



## Firms in Competitive Markets

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# 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.

# 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

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

$$\text{Average Revenue} = \frac{\text{Total revenue}}{\text{Quantity}}$$

$$= \frac{\text{Price} \times \text{Quantity}}{\text{Quantity}}$$

$$= \text{Price}$$

# The Revenue of a Competitive Firm

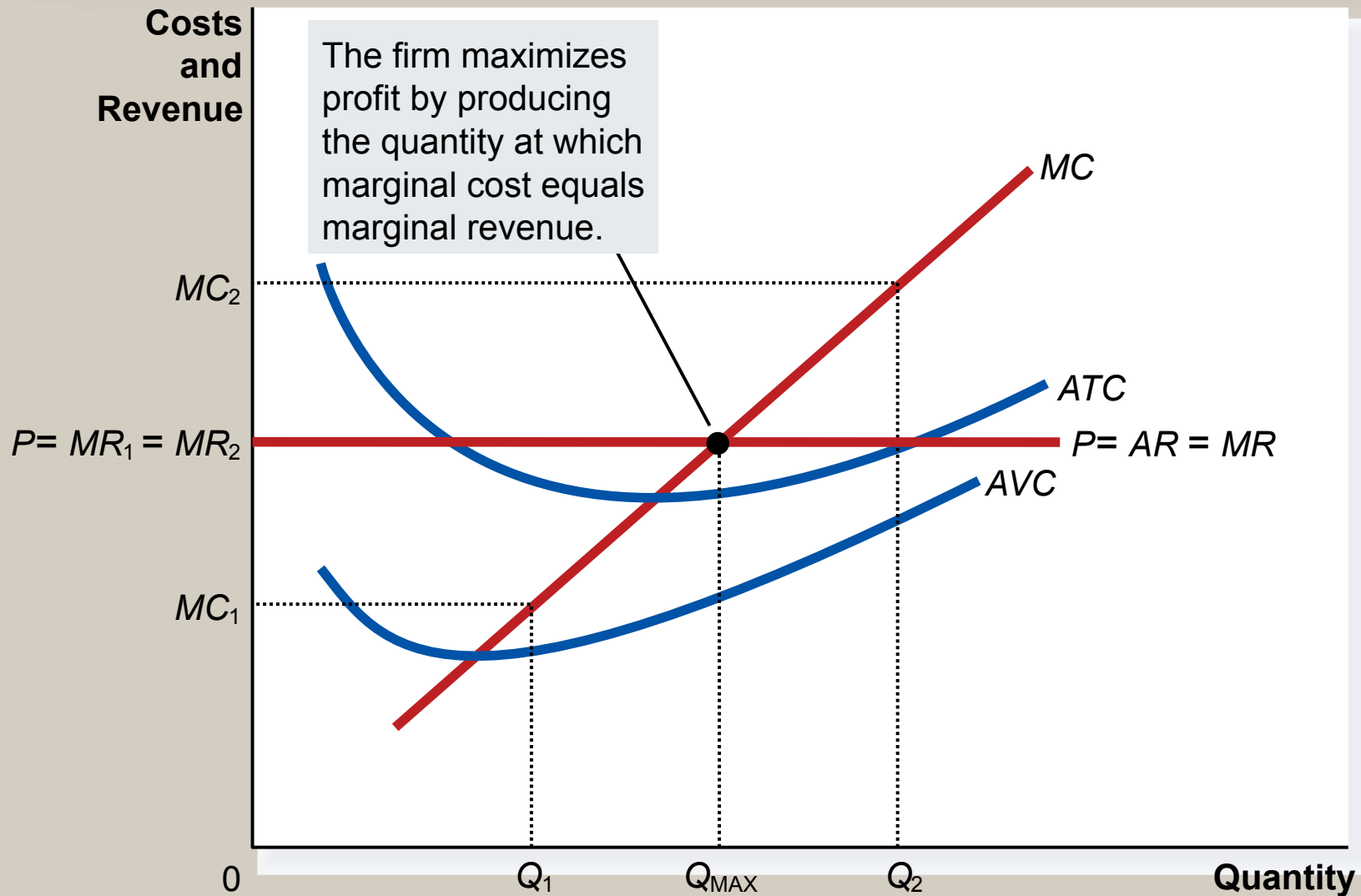
- *Marginal revenue* is the change in total revenue from an additional unit sold.

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

# The Revenue of a Competitive Firm

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

Figure 1 Profit Maximization for a Competitive Firm



# PROFIT MAXIMIZATION AND THE COMPETITIVE FIRM'S SUPPLY CURVE

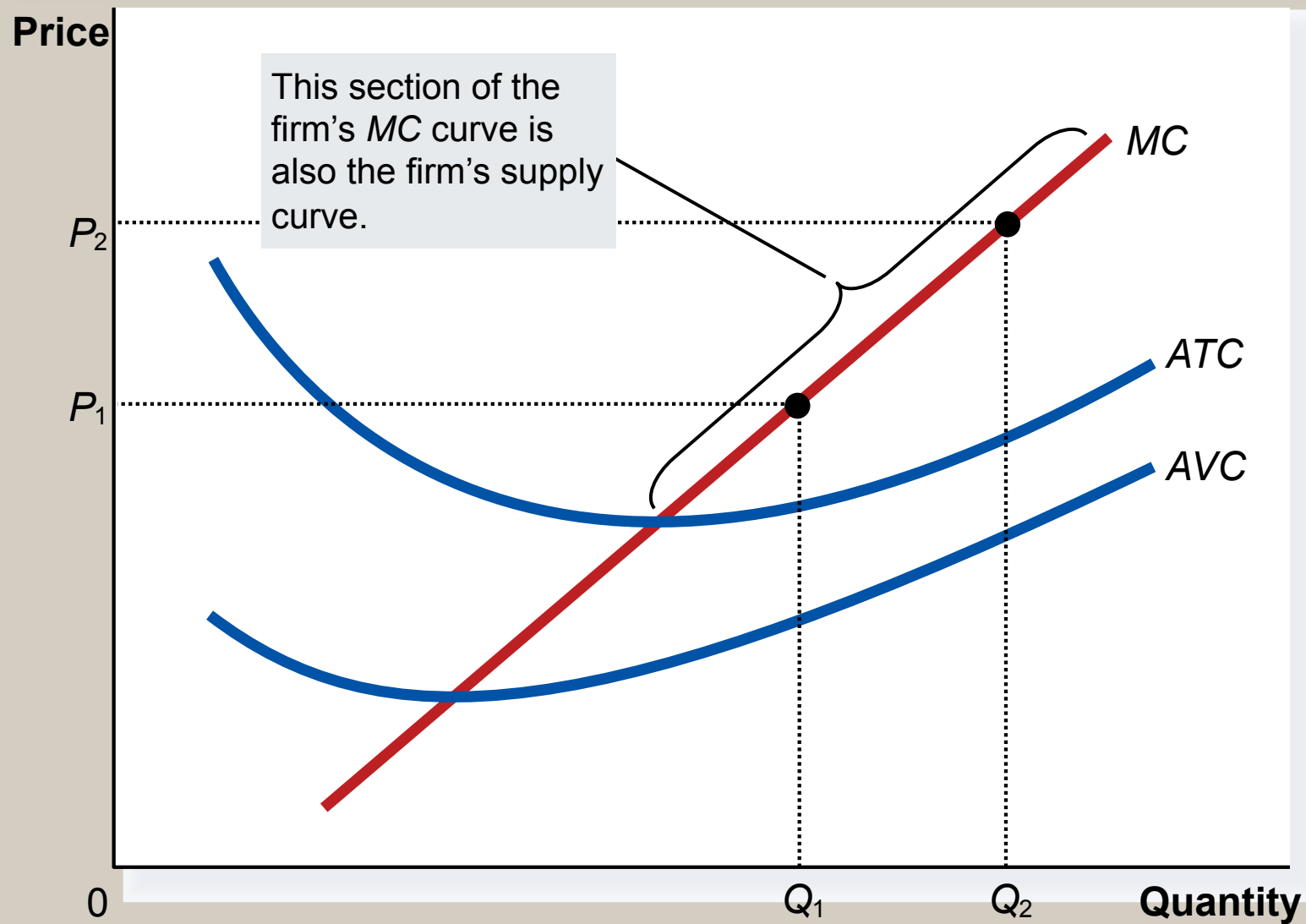
- Profit maximization occurs at the quantity where *marginal revenue equals marginal cost*.



# 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.

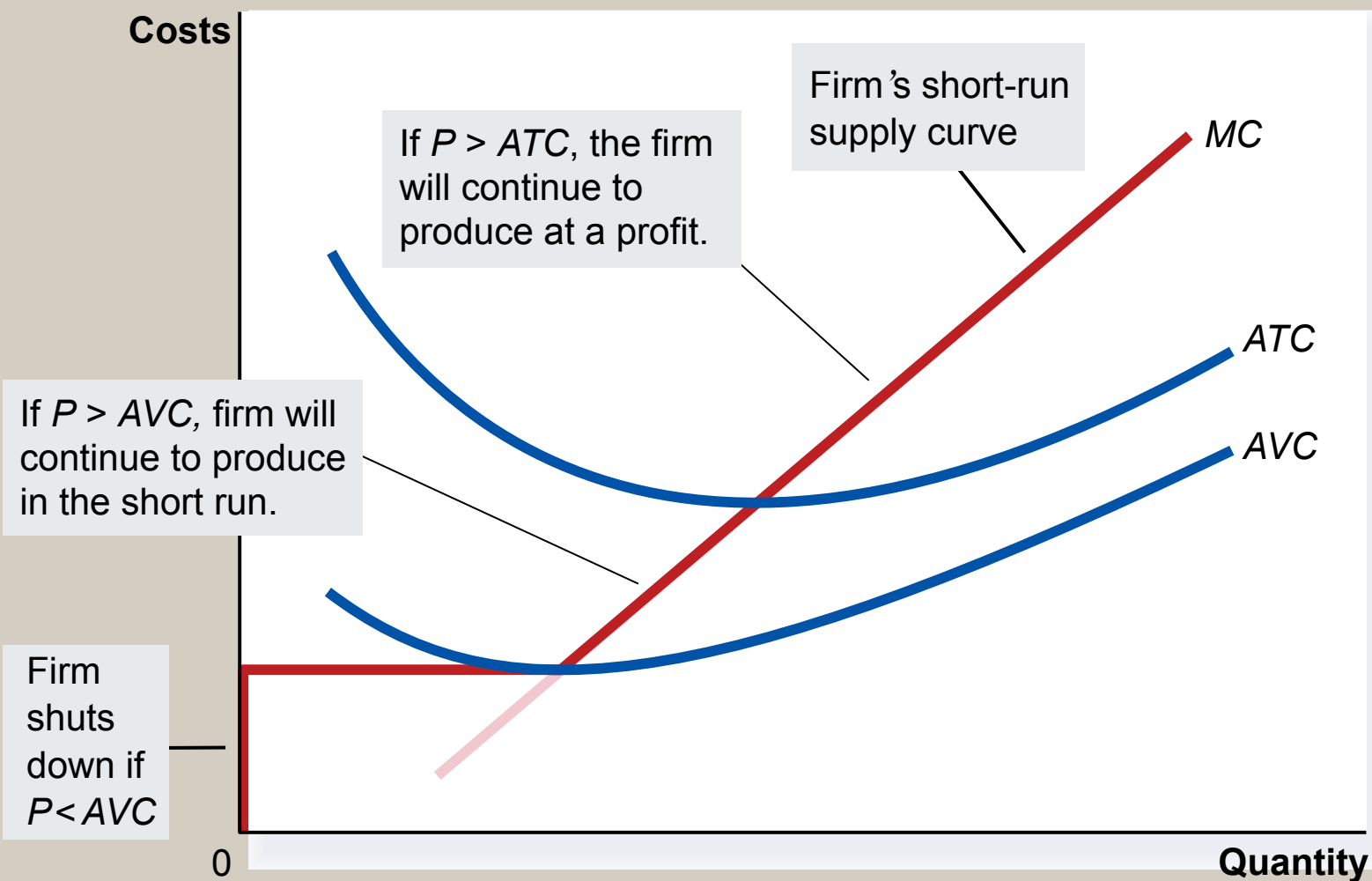
# The Firm's Short-Run Decision to Shut Down

- 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.

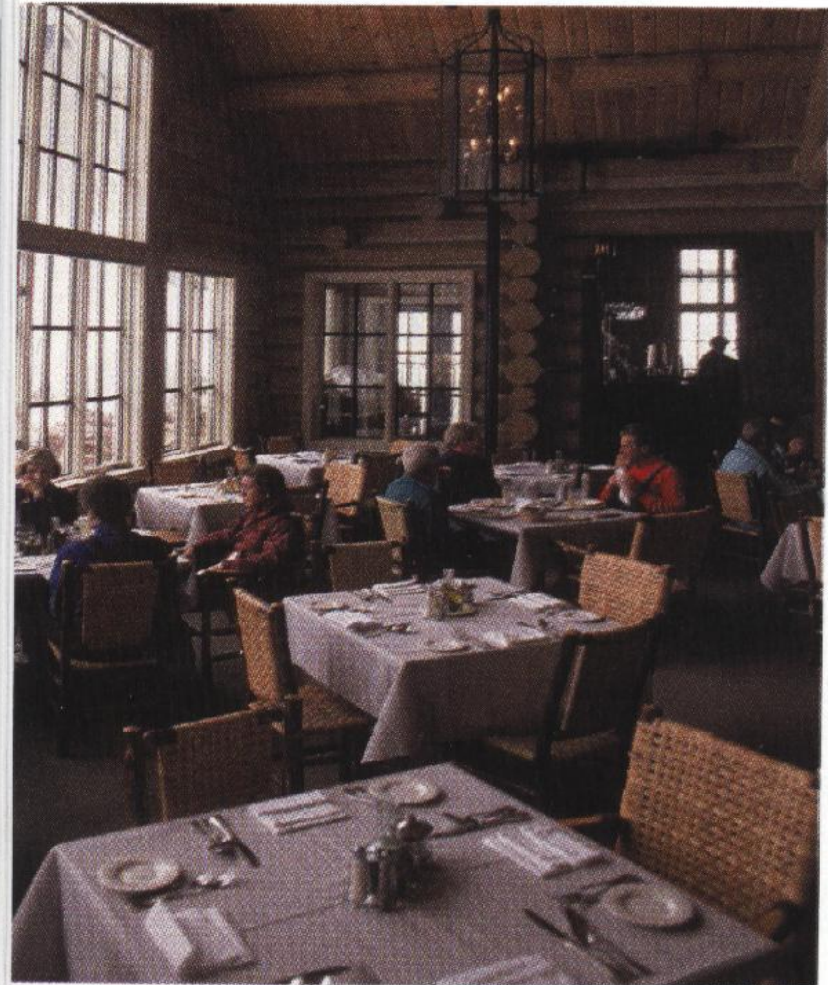
# The Firm's Short-Run Decision to Shut Down

- 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



Spilt Milk  
and Other  
Sunk Costs



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*Staying open can be  
profitable, even with many  
tables empty.*

## 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*.



# INVESTMENTS 1A

As the president of an airline company, you have invested **\$10 million** of the company's money into a research project. The purpose was to build a plane that would not be detected by conventional radar,. When the project is **90 percent** completed, another firm begins marketing a plane that cannot be detected by radar. Also, it is apparent that their plane is much faster and far more economical than the plane your company is building. The question is: should you invest **the last 10 percent** of the research funds to finish your radar-blind plane?

**NO - It makes no sense to continue spending money on the project.**

**YES - As long as \$10M is already invested, I might as well finish it.**

# INVESTMENTS 1B

As the president of an airline company, you have invested \$1,000 of the company's money into a research project. The purpose was to build a plane that would not be detected by conventional radar,. When the project is 0.01 percent completed, another firm begins marketing a plane that cannot be detected by radar. Also, it is apparent that their plane is much faster and far more economical than the plane your company is building. The question is: should you invest the last 99.99 percent of the research funds to finish your radar-blank plane?

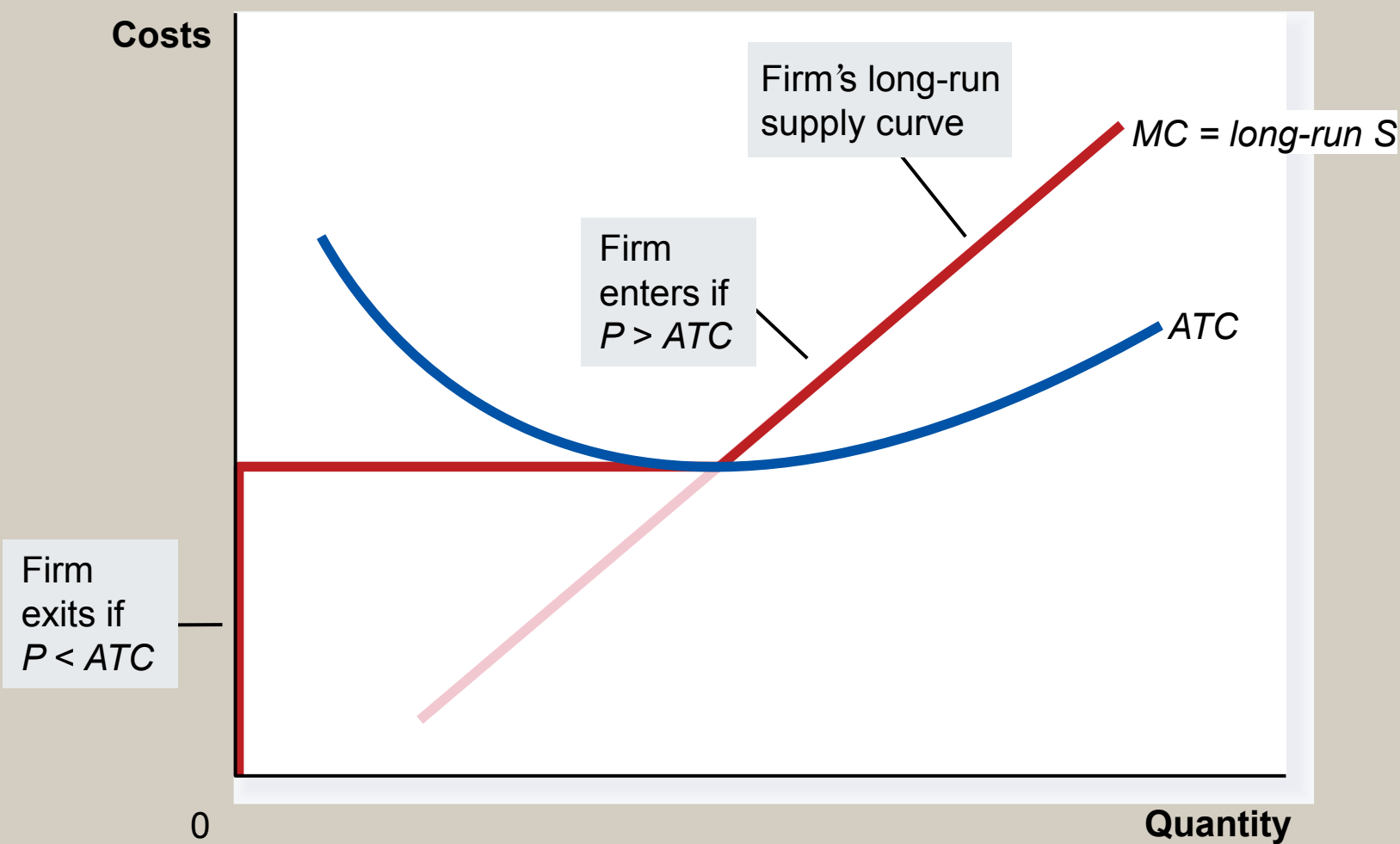
**NO - It makes no sense to continue spending money on the project.**

**YES - As long as \$1,000 is already invested, I might as well finish it.**

# 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  $P < ATC$

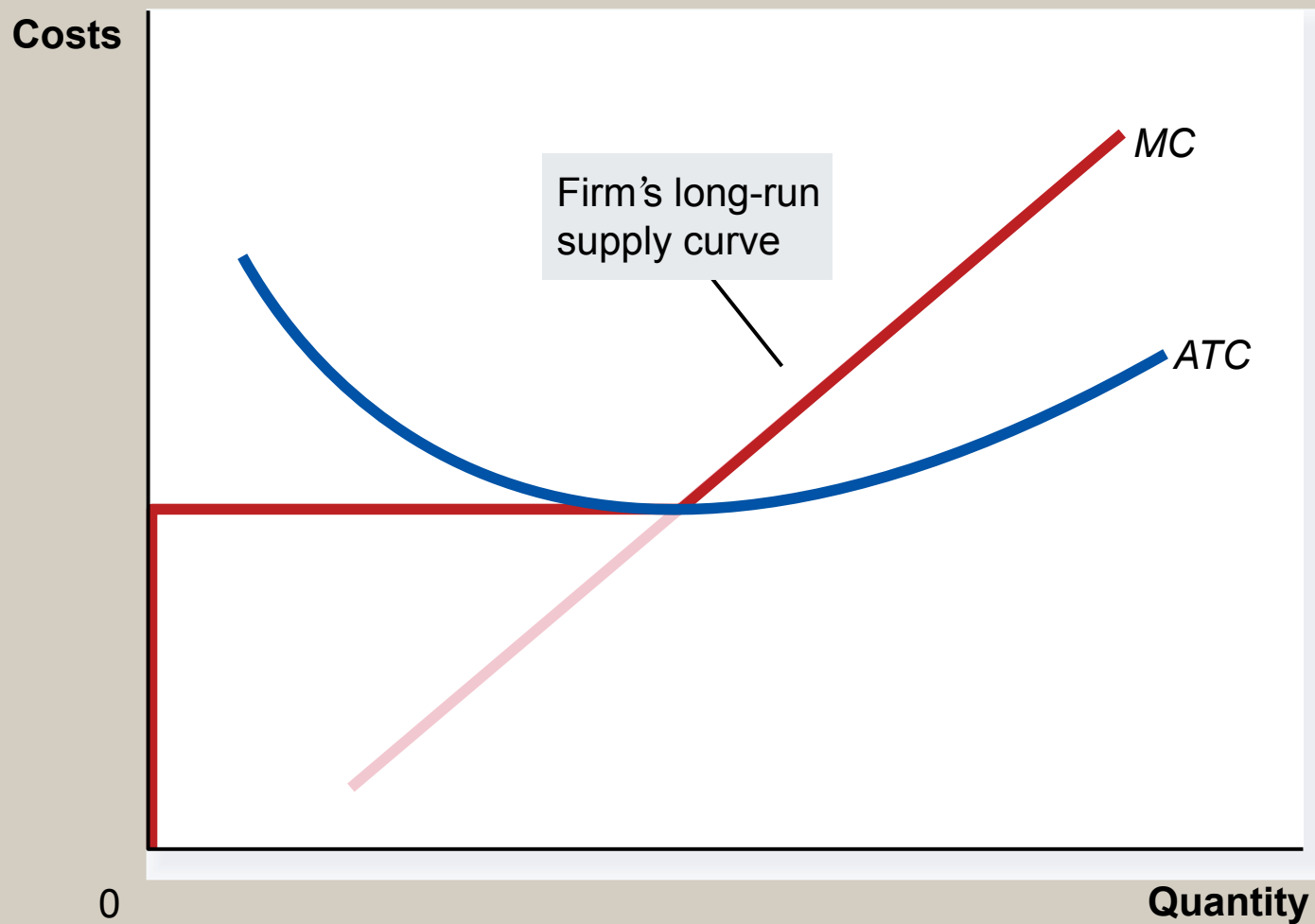
Figure 4 The Competitive Firm's Long-Run Supply Curve



# 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

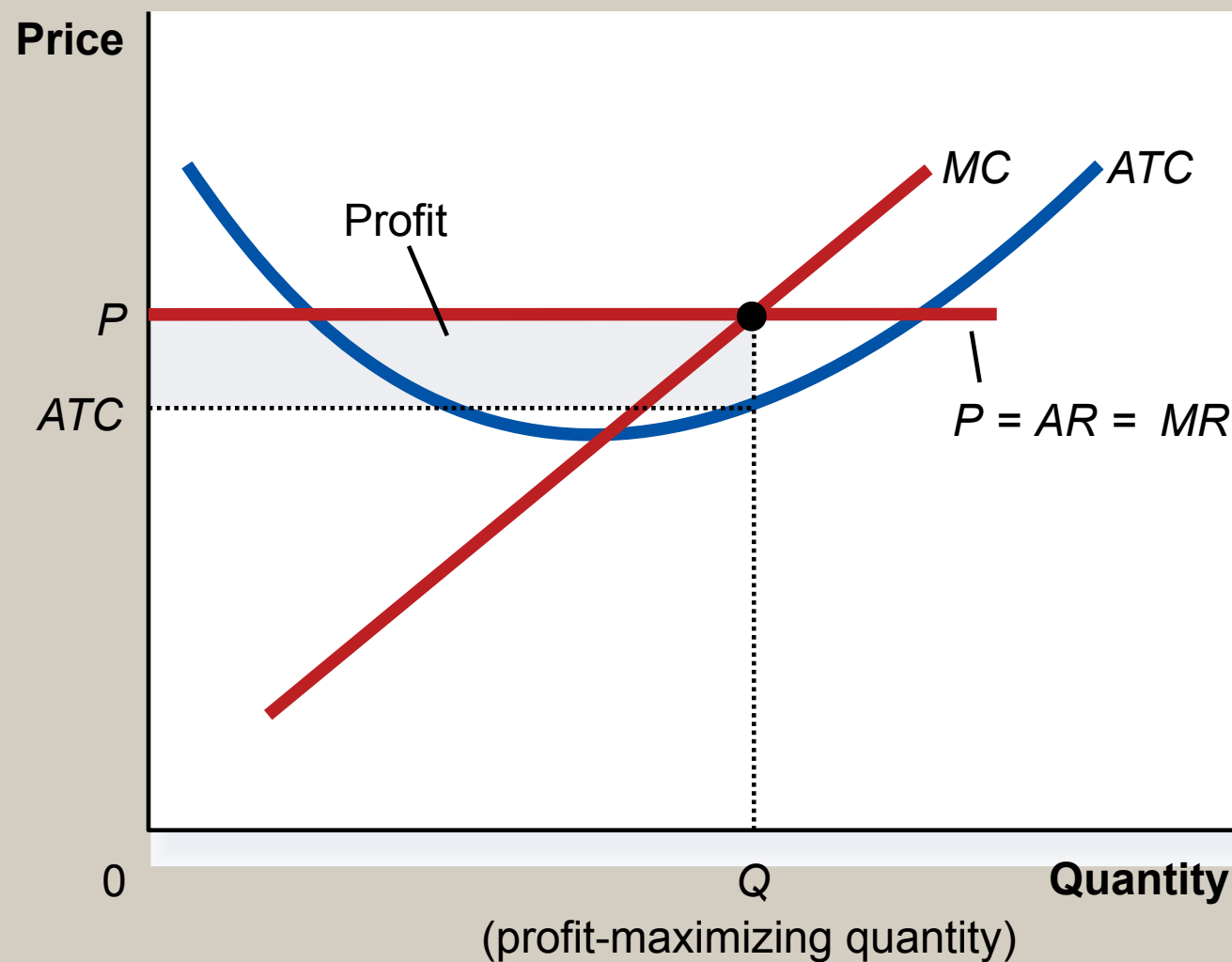


# THE SUPPLY CURVE IN A COMPETITIVE MARKET

- 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

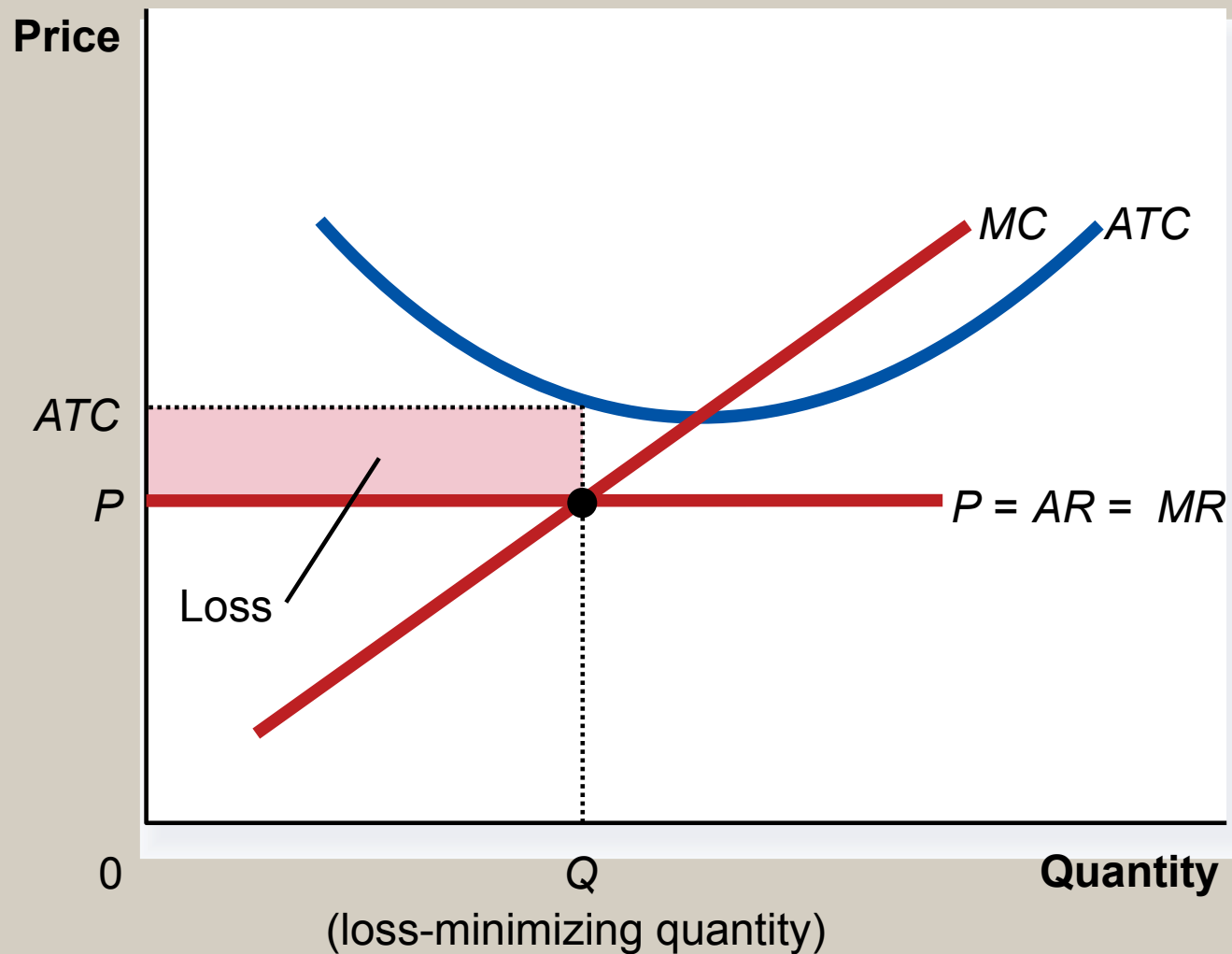
(a) A Firm with Profits





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

(b) A Firm with Losses



# THE SUPPLY CURVE IN A COMPETITIVE MARKET

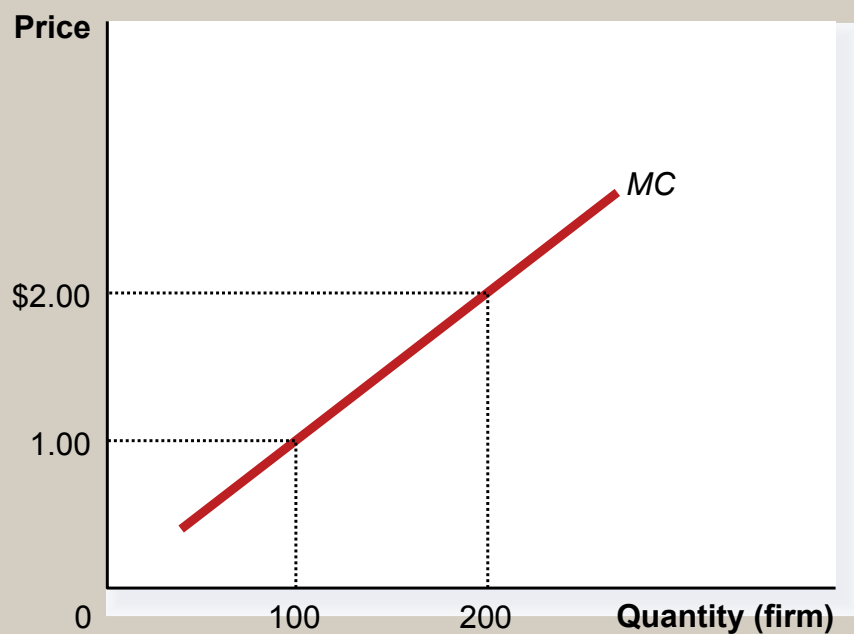
- Market supply equals the sum of the quantities supplied by the individual firms in the market.

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

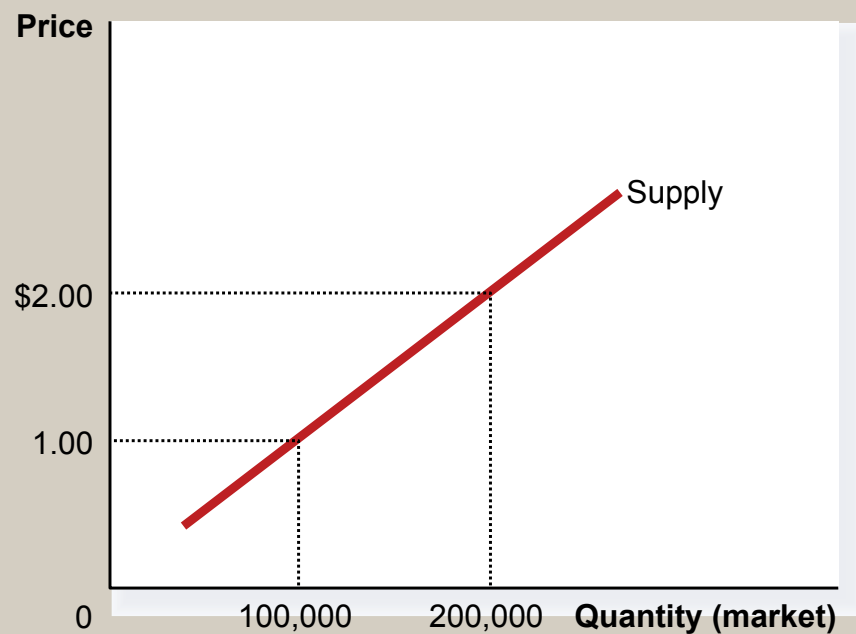
- For any given price, each firm supplies a quantity of output so that its marginal cost equals price.
- The market supply curve reflects the individual firms' marginal cost curves.

## Figure 6 Market Supply with a Fixed Number of Firms

(a) Individual Firm Supply



(b) Market Supply

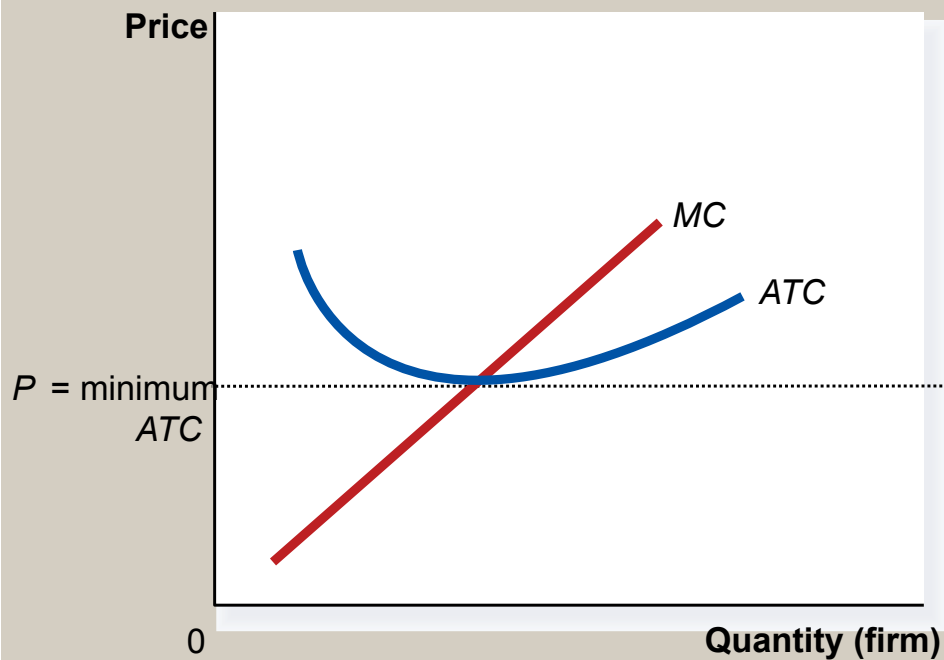


# The Long Run: Market Supply with Entry and Exit

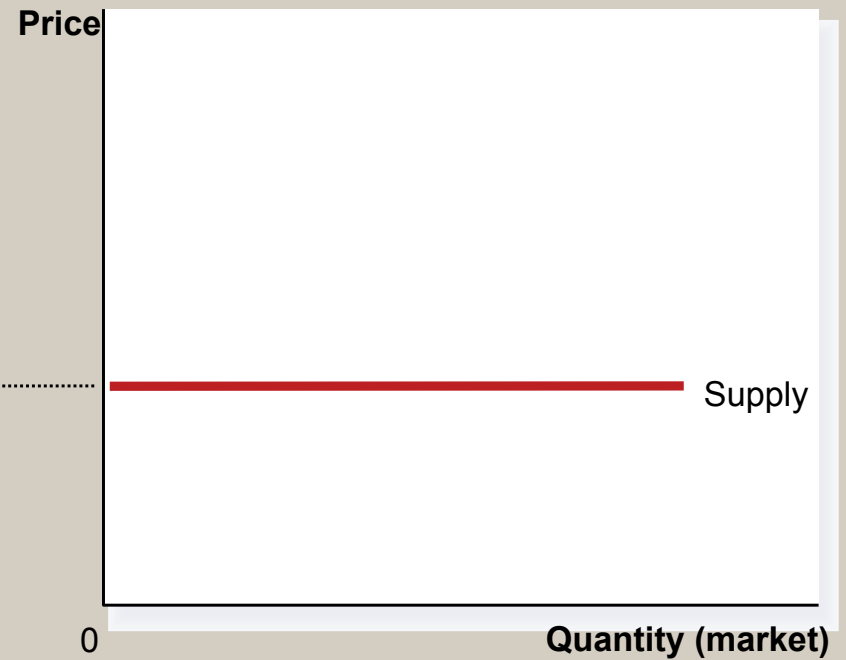
- Firms will enter or exit the market until profit is driven to zero.
- In the long run, price equals the minimum of average total cost.
- The long-run market supply curve is horizontal at this price.

## 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.

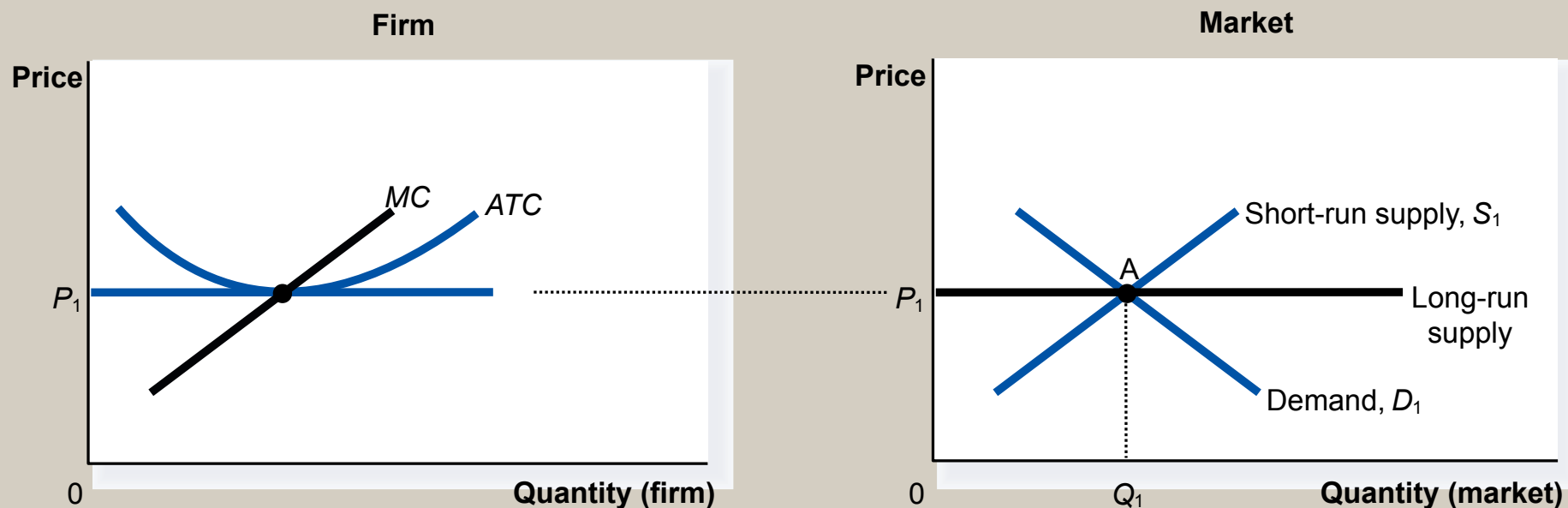


# A Shift in Demand in the Short Run and Long Run

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

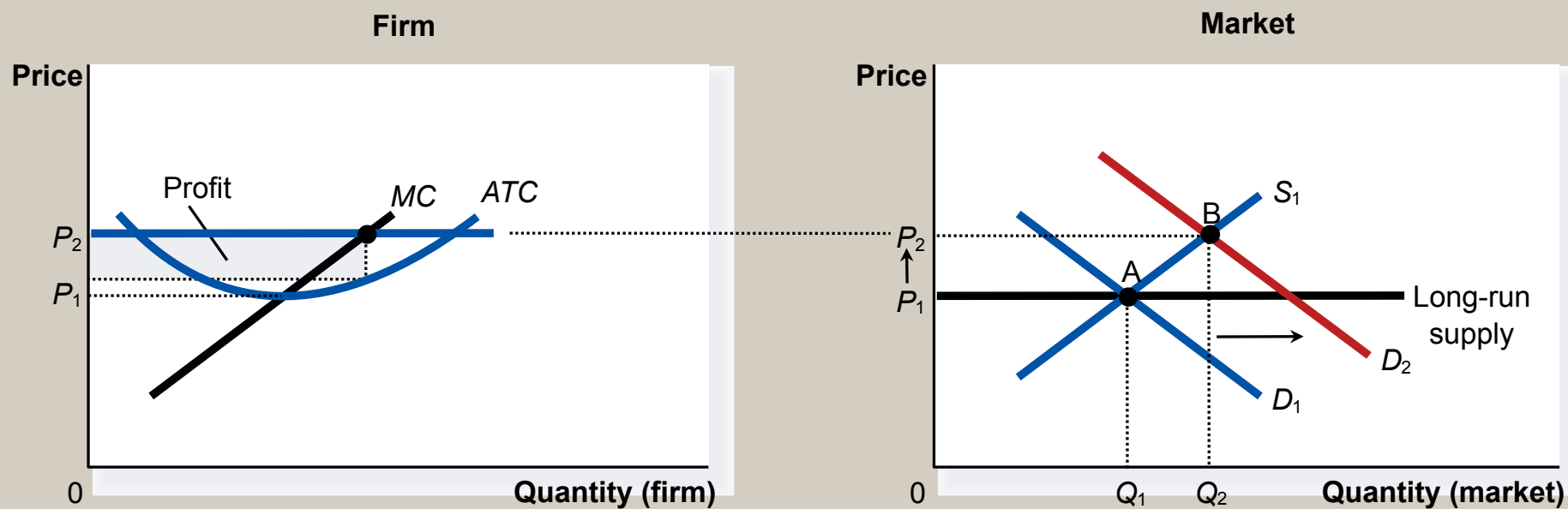
## Figure 8 An Increase in Demand in the Short Run and Long Run

(a) Initial Condition



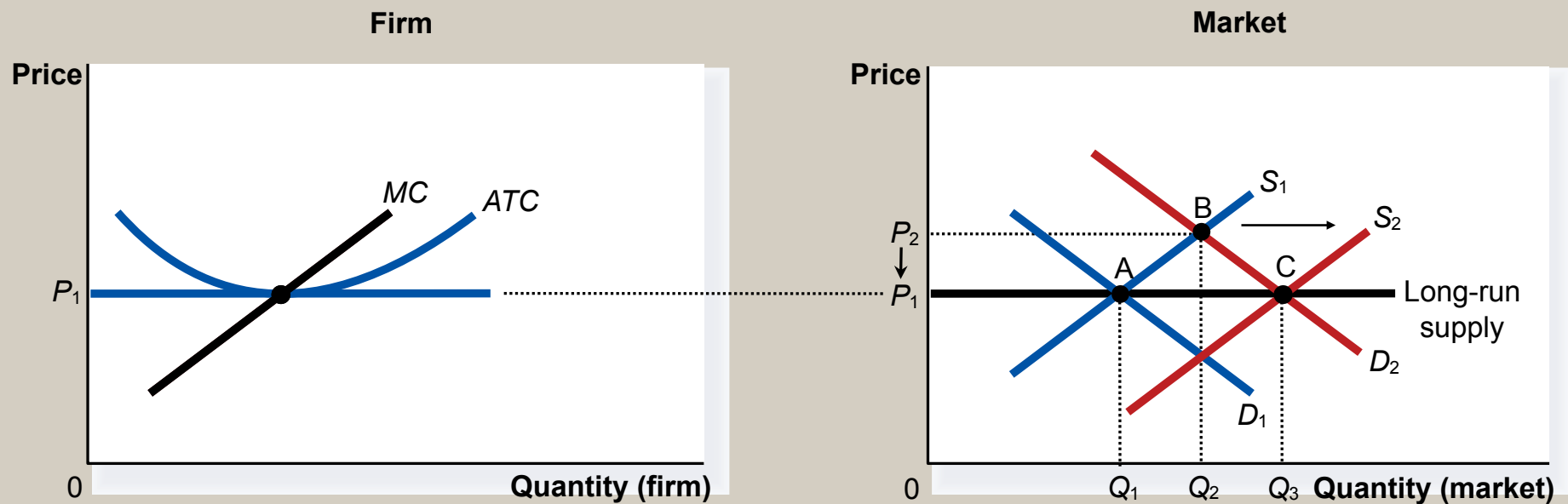
## Figure 8 An Increase in Demand in the Short Run and Long Run

(b) Short-Run Response



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

(c) Long-Run Response



# 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.

## Why the Long Run Supply Curve might Slope Upward

