



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?



What Affects The Break-Even Point?

● In the table below **RED** arrows show negative effects whilst **GREEN** arrows show positive effects for the business

Change	Effect on Total Costs	Effect on Total Revenue	Effect on Break-Even Point
Fixed or Variable Costs Increase	 INCREASE	NO CHANGE	 INCREASE
Fixed or Variable Costs Decreases	 DECREASE	NO CHANGE	 DECREASE
Sales Price Increases	NO CHANGE	 INCREASE	 DECREASE
Sales Price Decreases	NO CHANGE	 DECREASE	 INCREASE



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:

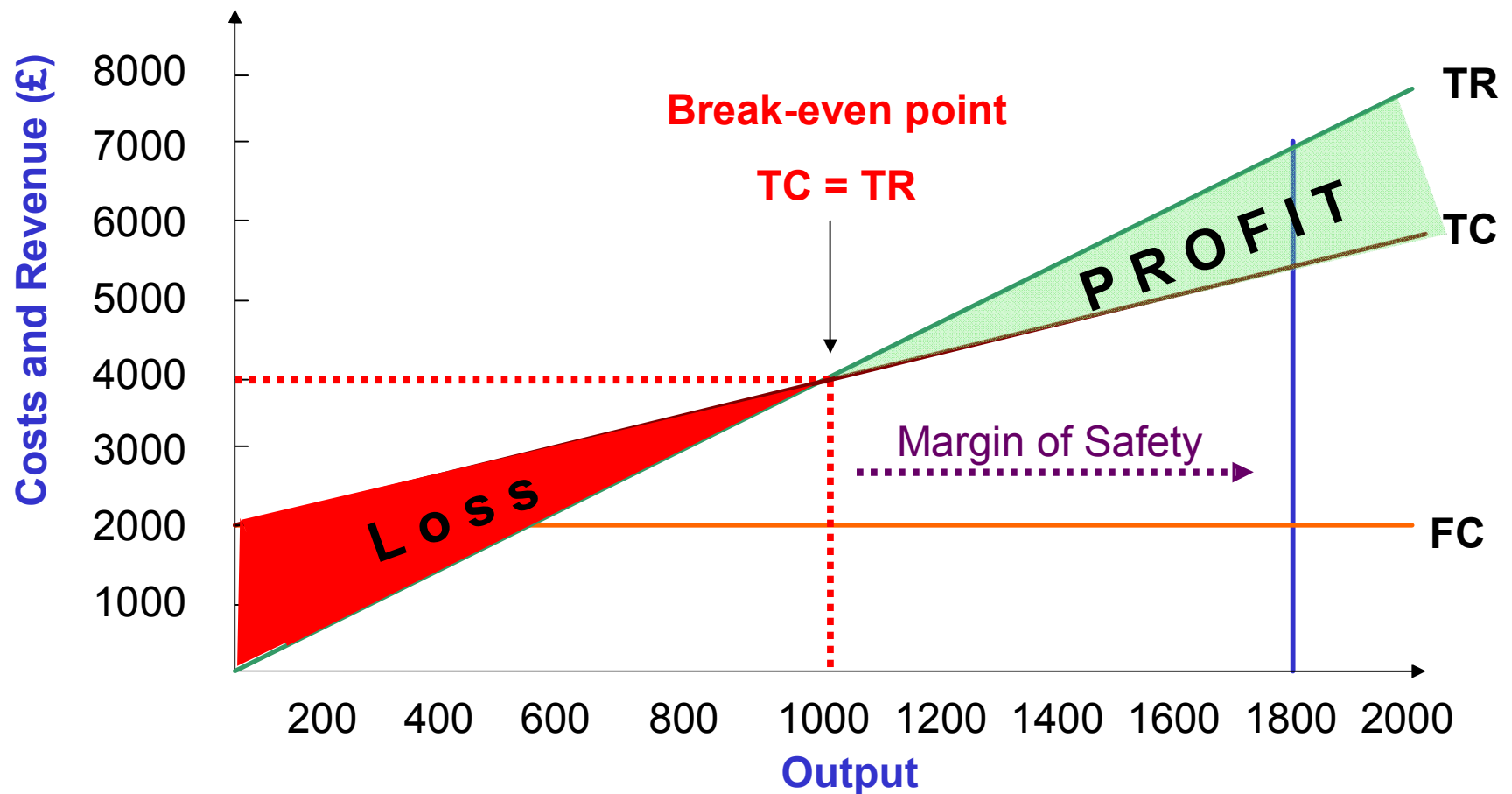
$$\text{Break - Even Point} = \frac{\text{Fixed Costs}}{\text{Contribution}}$$





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**