Presentation to accompany

Principles of Microconomics, Fourth Edition

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Lecture 9

Previously...

- Firm Behavior – Costs of Production
  - fixed, variable cost
  - marginal, average, total cost
  - short run, long run

Today...

- Firms in competitive markets
  - profit maximization
  - individual and market supply
  - entry, shutdown, exit

Competitive Market

A perfectly competitive market has the following characteristics:

- 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

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

Revenue on Competitive Market

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

Revenue on Competitive Market

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

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

Revenue on Competitive Market

In competitive market, average revenue is equal to price:

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

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

Revenue on Competitive Market

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

Revenue on Competitive Market

Quantity	Price	Total Revenue	Average Revenue	Marginal Revenue
(*Q*)	(*P*)	(*TR* = *P* × *Q*)	(*AR* = *TR*/*Q*)	(*MR* = Δ*TR*/Δ*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

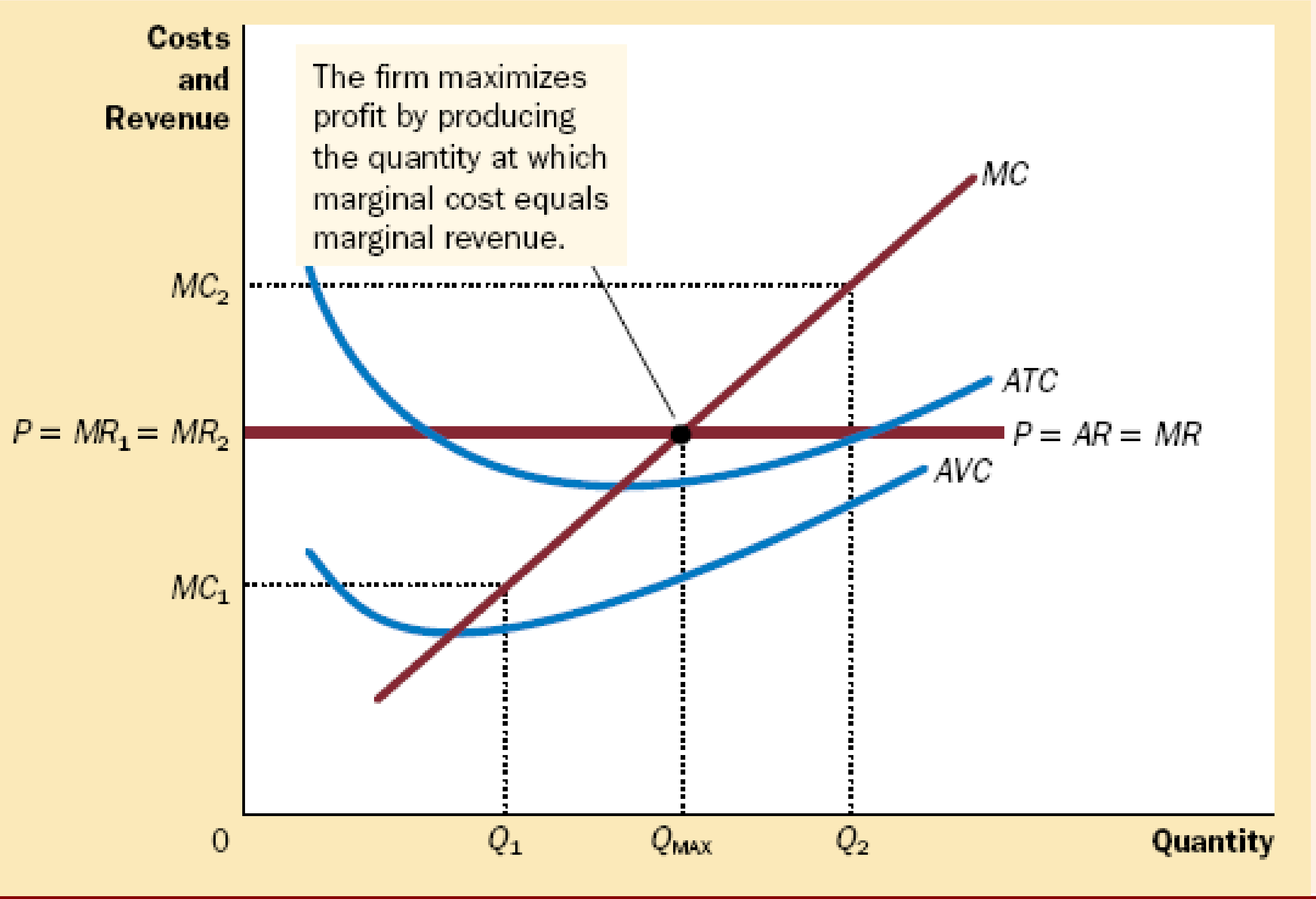
The goal of a competitive firm is to maximize profit

This means that the firm will want to produce the quantity that maximizes the difference between total revenue and total cost

Profit Maximization

Quantity (Q)	Total Revenue (TR)	Total Cost (TC)	Profit (TR – TC)	Marginal Revenue ($MR = \Delta TR/\Delta Q$)	Marginal Cost ($MC = \Delta TC/\Delta Q$)	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			

Profit Maximization

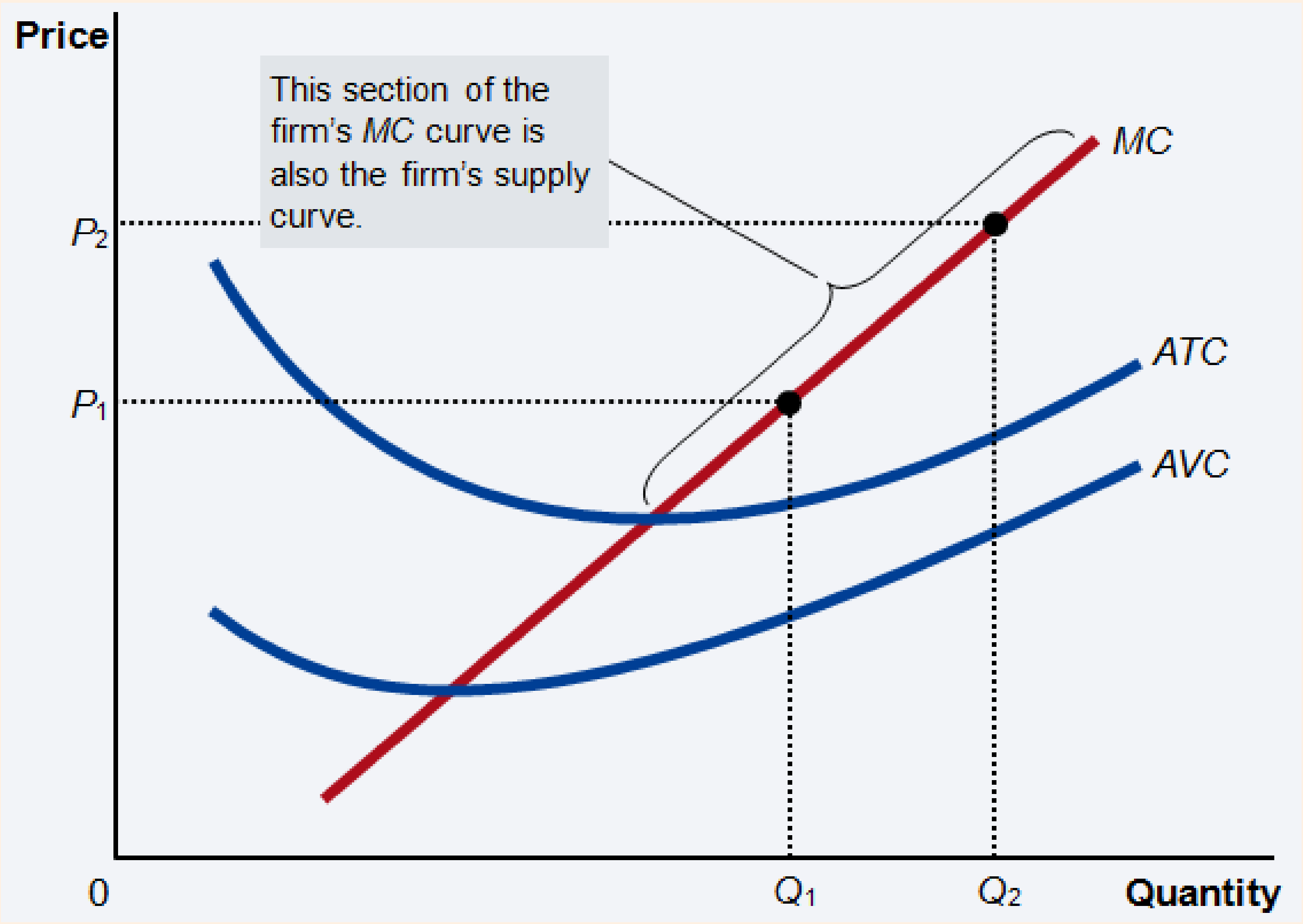


Profit Maximization

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

- If MR>MC $\longrightarrow$ increase Q
- If MR<MC $\longrightarrow$ decrease Q
- If MR=MC $\longrightarrow$ profit is maximized

Supply Curve



Shutdown and Exit

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

Shutdown and Exit

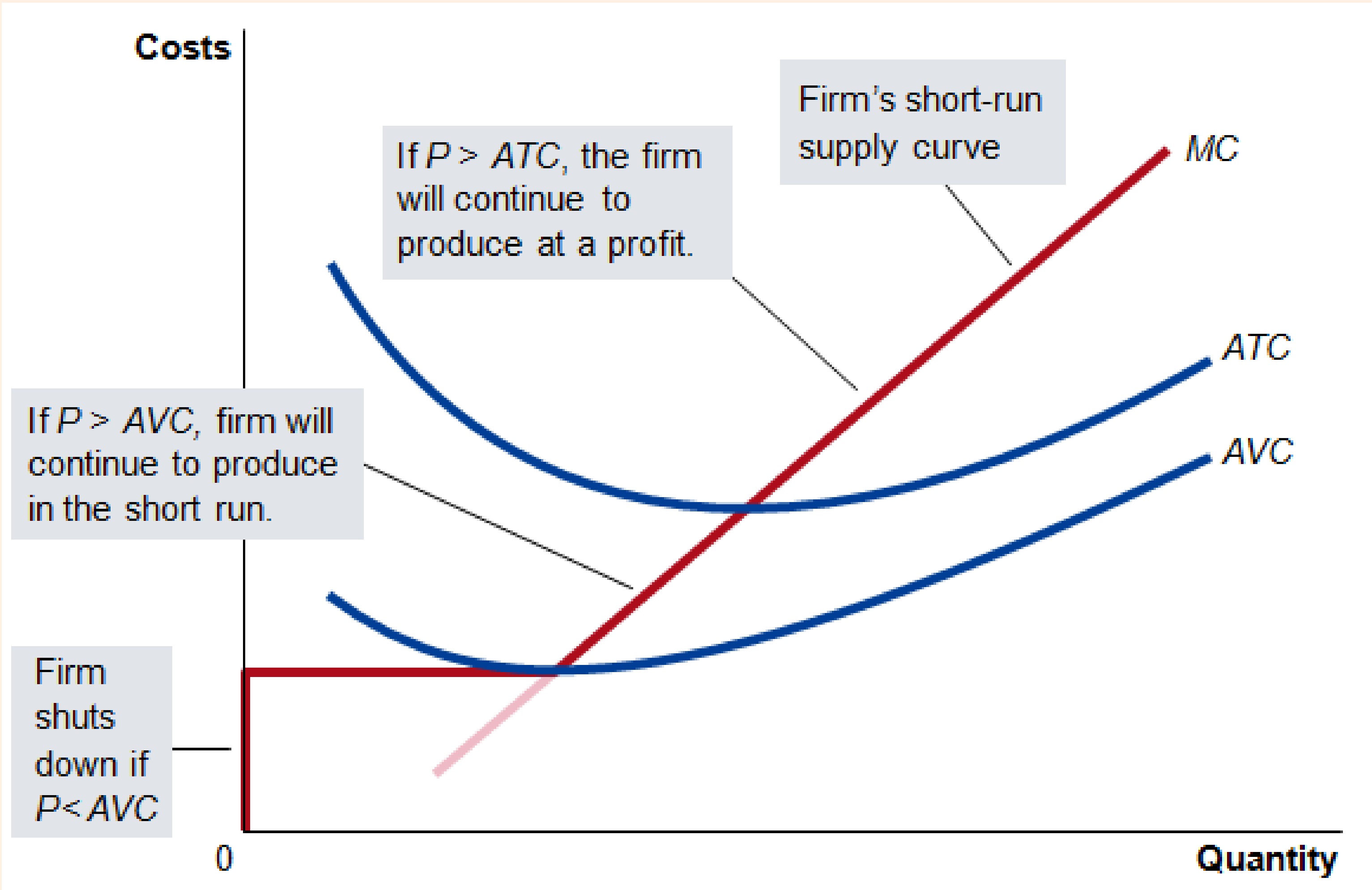
Sunk costs are costs that have already been committed and cannot be recovered

The firm considers its sunk costs when deciding to exit, but ignores them when deciding whether 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 $P < AVC$

Shutdown and Exit



Shutdown and Exit

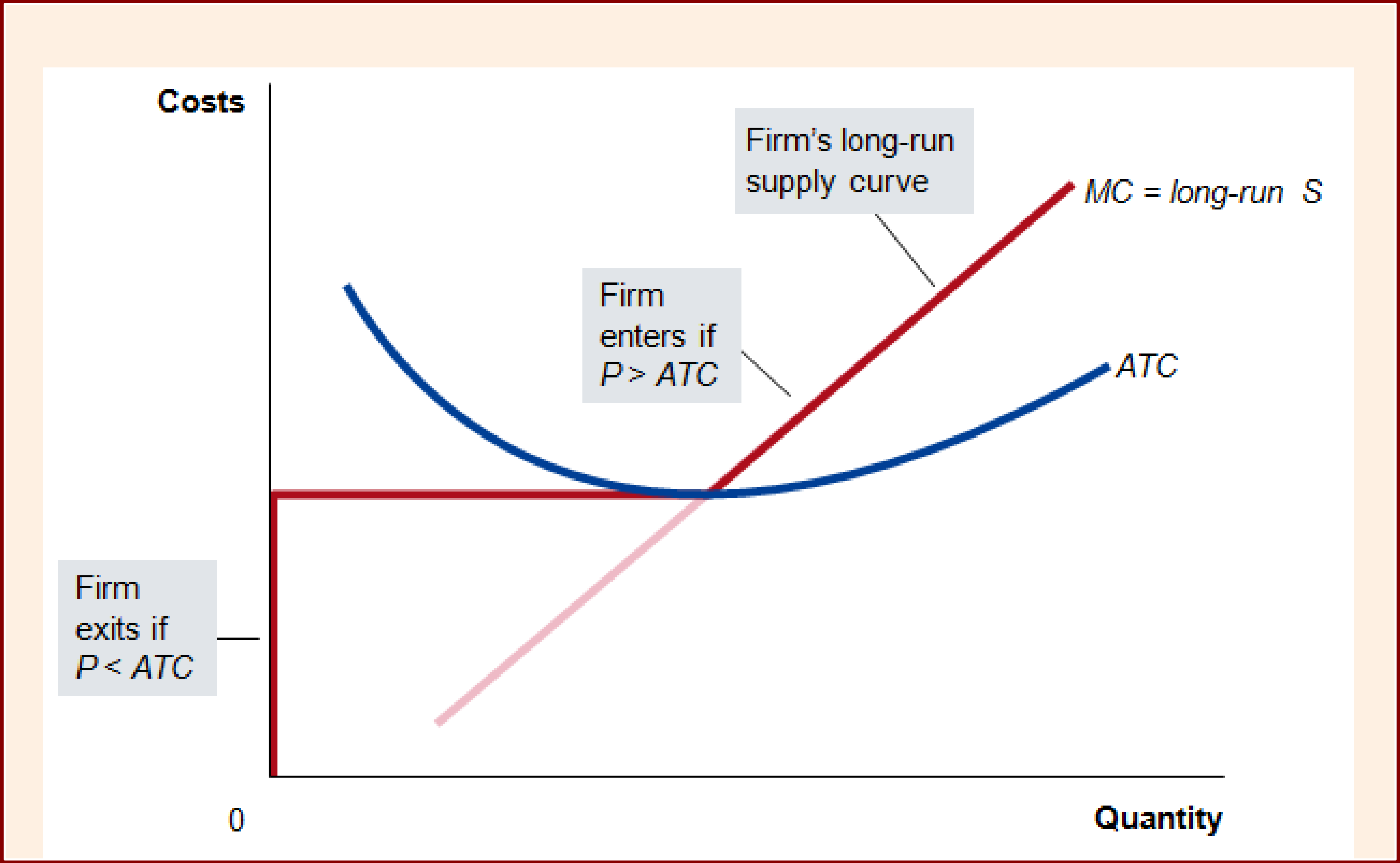
In the long run, the firm exits if the revenue it would get from producing is less than its total cost:

Exit if $TR < TC$
Exit if $TR/Q < TC/Q$
Exit if $P < ATC$

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

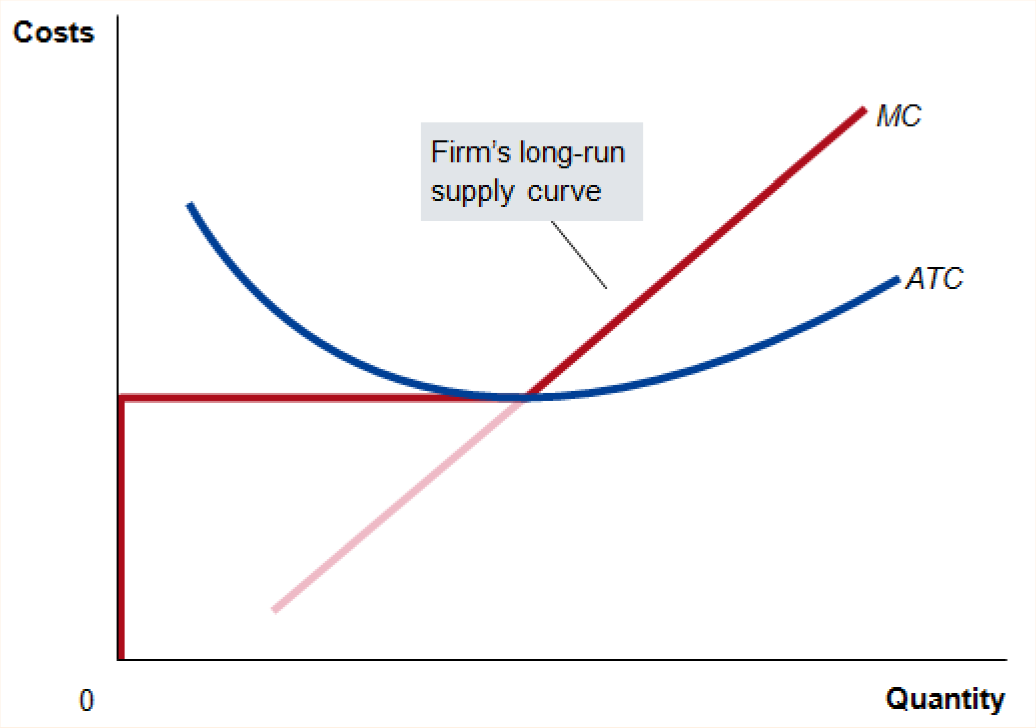
Enter if $TR > TC$
Enter if $TR/Q > TC/Q$
Enter if $P > ATC$

Shutdown and Exit



Supply Curve

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

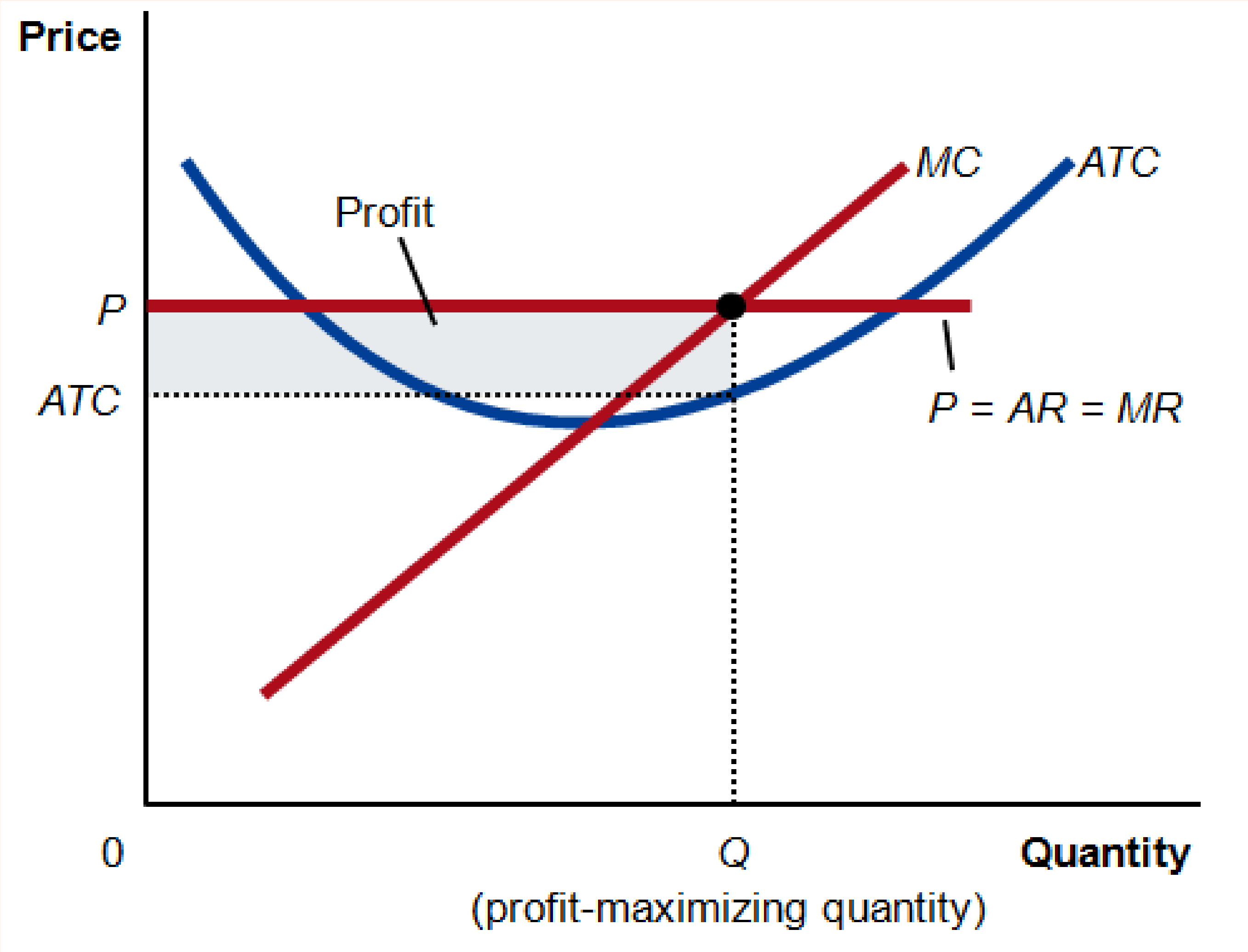


Supply Curve

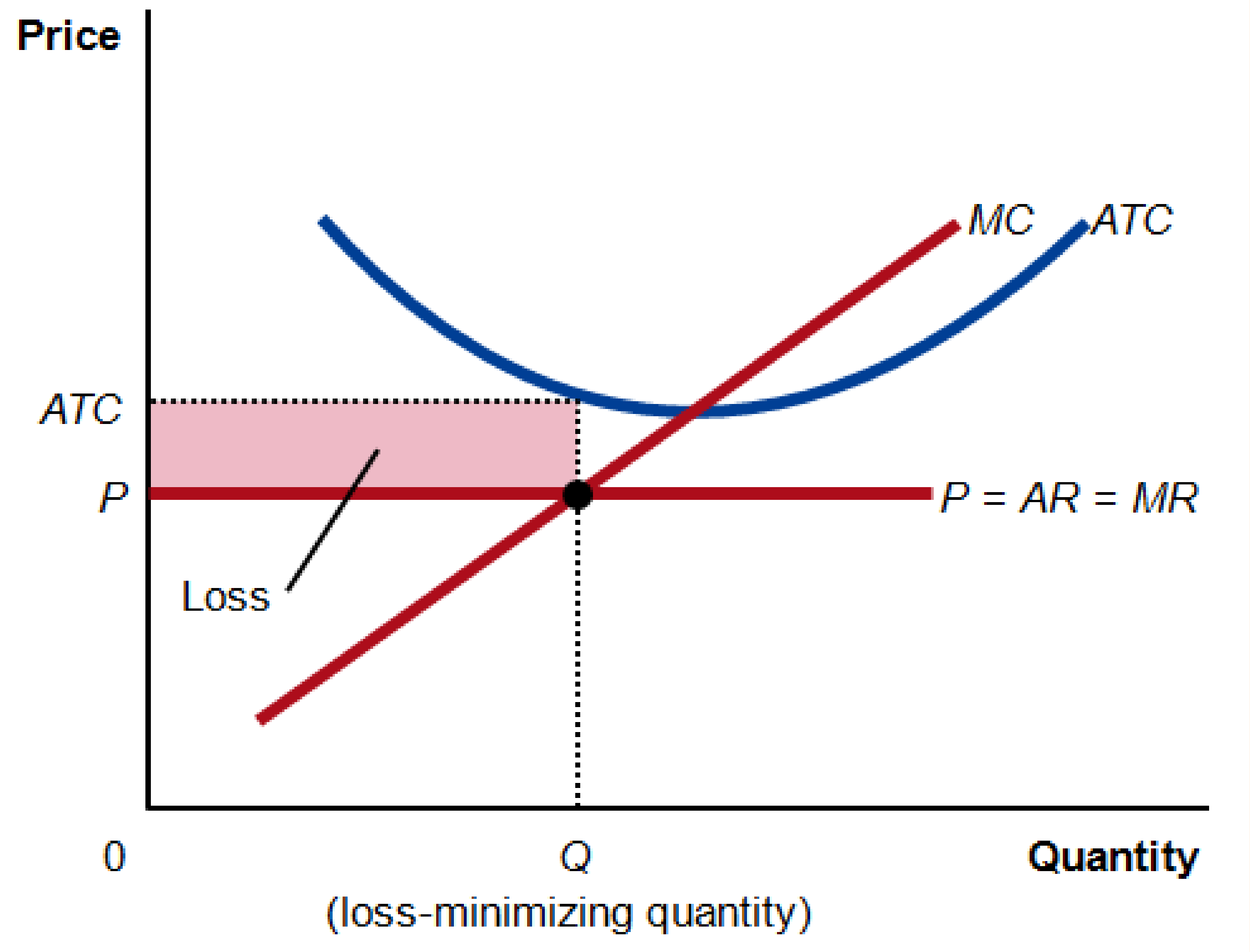
Short-Run Supply Curve
The portion of its marginal cost curve that lies above average variable cost

Long-Run Supply Curve
The marginal cost curve above the minimum point of its average total cost curve

Firm with Profit



Firm with Loss



Individual and Market Supply

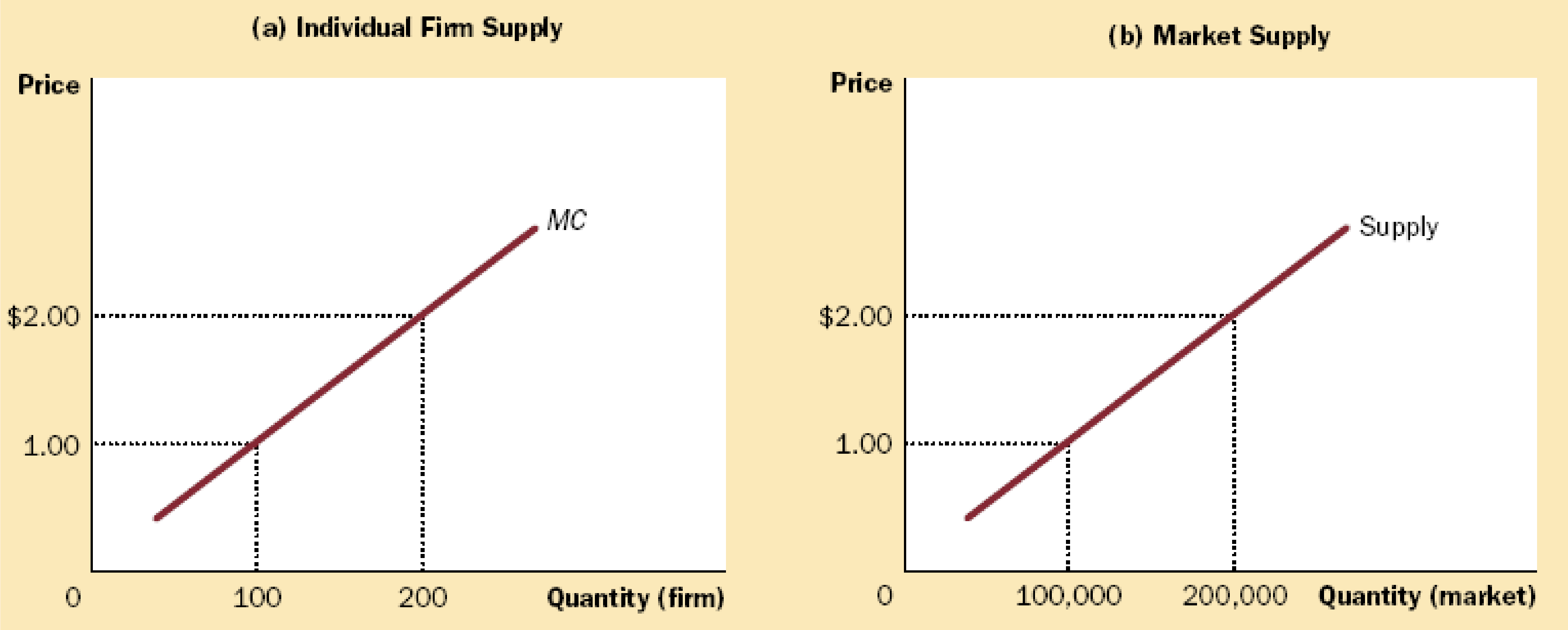
Market supply equals the sum of the quantities supplied by the individual firms in the market

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

Individual and Market Supply

Individual supply, market supply with 1000 firms



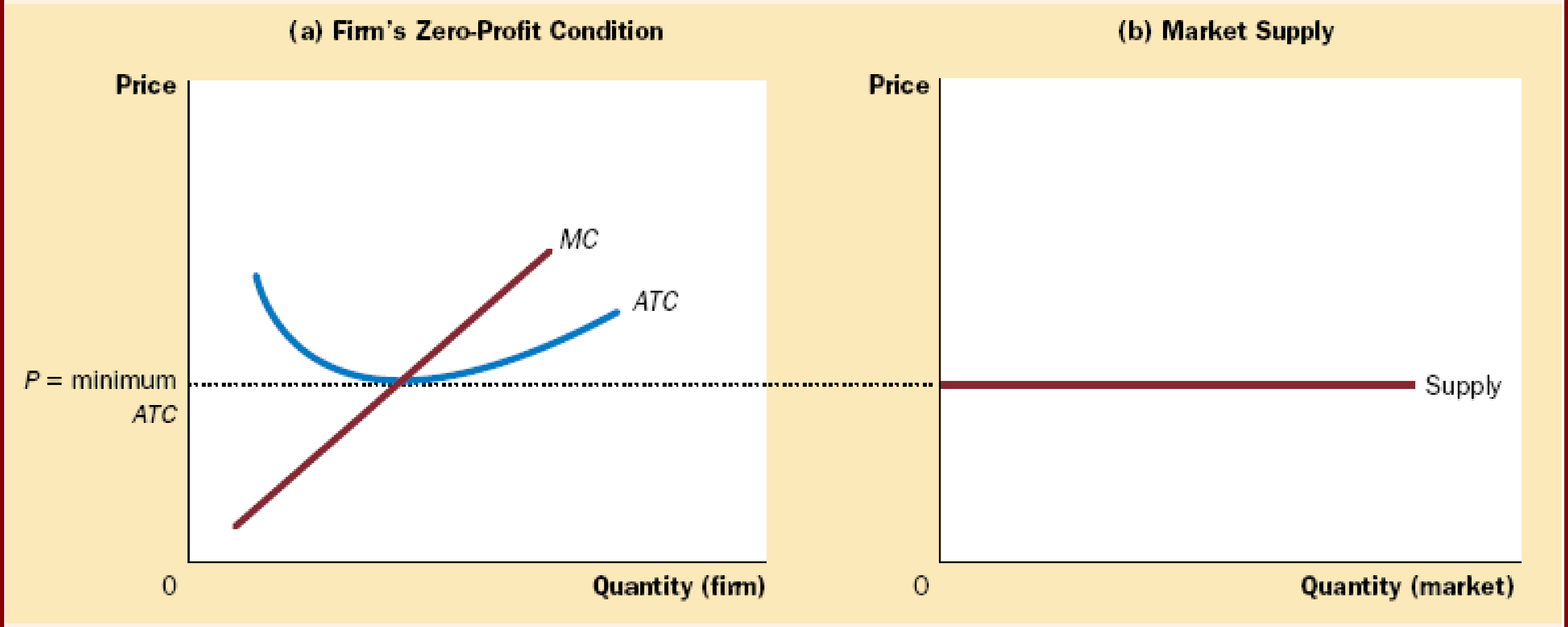
Individual and Market Supply

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

Individual and Market Supply



Individual and Market Supply

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

Individual and Market Supply

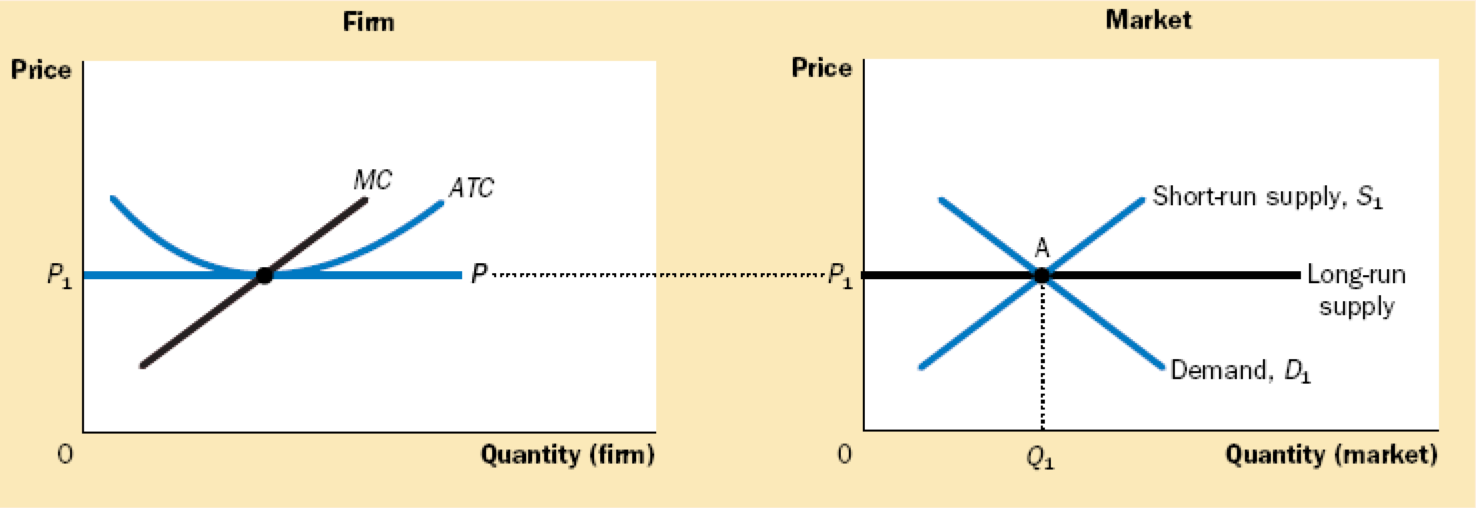
Profit equals total revenue minus total cost. Total cost includes all the opportunity costs of the firm

In the zero-profit equilibrium, the firm's revenue compensates the owners for the time and money they spend to keep the business going

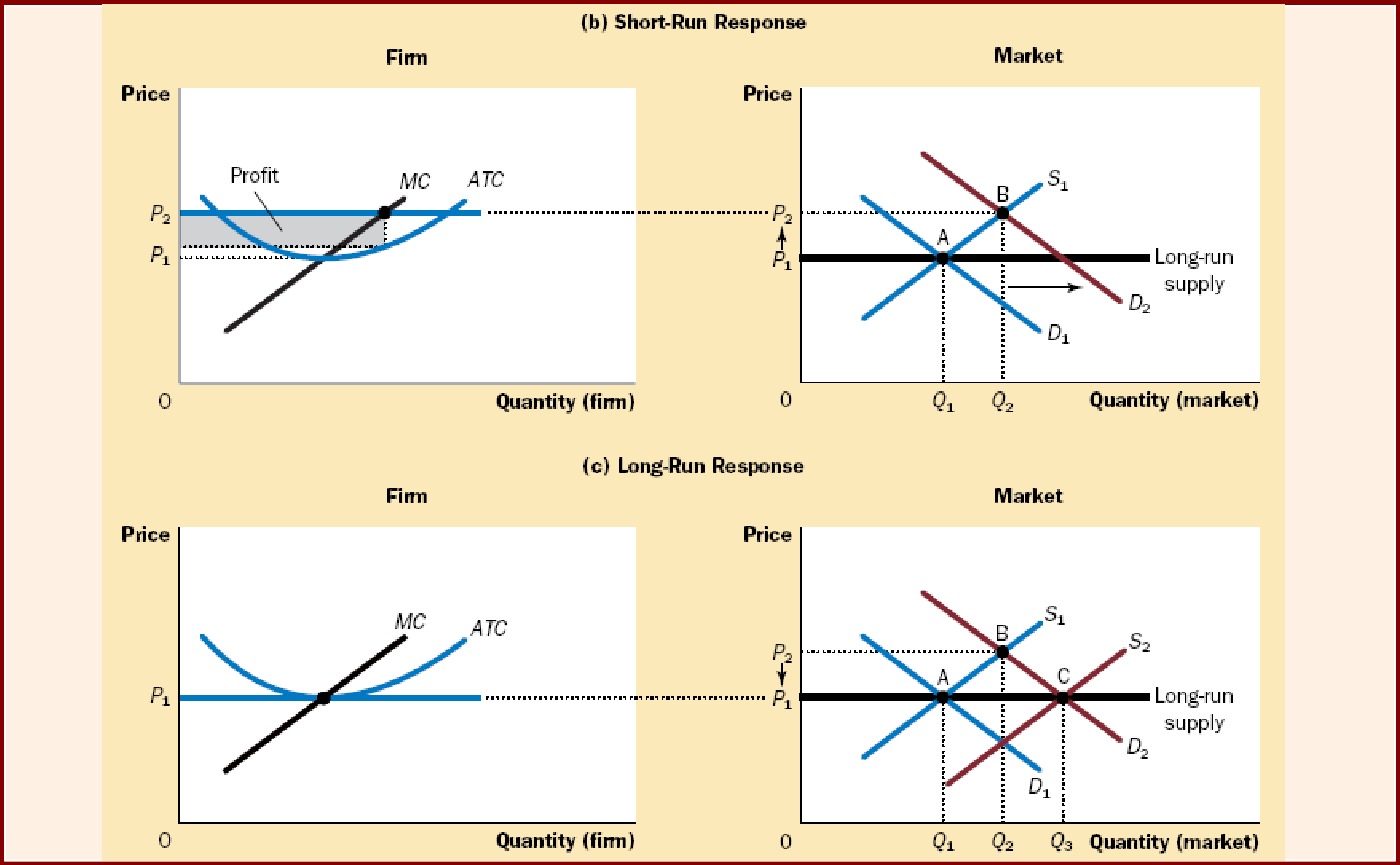
Individual and Market Supply

An increase in demand raises price and quantity in the short run

Firms earn profits because price now exceeds average total cost



Individual and Market Supply



Summary I

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 II

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 III

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 IV

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