

Theory of cost (Section : C)

Learning Objectives

- Differentiate between a firm's long-run and short-run cost curves.
- Understand how the minimum efficient scale of production is related to market structure.
- Cover economies of scope – is it cheaper for one firm to produce products jointly than it is for separate firms to produce the same products independently?
- Overview how cost functions can be empirically estimated through surveys and regression analysis.

The Nature of Cost

- Recall:
 - Explicit costs – arise from transactions in which the firm purchases inputs or the services of inputs from other parties
 - Implicit costs – costs associated with the use of the firm's own resources and reflect the fact that these resources could be employed elsewhere
- Opportunity cost reflects both explicit and implicit costs.

Measures of Short-Run Cost

- Total fixed cost (TFC) – the cost incurred by the firm that does not depend on how much output it produces
- Total variable cost (TVC) – the cost incurred by the firm that depends on how much output it produces

Five Other Measure of Short-Run Cost

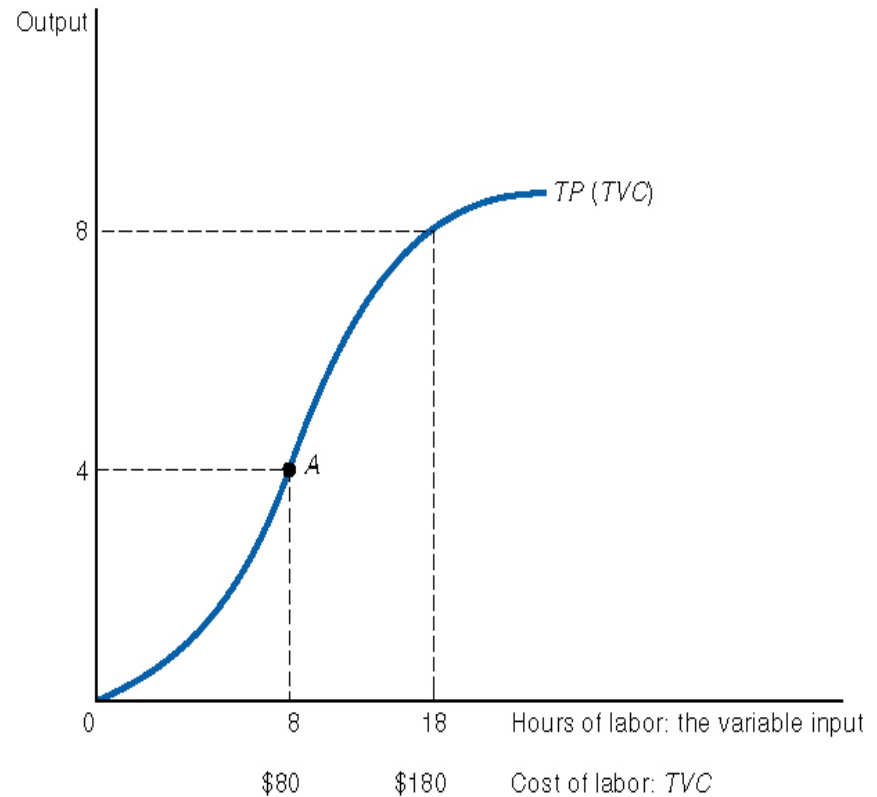
- Total cost (TC) – the sum of total fixed and total variable cost at each output level
- Marginal cost (MC) – the change in total cost that results from a one-unit change in output
- Average fixed cost (AFC) – total fixed cost divided by the amount of output
- Average variable cost (AVC) – total variable cost divided by the amount of output
- Average total cost (ATC) – total cost divided by the output

Example of Short-Run Costs (\$)

Short-Run Costs (\$) for a Hypothetical Firm							
Output	Total Fixed Cost	Total Variable Cost	Total Cost	Marginal Cost	Average Fixed Cost	Average Variable Cost	Average Total Cost
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
0	60.00	0	60.00	—	—	—	—
1	60.00	30.00	90.00	30.00	60.00	30.00	90.00
2	60.00	49.00	109.00	19.00	30.00	24.50	54.50
3	60.00	65.00	125.00	16.00	20.00	21.67	41.67
4	60.00	80.00	140.00	15.00	15.00	20.00	35.00
5	60.00	100.00	160.00	20.00	12.00	20.00	32.00
6	60.00	124.00	184.00	24.00	10.00	20.67	30.67
7	60.00	150.00	210.00	26.00	8.57	21.43	30.00
8	60.00	180.00	240.00	30.00	7.50	22.50	30.00
9	60.00	215.00	275.00	35.00	6.67	23.89	30.56
10	60.00	255.00	315.00	40.00	6.00	25.50	31.50

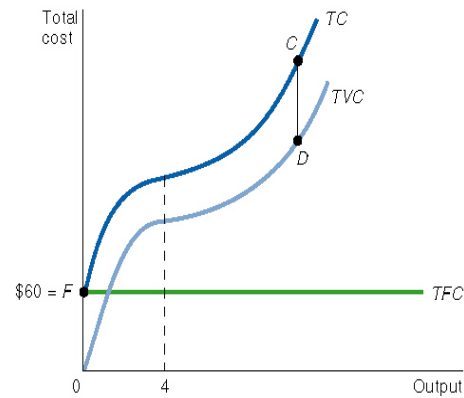
Behind Cost Relationships

- The shape of the TVC curve is determined by the shape of the TP curve, which in turn reflects diminishing marginal returns.

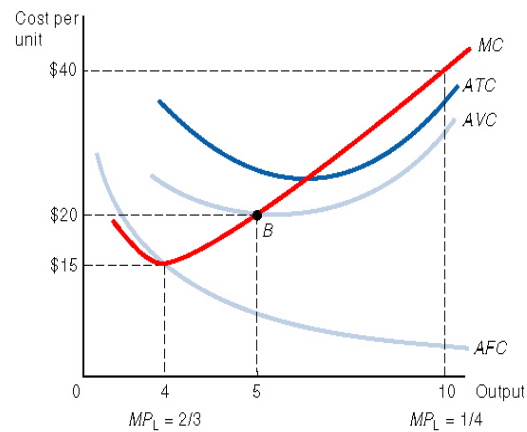


Short-Run Cost Curves

[Figure 8.2]



(a)



(b)

Marginal Cost

- The marginal product curve of the variable input generally rises and then falls, attributable to the law of diminishing marginal returns.
- As a result, the MC curve will first fall and then rise.

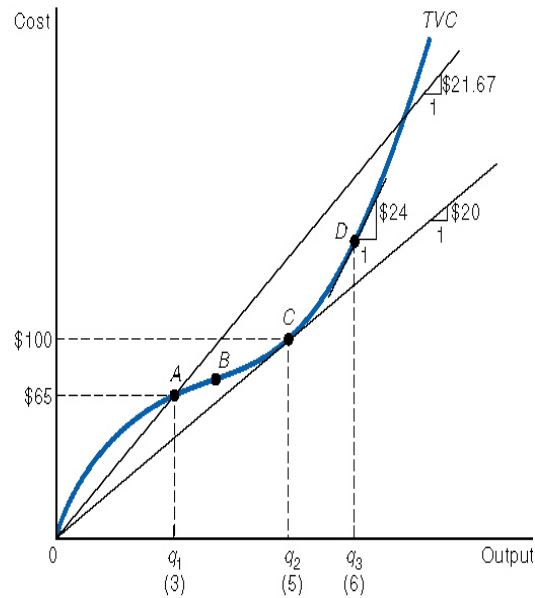
Average Cost

- The average product curve rises, reaches a maximum, and then falls, due to the law of diminishing marginal productivity.
- As a result, the AVC curve will fall and then rise.
- The AFC curve declines over the entire range of output as the amount of total fixed cost is spread over ever-larger rates of output.
- The ATC curve is the sum of AFC and AVC. It measures the average unit cost of all inputs, both fixed and variable, and must also be U-shaped.

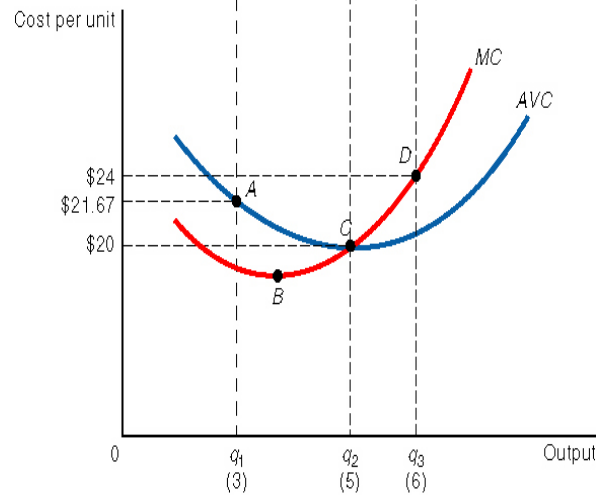
Marginal-Average Relationships

- When marginal cost is below average (total or variable) cost, average cost will decline.
- When marginal cost is above average cost, average cost rises.
- When average cost is at a minimum, marginal cost is equal to average cost.

Geometry of Cost Curves



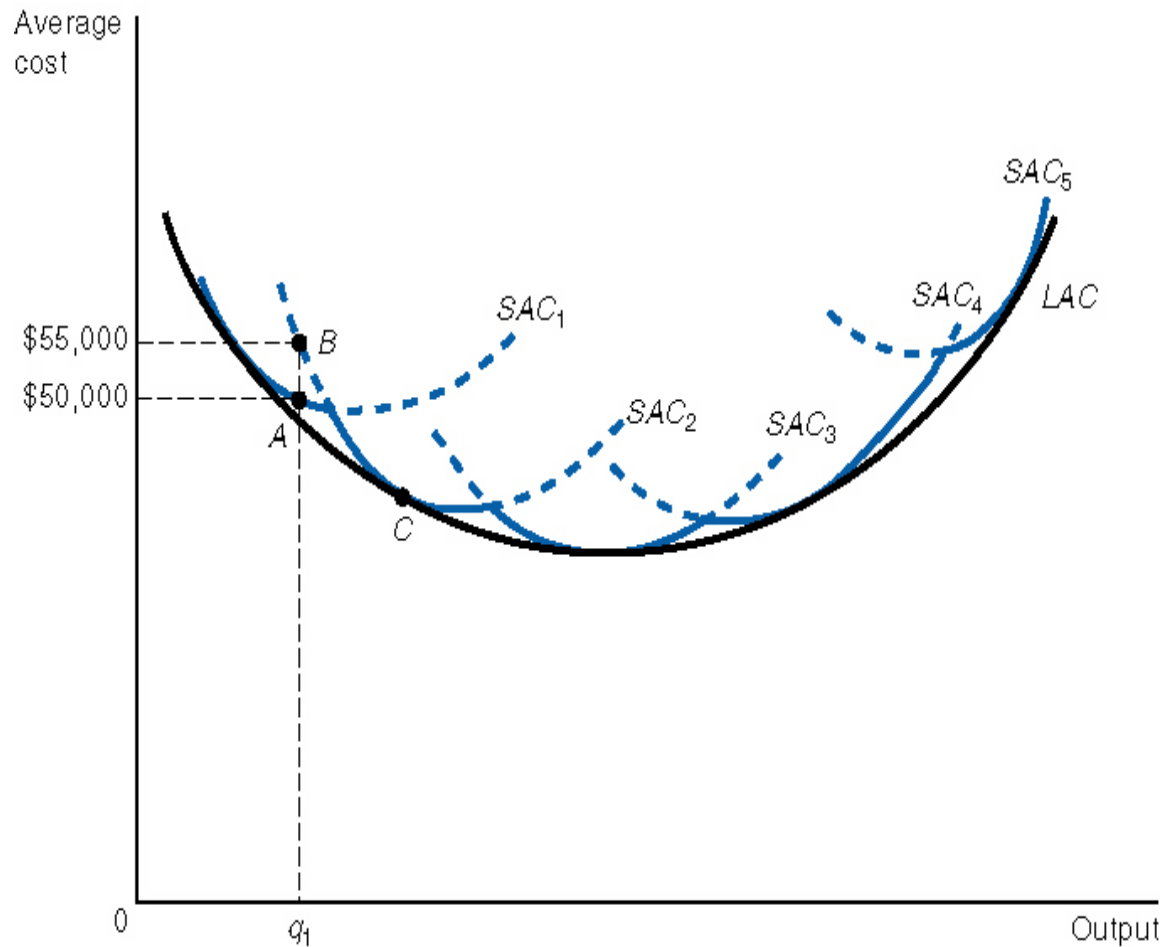
(a)



(b)

Long-Run Cost Curves

[Figure 8.7]



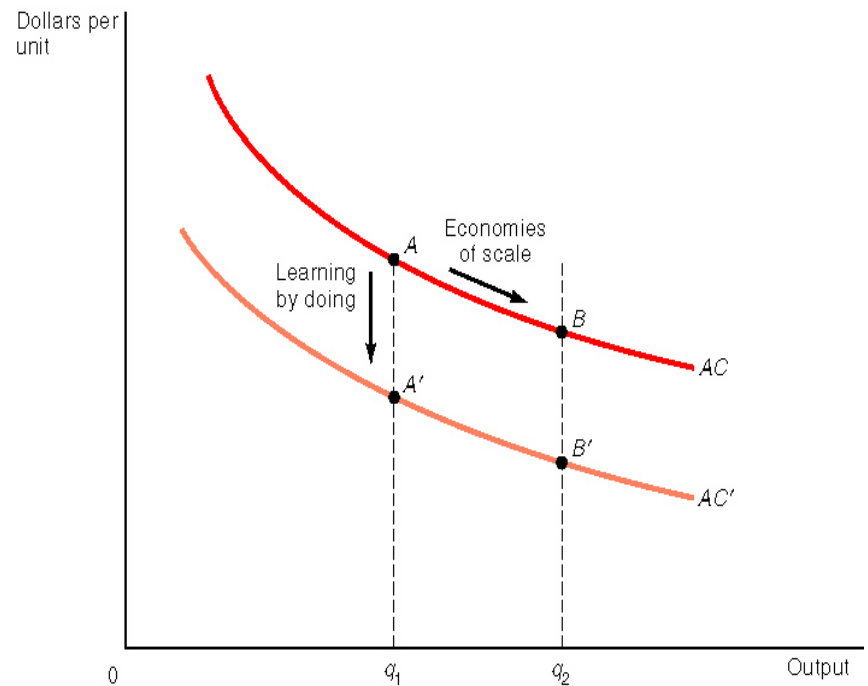
Note Figure 8.6 in book

Economies of Scale and Diseconomies of Scale

- Economies of scale – a situation in which a firm can increase its output more than proportionally to its total input cost
- Diseconomies of scale – a situation in which a firm's output increases less than proportionally to its total input cost

Learning by Doing

- Learning by doing – improvements in productivity resulting from a firm's cumulative output experience
- Versus economies of scale



Economies of Scope and Diseconomies of Scope

- Economies of scope – a case where it is cheaper for one firm to produce products jointly than it is for separate firms to produce the same products independently
$$TC(R,T) < [TC(R,0) + TC(0,T)]$$
- Diseconomies of scope – a case where it is cheaper for separate products to be produced independently than for one firm to produce the same products jointly