

### 3. Break - Even Analyses

Break-even analysis reveals the relationship between the volume and cost of production on the one hand and the revenue and profit obtain from the sales on the other. The point, at which there is neither profit nor loss, is known as break-even point or limit. In fact the break-even analysis is a tool in the hands of management people to decide about the earning capacity of the firm. It is the study of inter relationship among sales cost and profit. It is also known as profit contribution analysis which can be established through graphic device.

#### 8.1 Cost and Revenue:-

The cost of production may be divided into-

- (a.) Fixed cost
- (b.) Variable cost.

The total cost is equal to a sum of fixed cost and variable cost; fixed costs are those costs which do not vary with the output. They are fixed; they include costs on level building machinery rent interest etc. But on the other hand variable costs are those that vary with production (output). They include costs on raw material input. Payment made to flow of services. The total revenue (TR) is equal to the number of unit sold multiplied by the price per unit ( $TR = p \times q$ ). The difference between total revenue and total cost is known as profit  $= TR - TC$ .

There are two approaches to representing a breakeven point

1. The graphical method, where one takes the help of break even chart; and
2. The algebraic method

#### 8.2 Preparation of break-even chart:-

Break-even chart is a graphical representation showing the breakeven point cost and the volume of profit relationship at different level of activity. It is a device which shows the relationship between sales value, marginal cost and fixed costs and profit or loss at different level of production or sales. The intersection of total sales line and total cost line is called the breakeven point.

Break-even chart shows the following:-

- (a) Profit and expenditure analysis.
- (b) Cost volume profit relationship and breakeven point.
- (c) Profit volume ration and margin of safety.
- (d) Change in level of sales and its impact on cost and profit.

#### Break-even Chart

The B.E.P. of a firm can be found out in terms of physical units i.e. volume of output. The B.E.P. can be explained with help of following illustration:

assume, a firm produces 600 units and incurs costs as follows fixed cost Rs 200/- variable cost Rs 1/- per unit. The selling price is Rs 1.50 per unit. The break-even point in this case will be

$$B.E.P = \frac{FC}{SP - V \text{ (PER UNIT)}} = \frac{200}{(Rs. 1.50 - 1.00 = 0.50)} = 200 / 0.50 = 400 \text{ UNITS}$$

FC= fixed cost      V=variable cost      SP=selling price

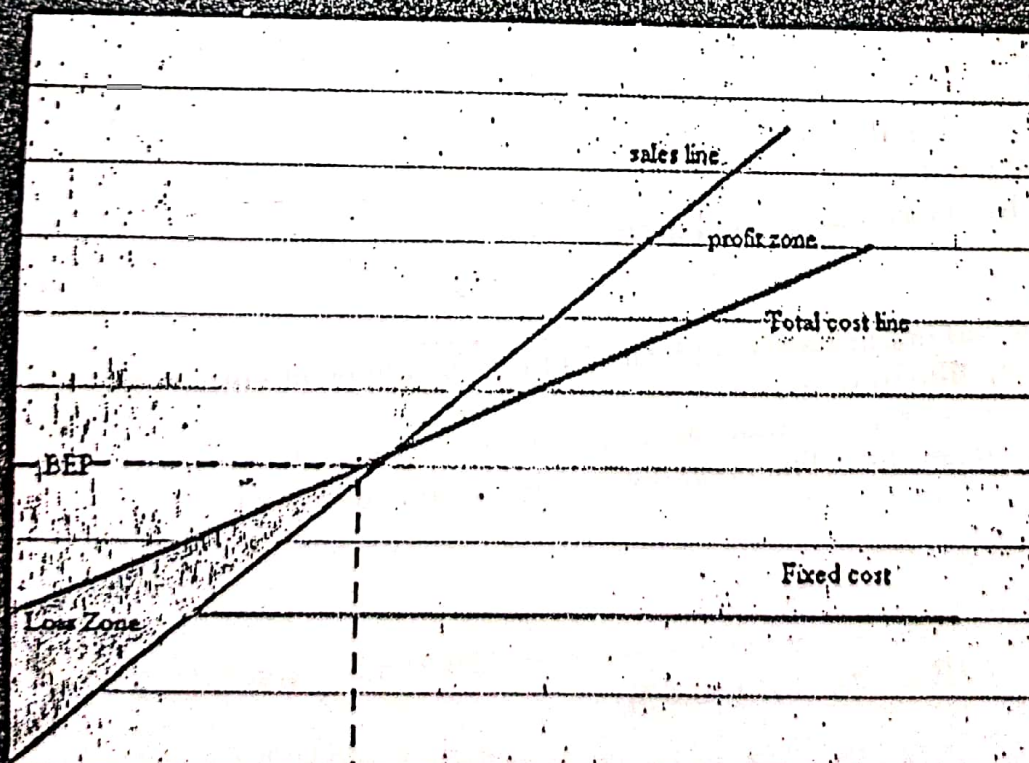


The sales volume at 400 units @ 1.50 shall be Rs 600/- now we can illustrate below by means of schedule and a graph

Production Units	Fixed Cost (F) Rs.	Variable Cost @ Rs 1/unit	Total cost (F+V)	Sales @ Rs. 1.50 /unit
0	200	0	200	0
100	200	100	300	150
200	200	200	400	300
300	200	300	500	450
400	200	400	600	600
500	200	500	700	750
600	200	600	800	900

From above table we can see that when input is zero the firm incurs only fixed cost under total cost. When the output is 200 the total cost is Rs 400 and volume of sales Rs300/- The firm incur loss of Rs100/- as different between 400-300 is Rs100. At the level of output 400 units and sales of 400 units at Rs 1.50 the total cost equal to total revenue Rs 600/- at this point the firm is working at a point where there is no profit or loss. This is the break-even point (bep) from the level of 500 units of output, the firm is making profit.

This is illustrated in this figure:-





In this break-even chart, TFC is total fixed cost TR (value of sales) and total cost line. Since total fixed cost is constant at all level of output, it is parallel to X-axis. From the figure, we can see the BEP lies at 400 units of output. Up to 400 units of output the firm will be incurring loss in all units of outputs as TC is at a higher level than sales value. This is called loss zone. Beyond 400 units of output the firm is realising profit as sales value exceeds TC. At 400 units of output the firm is neither incurring loss nor making any profit. It is the break-even point (BEP) or no profit no loss point of production.

#### Advantage of break-even analysis:

The main advantages of using break-even analysis in manageable decision making can be the following:

- i. It helps in determining the optimum level of output.
- ii. It helps in determining the target capacity for firm to get the benefit of minimum unit cost of production.
- iii. With the help of the break-even analysis the firm can determine minimum cost for a given level of output.
- iv. It helps the firms in deciding which products to be produced and to be bought by firm.
- v. Plant expansion or contraction decision are often based on the break-even analysis of the perceived situation.
- vi. Input of changes in price and costs on profits of the firm can also be analysed with the help of break down technique.
- vii. The break-even analysis can be used in finding the selling price which would prove most profitable for the firm.

#### Limitations of break-even chart:

- i. The breakeven point is difficult to determine in many instances because of the difficulty in properly classifying costs as either fixed or variable and because market conditions may not remain constant over the range of projected capacity.
- ii. The breakeven chart is a tool for short run analysis; it cannot be used for 8 or 10 year projection because of the difficulty of indicating variables in each of the cost lines on the chart.
- iii. The total cost line, representing the variable costs added to fixed costs, need not be a straight line; in actual fact, costs do not usually vary in direct proportion.
- iv. The straight line which represents sales revenue may also misrepresent the true facts.
- v. The breakeven chart represents a static picture whereas business operations are far from static.