



Break-Even Analysis

- Once a firm knows its total costs and revenue it can calculate the break-even point
- A firm is said to **BREAK-EVEN** when its total revenue is equal to its total costs
- In other words when:

$$\text{Total Revenue} - \text{Total Costs} = 0 = \text{Profit}$$





Why Bother?

- It is useful when deciding whether a new product is going to be viable
 - i.e. realistically can the required quantity be sold?
- To see how changes in price, costs, and output affect the break-even point
 - i.e. if price is increased will profits increase?
- To Know the level of output needed to achieve a given level of profit
 - i.e. how many units must be sold to make £100,000 profit?



Calculating The Break-Even Point

- To calculate the B.E.P. we use contribution:
 - Remember:

$$\text{Contribution} = \text{Price} - \text{variable cost per unit}$$

- The formula for break-even is:

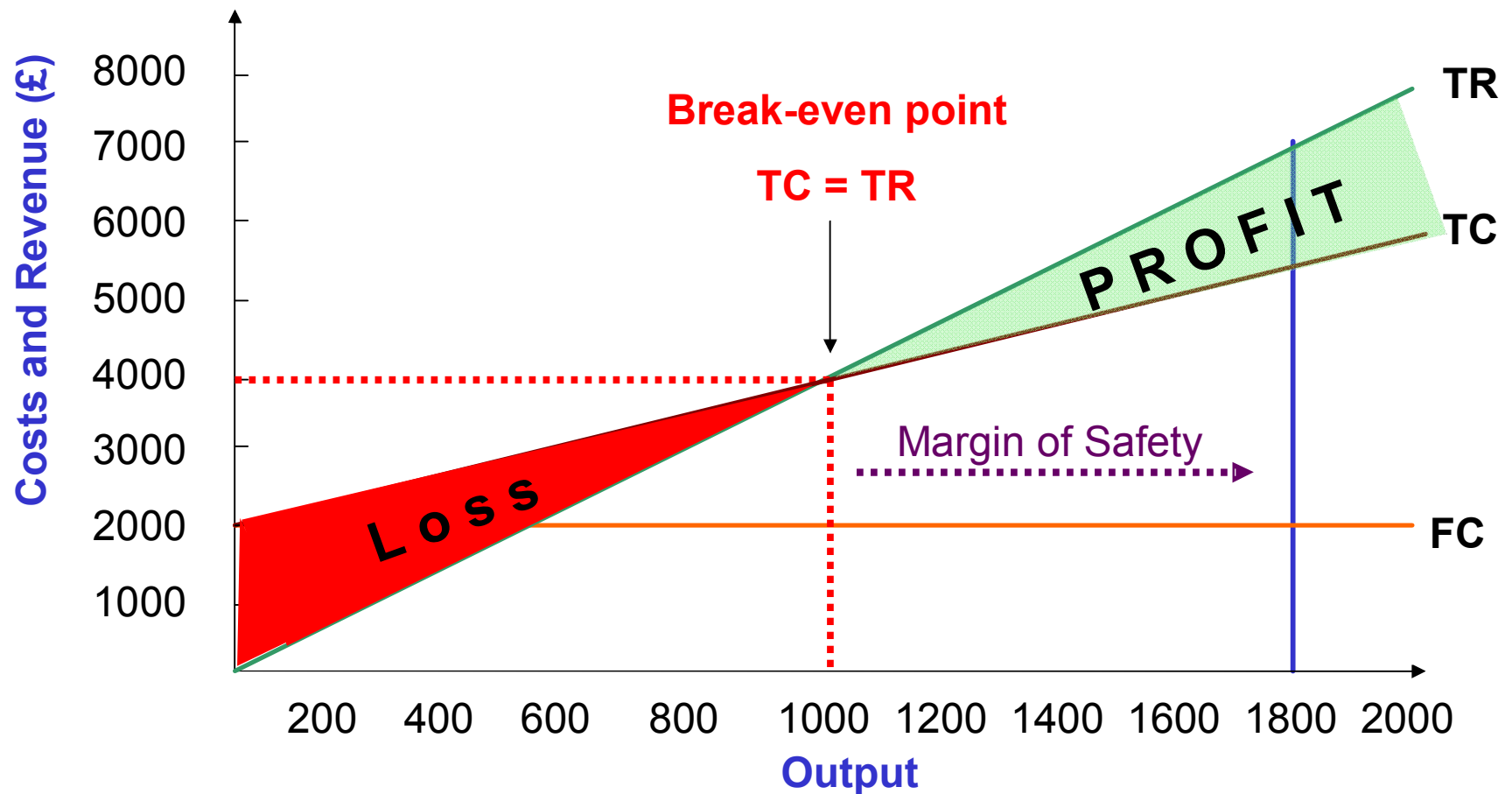
$$\text{Break - Even Point} = \frac{\text{Fixed Costs}}{\text{Contribution}}$$





The Break Even Chart

- This break-even point can also be shown graphically using a break even chart





The Margin of Safety

- If a firm is producing AND selling more than the break even level of output then a profit is being made
- In this situation they are said to have a “Margin of Safety”
- This is effectively a “safety net”, and can be calculated as:

$$\text{Actual Sales} - \text{Break Even Output}$$

- So in our previous example, the margin of safety would be:
 - Margin of Safety = 1800 – 1000 = 800
- The margin of safety is the range of output over which a profit can be sustained



The Limitations Of Break-Even

- Of limited use for service industries
 - Since the revenue will change from customer to customer
- Manufacturing industries will experience changes in fixed costs
- It assumes that all the output can be sold
- It is a static model
- It relies upon the accuracy of the data used
- It is assumed that the total cost and revenue functions are linear
 - This may not be the case due to the **LAW OF DIMINISHING RETURNS**