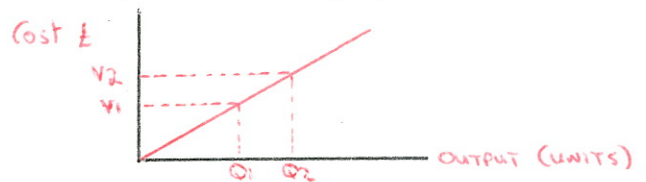


BREAKEVEN ANALYSIS

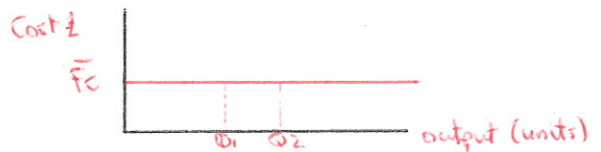
Cost Classification:

Accounting costs may be classified as being variable or fixed.

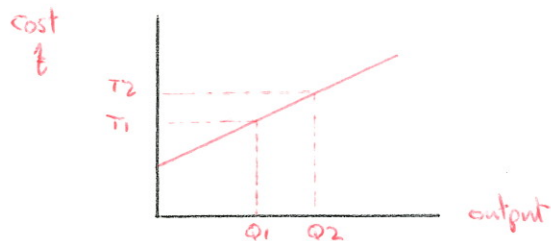
Variable Costs: May also be called direct or marginal costs. They tend to vary directly with changes in the level of output. There is generally a straight line or linear relationship between variable costs and output when the two are plotted on a graph.



Fixed Costs: Tend not to be affected by variations in the level of output e.g. Rent, Insurances, Rates. Fixed Costs are also called 'Period Costs'.



Total Costs: Represent the summation of fixed and variable costs for a given level of output.



Contribution:

This is defined as the difference between the selling price p.u. and the variable cost p.u. It represents the amount of fixed costs recovered by producing one unit of output.

Margin of safety: the excess of actual sales over sales at break-even point. It can sometimes be expressed as a percentage of actual sales (Sale = Output).

Consider the following data:

Selling Price	=	£6 p.u.
Variable Cost	=	£4 p.u.
Fixed Costs	=	£80
Contribution p.u.	=	£6 - £4 = £2

Output	Sales	Var. Costs	Fixed Costs	Total Costs	Profit
0	-	-	+ 80	= 80	(80)
1	6	4	+ 80	= 84	(78)
10	60	40	+ 80	= 120	(60)
20	120	80	+ 80	= 160	(40)
40	240	160	+ 80	= 240	B/E
60	360	240	+ 80	= 320	40

Table 1

For every unit that is produced, there is a contribution of £2 p.u. towards the recovery of fixed costs. Therefore, to recover all fixed costs, we must produce $80/2 = 40$ units. This is the breakeven point.

Breakeven Point - point at which you earn no profit or loss.

Margin of Safety - the difference between actual output and the output required to breakeven. Expressed as $\frac{\text{Actual Sales} - \text{B/E Sales}}{\text{Actual Sales}}$

Formula:

$$\begin{aligned}
 \text{Revenue} - \text{Costs} &= \text{Profit} \\
 QS - (QV + FC) &= \pi \\
 QS - QV - FC &= \pi \\
 QS - QV &= FC + \pi \\
 Q(S - V) &= FC + \pi
 \end{aligned}$$

Q	=	$\frac{FC + \pi}{S - V}$
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Refer to Example and Table 1:

(a) Output required to Breakeven

$$\text{Set } \pi = 0$$

$$Q = \frac{FC + \pi}{S - V} = \frac{80 + 0}{6 - 4} = \frac{80}{2} \frac{FC}{\text{Contrib}^m} = 40 \text{ units}$$

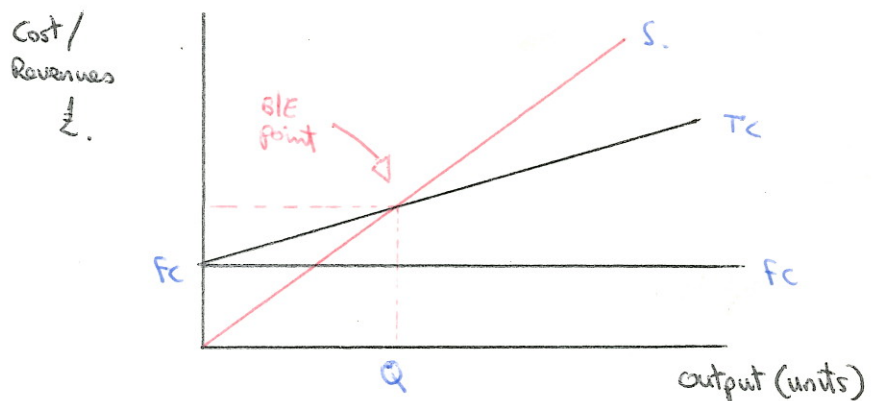
(b) Output to make £40

$$Q = \frac{FC + \pi}{S - V} = \frac{80 + 40}{6 - 4} = \frac{120}{2} = 60 \text{ units}$$

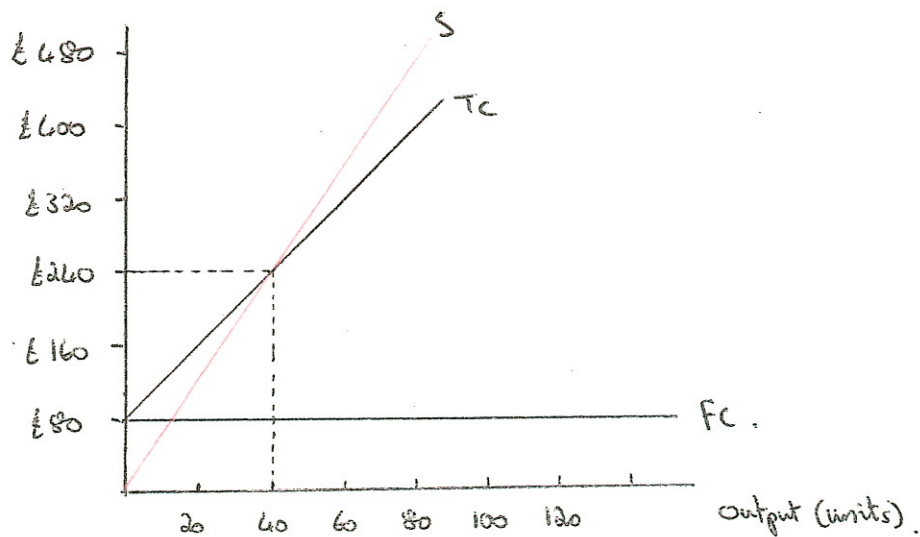
To Construct a Breakeven Chart:

A breakeven chart is a series of static points, it is not a progress chart of the firms developing performance. It shows expected cost - income situations at various levels of output. On the breakeven chart, the horizontal axis shows various levels of output up to total capacity: the vertical axis shows the signs of costs and income. The point at which the sales curve and the total costs curve (FC + VC) intersect is the breakeven point i.e. the point at which there is neither profit nor loss.

1. Draw FC Curve.
2. Draw TC Curve.
3. Draw Sales Curve.

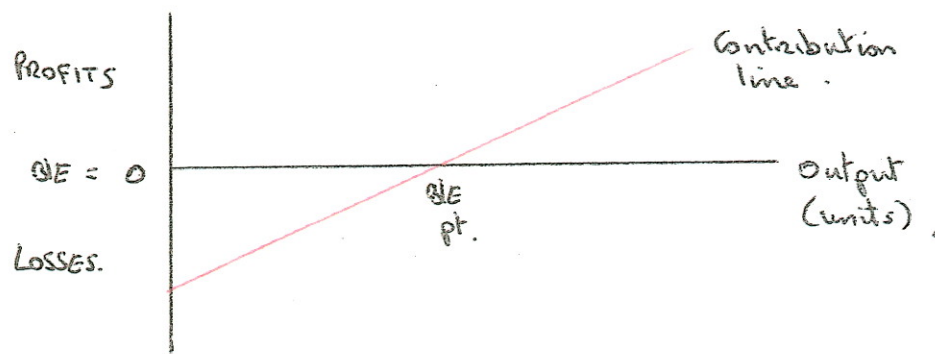


We shall now construct a breakeven chart using the data in the previous example.

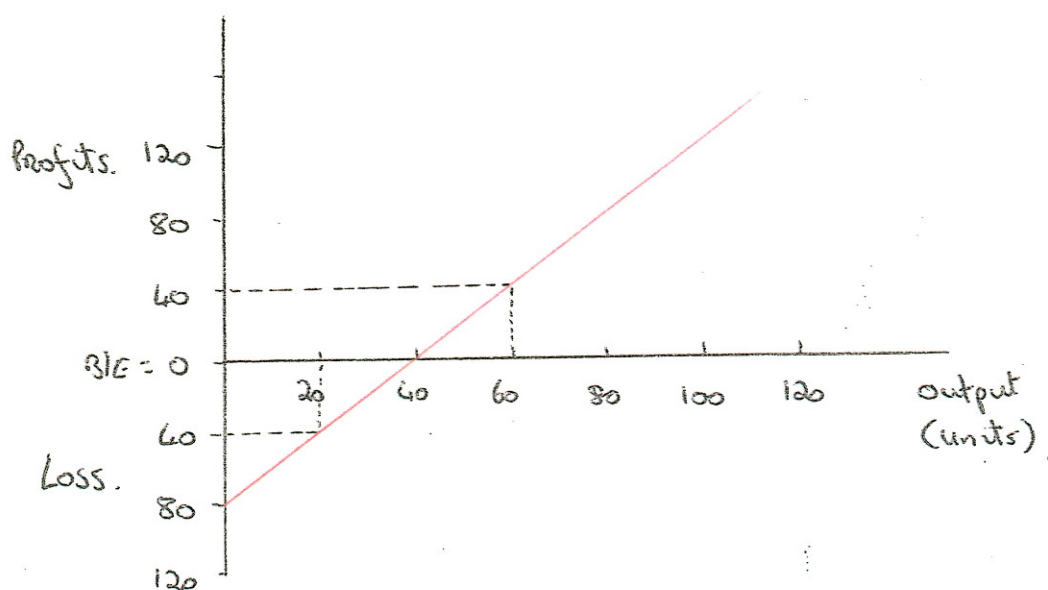


Profit Chart:

The profit chart measures the profits/losses directly for any given level of output. It is constructed when the breakeven volume has been established.



For our previous example, the profit chart looks as follows:



Assumption of Breakeven Analysis

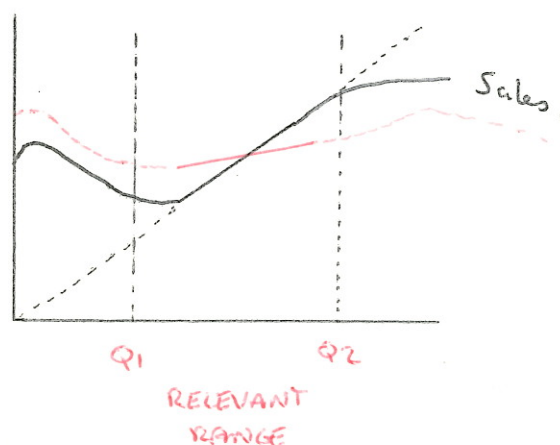
1. Sell everything you produce. It ignores the possibility of opening and closing stocks. The analysis holds true if stock levels remain constant or do not change significantly.
2. The selling price remains constant over the entire range. (To expand output, companies often decrease selling price).
3. Variable costs remain constant over the entire range. This in practice may not hold as:
 - * Sometimes labour is remunerated at 'time and a half' (Overtime) to achieve the desired production level.
 - * Companies can earn bulk discounts on materials required to meet expanding production needs.
4. All costs can be classified as being either fixed or variable.

Limitations of Breakeven Analysis

1. In practice there are opening and closing stocks.
2. The C.V.P. relationships are only true for an individual product or a specific mix of products.
3. To achieve a high sales volume, companies reduce their selling price (Competition).
4. Variable costs can change where companies can earn bulk discounts on materials required to meet expanding production needs or where labour is remunerated at 'Time and a half' to achieve required production level.
5. The analysis does not take into account Capital Employed, an important factor in relation to expansion.

Uses

- For presenting a simplified picture of cost-volume-profit relationships.
- Provides guidance to Management in decision making in the short term.
- The limitations do not apply over a 'relevant range' of activity.



BREAKEVEN ANALYSIS

Formula $Q = \frac{FC + \pi}{S - V}$ Where Q - Output in units.
FC - Fixed Costs.
 π - Profit/Loss
S - Selling Price p.u.
V - Variable Cost p.u.

- B/E Chart:**
1. Calculate B/E point.
 2. Calculate sales value of B/E Volume.
 3. Plot Breakeven point.
 4. Draw sales curve and total costs curve.

EXAMPLE 1: Fixed costs £20,000
Selling Price 100 p.u.
Variable Cost 60 p.u.

- From Graph
- (1) Breakeven Volume.
 - (2) Profit/Loss on sale of 600 units.
 - (3) Compute output to make loss of £8,000 - verify on graph.

EXAMPLE 2: Fixed Costs 5,000
Material Cost p.u. 8
Labour Cost p.u. 5
Variable O/H p.u. 2
Selling Price 20

- From Graph
- (1) Breakeven Volume.
 - (2) Profit/Loss on sale of 600 units.
 - (3) Output necessary to make to make profit of £1,500.

EXAMPLE 3: Fixed manufacturing O/H 8,000
Variable manufacturing O/H 5 p.u.
Fixed Administrative O/H 4,000
Variable indirect O/H 3 p.u.
Selling Price 12 p.u.

- (a) Compute Breakeven volume.
- (b) Compute Breakeven point in sales value terms.
- (c) Output to make profit of £8,000.
- (d) What is Breakeven volume if selling price increase to £16 p.u.

Principle assumption of B/E analysis:

1. Sell all production.
2. No opening or closing stocks.
3. Unit variable costs constant over entire range.
4. Unit selling price constant over entire range.

Limitations of B/E analysis

1. In practice there is opening and closing stocks.
2. Bulk discounts can reduce variable costs p.u.
3. Benefits of discounts passed on in cheaper prices.
4. Analysis is a useful guide but only over a relevant range.
5. Only useful for one product or mix of similar products.

The relevant range is the volume zone within which the behaviour of variable costs, fixed costs and selling prices can be predicted with reasonable accuracy.