Understanding Cost and Analysing Cost for Decision Making

Pawan K. Taneja

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Learning Outcomes

- Distinguish between fixed and variable costs.
- Use break-even analysis as a decision-making tool
- *Use the concept of contribution to determine the break-even point and the projected surplus level*
- *Determine the point when it is worth moving to hi-tech process*
- Be able to calculate and understand contribution, the break-even point and margin of safety

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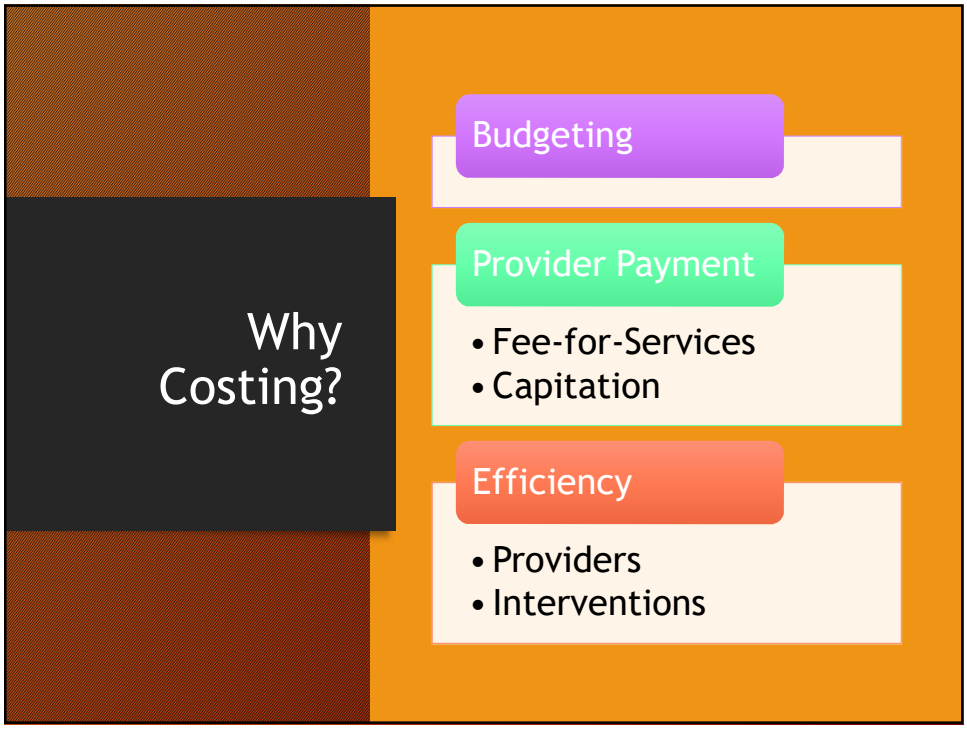

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How to Analyze the Cost?

Methods to Analyze Cost

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Cost Identification Analysis

- Cost Identification Analysis – measures the total economic cost of a given condition or type of adverse behavior.
  - Examples: Cost of asthma or Alzheimer's disease. Cost of cigarette smoking or excessive alcohol consumption.

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Three Types of Costs

- Direct medical costs – all costs incurred by medical care providers when treating the condition.
- Direct nonmedical costs – monetary costs imposed on any nonmedical care personnel, including patients and their relatives.
- Indirect costs – opportunity cost of the time influenced by the illness or health behavior such as lost productivity because of sickness, injury, or loss of life.

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Example of Cost Identification Analysis

- Weiss, Gergen, and Hodgson (1992), *New England Journal of Medicine*
  - Total annual cost of asthma in the U.S. > $6.2 million in 1990
    - Direct medical costs > $3.6 million
    - Indirect costs > $2.5 million
      - Lost school days = $900 million
      - Lost work due to illness = $800 million
      - Lost work because of worker death = $800 million

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Value of Cost Identification Analysis

- Sheds light on the economic impact of illnesses and adverse health behaviors etc.
- Does not provide information on the wastefulness of various interventions or the best or efficient way of saving lives/resources.

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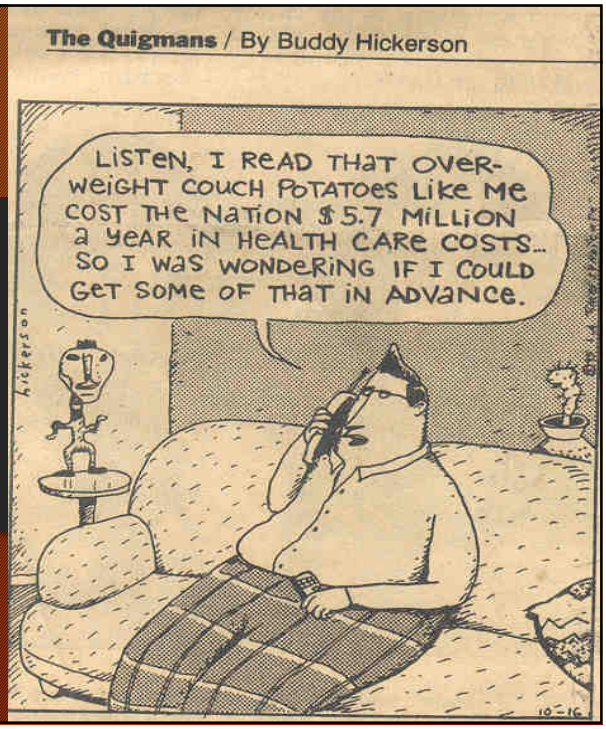
Limitation of Cost Identification Model



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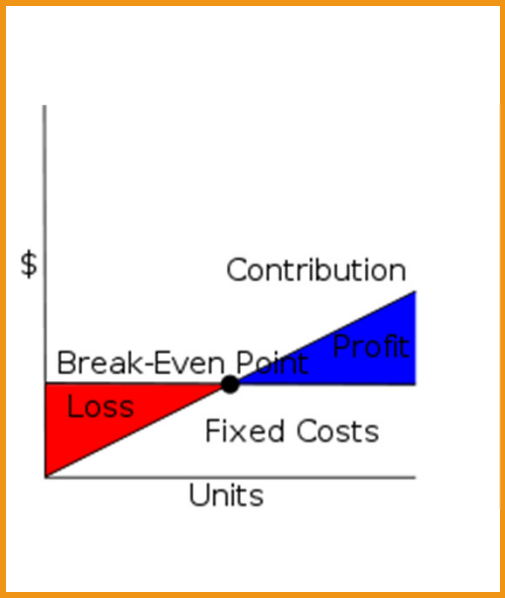
Cost Volume Profit Analysis

Break Even Analysis/Contribution Analysis



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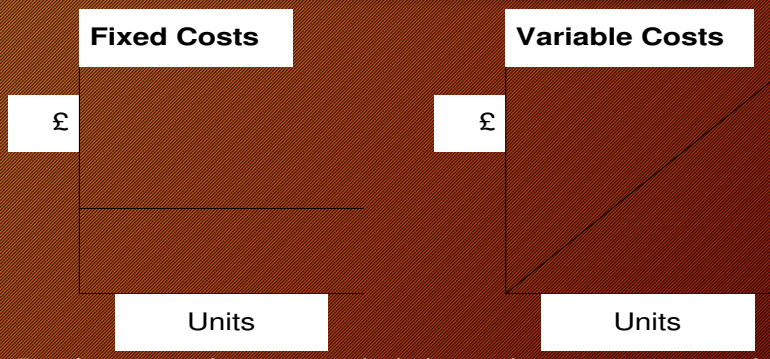
Classification of Cost



- **Fixed costs** are those costs, which do not change over a range of output.
- **Variable costs** vary directly with the number of units produced

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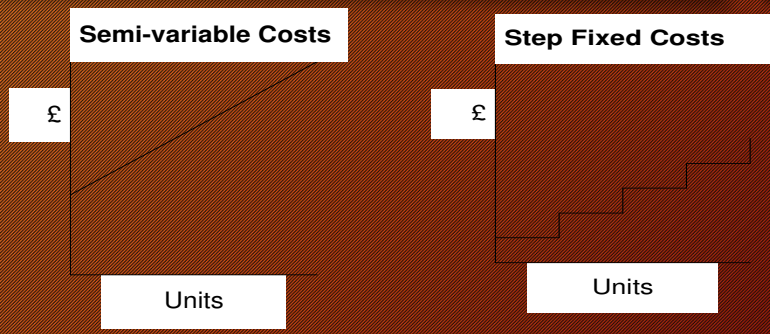
Classification of Cost



- **Semi-variable costs** have both a fixed and a variable element
- **Step fixed costs** change with change in level of operations

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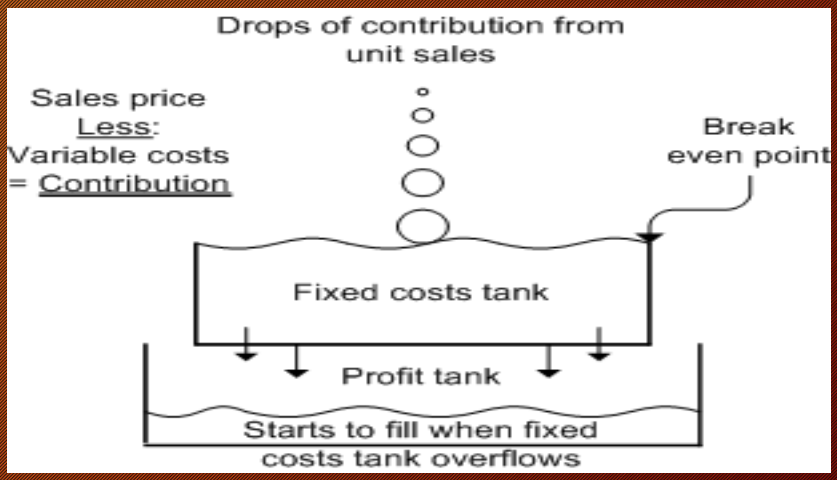
THE CONCEPT OF CONTRIBUTION



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Contribution

SALES PRICE
LESS *VARIABLE COSTS*
= *CONTRIBUTION*
LESS *FIXED COSTS*
= *PROFIT*

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Break-Even Point

- The level of activity at which the total contribution
- Revenue is sufficient to cover all fixed costs but not make a Surplus

REVENUE = COSTS

$$\frac{\text{FIXED COSTS}}{\text{CONTRIBUTION PER UNIT}}$$

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Projected Surplus OR Deficit?

- *What level of Revenue is required to produce a given surplus?*

$$\frac{\text{FIXED COSTS + SURPLUS}}{\text{CONTRIBUTION PER UNIT}}$$

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Case 1

- A company produces a single product with a selling price of Rs.1.10 Variable costs are Rs.0.60 per unit and fixed costs are Rs.40,000 per annum. Unit sales are expected to be 120,000 per annum.

Contribution per unit = Rs.1.10 - Rs.0.60
= Rs.0.50

Fixed costs = Rs.40,000

Break-even point =

$$\frac{\text{FIXED COSTS}}{\text{CONTRIBUTION PER UNIT}}$$

$$\frac{\text{Rs.40,000}}{\text{Rs.0.50}}$$

= 80,000 units

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Case 1 Continues..

- Production Required to achieve Rs.10,000 Surplus

$$\frac{\text{FIXED COSTS + SURPLUS}}{\text{CONTRIBUTION PER UNIT}}$$

$$\frac{\text{Rs.40,000 + Rs.10,000}}{\text{Rs.0.50}}$$

$$\frac{\text{Rs.50,000}}{\text{Rs.0.50}}$$

= **100,000 Units**

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CONTRIBUTION/REVENUE RATIO % (CR RATIO)

- *Used in Service Industries*
- *More than One Product in Manufacturing*
- *Level of Revenue will be in MONETARY TERMS instead of units* sold

Break Even Point =

$$\frac{\textit{Fixed Cost}}{\textit{Contribution Revenue Ratio \%}}$$

Here,

CR % = Contribution value x 100
Revenue

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Case 2

An State Transport company has budgeted the following:

	₹	₹
Sales		1,000,000
Costs:		
Variable costs	250,000	
Fixed costs	600,000	850,000
Profit		150,000

What is the Break-Even point in sales value?

Contribution =

Revenue	=	***Rs.1,000,000***
less Variable costs	=	***Rs.250,000***
Contribution	=	***Rs.750,000***

CR % = Contribution value x 100
Revenue

= Rs.750,000 x 100 = 75%
Rs.1,000,000

break-even = Fixed Costs
CS ratio

= Rs.600,000
75%

Break even = Rs.800,000

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BREAK-EVEN APPLICATIONS

- Upgrading Equipment or Adopting New Technology
- If the revenue for the product/service is the same for both methods
- At what point of production (i.e. output) adopt New technology

= Additional Total Fixed Costs, using Hi-Tech Method
Saving in Unit Variable Cost, using Hi-Tech Method

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Case 3

- The Bio Tech lab is thinking of investing in hi-tech machinery in an attempt to reduce operating costs. Output is at present 600,000 copies per annum and rising. The comparative costs of printing 600,000 copies per annum are:
- At what level of output would it be worthwhile changing to the hi-tech system?

	Rs. Existing	Rs. Hi-tech
Variable costs	9,000	6,000
Fixed costs	3,000	6,200
	12,000	12,200

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Solution

- Level of output would it be worthwhile changing to the hi-tech system?

Additional **TOTAL** fixed costs using hi-tech
Saving in **UNIT** variable cost using hi-tech

Rs.3,200 (Rs.6,200 – 3,000)
Rs.3,000 (Rs.9,000 – 6,000) ÷ 600,000

Rs.3,200
Rs.0.005

= 640,000 copies

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Cost and Revenue Analysis

Cost analysis	• **A** study of the costs of the resources (such as personnel, supplies, and equipment) associated with implementing a project, program, service, or other activity.
Revenue analysis	• **A** study of the revenues (fees, donations, and grants) received from clients, external sources, or an organization's headquarters.
Matching Cost with Revenue	• Analyzing revenues is useful for examining the relationship between the fee you charge (if any) and the cost of providing a service.

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Strategies for Cost and Revenue Management

- Cutting Costs Strategies
  - Substitution
  - Economies of scale
  - Cost sharing
  - Bulk purchasing
  - Reducing idle capacity

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Cross-Subsidization Strategies

- Charging more than full cost for high-demand services to subsidize other *services*
- Increasing the volume of high-revenue services to subsidize others
- Using some facilities to subsidize others

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RESPONSIBILTY ACCOUNTING
Cost centres match organisation structure
Managers responsible for costs in their own cost centres to achieve their budgeted goals
Gives high level of motivation, provided favourable and unfavourable variances are equally considered

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