip

There are occasions when a product may fail to break even, yet a company keeps on producing it.

This might happen, for example, if the product is new and the business hopes that it will make a profit in the future. This relates to the Boston Consulting Group matrix, which you studied in [Subtopic 4.1 \(/study/app/y12-business-management-a-hl-may-2024/sid-351-cid-174702/book/the-big-picture-id-37435\)](https://study/app/y12-business-management-a-hl-may-2024/sid-351-cid-174702/book/the-big-picture-id-37435), and which states that money from profitable products may be used to subsidise those attempting to gain increased market share.

Another situation where this might happen would be for non-profit social enterprises that earn revenues. It could be that the losses are covered by other sources of finance, such as donations. In cases where the product or service being provided is especially important for people or the planet, it may be possible to find a way to continue producing the product.

It is also worth noting that social enterprises are likely to have higher break-even points because they may be charging lower prices to maximise the impact of their product. Or they may be distributing more value to stakeholders, such as paying employees living/higher wages or paying suppliers fairly. As a result, their costs are higher.