

Chapter 14

Firms in Competitive Markets

What is a Competitive Market

- Competitive market
 - Market with **many buyers and sellers**
 - Trading **identical products**
 - Each buyer and seller is a **price taker**
 - Firms can **freely enter or exit** the market

What is a Competitive Market

- Firm in a competitive market
 - Tries to maximize profit
- Profit
 - Total revenue minus total cost
- Total revenue, $TR = P \times Q$
 - Price times quantity

What is a Competitive Market

- Average revenue, $AR = TR / Q$
 - Total revenue divided by the quantity sold
- Marginal revenue, $MR = \Delta TR / \Delta Q$
 - Change in total revenue from an additional unit sold
- For competitive firms
$$AR = P$$
$$MR = P$$

Table 1 Total, Average, and Marginal Revenue for a Competitive Firm

(1) Quantity (Q)	(2) Price (P)	(3) Total Revenue ($TR = P \times Q$)	(4) Average Revenue ($AR = TR / Q$)	(5) Marginal Revenue ($MR = \Delta TR / \Delta Q$)
1 gallon	\$6	\$6	\$6	
				\$6
2	6	12	6	
				6
3	6	18	6	
				6
4	6	24	6	
				6
5	6	30	6	
				6
6	6	36	6	
				6
7	6	42	6	
				6
8	6	48	6	

Profit Maximization

Compare marginal revenue with marginal cost

- If $MR > MC$: increase production
- If $MR < MC$: decrease production
- Maximize profit where $MR = MC$

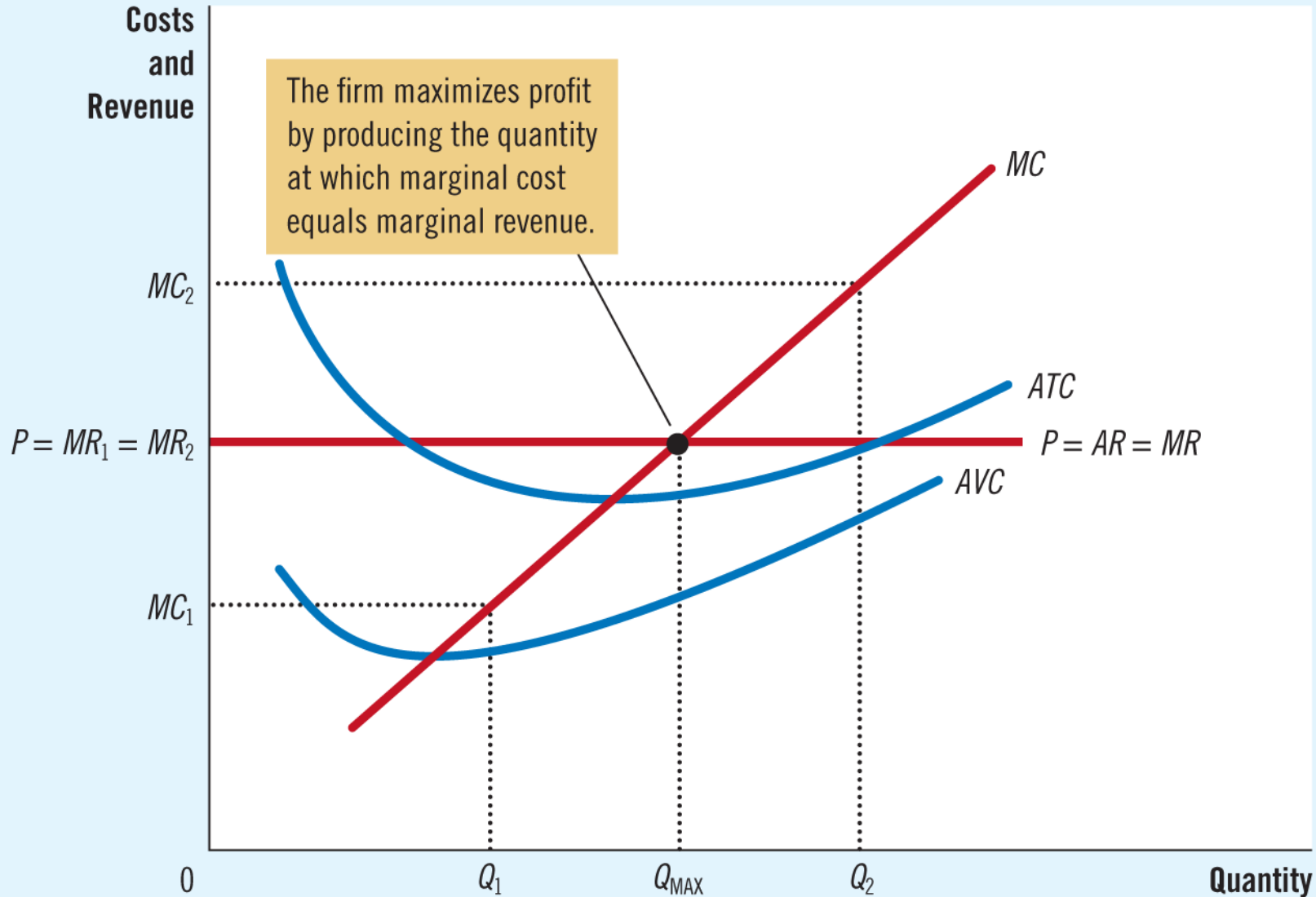
Table 2 Profit Maximization: A Numerical Example

(1) Quantity (Q)	(2) Total Revenue (TR)	(3) Total Cost (TC)	(4) Profit ($TR - TC$)	(5) Marginal Revenue ($MR = \Delta TR / \Delta Q$)	(6) Marginal Cost ($MC = \Delta TC / \Delta Q$)	(7) Change in Profit ($MR - MC$)
0 gallons	\$ 0	\$ 3	-\$3			
1	6	5	1	\$6	\$2	\$4
2	12	8	4	6	3	3
3	18	12	6	6	4	2
4	24	17	7	6	5	1
5	30	23	7	6	6	0
6	36	30	6	6	7	-1
7	42	38	4	6	8	-2
8	48	47	1	6	9	-3

Profit Maximization

- The marginal-cost curve and the firm's supply decision
 - MC curve is upward sloping
 - ATC curve is U-shaped
 - MC curve crosses the ATC curve at the minimum of ATC curve
 - The price line is horizontal: $P = AR = MR$

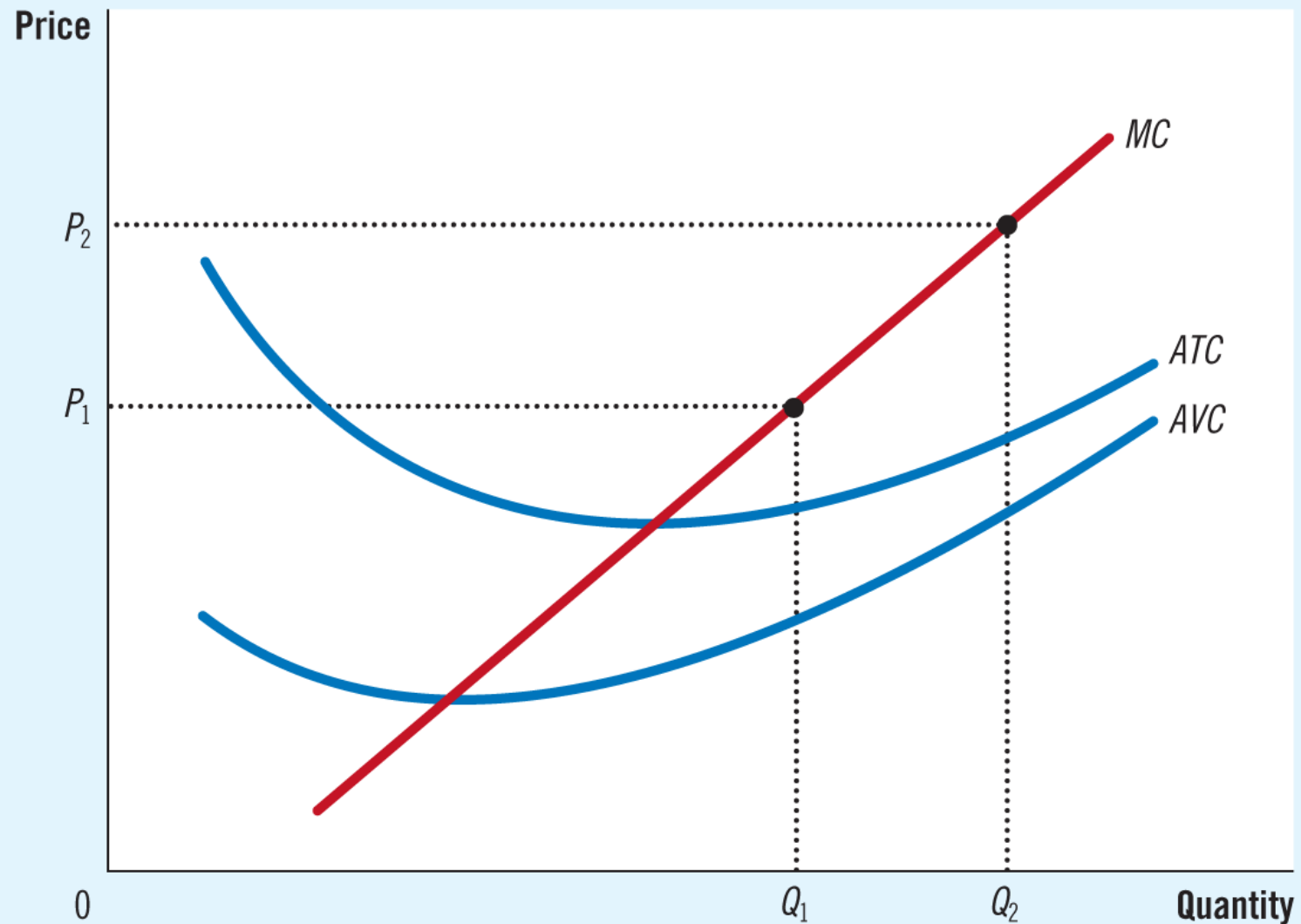
Figure 1 Profit Maximization for a Competitive Firm



Profit Maximization

- Rules for profit maximization:
 - If $MR > MC$, firm should increase output
 - If $MC > MR$, firm should decrease output
 - If $MR = MC$, profit-maximizing level of output
- Marginal-cost curve
 - Determines the quantity of the good the firm is willing to supply at any price
 - Is the **supply curve**

Figure 2 Marginal Cost as the Competitive Firm's Supply Curve



Profit Maximization

- Shutdown

- Short-run decision not to produce anything
- During a specific period of time
- Because of current market conditions
- Firm still has to pay fixed costs

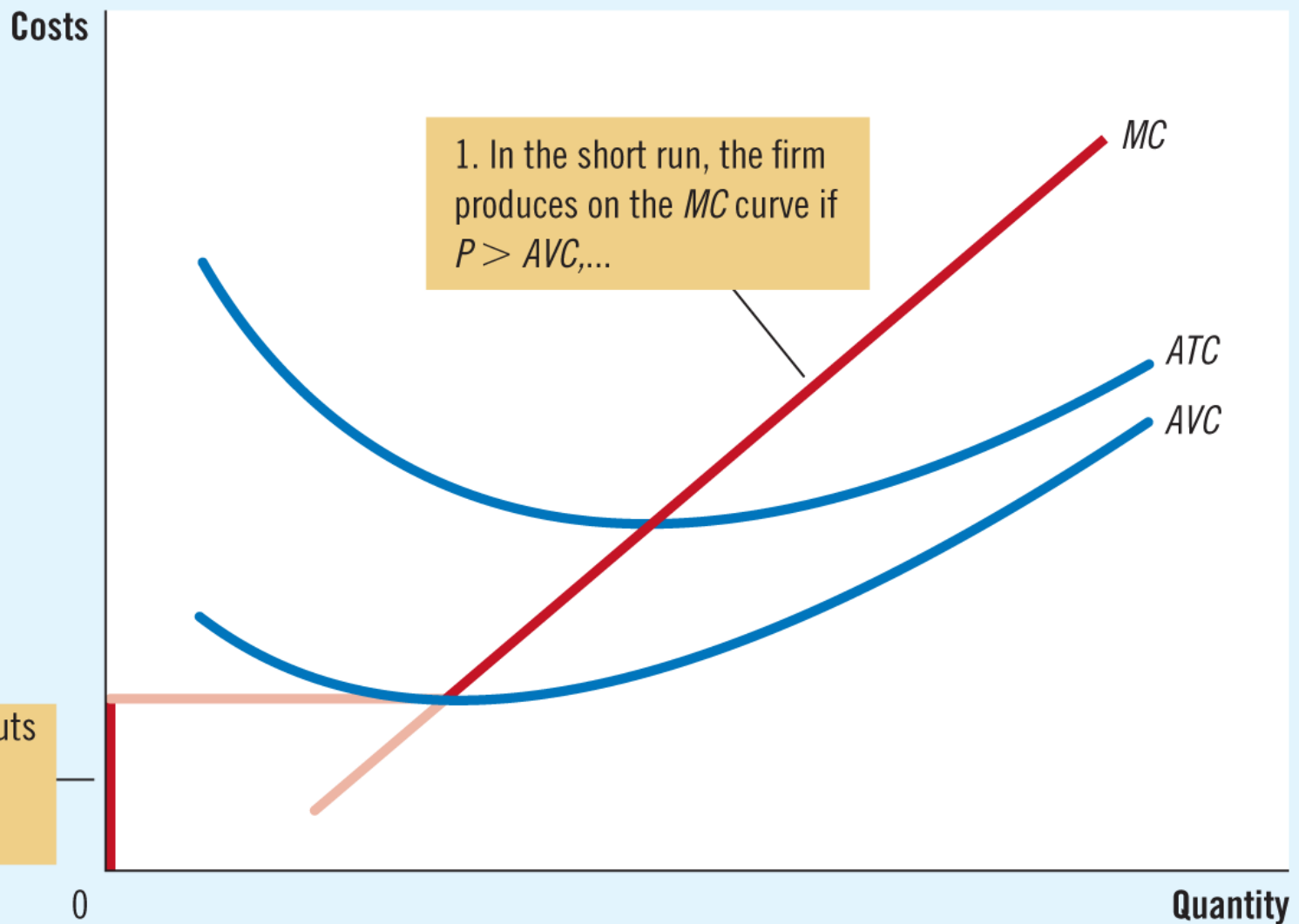
- Exit

- Long-run decision to leave the market
- Firm doesn't have to pay any costs

Profit Maximization

- The firm's short-run decision to shut down
 - TR = total revenue
 - VC = variable costs
- Firm's decision:
 - Shut down if $TR < VC$ (or $P < AVC$)
- Competitive firm's short-run supply curve
 - The portion of its marginal-cost curve that lies above average variable cost

Figure 3 The Competitive Firm's Short-Run Supply Curve



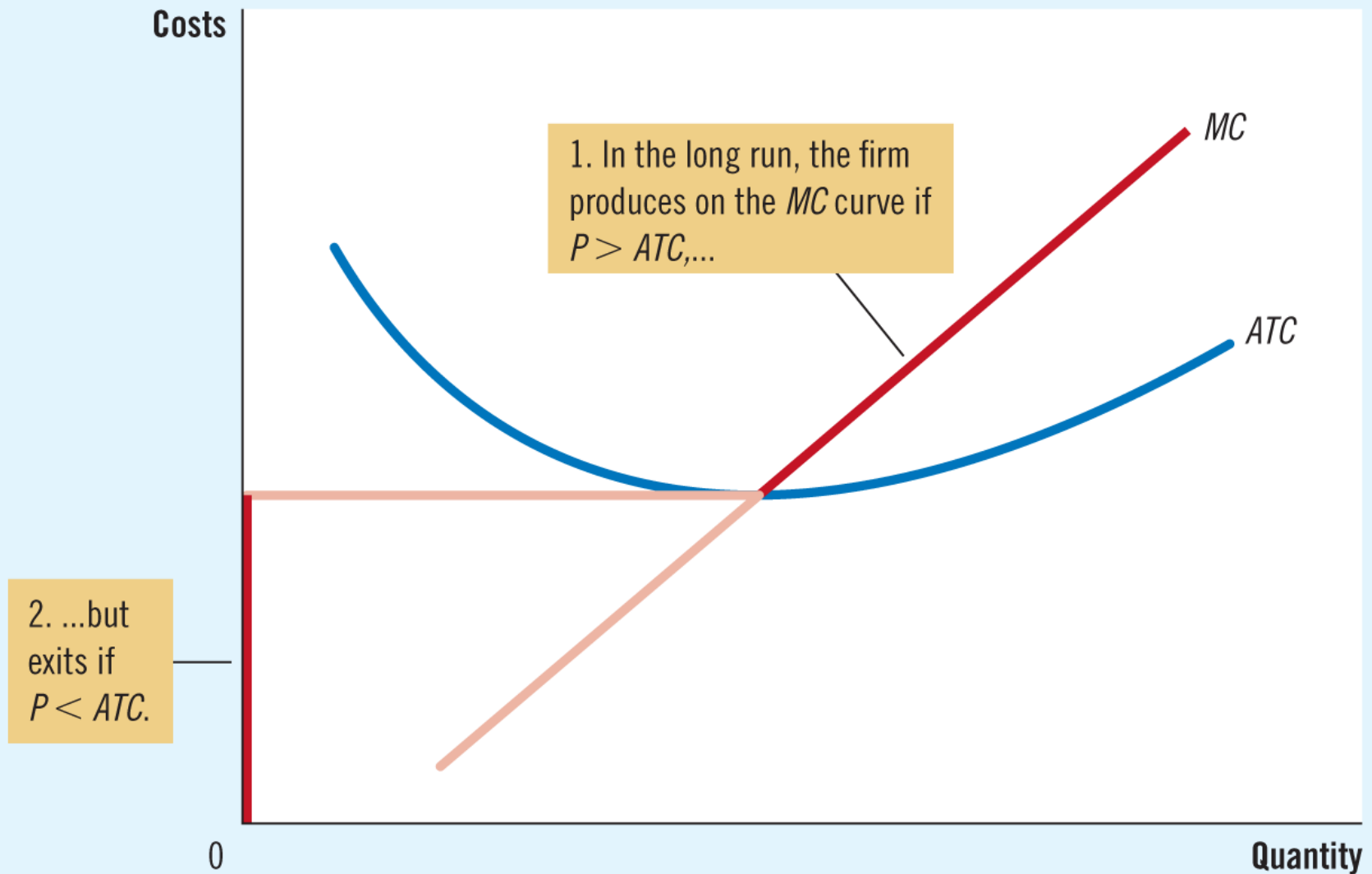
Profit Maximization

- Sunk cost
 - A cost that has already been committed and cannot be recovered
 - Should be ignored when making decisions
 - In the short run, fixed costs are sunk costs

Profit Maximization

- Firm's long-run decision
 - Exit the market if
 - Total revenue < total costs; $TR < TC$ (same as: $P < ATC$)
 - Enter the market if
 - Total revenue > total costs; $TR > TC$ (same as: $P > ATC$)
- Competitive firm's long-run supply curve
 - The portion of its marginal-cost curve that lies above average total cost

Figure 4 The Competitive Firm's Long-Run Supply Curve



Profit Maximization

- Measuring profit

$$\text{Profit} = \text{TR} - \text{TC} = (P - \text{ATC}) \times Q$$

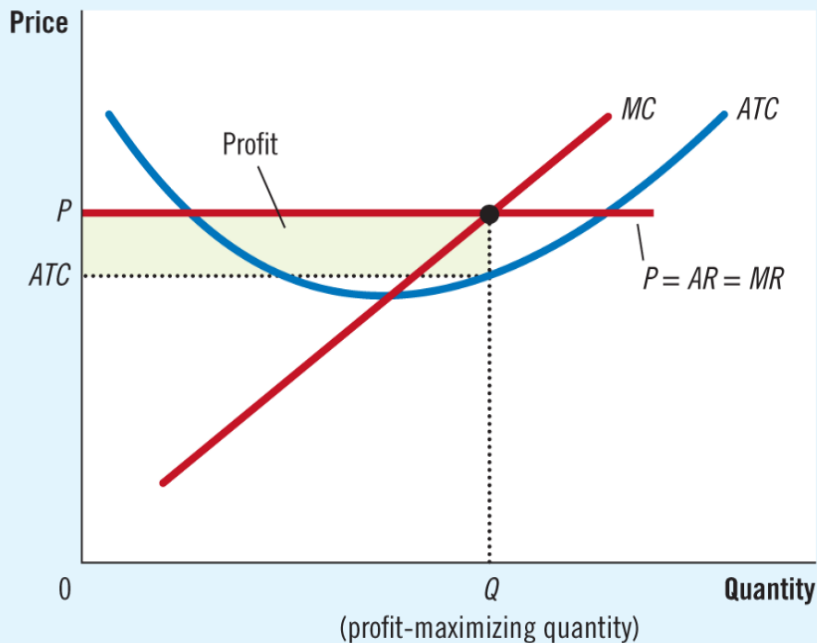
Figure 5 Profit as the Area between Price and Average Total Cost

FIGURE 5

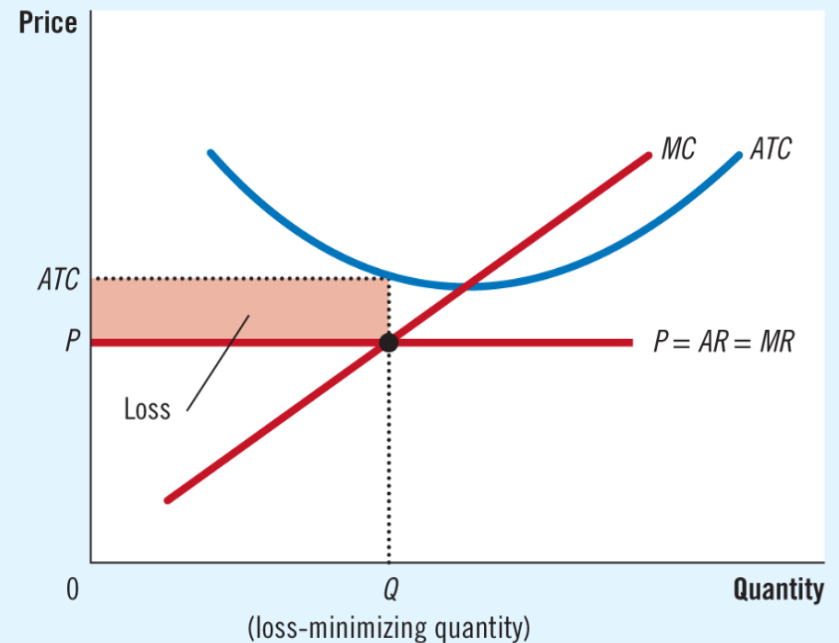
Profit as the Area between Price and Average Total Cost

The area of the shaded box between price and average total cost represents the firm's profit. The height of this box is price minus average total cost ($P - ATC$), and the width of the box is the quantity of output (Q). In panel (a), price is greater than average total cost, so the firm has positive profit. In panel (b), price is less than average total cost, so the firm incurs a loss.

(a) A Firm with Profits



(b) A Firm with Losses



Supply Curve

- Short run: market supply with a fixed number of firms
 - Short run: number of firms is fixed
 - Each firm supplies quantity where $P = MC$
 - For $P > AVC$: supply curve is MC curve
 - Market supply
 - Add up quantity supplied by each firm

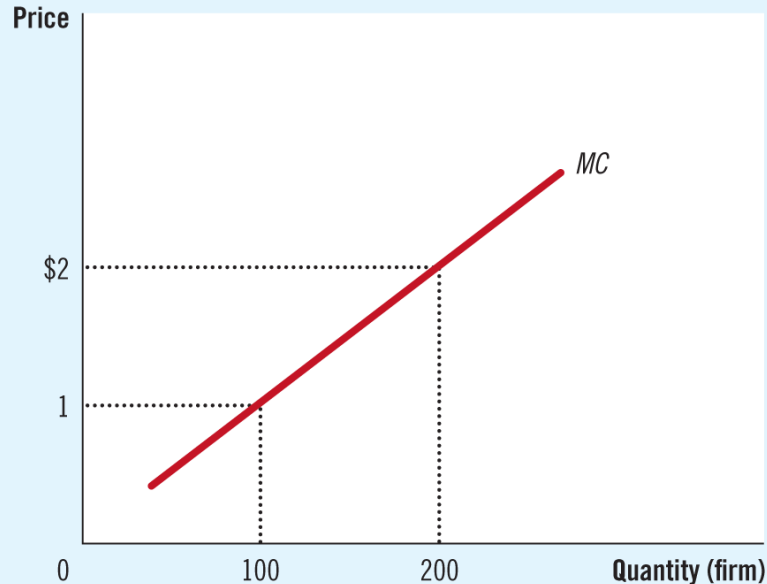
Figure 6 Short-Run Market Supply

In the short run, the number of firms in the market is fixed. As a result, the market supply curve, shown in panel (b), reflects the sum of individual firms' marginal-cost curves, shown in panel (a). Here, in a market of 1,000 identical firms, the quantity of output supplied to the market is 1,000 times the quantity supplied by each firm.

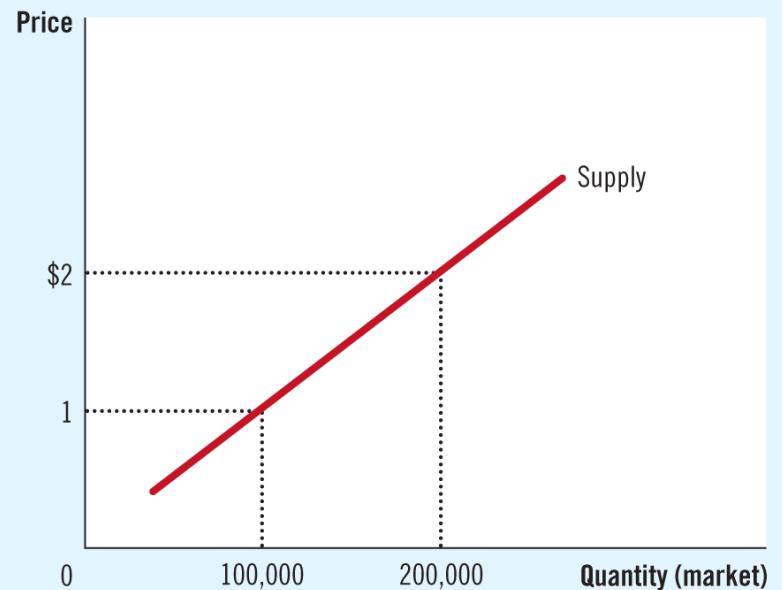
FIGURE 6

Short-Run Market Supply

(a) Individual Firm Supply



(b) Market Supply



Supply Curve

- Long run
 - Firms can enter and exit the market
 - If $P > ATC$, firms make positive profit
 - New firms enter the market
 - If $P < ATC$, firms make negative profit
 - Firms exit the market

Supply Curve

- Long run
 - Process of **entry and exit ends** when
 - Firms still in market make zero economic profit (**$P = ATC$**)
 - Because $MC = ATC$: Efficient scale
 - **Long run supply curve is perfectly elastic**
 - Horizontal at minimum ATC

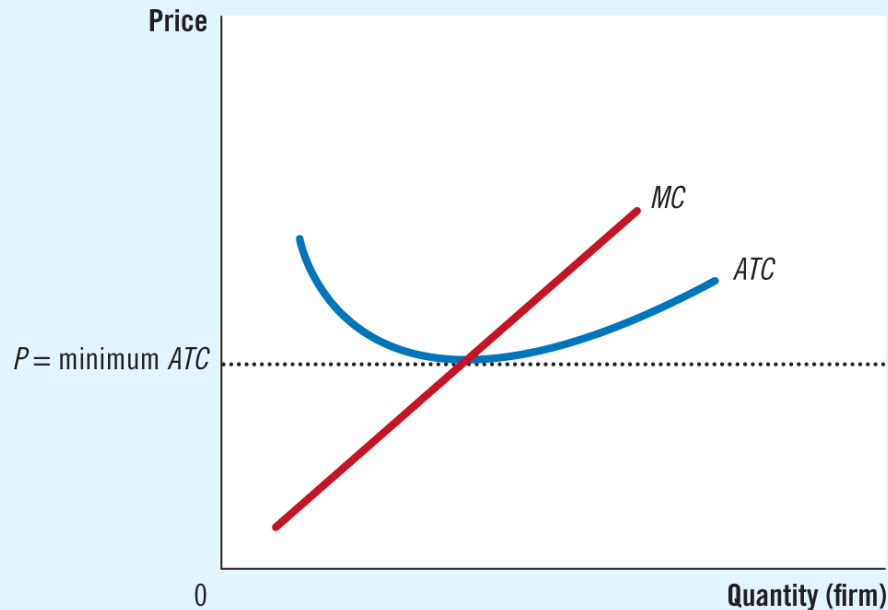
Figure 7 Long-Run Market Supply

FIGURE 7

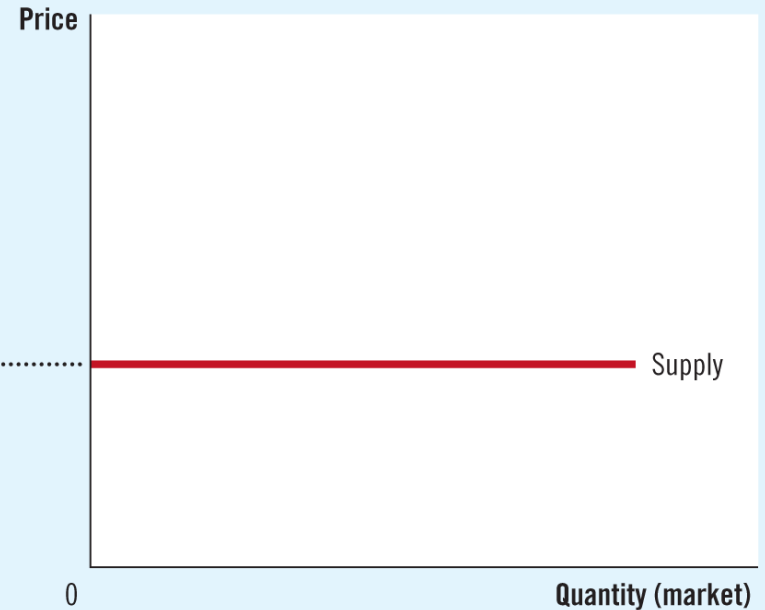
Long-Run Market Supply

In the long run, firms will enter or exit the market until profit is driven to zero. As a result, price equals the minimum of average total cost, as shown in panel (a). The number of firms adjusts to ensure that all demand is satisfied at this price. The long-run market supply curve is horizontal at this price, as shown in panel (b).

(a) Firm's Zero-Profit Condition



(b) Market Supply



Supply Curve

- Why do competitive firms stay in business if they make zero profit?
 - Profit = total revenue – total cost
 - Total cost includes all opportunity costs
 - Zero-profit equilibrium
 - Economic profit is zero
 - Accounting profit is positive



"We're a nonprofit organization - we don't intend to be, but we are!"

Figure 8 An Increase in Demand

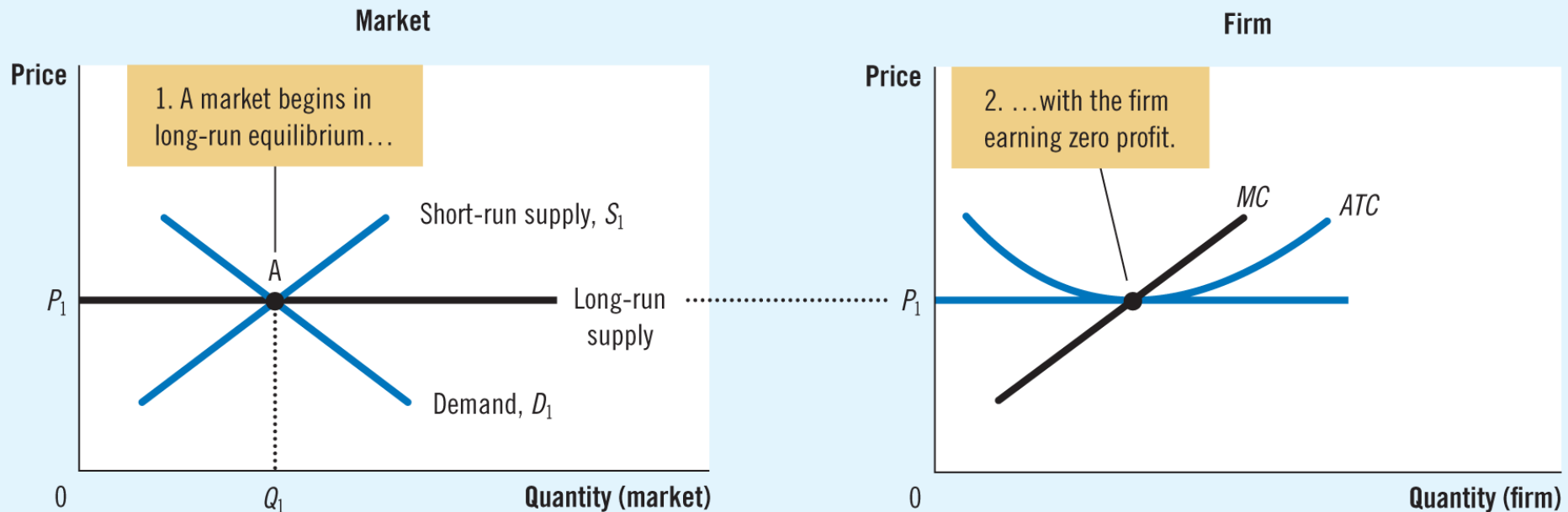


Figure 8 An Increase in Demand

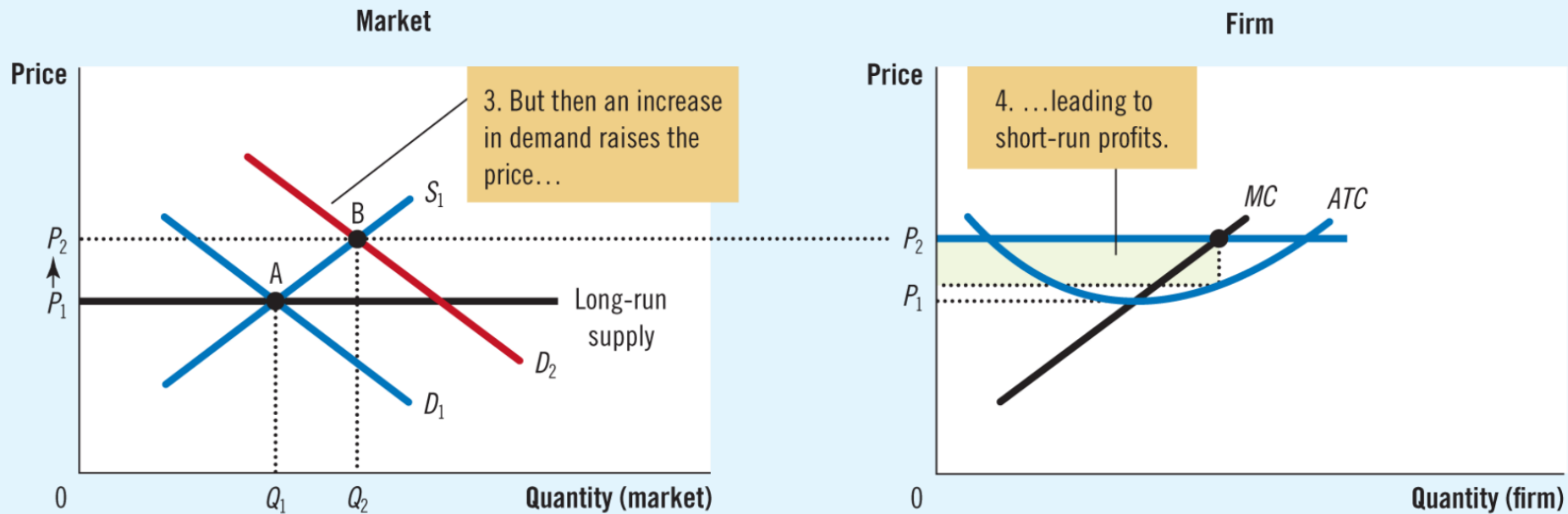


Figure 8 An Increase in Demand

