Behaviour of firms in perfectly competitive markets

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HS 101 Economics

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 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. Product homogeneity.
  - Firms can freely enter or exit the market.
  - All the buyers and sellers are price takers.

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 Revenue of a Competitive Firm

- Total revenue for a firm is the selling price times the quantity sold.
- $TR = (P \times Q)$
- 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.

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

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

$$= \text{Price}$$

The Revenue of a Competitive Firm

- *Marginal revenue* is the change in total revenue from an additional unit sold.
- $MR = \Delta TR / \Delta Q$
- For competitive firms, marginal revenue equals the price of the good.

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

Quantity (Q)	Price (P)	Total Revenue ($TR = P \times Q$)	Average Revenue ($AR = TR/Q$)	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 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 (Q)	Total Revenue (TR)	Total Cost (TC)	Profit (TR − TC)	Marginal Revenue (MR = ΔTR/ΔQ)	Marginal Cost (MC = ΔTC/ΔQ)	Change in Profit (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			

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

- Profit maximization occurs at the quantity where *marginal revenue equals marginal cost*.
  - When $MR > MC$, *in*crease Q
  - When $MR < MC$, *de*crease Q
  - When $MR = MC$, profit is maximized.

Figure 1 Profit Maximization for a Competitive Firm

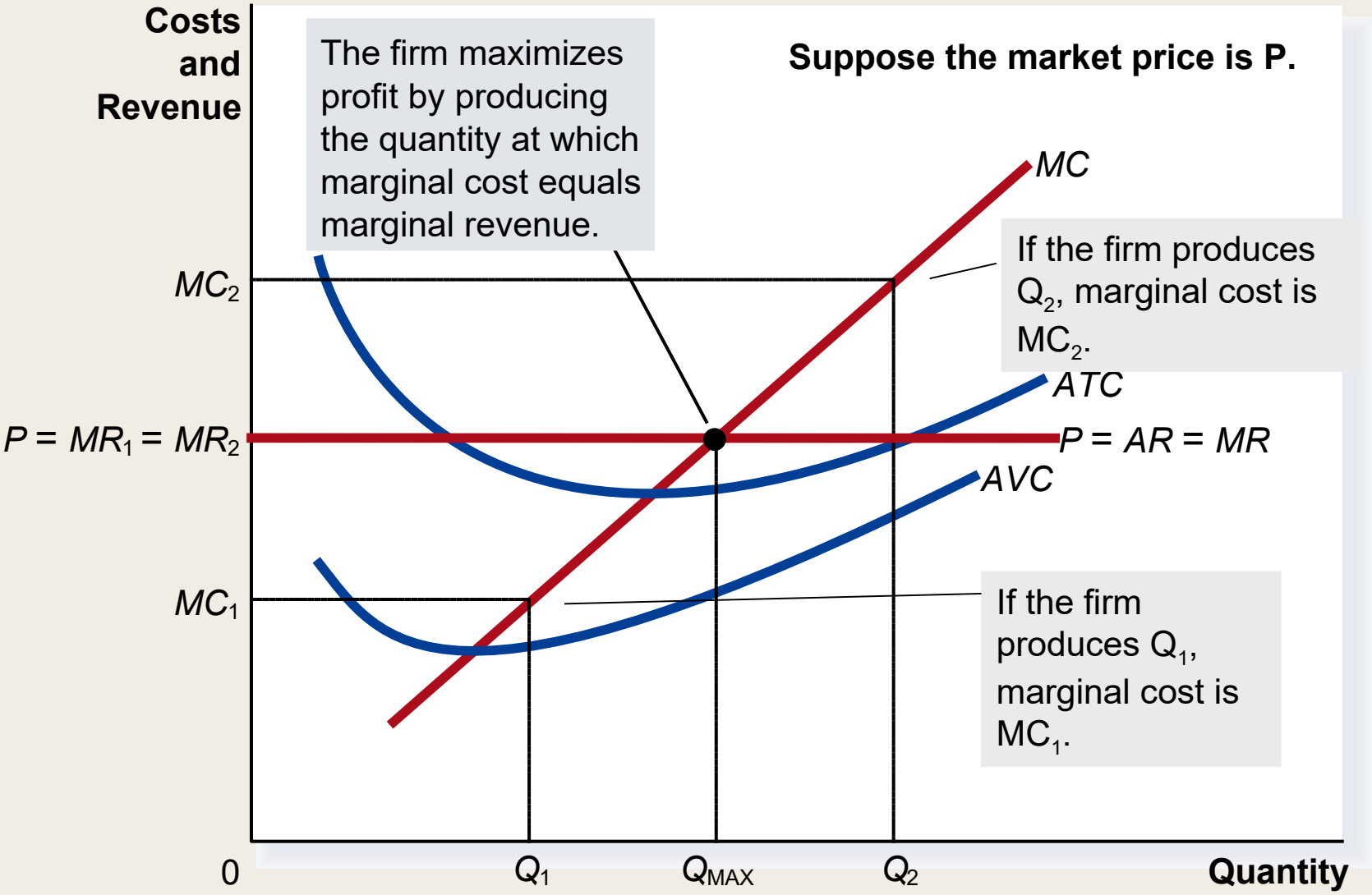
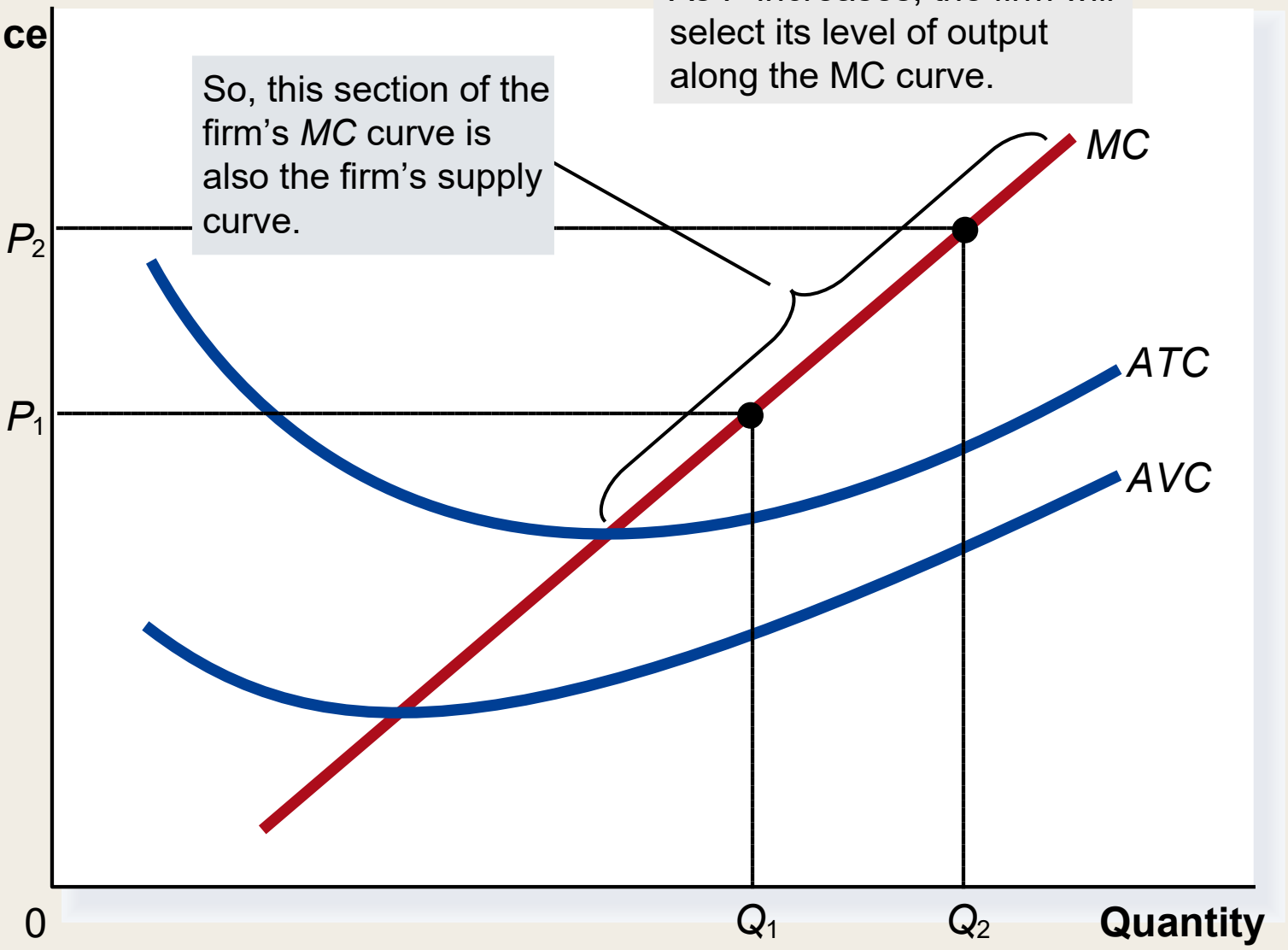


Figure 2 Marginal Cost as the Competitive Firm's Supply Curve



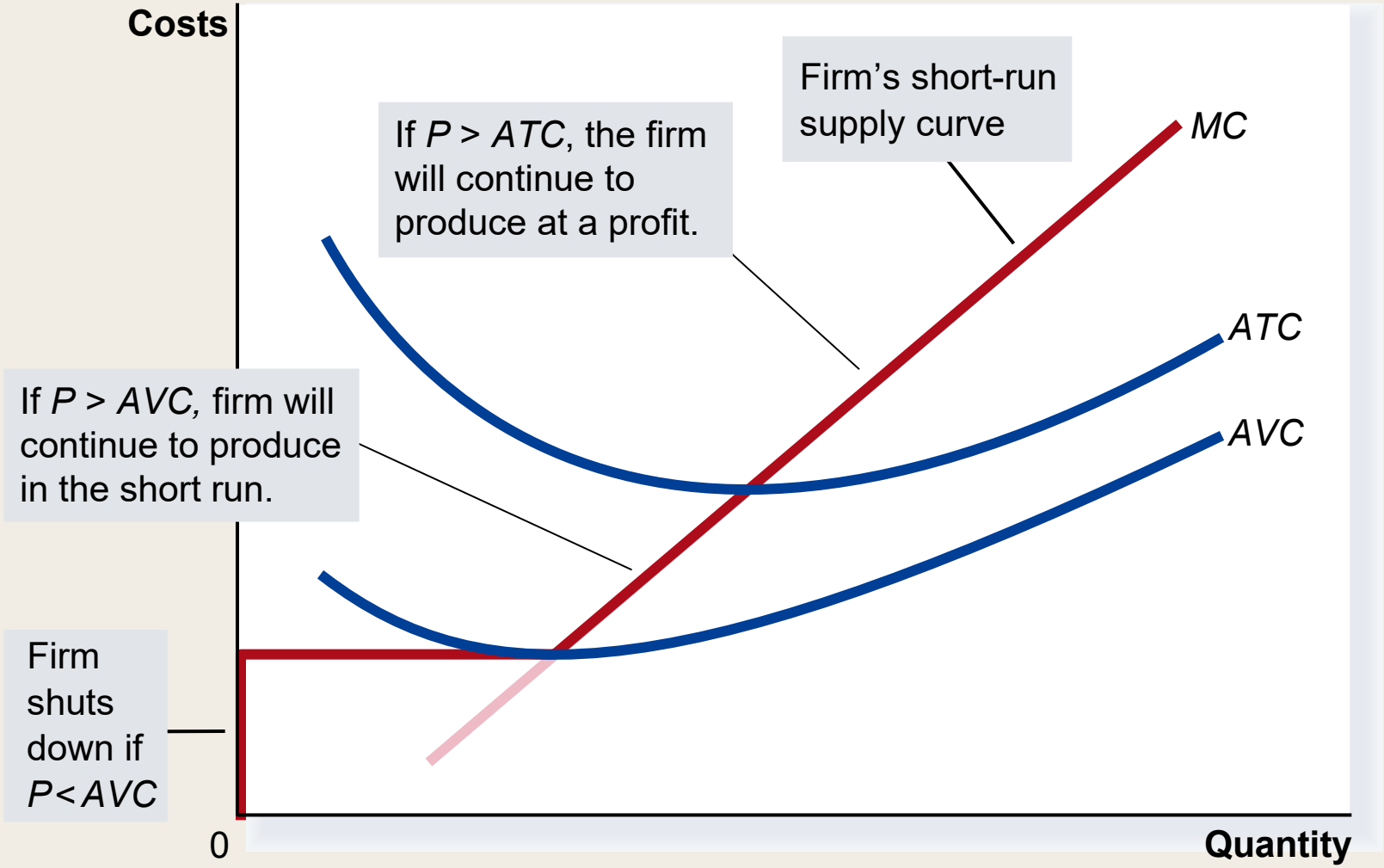
The Firm's Short-Run Decision to Shut Down

- 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 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

- 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.
    - It is not the same as the Fixed Costs.

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.

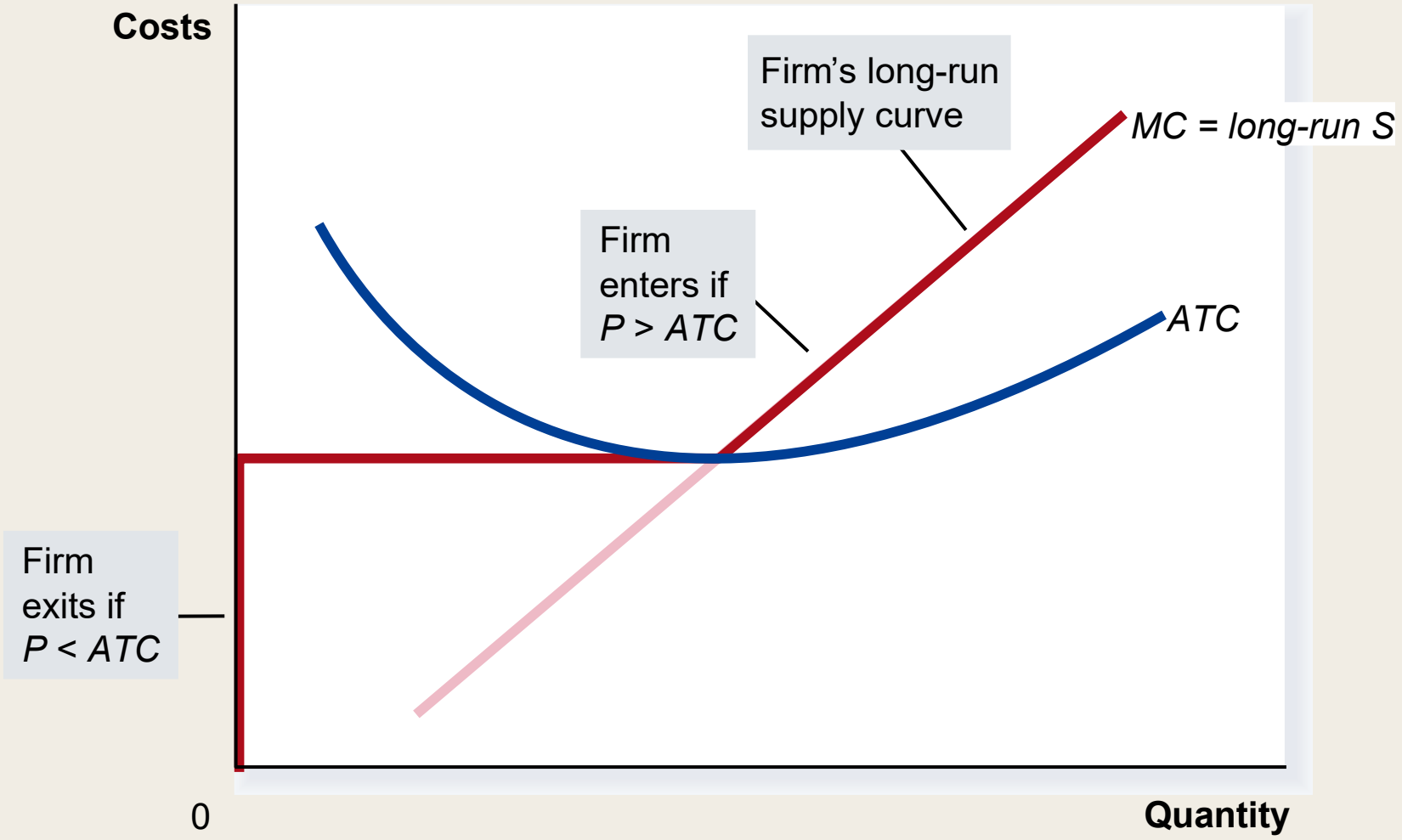
The Firm's Long-Run Decision to Exit or Enter a Market

- 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



Measuring Profit in Our Graph for the Competitive Firm

- Profit = $TR - TC$
- Profit = $(TR/Q - TC/Q) \times Q$
- Profit = $(P - ATC) \times Q$

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

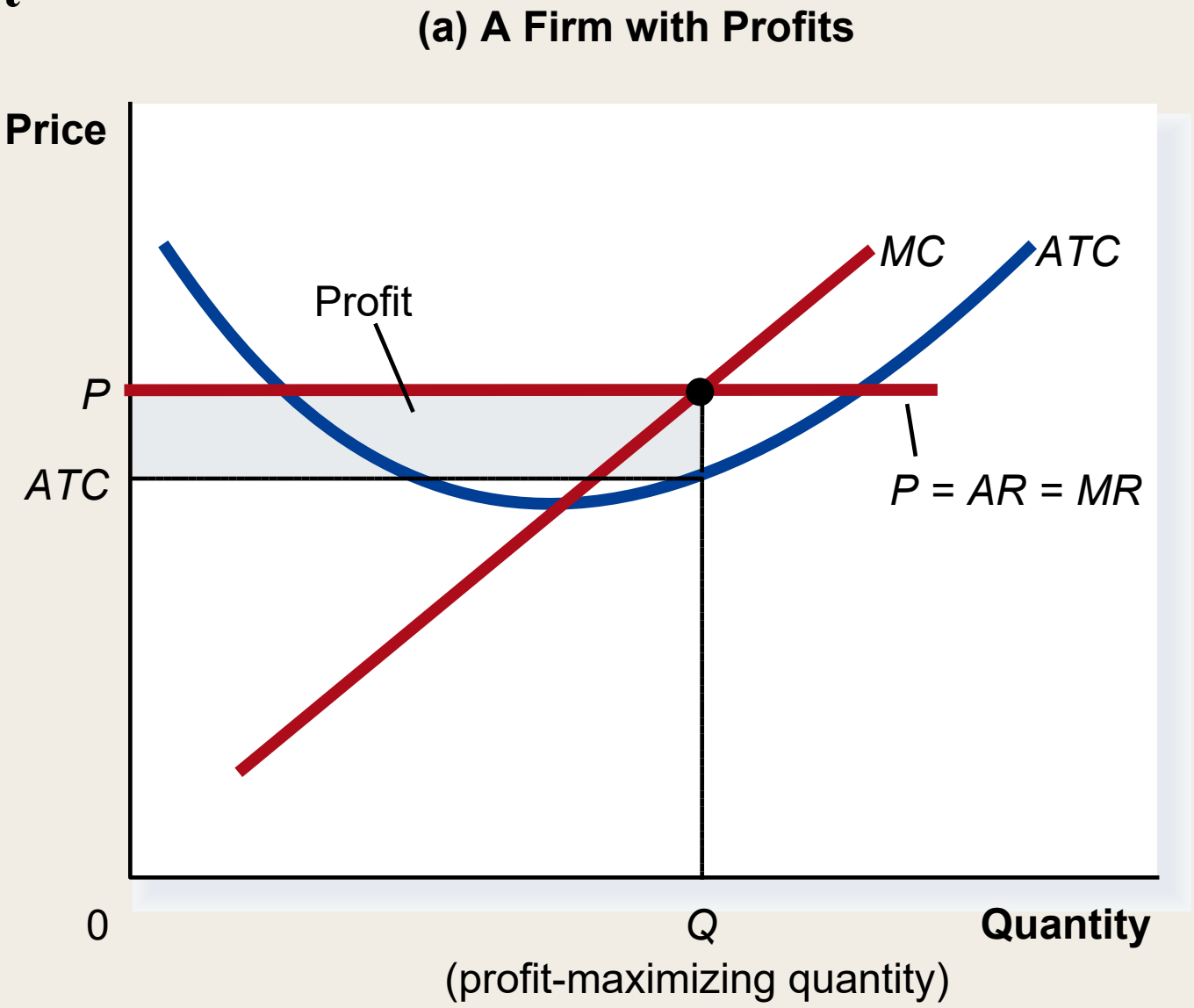
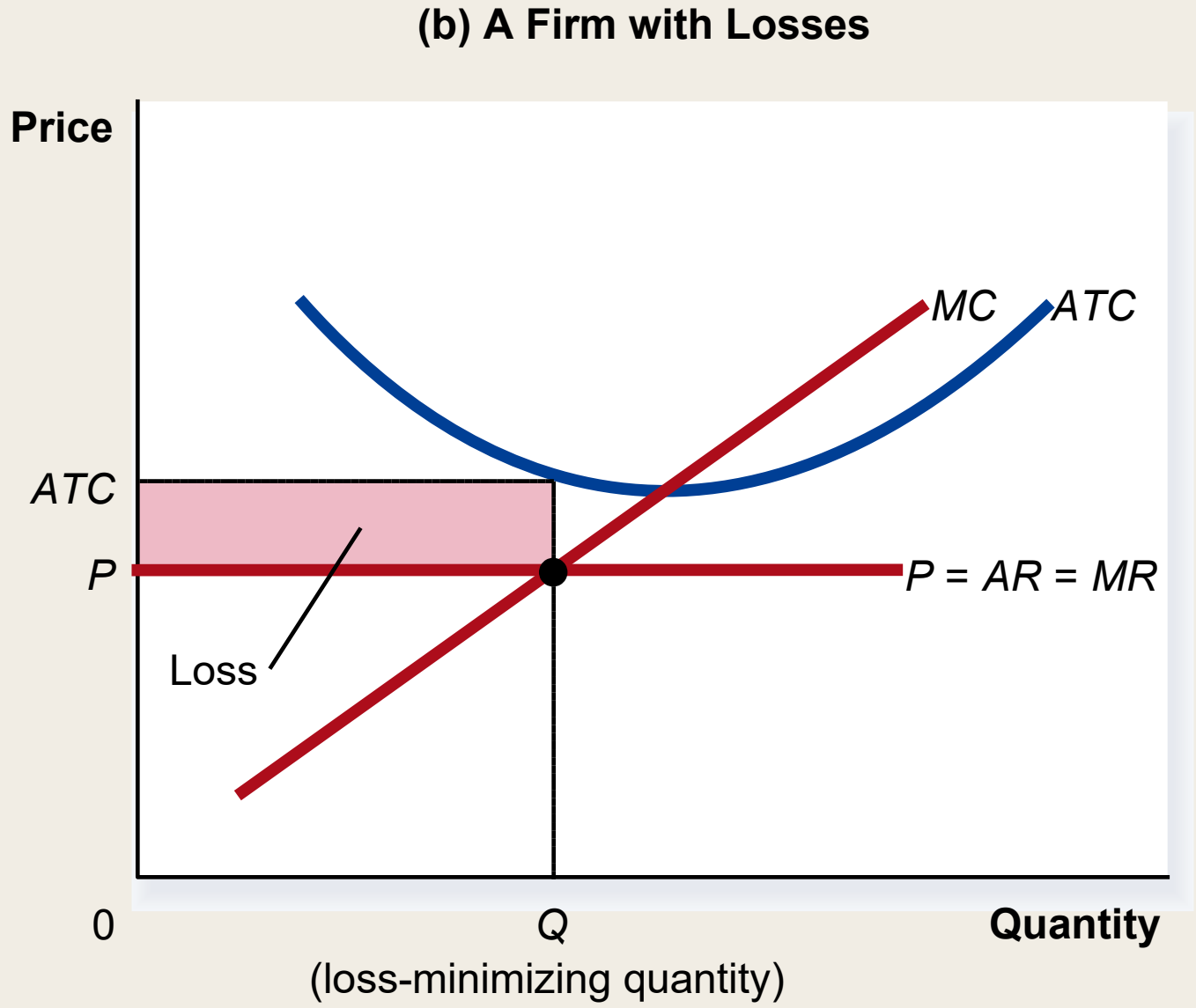


Figure 5 Profit as the Area between Price and Average Total Cost



THE 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.

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.

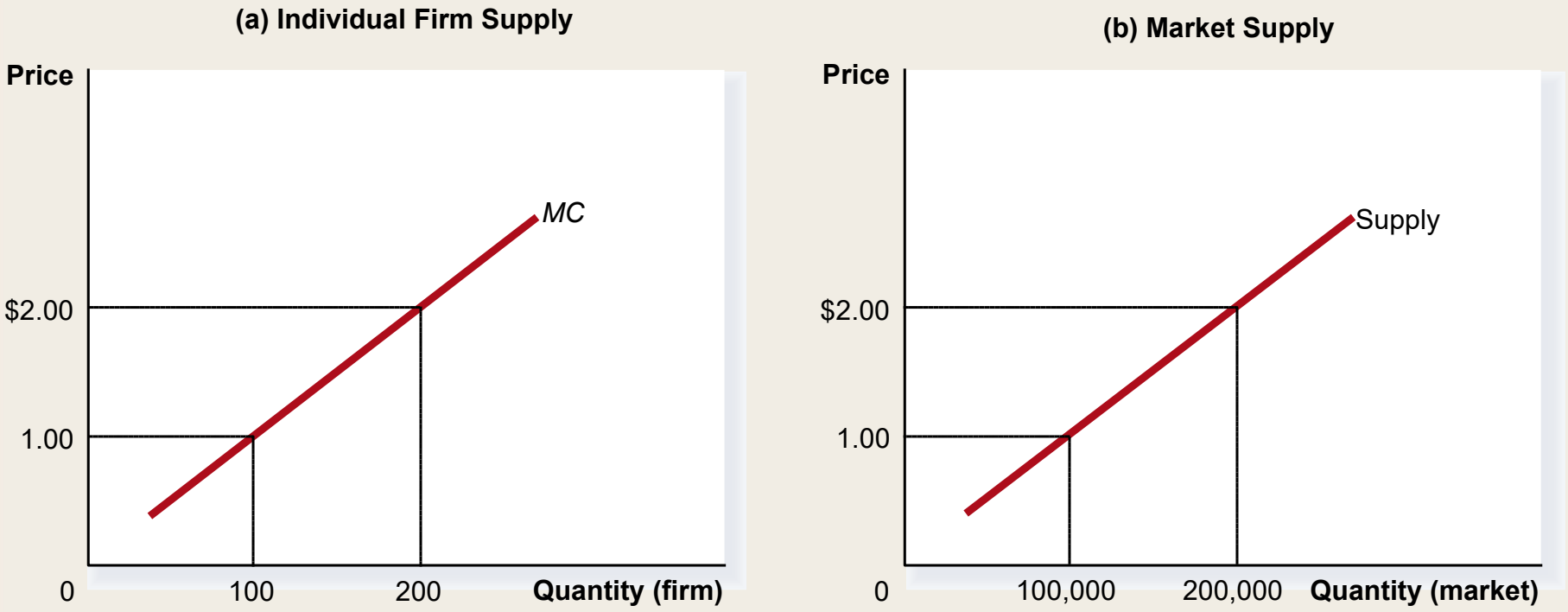
THE SUPPLY CURVE IN A COMPETITIVE MARKET

- 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 Short-Run Market Supply

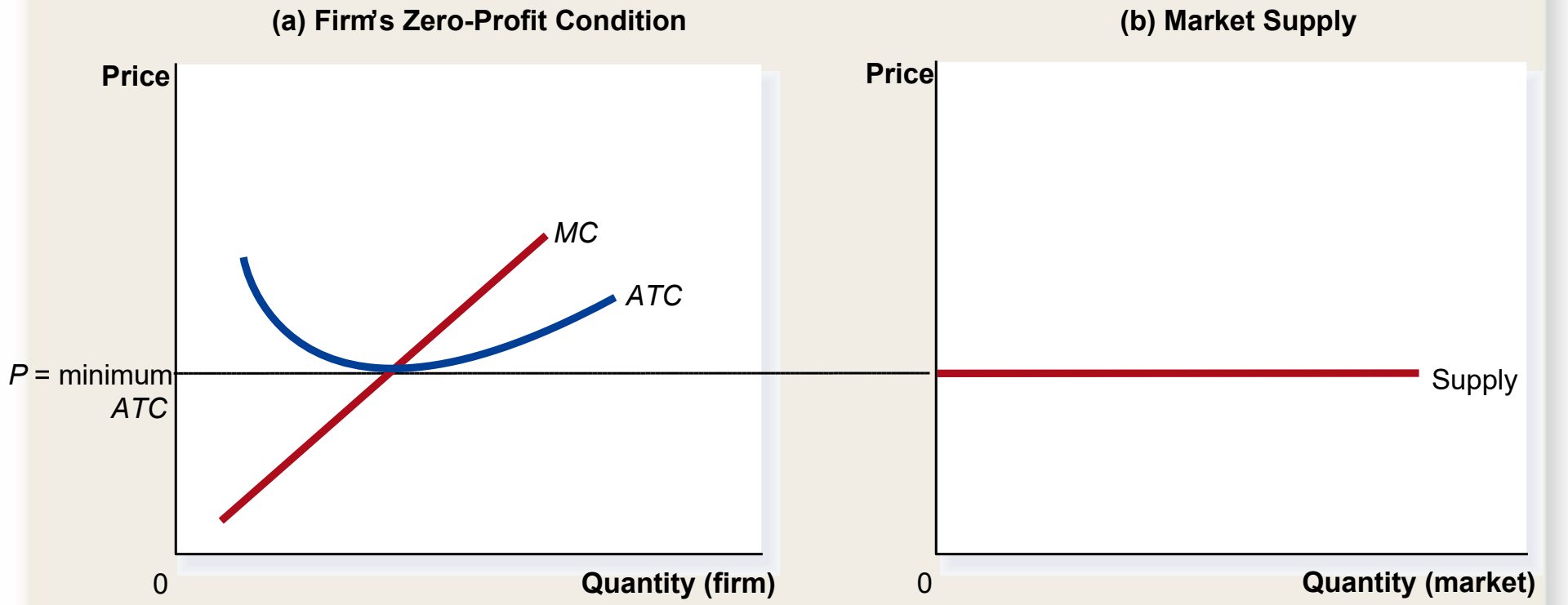


If the industry has 1000 identical firms, then at each market price, industry output will be 1000 times larger than the representative firm's output.

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 Long-Run 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.

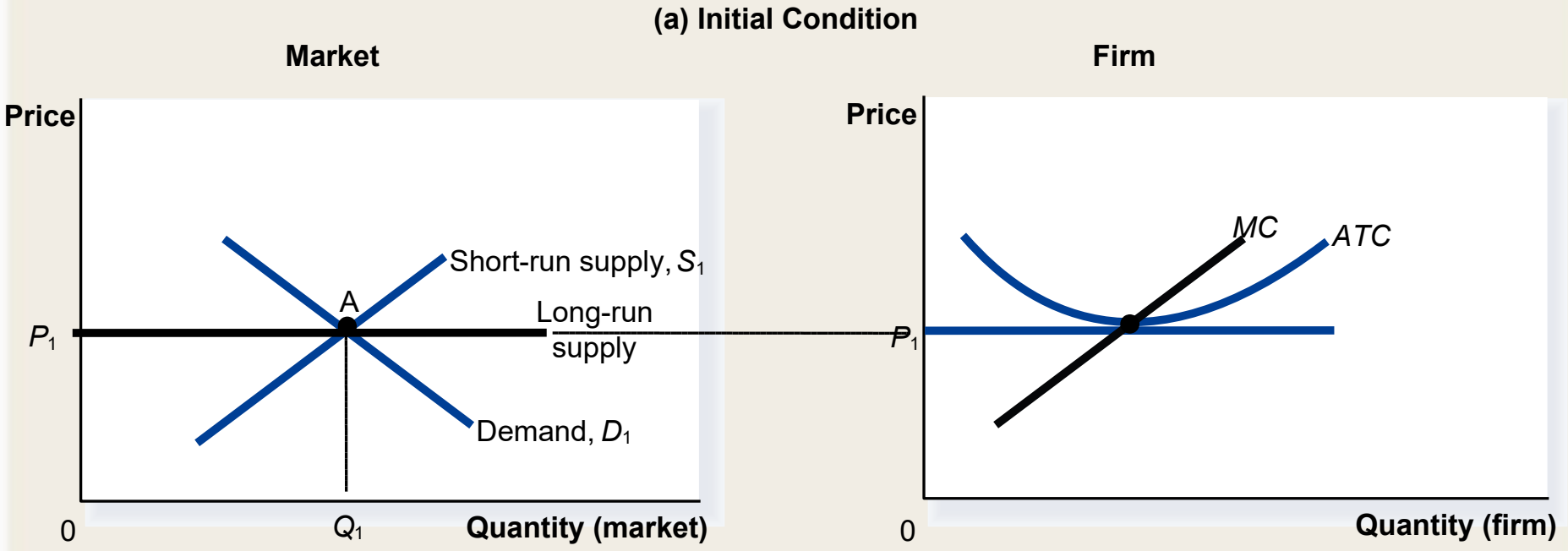
Why Do Competitive Firms Stay in Business If They Make Zero Profit?

- 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 market begins in long run equilibrium.

And firms earn zero profit.

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

An increase in market demand…

…raises price and output.

The higher P encourages firms to produce more… …and generates short-run profit.

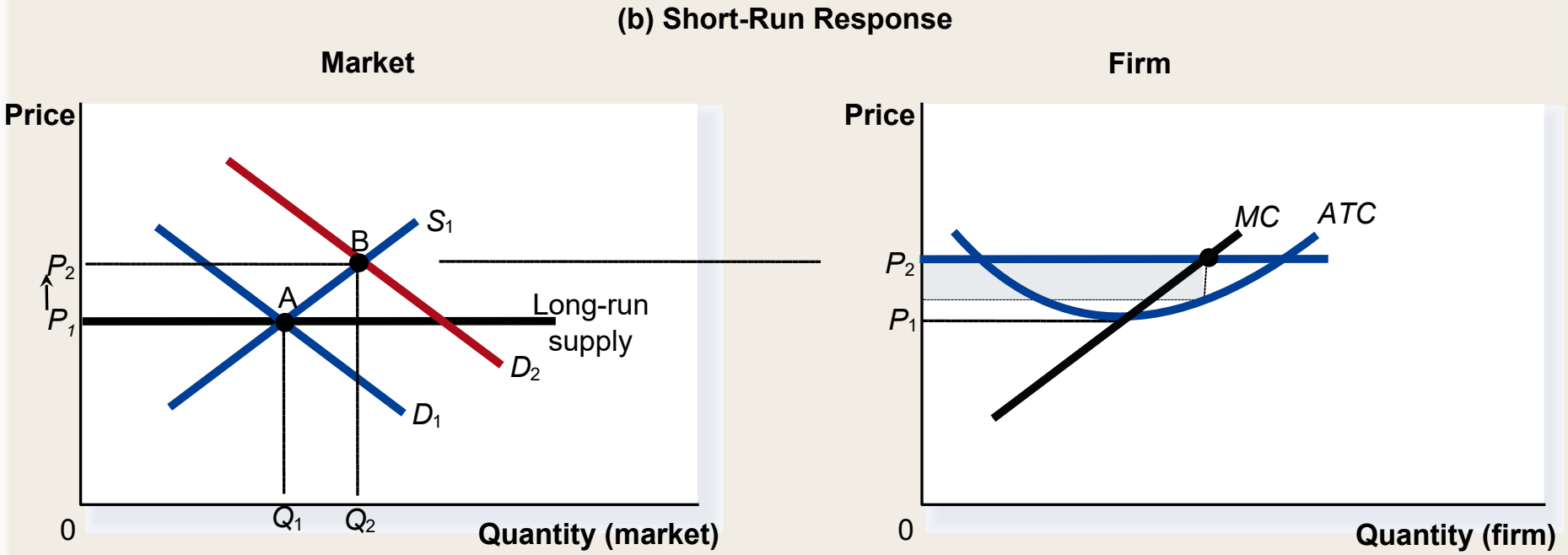
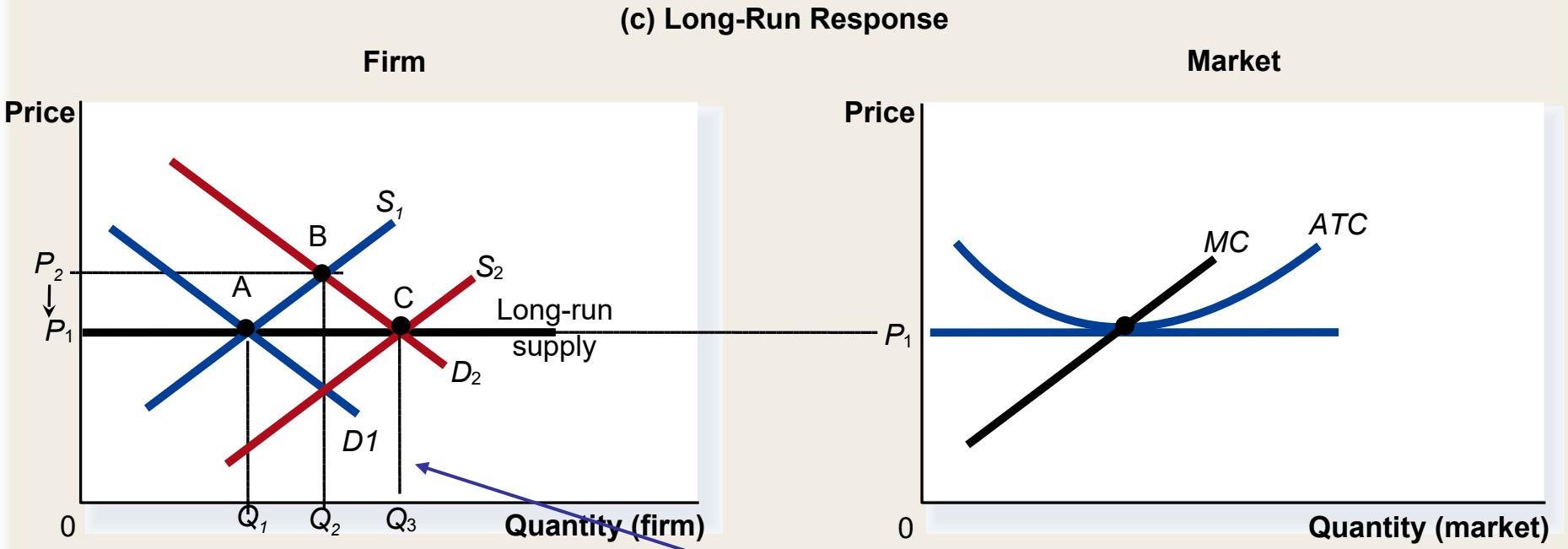


Figure 8 An Increase in Demand in the Short Run and Long Run

Profits induce entry and market supply increases.



The increase in supply lowers market price.

In the long run market price is restored, but market supply is greater.

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.

Special cases of Competitive Markets

- Constant and Increasing costs
- Completely inelastic supply [which produces economic rents], and
- Backward bending supply.

Evaluating the market mechanism

- Efficiency:
  - Pareto efficiency [also known an just efficiency] occurs when no possible reorganisation of production or distribution can make anyone better off without making someone else worse off.
    - Under conditions of allocative efficiency, one person's satisfaction or utility can be increased only by lowering someone else's utility.
    - Maximising economic surplus, i.e., consumers' & producers' surplus.

Equilibrium with many consumers and markets

- The perfectly competitive market is a device for synthesizing
  - The willingness of consumers possessing rupee votes to pay for goods with
  - The marginal costs of those goods as represented by firms' supply.
    - Under certain conditions, competition guarantees efficiency, in which no consumer's utility can be raised without lowering another consumer's utility. This is true in a world of many factors and products.

Marginal cost as a benchmark of efficiency

- Marginal cost is a fundamental concept for efficiency.
- For any goal-oriented organization, efficiency requires that the marginal cost of attaining the goal should be equal in every activity.
- In a market, an industry will produce its output at minimum total cost only when each firm's MC is equal to a common price.

Exception to the Rule

- Markets may be inefficient in situations where pollution or other externalities are present or when there is imperfect competition or information.
- The distribution of incomes under competitive markets, even when it is efficient, may not be socially undesirable or acceptable.

Several questions arise

- Positive economics cannot say how much govts should intervene to correct the inequalities and inefficiencies of the market place
- The normative questions are appropriately answered through political debate and fair elections.
  - The subject matter of economics can offer valuable insights into the merit of alternative iterventions so that the goals of a modern society can be achieved in the most effective manner.

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.