Chapter - 3

Theory of Production and Cost

Unit -2 Theory of Cost

- **Cost Analysis**

  Cost analysis is related with the financial aspects of production

- **Cost Concepts**

1. Accounting Costs & Economic Costs

- Accounting costs (similar as Explicit cost or Outlay cost) are expenses which will have to be incurred by firm and are recorded in books of accounts (financial statements).
- Economic Cost = Explicit cost + Implicit Cost
- Implicit Cost is cost of using self owned factors. E.g.- normal return on capital invested by owner himself in his business; etc.
- Implicit cost includes normal profit

2. Outlay costs and Opportunity costs

- Outlay costs are actual expenditure.
- Opportunity cost is the cost of next best alternative opportunity which was foregone. It is cost of the missed opportunity.
- Implicit cost is a type of opposite cost.

Total Revenue
(–) Explicit Cost (accounting cost)
Accounting Profit
(–) Implicit Cost
Economic Profit

3. Traceable (Direct) costs and Non-Traceable (Indirect) costs

- Direct costs are costs that are readily identified and are traceable to a particular product, operation or plant.
- Indirect costs are those which are not easily and definitely identifiable in relation to a plant, product, process or department. E.g.- Electricity expenses, common or general expenses etc.

4. Incremental costs and Sunk costs

- Incremental cost refers to the additional cost incurred by a firm as result of a business decision. (Marginal Cost)
- Sunk Costs are costs which are already incurred once and for all and cannot be recovered. They are based on past commitments and cannot be revised or reversed if the firm wishes to do so. Like cost incurred in advertising , R&D exp,

5. Historical costs and Replacement costs

- Historical cost refers to the cost incurred in the past on the acquisition of a productive asset such as machinery etc.
- Replacement cost is the money expenditure that has to be incurred for replacing an old asset.

6. Private costs and Social costs

- Private costs are costs actually incurred or provided for by firms and are either explicit or implicit.
- Social cost refers to the total cost borne by the society on account of a business activity and includes private cost and External Cost.

7. Fixed Costs and Variable costs

- Fixed or constant costs are costs which do not vary with output up to a certain level of activity.
- These require fixed expenditure of funds irrespective of level of output e.g., rent, property taxes, interest on loans etc.
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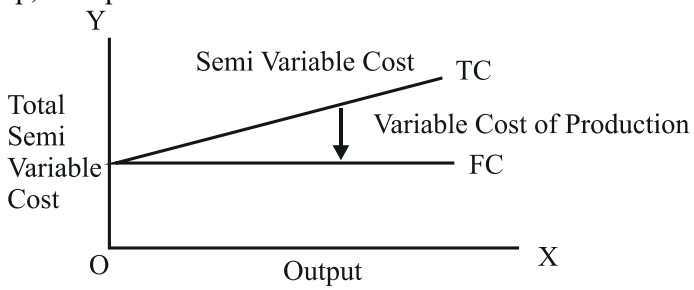
- Fixed cost is a function of capacity.
- If the firm closes down for some time in the short run but remains in business, fixed cost CANNOT be avoided. (this cost is inescapable)
- Shut down costs are costs which will continue even after operations are suspended. E.g.- for storing of old machines which cannot be sold in market.
- Variable Costs are costs which change with the level of output (it is a function of output)
- If a firm shuts down for a short period, then variable cost can be avoided like wages of labour, prices of raw material, etc

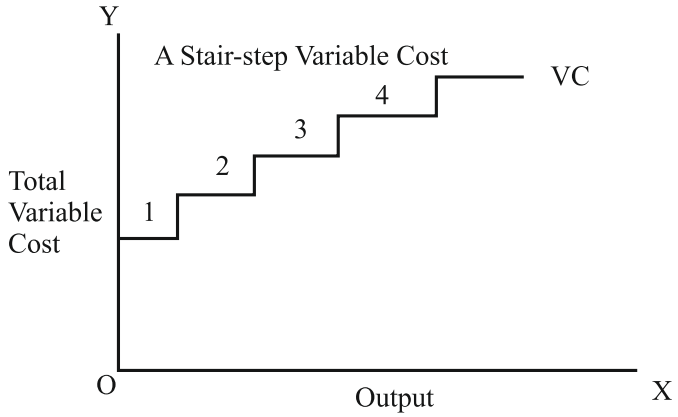
8. Semi - Variable Cost

- Some costs which are neither perfectly variable, nor absolutely fixed in relation to the changes in the size of output.
- E.g.: Electricity exp, Post-paid Phone Bill etc.



9. Stair-Step Variable Cost

- Some costs which may increase in a stair-step fashion, i.e., they remain fixed over certain range of output: but suddenly jump to new higher level when output goes beyond a given limit.

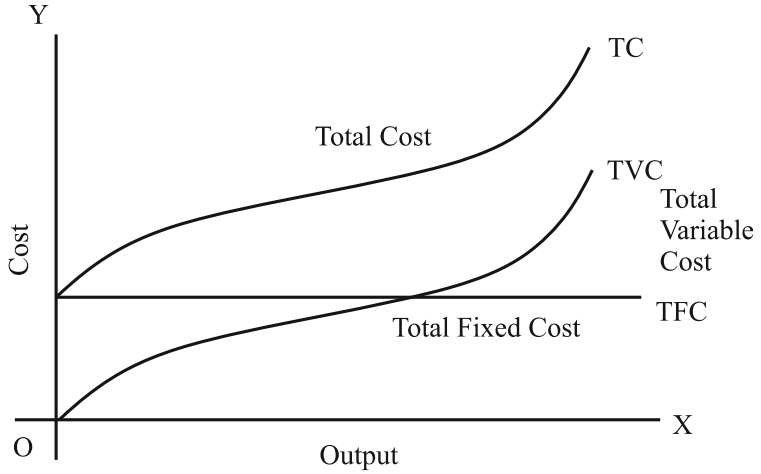


- **Short Run Total Costs**
  - TC = TFC + TVC

- **Total Fixed Cost curve (TFC)**
  - horizontal straight line parallel to X-axis
  - Starts from a point on the Y-axis

- **Total Variable Cost(TVC)**
  - Initially increases at a decreasing rate and then at an increasing rate.
  - It is Inverted-S shaped curve.

- **Total Cost Curve (TC)**
  - Total cost is vertical summission of the TFC curve and the TVC curve.
  - Starting point of TC & TFC is same, because at 0 units of output → TC = TFC
  - Slopes of TC & TVC are same (Inverted-S shaped). Name of their slope is MC.
  - At each point the TC & TVC curves have vertical distance equal to total fixed cost.



Short run Total Cost Curve

- **Average Fixed Cost curve (AFC)**
  - AFC = TFC/Q
  - AFC is fixed cost per unit of Output
  - AFC falls as output increases and vice-versa.

- AFC Curve will slope downwards but will not touch the X-axis as AFC cannot be zero.
- Shape of AFC curve is known as rectangular hyperbola)

- **Average Variable Cost (AVC) (Law of VP)**
  - AVC = TVC/Q
  - AVC Curve will first fall then reach a minimum and then rise (it is U-shaped)

- **Average Total Cost (ATC or AC)**
  - ATC = TC/Q or ATC = AFC + AVC
  - ATC curve will first fall, then reach a minimum and then rise (it is U-shaped)

Marginal Cost Curve (MC)

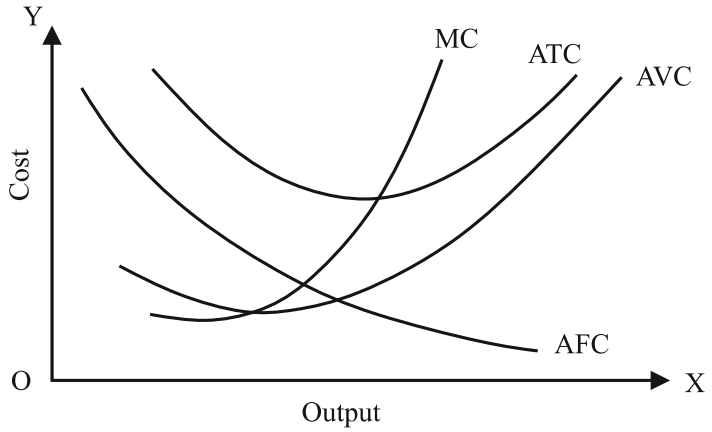
- Marginal cost is addition made to total cost by production of an additional unit of output.

$$MC = \Delta \text{ in } TC/\Delta \text{ in Output}$$

Or

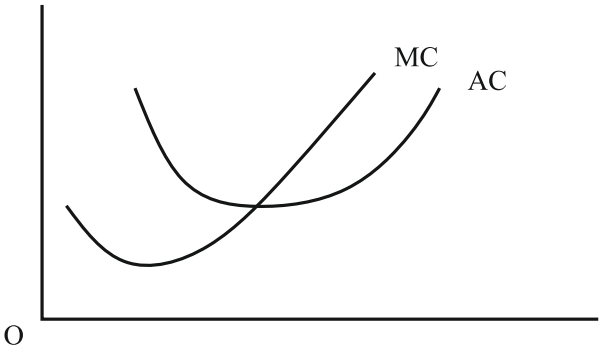
$$MC = \Delta \text{ in } TVC/\Delta \text{ in Output}$$

- MC is not related with of fixed cost.
- MC is related with variable costs.
- MC curve becomes minimum corresponding to the point of inflection on the total cost curve.
- MC curve declines first, reaches its minimum and then rises ("U" shaped)
- MC Curve intersects AC curve and AVC curve at their minimum points.

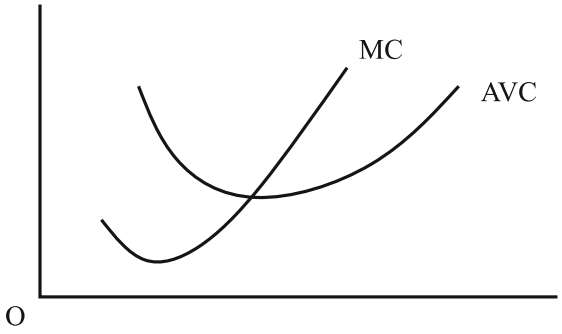


Short run Average and Marginal Cost Curves

MC and AC



MC and AVC



MC Curve cuts both AC and AVC at there minimum Point.

- Relationship between:-

MC & AC	MC & AVC
AC Falls → MC < AC	AVC Falls → MC < AVC
AC rises → MC > AC	AVC rises → MC > AVC
AC Min. → MC = AC	AVC Min. → MC = AVC

Long Run Average Cost Curve

- Long run is a period during which firm can vary all its inputs (Labour & Capital both)
- In the long run the firm can build any size or scale of plant and therefore, can move from one plant to another. Long run is planning horizon.
- A firm plans for the long run and operates in short run.
- Long run cost of production is the least possible cost of producing any given level of output when all individual factors are variable.
- Long run cost curve depicts functional relationship between output and long run cost of prod.
- Long run cost of production is the least possible cost of producing any given level of output when all individual factors are variable.

- **When LAC is falling (LAC has negative Slope)**

(1) LAC is tangent to the falling portion of SAC → Under – Utilisation

↓

Excess Capacity

(2) LAC curve falls (-ve Slope) as initially in long Run we experience IRS (Economies of Scale)

- **When LAC is rising (LAC has positive Slope)**

(1) LAC is tangent to rising Portion of SAC. - Over – utilisation

↓

Beyond Capacity

(2) LAC curve rises (+ve Slope) as initially in long Run we experience DRS (Dis-Economies of Scale)

Economies of scale are cost advantages that firms obtain due to their scale of operation, with cost per unit of output decreasing which causes scale increasing.

■ Types of Economies

Internal Economies	External Economies
Internal economies accrue to firm when it expands its output, so that cost of production would come down.	External economies are benefits accruing to each member firm of the industry as a result of expansion of the industry.
Internal economies arise purely due to endogenous (internal) factors.	They are not dependent on the output level of individual firms.

- **External Economies & Diseconomies**

(1) Cheaper raw materials & equipment
(2) Technological external economies
(3) Development of skilled labour
(4) Growth of ancillary industries
(5) Better transportation & marketing
(6) Economies of Information

- **Internal Economies & Diseconomies**

(1) Technical
(2) Managerial
(3) Commercial
(4) Financial
(5) Risk bearing

- **Formulae**

Cost		
$TC = TFC + TVC$ $= AC \times Q$ $= \sum MC$ $TVC = TC - TFC$ $= AVC \times Q$ $= \sum MC$ $TFC = TC - TVC$ $= AFC \times Q$	$AC = AFC + AVC$ $= \frac{TC}{Q}$ $AVC = AC - AFC$ $= \frac{TVC}{Q}$ $AFC = AC - AVC$ $= \frac{TFC}{Q}$	$MC = TC_n - TC_{n-1}$ $= \frac{\Delta TC}{\Delta Q}$ $= TVC_n - TVC_{n-1}$ $= \frac{\Delta TVC}{\Delta Q}$