

HSS 201: Economics for Engineers

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March 15, 2019

Long Run Costs

All costs are variable cost. There are no fixed costs in the long run.

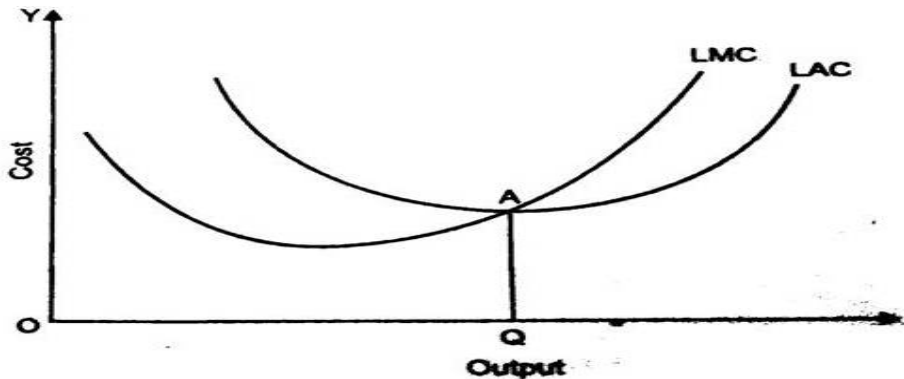
LC = Long Run Cost and LAVC = Long Run Variable Cost (LVC); $LC = LVC$

Long Run Average Costs (LAC) = Long Run Average Variable Costs (LAVC)

$$LAC = \frac{LC}{Q} \text{ and } LAVC = \frac{LVC}{Q}$$

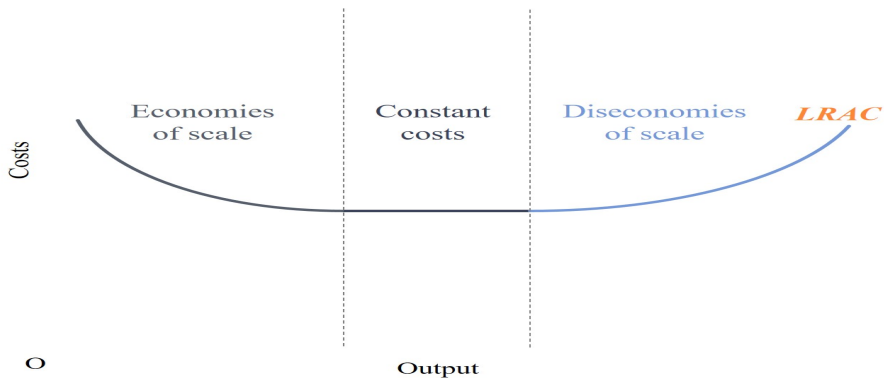
$$\text{Long Run Marginal Cost (LMC)} = \frac{dLC}{dQ}$$

Shape of LAC and LMC Curves



Any point above the LAC curve represents attainable level of cost, and any point below the curve represents unattainable level of cost.

Shape of the LAC and Economies of Scale



Minimum point on the LAC curve is called the minimum efficient scale of production.

Deriving the Long Run Average Cost Curve

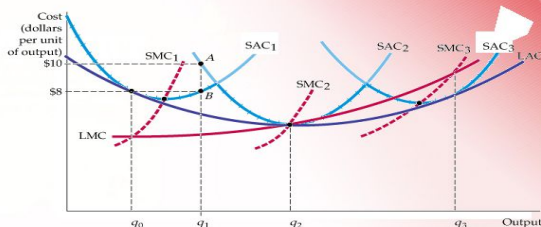
7.4 LONG-RUN VERSUS SHORT-RUN COST CURVES

The Relationship Between Short-Run and Long-Run Cost

Figure 7.9

Long-Run Cost with Economies and Diseconomies of Scale

The long-run average cost curve LAC is the envelope of the short-run average cost curves SAC_1 , SAC_2 , and SAC_3 . With economies and diseconomies of scale, the minimum points of the short-run average cost curves do not lie on the long-run average cost curve.



Economies and Diseconomies of Scope

Usually, firms produce more than one product. In such cases, firms can enjoy product or cost benefits when it produces two or more products.

Economies of Scope: Joint output of a single firm is *greater* than the combined output of two firms producing only one product.

Diseconomies of Scope: Joint output of a single firm is *less* than the combined output of two firms producing only one product.

Producing Sitar and Sarod jointly is much more cheaper than producing each good separately. But production would be the most efficient if the production is undertaken in small scale as the labour required is highly specialized. Firm is enjoying economies of scope but not economies of scale.

Some Practice Questions

- ① The short-run cost function of a company is given by the equation $TC = 200 + 55q$, where TC is the total cost and q is the total quantity of output, both measured in thousands.
- What is the company's fixed cost
 - If the company produced 100,000 units of goods, what would be its average variable cost
 - What would be its marginal cost of production
 - What would be its average fixed cost
- ② Answer in True and False
- If the owner of a business pays himself no salary, then the accounting cost is zero, but the economic cost is positive
 - A firm that has positive accounting profit does not necessarily have positive economic profit

- ① Suppose the total cost function for an industry is given by the cubic equation $TC = a + bq + cq^2 + dq^3$. Is this total cost function consistent with a U-shaped long run average cost curve for at least some values of a , b , c , and d . Do the same exercise for marginal cost too.

In the short run, a firm faces the following input requirements:

Q	L	K
1	25	10
2	40	10
3	60	10
4	85	10
5	125	10

Also, $w = \text{Rs. } 2$ and $r = \text{Rs. } 10$. Fill the following table:

Q	TFC	TVC	TC	MC	AFC	AVC	AC
1							
2							
3							
4							
5							