

COST VOLUME PROFIT ANALYSIS (I)

Basically, break-even analysis determines the “break-even point”, at which operations neither make money nor lose money. At the break-even point, there is no gain or loss; hence costs or expenses are equal to revenues/incomes. Determining the break-even point for a business is the useful business planning tool.

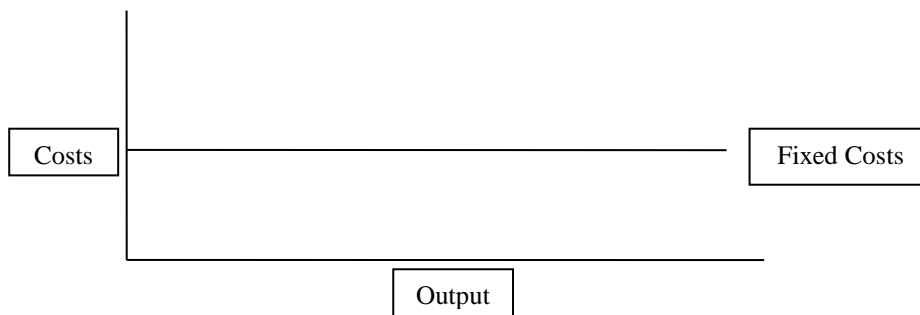
Cost, Revenue and Profit

Following are costs and revenues are used for break-even analysis

Fixed Cost

Fixed costs are those that remain the same regardless of sales volume or production. They are expressed usually in amount or rupees say Rs. 200,000. Rent, insurance, supervisory salary and real estate taxes are usually examples of fixed cost

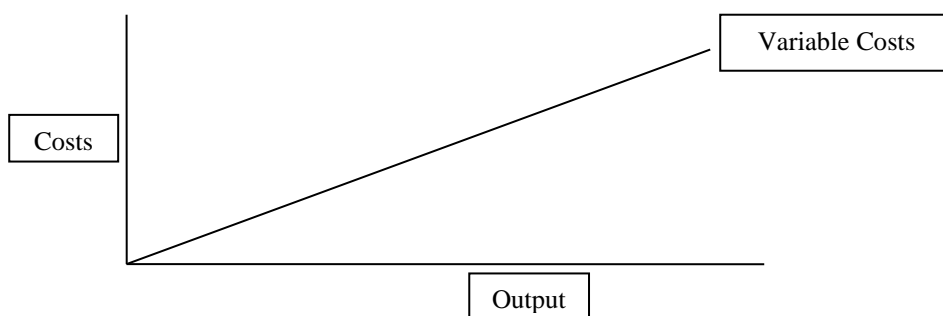
- ❖ Fixed cost remains the same whether the business produces nothing or is working at full capacity
- ❖ Fixed cost per unit is variable, when production increase it decrease and vice versa



Variable Cost

Variable costs are those which change as sales volume or production changes. They are expressed usually as a percent of sold units like 8% of sales. Inventory, raw materials and direct production labor, for example, are usually variable costs.

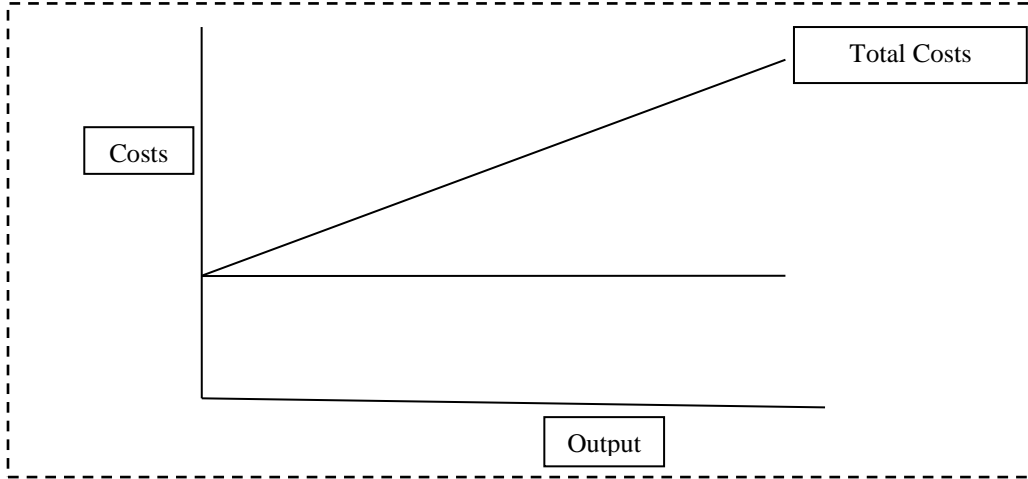
- Variable Cost = Variable Cost per Unit x Sold Units
- Variable cost per unit is fixed



Total Costs

By adding fixed and variable cost we derive total cost

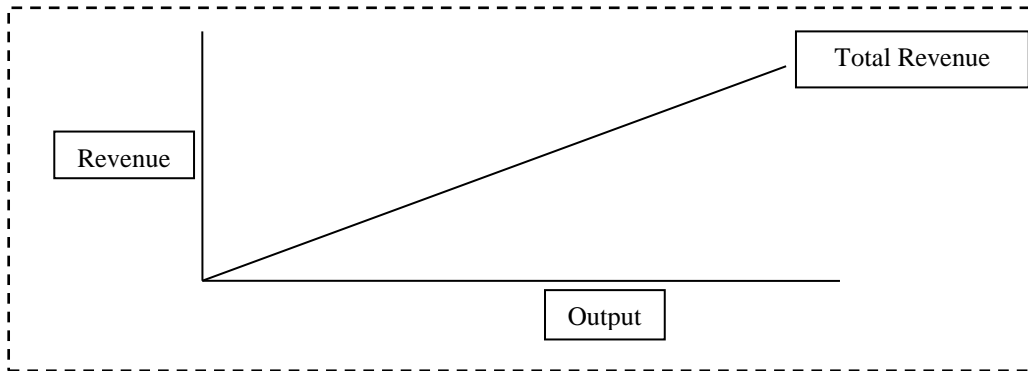
$$\text{Total Cost} = \text{Fixed Cost} + \text{Variable Cost}$$



Total Revenue

This is the amount of money that a firm receives from selling the product or providing services

$$\text{Total Revenue} = \text{Price per Unit} \times \text{Sold Units}$$



Profit

Profit is net of revenue from expenses. The state when revenues are higher side and expenses are in lower side is called profit.

$$\text{Profit} = \text{Total Revenue} - \text{Total Cost}$$

$$\text{Profit} = \text{SP} (X) - \text{VC} (X) - \text{FC}$$

SP = Selling price;

X = Quantity of units produced or sale

VC = Variable cost and

FC = Fixed cost

Example # 1: Ahmed, Inc. produces and sells a single product for Rs. 40 per unit. Costs are: variable cost per unit Rs. 30 and fixed costs Rs. 360,000. Using the profit equation determine the break-even point in units.

Solution:

$$\text{Profit} = \text{SP (X)} - \text{VC (X)} - \text{FC}$$

Contribution Margin

Contribution Margin is the amount of money remaining after the variable costs of producing or purchasing is subtracted from the selling price.

- Contribution margin = Selling price - Variable cost
- Contribution margin can be calculated as per unit and as a ratio

$$\text{Contribution Margin (per unit)} = \text{Selling price per unit} - \text{Variable costs per unit}$$

$$\text{Contribution Margin (ratio)} = 1 - [\text{Variable costs} / \text{Selling price}]$$

Cost-Volume-Profit (CVP) Analysis

Calculating break-even is also referred to as Cost-Volume-Profit Analysis (CVP) or Contribution Analysis. Break even analysis is sometimes referred to as cost-volume-profit analysis because these are three key elements (i.e. cost, volume and profit) in the calculation. It is sometimes referred to as contribution analysis because calculating break even requires determining how many service or product contributions (selling price per unit minus variable costs per unit) are necessary to cover, or pay for, the product's expected fixed costs. CVP Analysis includes:

1. Break-Even in units and amount
2. Margin of Safety
3. Calculating the Target Sales (in units and amount) required to achieve target profit
4. Estimated Future Profit
5. Deciding Selling Price

Break-Even in units and amount

Break-even is volume of sales or units at which business just 'break even'. At break-even point total cost is equal to total revenue. At break-even point, total contribution is just large enough to cover fixed cost. There are two methods for calculating break-even point in unit and amount:

- ✓ Mathematical equation
- ✓ Graphical presentation

Mathematical Equations for Break-even Analysis: Following are equations for Break-even analysis

Break-Even in Rupee = Total Fixed Cost / Contribution Margin Ratio

$$\text{Break - even in Rupee} = \frac{\text{Total Fixed Cost}}{1 - \frac{\text{Variable Cost}}{\text{Selling Price}}}$$

Break-Even in Units = Total Fixed Cost / Contribution Margin per unit

$$\text{Breakeven in units} = \frac{\text{Total Fixed Cost}}{\text{Price per unit} - \text{Variable Cost per unit}}$$

$$\text{Breakeven Capacity} = \frac{\text{Breakeven sales}}{\text{Normal Sales}}$$

Example # 2: A Company has fixed costs of Rs. 10,000 for this period. Direct labor is Rs. 1.50 per unit, and material is Rs. 0.75 per unit. The selling price is Rs. 4.00 per unit and normal sales is Rs. 24,000. Find the break-even point in dollars and in units and also break-even capacity?

Solution

The break-even point in dollars

The break-even point in units

Break-even capacity

Example # 3: Following data is extracted from Ali (Pvt.) Ltd. You are required to calculate the break-even in rupees, in units and capacity. The data shows sales Rs. 5,000,000, per unit sale price Rs. 4 and variable cost per unit is 2.4.

Accounts	Total	Variable	Fixed
Material	1,000,000	1,000,000	0
Labor	1,400,000	1,400,000	0
FOH	1,600,000	400,000	1,200,000
Marketing Expenses	350,000	150,000	200,000
Admin Expenses	250,000	50,000	200,000

Solution

The break-even point in dollars

The break-even point in units is:

The break-even capacity

Margin of Safety

Actual sales volume may not be the same as budgeted sales volume. Actual sales may fall short or exceed to budget. The difference between the budgeted sales volume and the break-even sales volume is known as the margin of safety. It usually expressed as a percentage of budgeted sales ($100/\text{Budgeted Sales} \times \text{Margin of Safety}$).

$$\text{Margin of Safety} = \text{Budgeted Sales Units} - \text{Break-Even Sales Units}$$

Example # 4: Following data extracted from the books of ABC Company:

Budgeted sales	80,000 units	Selling price	Rs. 8
Variable cost	Rs. 4 per unit	Fixed cost	Rs. 200,000

Solution:

Further Study and Practice of Inventory Management

Video Lecture (Cost Volume Profit Analysis)

<https://youtu.be/dLBsoqKa6B0>

Workbook Solution (Cost Volume Profit Analysis)

<https://www.accountancyknowledge.com/cost-volume-profit-analysis/>

Practice MCQs (Cost Volume Profit Analysis)

<https://www.accountancyknowledge.com/cost-volume-profit-analysis-mcqs/>

Practice Problems with Solutions (Cost Volume Profit Analysis)

<https://www.accountancyknowledge.com/cost-volume-profit-analysis-problems-and-solutions/>