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
  - Economic costs = Explicit costs + 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

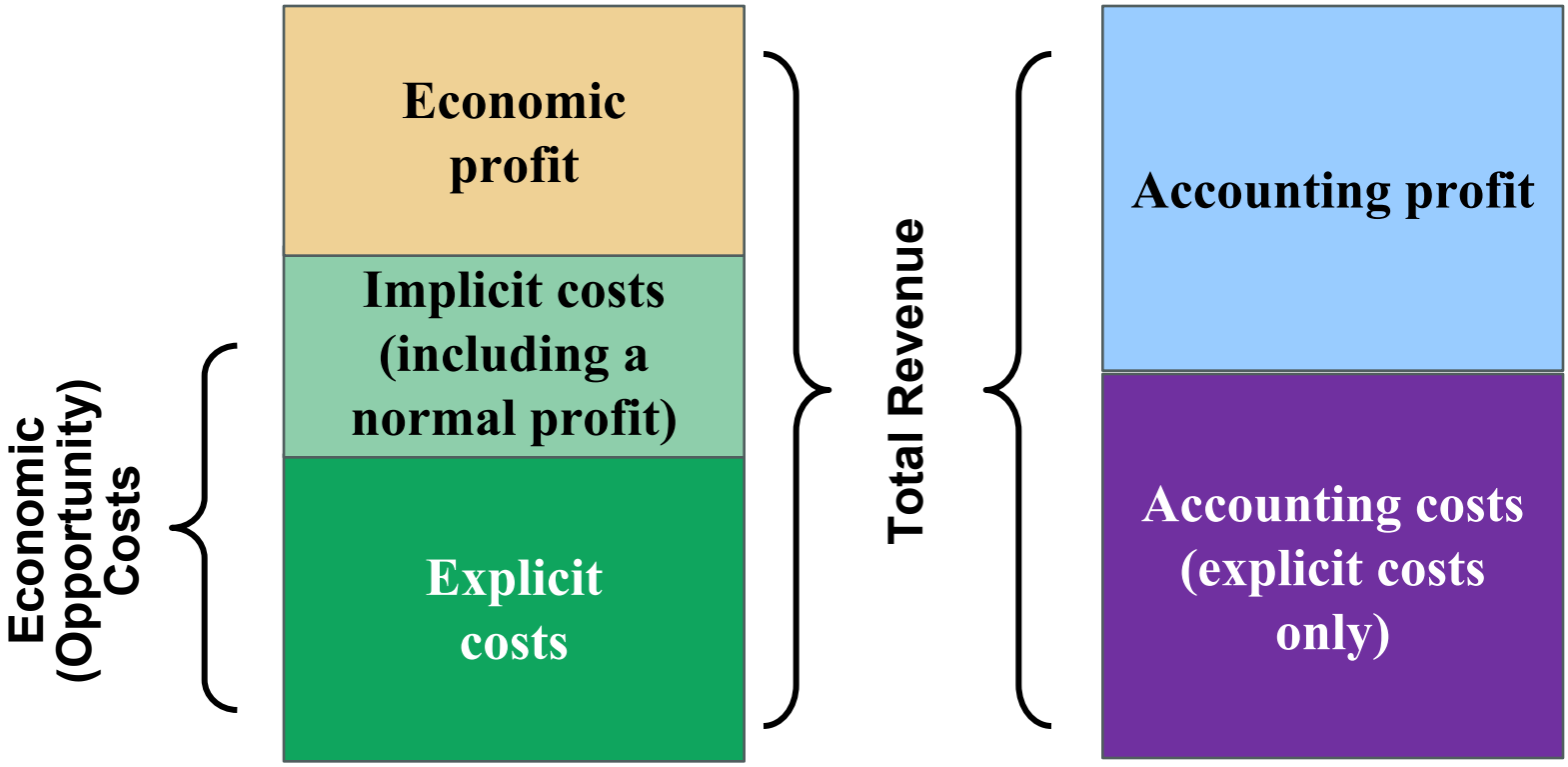
Accounting Profit and Economic Profit

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)

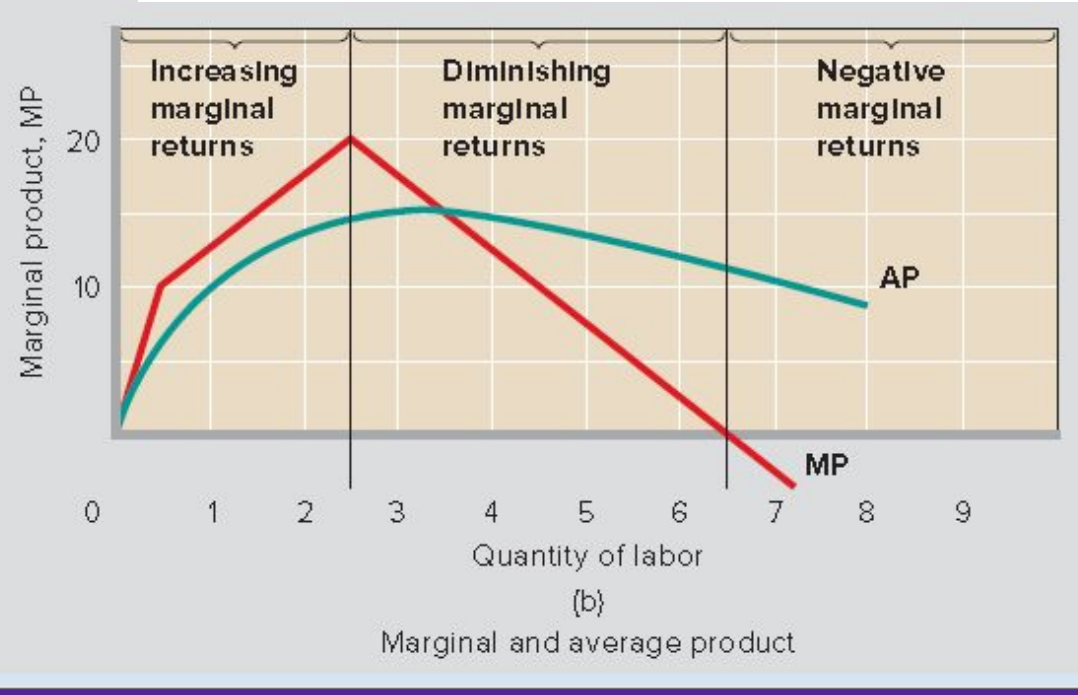
$$\text{Average Product} = \frac{\text{Total Product}}{\text{Units of Labor}}$$

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	Increasing marginal returns	10.00
2	25	15		12.50
3	45	20		15.00
4	60	15	Diminishing marginal returns	15.00
5	70	10		14.00
6	75	5		12.50
7	75	0	Negative marginal returns	10.71
8	70	−5		8.75

The Law of Diminishing Returns



Short-Run Production Costs

Fixed, Variable, and Total Costs

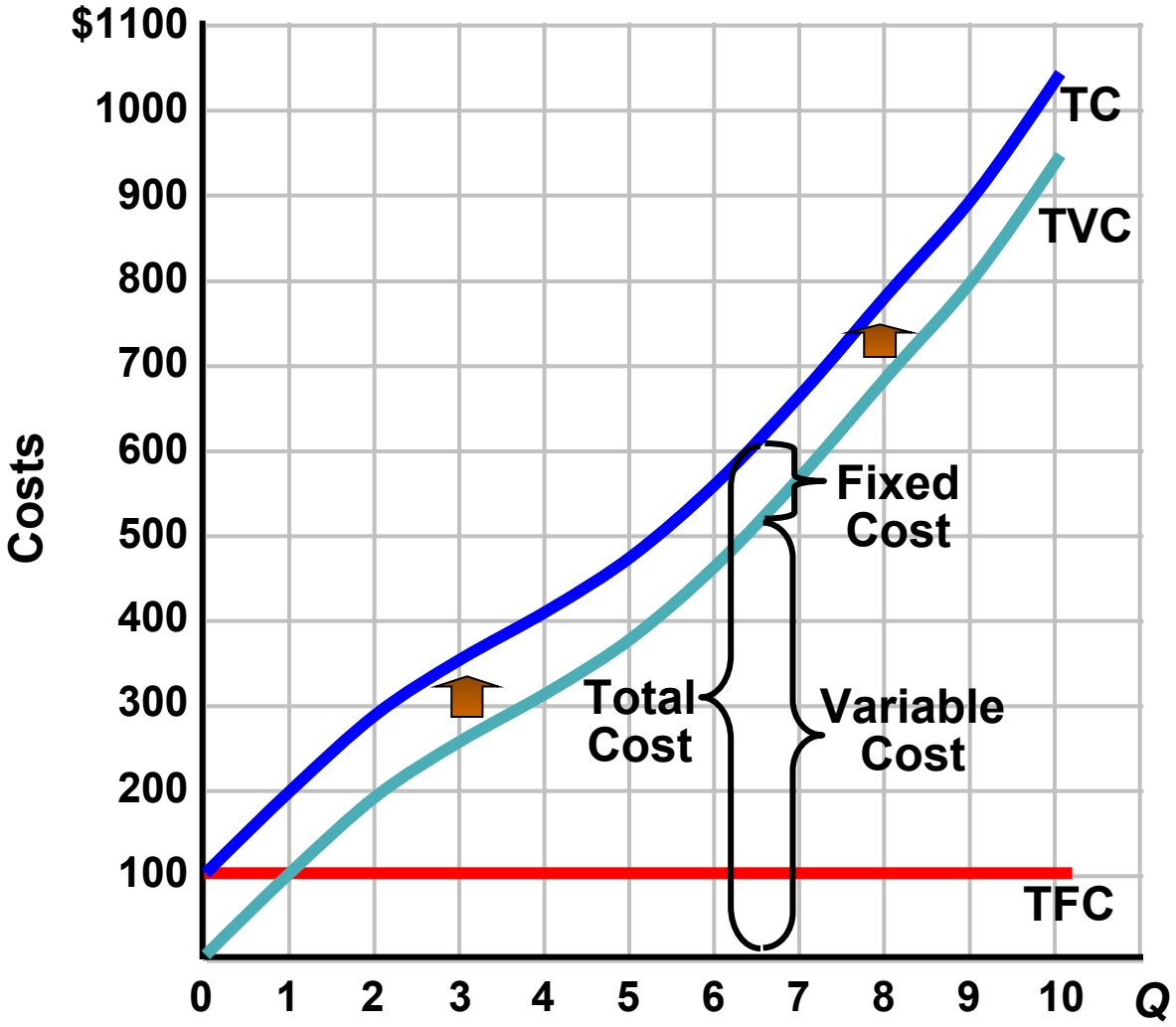
- Fixed Costs (TFC)
  - Costs do not vary with output
- Variable Costs (TVC)
  - Costs vary with output
- Total Costs (TC)
  - Sum of TFC and TVC
  - TC = TFC + TVC

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	

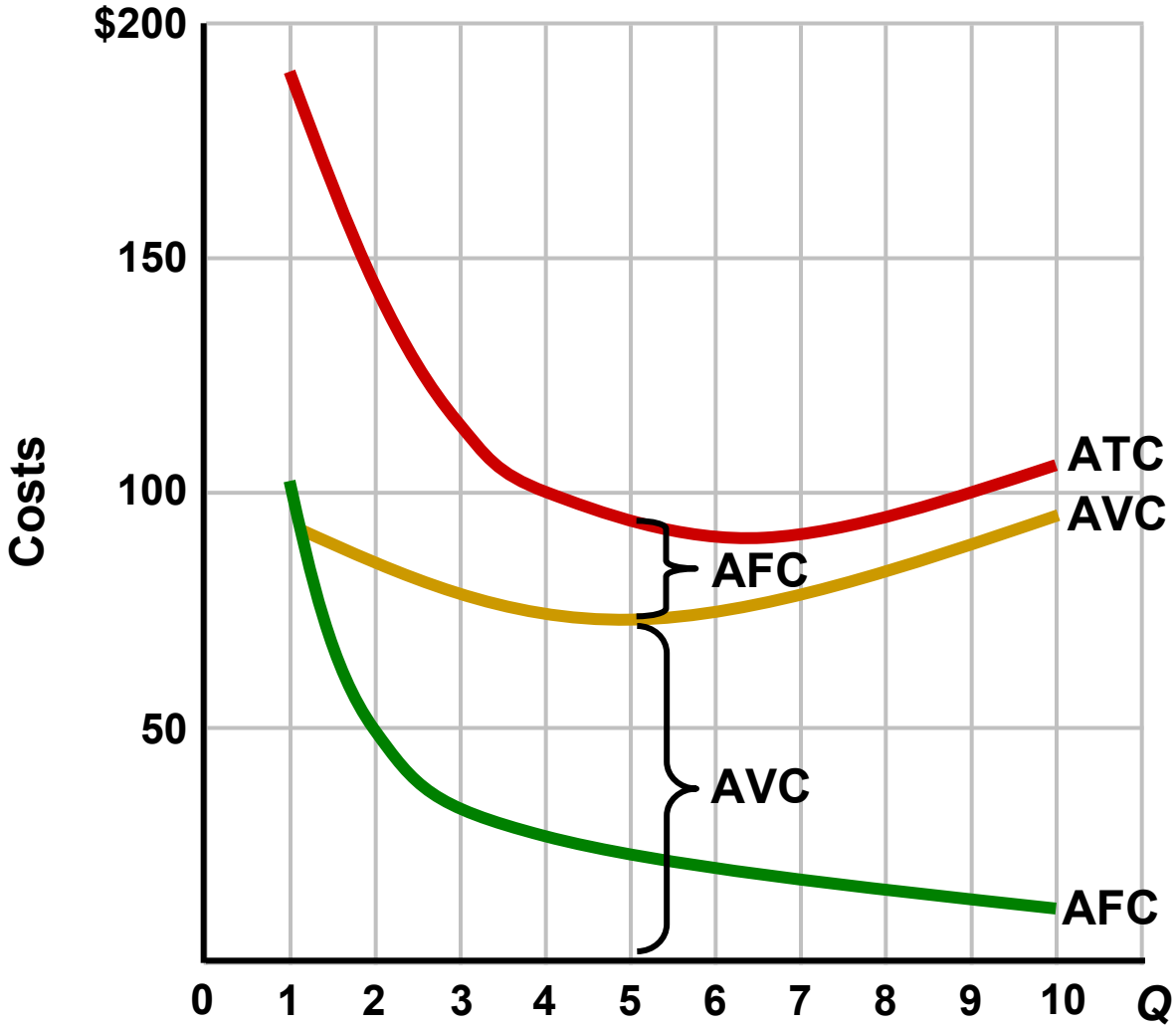
Short-Run Production Costs



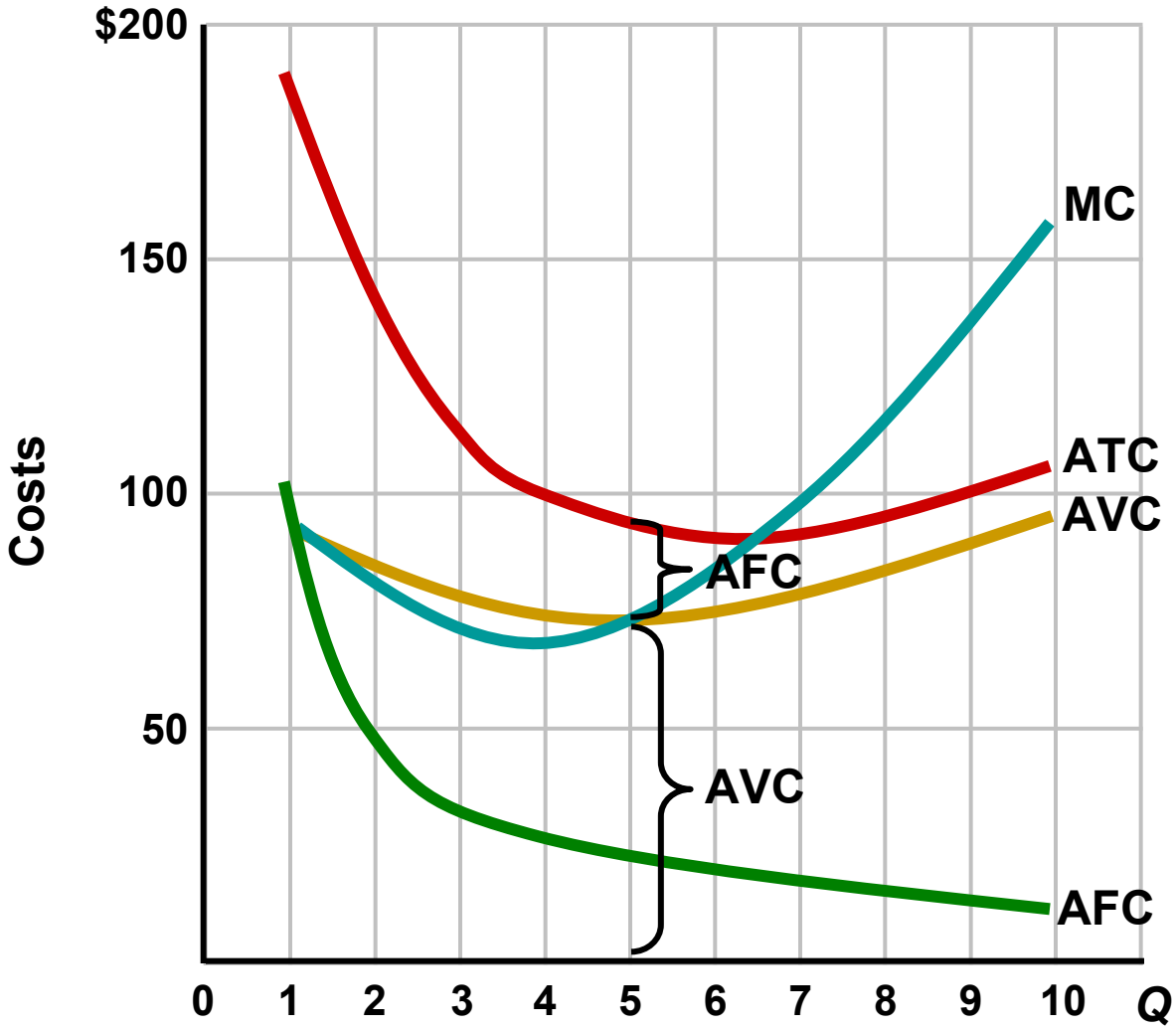
Per-Unit, or Average, Costs

- 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 = ΔTC/ΔQ

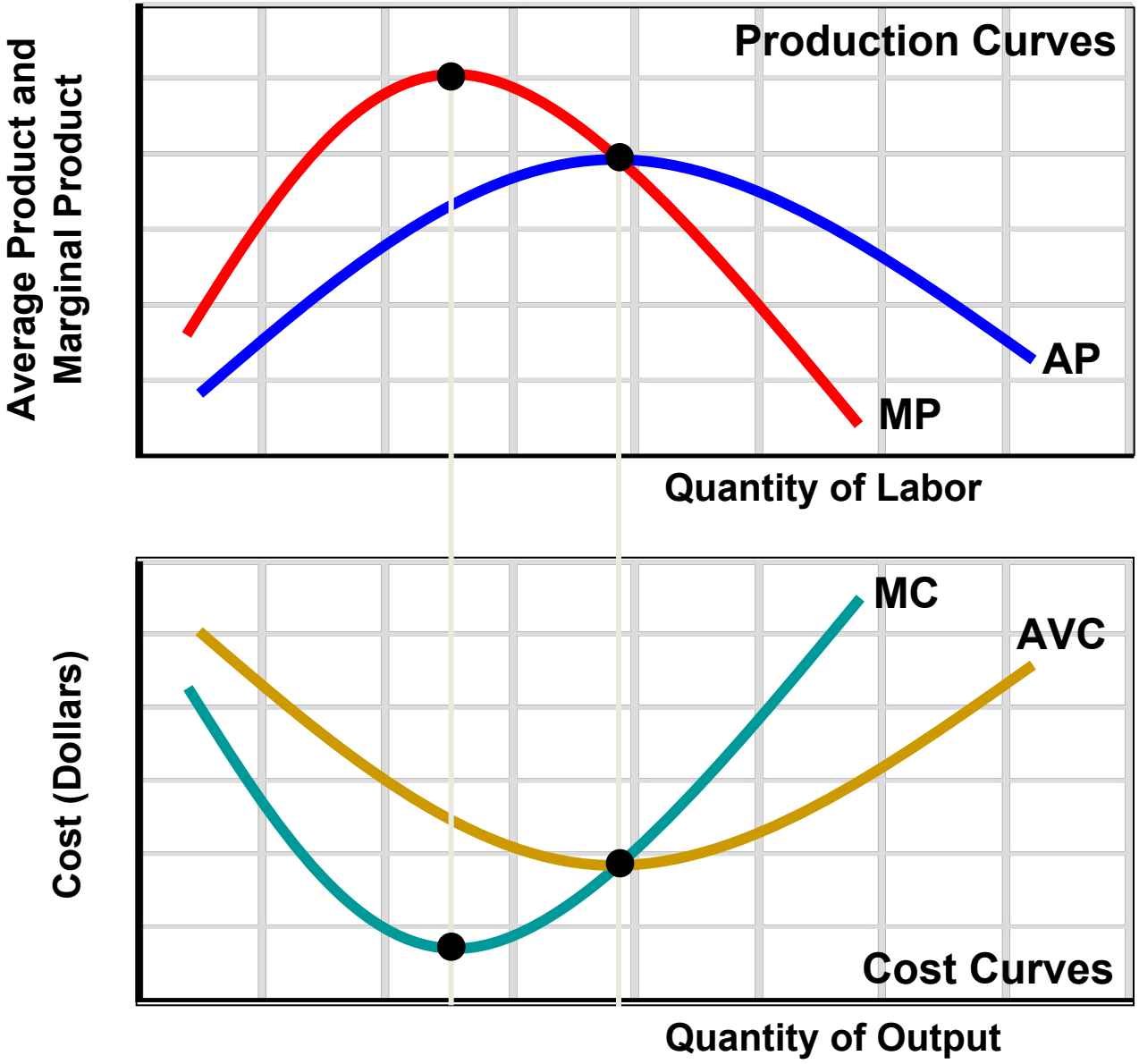
Per-Unit, or Average, Costs



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	_____	_____

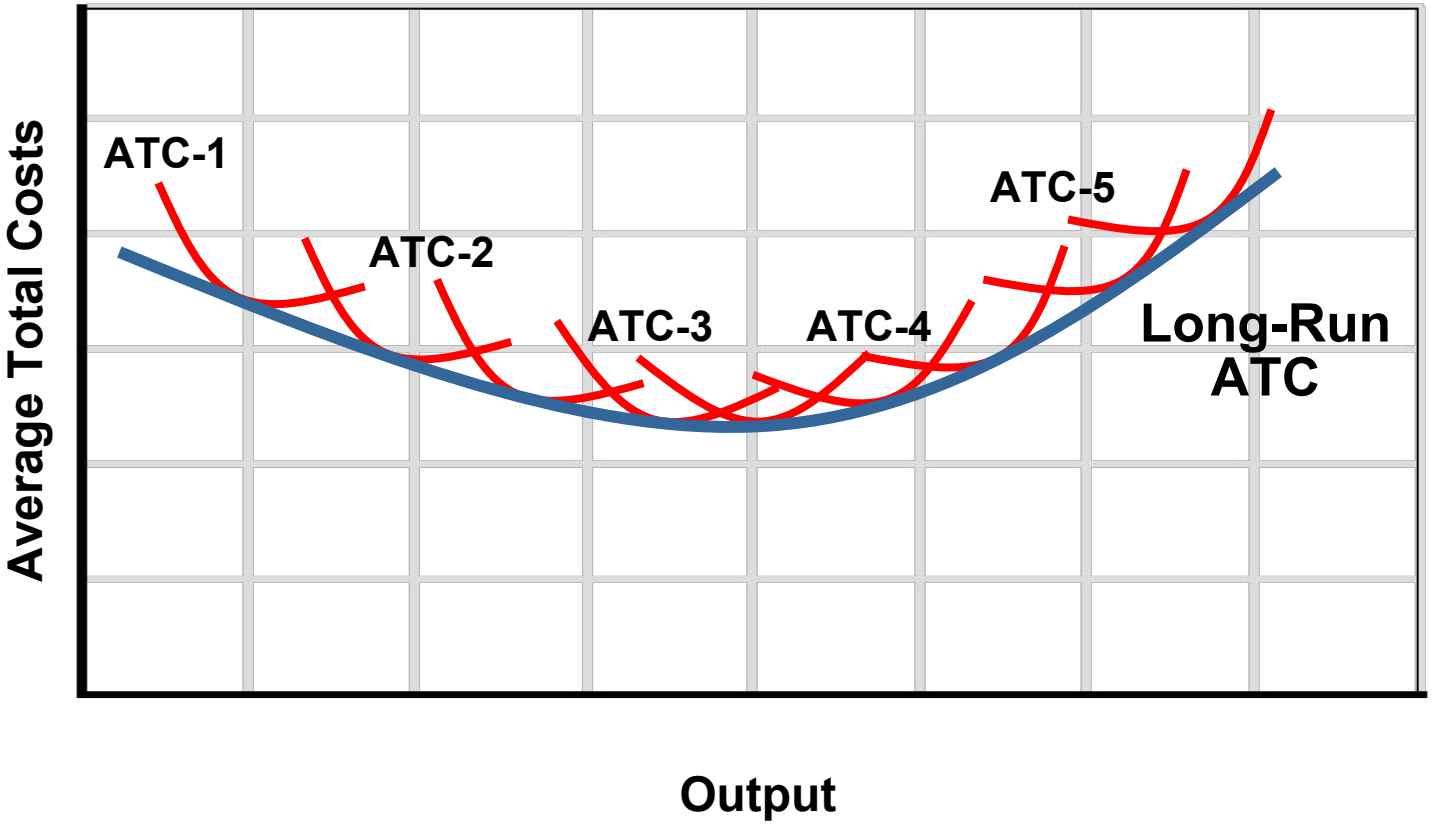
Continue with last slide

- 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

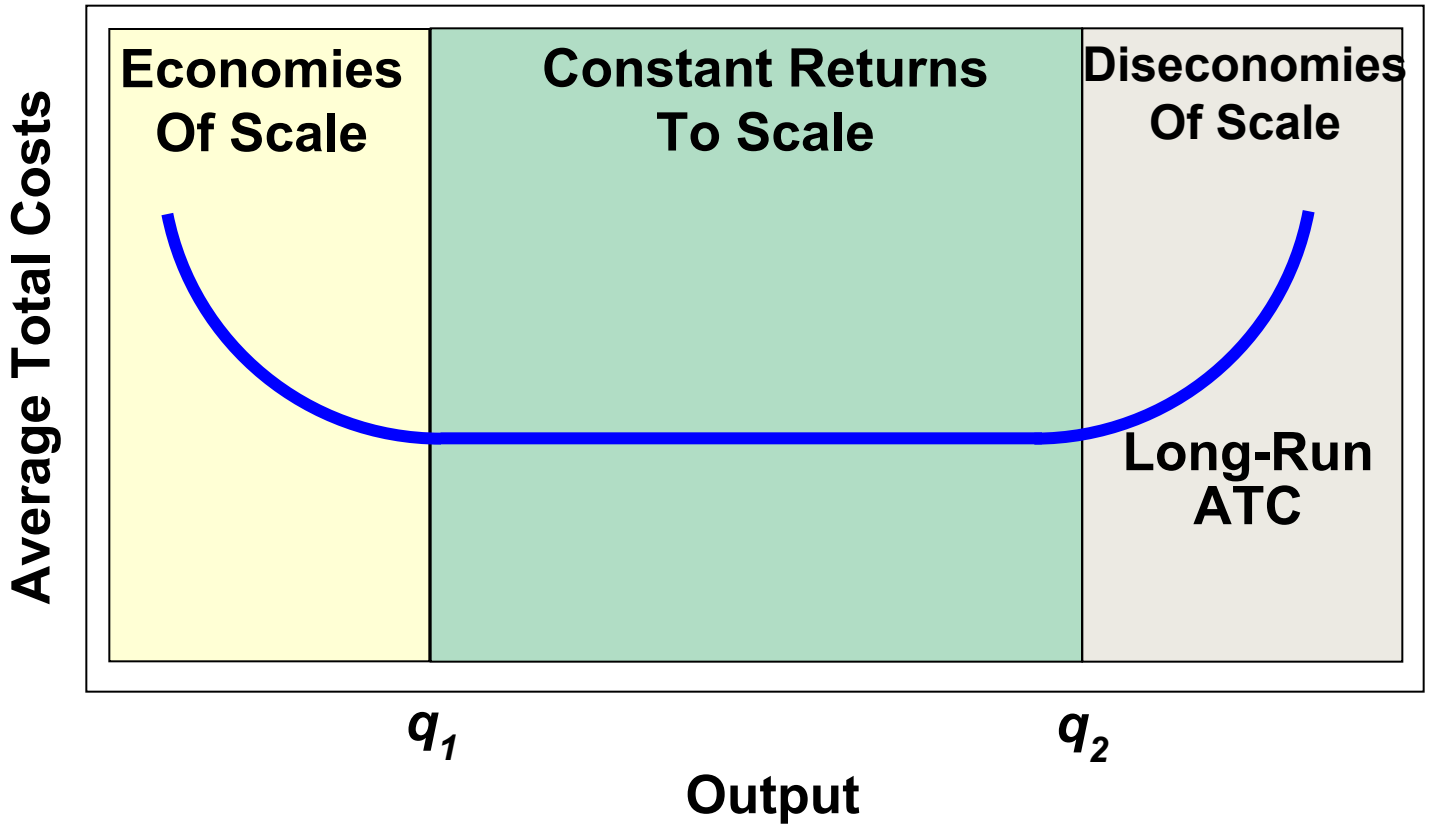
Economies and Diseconomies of Scale

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

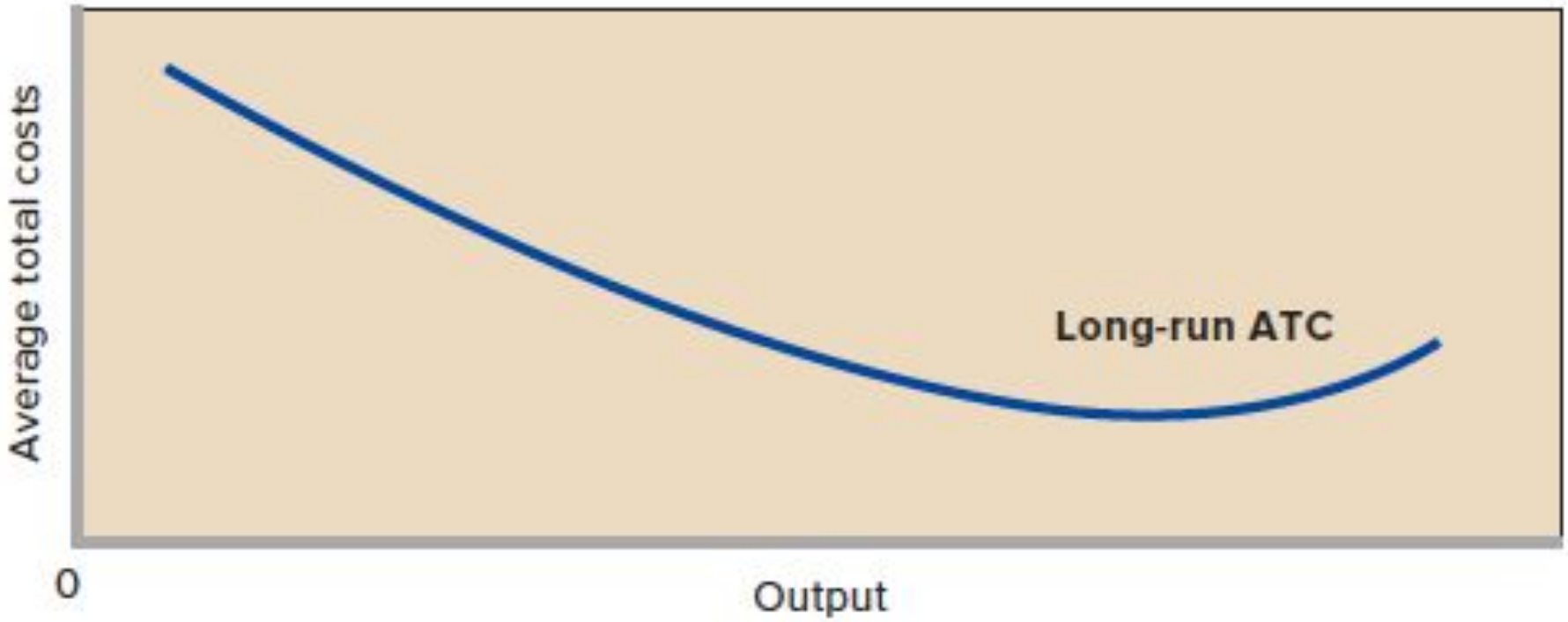
MES and Industry Structure

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

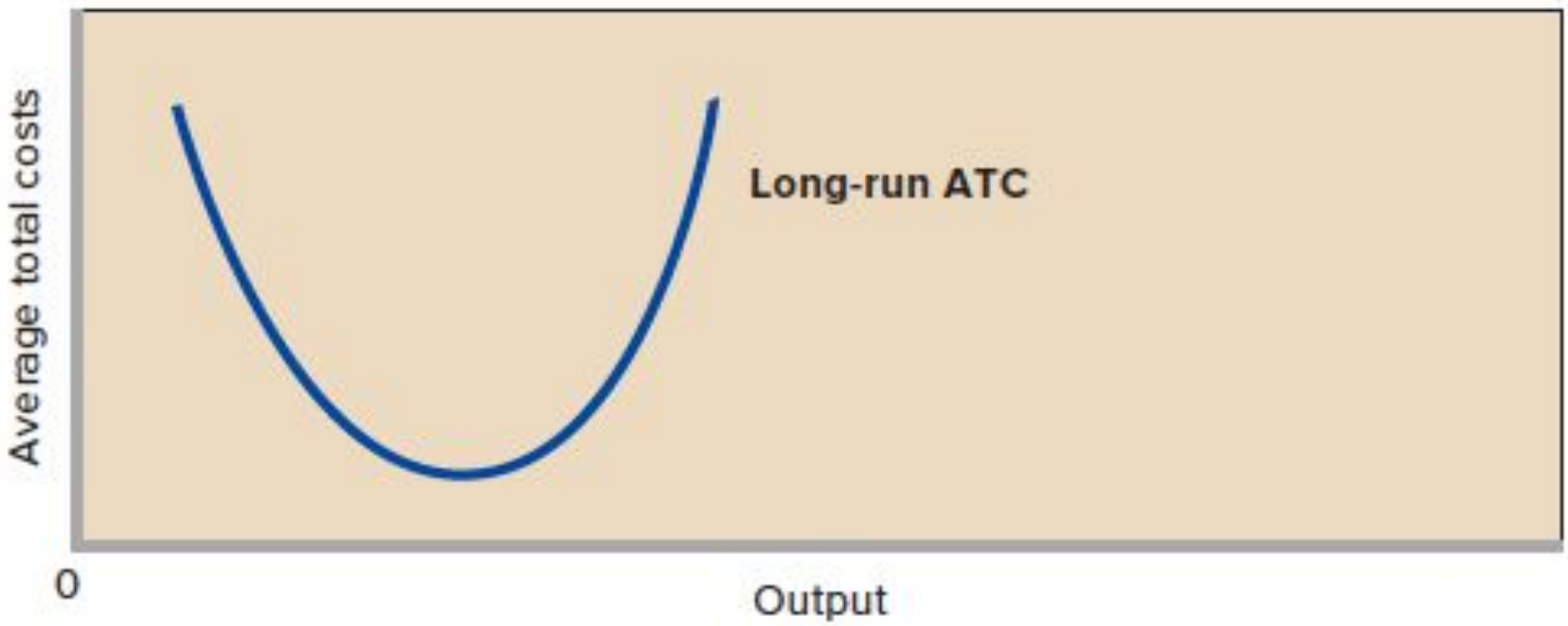
MES and Industry Structure



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