Producer Theory

EC 201: Principles of Microeconomics

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Winter 2020

Prologue

Agenda

Goal: Understand the tradeoffs that producers face.

- How do producers make decisions?
- Where does the supply curve come from?

Outline

1. Costs of production.
2. Firms in competitive markets (today).
3. Monopoly (next week).

Firms in Competitive Markets

(Perfectly) Competitive Markets

Conditions

1. Many buyers and sellers.
2. Identical, undifferentiated products.
3. Free entry and exit.
4. Each firm is small relative to the market.

Result

No market power: Firms have no control over the market price.

- Each firm is a **price taker**.

Competitive Markets

Examples?

Q: Is a stock market perfectly competitive? Why or why not?

- Many buyers and sellers of a single stock + real-time information.
- Large institutional investors big enough to influence prices.

A: Competitive, but far from perfectly.

Competitive Markets

Examples?

Q: Is a farmers' market perfectly competitive? Why or why not?

- Many buyers and sellers + similar products + sellers can enter at low cost.
- Sometimes there are few sellers $\longrightarrow$ ability to set higher prices.

A: Not perfectly competitive, but close in some settings.

Competitive Markets

Examples?

Q: Is an online ticket auction perfectly competitive? Why or why not?

- Many buyers and sellers of the same event.
- Some companies get special privileges to buy or sell tickets before others $\longrightarrow$ barriers to entry.

A: Not perfectly competitive, but close.

Competitive Markets

Examples?

Q: Is the Amazon.com marketplace perfectly competitive? Why or why not?

- Many buyers and sellers of similar products.
- Differentiated products + imperfect information + Amazon big enough to force other sellers out by temporarily undercutting prices.

A: Probably not.

Competitive Markets

Examples?

Q: Is the market for corn perfectly competitive? Why or why not?

- Many buyers and sellers + genetically identical crops.
- Farm consolidation + government manipulation of prices (*e.g.*, subsidies).

A: Not perfectly competitive, but close.

Competitive Markets

Examples?

Q: Is the market for corn seed perfectly competitive? Why or why not?

- Few sellers (*e.g.*, Monsanto and Syngenta) + barriers to entry (*e.g.*, patents).

A: Not a chance.

Competitive Markets

Q: If there are no examples of a perfectly competitive market, why bother modelling one?

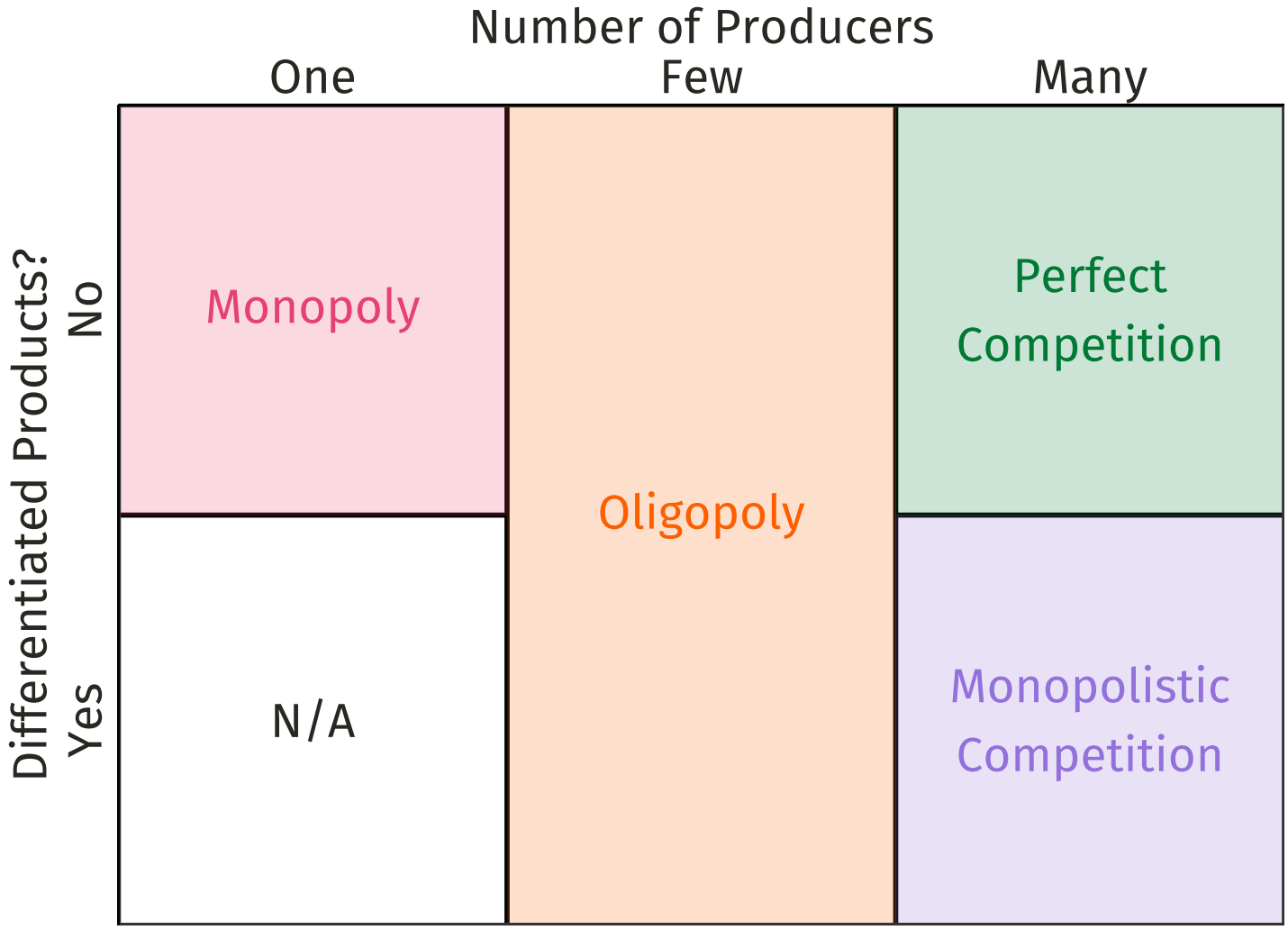
A_1: Lay groundwork for modelling more-realistic scenarios.

- Simple, but not for simplicity's sake.
- Insights for other market structures.

A_2: Establish a benchmark to compare the "real world" against.

- Helps us answer the question "can we do better?"
- Can address "how can we do better?" by comparing market conditions of "real world" to benchmark conditions.

Market Structure

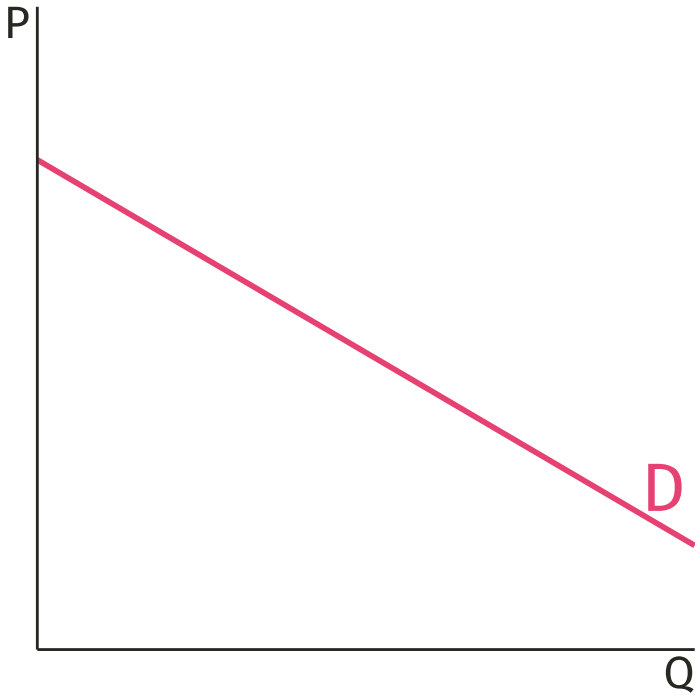


The Wire - Stringer Bell learns the basics of Macroeconomics

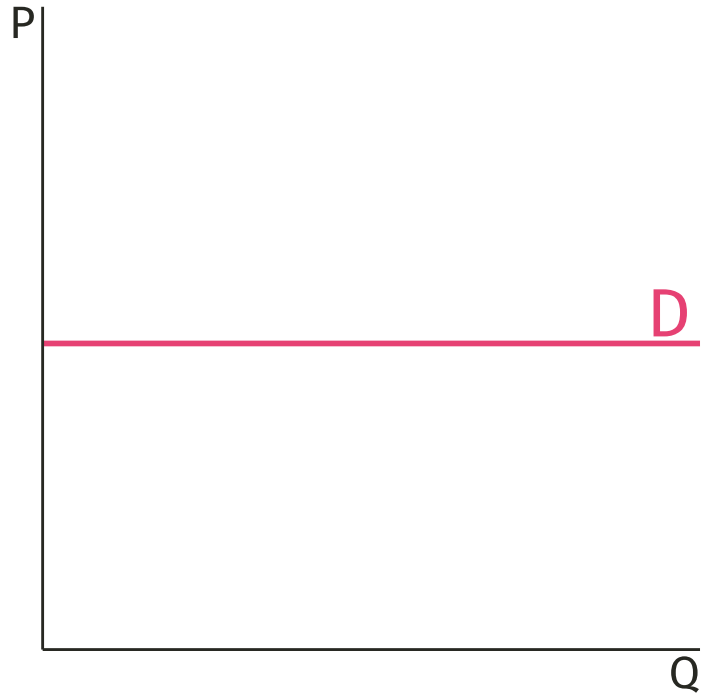
Market Structure

Price elasticity of demand for a particular firm's product is an important determinant of market structure.

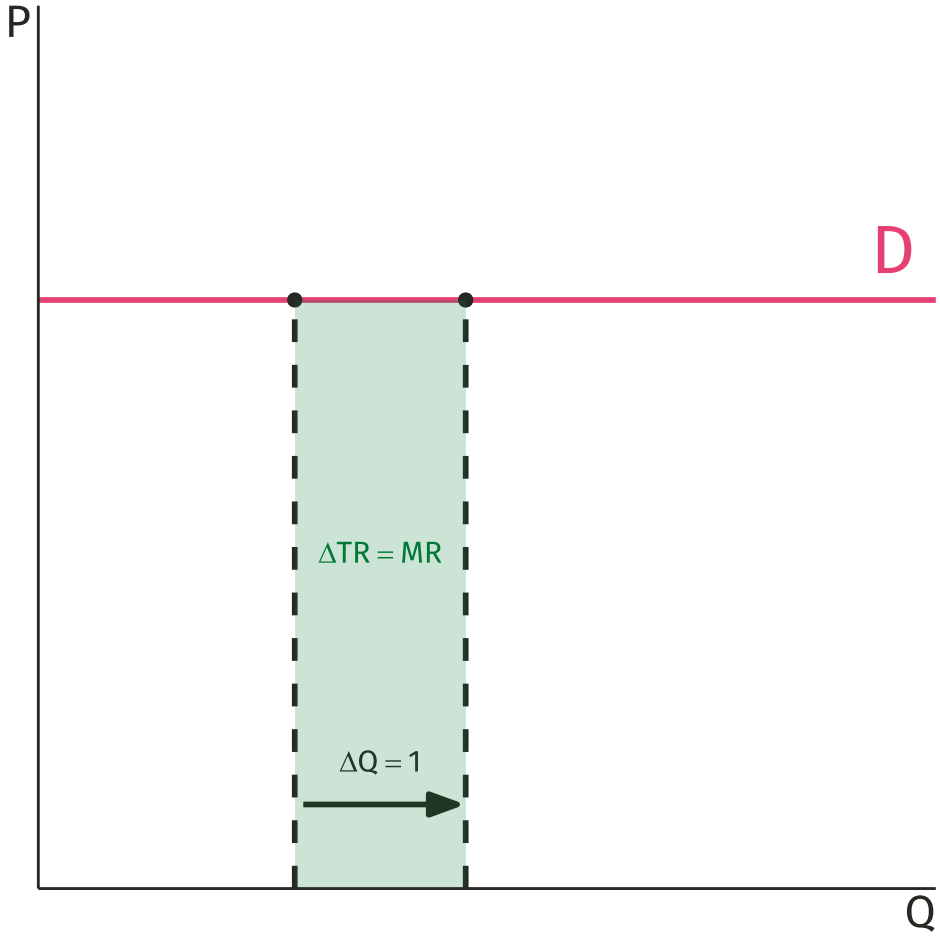
Monopolist



Perfectly Competitive Firm



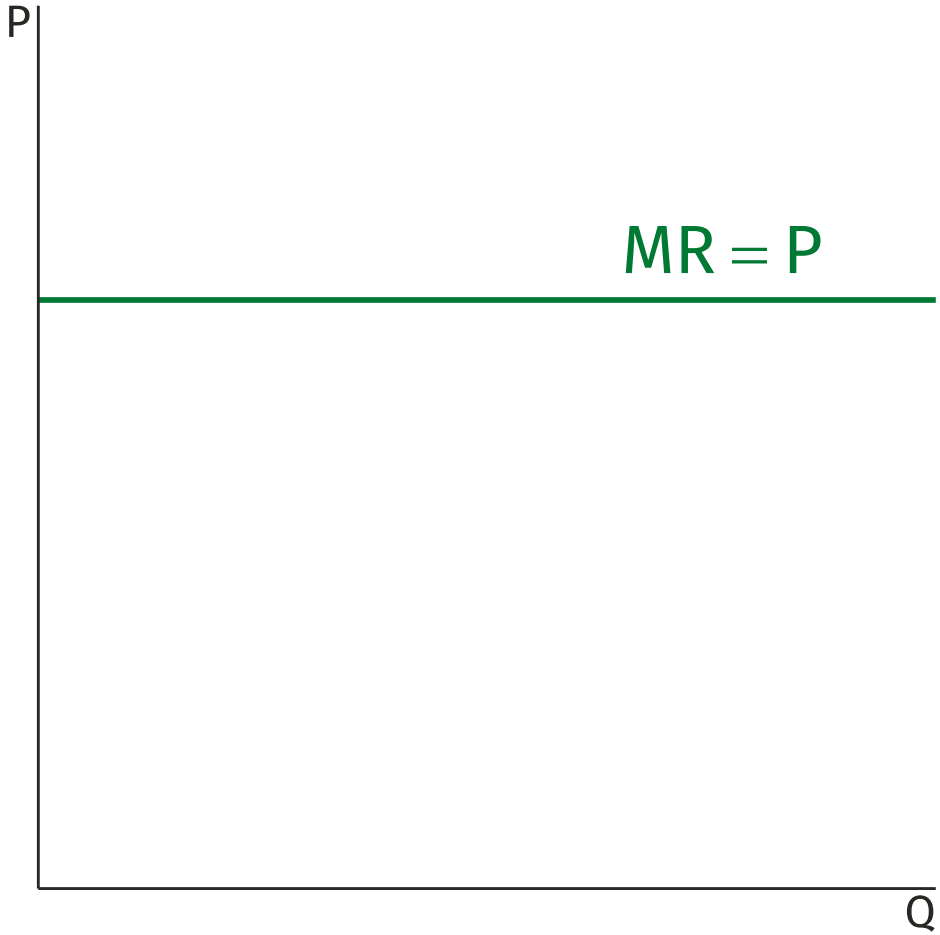
Marginal Revenue



Definition

> Change in total revenue that arises from a one-unit increase in output.

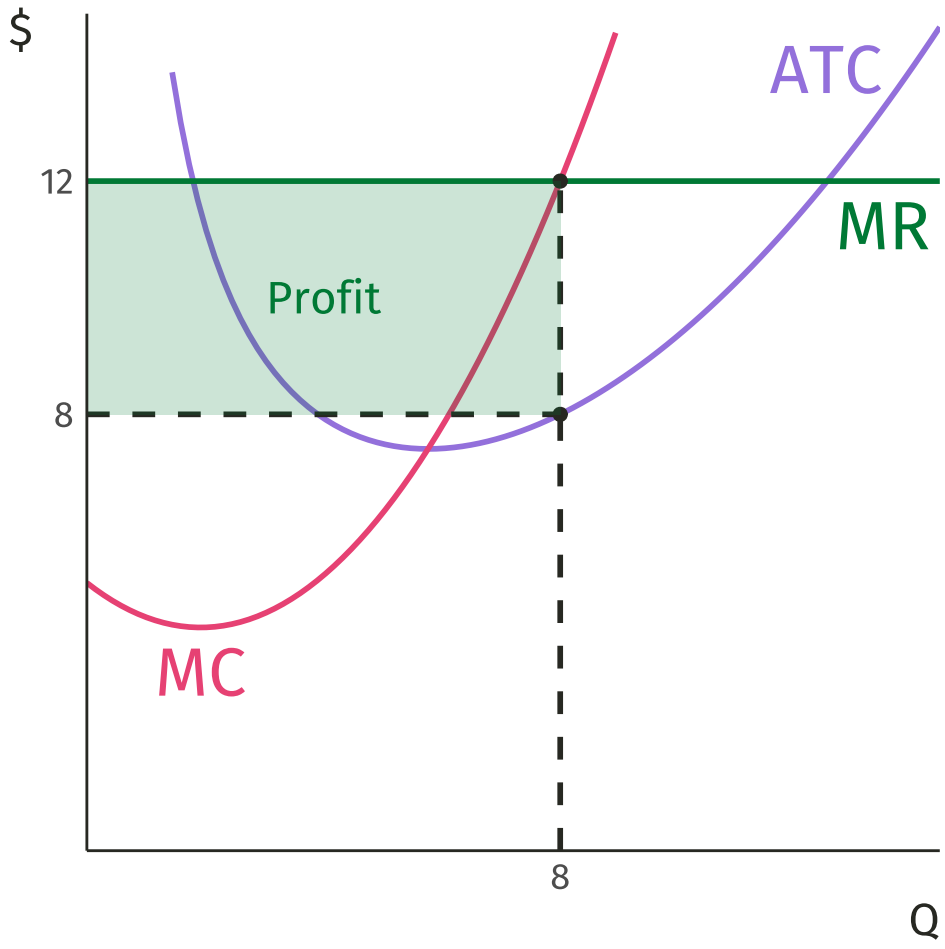
Marginal Revenue



For a firm in a perfectly competitive market,

- MR $\iff$ D.
- MR = P.

Profit Maximization

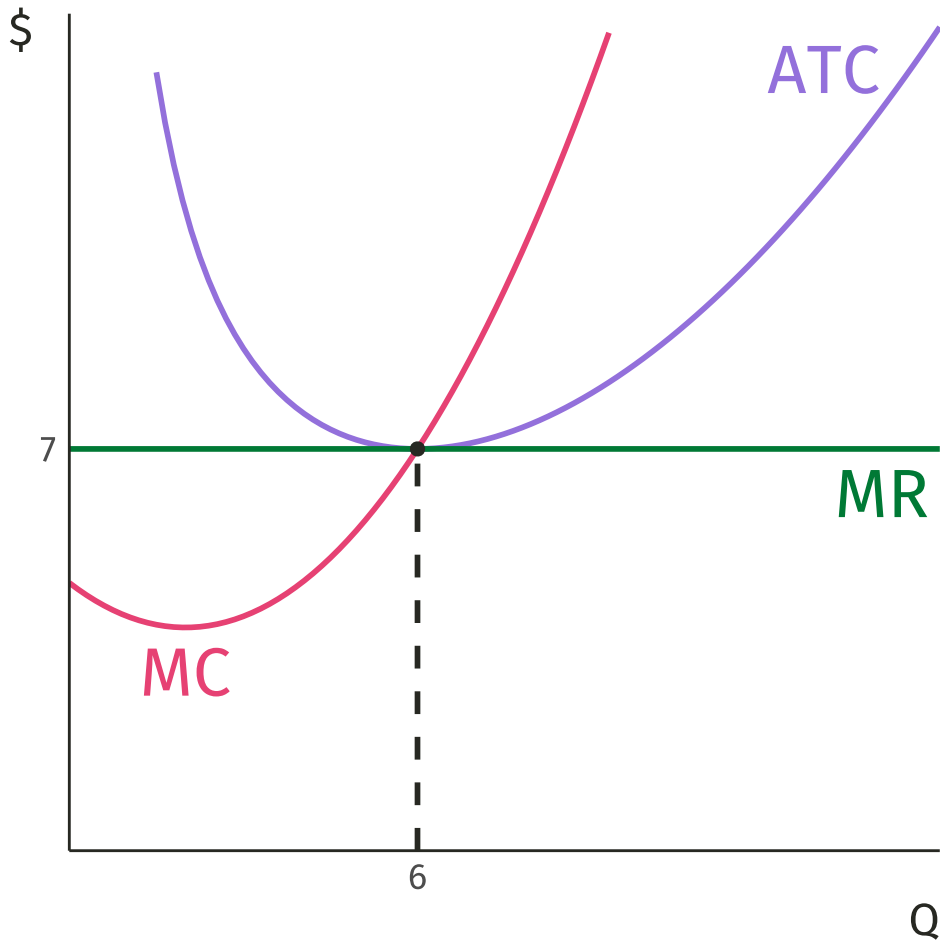


Q: How does a firm maximize profit?

A: Pick Q at MR = MC.

Price (P)	**$12.00**
Q	8
TR = P × Q	$96.00
ATC	$8.00
TC = ATC × Q	$64.00
Profit	$32.00

Profit Maximization

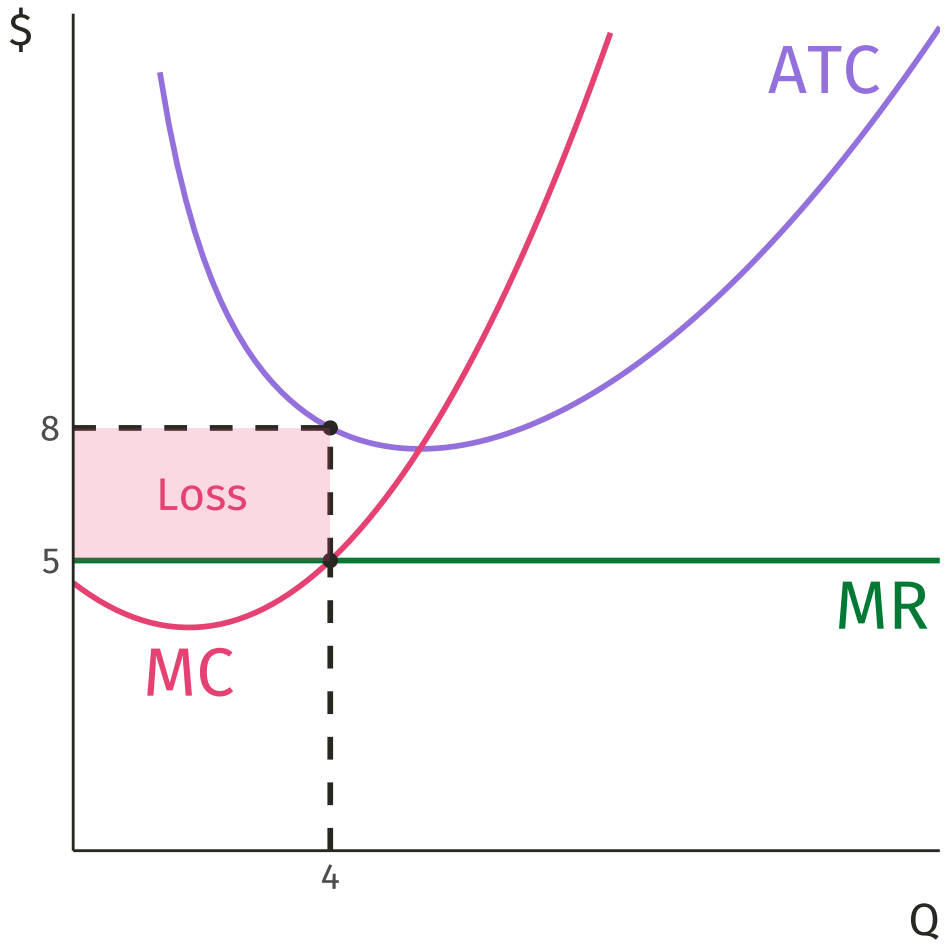


Q: How does a firm maximize profit?

A: Pick Q at MR = MC.

Price (P)	**$7.00**
Q	6
TR = P × Q	$42.00
ATC	$7.00
TC = ATC × Q	$42.00
Profit	$0.00

Profit Maximization



Q: How does a firm maximize profit?

A: Pick Q at MR = MC.

Price (P)	**$5.00**
Q	4
TR = P × Q	$20.00
ATC	$8.00
TC = ATC × Q	$32.00
Profit	-$12.00

Short-Run *vs.* Long-Run Decisions

Short Run

Cannot avoid fixed costs $\longrightarrow$ ignore them when making production decisions.

- Must pay rent whether business or open or not.

Can avoid paying variable costs.

- Schedule shorter or fewer shifts for workers, buy fewer raw materials, *etc.*

Businesses will stay open as long as they can cover their variable costs.

- Variable costs covered $\longrightarrow$ can operate at a loss to defray fixed costs.
- Variable costs not covered $\longrightarrow$ shut down to minimize loss.

Short-Run *vs.* Long-Run Decisions

Long Run

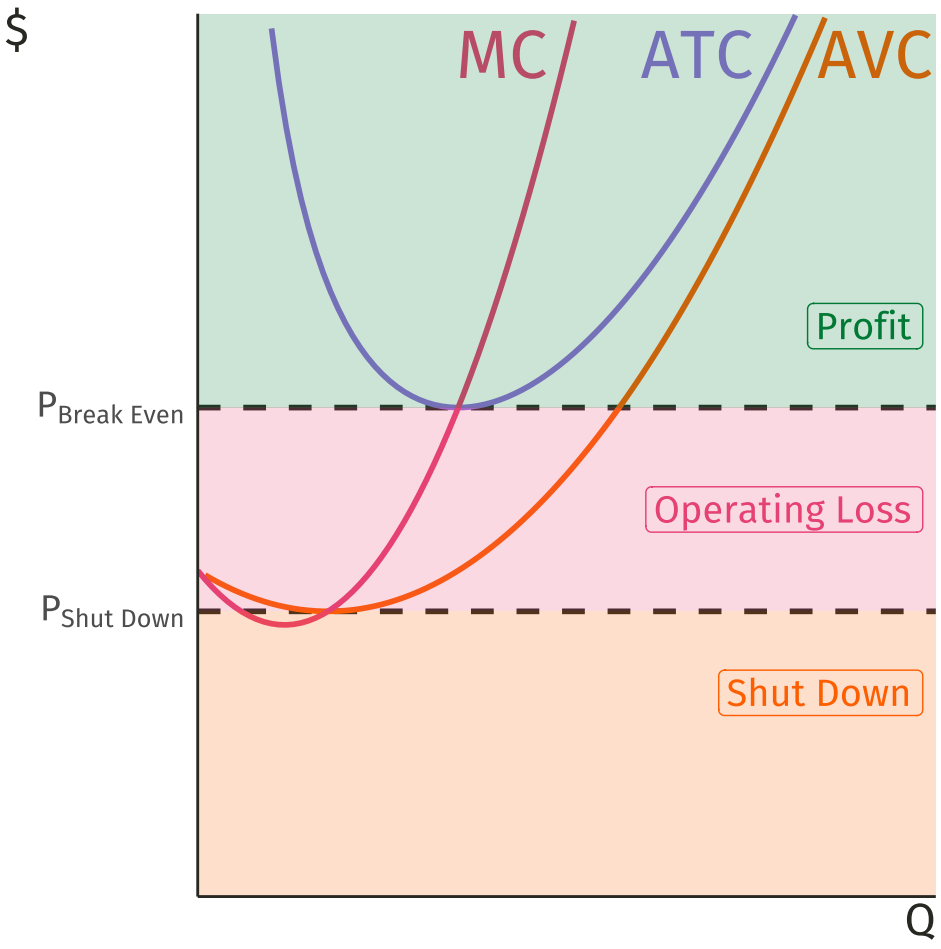
All costs are variable.

Free exit $\longrightarrow$ businesses can leave the industry.

- *e.g.*, by not renewing the lease.

Free entry $\longrightarrow$ entrepreneurs can join the industry.

Short-Run Decisions

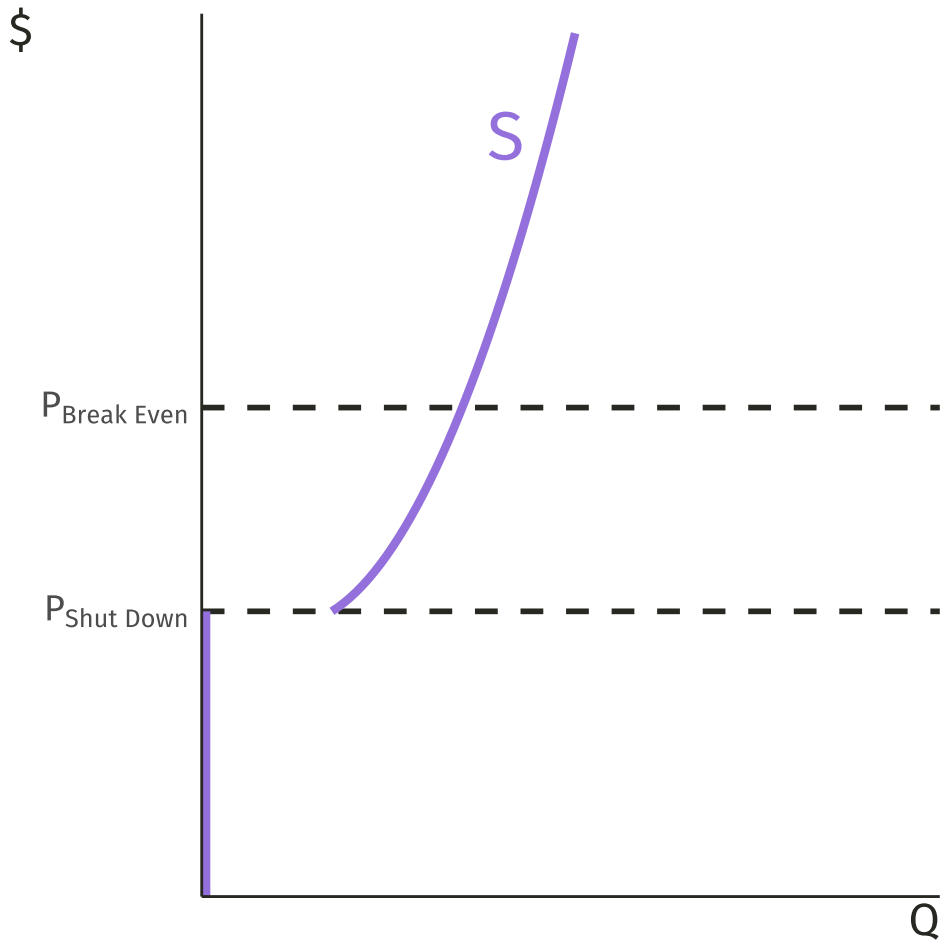


Q: When does a firm operate? When does it shut down?

A: Depends on price.

1. P > ATC
   $\longrightarrow$ Profit.
2. ATC > P > AVC
   $\longrightarrow$ Operating loss.
3. AVC > P
   $\longrightarrow$ Shut down.

Short-Run Decisions



Short-Run Supply

$P > P_{Shut\ Down} \longrightarrow$ short-run supply curve = marginal cost curve.

$P < P_{Shut\ Down} \longrightarrow$ short-run supply curve = vertical line at 0.

Sunk Costs

Definition

> Unrecoverable costs incurred as a result of previous decisions.

Examples: Fixed costs in the short run, classes you've already completed, the amount of time you've been with the same company, *etc.*

Punchline: You should ignore sunk costs when making decisions!

- **Q:** Why?
- **A:** You must pay them regardless of your choice!

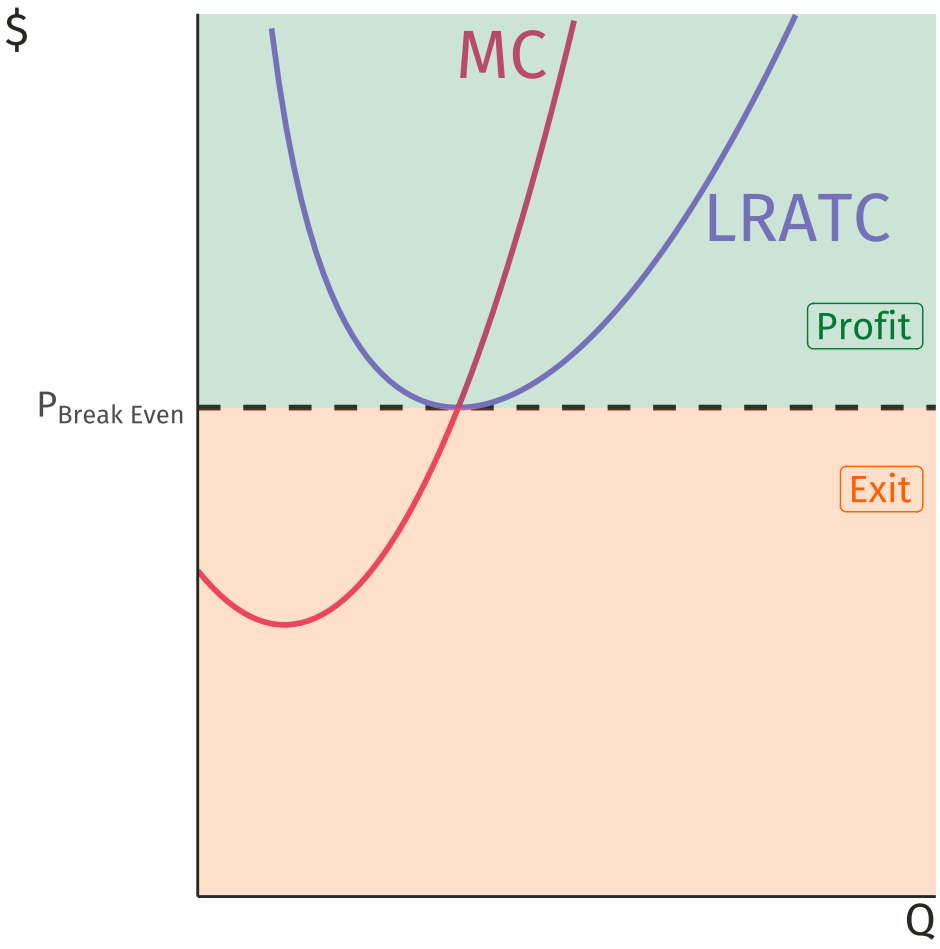
Long-Run Decisions

Q: Should a firm exit or enter the market in the long run?

- Benefit of exiting market = cost savings = TC.
- Cost of exiting market = revenue loss = TR.

A: Exit if TC > TR, enter if TC < TR.

Long-Run Decisions



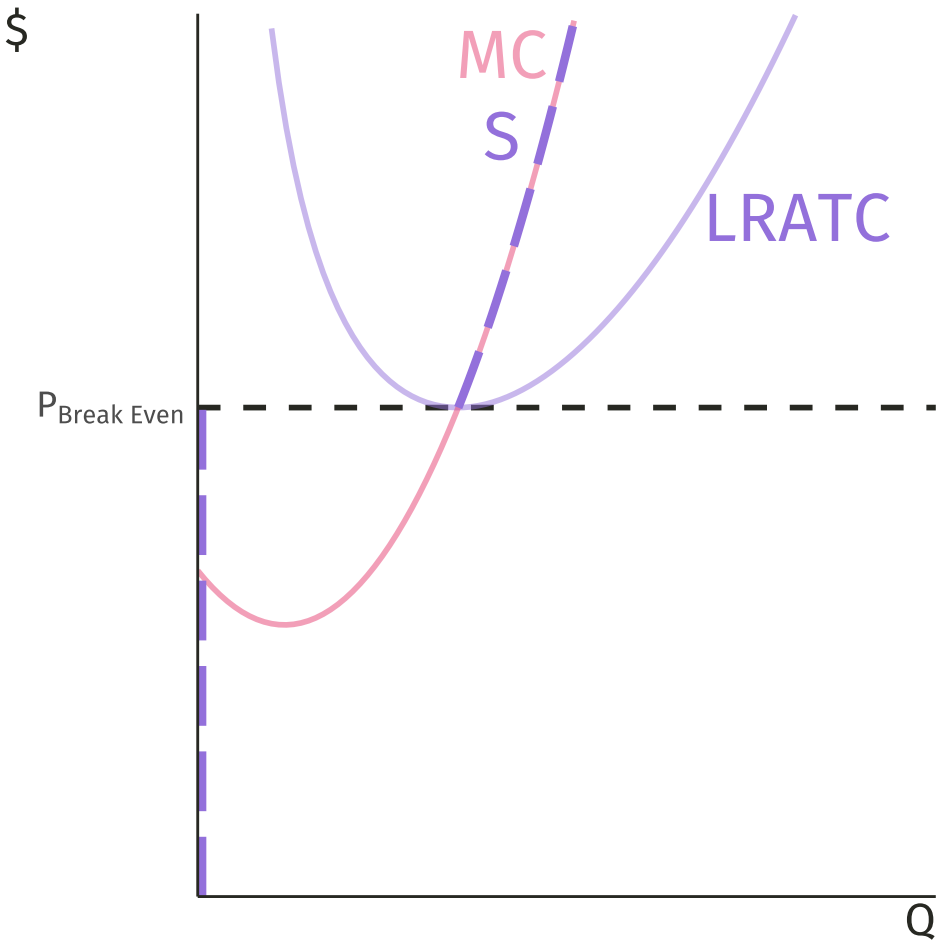
Q: When does a firm operate? When does it exit?

A: Depends on price.

1. P > ATC
   $\longrightarrow$ Profit.

2. ATC > P
   $\longrightarrow$ Exit.

Long-Run Decisions

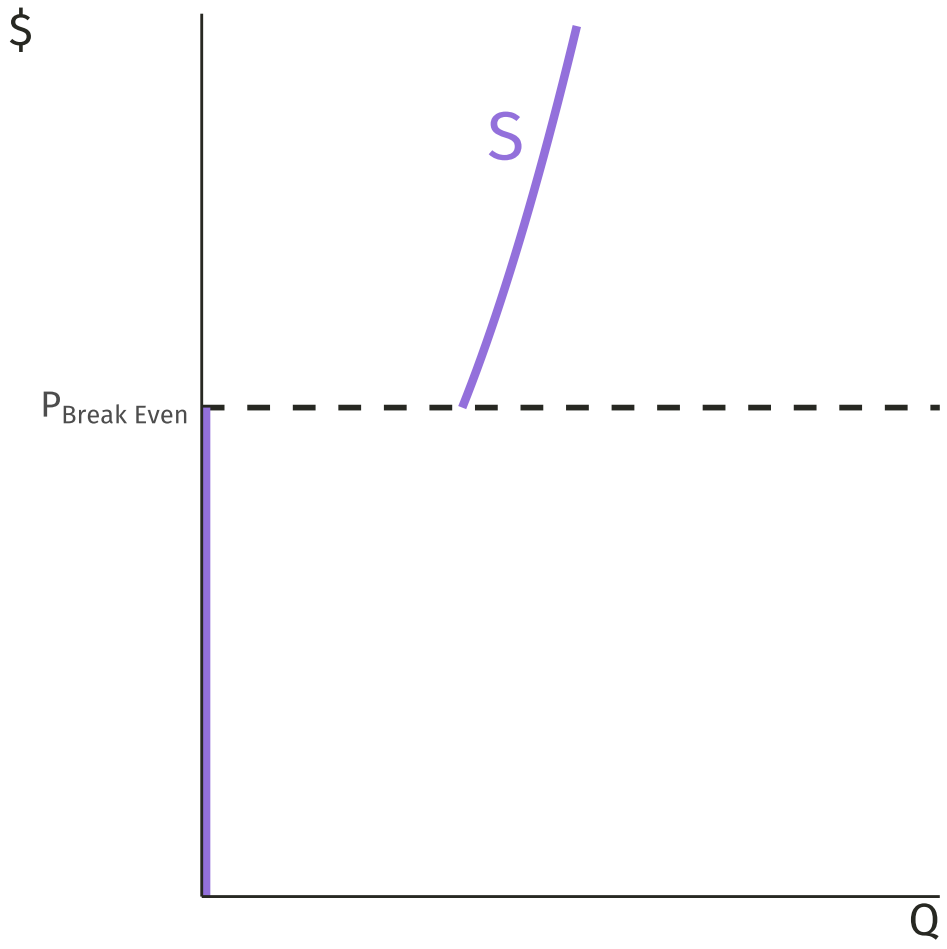


Long-Run Supply

$P > P_{Break\ Even} \longrightarrow$ long-run supply curve = marginal cost curve.

$P < P_{Break\ Even} \longrightarrow$ long-run supply curve = vertical line at 0.

Long-Run Decisions

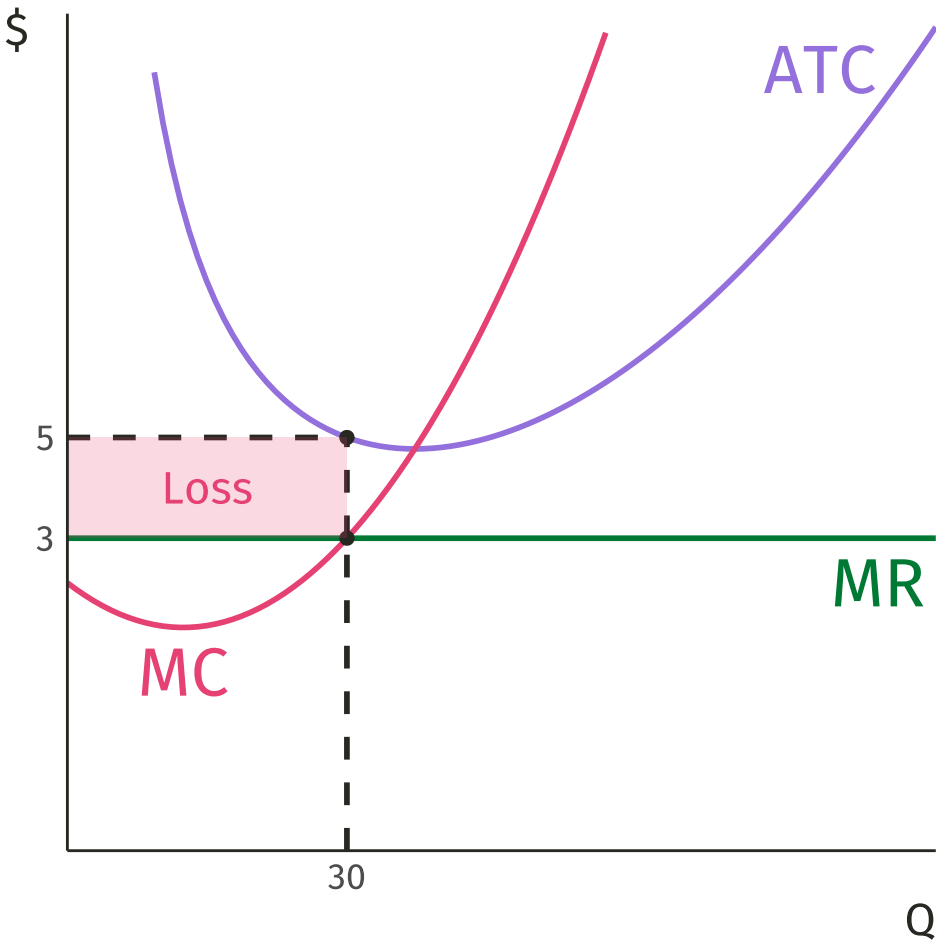


Long-Run Supply

$P > P_{\text{Break Even}} \longrightarrow$ long-run supply curve
= marginal cost curve.

$P < P_{\text{Break Even}} \longrightarrow$ long-run supply curve
= vertical line at 0.

Q: Assume that AVC < $3. Is this firm earning a profit or operating at a loss?

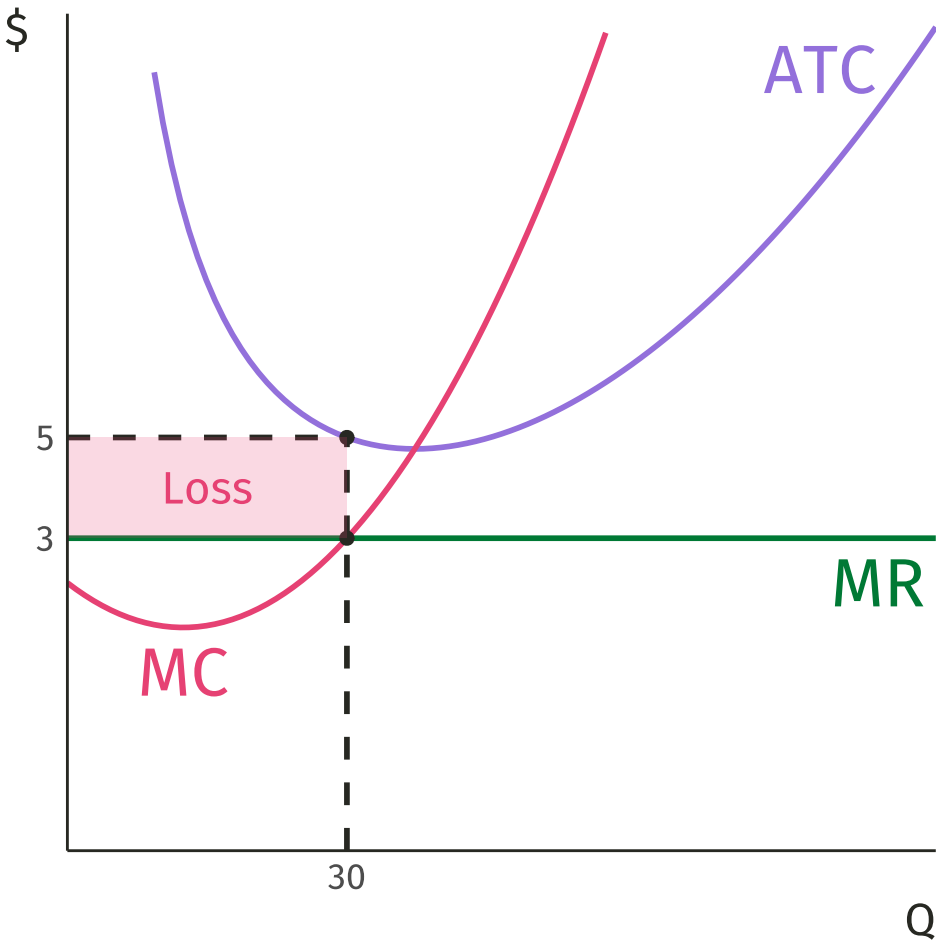


A. Earning a profit.

B. Operating at a loss.

C. Neither.

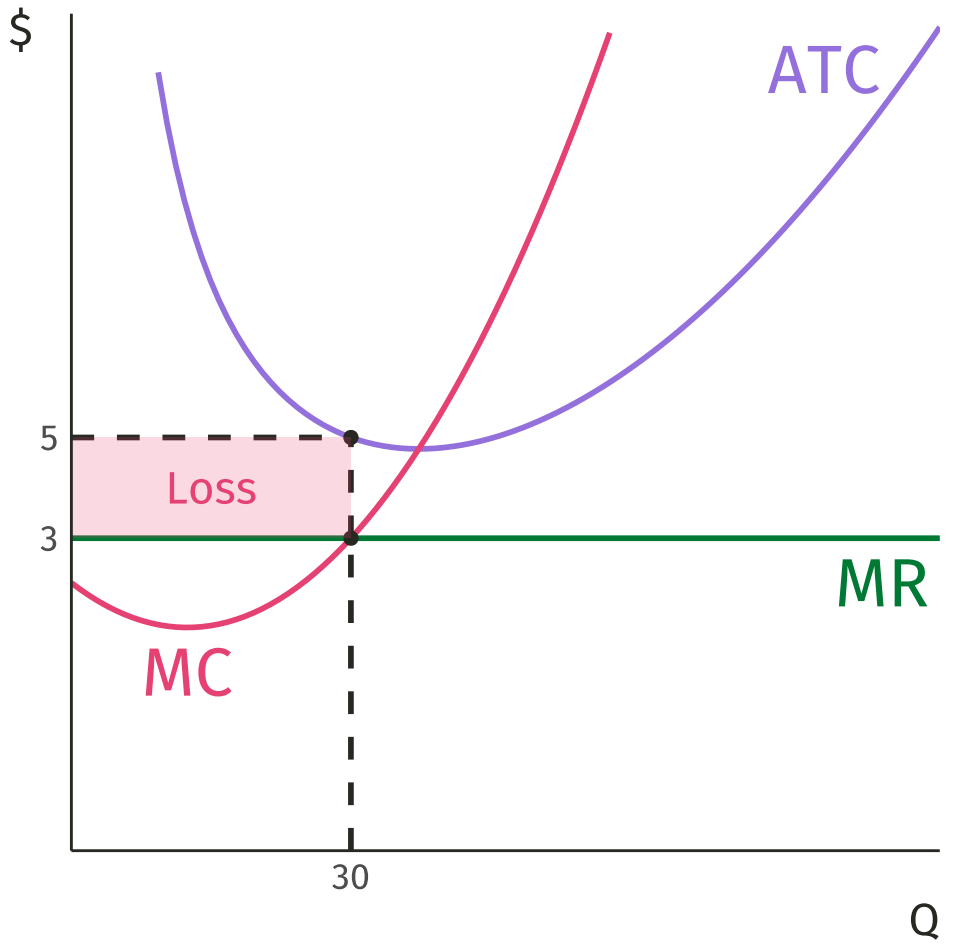
Q: Assume that AVC < $3. How much money is this firm losing?



A: $60.

Loss = (ATC - P) × Q

Q: What will this firm do in the long run?



A. Earn positive profits.

B. Operate at a loss.

C. Exit the market.

D. 👧.

Competitive Markets

Q: How do we understand the consequences of the decisions of many firms on market outcomes?

A: Construct a market supply curve.

- Market supply = sum of individual supply curves.

Competitive Markets

Conditions

1. Many buyers and sellers.
2. Identical, undifferentiated products.
3. Free entry and exit.
    - *e.g.*, same technology available to all firms.
4. Each firm is small relative to the market.
5. Input prices to industry do not change as the market expands.

Results

Conditions 1 through 4 $\Longrightarrow$ each firm is a price-taker.

Conditions 1 through 5 $\Longrightarrow$ perfectly elastic long-run market supply curve.

Intuition

Case 1: Short-run price > long-run price.

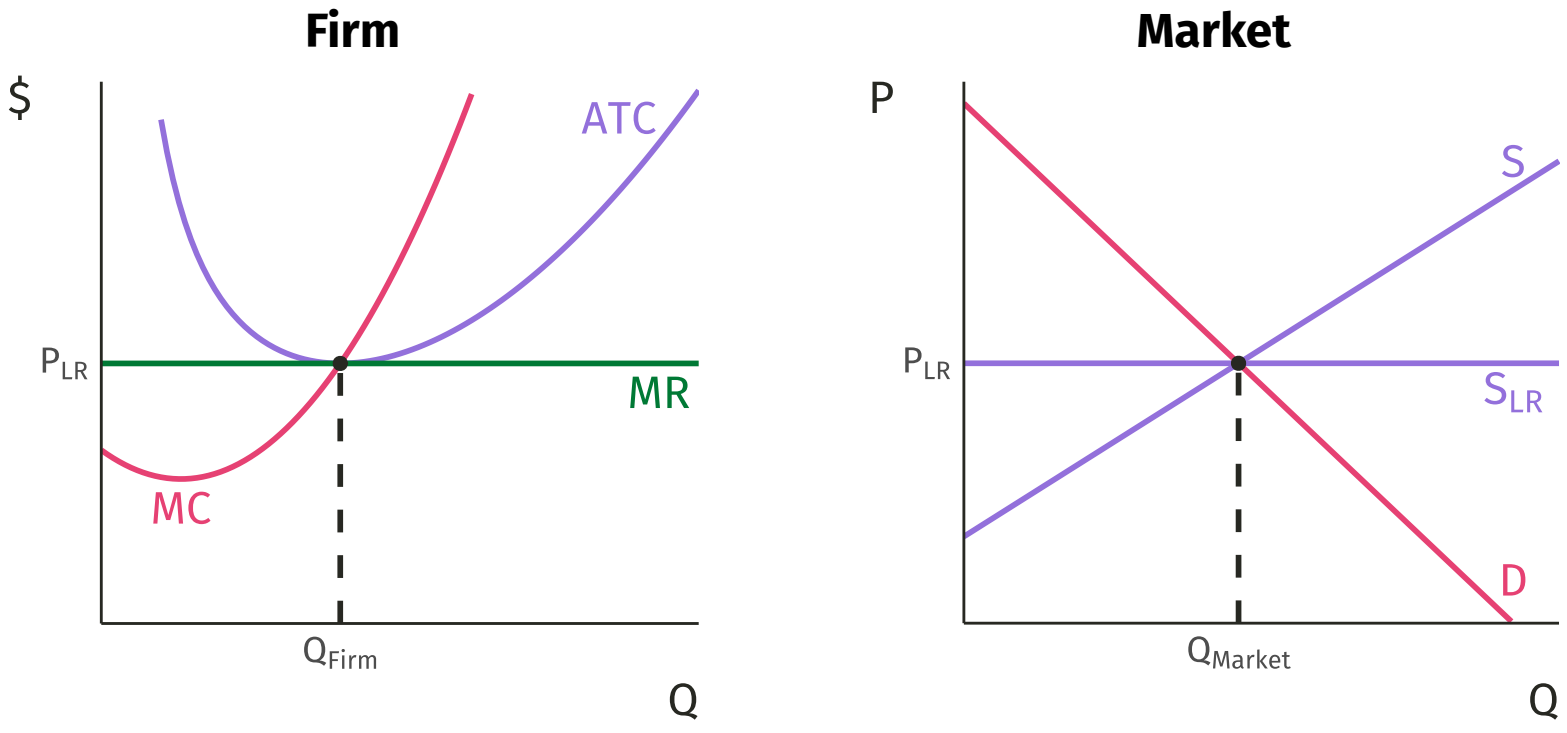
- Firms make a profit
  $\longrightarrow$ entrepreneurs see that they can make a profit, too
  $\longrightarrow$ number of firms increases
  $\longrightarrow$ short-run supply shifts right
  $\longrightarrow$ short-run price falls.

Intuition

Case 2: Short-run price < long-run price.

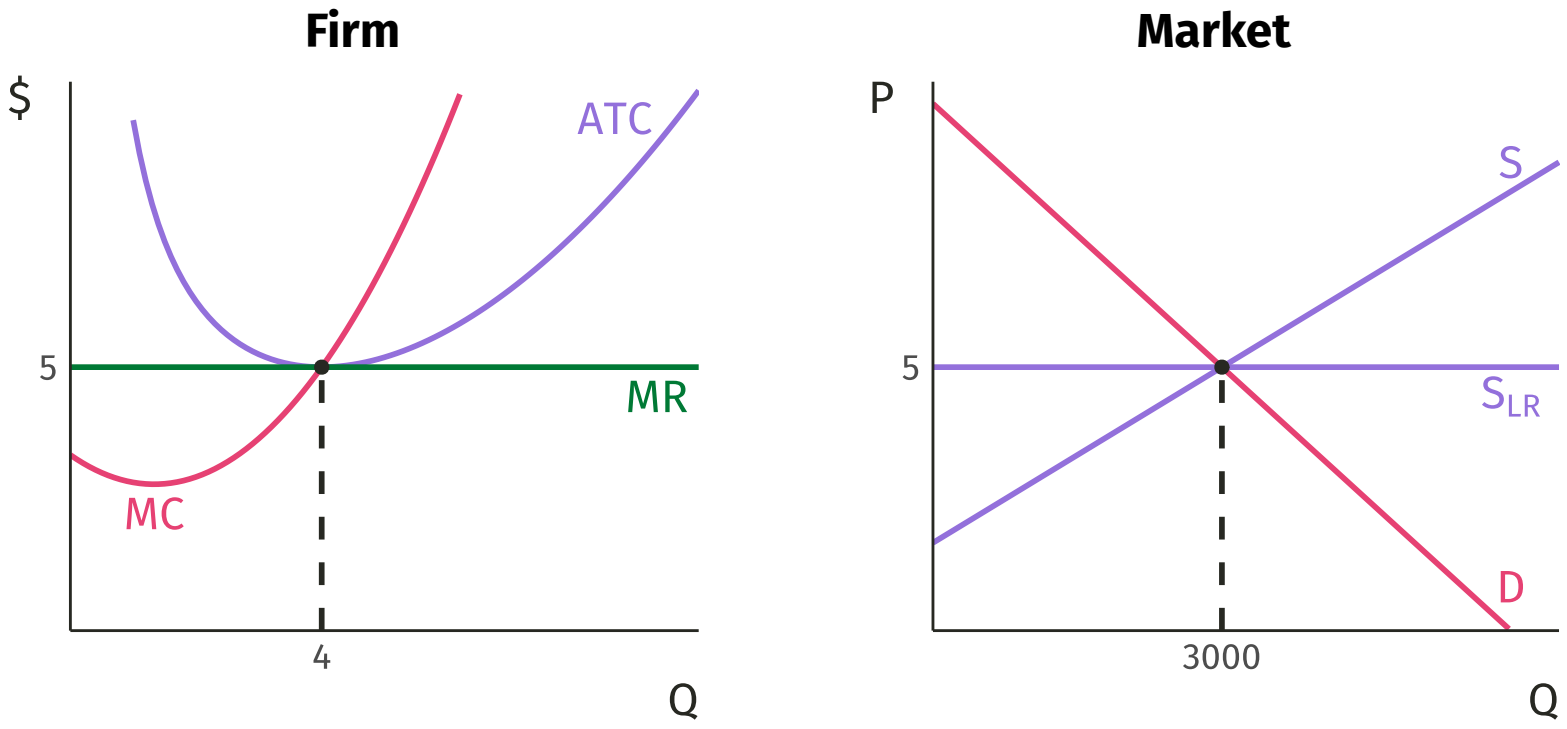
- Firms operate at a loss (or shut down)
  $\longrightarrow$ firms exit market
  $\longrightarrow$ number of firms decreases
  $\longrightarrow$ short-run supply shifts left
  $\longrightarrow$ short-run price rises.

Long-Run Equilibrium



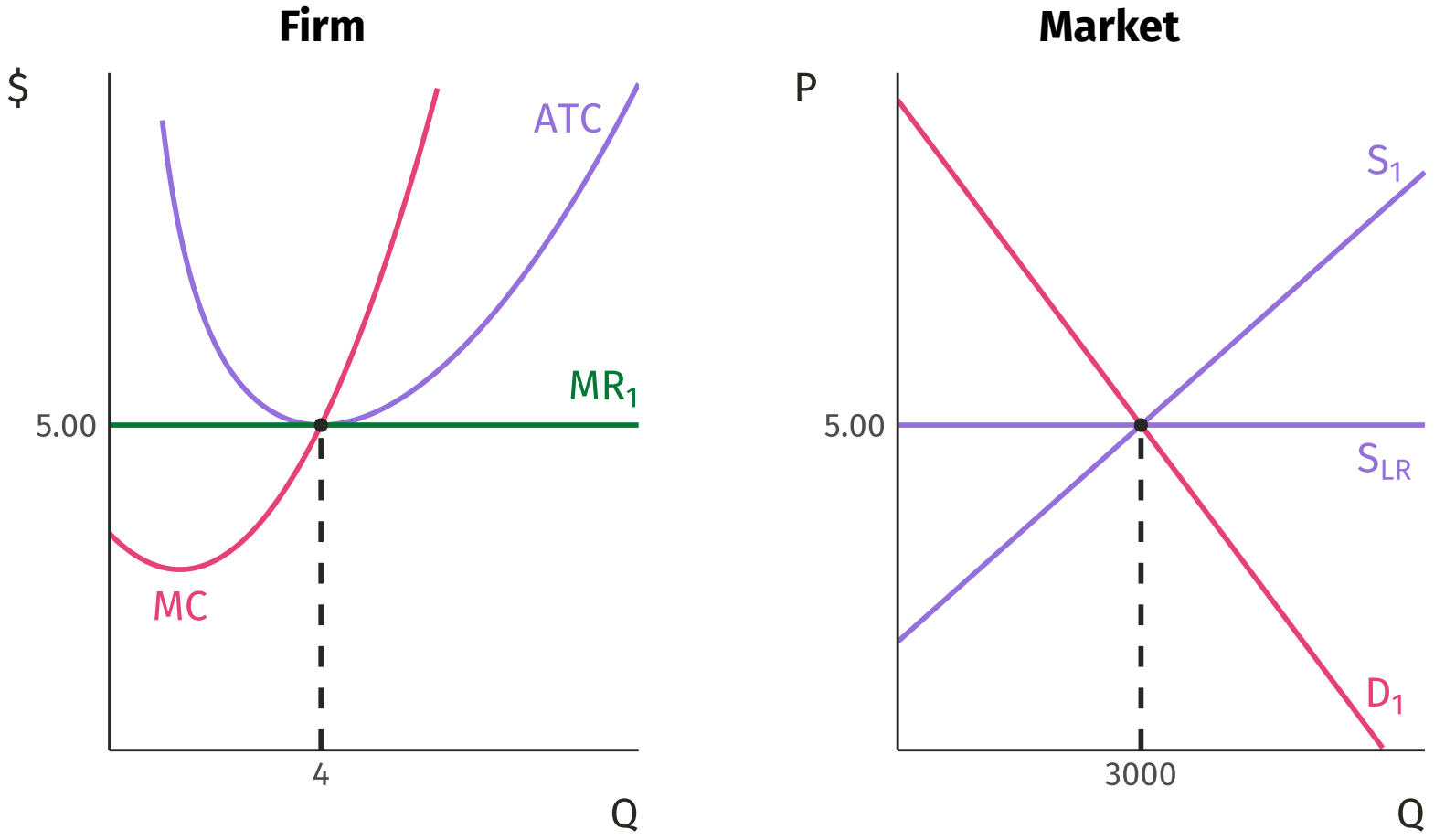
P_{LR}	Q_{Firm}	Q_{Market}	N_{Firms}
Minimum of ATC	Q that minimizes ATC	$Q_{Firm} \times N_{Firms}$	$Q_{Market} \div Q_{Firm}$

Long-Run Equilibrium



P_{LR}	Q_{Firm}	Q_{Market}	N_{Firms}
$5.00	4	3000	750

Q: A newfound taste for gluten-free diets decreases demand for wheat. How do wheat farmers adjust *in the short run*?



Q: A newfound taste for gluten-free diets decreases demand for wheat. How do wheat farmers adjust *in the short run*?

Equilibrium	Initial	New Short-Run	New Long-Run
P	\$5.00		
Q_{Firm}	4		
Q_{Market}	3000		
N_{Firms}	750		

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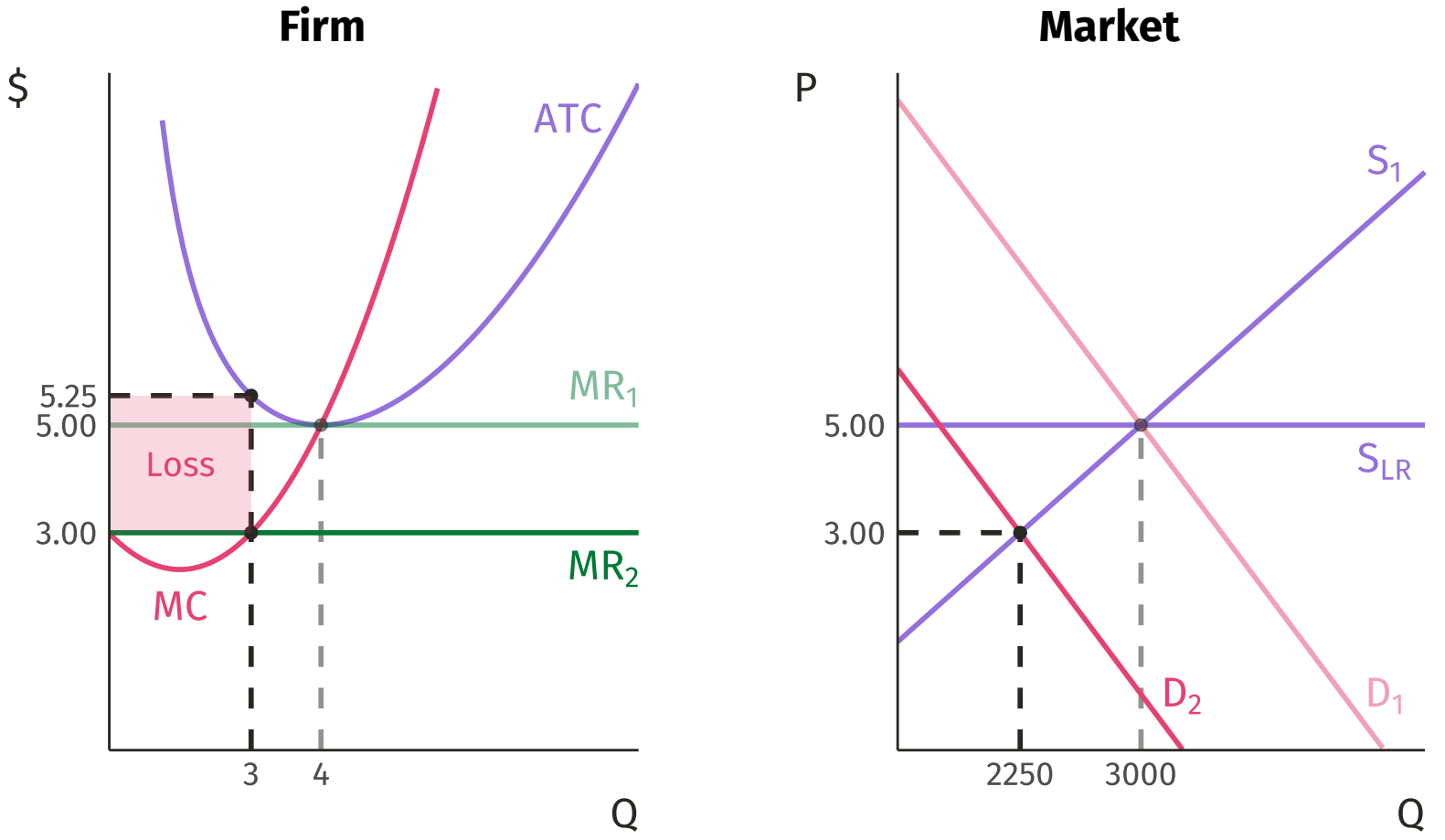


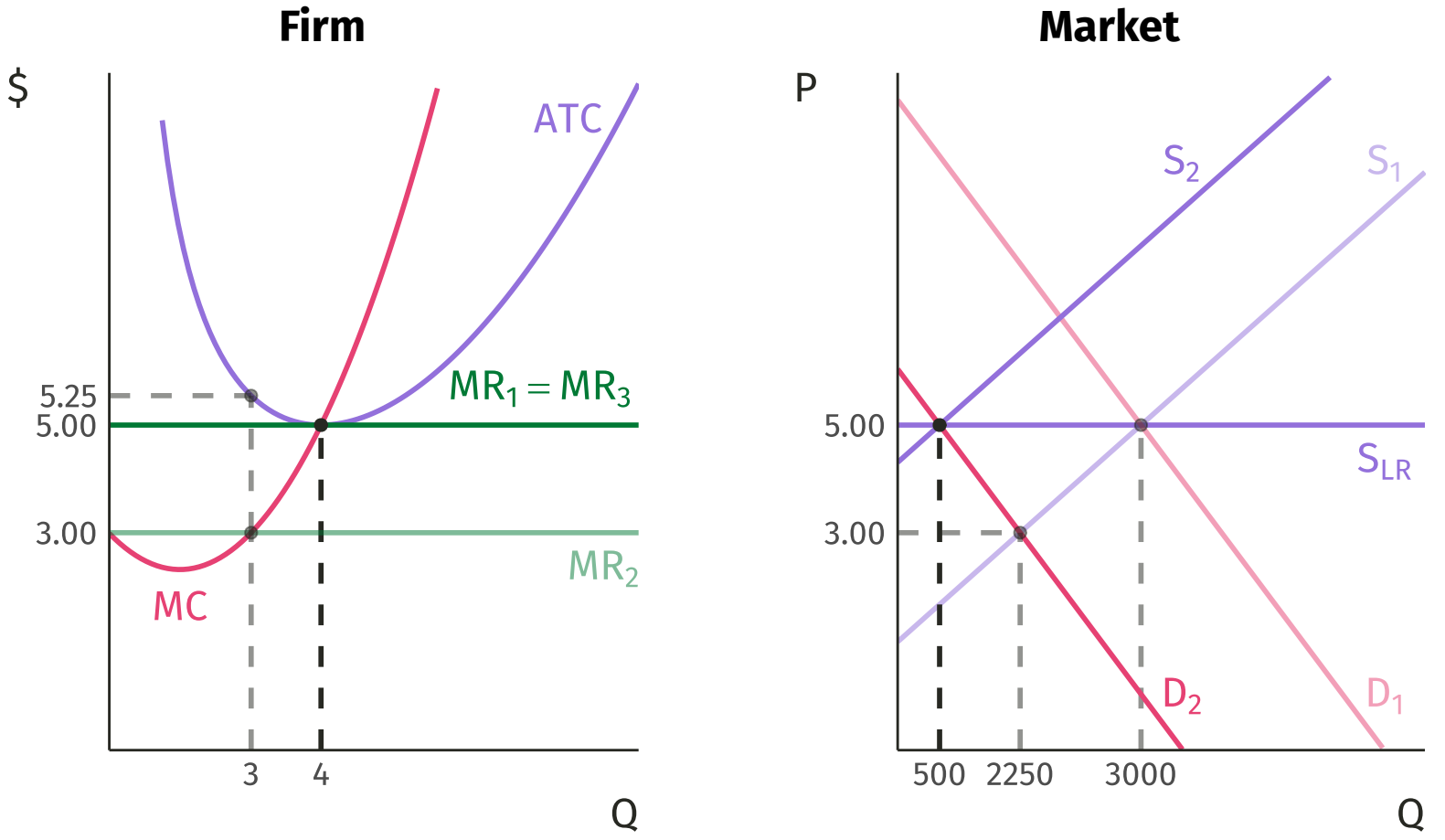
Q: A newfound taste for gluten-free diets decreases demand for wheat. How do wheat farmers adjust *in the short run*?

Equilibrium	Initial	New Short-Run	New Long-Run
P	\$5.00	\$3.00	
Q_{Firm}	4	3	
Q_{Market}	3000	2250	
N_{Firms}	750	750	

A_1: Farmers reduce production $\longrightarrow$ market quantity supplied decreases.

A_2: Farmers operate at a loss in the short run.

Q: A newfound taste for gluten-free diets decreases demand for wheat. How do wheat farmers adjust *in the long run*?



Q: A newfound taste for gluten-free diets decreases demand for wheat. How do wheat farmers adjust *in the long run*?

Equilibrium	Initial	New Short-Run	New Long-Run
P	\$5.00	\$3.00	\$5.00
Q_{Firm}	4	3	4
Q_{Market}	3000	2250	500
N_{Firms}	750	750	125

A: Farmers exit until economic profit returns to 0 $\longrightarrow$ market supply falls.

Practice

Q: Which of the following is not a characteristic of a perfectly competitive market?

> **A.** Firms produce a homogenous product.
>
> **B.** Sellers have better information about the product than consumers.
>
> **C.** There is a large number of buyers and sellers.
>
> **D.** Firms earn zero profit.
>
> **E.** Firms can easily enter or exit the industry.

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>
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>
> **D.** Firms earn zero profit.
>
> **E.** Firms can easily enter or exit the industry.

Q: Which of the following provides the closest example of a perfectly competitive market?

> **A.** Market for cars.
>
> **B.** Market for bread.
>
> **C.** Market for handmade soaps.
>
> **D.** Market for athletic shoes.
>
> **E.** Market for newspapers.

Q: What should a firm do when marginal revenue is greater than marginal cost?

> **A.** Increase the level of output until price is equal to average variable cost.
>
> **B.** Stop producing.
>
> **C.** Stay at the same level of output.
>
> **D.** Reduce the level of output.
>
> **E.** Increase the level of output.