

# Firms in Competitive Markets

## Chapter 14

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# The Meaning of Competition

- **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 Meaning of Competition

- 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.

# The Meaning of Competition

Buyers and sellers in competitive markets are said to be **price takers**.

Buyers and sellers must accept the price determined by the market.

# Revenue of a Competitive Firm

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

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

# Revenue of a Competitive Firm

**Total revenue** is proportional to the amount of output.

# Revenue of a Competitive Firm

**Average revenue** tells us how much revenue a firm receives for the typical unit sold.

# Revenue of a Competitive Firm

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

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



# Revenue of a Competitive Firm

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

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

# Revenue of a Competitive Firm

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

# Total, Average, and Marginal Revenue for a Competitive Firm

Quantity (Q)	Price (P)	Total Revenue (TR=P×Q)	Average Revenue (AR=TR/Q)	Marginal Revenue (MR= $\frac{\Delta TR}{\Delta Q}$ )
1	\$6.00	\$6.00	\$6.00	
2	\$6.00	\$12.00	\$6.00	\$6.00
3	\$6.00	\$18.00	\$6.00	\$6.00
4	\$6.00	\$24.00	\$6.00	\$6.00
5	\$6.00	\$30.00	\$6.00	\$6.00
6	\$6.00	\$36.00	\$6.00	\$6.00
7	\$6.00	\$42.00	\$6.00	\$6.00
8	\$6.00	\$48.00	\$6.00	\$6.00

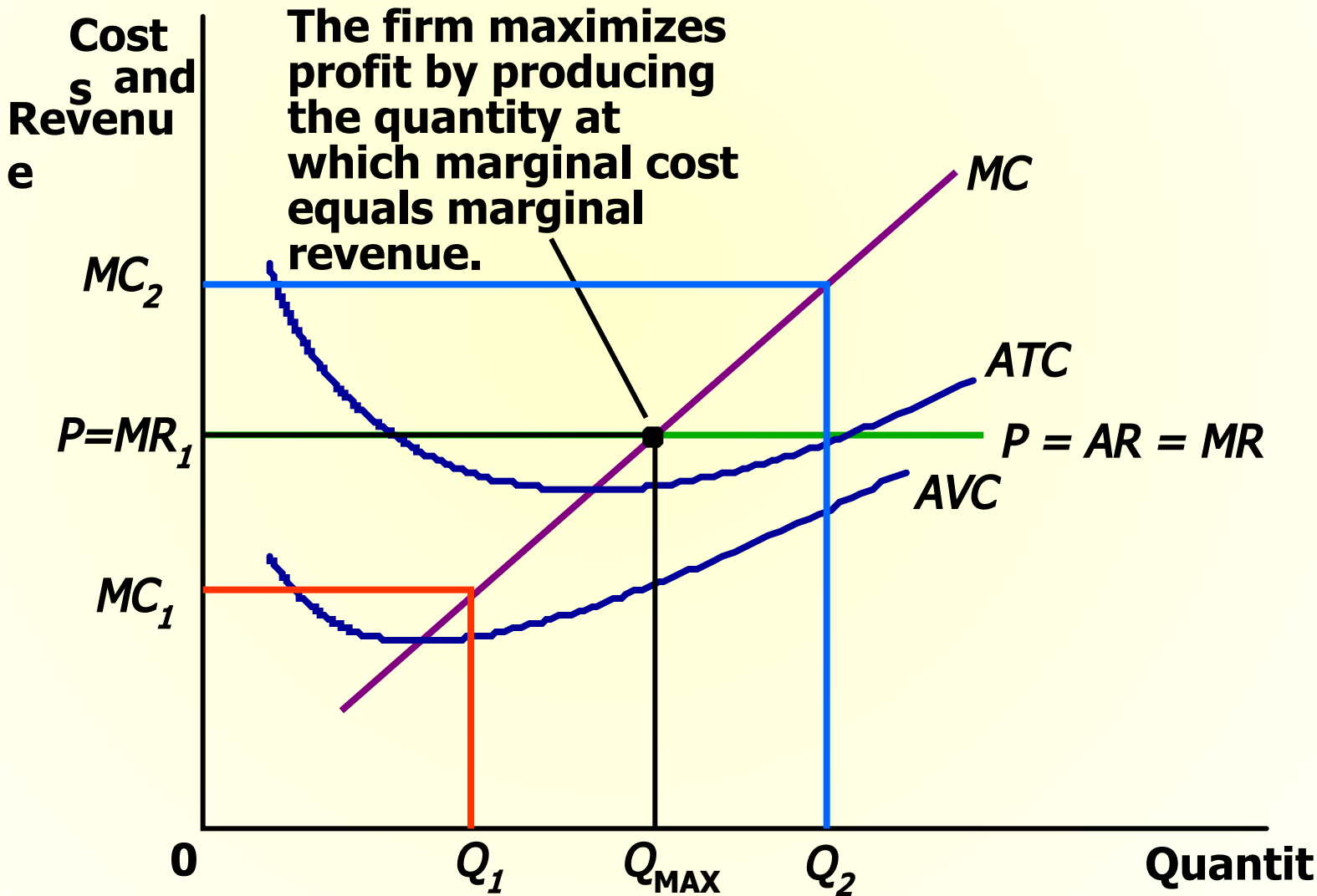
# Profit Maximization for the Competitive Firm

- 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*.

# Profit Maximization: A Numerical Example

Price (P)	Quantity (Q)	Total Revenue (TR=P×Q)	Total Cost (TC)	Profit (TR-TC)	Marginal Revenue (MR= $\frac{\Delta TR}{\Delta Q}$ )	Marginal Cost (MC= $\frac{\Delta TC}{\Delta Q}$ )
	0	\$0.00	\$3.00	-\$3.00		
\$6.00	1	\$6.00	\$5.00	\$1.00	\$6.00	\$2.00
\$6.00	2	\$12.00	\$8.00	\$4.00	\$6.00	\$3.00
\$6.00	3	\$18.00	\$12.00	\$6.00	\$6.00	\$4.00
\$6.00	4	\$24.00	\$17.00	\$7.00	\$6.00	\$5.00
\$6.00	5	\$30.00	\$23.00	\$7.00	\$6.00	\$6.00
\$6.00	6	\$36.00	\$30.00	\$6.00	\$6.00	\$7.00
\$6.00	7	\$42.00	\$38.00	\$4.00	\$6.00	\$8.00
\$6.00	8	\$48.00	\$47.00	\$1.00	\$6.00	\$9.00

# Profit Maximization for the Competitive Firm...



# Profit Maximization for the Competitive Firm

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

# Profit Maximization for the Competitive Firm

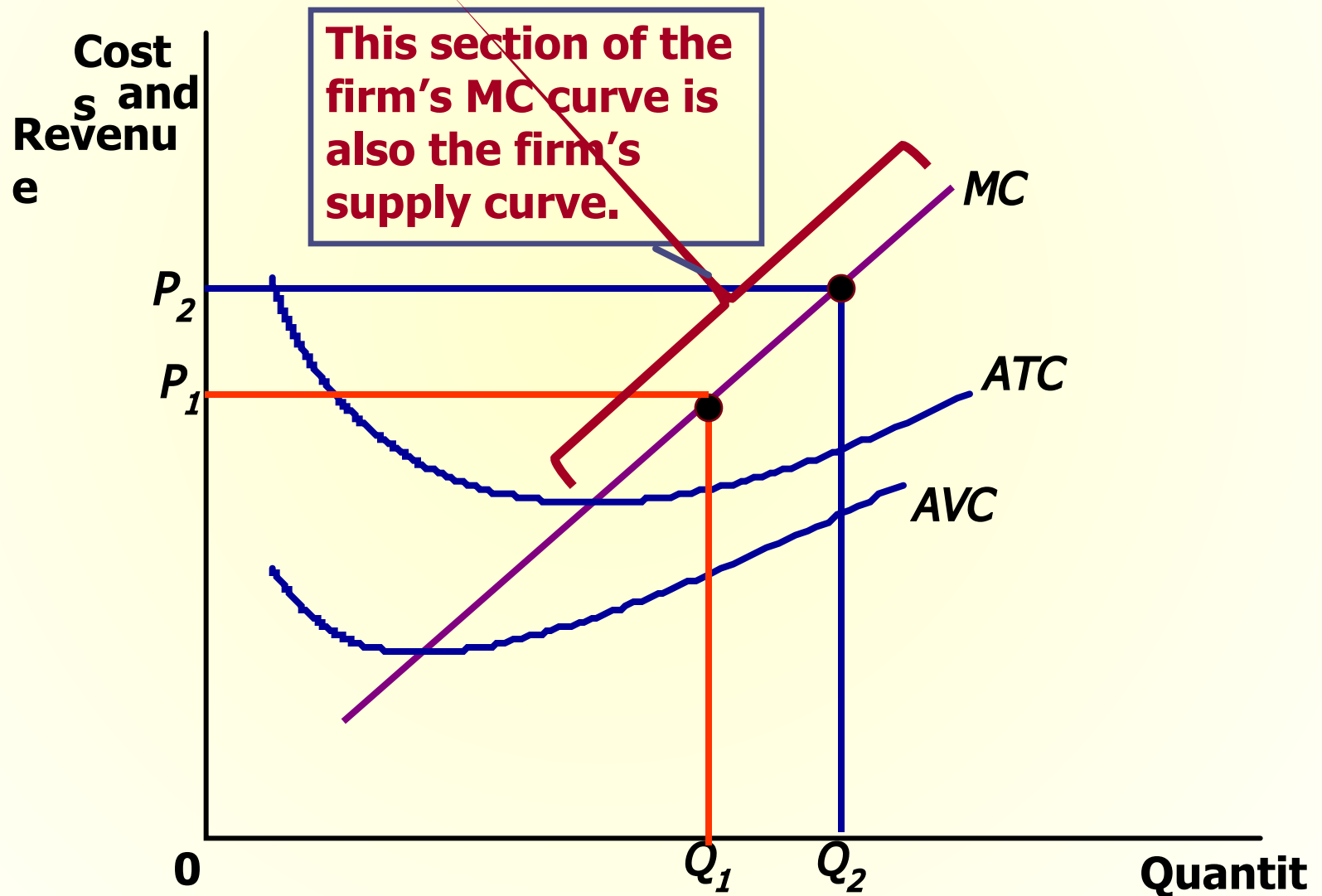
***When  $MR > MC$  □ increase  $Q$***

***When  $MR < MC$  □ decrease  $Q$***

***When  $MR = MC$  □ Profit is maximized.***



# The Marginal-Cost Curve and the Firm's Supply Decision...



# 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

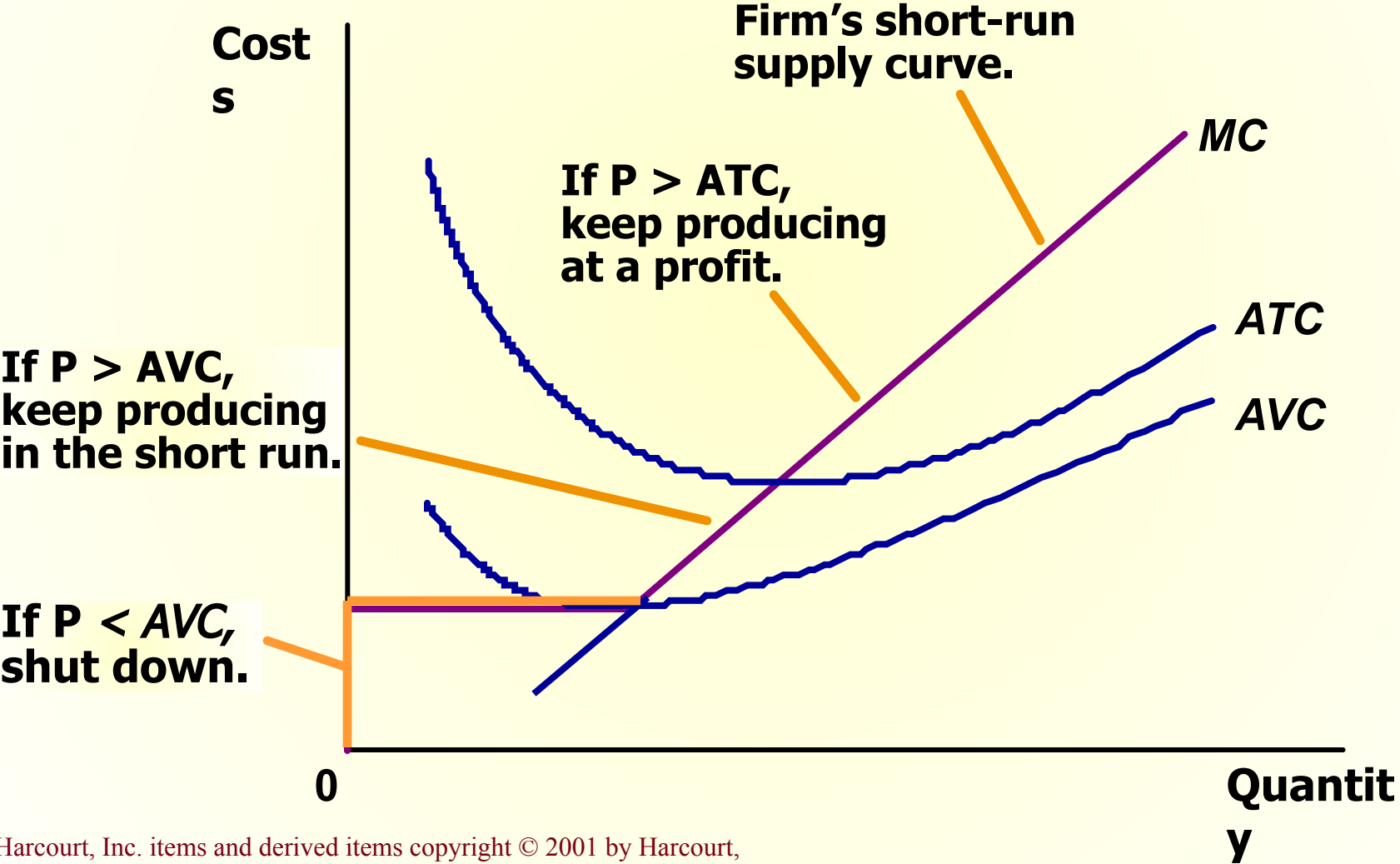
- The firm shuts down if the revenue it gets from producing is less than the variable cost of production.

***Shut down if  $TR < VC$***

***Shut down if  $TR/Q < VC/Q$***

***Shut down if  $P < AVC$***

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



# 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.

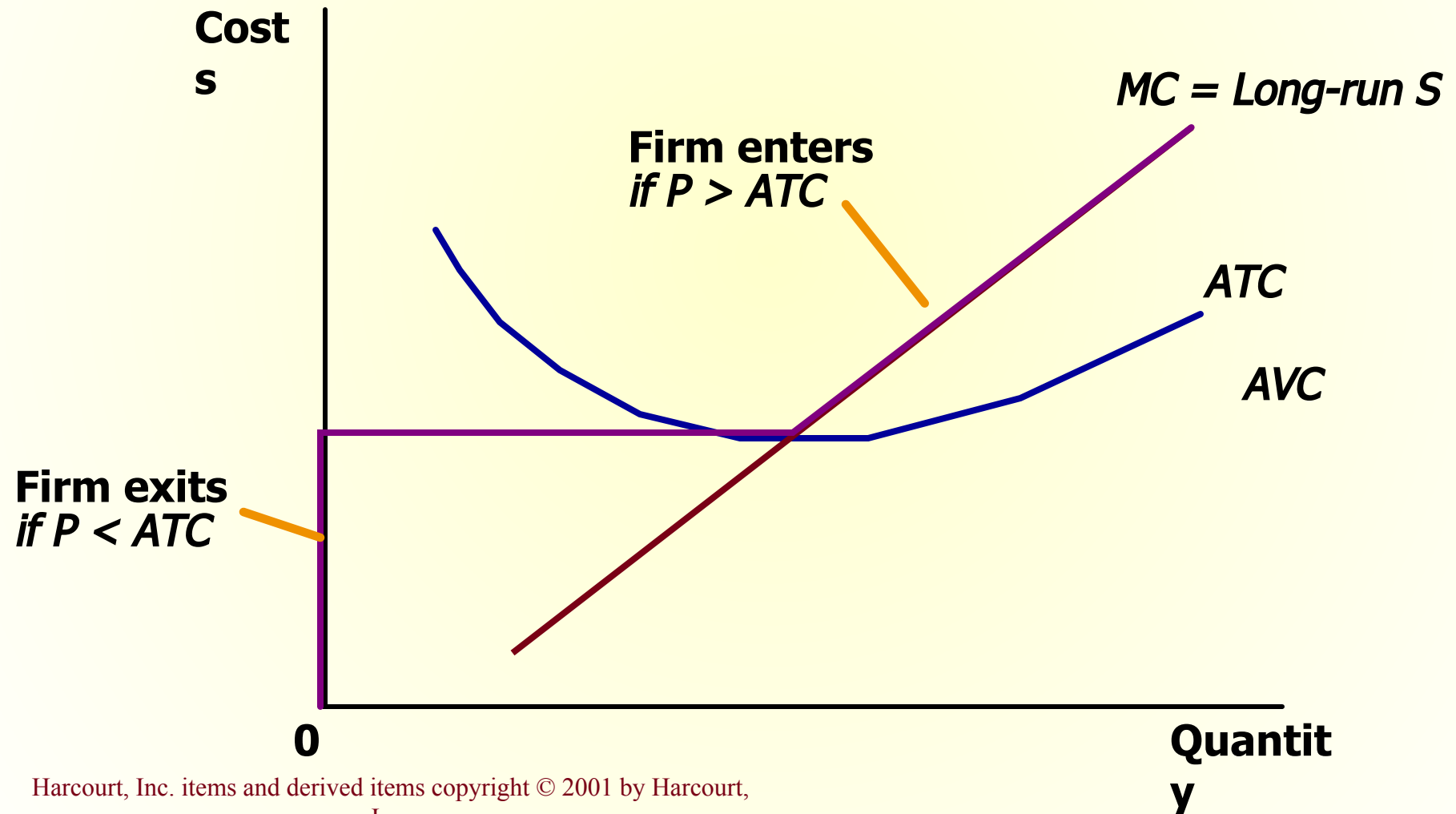
***Enter if  $TR > TC$***

***Enter if  $TR/Q > TC/Q$***

***Enter if  $P > ATC$***



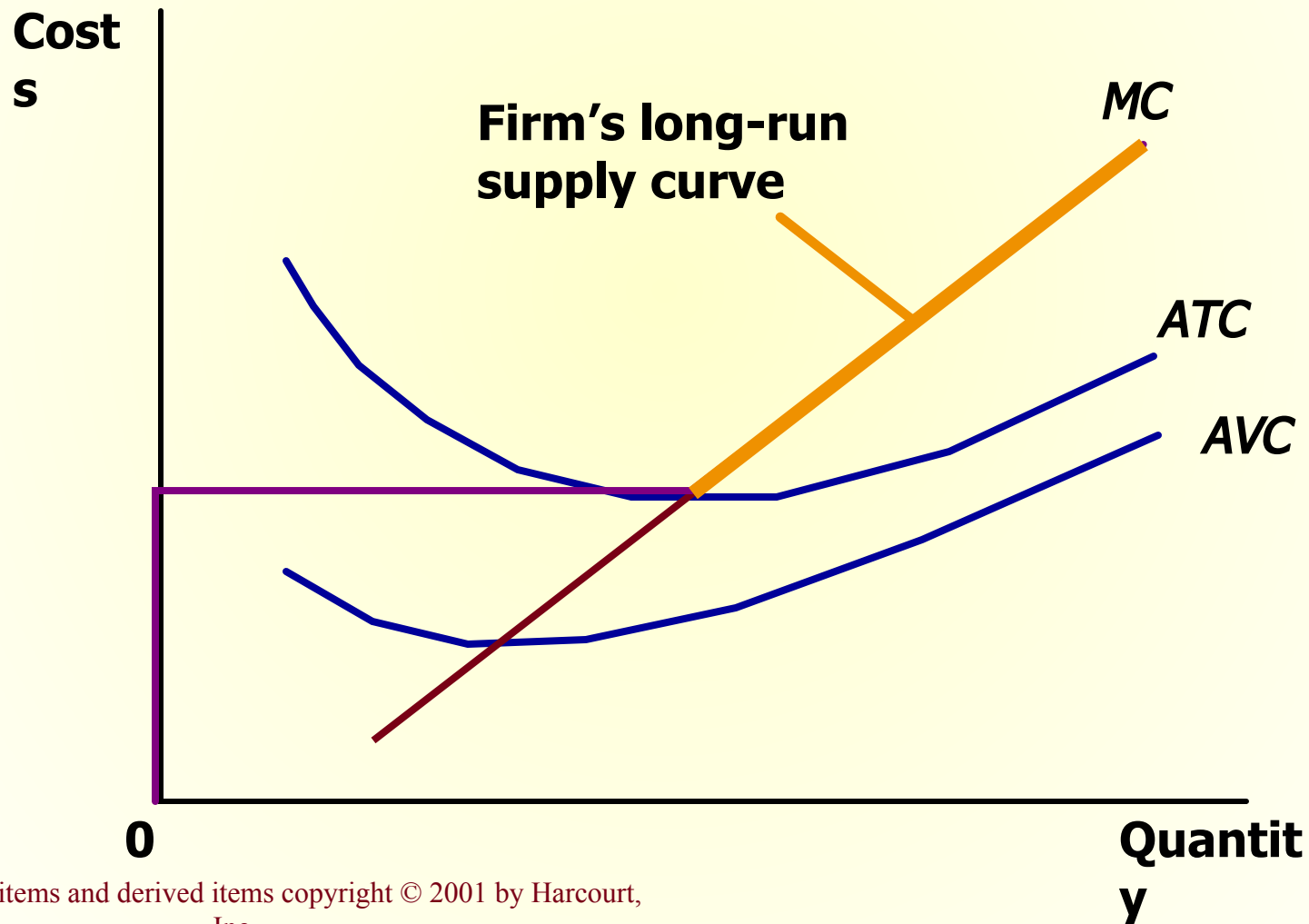
# The Competitive Firm's Long-Run Supply Curve...



# The Competitive Firm's Long-Run Supply Curve

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

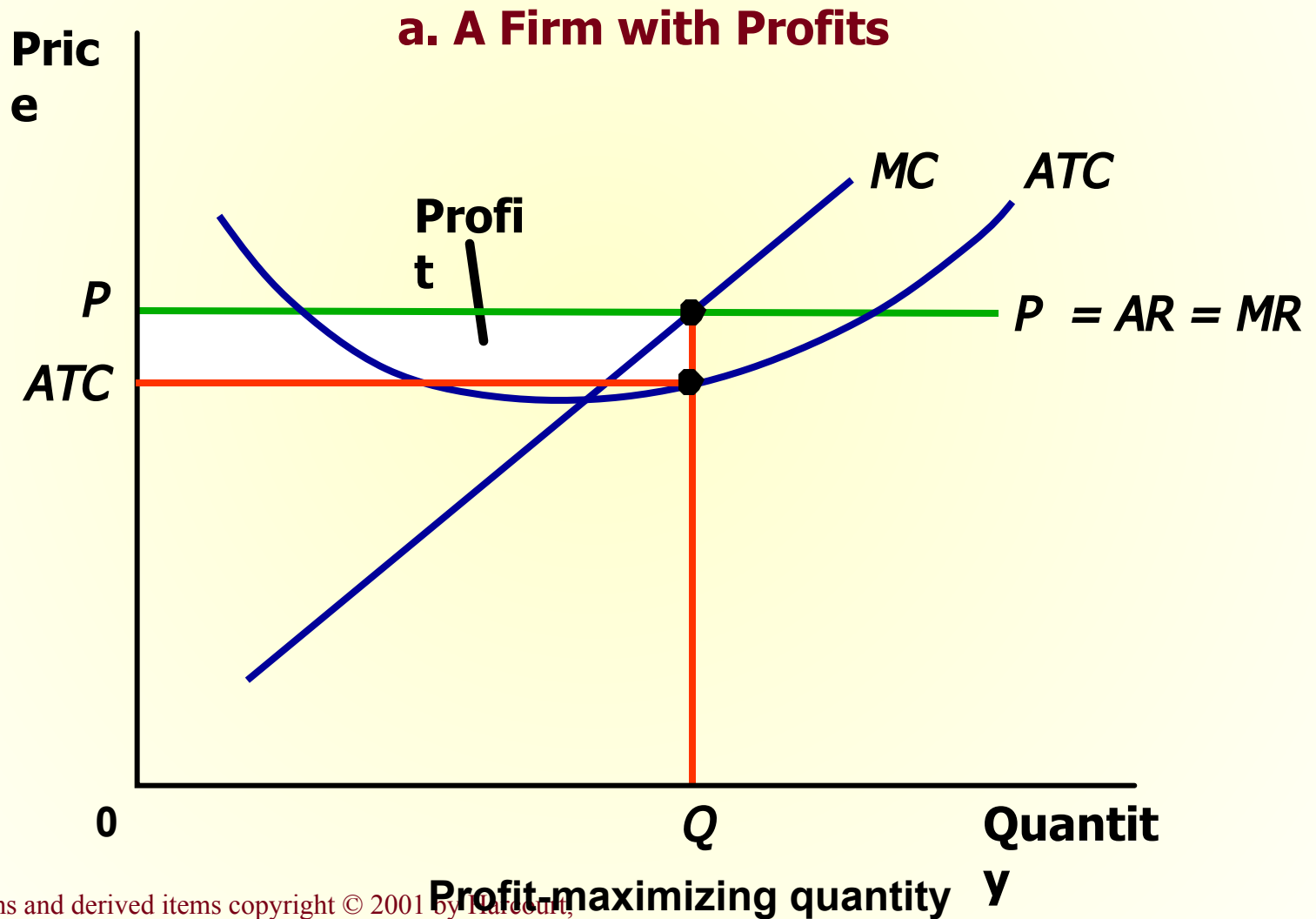
# *The Competitive Firm's Long-Run Supply Curve...*



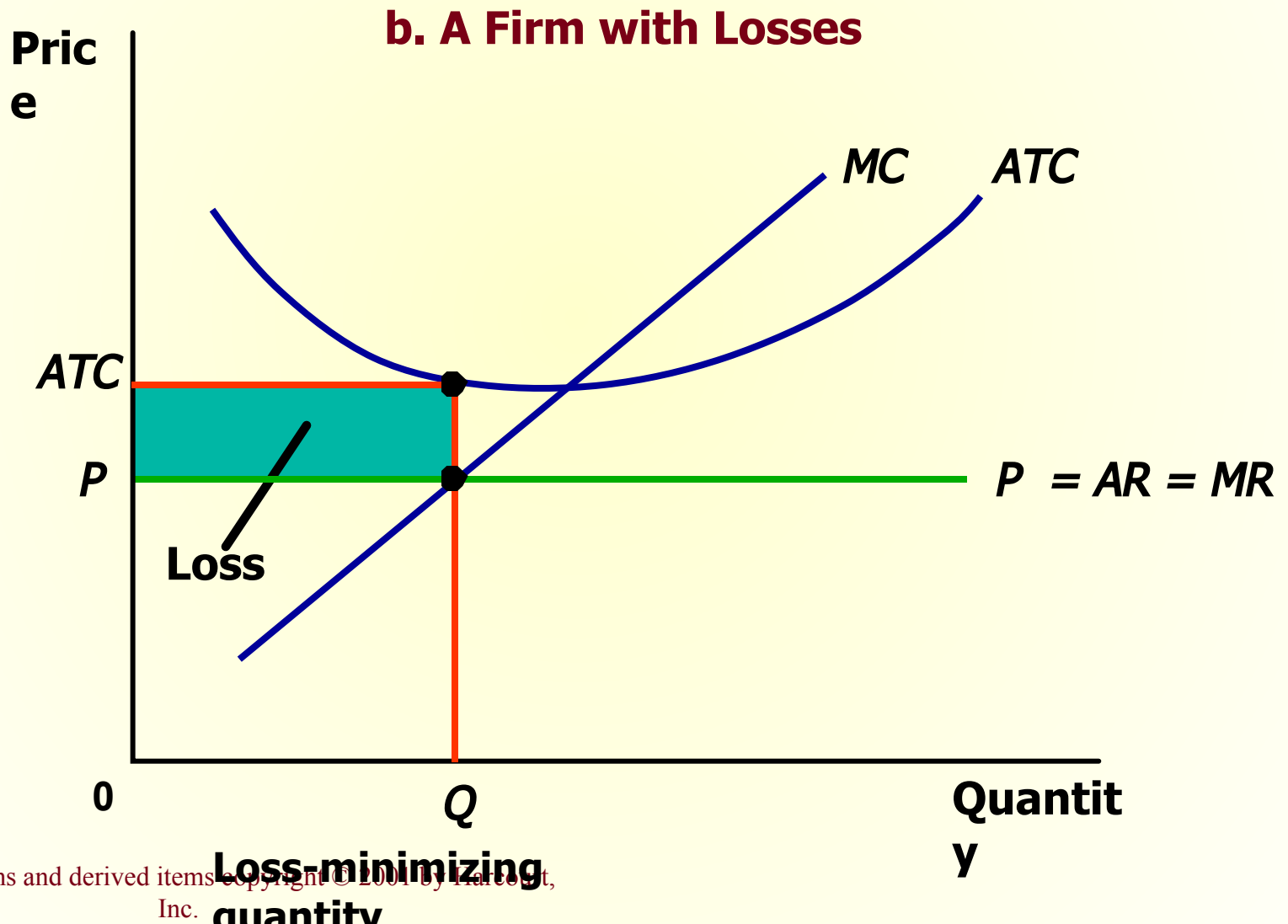
# The Firm's Short-Run and Long-Run Supply Curves

- **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.

# Measuring Profit in the Graph for the Competitive Firm...



# Measuring Profit in the Graph for the Competitive Firm...



# Supply in a Competitive Market

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

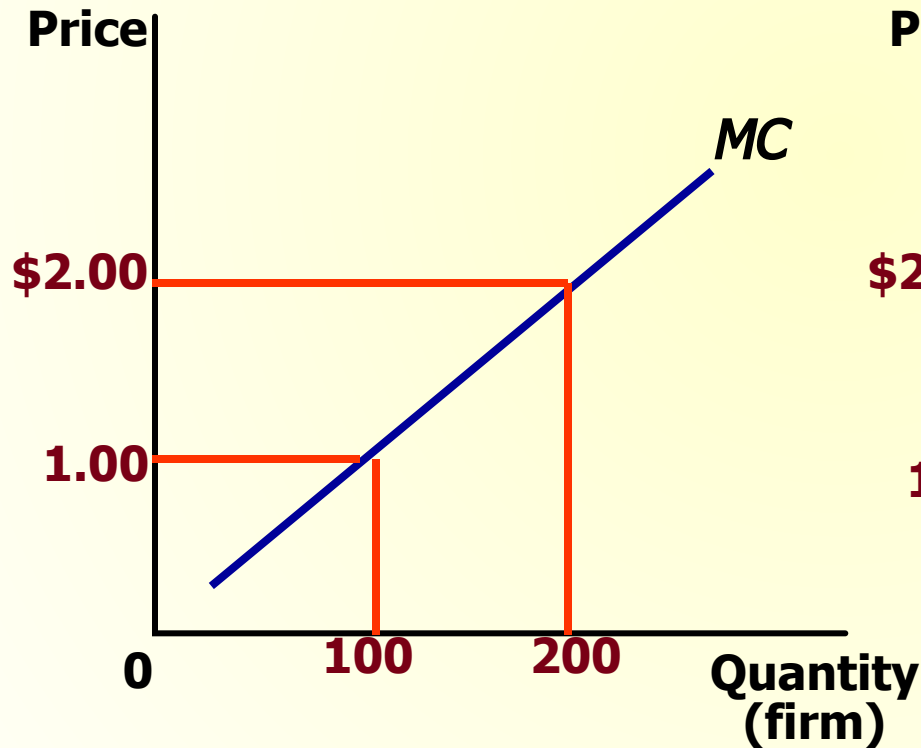
# The Short Run: Market Supply with a Fixed Number of Firms

- 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.

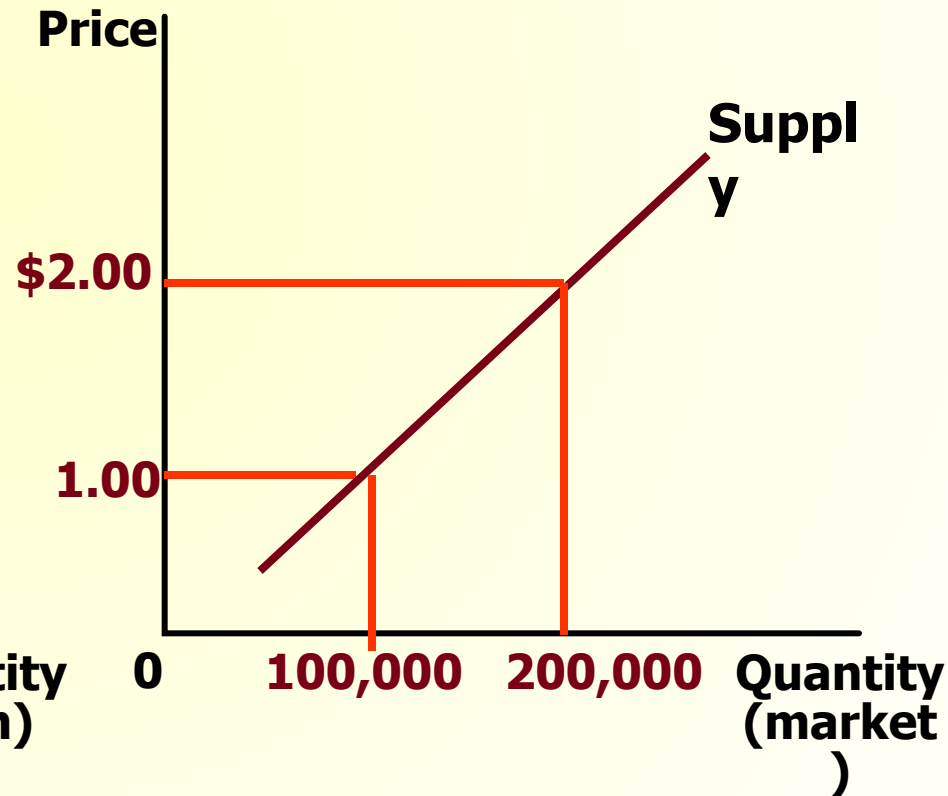


# *The Short Run: Market Supply with a Fixed Number of Firms...*

**(a) Individual Firm Supply**



**(b) Market Supply**

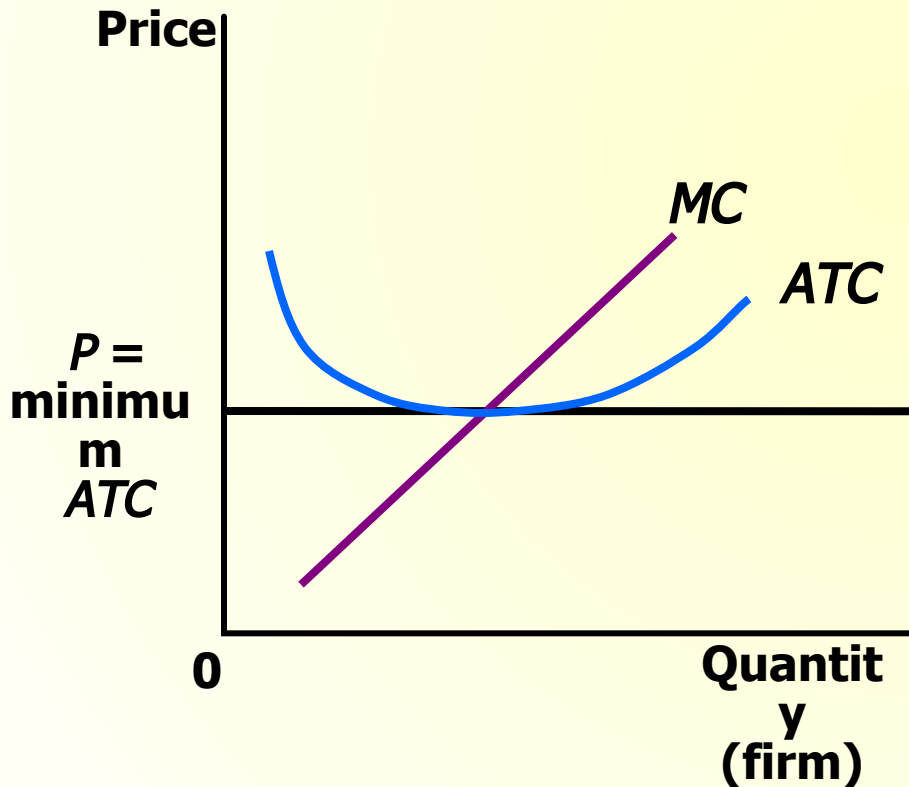


# The Long Run: Market Supply with Entry and Exit

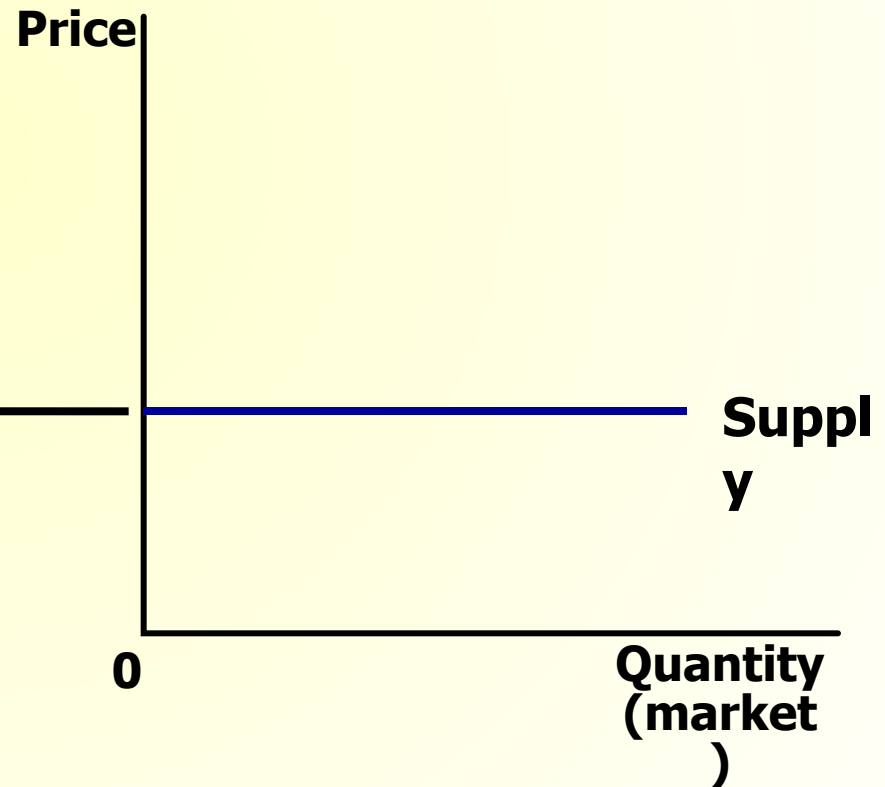
- Firms will enter or exit the market until profit is driven to zero.
- In the long run, price equals the minimum of average total cost.
- The long-run market supply curve is horizontal at this price.

# *The Long Run: 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 & exit ends only when price and average total cost are driven to equality.
- Long-run equilibrium must have firms operating at their efficient scale.

# Firms Stay in Business with Zero Profit

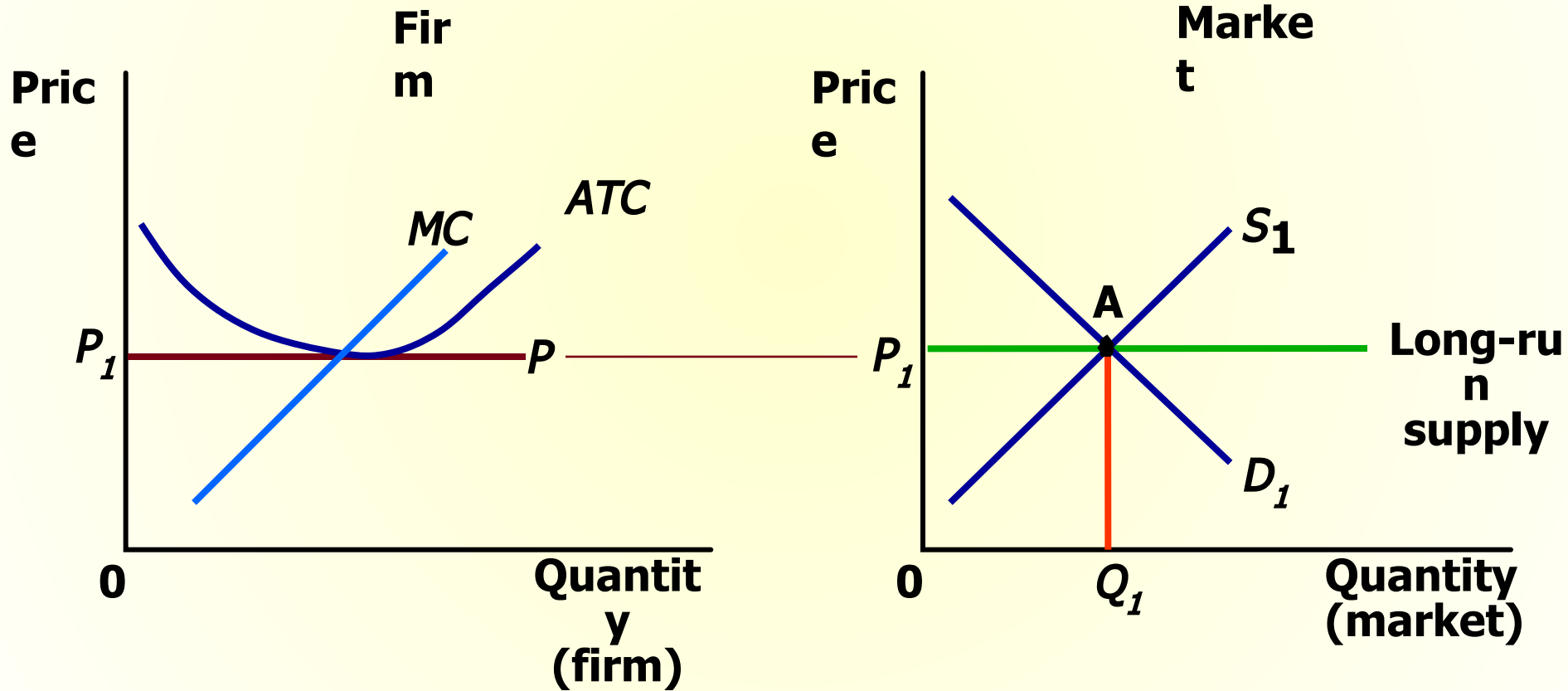
- Profit equals total revenue minus total cost.
- Total cost includes all the opportunity costs of the firm.
- In the zero-profit equilibrium, the firm's revenue compensates the owners for the time and money they expend to keep the business going.

# **Increase in Demand in the Short Run**

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

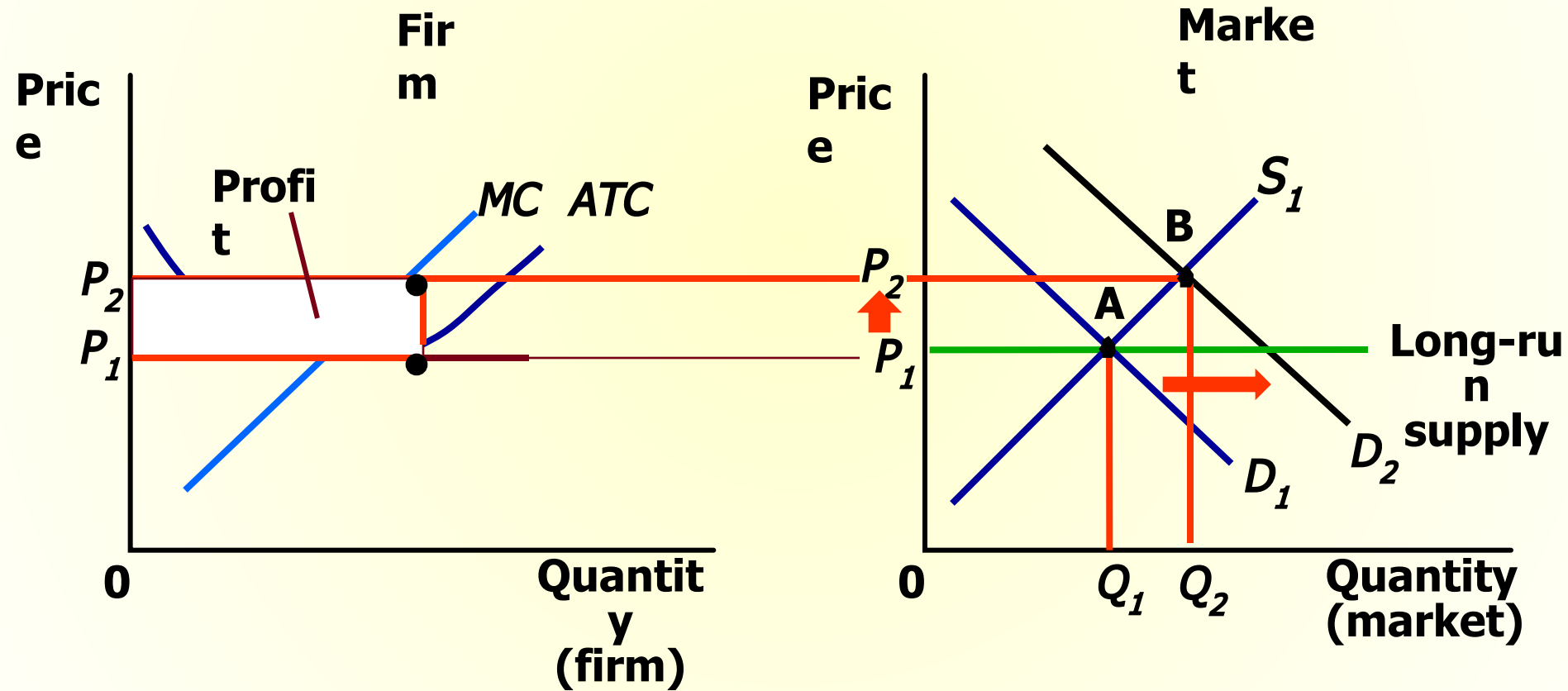
# Increase in Demand in the Short Run...

(a) Initial Condition



# Increase in Demand in the Short Run...

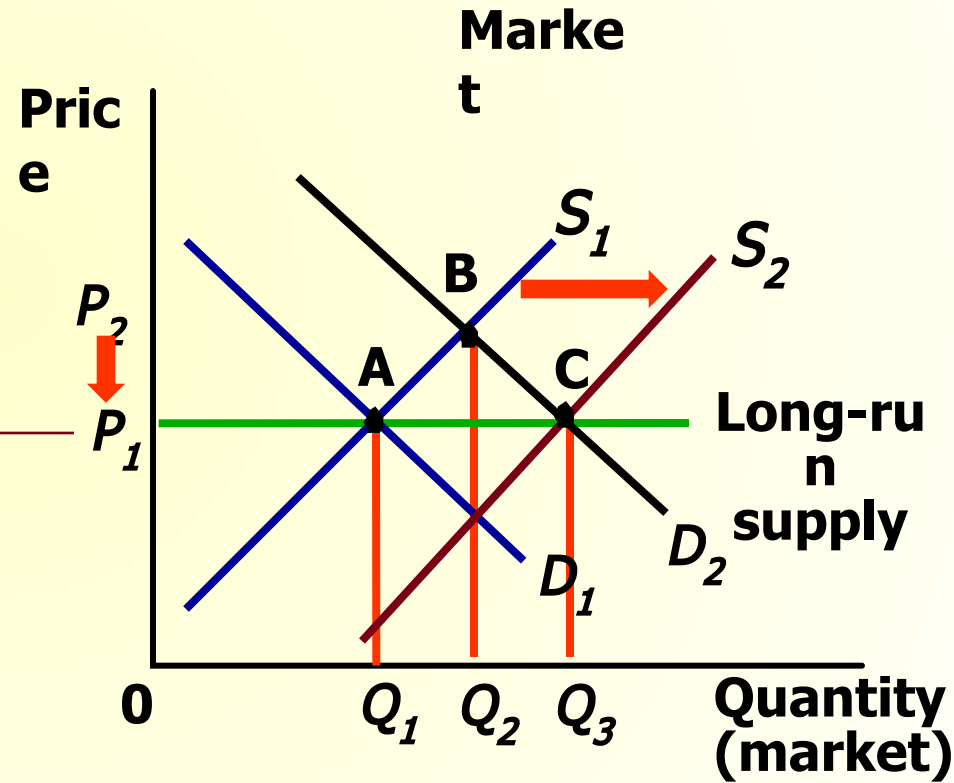
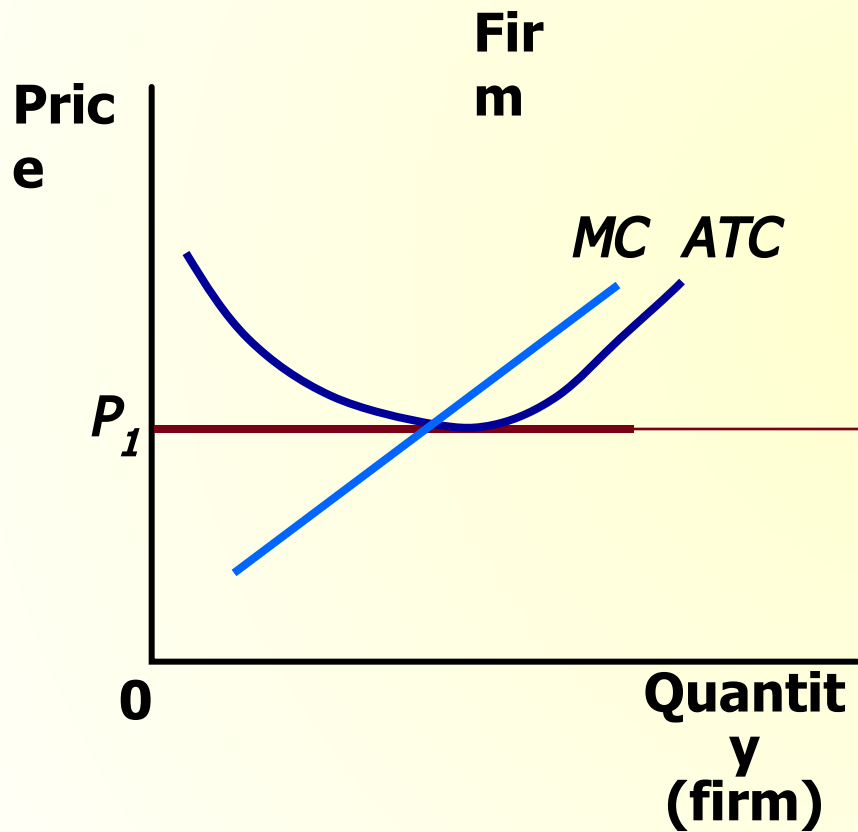
## (b) Short-Run Response





# Increase in Demand in the Short 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.**

# 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

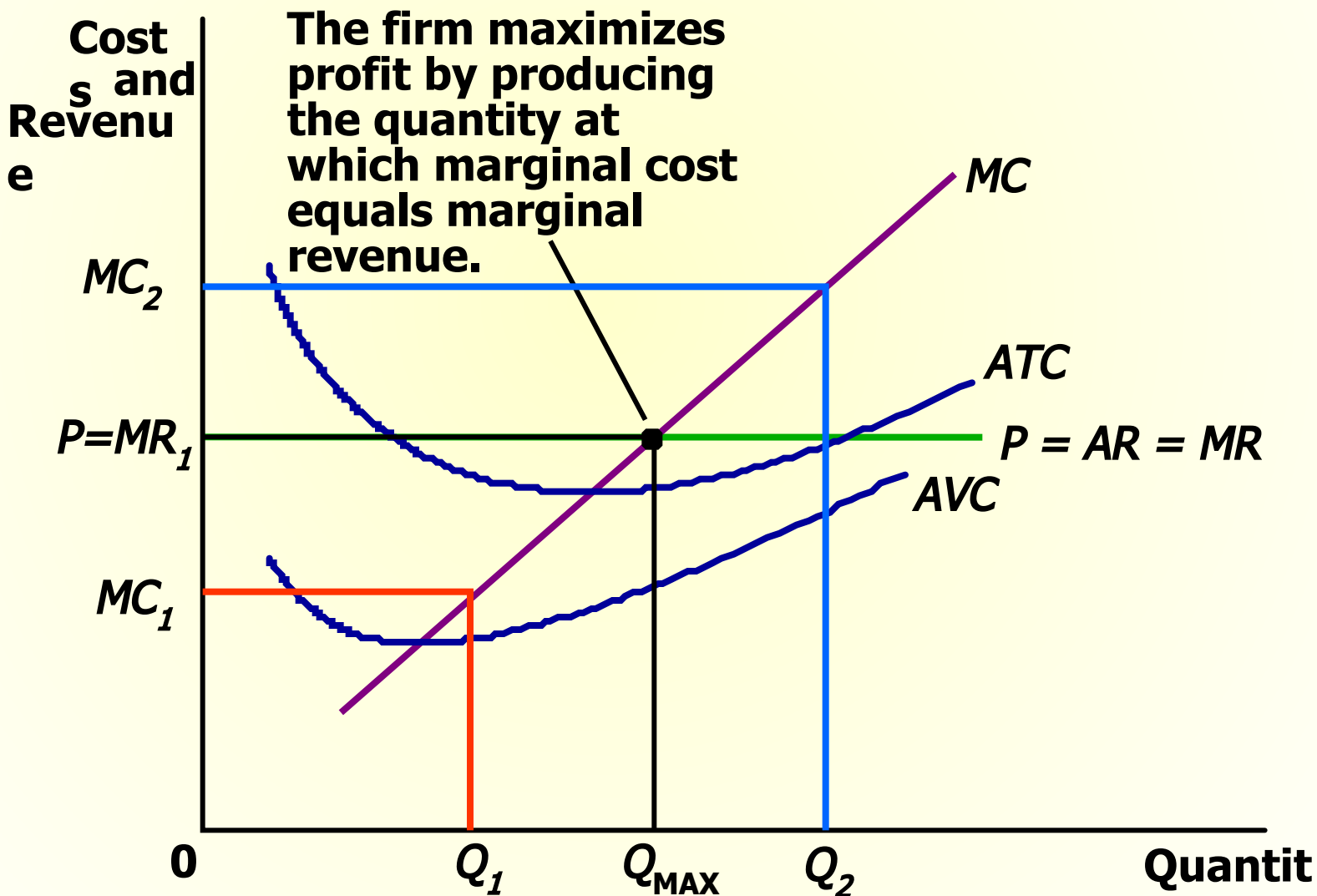
- **In a market with free entry and exit, profits are driven to zero in the long run and all firms produce at the efficient scale.**
- **Changes in demand have different effects over different time horizons.**



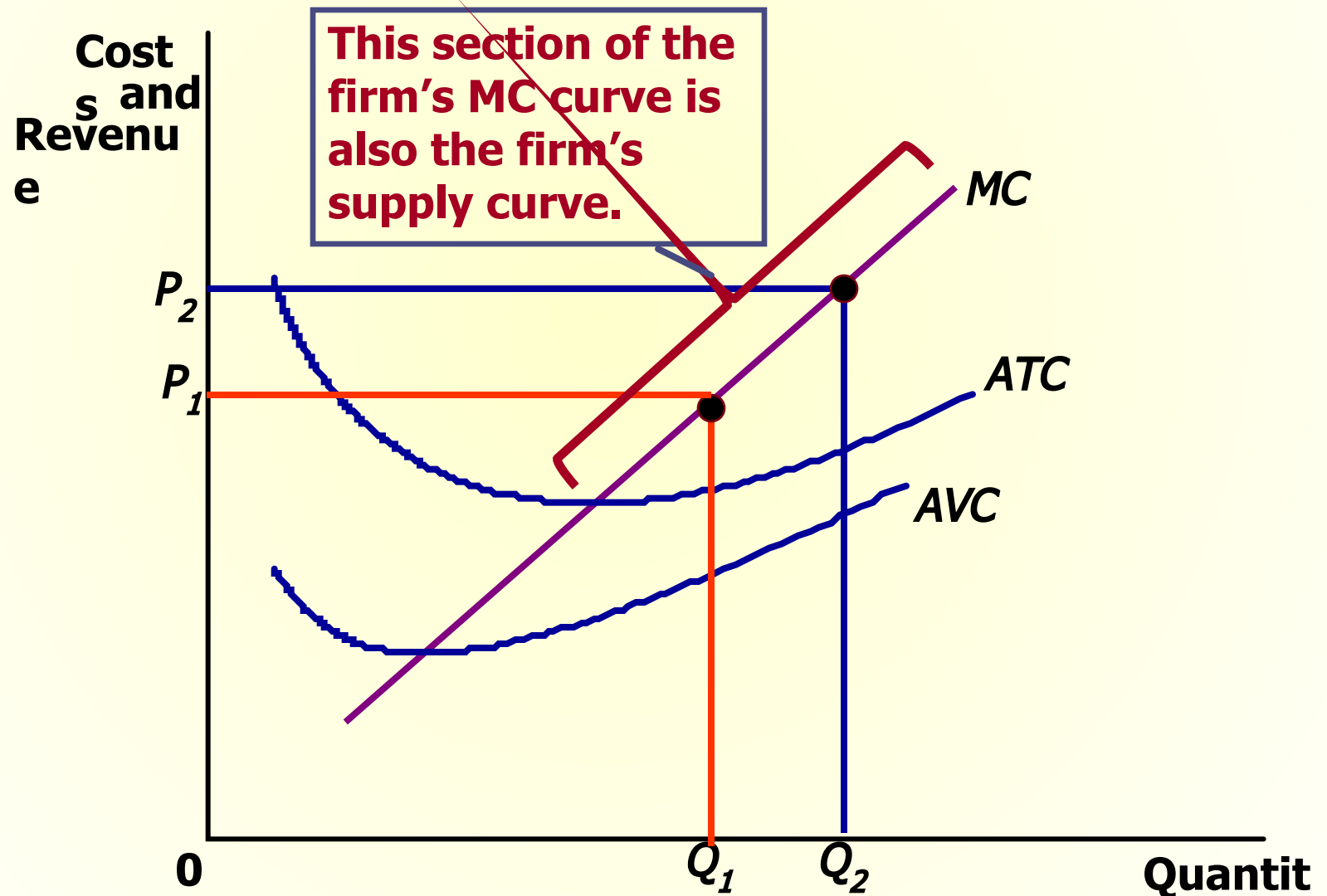
# Graphical Review



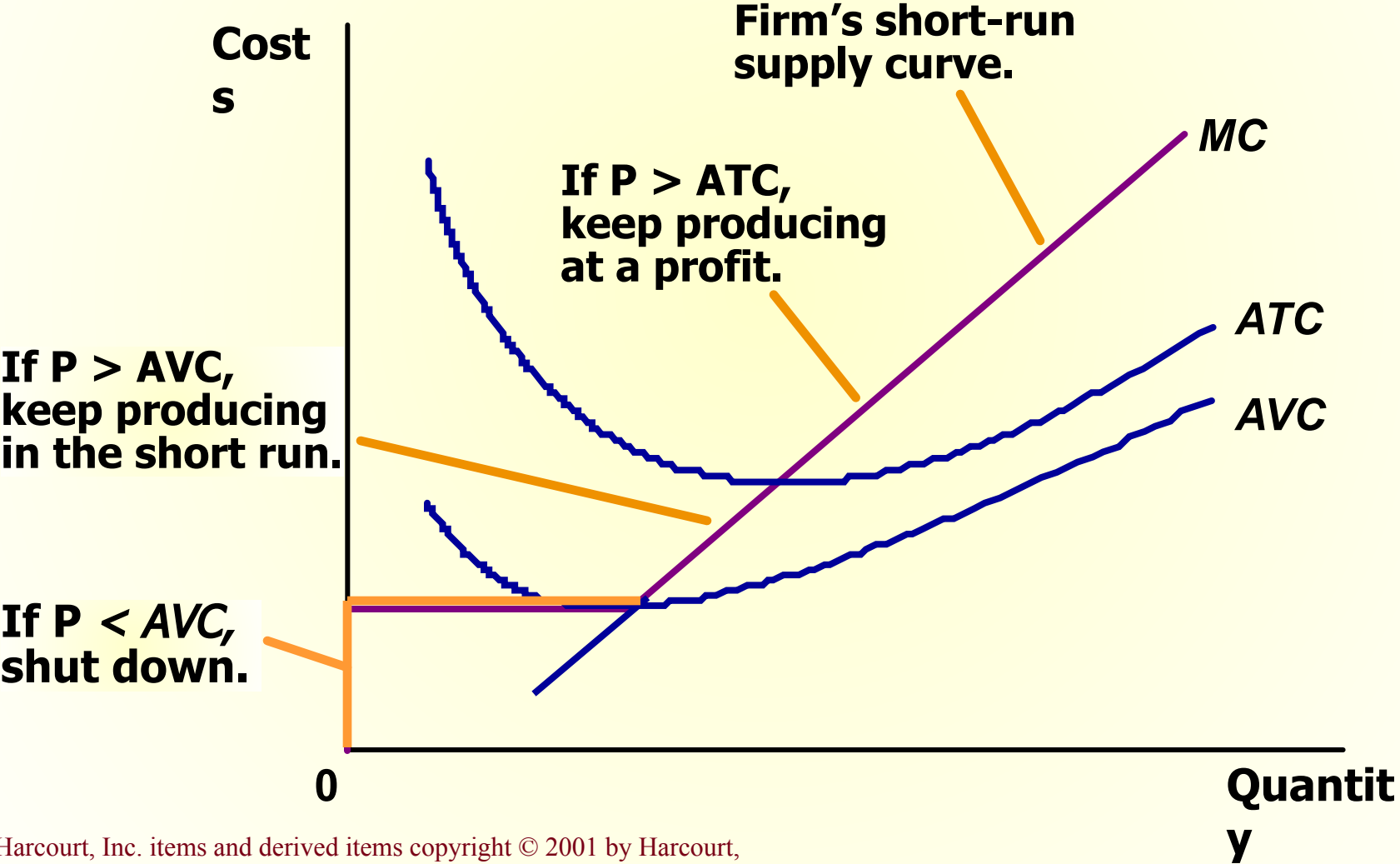
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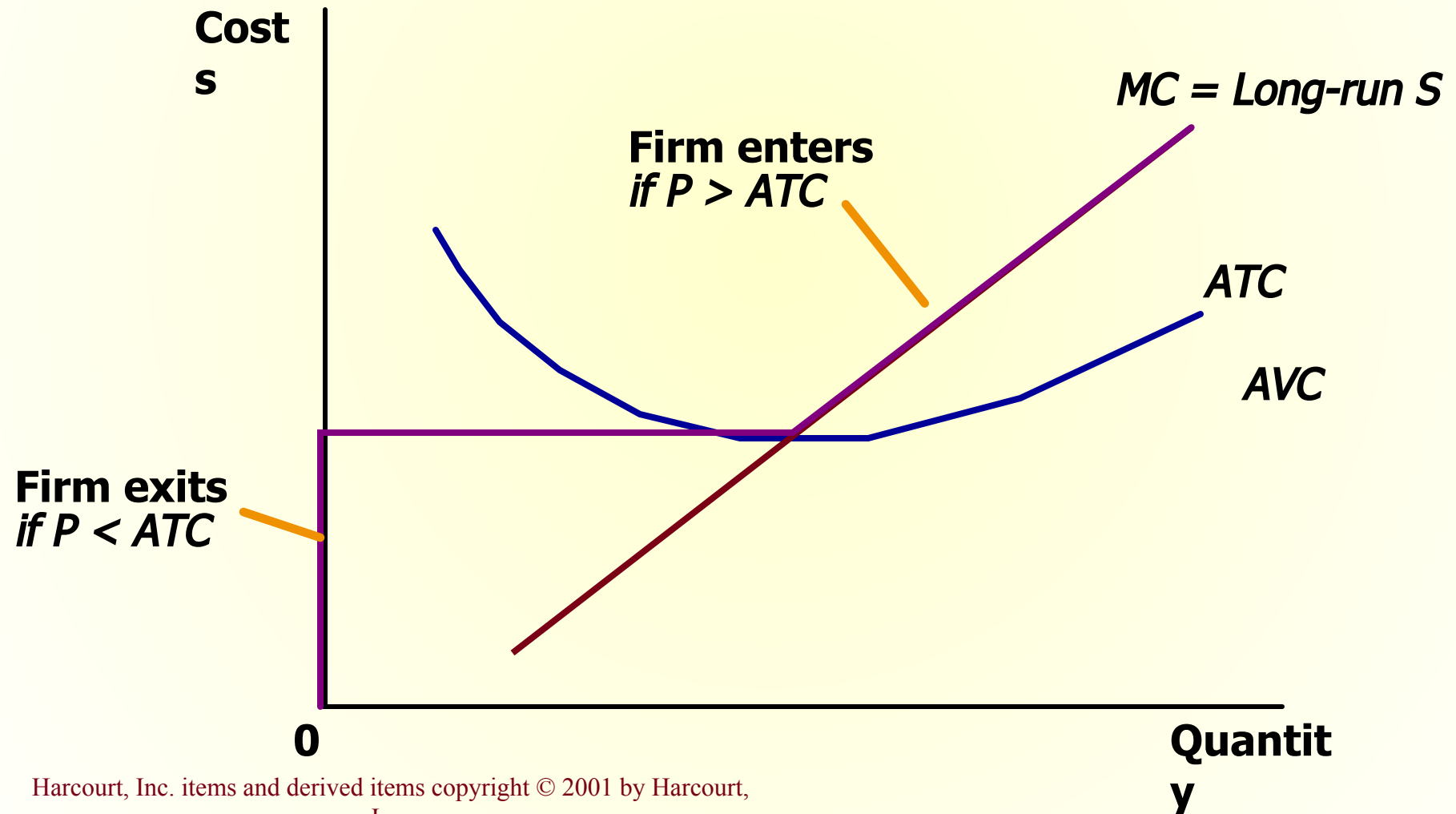
# The Marginal-Cost Curve and the Firm's Supply Decision...



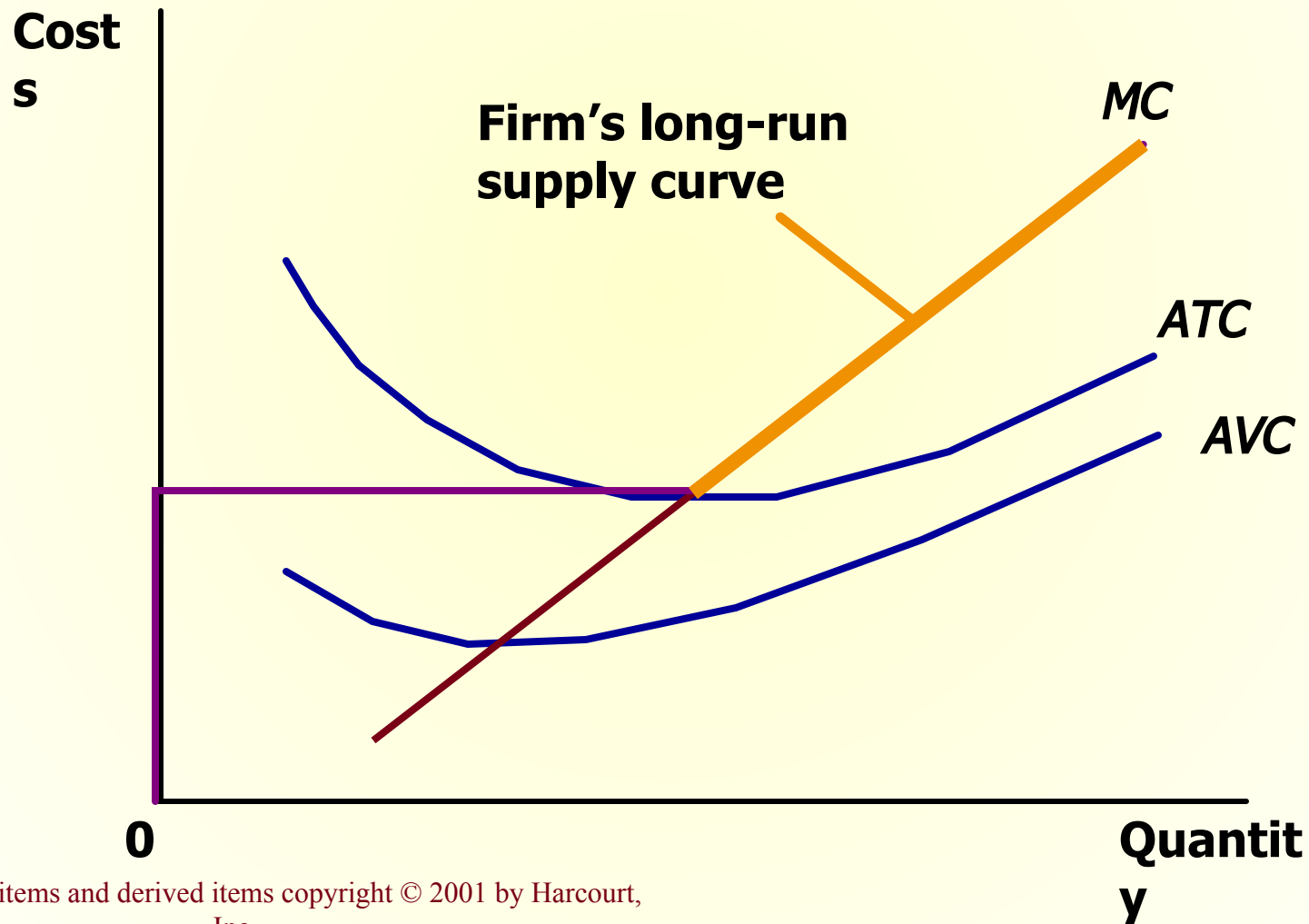
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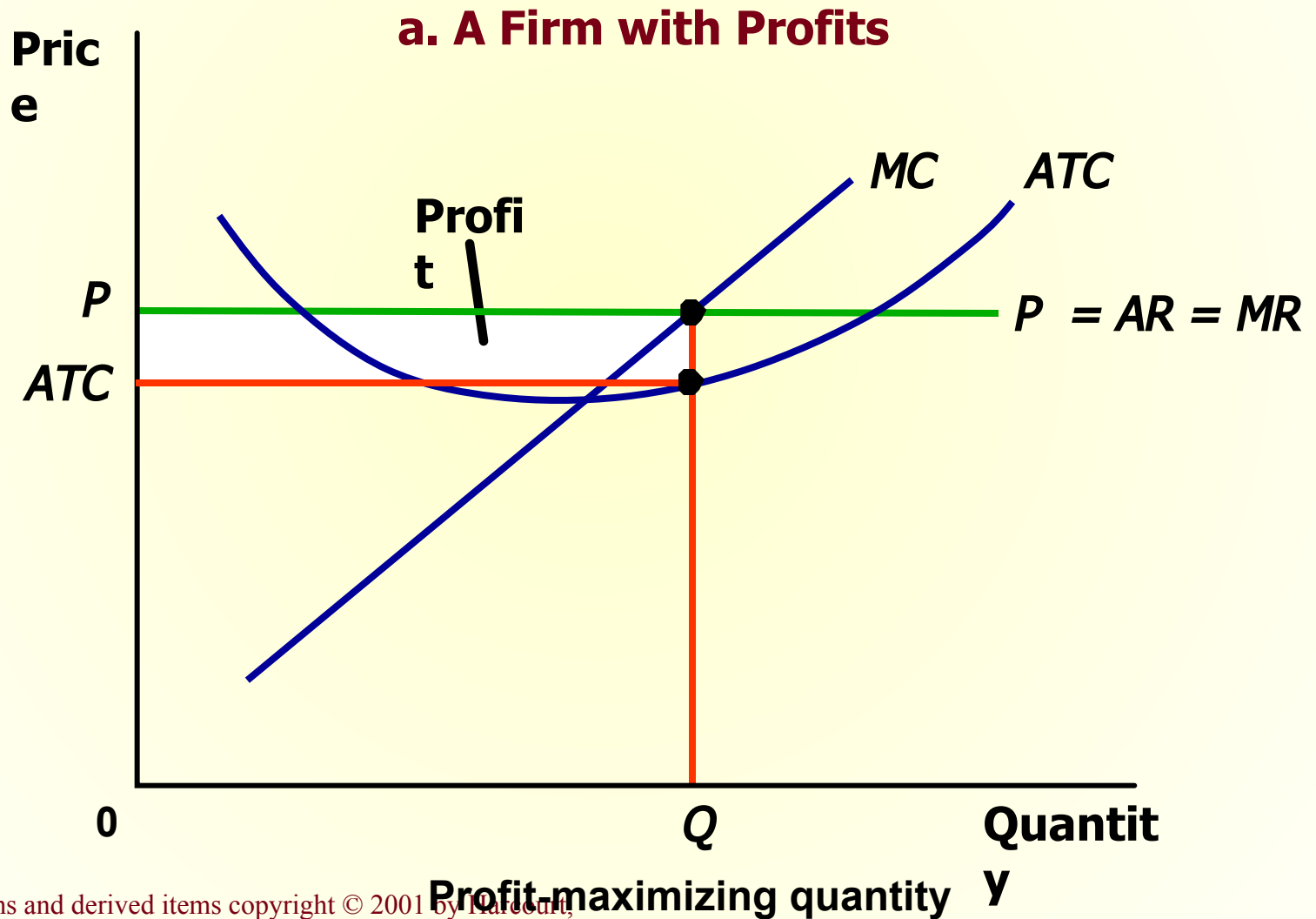
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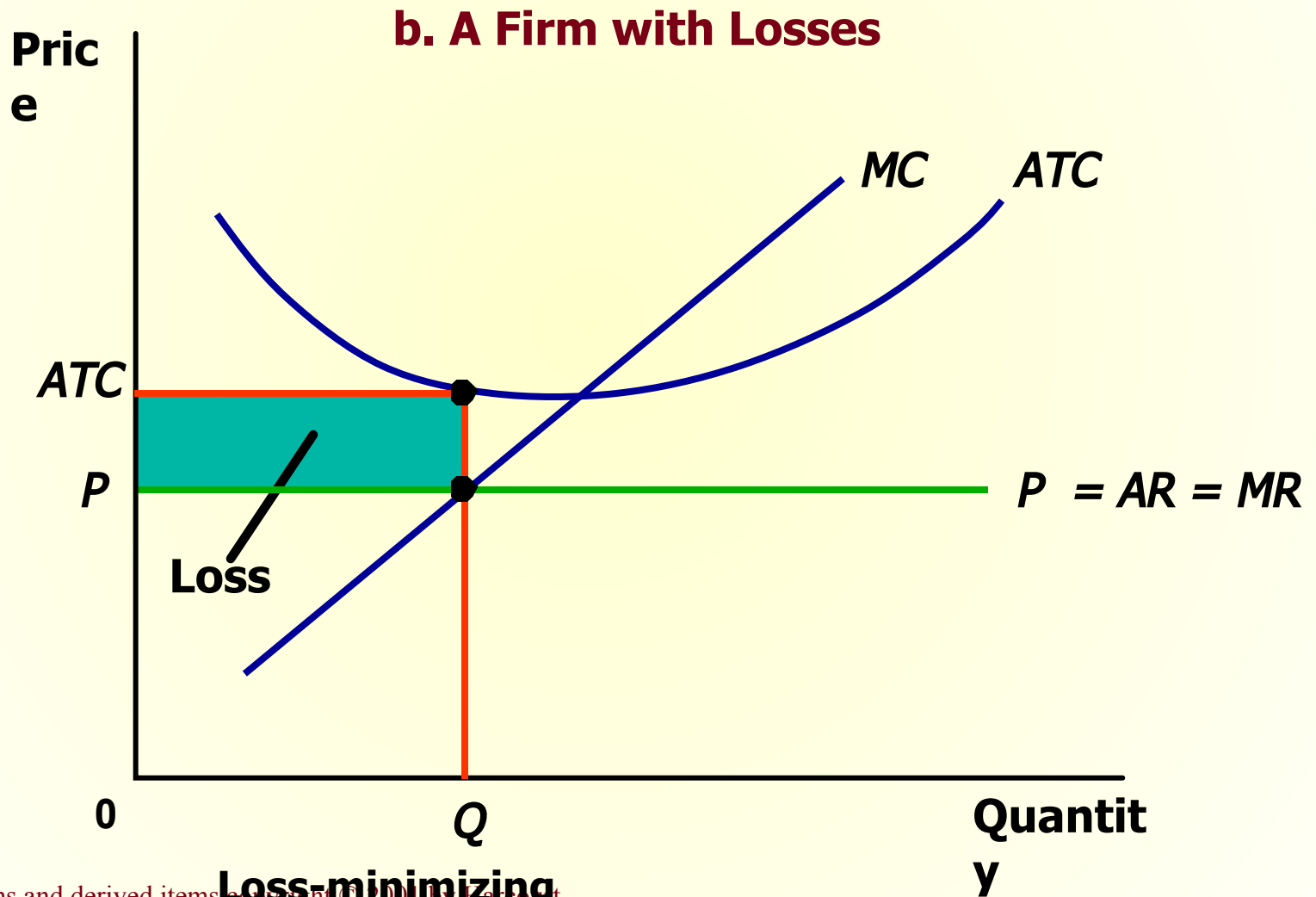
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# Measuring Profit in the Graph for the Competitive Firm...

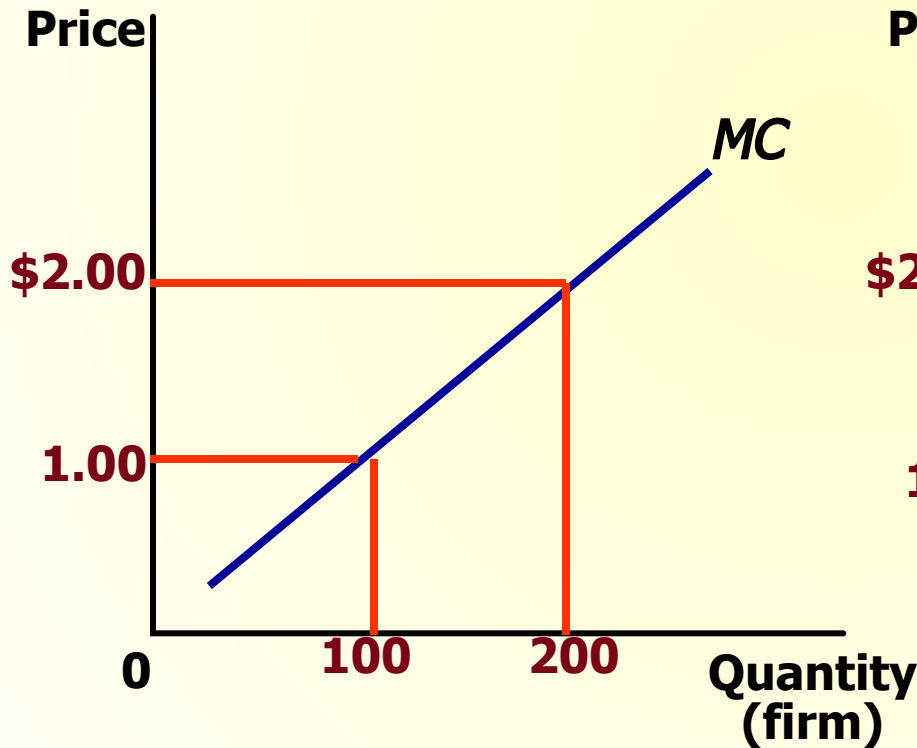


# Measuring Profit in the Graph for the Competitive Firm...

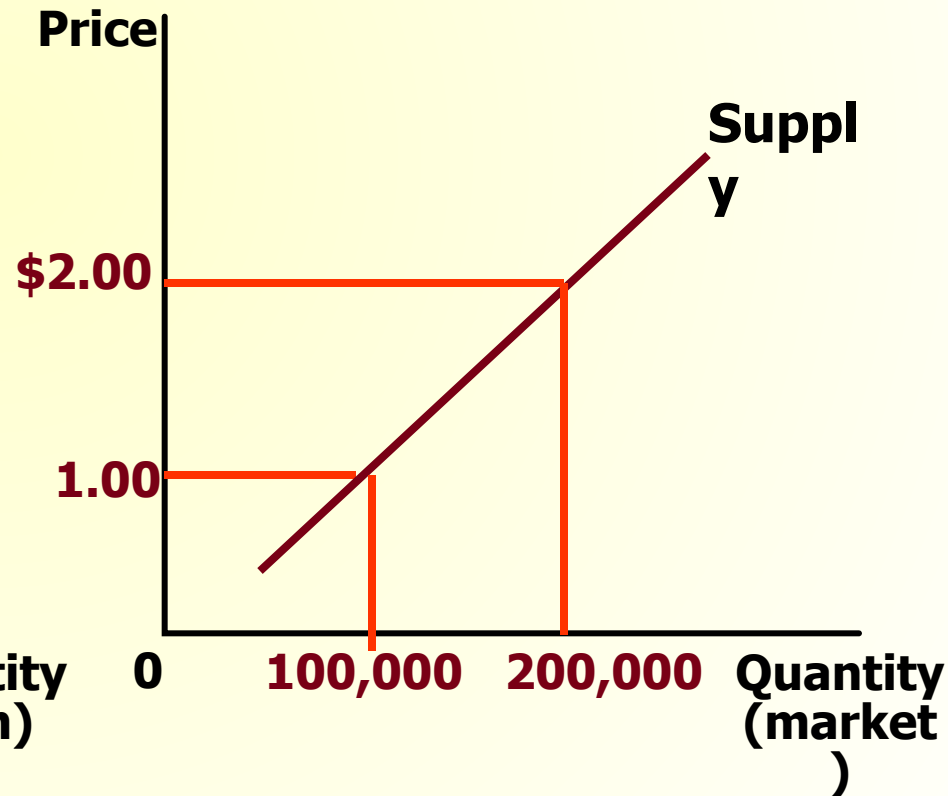


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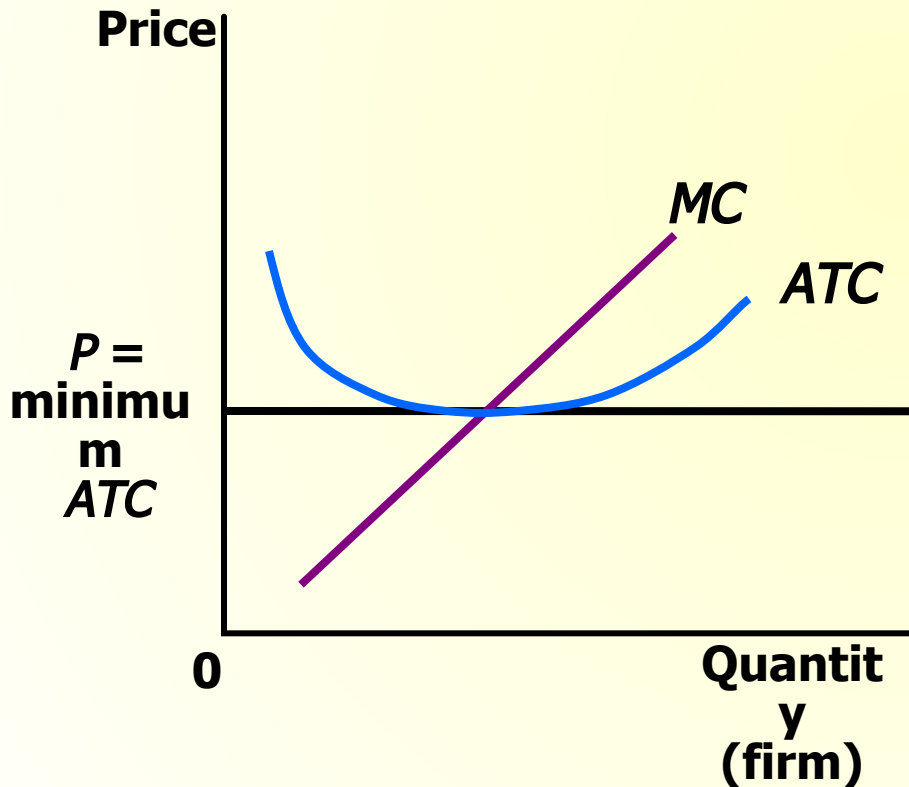
**(b) Market Supply**



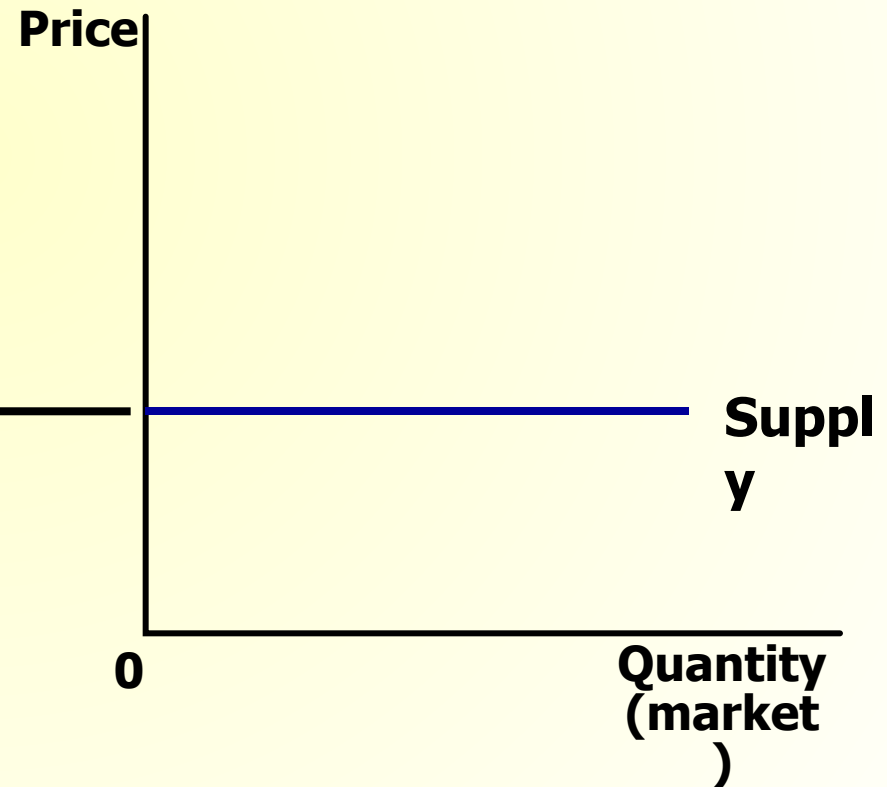


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**(a) Firm's Zero-Profit Condition**

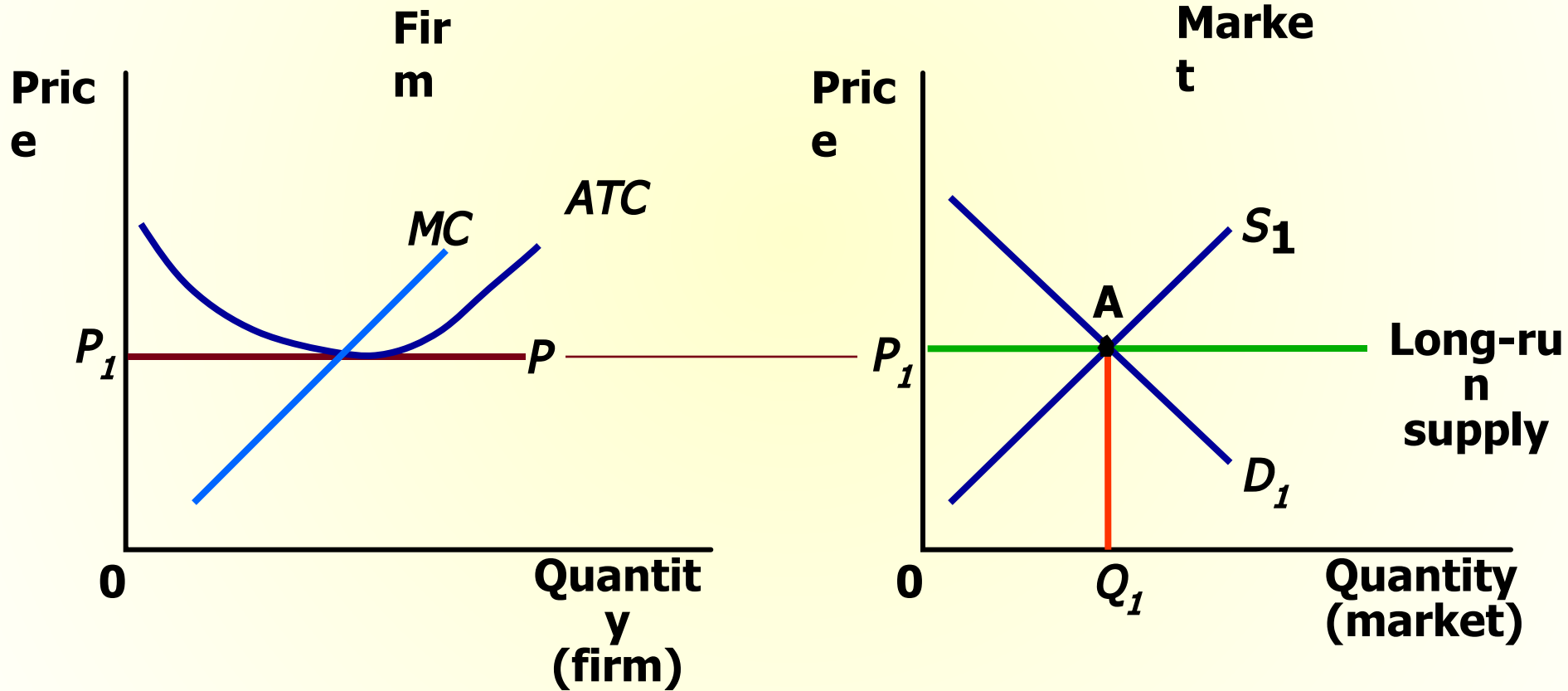


**(b) Market Supply**



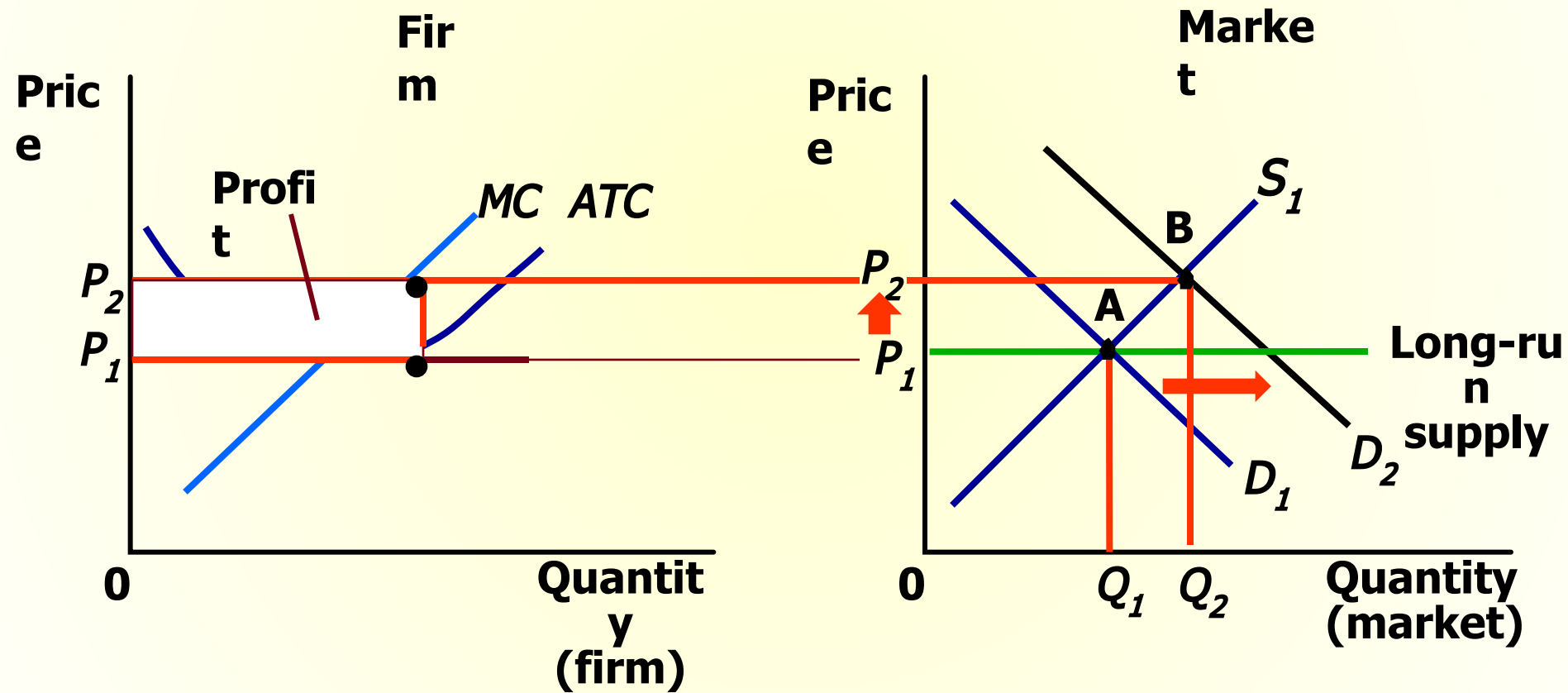
# Increase in Demand in the Short Run...

(a) Initial Condition



# Increase in Demand in the Short Run...

## (b) Short-Run Response



# Increase in Demand in the Short Run...

## (c) Long-Run Response

