Firms in Competitive Markets

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.

$$\textit{Average revenue} = \frac{\textit{Total revenue}}{\textit{Quantity}}$$

$$= \frac{(\textit{Price} \times \textit{Quantity})}{\textit{Quantity}}$$

$$= \textit{Price}$$

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=PxQ)	Average Revenue (AR=TR/Q)	Marginal Revenue (MR= $\Delta TR / \Delta Q$)
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

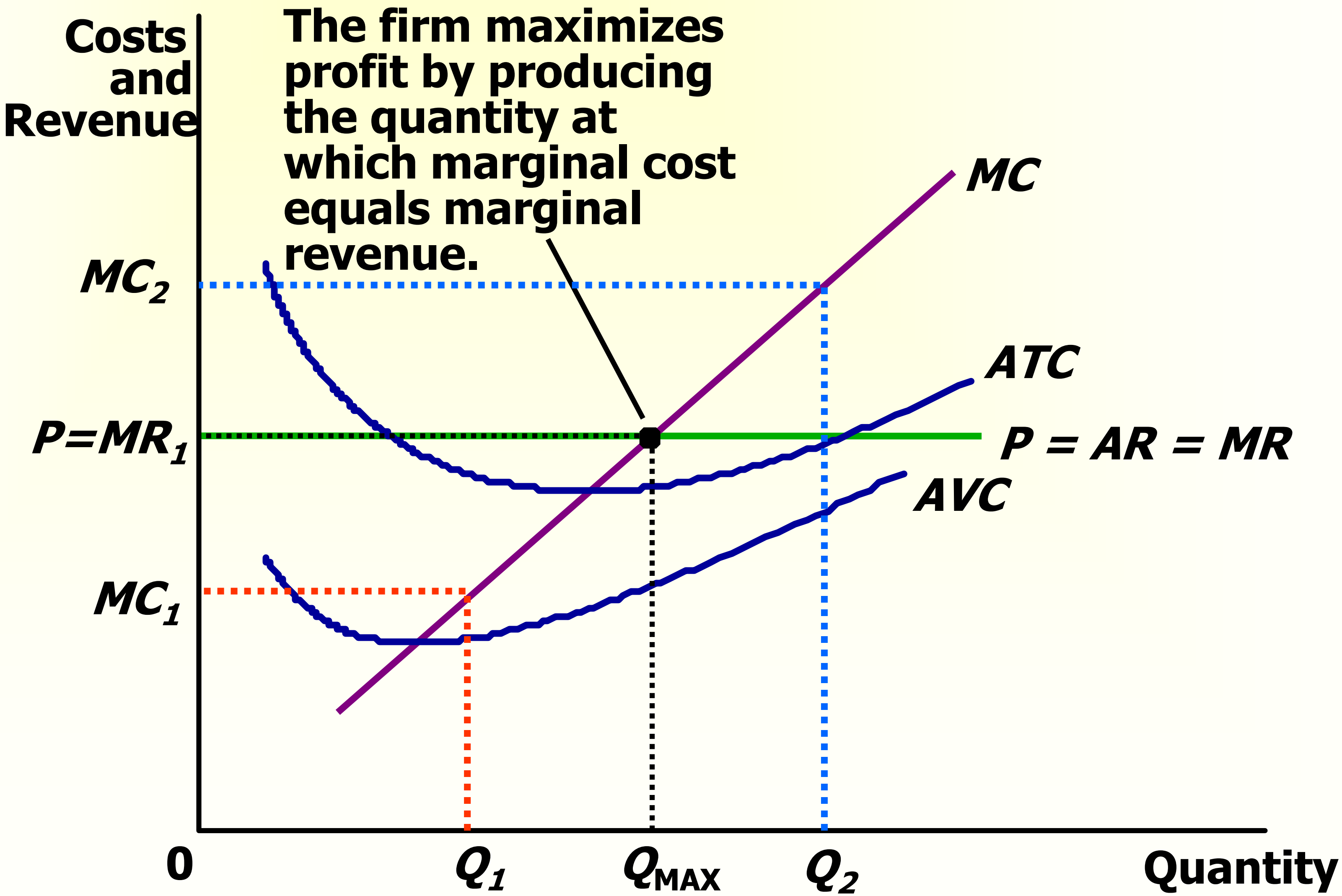
Profit Maximization for the Competitive Firm

- **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=PxQ)	Total Cost (TC)	Profit (TR-TC)	Marginal Revenue (MR= $\boxed{\Delta TR / \Delta Q}$)	Marginal Cost MC= $\boxed{\Delta TC \ / \ \Delta Q}$
	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.

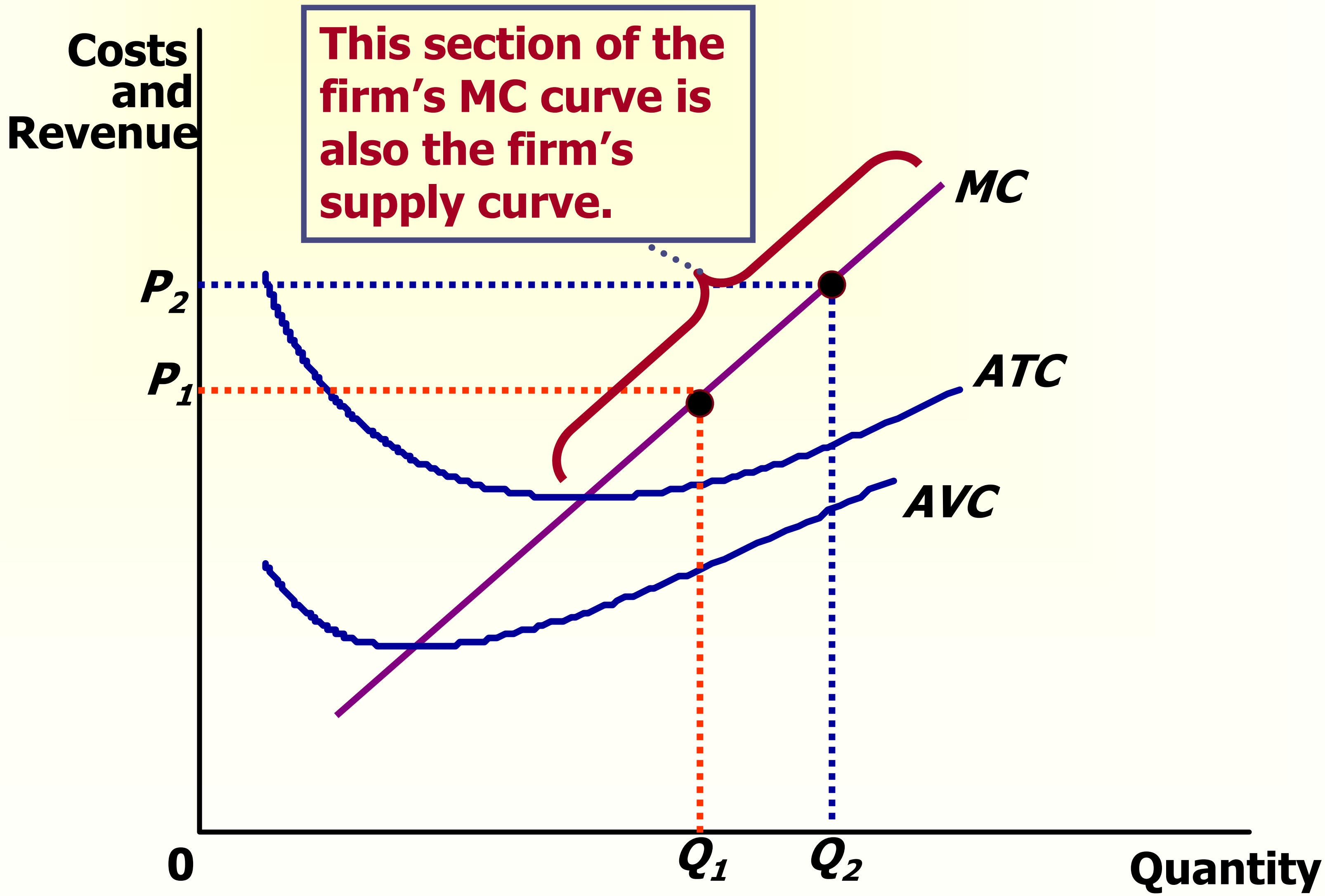
Profit Maximization for the Competitive Firm

When MR > MC ⇒ **increase *Q***

When MR < MC ⇒ ***de*****crease *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

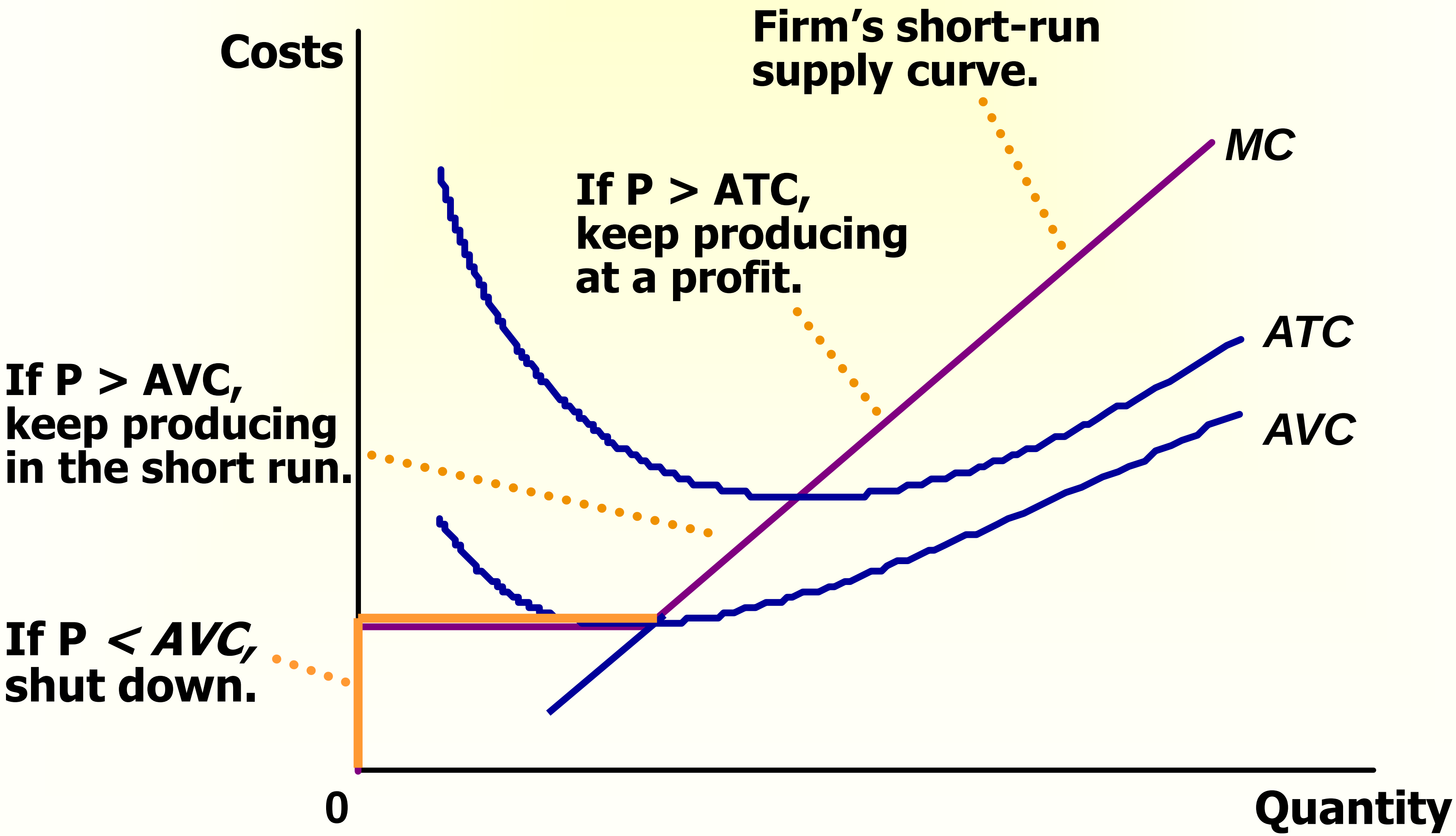
- The firm shuts down if the revenue it gets from producing is less than the variable cost of production.

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

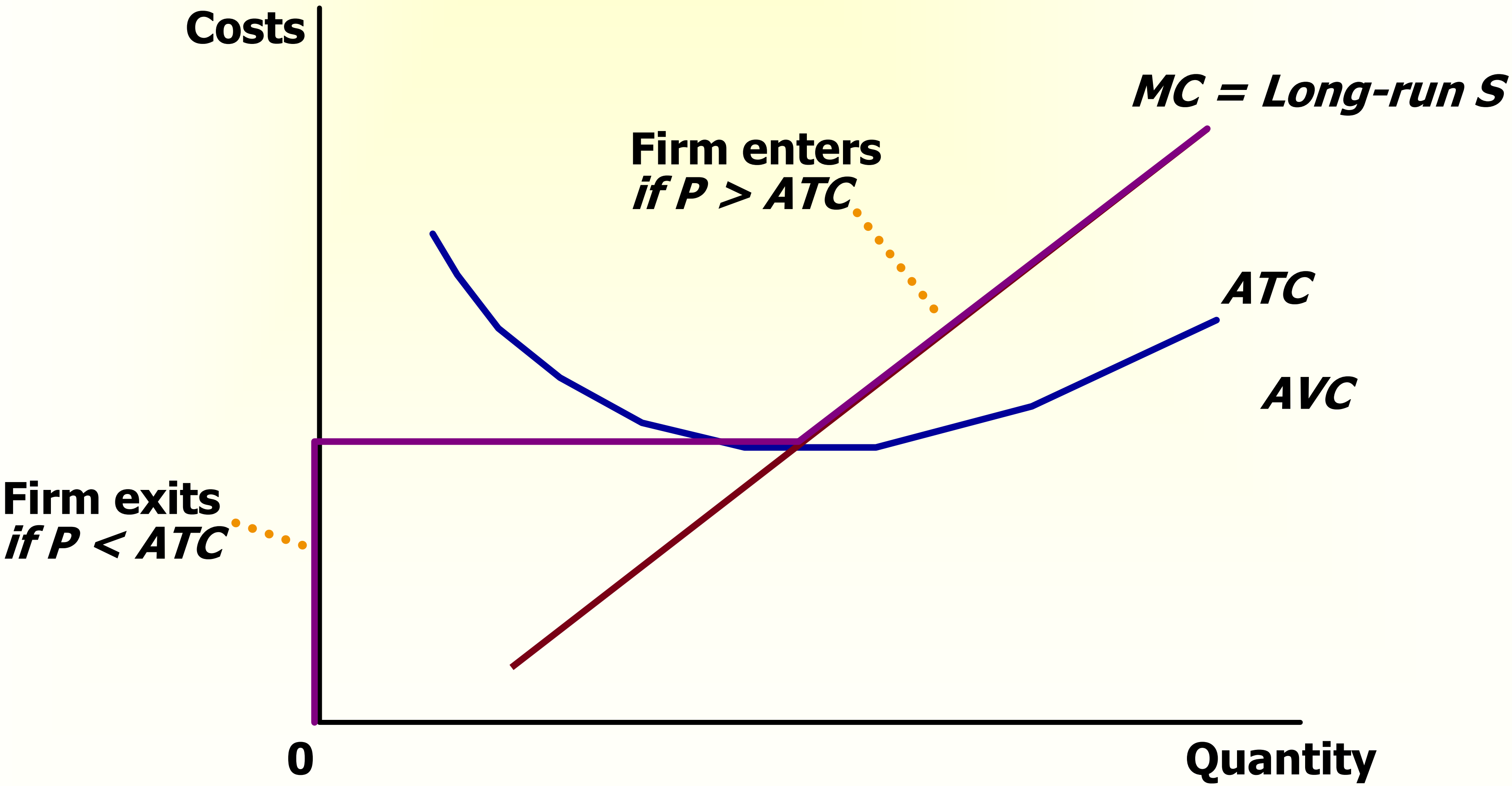
- A firm will enter the industry if such an action would be profitable.

Enter if TR > TC

Enter if TR/Q > TC/Q

Enter if P > ATC

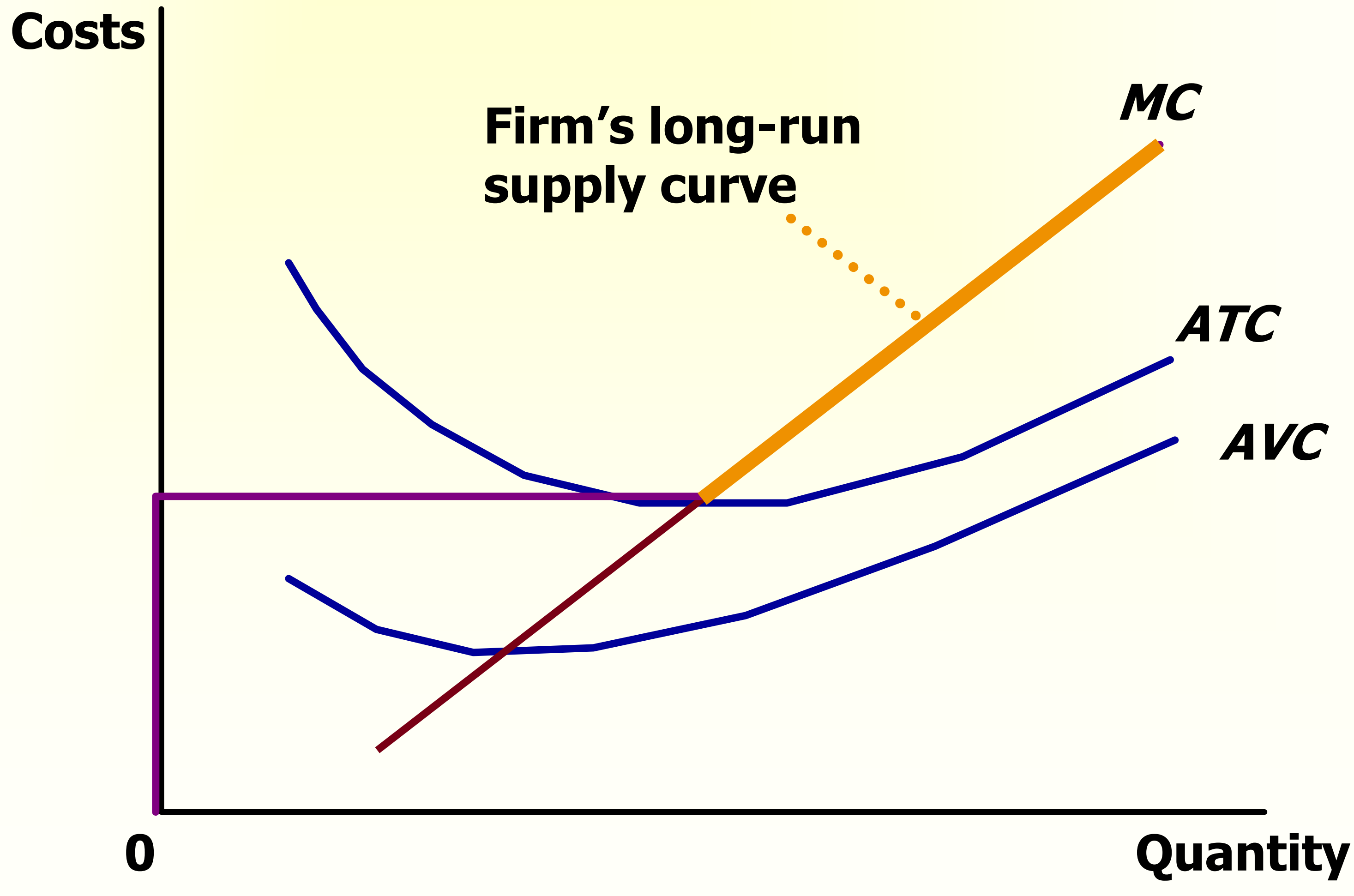
The Competitive Firm's Long-Run Supply Curve...



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.

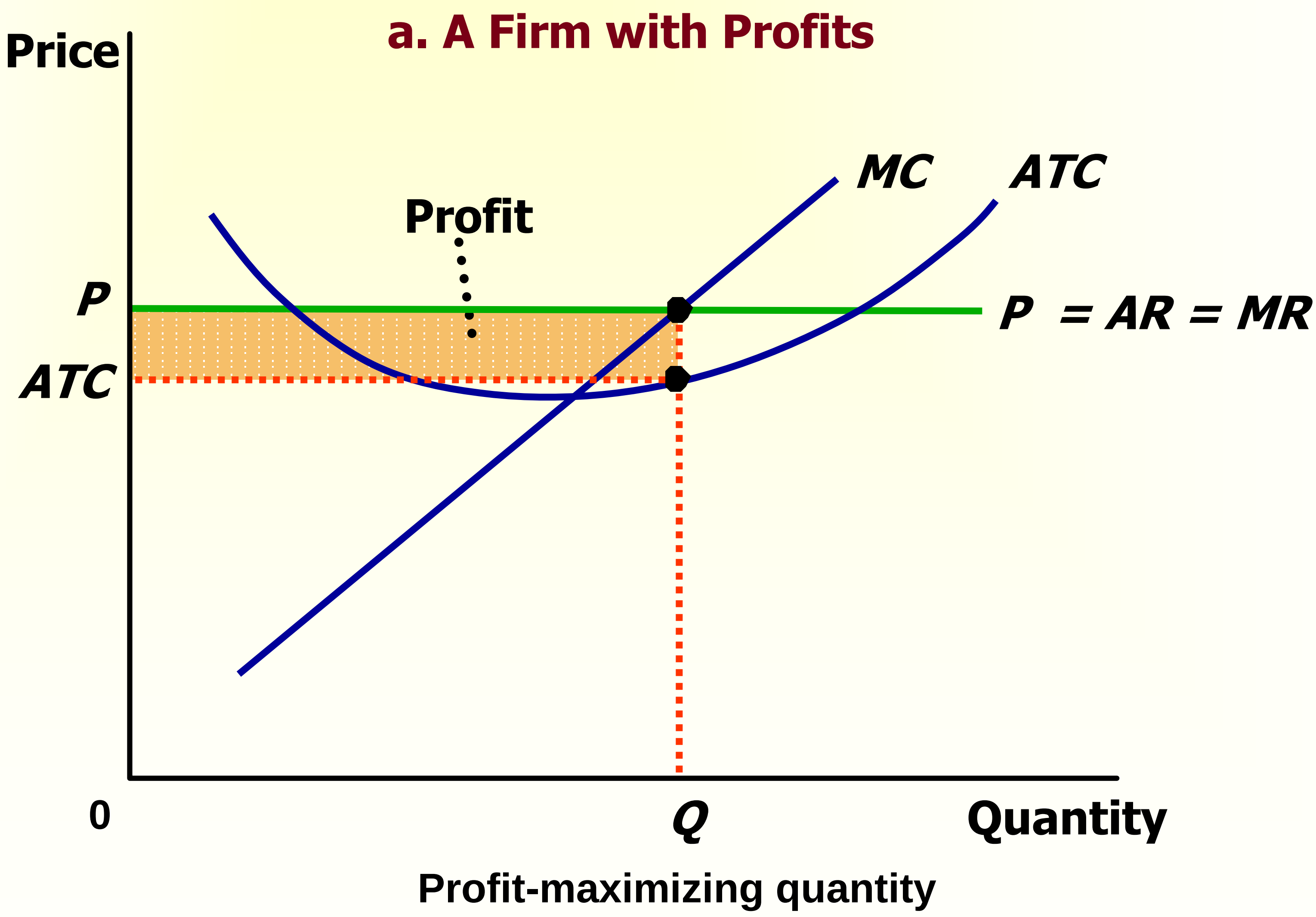
The Competitive Firm's Long-Run Supply Curve...



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...



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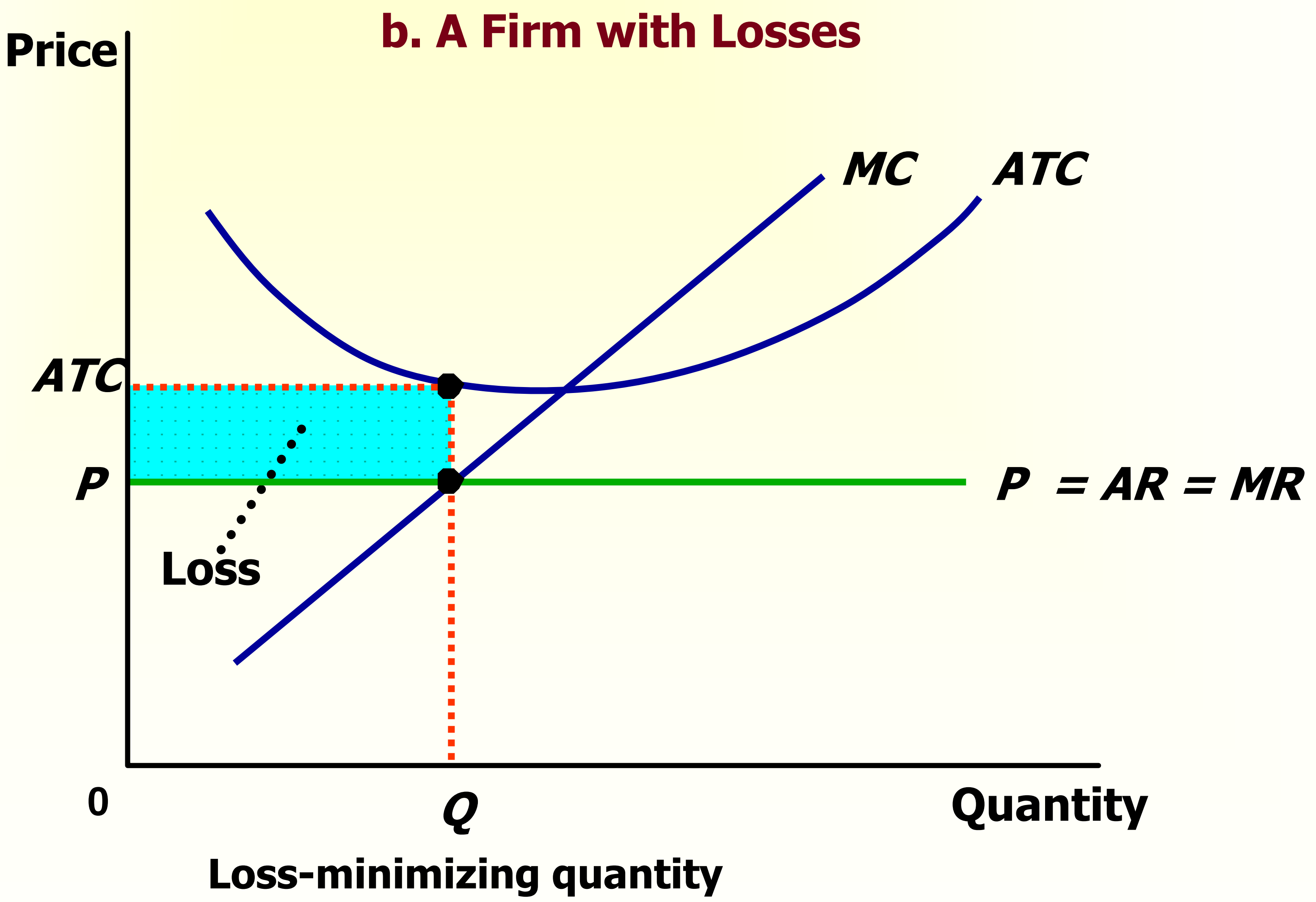


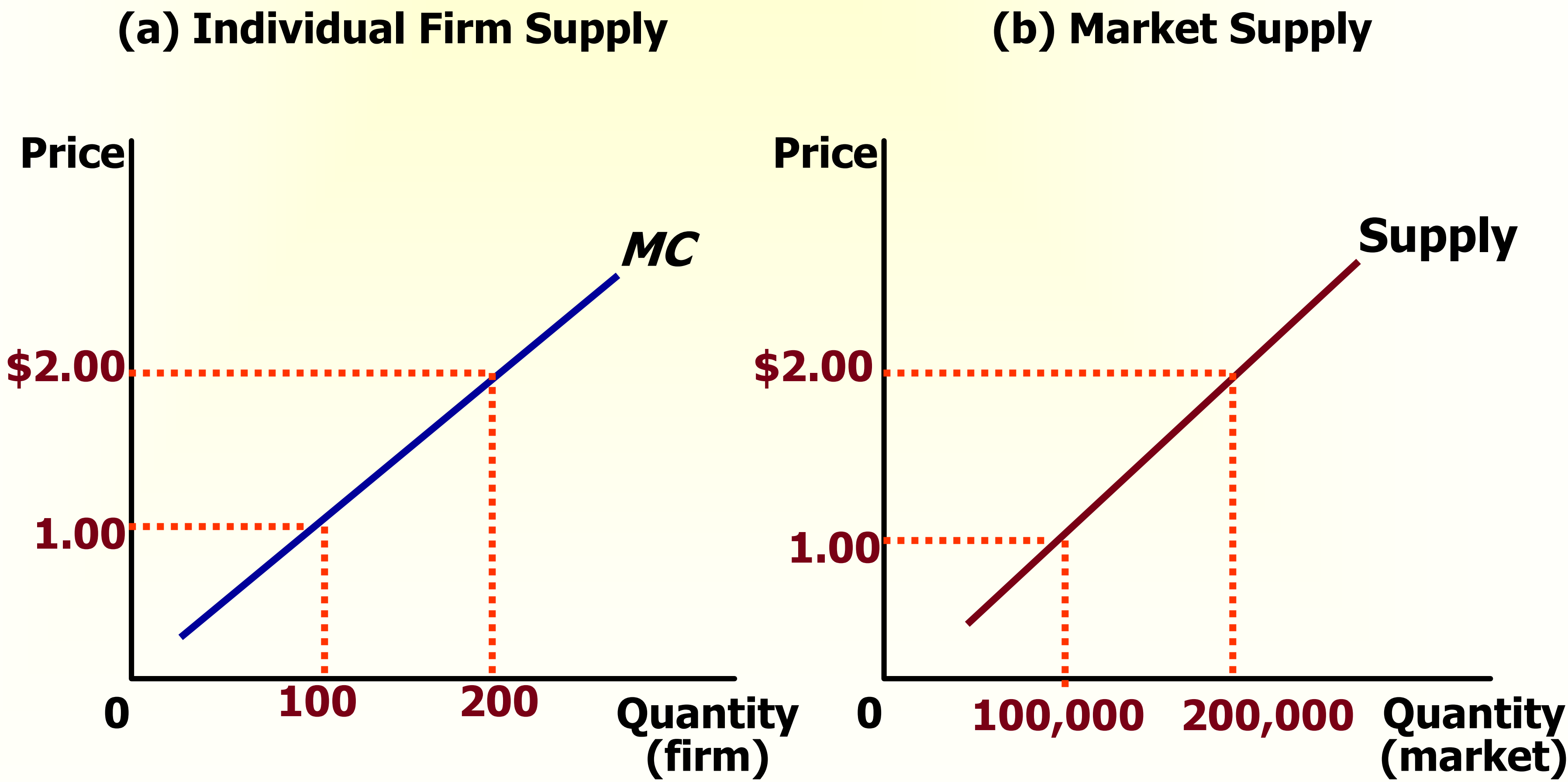
Supply in a Competitive Market

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.

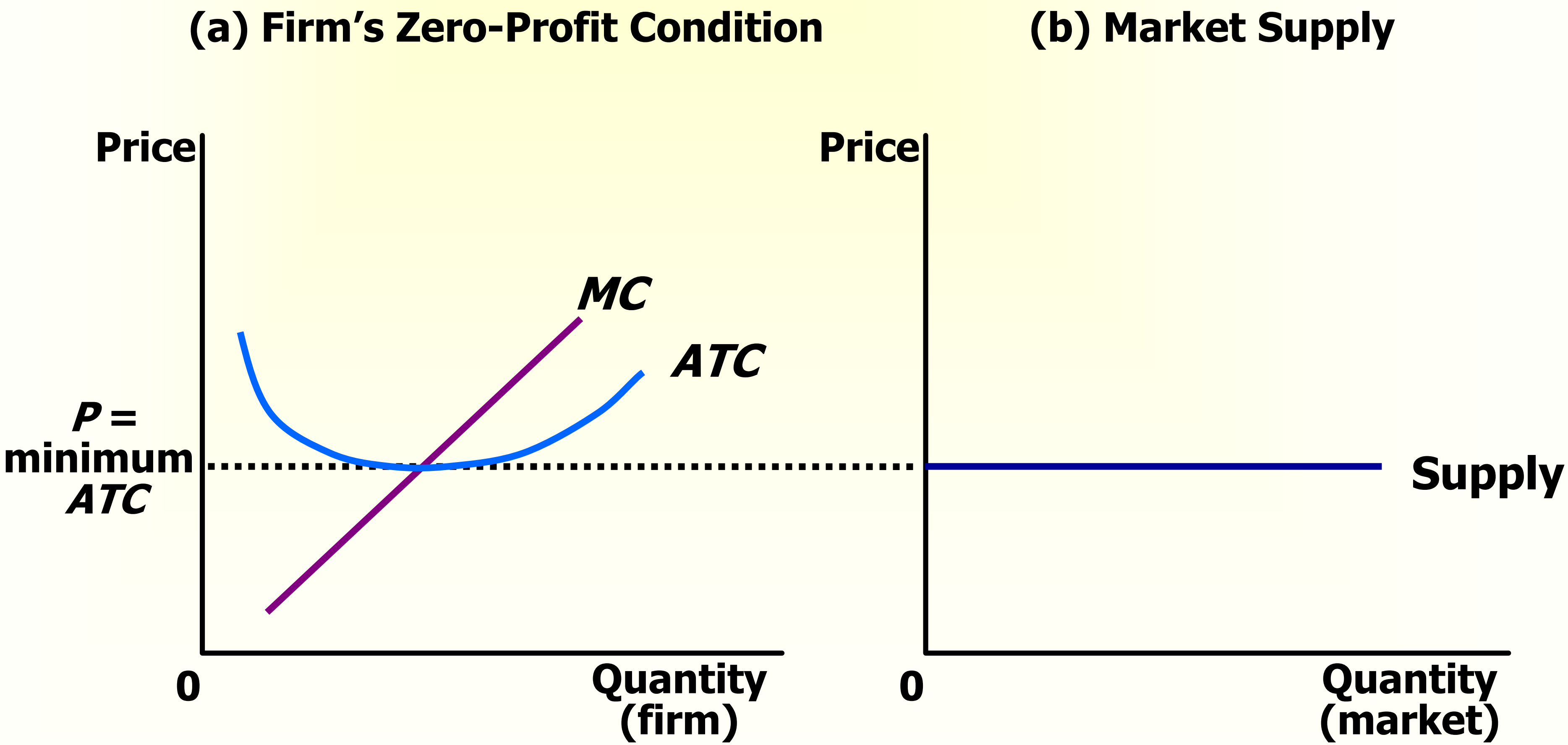
The Short Run: Market Supply with a Fixed Number of Firms...



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...



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

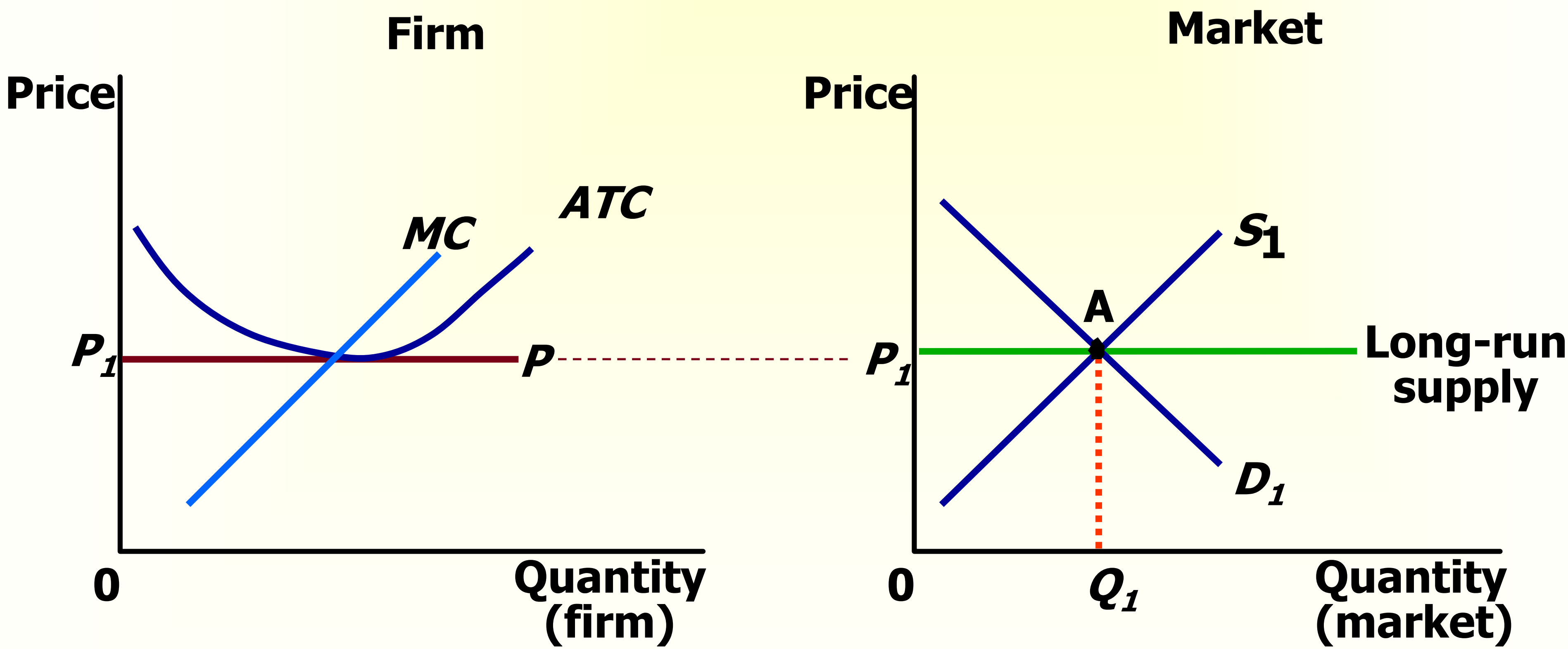
- Profit equals total revenue minus total cost.
- Total cost includes all the opportunity costs of the firm.
- In the zero-profit equilibrium, the firm’s revenue compensates the owners for the time and money they expend to keep the business going.

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.

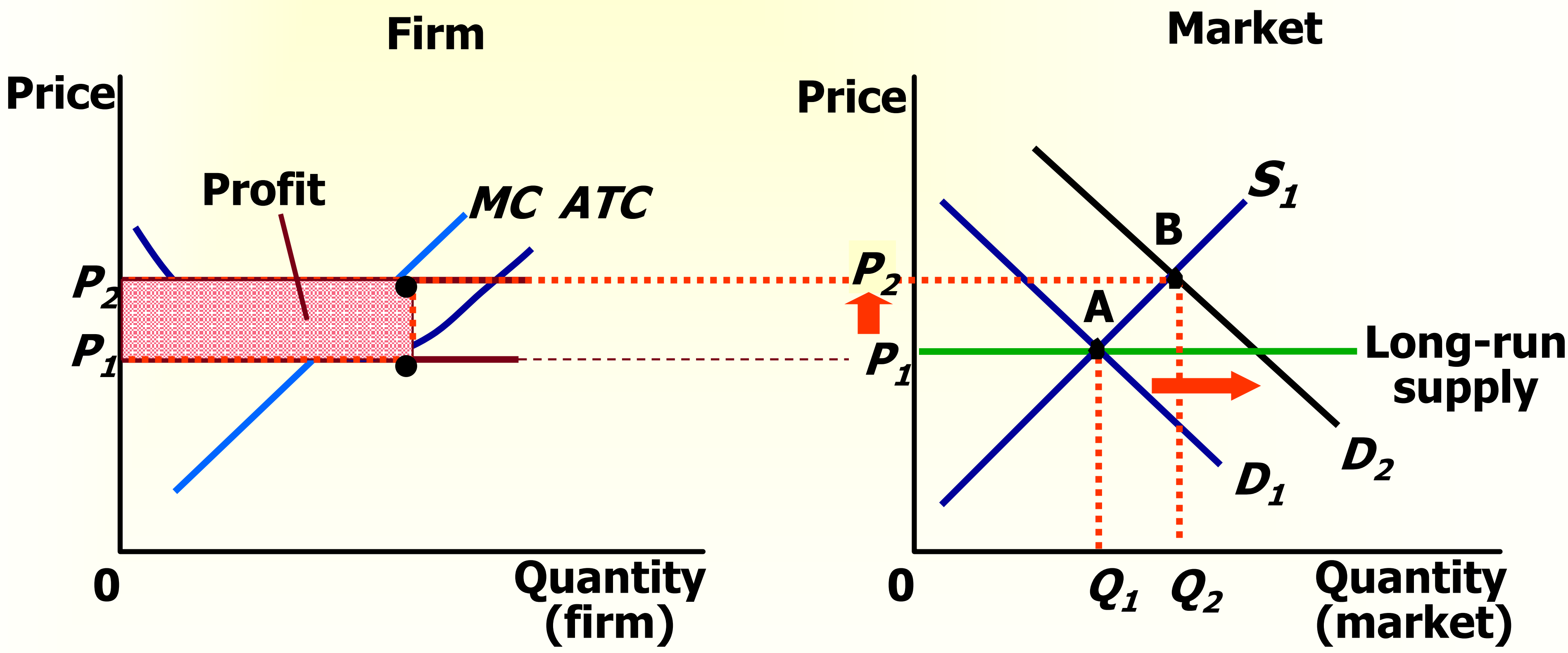
Increase in Demand in the Short Run...

(a) Initial Condition



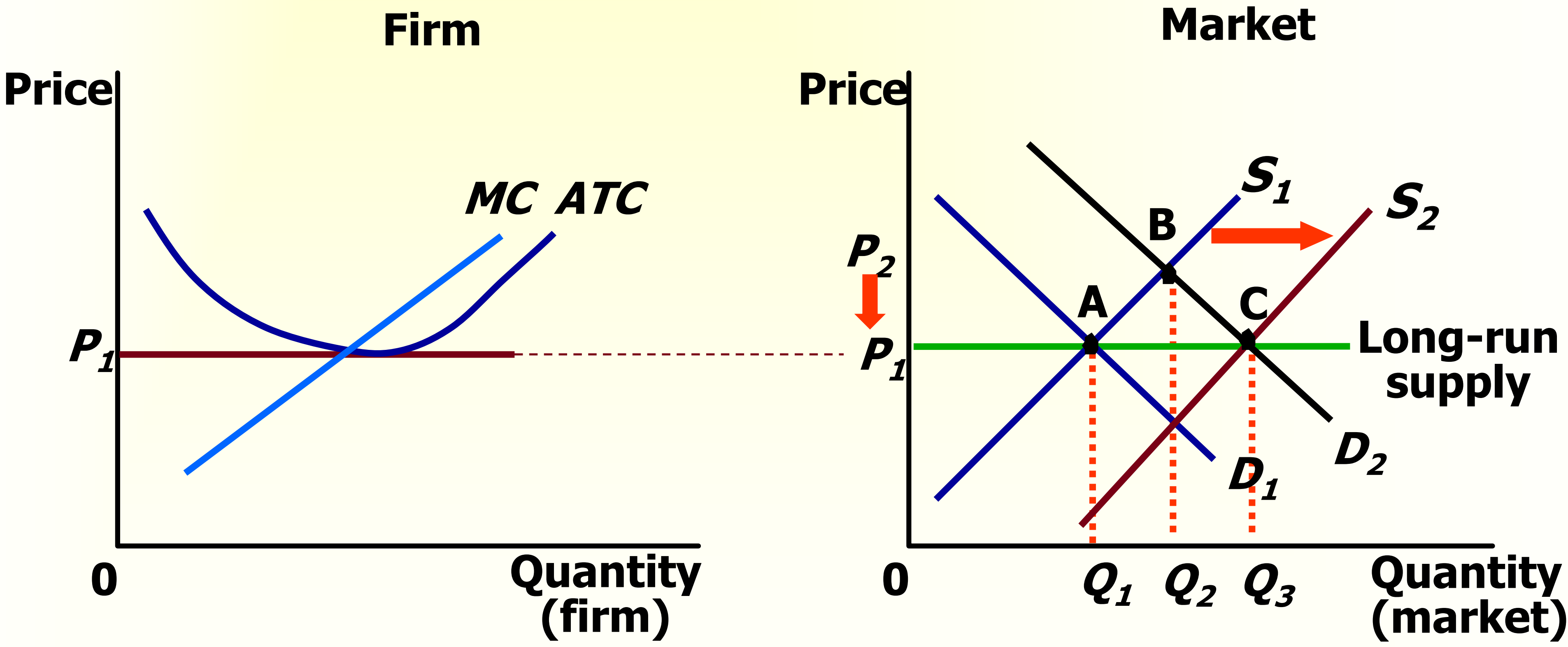
Increase in Demand in the Short Run...

(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

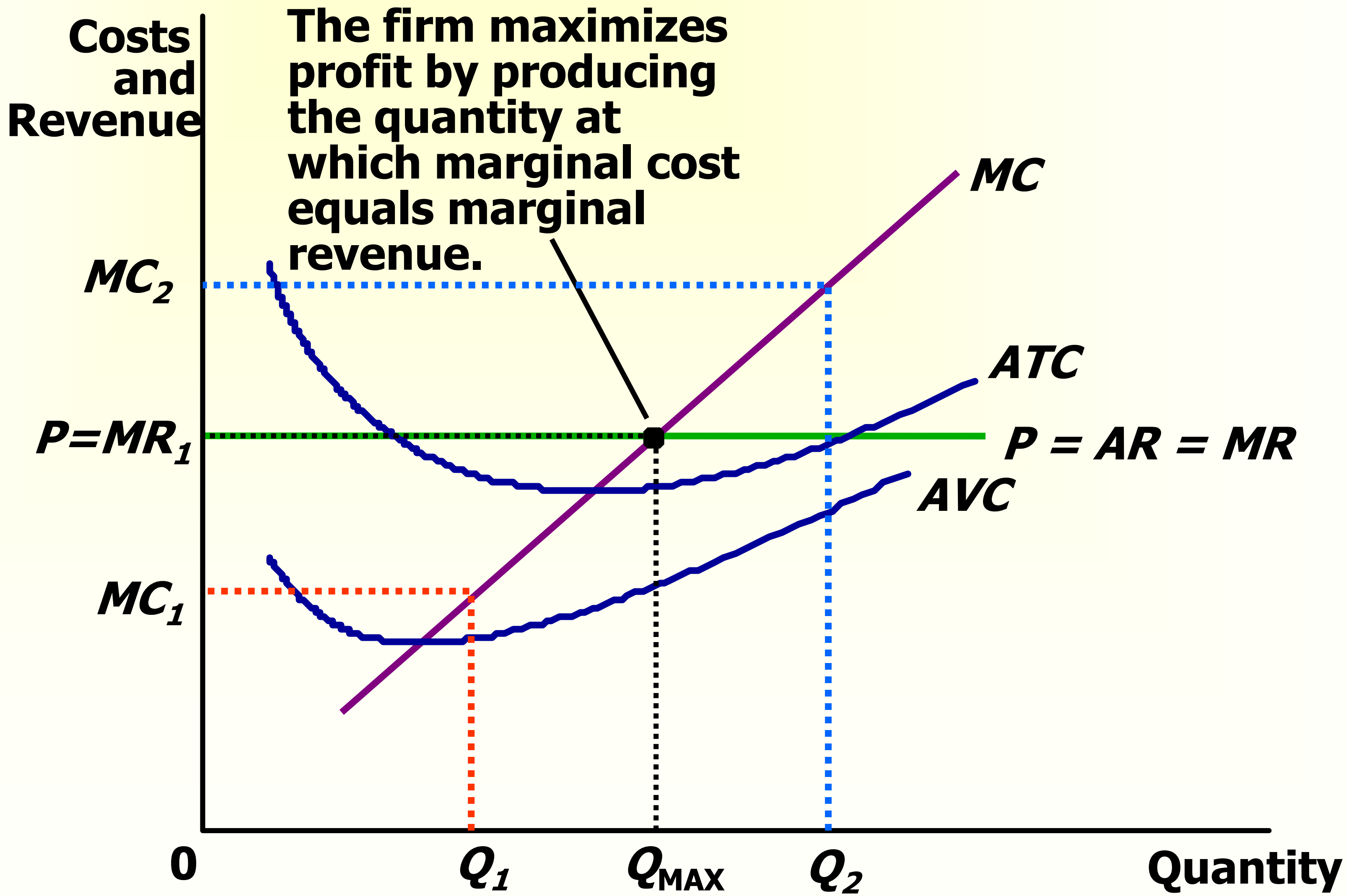
- In the short run when a firm cannot recover its fixed costs, the firm will choose to shut down temporarily if the price of the good is less than average variable cost.
- In the long run when the firm can recover both fixed and variable costs, it will choose to exit if the price is less than average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

Profit Maximization for the Competitive Firm...



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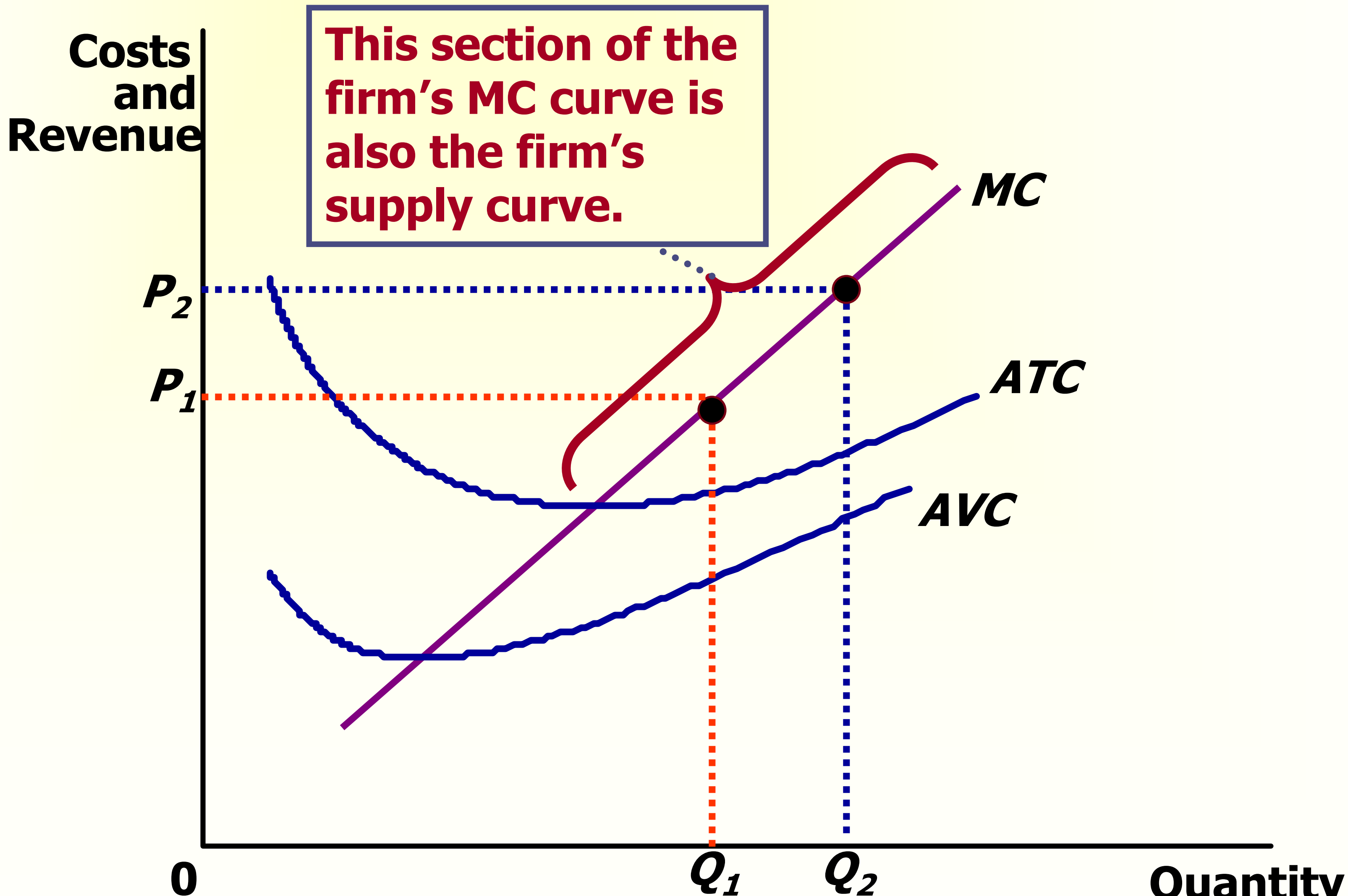

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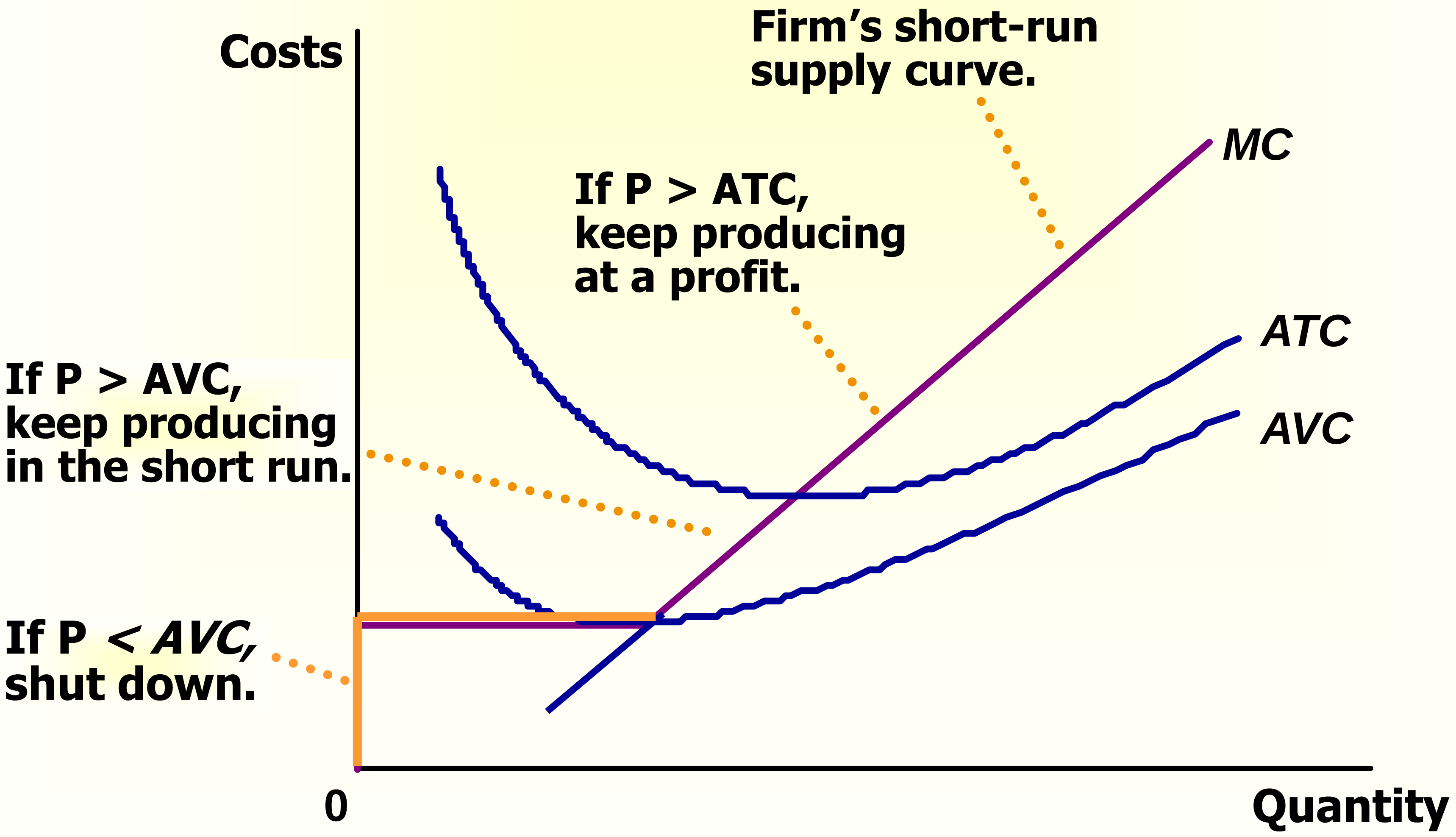
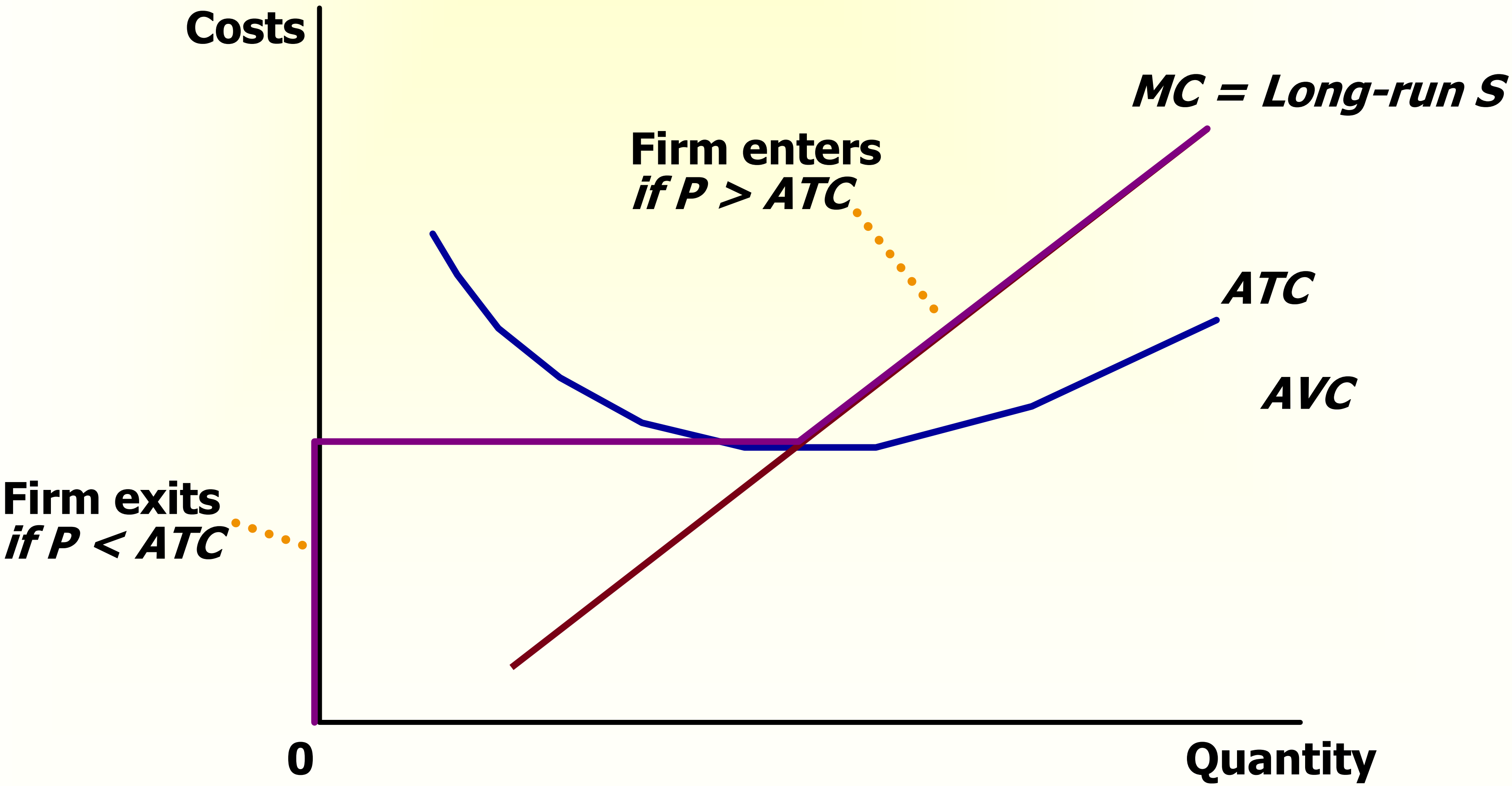


The Competitive Firm's Long-Run Supply Curve...



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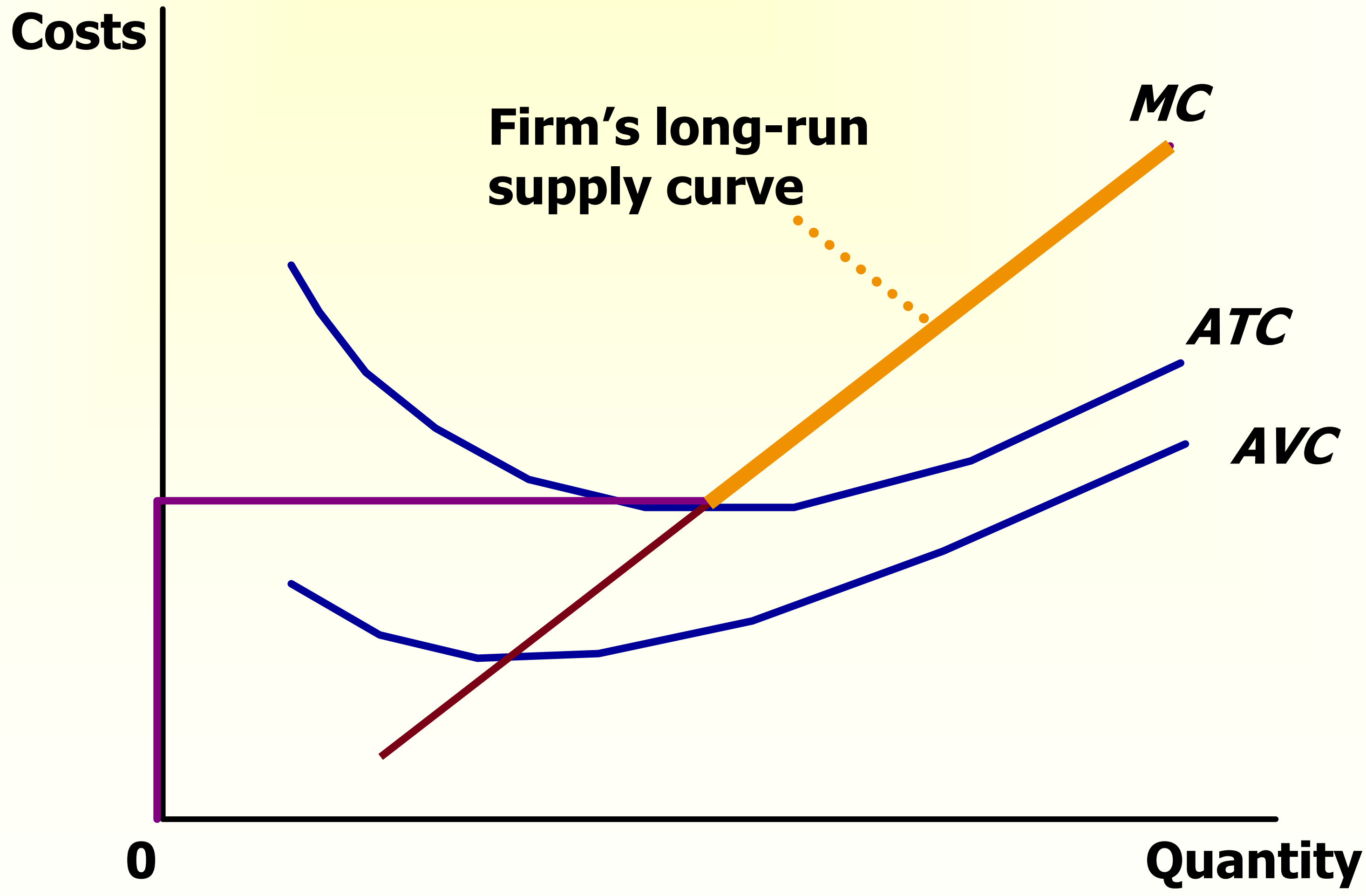
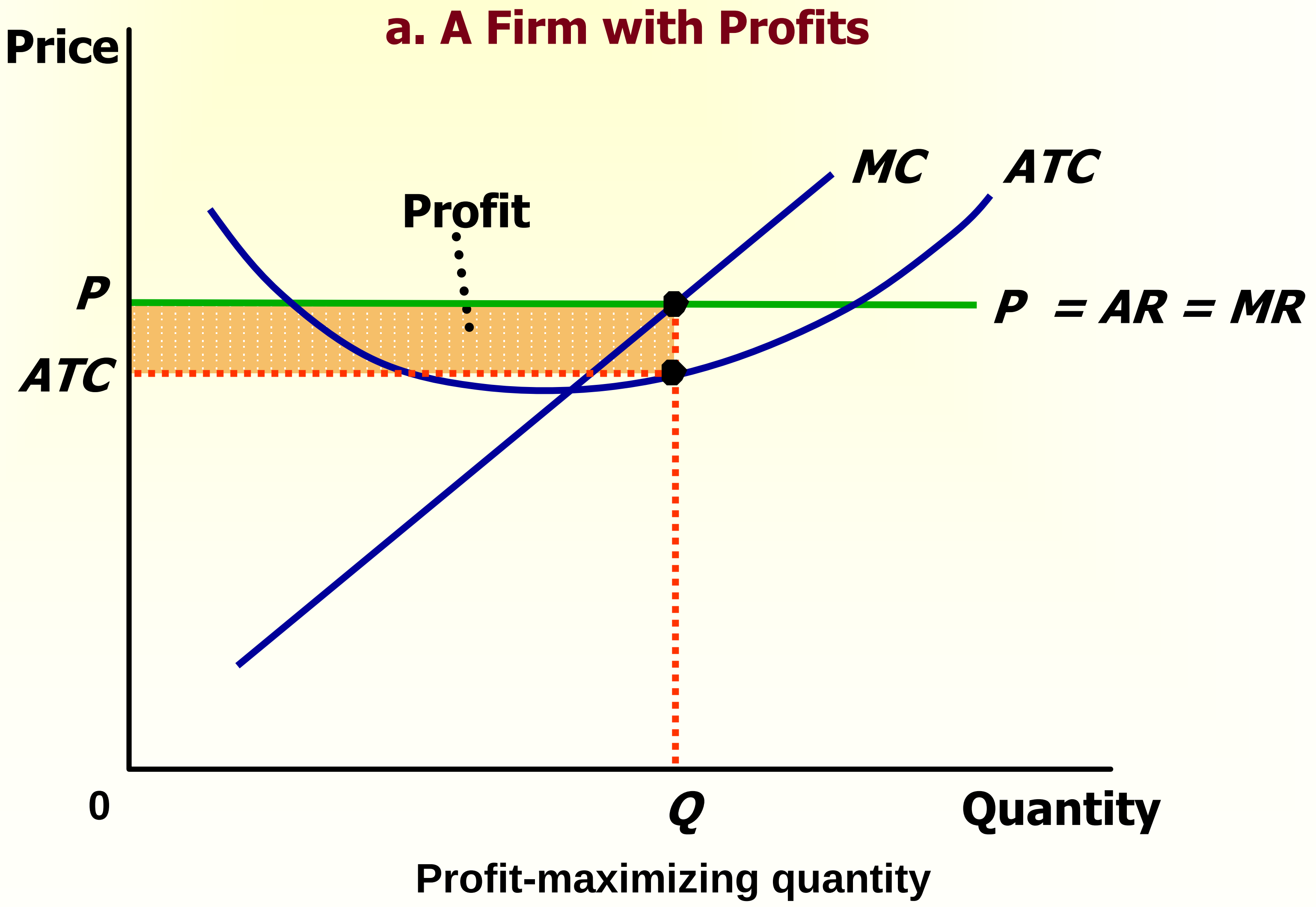


Measuring Profit in the Graph for the Competitive Firm...



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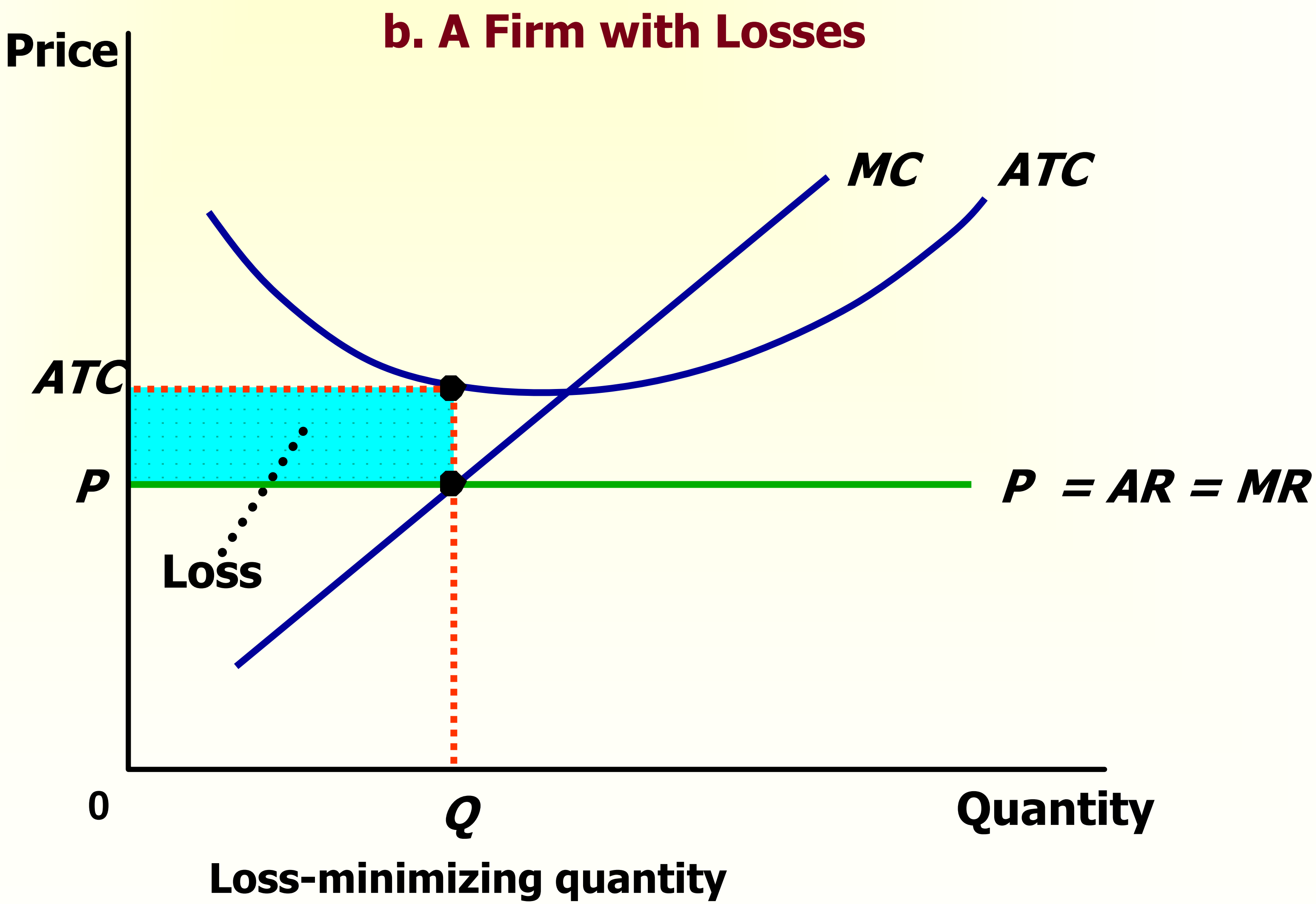
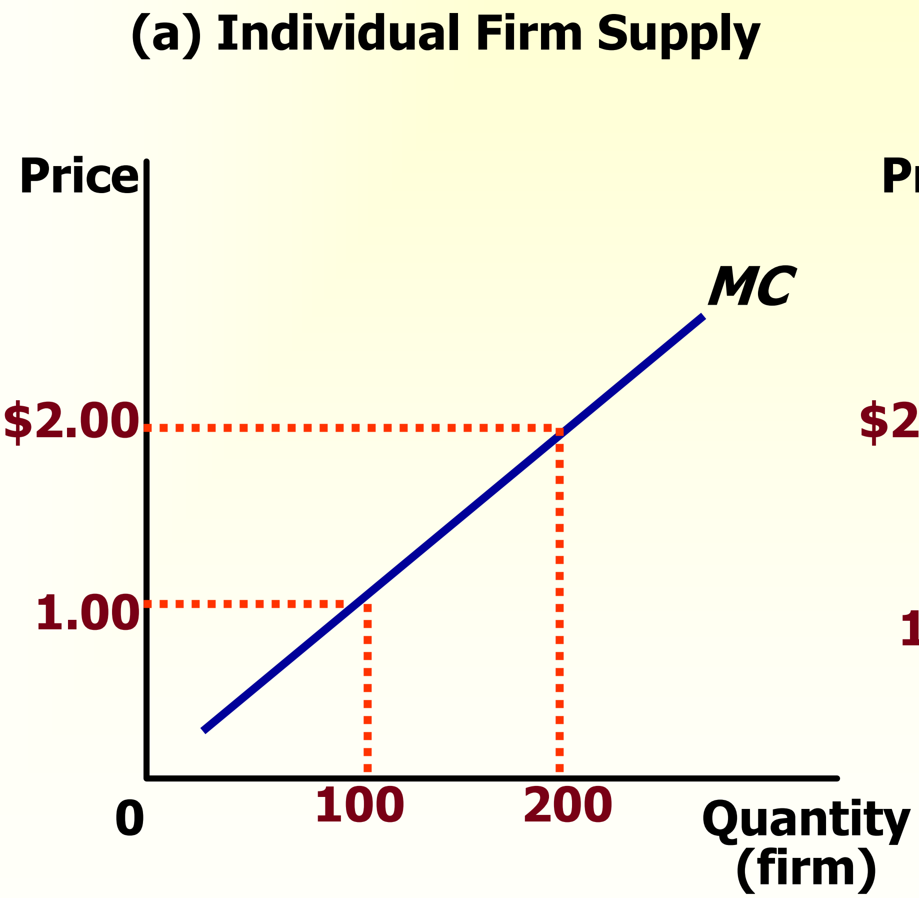
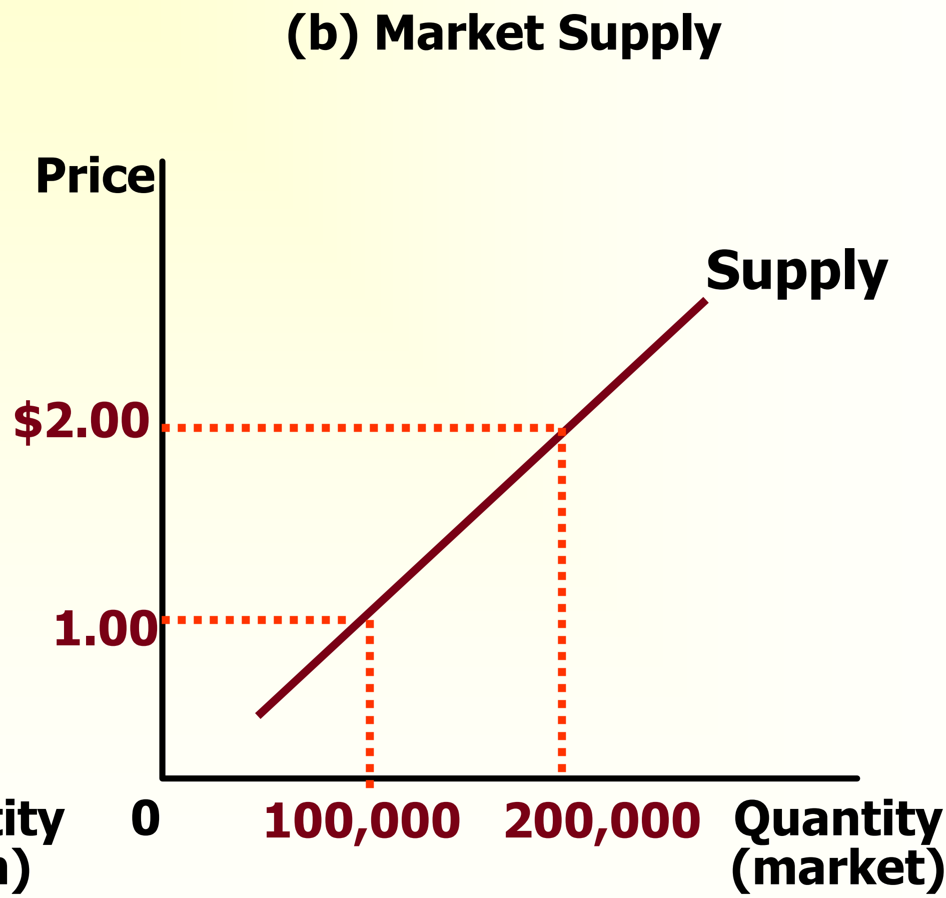
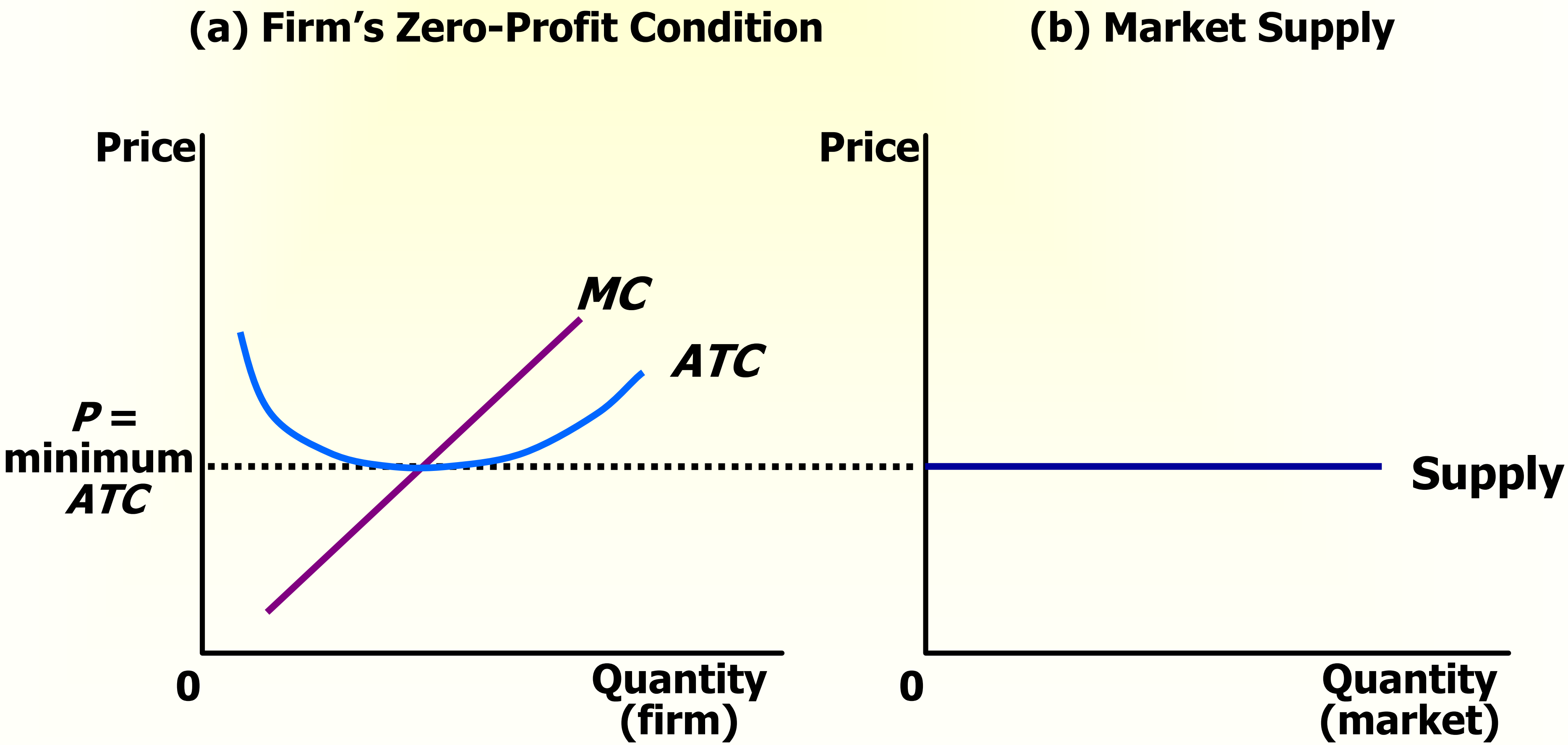


The Short Run: Market Supply with a Fixed Number of Firms...



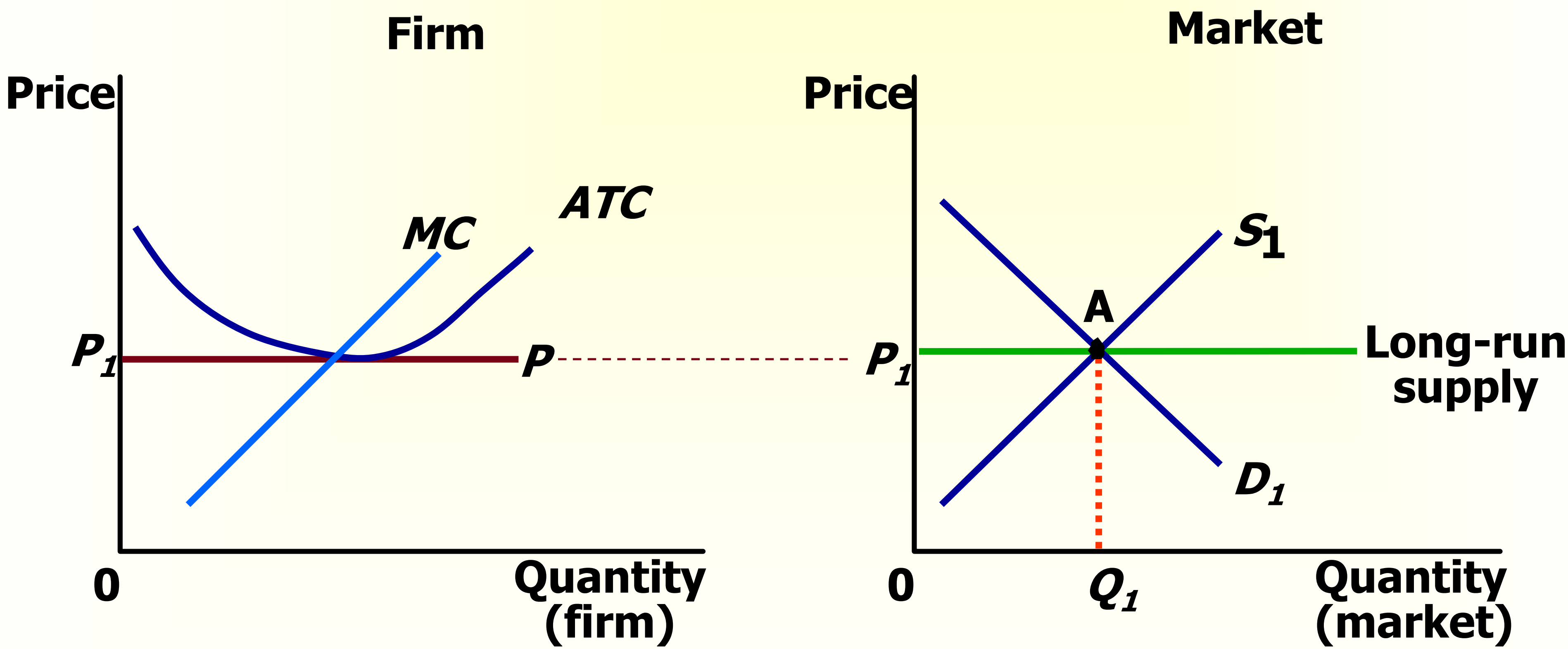


The Long Run: Market Supply with Entry and Exit...



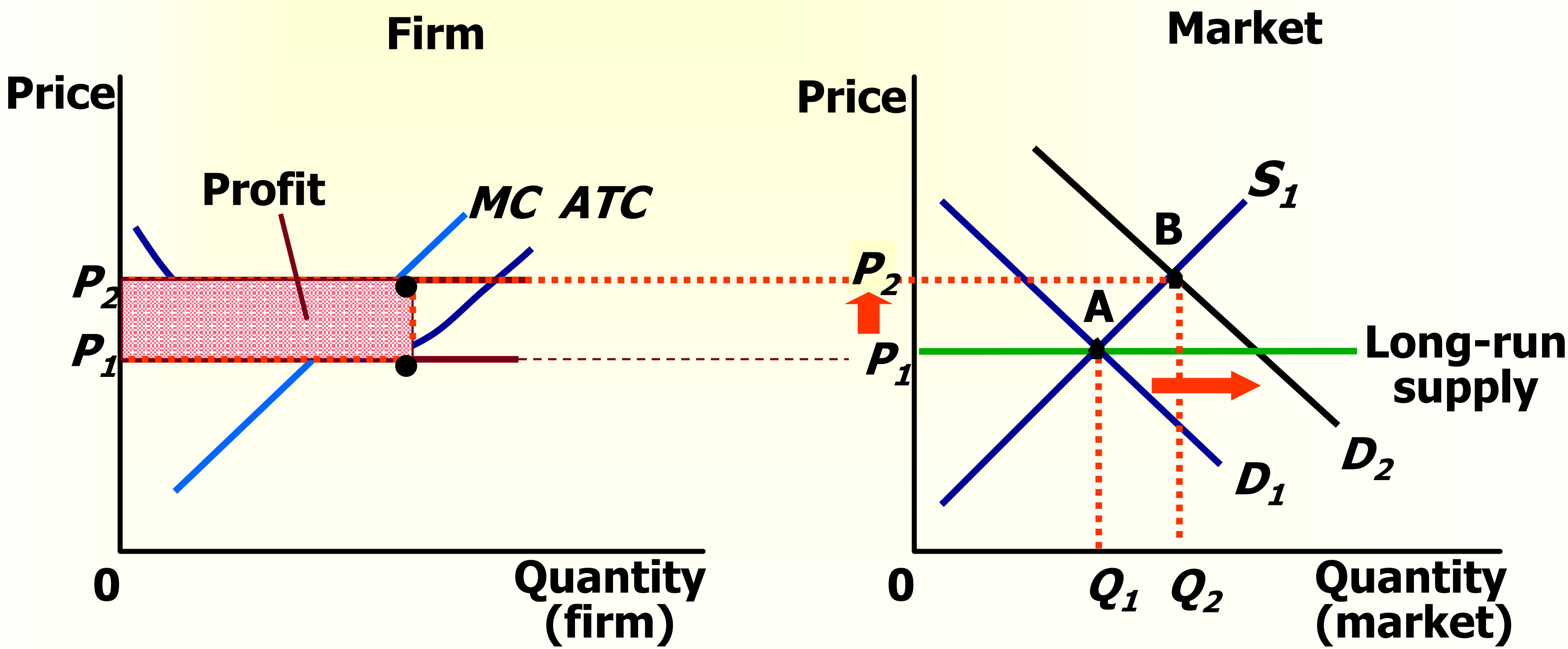
Increase in Demand in the Short Run...

(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