

Introduction

- Cost is a sacrifice or foregoing that has occurred or has potential to occur in future, measured in monetary terms.
- The determinants of cost are the price of the factors of production, their efficiency, technology and the level of output.

$$C = f(Q, T, P)$$



Kind of Costs

Accounting Costs

Real Costs

Opportunity Costs

Implicit Costs

Explicit Costs

Social Costs

Replacement
Costs

Historical and
Future Costs

Direct and
Indirect Costs

Controllable and
Uncontrollable
Costs

Production and
Selling Costs



- The costs that are measurable in terms of money.
- They are recorded in the books of account.
- Examples are cost of labour, raw materials, interest on loans etc.
- Also called explicit costs.

- It is a broader concept.
- They are social and psychological in nature.
- It is not considered as an accounting cost as there is no actual outflow of money.
- Example: The perks given to employees to compensate for leisure, social and family needs.

- It is the cost of the next best alternative.
- It is not measurable in money terms but holds the key in decision making.
- Example: If an individual has a certain sum of money, they have two choices. They can invest it in shares and get dividend which is not fixed or they can invest it in term deposits and earn a fixed returns.

- Implicit costs do not involve actual payment or cash outflow or reduction in assets.
- These are the costs that are internal to an organization but they do not take place in actual money terms.
- Example: Rent of self owned building.
- If this cost is positive then the economic cost is more than the accounting cost.

In economics, an implicit cost, also called an imputed cost, implied cost, or notional cost, is the opportunity cost equal to what a firm must give up in order to use a factor of production for which it already owns and thus does not pay rent.



- Explicit costs go to the trading and profit and loss account.
- It is also known as out of pocket costs or accounting costs.
- Explicit costs refer to all those expenses made by a firm to buy goods directly. They include, payments for raw material, taxes and depreciation charges, transportation, power, high fuel, advertising and so on.

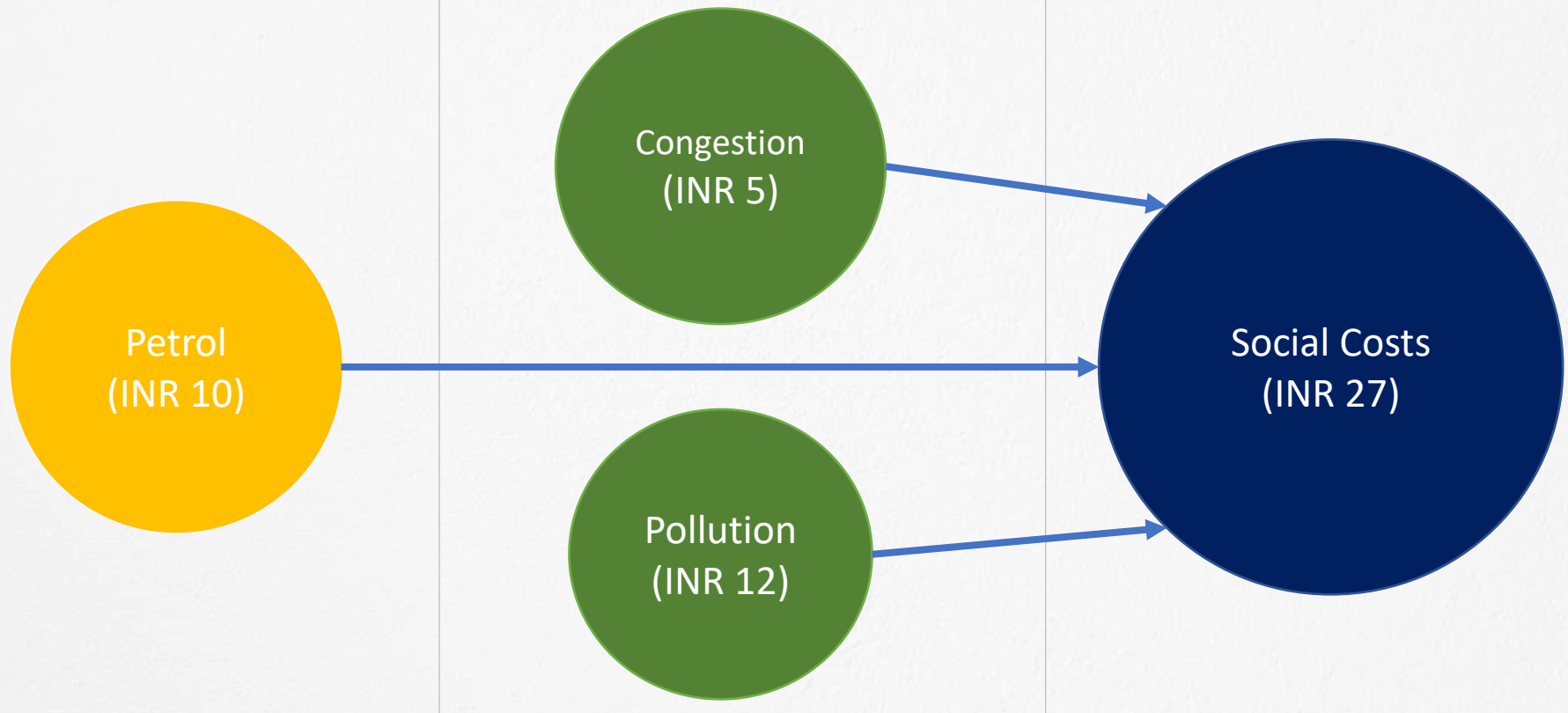
Social Costs

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Personal Cost

External Cost

Social Cost
(Private + External)



- Replacement costs are current price or cost of buying or replacing any input at present.
- It is known as current cost.

Replacement Costs

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Original Cost



Replacement Cost

- Historic costs are sunk costs, as they cannot be retrieved from the business without loss.
- Future costs are the costs that are going to be incurred in the future and therefore they are the forecast cost.
- There is an element of chance in it.



- Direct costs are those that can be attributed to any particular activity.
- Indirect costs may not be attributable to output. They are distributed over all activities.

- Controllable costs are the regulated costs.
- Uncontrollable costs are not regulated by the management of the company but are fixed as per the policies of the government.



- Production Cost = $f(\text{Output})$
- Selling Cost = $f(\text{Sales})$

Relationship between Production & Cost

Relationship between Production and Cost

- **Total variable cost (TVC)** = the cost associated with the variable input, found by multiplying the number of units by the unit price.
- **Marginal cost (MC)** = the rate of change in total variable cost

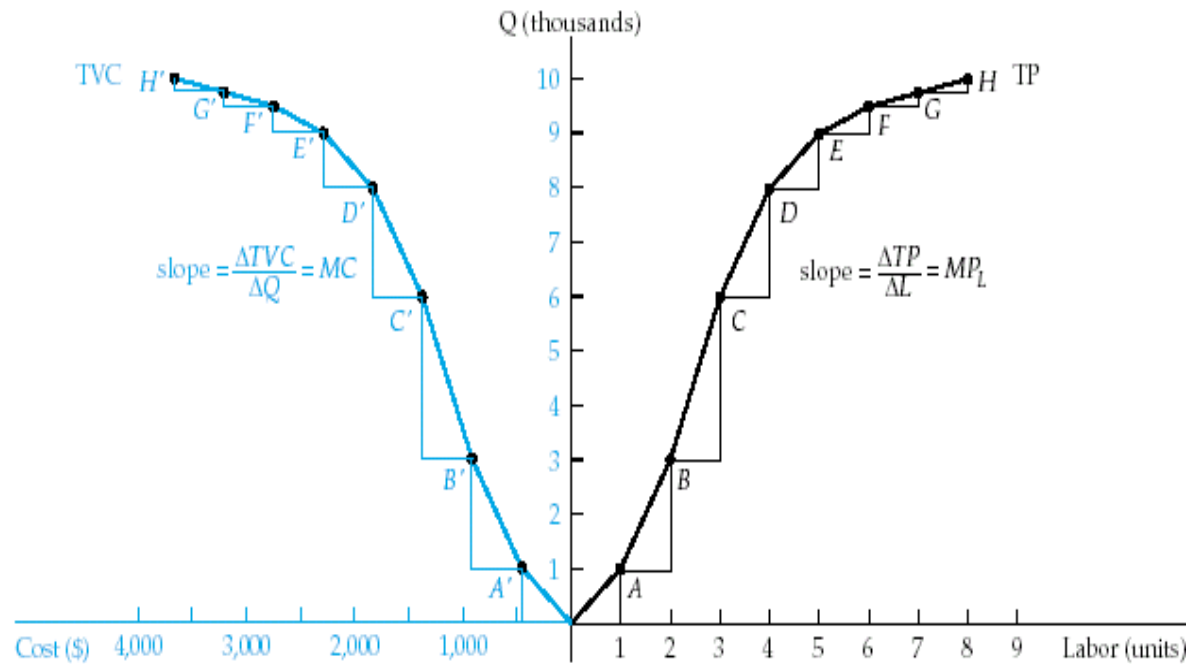
$$MC = \frac{\Delta TVC}{\Delta Q} = \frac{W}{MP}$$

The law of diminishing returns implies that MC will eventually increase



Relationship between Production and Cost

- Both the curves are mirror images of each other
- When TP increases at an increasing rate, TVC increases at a decreasing rate



Short Run Costs

Short-run Cost Function

Short-run cost function assumptions:

- the firm employs two inputs, labor and capital
- the firm operates in a short-run production period where labor is variable, capital is fixed
- the firm produces a single product
- the firm employs a fixed level of technology



Short-run Cost Function

More short run cost function assumptions.

- the firm operates at every level of output in the most efficient way
- the firm operates in perfectly competitive input markets and must pay for its inputs at a given market rate (it is a 'price taker')
- the short-run production function is affected by the law of diminishing returns



Short-run Cost Function

- Standard variables in the short-run cost function:
 - Quantity (Q) is the amount of output that a firm can produce in the short run
 - Total fixed cost (TFC) is the total cost of using the fixed input, capital (K)



Short-run Cost Function

- Standard variables in the short-run cost function:
 - Average fixed cost (AFC) is the average per-unit cost of using the fixed input K

$$AFC = TFC/Q$$

- Average variable cost (AVC) is the average per-unit cost of using the variable input L

$$AVC = TVC/Q$$



Short-run Cost Function

- Standard variables in the short-run cost function:
 - Average total cost (AC) is the average per-unit cost of all the firm's inputs

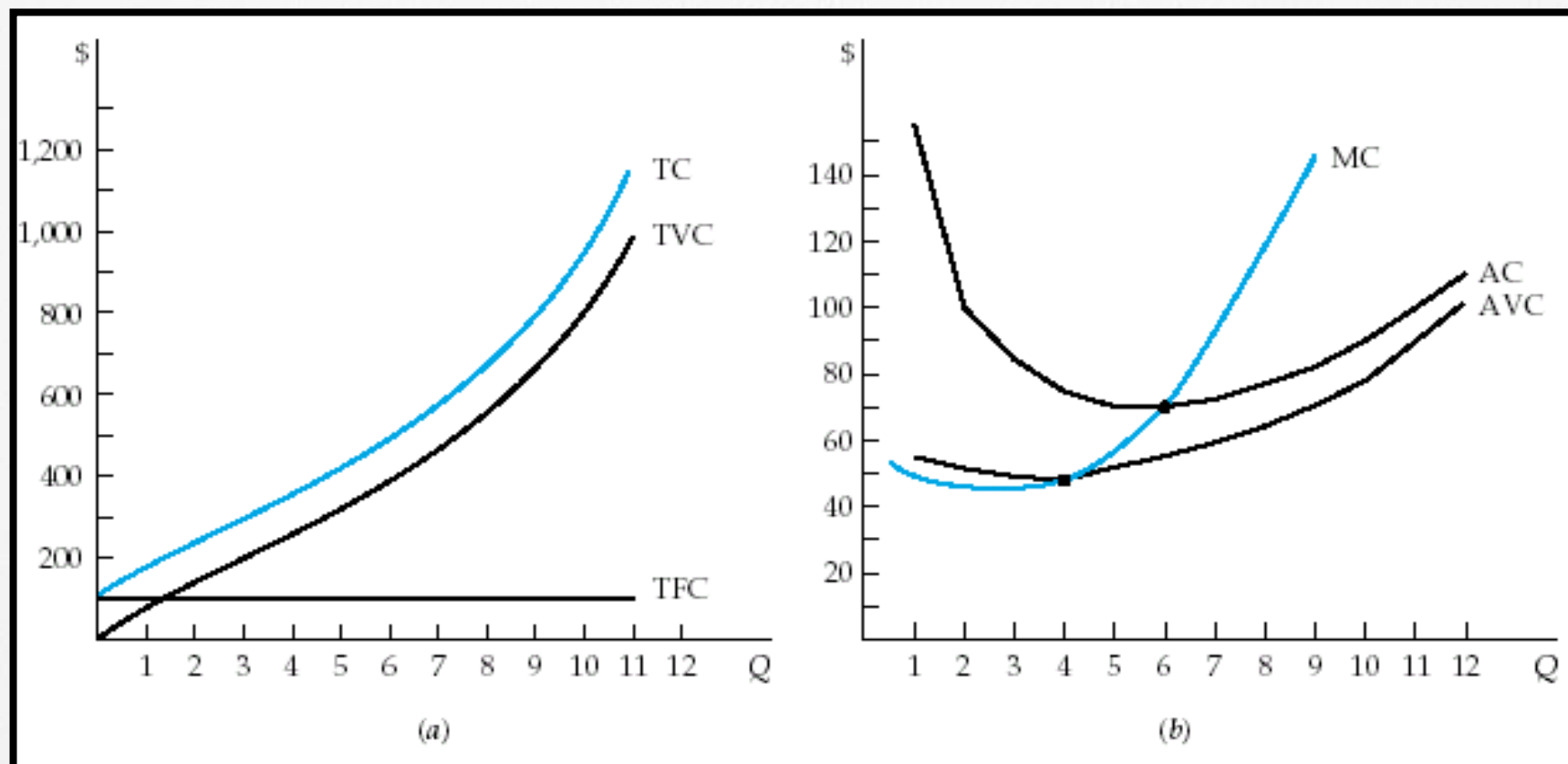
$$AC = AFC + AVC = TC/Q$$

- Marginal cost (MC) is the change in a firm's total cost (or total variable cost) resulting from a unit change in output

$$MC = \Delta TC / \Delta Q = \Delta TVC / \Delta Q$$

Short-run Cost Function

Graphical example of the cost variables



Short-run Cost Function

- Important observations
 - AFC declines steadily
 - when $MC = AVC$, AVC is at a minimum
 - when $MC < AVC$, AVC is falling
 - when $MC > AVC$, AVC is rising

The same three rules apply for average cost (AC) as for AVC



Short-run Cost Function

Two critical relationships:

- Productivity and cost are inversely related.
- The marginal cost pulls average either up or down depending on if it is above or below average.

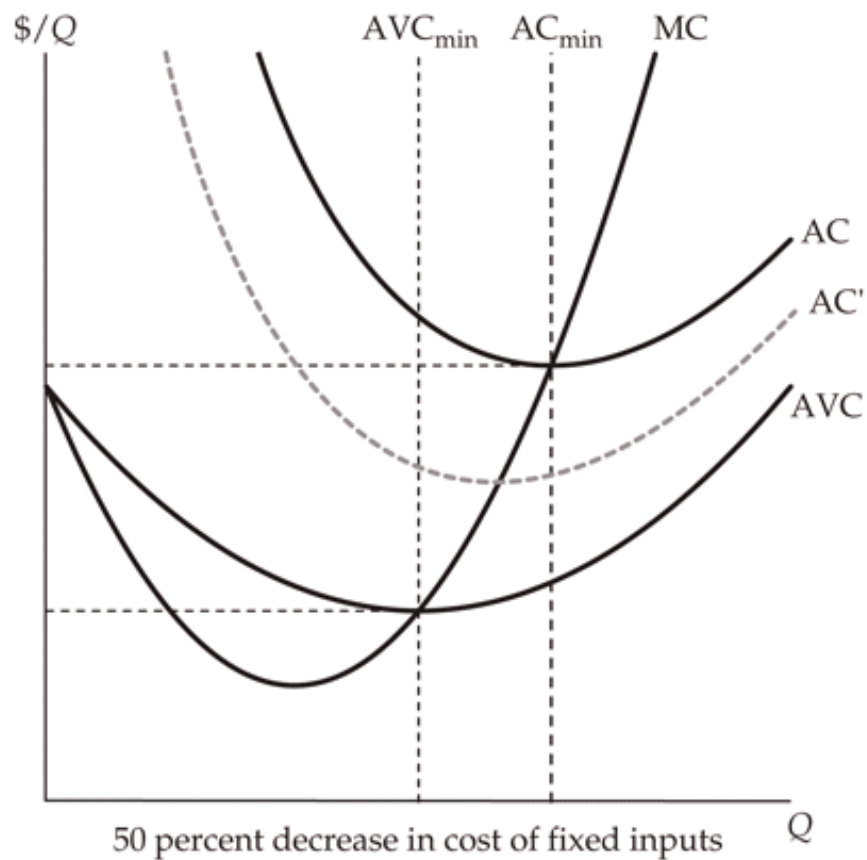


Short-Run Cost Function

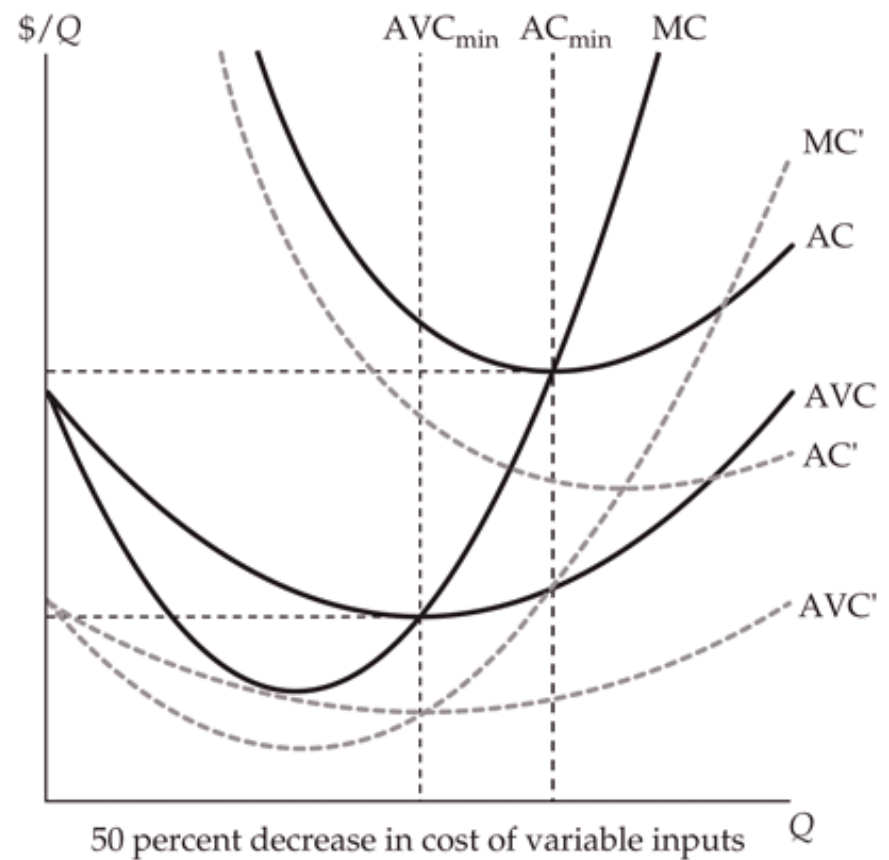
- A reduction in the firm's fixed cost would cause the average cost line to shift downward
- A reduction in the firm's variable cost would cause all three cost lines (AC, AVC, MC) to shift downward.



Short-run Cost Function



(a)



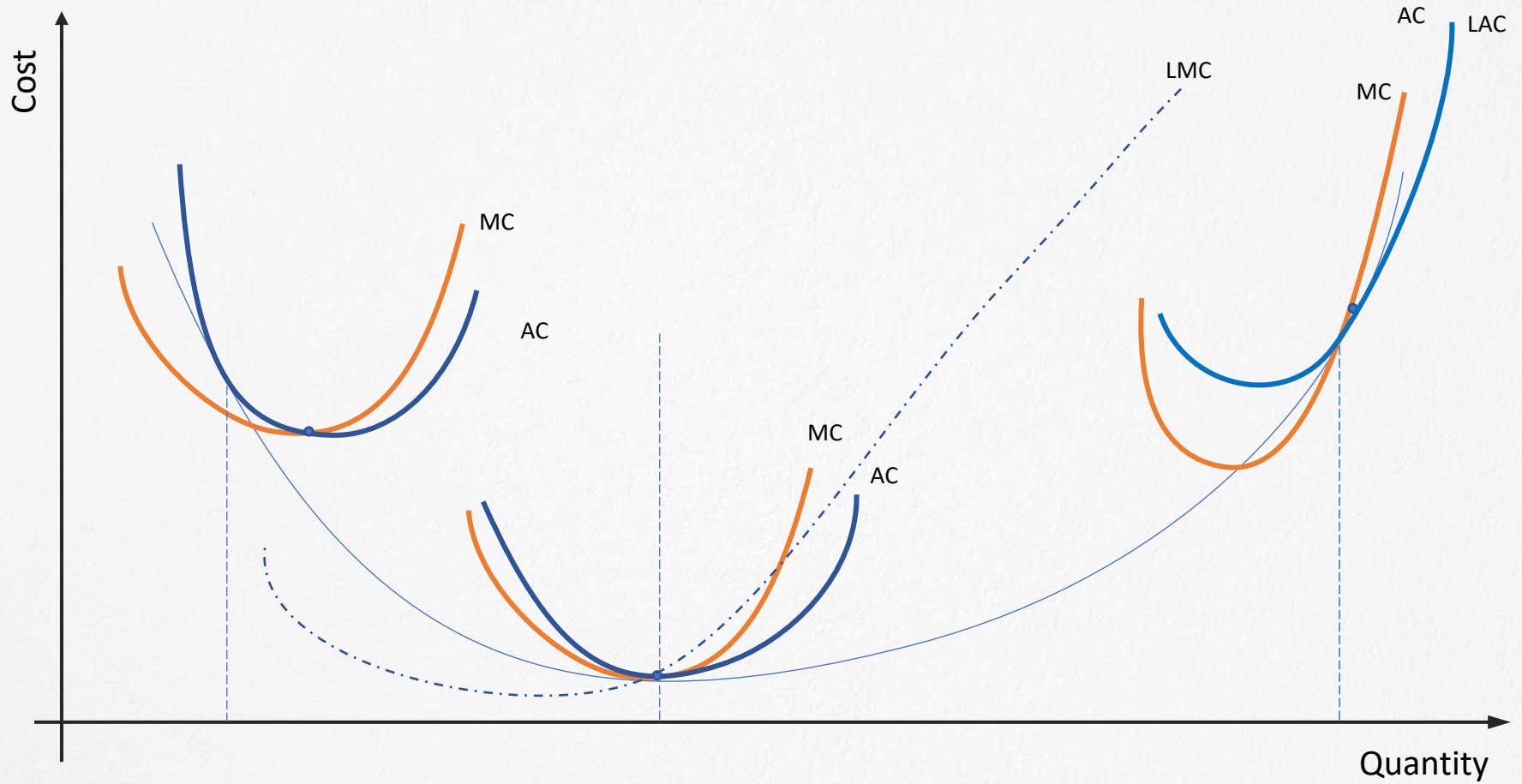
(b)

Introduction

- In the long run all the factors of production become variable in nature.
- As all the cost is variable in nature, the Average Cost is the most crucial in taking decisions.
- The long run cost curve is also known as **Planning Cost function** the Long Run Cost Curve is known as **Planning Curve**.

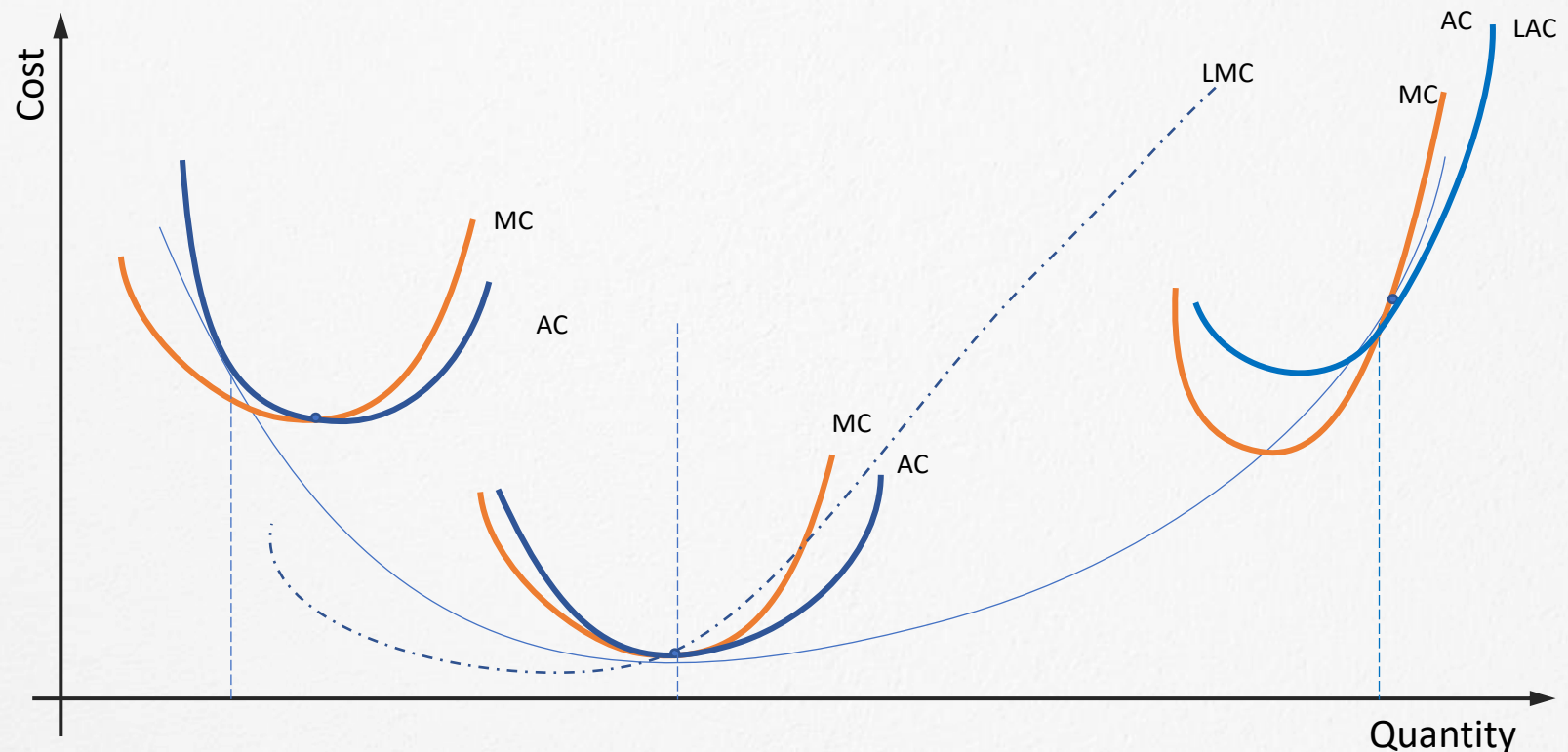


Long Run Average Cost Curve



Long Run Marginal Cost Curve

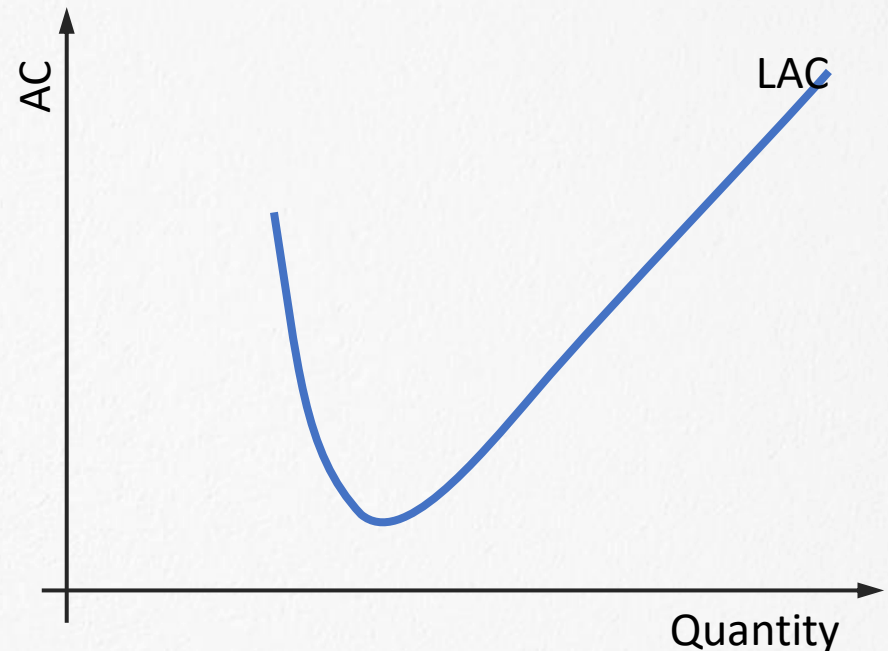
The LMC curve joins the points on the SMC curves that are associated with SACs corresponding to each level of output.



Different shapes of Long Run Cost Curves

A

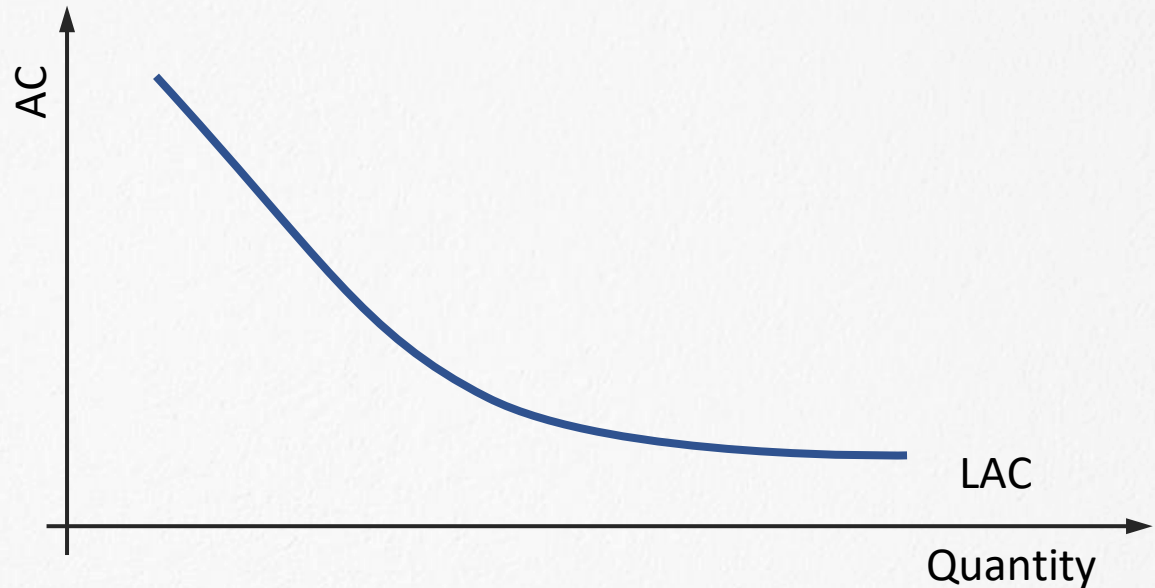
- The first part of the curve shows economies of scale followed by diseconomies of scale.
- The diseconomies are greater than the economies of scale.



Different shapes of Long Run Average Cost Curves

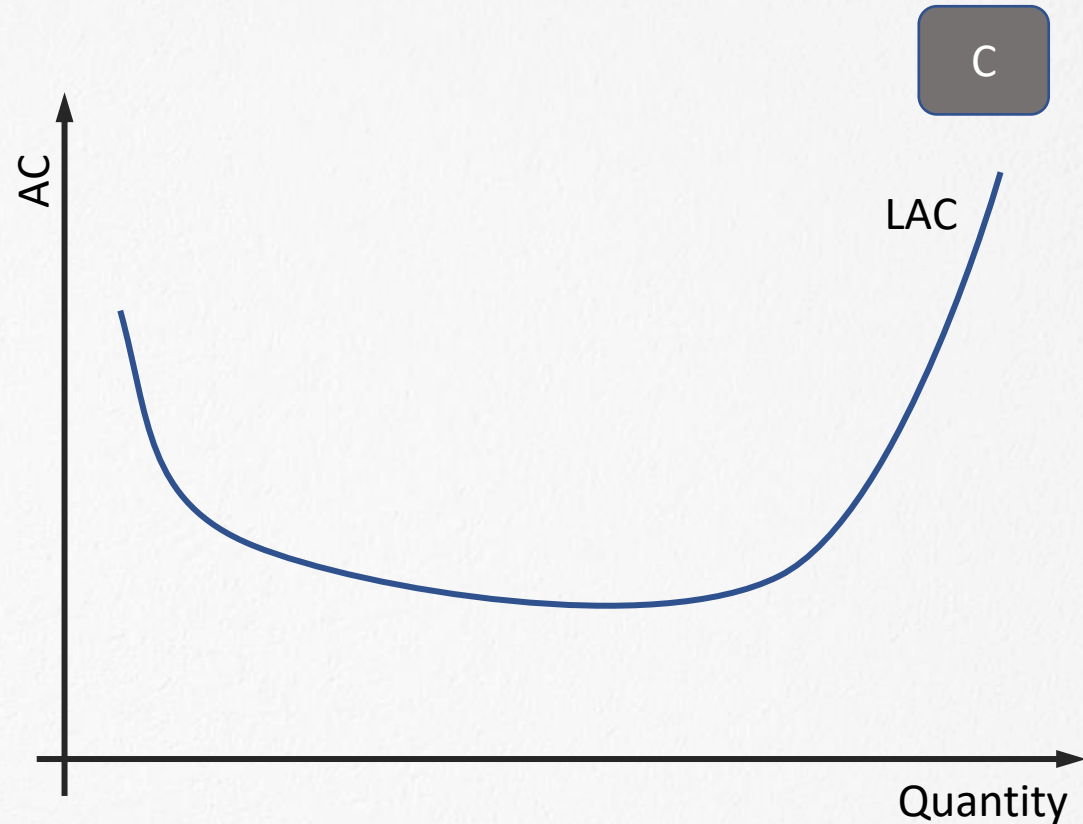
B

- This curve occurs when the diseconomies of scale are offset by the economies of scale.
- The LAC curve has a prolonged downward slope.



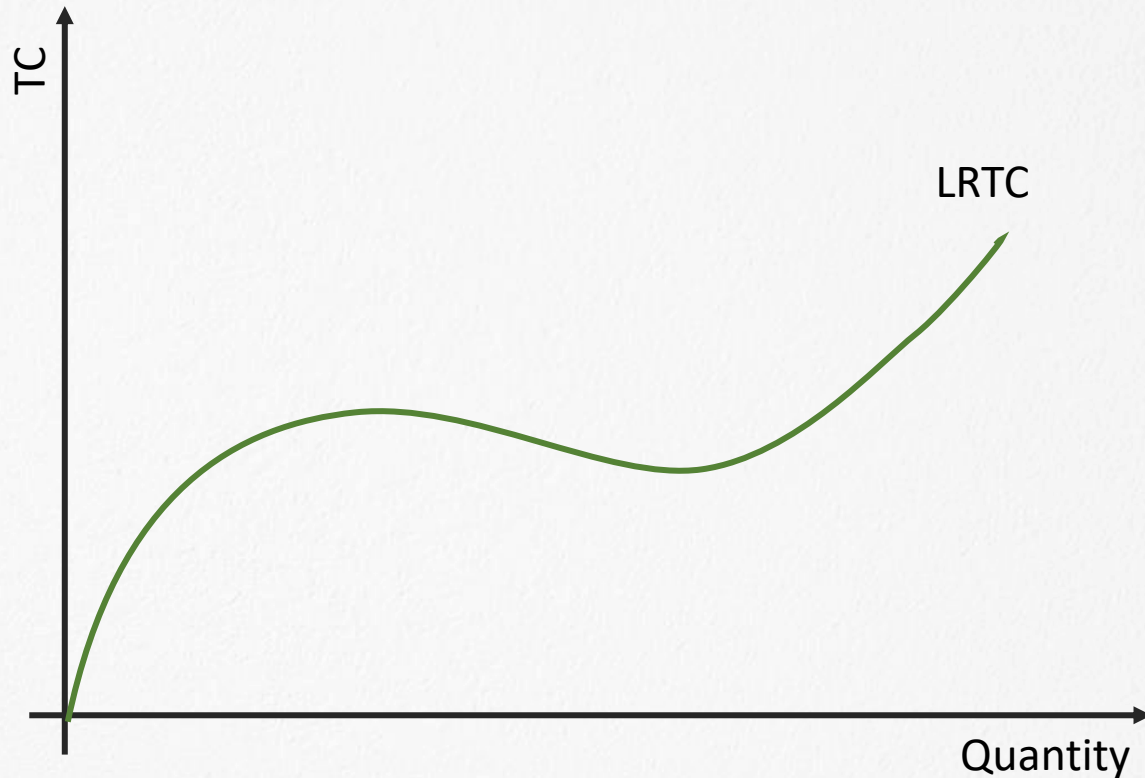
Different shapes of Long Run Average Cost Curves

- The firm initially enjoys economies of scale because of which the LAC slopes downward.
- Beyond a certain level, if the firm proceeds then all the economies of scale are exhausted and LAC curve becomes flat.
- Again the firm expands and then diseconomies of scale start and the LAC moves upward.



Long Run Total Cost Curves

The Total cost curve is derived from the Average Cost curve



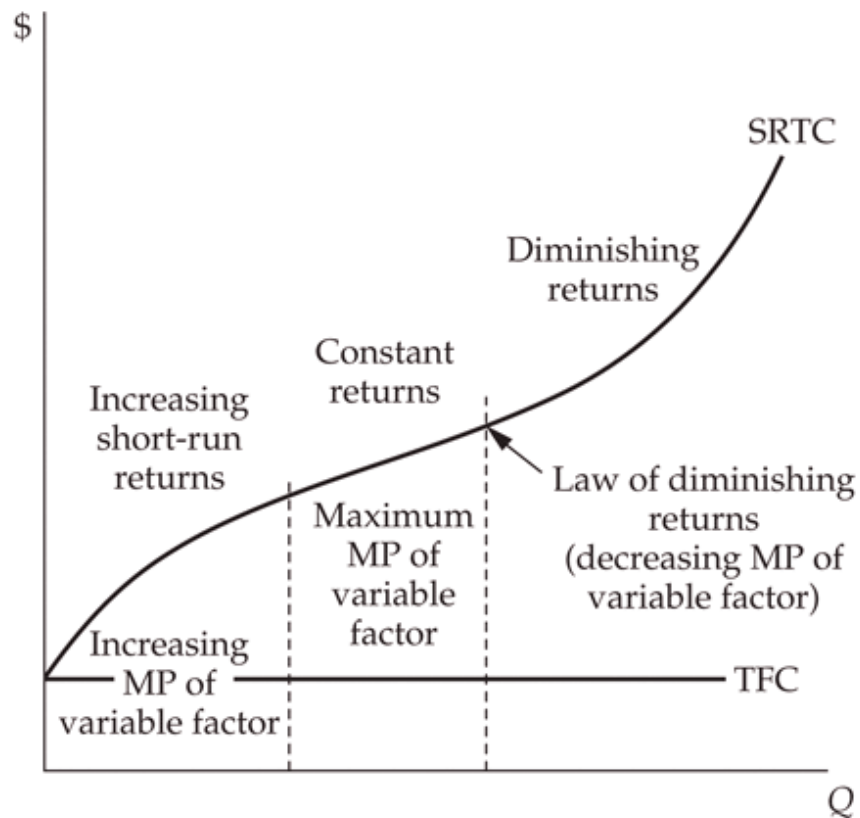
Long-run Cost Function

In the **long run**, all inputs to a firm's production function may be changed

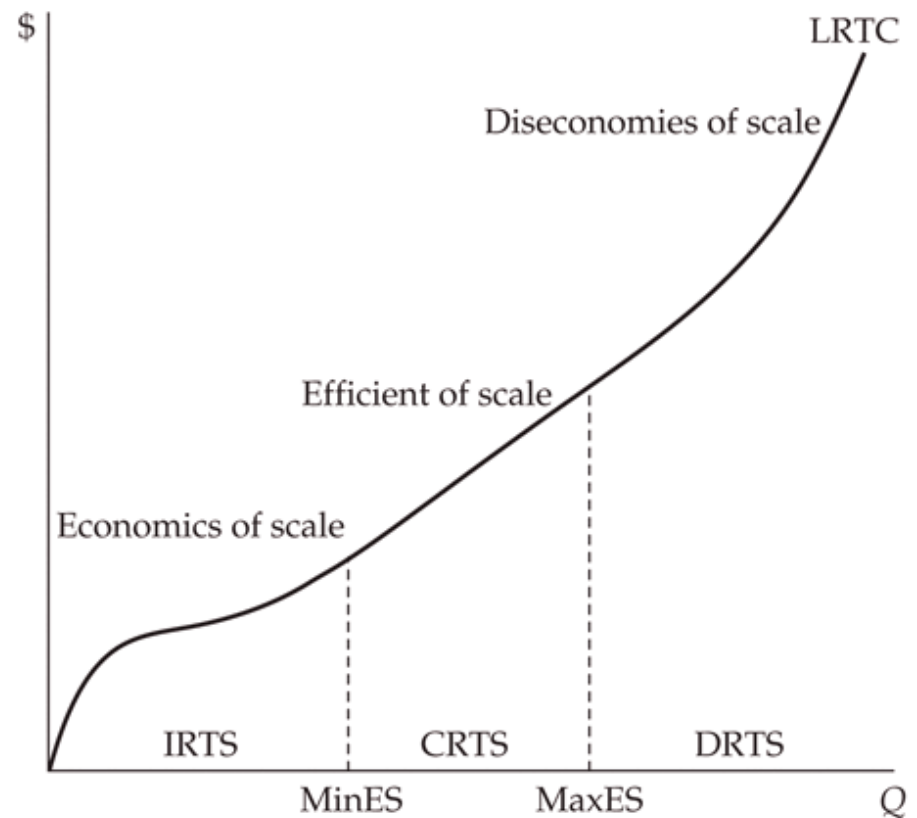
- Because there are no fixed inputs, there are no fixed costs
- The firm's long run marginal cost pertains to returns to scale
- In general, at first firms achieve increasing returns to scale, then as they mature, they have constant returns, then they may experience decreasing returns to scale



Long-run Cost Function



(a) Short run



(b) Long run

Long-run Cost Function

When a firm experiences increasing returns to scale:

- a proportional increase in all inputs increases output by a greater proportion
- as output increases by some percentage, total cost of production increases by some lesser percentage



Long-run Cost Function

- **Economies of scale:** situation where a firm's long-run average cost (LRAC) declines as output increases
- **Diseconomies of scale:** situation where a firm's LRAC increases as output increases
- In general, the **LRAC curve** is U-shaped.



Long-run Cost Function

Reasons for long-run economies of scale:

- specialization of labor and capital
- prices of inputs may fall with volume discounts in firm's purchasing
- use of capital equipment with better price-performance ratios
- larger firms may be able to raise funds in capital markets at a lower cost
- larger firms may be able to spread out promotional costs



Long-run Cost Function

Reasons for diseconomies of scale:

- Scale of production is not optimal for the total market demand
- Transportation costs tend to rise as production grows, due to handling expenses, insurance, security, and inventory costs

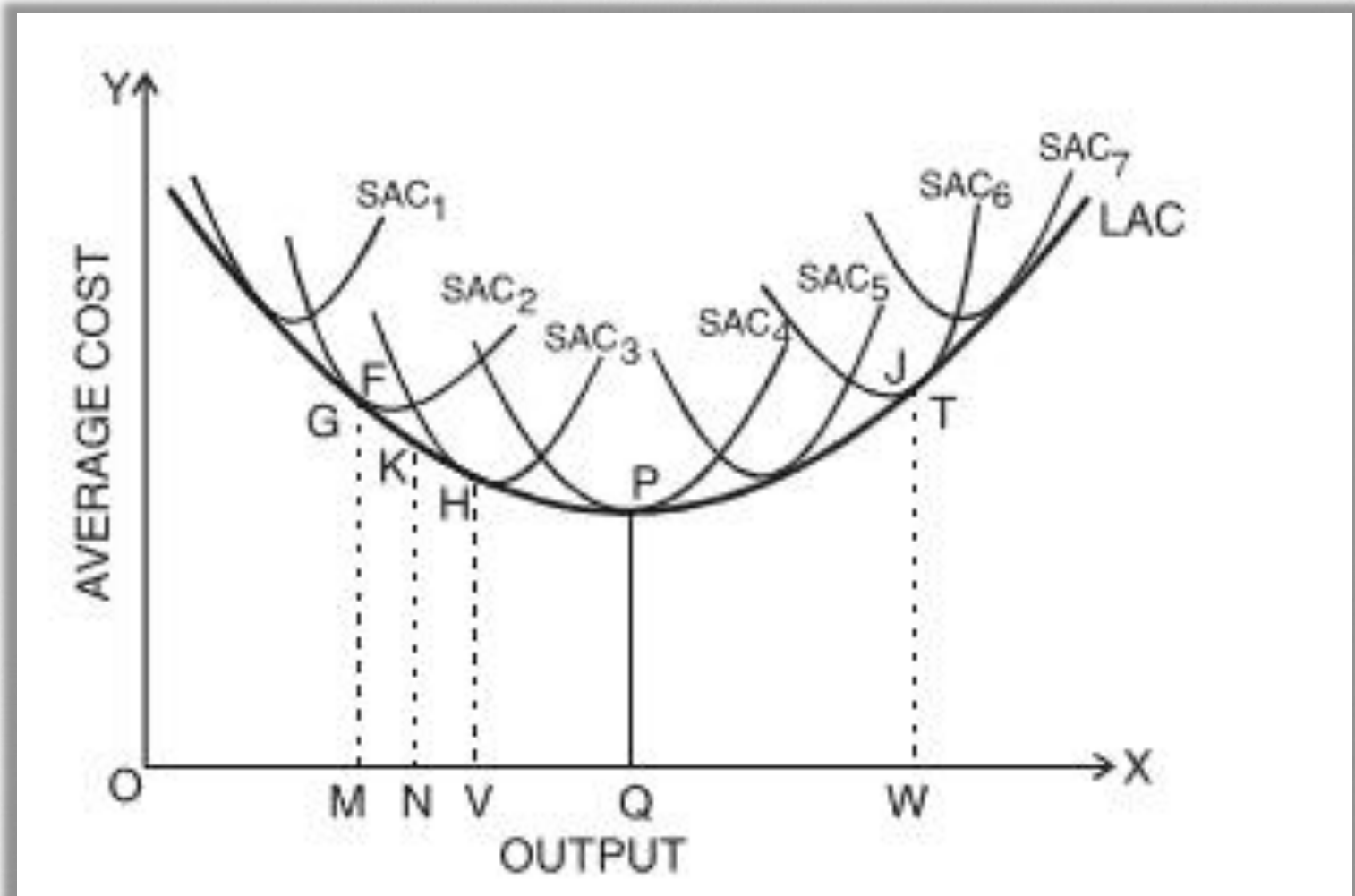


Long-run Cost Function

- In long run, the firm can choose any level of capacity
- Once it commits to a level of capacity, at least one of the inputs must be fixed. This then becomes a short-run problem.
- The LRAC curve is an envelope of SRAC curves and outlines the lowest per-unit costs the firm will incur over a range of output.



Long-run Cost Function

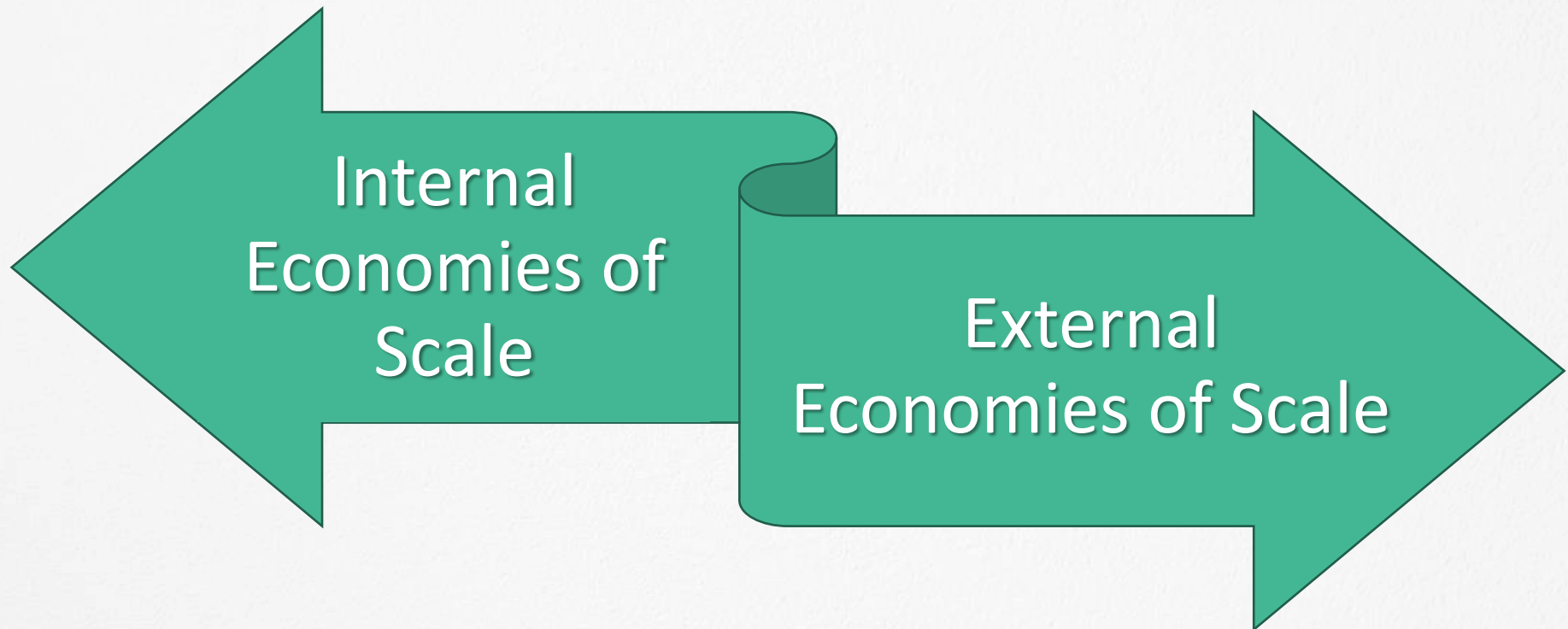


Introduction

- Economies of scale are the cost advantages that a business obtains due to expansion.
- Economies of scale mean lowering of costs of production by producing in bulk.



Types of Economies of Scale



Internal Economies of Scale

- Cost per unit depends on size of the firm.
- Lower long run average costs resulting from a firm growing in size.
- Higher longrun average cost arising from a firm growing too large.



Types of Internal Economies

Specialization

Greater efficiency
of machines

Managerial
economies

Financial
economies

Production in
stages

Risk bearing
economies

R & D
economies

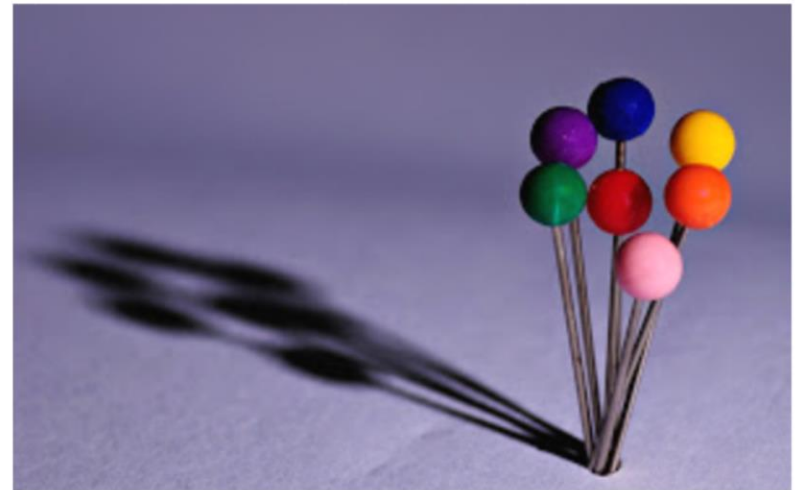


Specialisation

1



Adam Smith's Pin Factory



Greater Efficiency of Firms

2

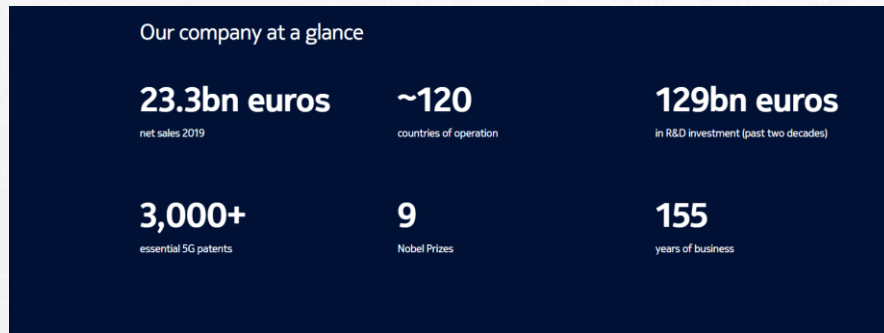


- As a firm grows, there is greater potential for managers to specialize in particular tasks (e.g. marketing, human resource management, finance).
- Specialist managers are likely to be more efficient as they possess a high level of expertise, experience and qualifications compared to one person in a smaller firm trying to perform all of these roles.

- Many small businesses find it hard to obtain finance and when they do obtain it, the cost of the finance is often quite high.
- This is because small businesses are perceived as being riskier than larger businesses that have developed a good trackrecord.
- Larger firms therefore find it easier to find potential lenders and to raise money at lower interest rates.

- When production of a product takes place in stages and if all the processes are housed together at one place, then it leads to efficiency.
- The movement of goods and resources is minimum.

- In a multi-product firm, the risk is shared among the various products.
- If one of the product does not do well, then they may shift the resources to other products.



This is possible in large firms where they can invest in a separate R&D department which would lead to reduction in cost.



External Economies

External Economies of Scale

- The economies that arise from outside a firm.
- Lower long run average costs resulting from an industry growing in size.
- Higher long run average costs resulting from an industry growing too large.



Types of External Economies

Technological
Advancement

Cheap Raw
Materials

Financial
Institutions

Pool of Skilled
workers

Improved
Infrastructure

Specialized
Markets



Any advancement in technology by the industry would lead to an advancement of technology of a particular firm.



As the size of the industry grows, the ancillary/subsidiary units provide it the raw materials and the bargaining power of the industry is much more.



- The finance is available to the industries with large size at cheaper rates.
- The credit policy is changed as per the needs of the organisation.
- Example- as the IT sector is currently booming, therefore easy credit is available to this industry.

Pool of Skilled Workers

4



The growth of an industry may encourage a government and private sector firms to provide better road links, electricity supplies, build new airports and develop dock facilities.



Some large industries have specialist selling places and arrangements such as Mandi and insurance markets.



Diseconomies of Scale

- Diseconomies of scale are the disadvantages of being too large.
- A firm that increases its scale of operation to a point where it encounters rising long run average costs is said to be experiencing internal diseconomies of scale.

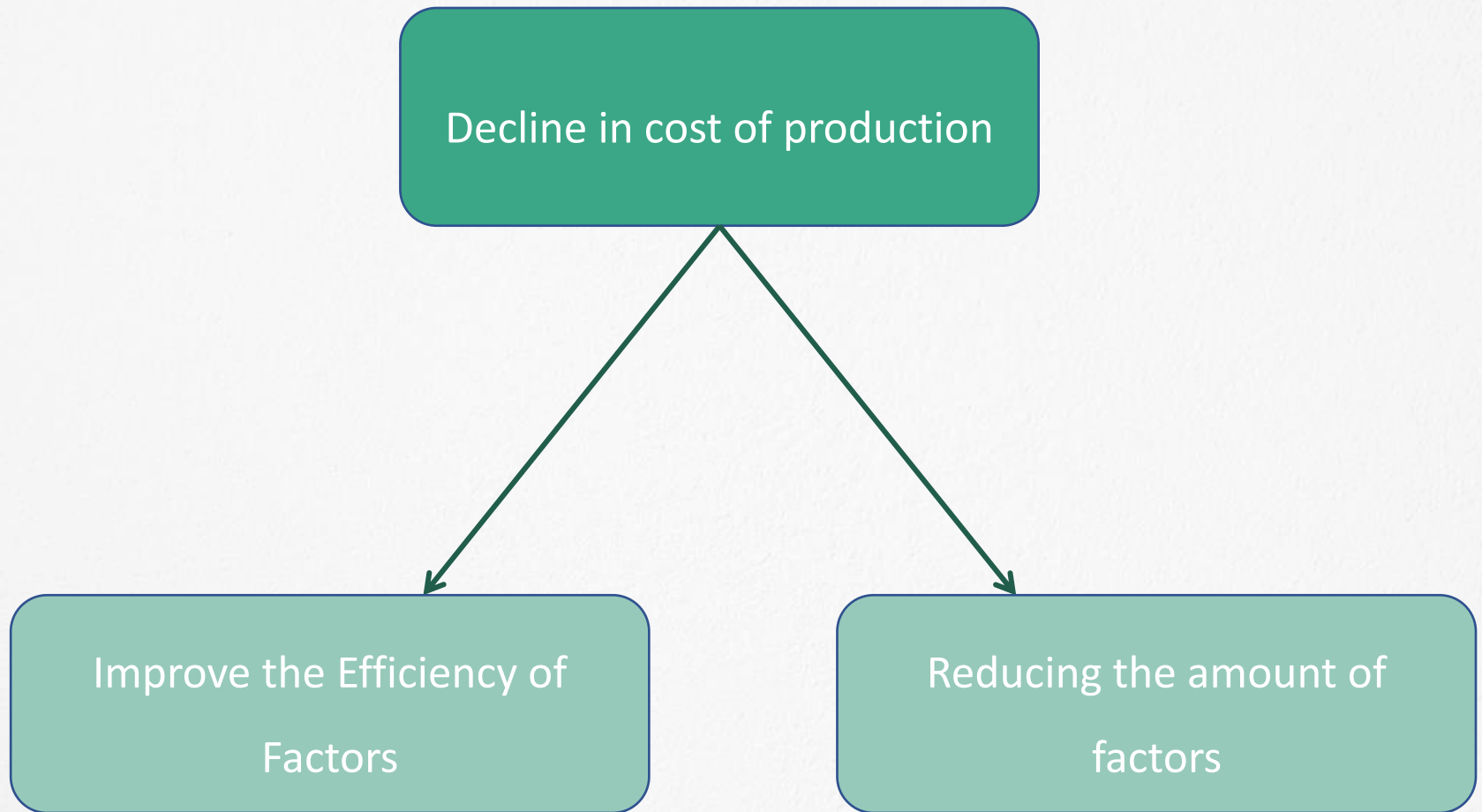


Introduction

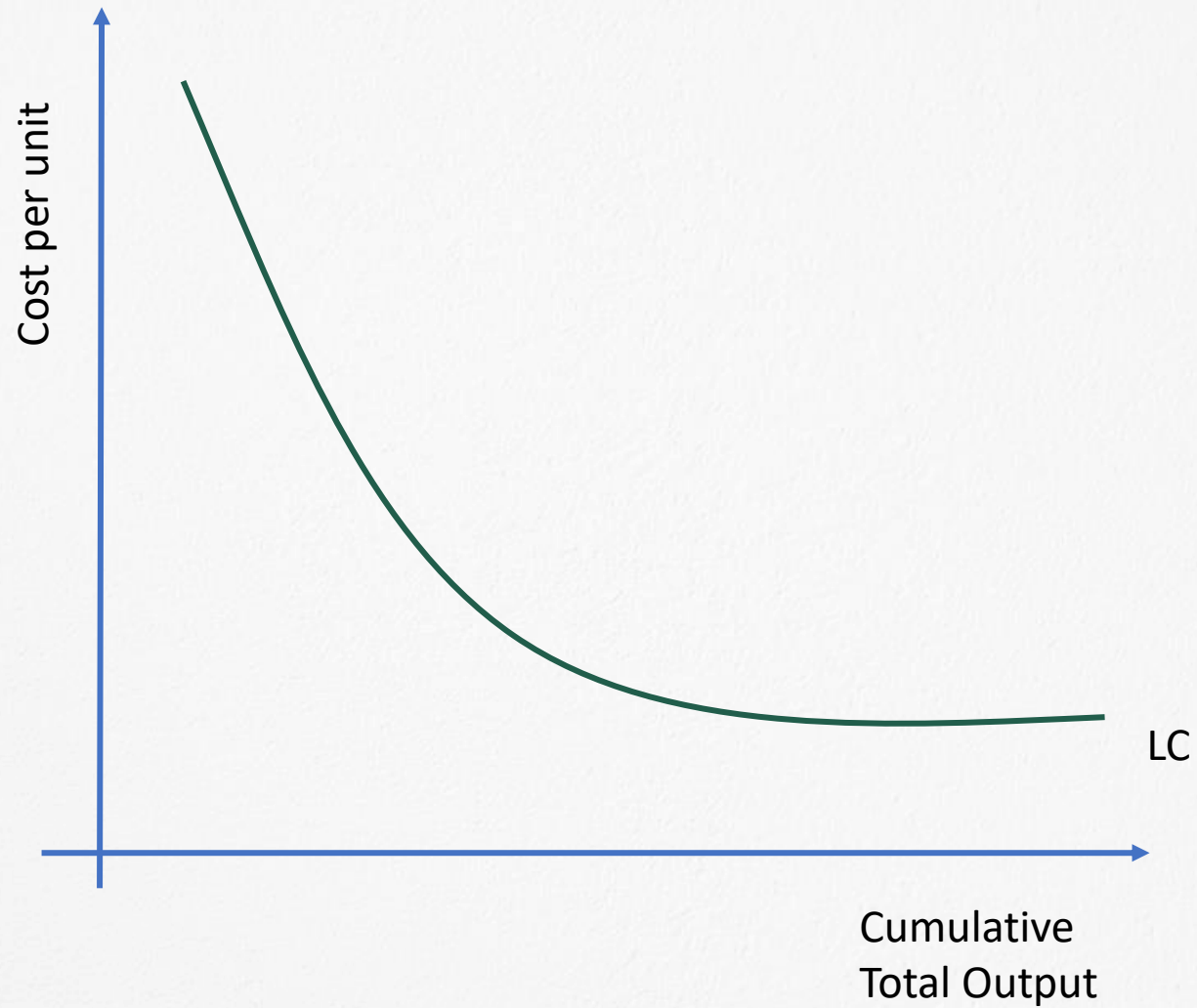
- Learning Curve is a modern concept which came in the post Keynesian era.
- Kenneth J. Arrow was one of the pioneers who gave this concept and called it “learning by doing”.



Introduction



Learning Curve



Learning Curve

- The learning curve effect is usually expressed as a constant percentage.
- This percentage represents the proportion by which cost per unit of output declines with the increase in cumulative output in each successive time period.



Learning Curve Relationship between Cost-Output

- The algebraic expression of the relationship is

$$C = aA^b$$

Where

C=input cost of Q^{th} unit of output,

A= successive unit of output produced,

a= input cost per unit of output in the first period

b= rate of decline in cost per unit of output in the successive period.

Since the learning curve is downward sloping, the value of b is negative.



Learning Curve

Economies of Scale



Whereas economies of scale refer to the decline in cost per unit of output as a firm's output per time period increases

Learning Curve



The learning curve describes the reduction in cost per unit of output as a firm's cumulative output over successive time periods increases, while output per period may remain the same.



Effects of Learning Curves on Variable Costs per Unit and Profit

A common form of learning curve is based on reduction of labour hours per extra unit of output by a constant fraction each time the total output is doubled.



Effects of Learning Curves on Variable Costs per Unit and Profit

Suppose the labour requirement is reduced by 10% with each doubling of output. Incremental labour requirement for the i th unit is 0.9 times the incremental labour needed for the i th unit. The factor 0.9 is called the learning rate for the particular work process.

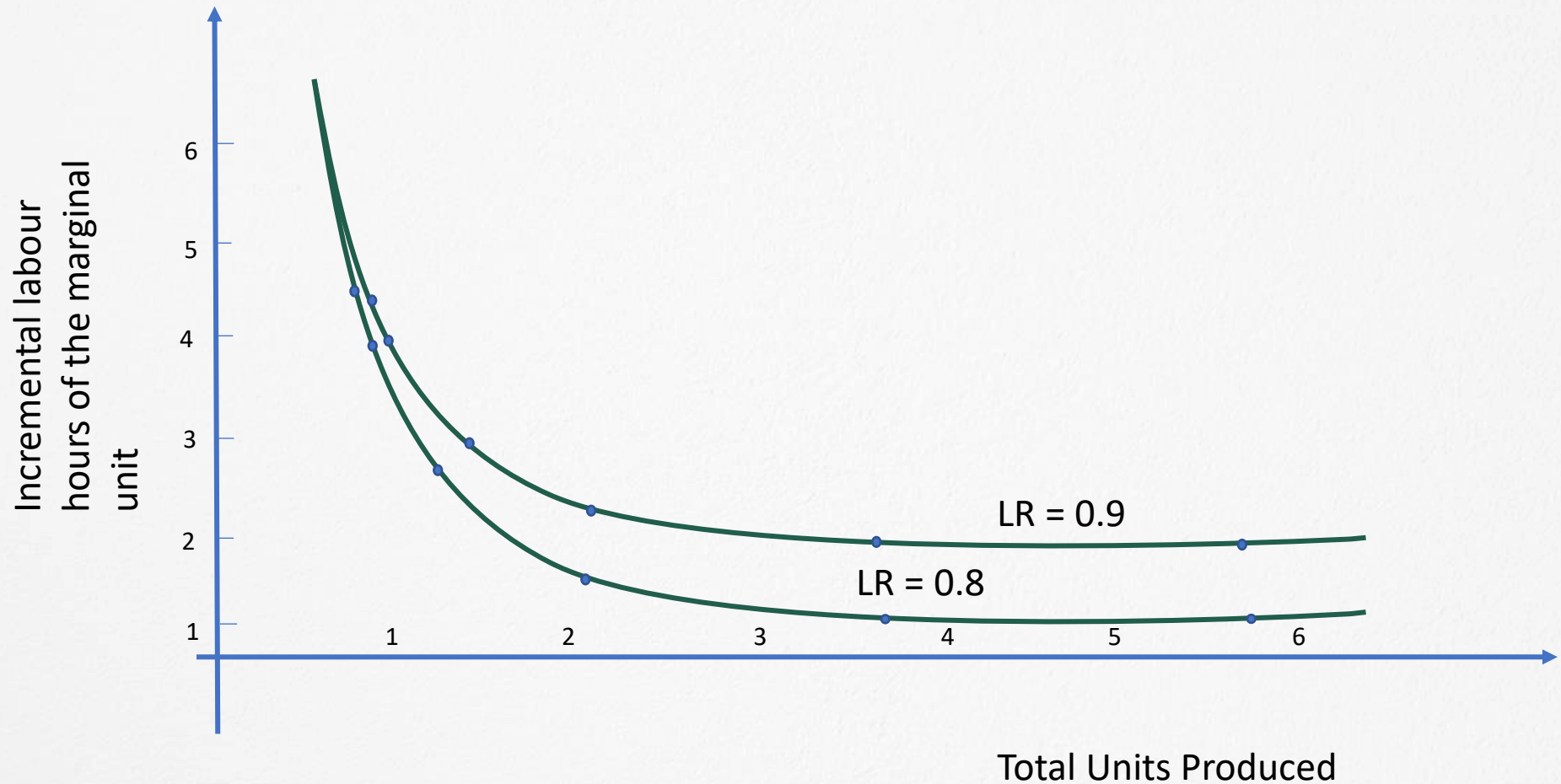


Effects of Learning Curves on Variable Costs per Unit and Profit

The equation for the learning curve in the above example is $L_i = 0.9L_1 \sqrt{i}$, in which L is incremental labour per unit. If the first unit of output requires 1,000 labour hours, the second will need 900 units, the fourth 810 units, and so on.



Effects of Learning Curves on Variable Costs per Unit and Profit



Relevance of Learning Curve in Profit Planning

- The learning curve is often made use of in developing new products and projecting the profitability of such products in the face of rapid technological change.
- Various other costs such as indirect labour, power, etc. depend on the time required to complete a job.



If learning has been occurring, it is reasonable to believe that it can continue, if the dynamic content of the environment remains the same.



Another application lies in choosing between modernizing existing plants and replacing them.



There is also an incentive for a company to refine its practices so as to capitalize more fully on the potential inherent in its daily operations.

