



Firms in Competitive Markets

14

WHAT IS A COMPETITIVE MARKET?

- A perfectly *competitive market* has the following characteristics:
 - There are many buyers and sellers in the market.
 - The goods offered by the various sellers are largely the same.
 - Firms can freely enter or exit the market.

WHAT IS A COMPETITIVE MARKET?

- As a result of its characteristics, the perfectly competitive market has the following outcomes:
 - The actions of any single buyer or seller in the market have a negligible impact on the market price.
 - Each buyer and seller takes the market price as given.

WHAT IS A COMPETITIVE MARKET?

- A competitive market has many buyers and sellers trading identical products so that each buyer and seller is a price taker.
 - Buyers and sellers must accept the price determined by the market.

The Revenue of a Competitive Firm

- Total revenue for a firm is the *selling price* times the *quantity sold*.

$$TR = (P \times Q)$$

The Revenue of a Competitive Firm

- Total revenue is proportional to the amount of output.

The Revenue of a Competitive Firm

- *Average revenue* tells us how much revenue a firm receives for the typical unit sold.
- Average revenue is total revenue divided by the quantity sold.

The Revenue of a Competitive Firm

- In perfect competition, average revenue equals the price of the good.

$$\begin{aligned}\text{Average Revenue} &= \frac{\text{Total revenue}}{\text{Quantity}} \\ &= \frac{\text{Price} \times \text{Quantity}}{\text{Quantity}} \\ &= \text{Price}\end{aligned}$$

The Revenue of a Competitive Firm

- *Marginal revenue* is the change in total revenue from an additional unit sold.

$$MR = \Delta TR / \Delta Q$$

The Revenue of a Competitive Firm

- For competitive firms, marginal revenue equals the price of the good.

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

Quantity	Price	Total Revenue	Average Revenue	Marginal Revenue
(Q)	(P)	($TR = P \times Q$)	($AR = TR/Q$)	($MR = \Delta TR/\Delta Q$)
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	6

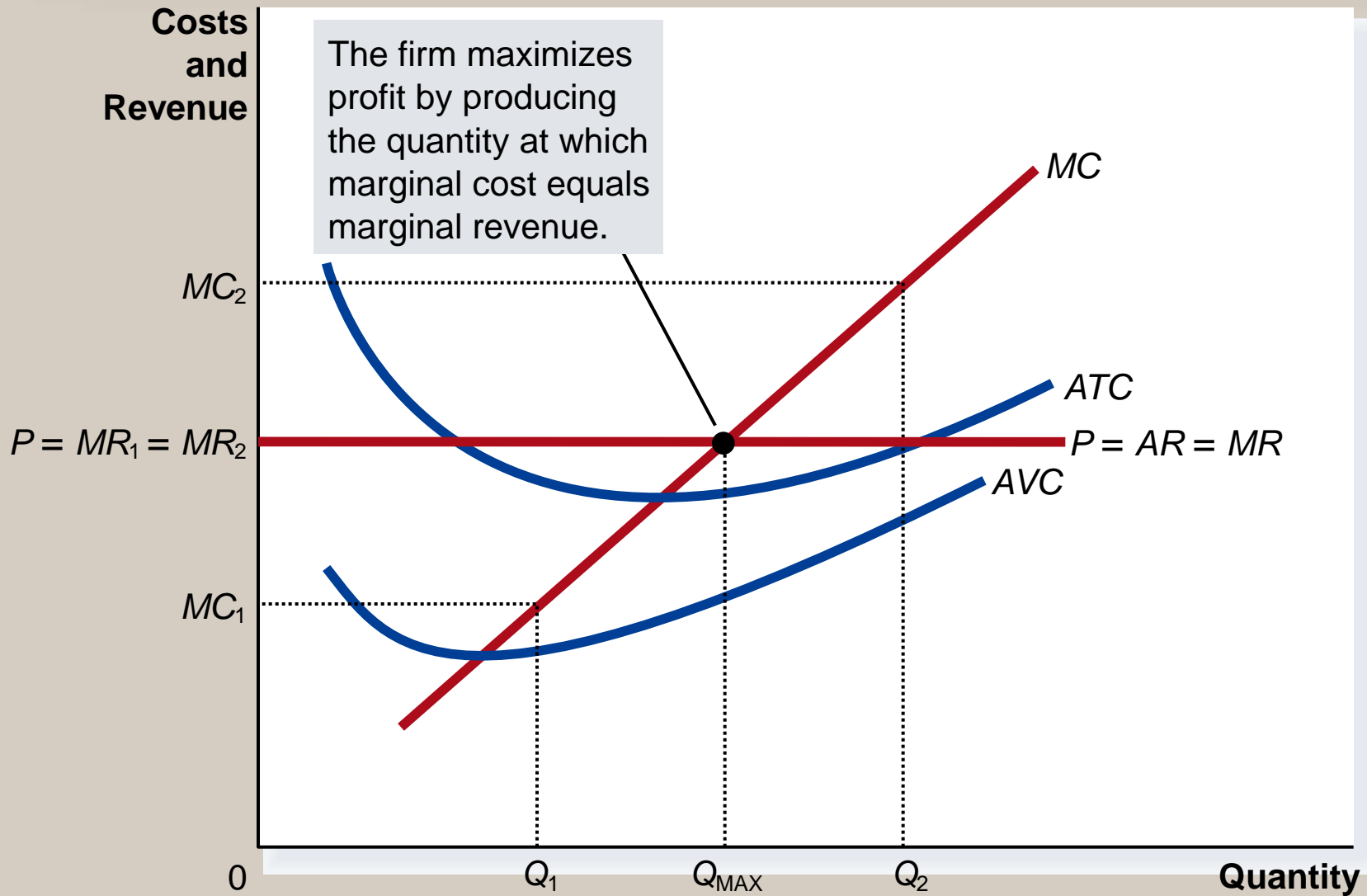
PROFIT MAXIMIZATION AND THE COMPETITIVE FIRM'S SUPPLY CURVE

- The goal of a competitive firm is to maximize profit.
- This means that the firm will want to produce the quantity that maximizes the *difference between total revenue and total cost*.

Table 2 Profit Maximization: A Numerical Example

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

Figure 1 Profit Maximization for a Competitive Firm



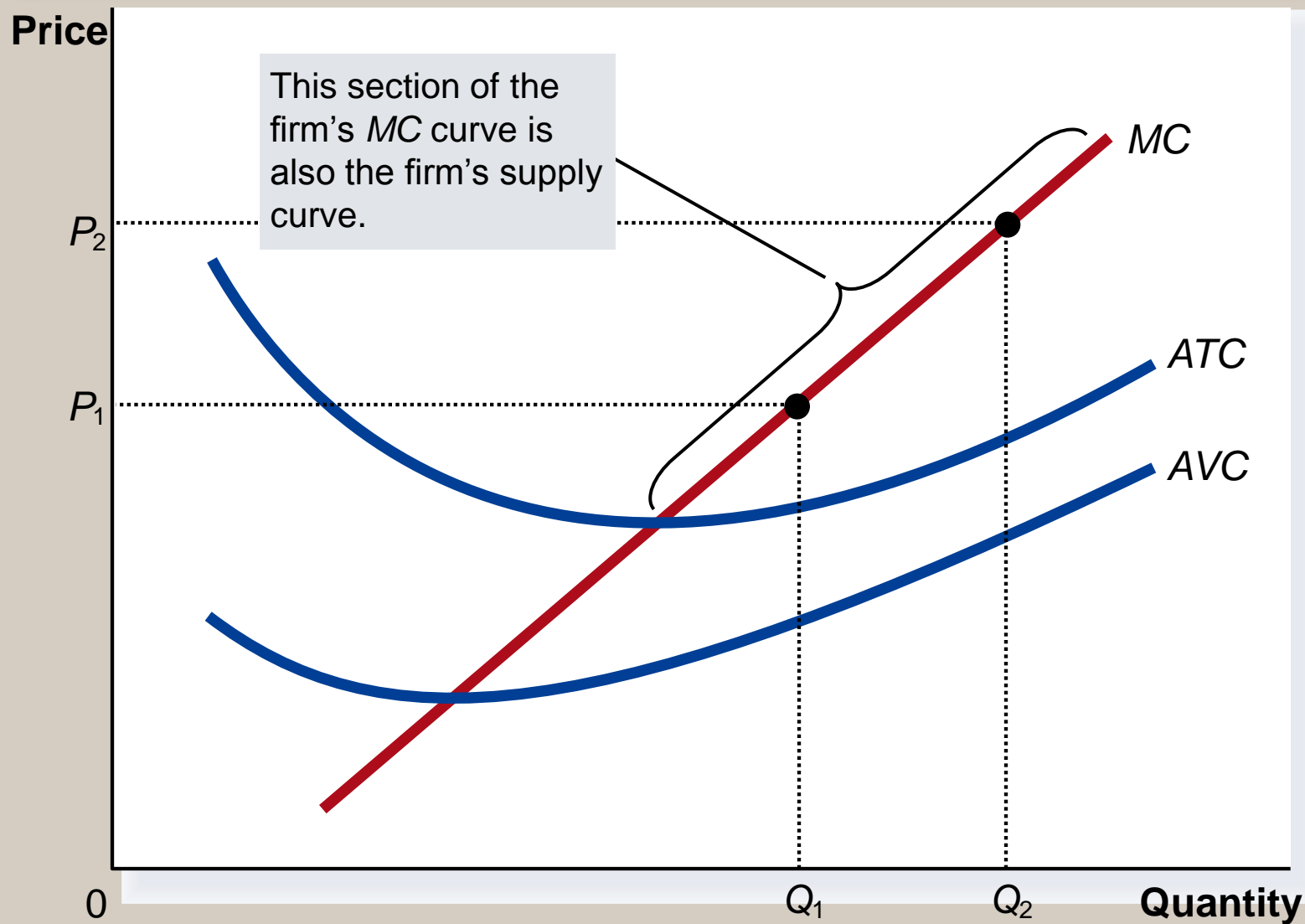
PROFIT MAXIMIZATION AND THE COMPETITIVE FIRM'S SUPPLY CURVE

- Profit maximization occurs at the quantity where *marginal revenue equals marginal cost*.

PROFIT MAXIMIZATION AND THE COMPETITIVE FIRM'S SUPPLY CURVE

- When $MR > MC$ ↓ increase Q
- When $MR < MC$ ↓ decrease Q
- When $MR = MC$ ↓ Profit is maximized.

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



The Firm's Short-Run Decision to Shut Down

- A *shutdown* refers to a short-run decision not to produce anything during a specific period of time because of current market conditions.
- *Exit* refers to a long-run decision to leave the market.

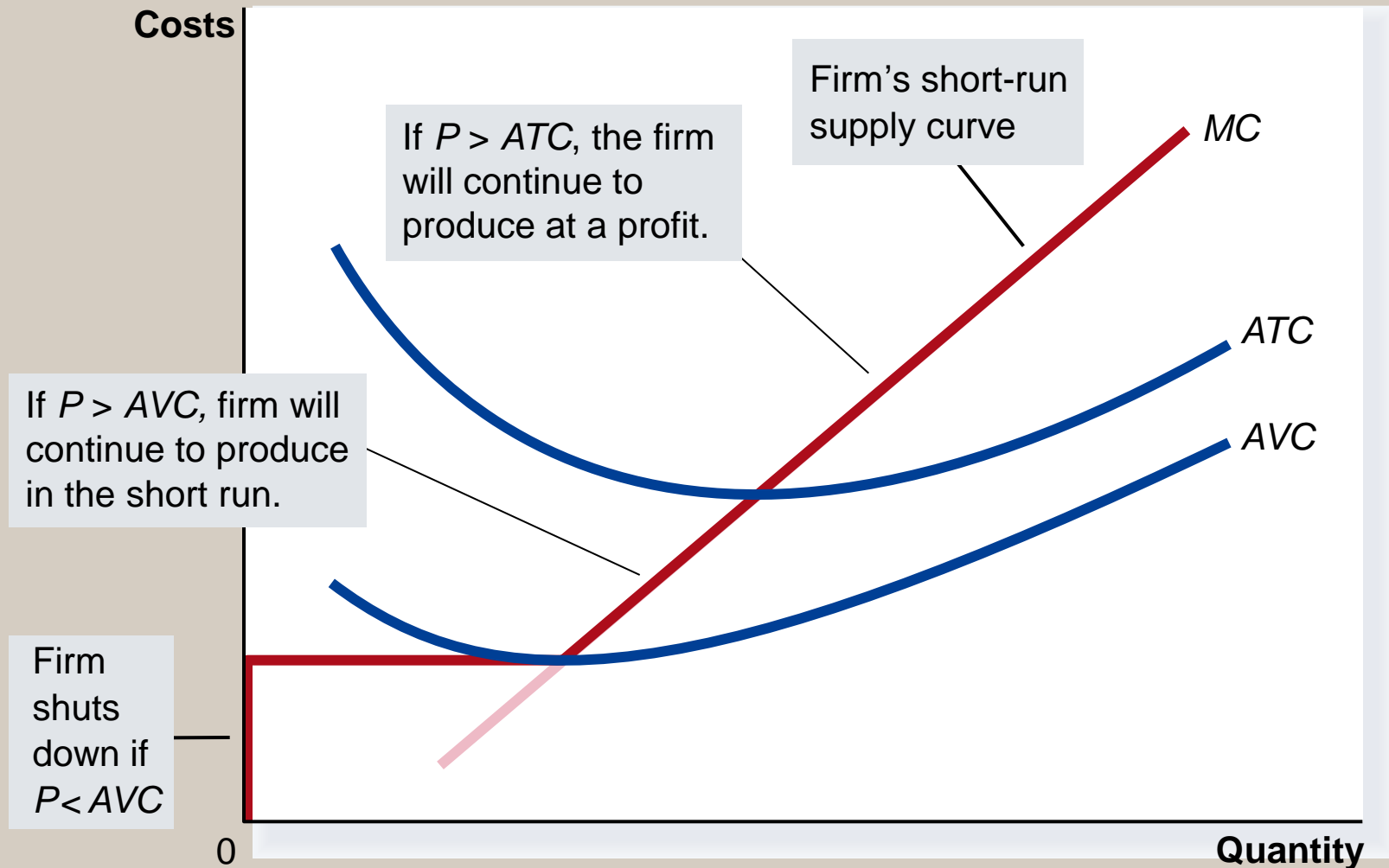
The Firm's Short-Run Decision to Shut Down

- The firm considers its *sunk costs* when deciding to exit, but ignores them when deciding whether to shut down.
 - *Sunk costs* are costs that have already been committed and cannot be recovered.

The Firm's Short-Run Decision to Shut Down

- The firm shuts down if the revenue it gets from producing is less than the variable cost of production.
 - Shut down if $TR < VC$
 - Shut down if $TR/Q < VC/Q$
 - Shut down if $P < AVC$

Figure 3 The Competitive Firm's Short Run Supply Curve



The Firm's Short-Run Decision to Shut Down

- The portion of the marginal-cost curve that lies above average variable cost is the competitive firm's *short-run supply curve*.

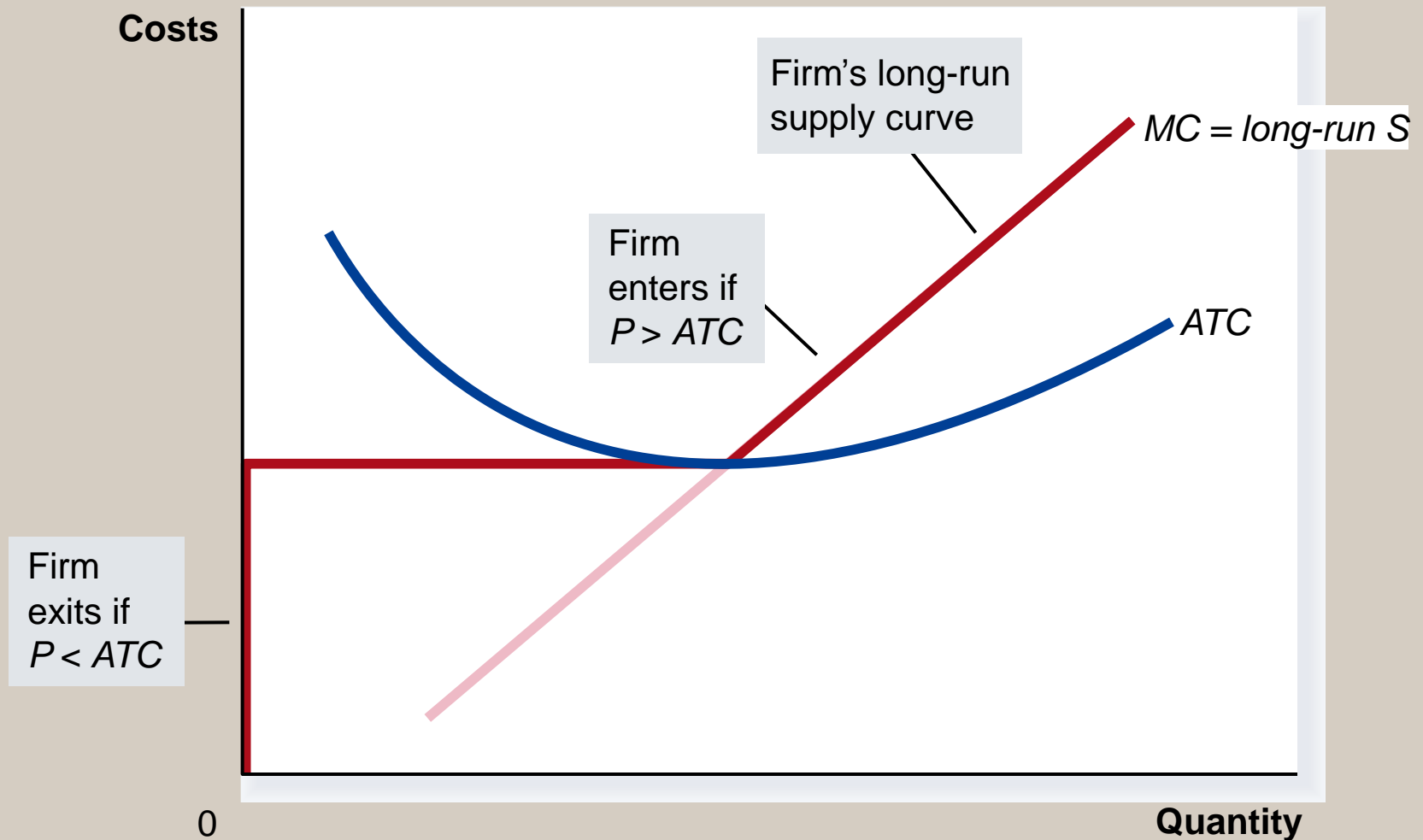
The Firm's Long-Run Decision to Exit or Enter a Market

- In the long run, the firm exits if the revenue it would get from producing is less than its total cost.
 - Exit if $TR < TC$
 - Exit if $TR/Q < TC/Q$
 - Exit if $P < ATC$

The Firm's Long-Run Decision to Exit or Enter a Market

- A firm will enter the industry if such an action would be profitable.
 - Enter if $TR > TC$
 - Enter if $TR/Q > TC/Q$
 - Enter if $P > ATC$

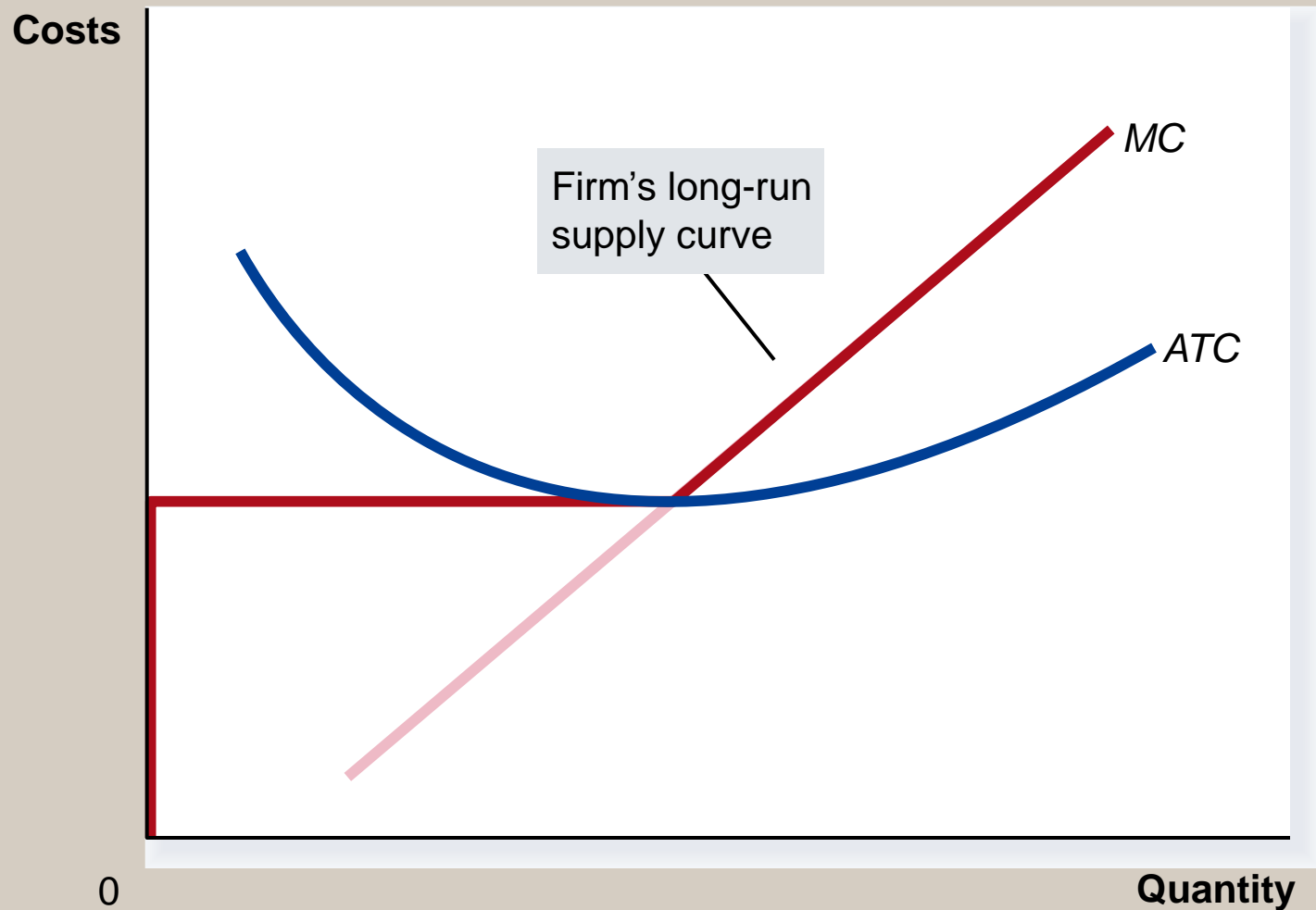
Figure 4 The Competitive Firm's Long-Run Supply Curve



THE SUPPLY CURVE IN A COMPETITIVE MARKET

- The competitive firm's long-run supply curve is the portion of its marginal-cost curve that lies above average total cost.

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



THE SUPPLY CURVE IN A COMPETITIVE MARKET

- Short-Run Supply Curve
 - The portion of its marginal cost curve that lies above average variable cost.
- Long-Run Supply Curve
 - The marginal cost curve above the minimum point of its average total cost curve.

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

(a) A Firm with Profits

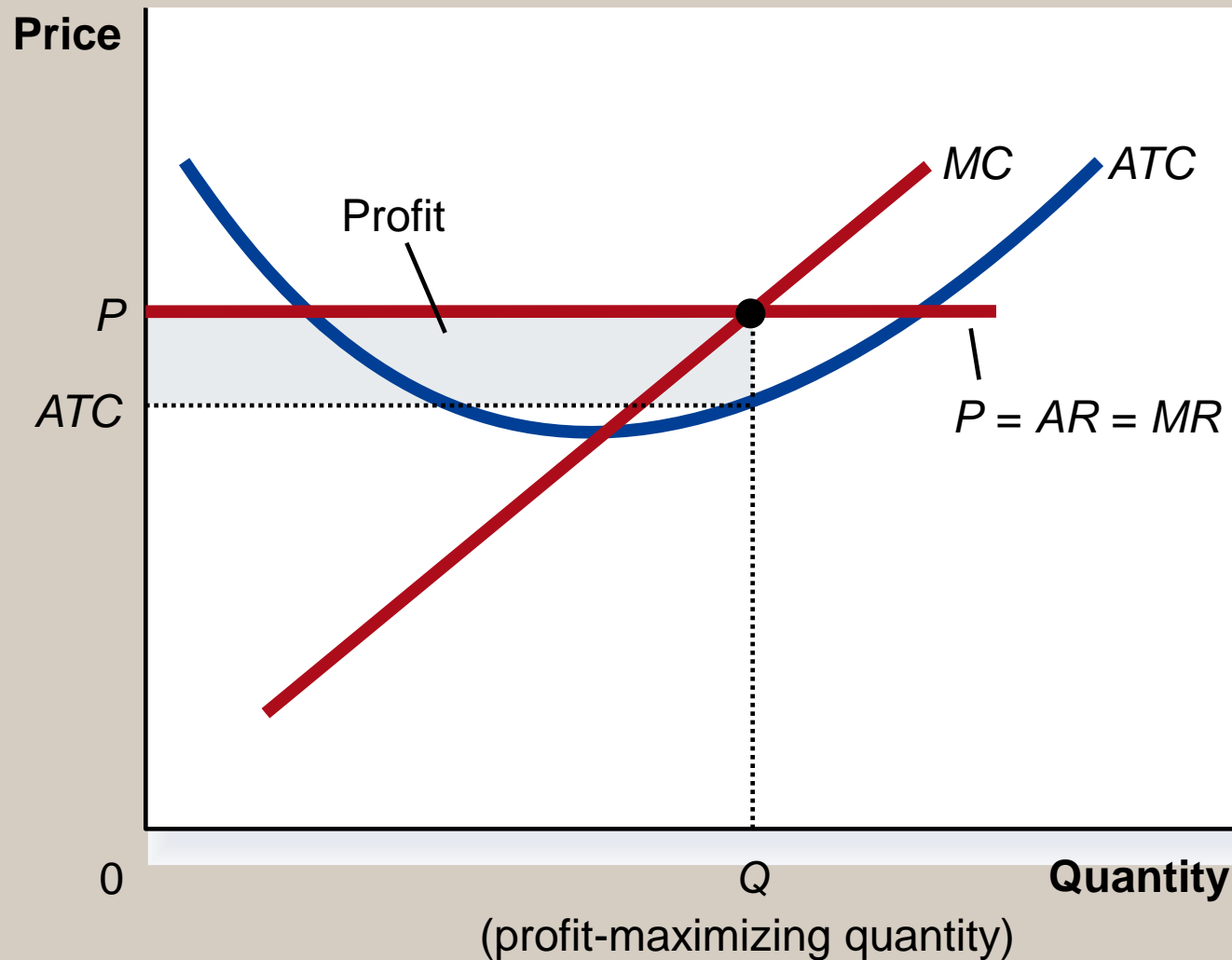
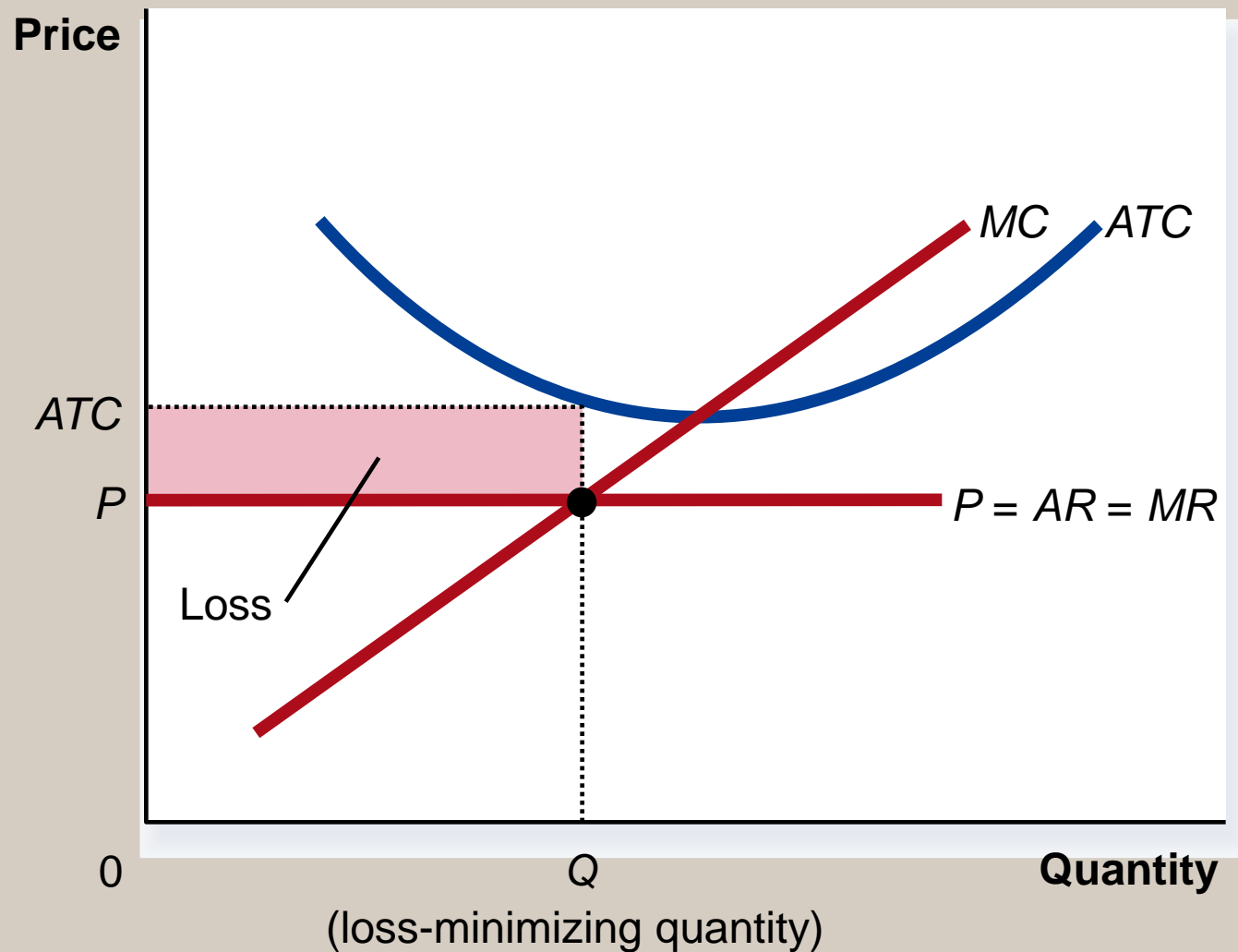


Figure 5 Profit as the Area between Price and Average Total Cost

(b) A Firm with Losses



THE SUPPLY CURVE IN A COMPETITIVE MARKET

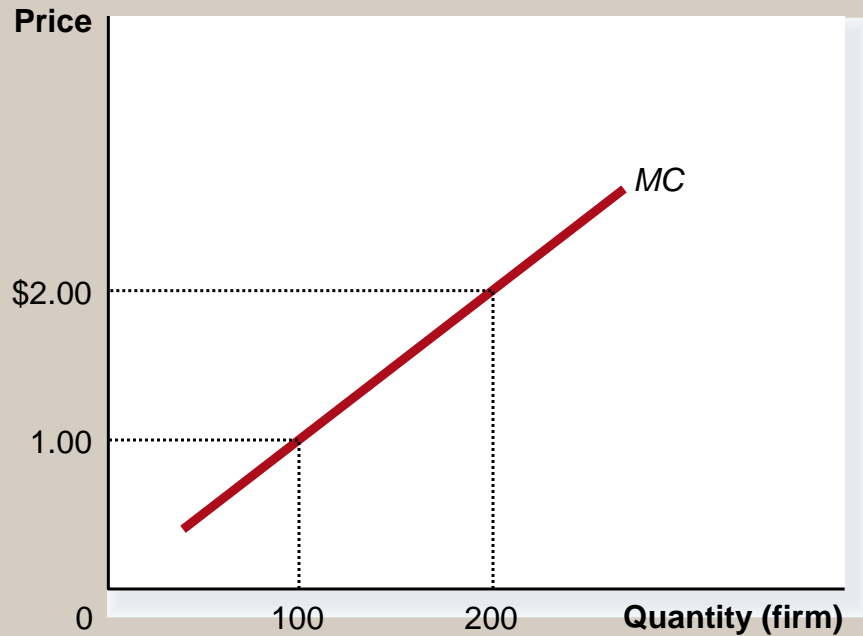
- Market supply equals the sum of the quantities supplied by the individual firms in the market.

The Short Run: Market Supply with a Fixed Number of Firms

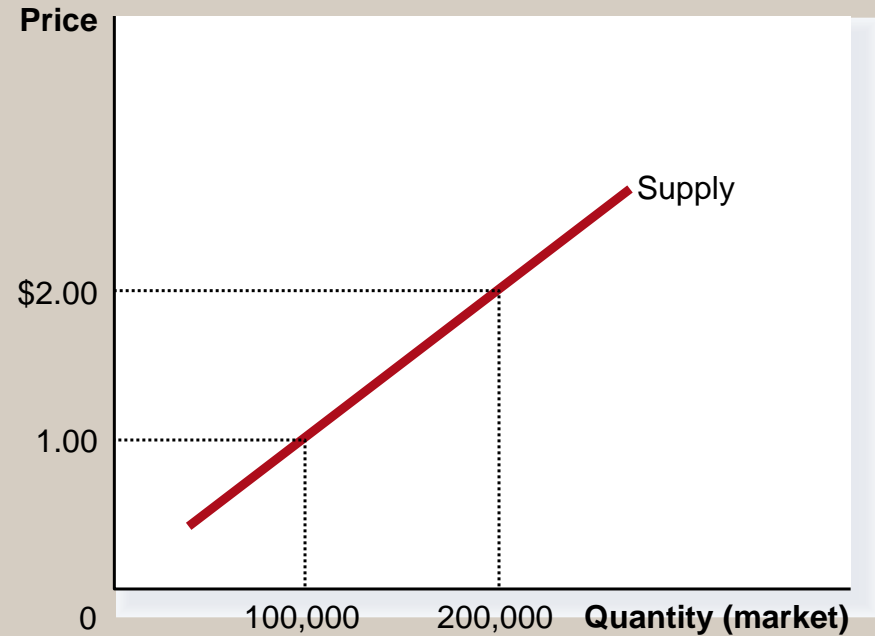
- For any given price, each firm supplies a quantity of output so that its marginal cost equals price.
- The market supply curve reflects the individual firms' marginal cost curves.

Figure 6 Market Supply with a Fixed Number of Firms

(a) Individual Firm Supply



(b) Market Supply

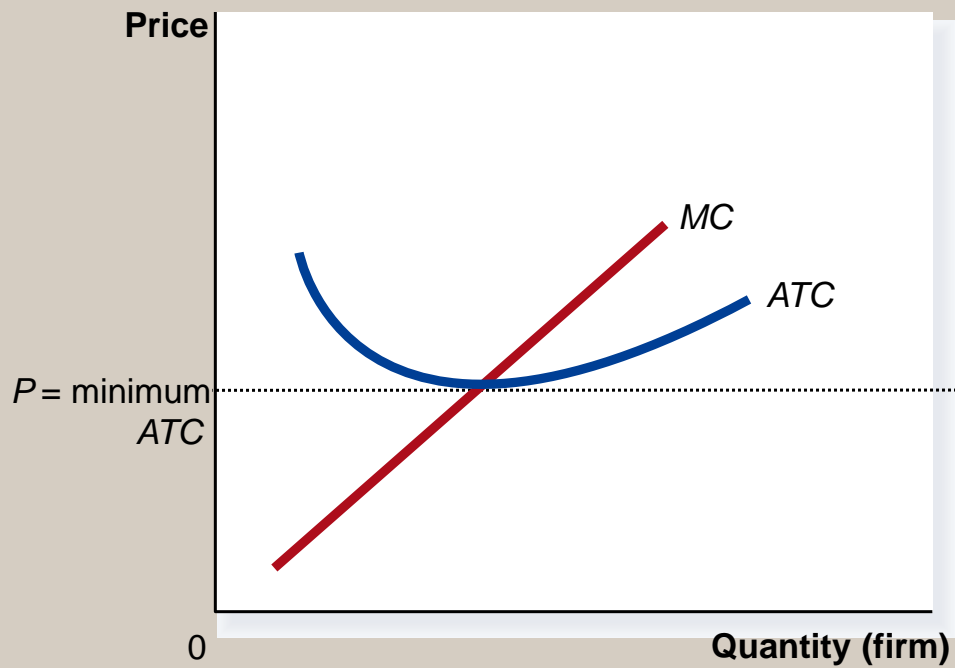


The Long Run: Market Supply with Entry and Exit

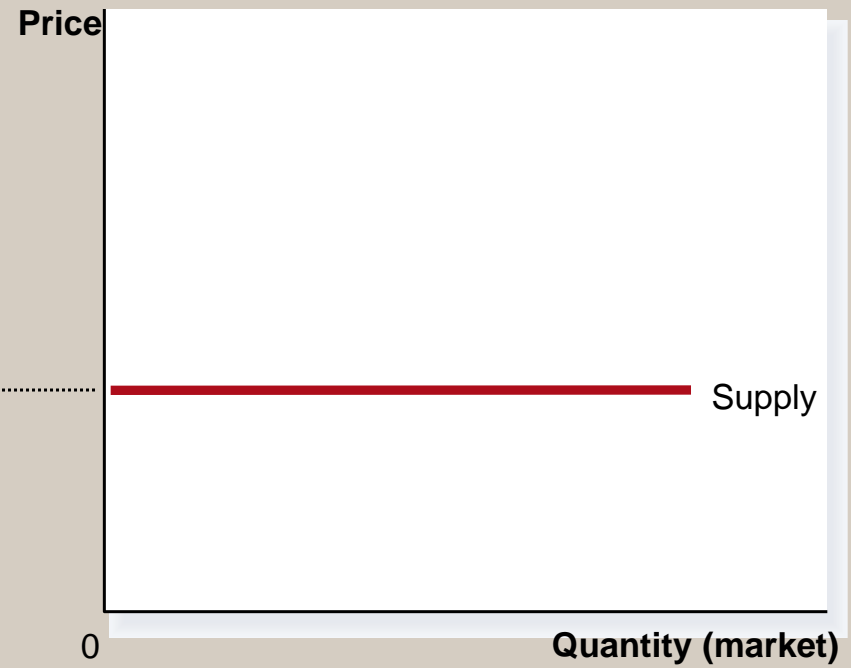
- Firms will enter or exit the market until profit is driven to zero.
- In the long run, price equals the minimum of average total cost.
- The long-run market supply curve is horizontal at this price.

Figure 7 Market Supply with Entry and Exit

(a) Firm's Zero-Profit Condition



(b) Market Supply



The Long Run: Market Supply with Entry and Exit

- At the end of the process of entry and exit, firms that remain must be making zero economic profit.
- The process of entry and exit ends only when price and average total cost are driven to equality.
- Long-run equilibrium must have firms operating at their efficient scale.

Why Do Competitive Firms Stay in Business If They Make Zero Profit?

- Profit equals total revenue minus total cost.
- Total cost includes all the opportunity costs of the firm.
- In the zero-profit equilibrium, the firm's revenue compensates the owners for the time and money they expend to keep the business going.

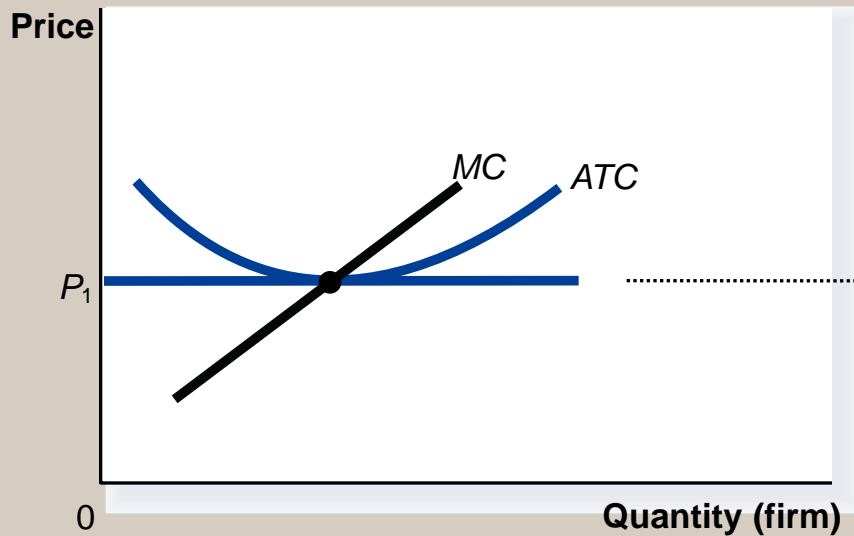
A Shift in Demand in the Short Run and Long Run

- An increase in demand raises price and quantity in the short run.
- Firms earn profits because price now exceeds average total cost.

Figure 8 An Increase in Demand in the Short Run and Long Run

(a) Initial Condition

Firm



Market

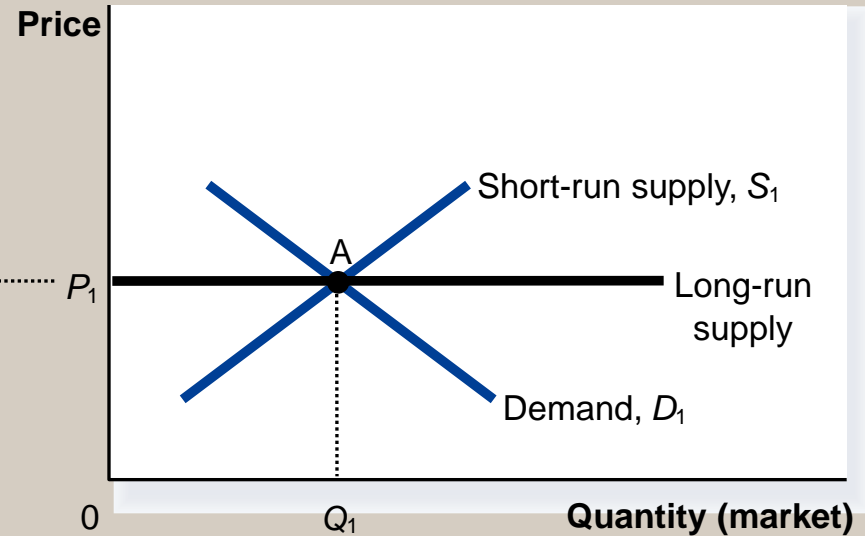


Figure 8 An Increase in Demand in the Short Run and Long Run

(b) Short-Run Response

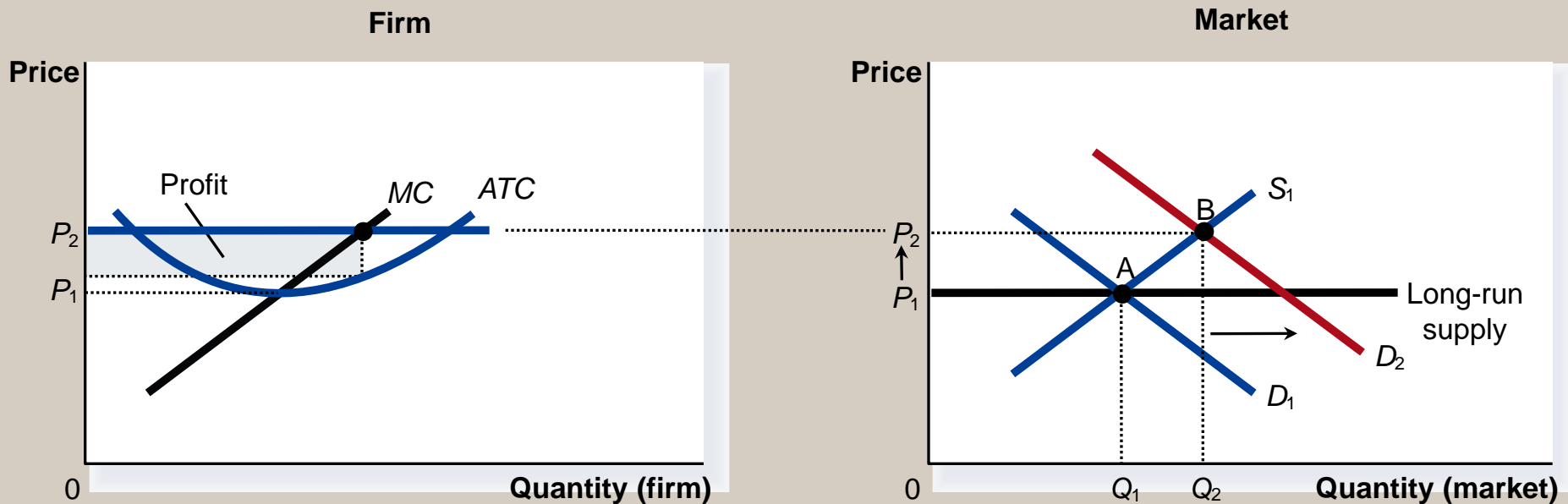
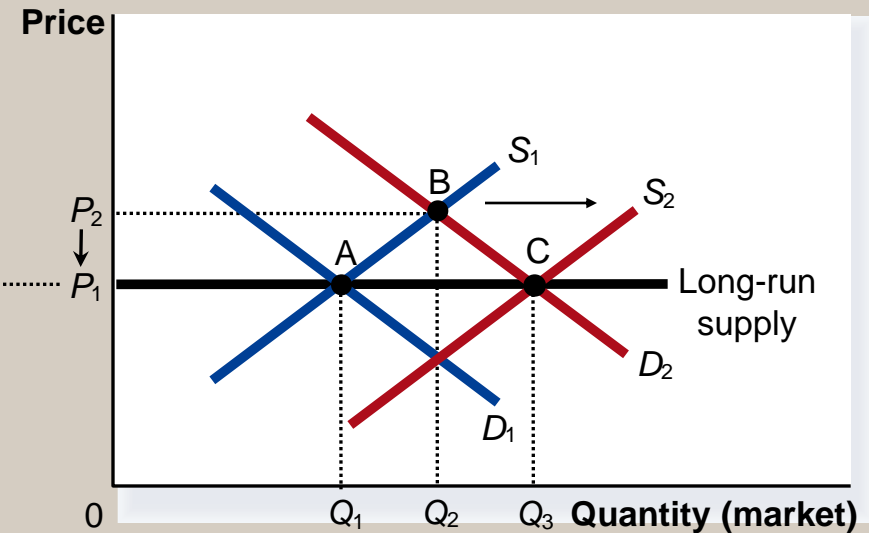
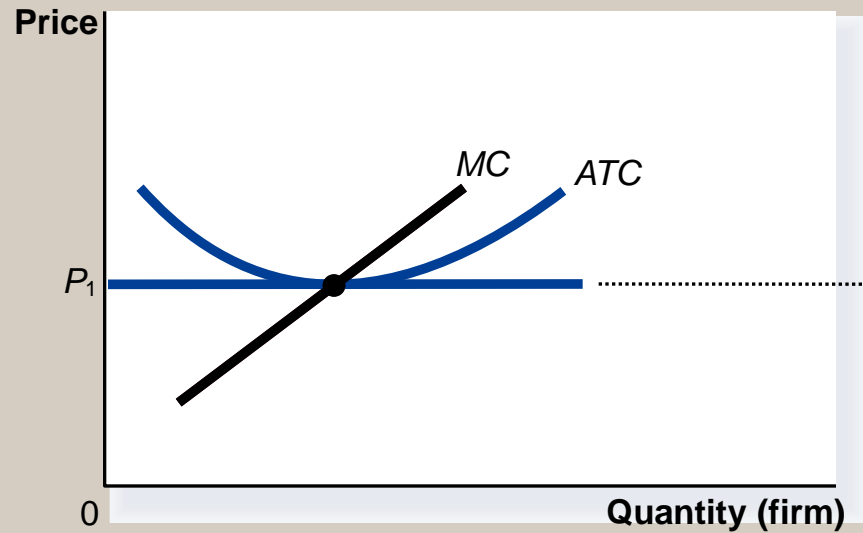


Figure 8 An Increase in Demand in the Short Run and Long Run

(c) Long-Run Response

Firm

Market



Why the Long-Run Supply Curve Might Slope Upward

- Some resources used in production may be available only in limited quantities.
- Firms may have different costs.

Why the Long-Run Supply Curve Might Slope Upward

- Marginal Firm
 - The *marginal firm* is the firm that would exit the market if the price were any lower.

Summary

- Because a competitive firm is a price taker, its revenue is proportional to the amount of output it produces.
- The price of the good equals both the firm's average revenue and its marginal revenue.

Summary

- To maximize profit, a firm chooses the quantity of output such that marginal revenue equals marginal cost.
- This is also the quantity at which price equals marginal cost.
- Therefore, the firm's marginal cost curve is its supply curve.

Summary

- In the short run, when a firm cannot recover its fixed costs, the firm will choose to shut down temporarily if the price of the good is less than average variable cost.
- In the long run, when the firm can recover both fixed and variable costs, it will choose to exit if the price is less than average total cost.

Summary

- In a market with free entry and exit, profits are driven to zero in the long run and all firms produce at the efficient scale.
- Changes in demand have different effects over different time horizons.
- In the long run, the number of firms adjusts to drive the market back to the zero-profit equilibrium.