

Businesses and the Costs of Production

From:

Book 1: Chapter 9



Economic Costs

- The payment that must be made to obtain and retain the services of a resource
 - $\text{Economic costs} = \text{Explicit costs} + \text{Implicit costs}$
- Explicit Costs
 - Monetary payments
- Implicit Costs
 - Value of next best use
 - Self-owned resources



Accounting Profit and Economic Profit

Suppose that after many years working as a sales representative for a large T-shirt manufacturer, you decide to strike out on your own. After considering many potential business ventures, you settle on opening a retail T-shirt shop.

Total sales revenue	\$120,000
Cost of T-shirts	\$40,000
Clerk's salary	18,000
Utilities	5,000
Total (explicit) costs	63,000
Accounting profit	57,000



Accounting Profit and Economic Profit

Accounting profit	\$57,000
Forgone interest	\$ 1,000
Forgone rent	5,000
Forgone wages	22,000
Forgone entrepreneurial income	5,000
Total implicit costs	33,000
Economic profit	24,000

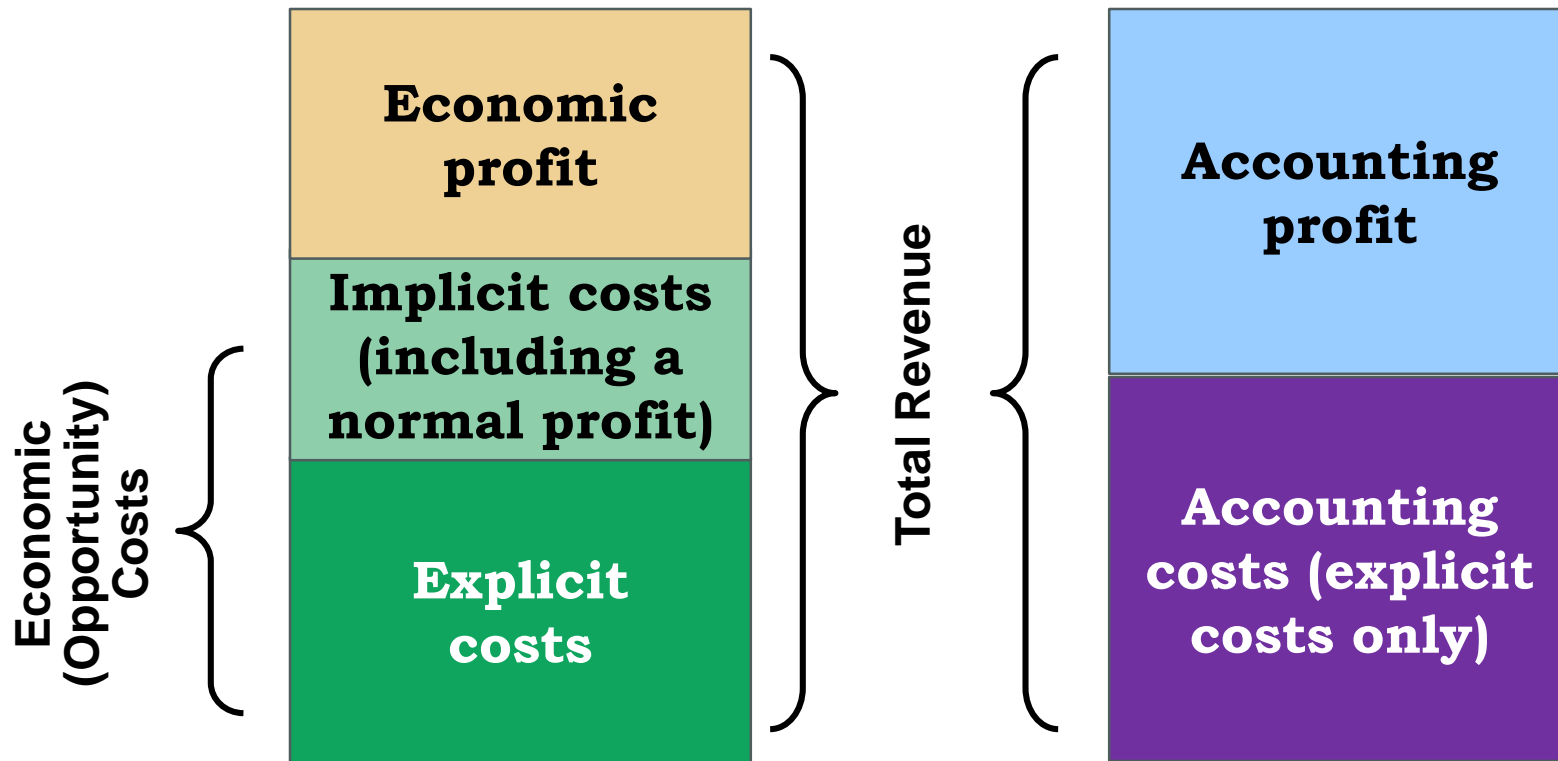


Accounting Profit and Economic Profit

- Accounting profit
= Revenue – Explicit Costs
- Economic profit
= Accounting Profit – Implicit Costs
- Economic profit (to summarize)
= Total Revenue – Economic Costs
= Total Revenue – Explicit Costs –
Implicit Costs



Economic Profit



Short Run and Long Run

- Short Run
 - Some variable inputs
 - Fixed plant
- Long Run
 - All inputs are variable
 - Variable plant
 - Firms enter and exit



Short-Run Production Relationships

- Total Product (TP)
- Marginal Product (MP)

$$\text{Marginal Product} = \frac{\text{Change in Total Product}}{\text{Change in Labor Input}}$$

- Average Product (AP)

$$\text{Average Product} = \frac{\text{Total Product}}{\text{Units of Labor}}$$



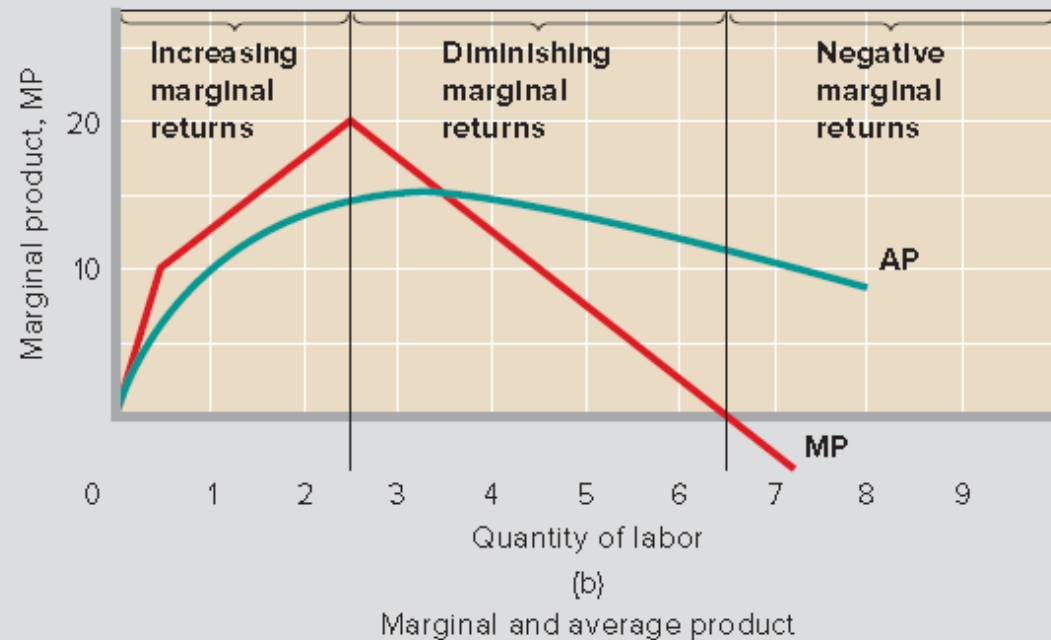
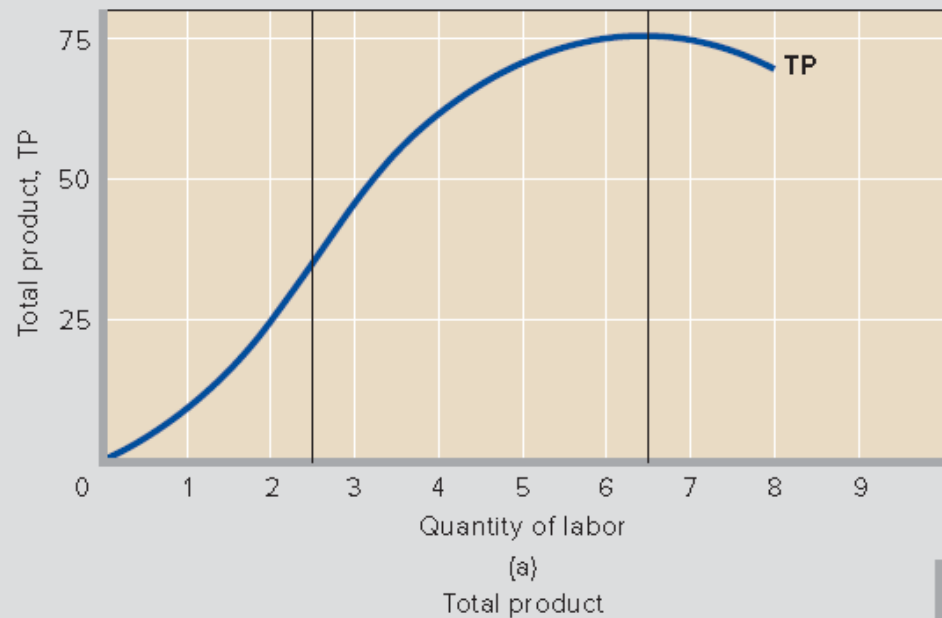
The Law of Diminishing Returns

TABLE 9.1 Total, Marginal, and Average Product: The Law of Diminishing Returns

(1) Units of the Variable Resource (Labor)	(2) Total Product (TP)	(3) Marginal Product (MP), Change in (2)/ Change in (1)	(4) Average Product (AP), (2)/(1)
0	0		—
1	10	10	10.00
2	25	15	12.50
3	45	20	15.00
4	60	15	15.00
5	70	10	14.00
6	75	5	12.50
7	75	0	10.71
8	70	-5	8.75



The Law of Diminishing Returns



Short-Run Production Costs

Fixed, Variable, and Total Costs

- Fixed Costs (TFC)
 - Costs do not vary with output
- Variable Costs (TVC)
 - Costs vary with output
- Total Costs (TC)
 - Sum of TFC and TVC
 - $TC = TFC + TVC$



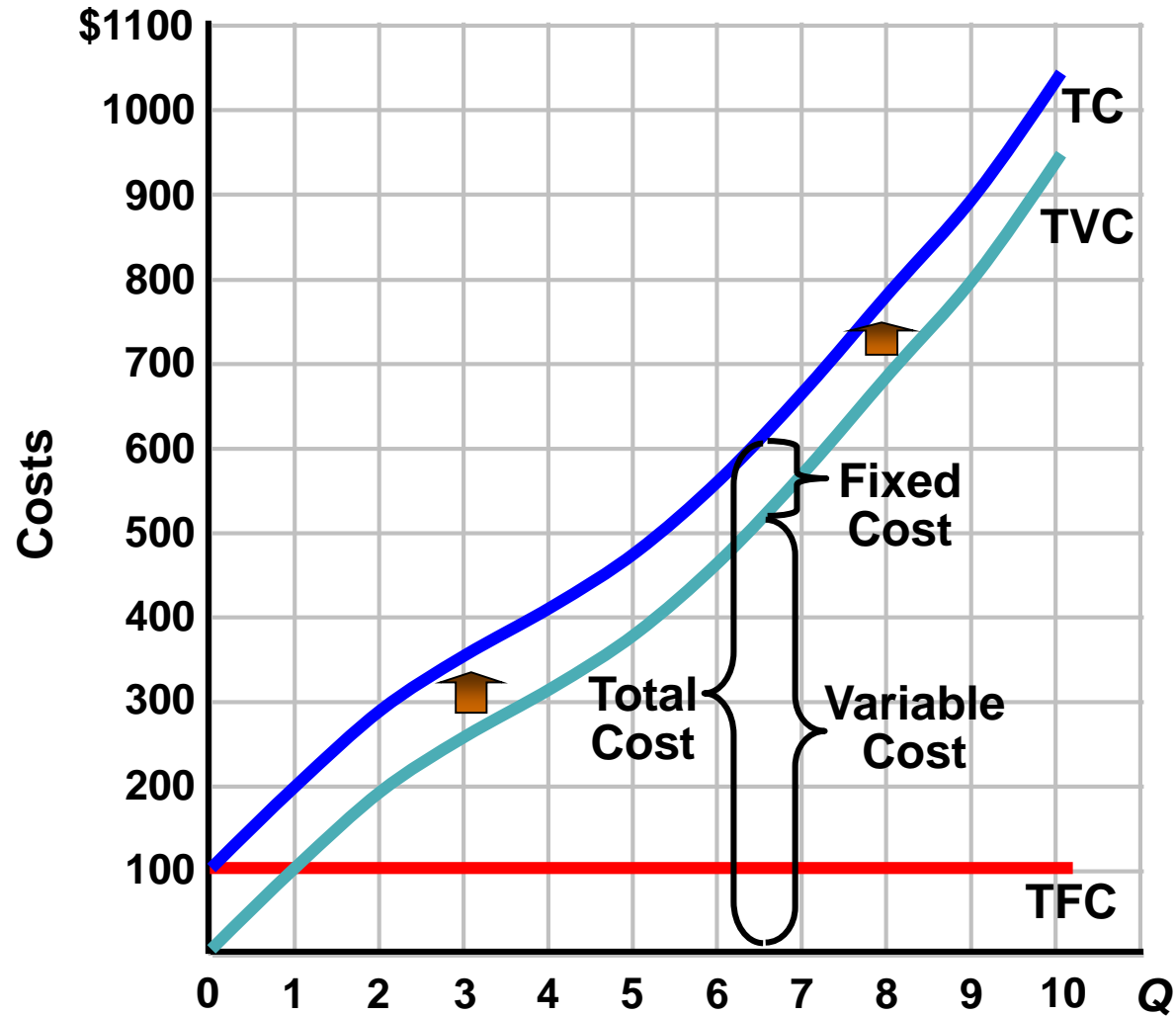
Short-Run Production Costs

TABLE 9.2 Total-, Average-, and Marginal-Cost Schedules for an Individual Firm in the Short Run

Total-Cost Data				Average-Cost Data			Marginal Cost
(1) Total Product (Q)	(2) Total Fixed Cost (TFC)	(3) Total Variable Cost (TVC)	(4) Total Cost (TC) TC = TFC + TVC	(5) Average Fixed Cost (AFC) $AFC = \frac{TFC}{Q}$	(6) Average Variable Cost (AVC) $AVC = \frac{TVC}{Q}$	(7) Average Total Cost (ATC) $ATC = \frac{TC}{Q}$	(8) Marginal Cost (MC) $MC = \frac{\text{change in TC}}{\text{change in } Q}$
0	\$100	\$ 0	\$ 100				\$ 90
1	100	90	190	\$100.00	\$90.00	\$190.00	80
2	100	170	270	50.00	85.00	135.00	70
3	100	240	340	33.33	80.00	113.33	60
4	100	300	400	25.00	75.00	100.00	70
5	100	370	470	20.00	74.00	94.00	80
6	100	450	550	16.67	75.00	91.67	90
7	100	540	640	14.29	77.14	91.43	110
8	100	650	750	12.50	81.25	93.75	130
9	100	780	880	11.11	86.67	97.78	150
10	100	930	1,030	10.00	93.00	103.00	



Short-Run Production Costs



Per-Unit, or Average, Costs

- Average Fixed Costs

- $AFC = TFC/Q$

- Average Variable Costs

- $AVC = TVC/Q$

- Average Total Costs

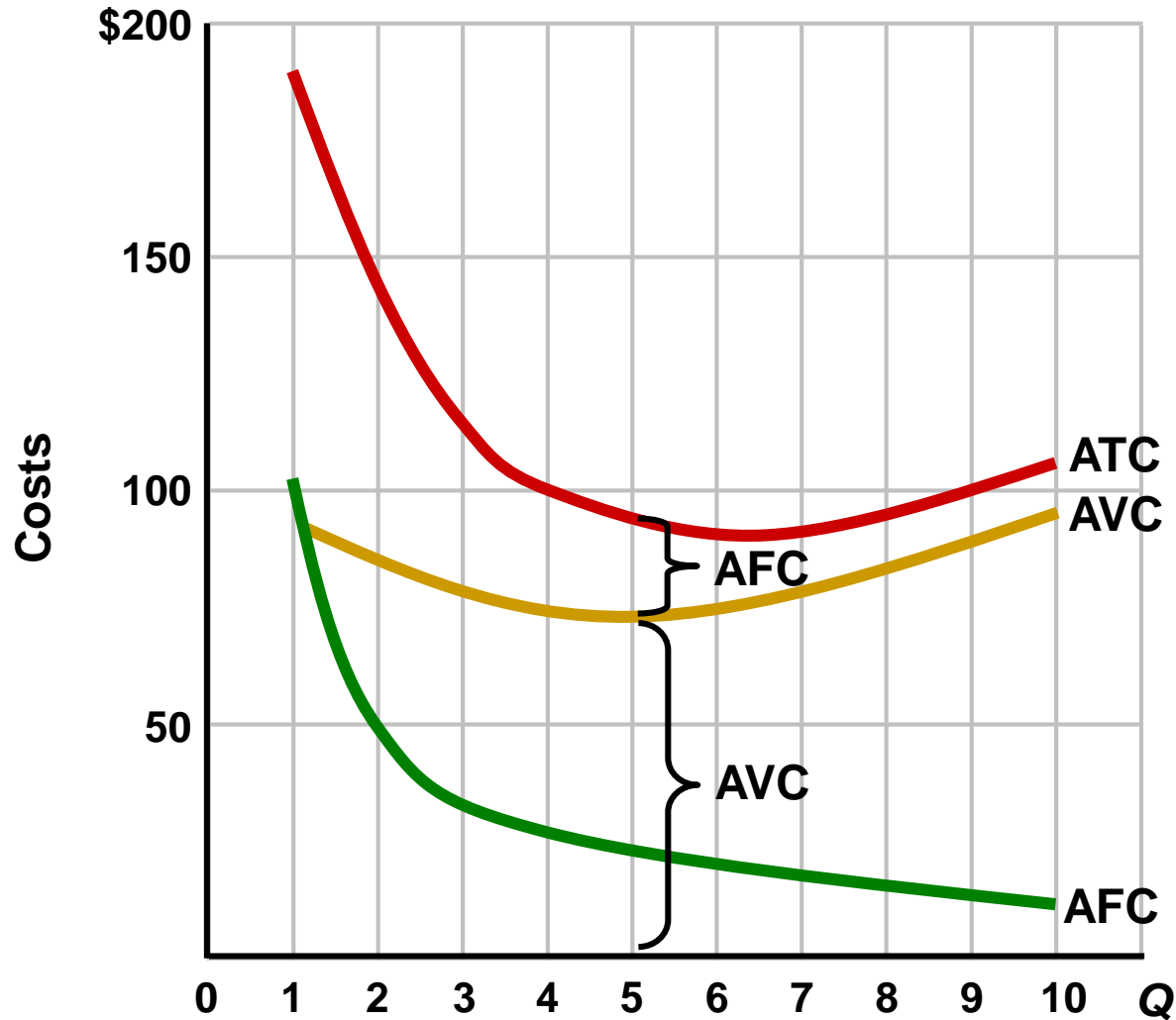
- $ATC = TC/Q = (TFC/Q) + (TVC/Q) = AFC + AVC$

- Marginal Costs

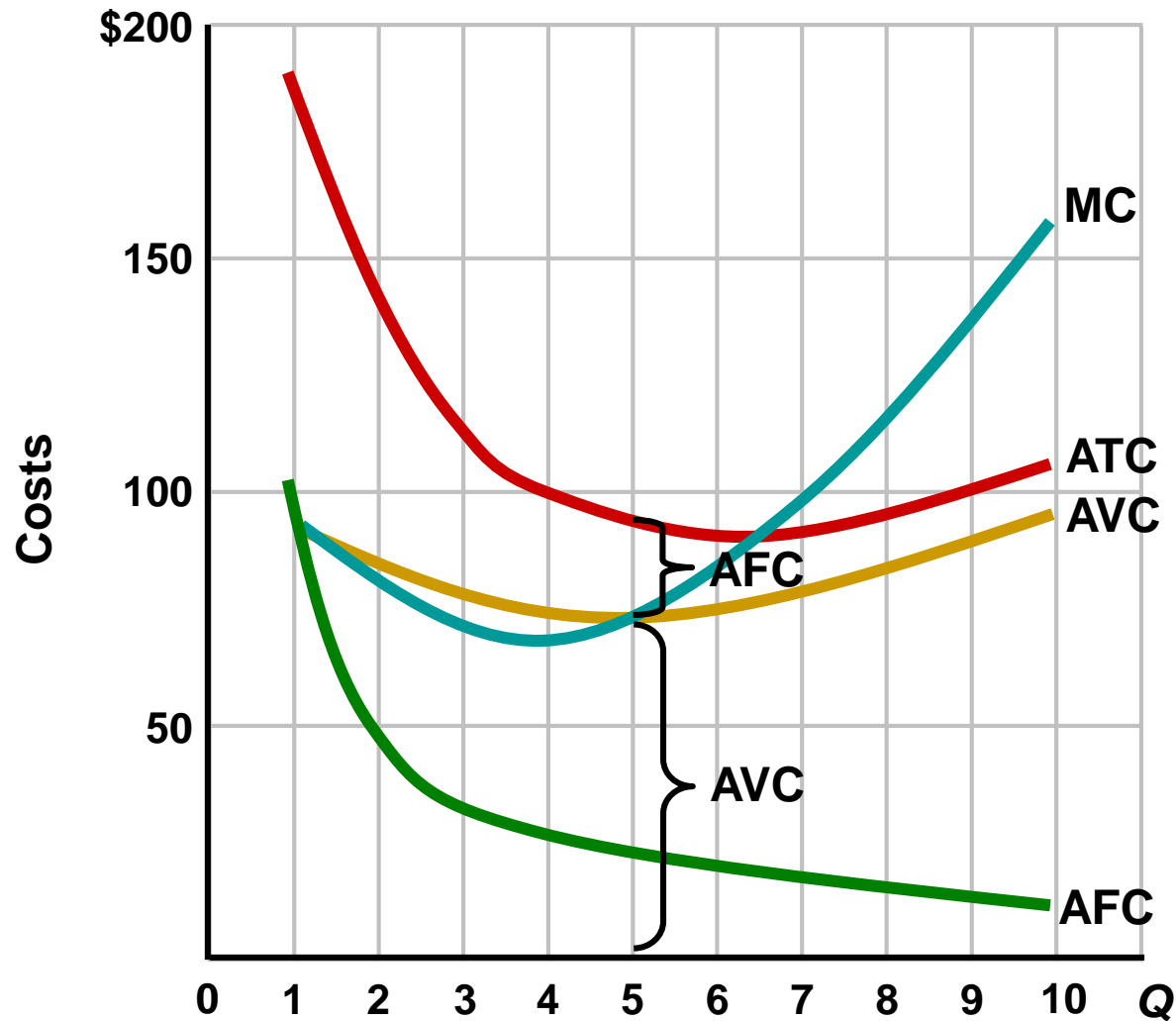
- $MC = \Delta TC / \Delta Q$



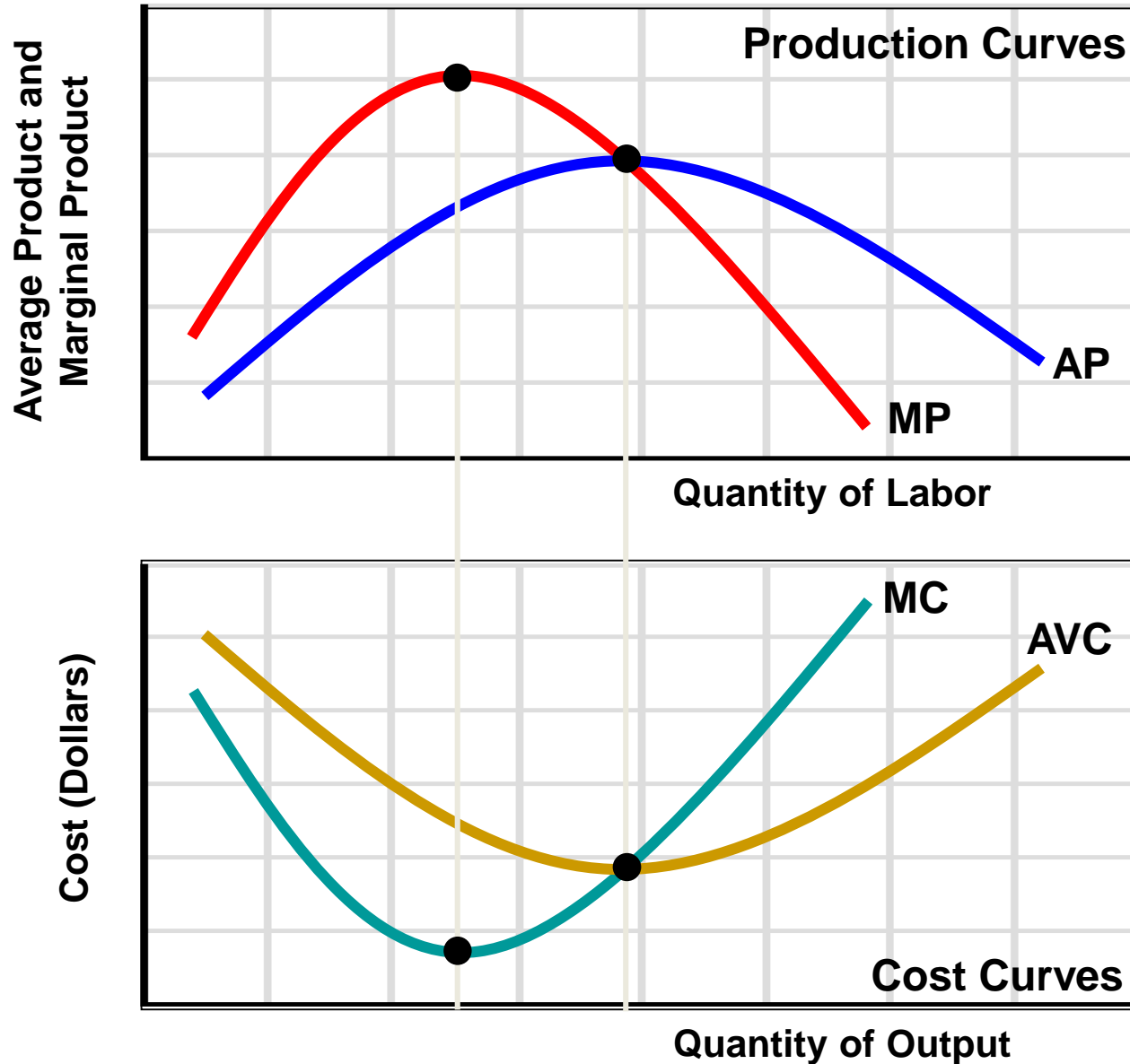
Per-Unit, or Average, Costs



Marginal Cost



MC and Marginal Product



Complete the following table

Inputs of Labor	Total Product	Marginal Product	Average Product
0	0	_____	
1	15	_____	_____
2	34	_____	_____
3	51	_____	_____
4	65	_____	_____
5	74	_____	_____
6	80	_____	_____
7	83	_____	_____
8	82		_____



Continue with last slide

- Plot the total, marginal, and average products and explain in detail the relationship between each pair of curves.
- Explain why marginal product first rises, then declines, and ultimately becomes negative.
- What bearing does the law of diminishing returns have on short-run costs?
- Illustrate and explain graphically.

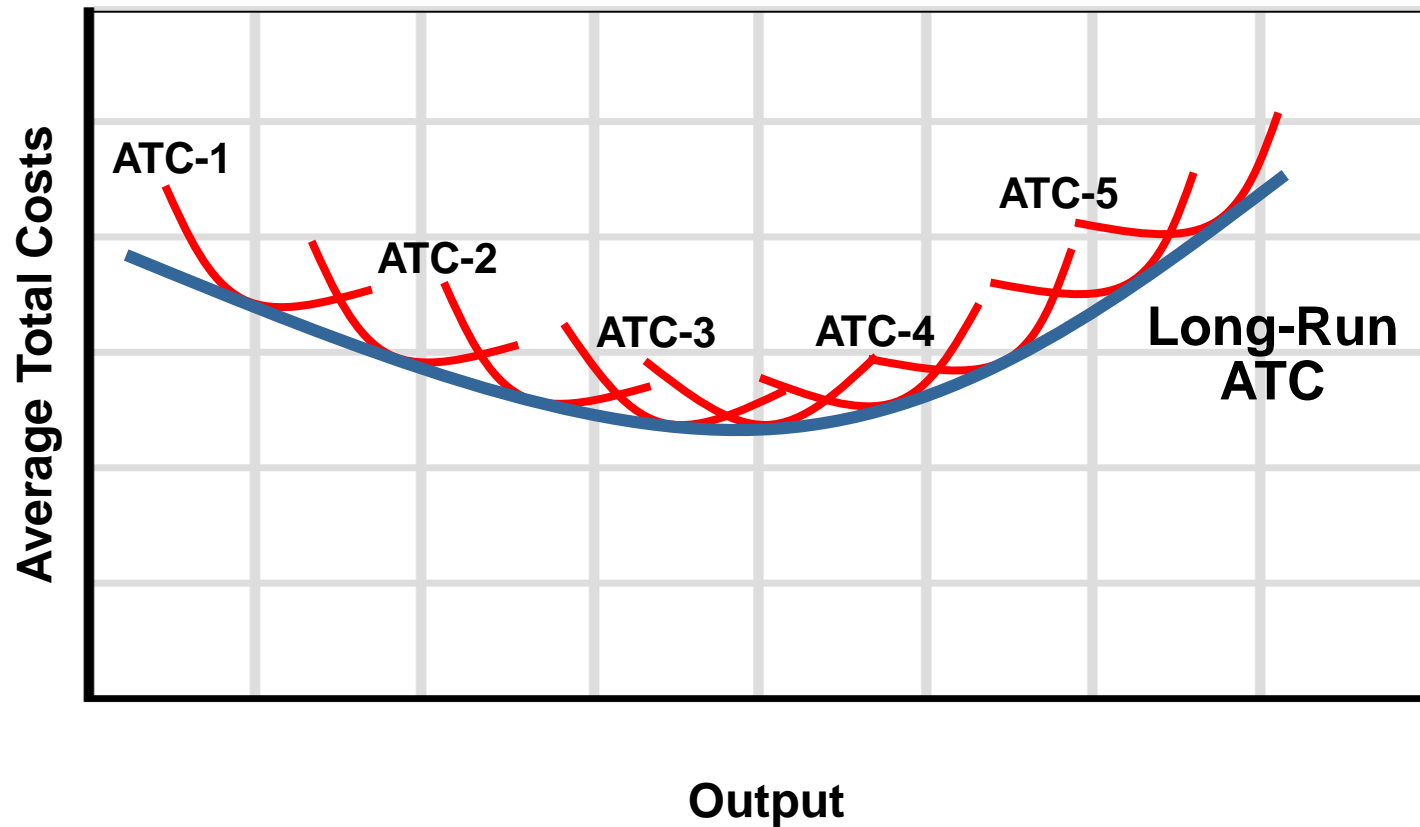


Long-Run Production Costs

- The firm can change all input amounts, including plant size.
- All costs are variable in the long run.
- Long run ATC
 - Different short run ATCs
 - Long-run cost curve also known as Planning Curve.



The Long-Run Cost Curve



Economies and Diseconomies of Scale

- Economies of scale
 - Labor specialization
 - Managerial specialization
 - Efficient capital
 - Other factors

- Constant returns to scale



Economies and Diseconomies of Scale

- Diseconomies of scale
 - Control and coordination problems
 - Communication problems
 - Worker alienation
 - Shirking

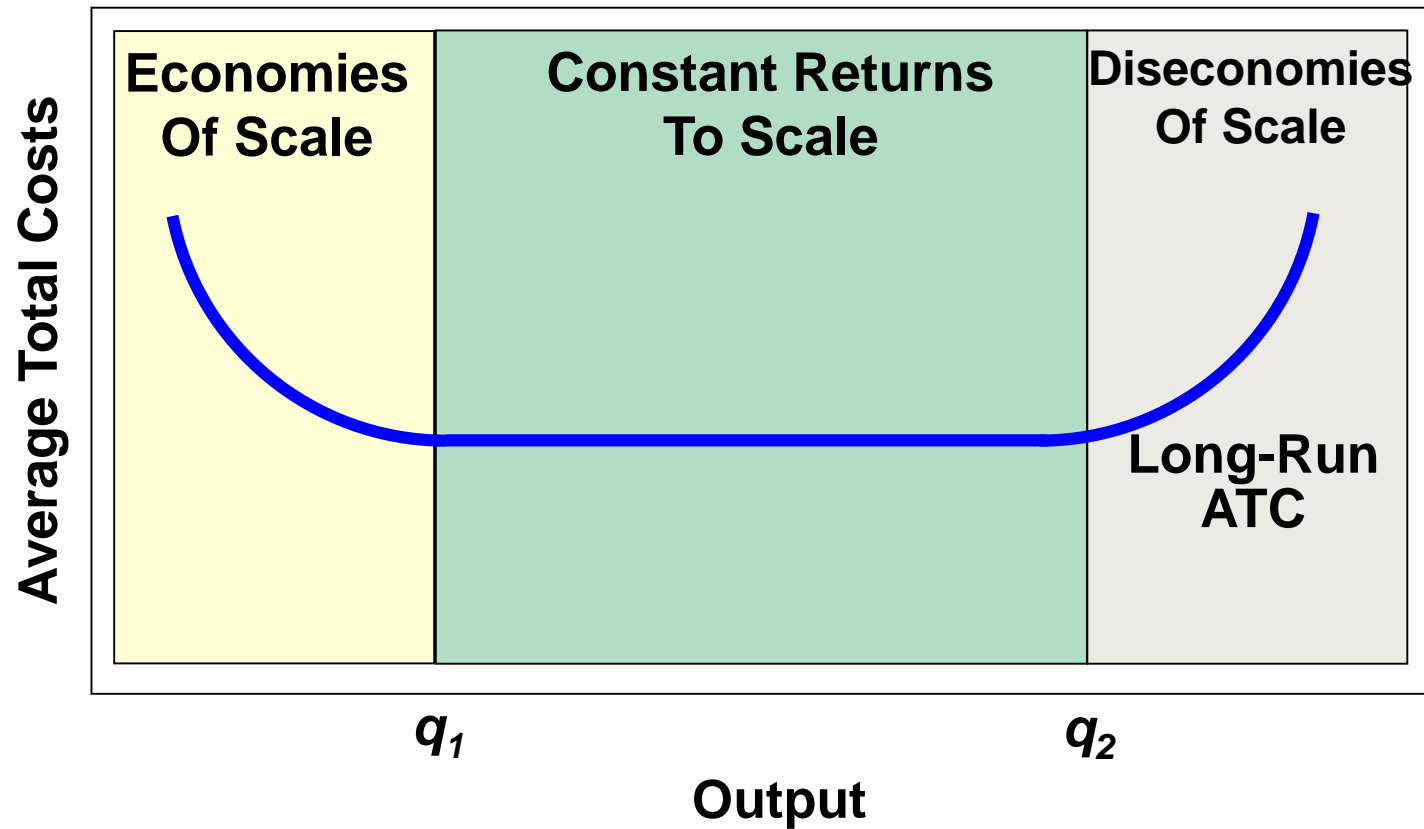


MES and Industry Structure

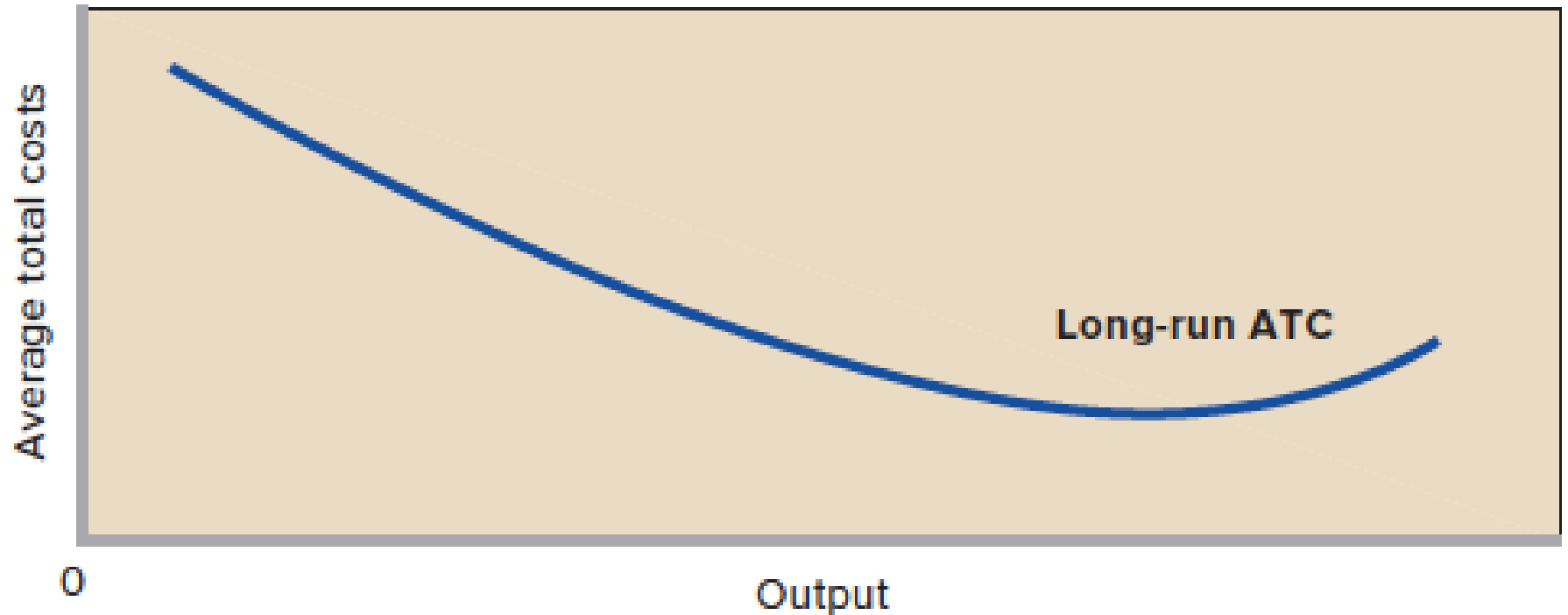
- Minimum Efficient Scale (MES):
 - Lowest level of output where long- run average costs are minimized
 - Can determine the structure of the industry



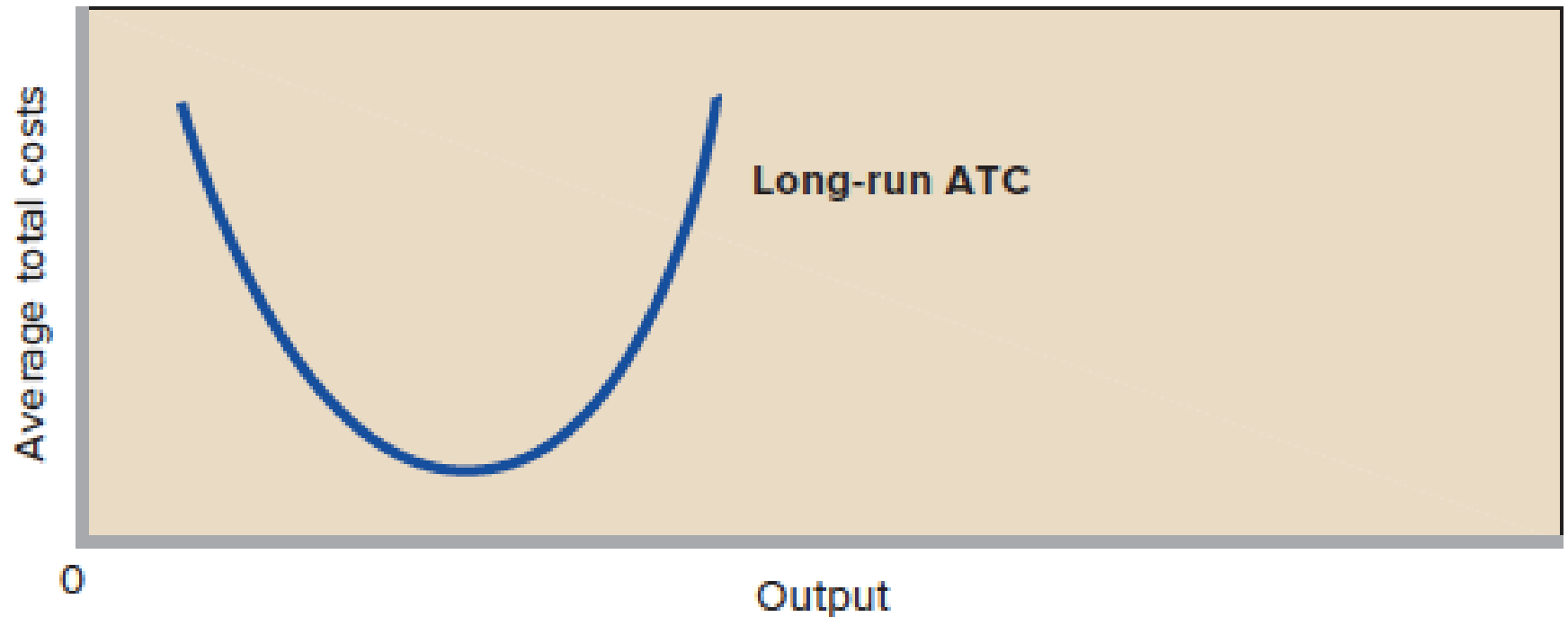
MES and Industry Structure



MES and Industry Structure



MES and Industry Structure



Reading Assignment

3-D Printers

3-D Printers Are Poised to Replace Mass Production with Mass Customization.

Book 1, Page 196

