Lecture 11:
Returns to Scale, Economies of Scale & Economies of Scope
Supply in a Competitive Market

November 4, 2025

Course Administration

1. Three lectures to go after today!
2. Final exam December 16, see webpage for dates and times
3. Any questions?

Next Week: Ripped from the Headlines

Send article by Wednesday midnight.

Afternoon

Finder	Presenter
Grisha	Dylan
Harini	Grisha

Evening

Finder	Presenter
Charlotte	Raghan

This Week: Ripped from the Headlines

Afternoon

Finder	Presenter
Dylan	Aykut
George	Harini

Evening

Finder	Presenter
Eric	Daija
Paula	Elizabeth

Today

- How getting bigger can be helpful
  - Returns to scale
  - Economies of scale
  - Economies of scope
- Power of competitive markets

Scale: Returns, Economies, and Scope

Economies of Scale, Returns to Scale, and Economies of Scope

Returns to scale

- Does increase in inputs increase output? By how much?

Economies of Scale, Returns to Scale, and Economies of Scope

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Economies of Scale

- Does increase in costs increase output? By how much?

Economies of Scale, Returns to Scale, and Economies of Scope

Returns to scale

- Does increase in inputs increase output? By how much?

Economies of Scale

- Does increase in costs increase output? By how much?

Economies of Scope

- Does increasing the number of products the firm produces lower costs for the production of any product?

Economies of Scale vs Returns to Scale

Returns to Scale

- You use 5 units of K and 3 units of L
- This costs \$100
- Gives output of 20

Economies of Scale vs Returns to Scale

Returns to Scale

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- Increase scale! Double inputs

Economies of Scale vs Returns to Scale

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- You use 5 units of K and 3 units of L
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- Increase scale! Double inputs
- Now you use 10 units of K and 6 units of L
- Do you make more or less than 40 units of output?

Economies of Scale vs Returns to Scale

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Economies of Scale

- Your firm has total cost of \$100
- It produces 20 units of output

Economies of Scale vs Returns to Scale

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- It produces 20 units of output
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Economies of Scale vs Returns to Scale

Returns to Scale

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- This costs \$100
- Gives output of 20
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- Do you make more or less than 40 units of output?

Economies of Scale

- Your firm has total cost of \$100
- It produces 20 units of output
- Increase scale! Double costs
- Now you can spend \$200
- Do you make more or less than 40 units of output?

Three Flavors of Returns to Scale and Economies of Scale

	Returns to Scale	Economies of Scale
Constant		
Increasing		
Decreasing		

Three Flavors of Returns to Scale and Economies of Scale

	Returns to Scale	Economies of Scale
Constant	double inputs, double outputs	
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Three Flavors of Returns to Scale and Economies of Scale

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Constant	double inputs, double outputs	double total cost, double outputs *no economies of scale*
Increasing	double inputs, more than double outputs	
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Three Flavors of Returns to Scale and Economies of Scale

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Constant	double inputs, double outputs	double total cost, double outputs *no economies of scale*
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Three Flavors of Returns to Scale and Economies of Scale

	Returns to Scale	Economies of Scale
Constant	double inputs, double outputs	double total cost, double outputs *no economies of scale*
Increasing	double inputs, more than double outputs	double total cost, more than double outputs *economies of scale*
Decreasing	double inputs, less than double outputs	double total cost, less than double outputs *decreasing economies of scale*

What Drives Returns to and Economies of Scale?

- Increasing returns

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  - Fixed costs
  - Learning by doing – if the firm gets bigger and better at production by producing

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- Increasing returns
  - Fixed costs
  - Learning by doing – if the firm gets bigger and better at production by producing
- Decreasing returns
  - Regulation
  - Limited low cost/high quality inputs (violates one of our assumptions)

Returns to Scale Examples

Decreasing returns to scale

Returns to Scale Examples

Decreasing returns to scale

- Restaurant that gets too big
- Projects that become too big to manage

Returns to Scale Examples

Decreasing returns to scale

- Restaurant that gets too big
- Projects that become too big to manage

Increasing returns to scale

Returns to Scale Examples

Decreasing returns to scale

- Restaurant that gets too big
- Projects that become too big to manage

Increasing returns to scale

- Cooking, frequently
- Library system

Economies of Scale Examples

Decreasing economies of scale

Economies of Scale Examples

Decreasing economies of scale

- Very high end food
- Artisan manufacturing

Economies of Scale Examples

Decreasing economies of scale

- Very high end food
- Artisan manufacturing

Increasing economies of scale

Economies of Scale Examples

Decreasing economies of scale

- Very high end food
- Artisan manufacturing

Increasing economies of scale

- Social networks
- Library system

Economies of Scale and Returns to Scale

Returns to scale

- Does increase in inputs increase output? By how much?

Economies of Scale

- Does increase in costs increase output? By how much?

Therefore

- Increasing returns to scale $\implies$ economies of scale
- Economies of scale $\not\implies$ returns to scale

Economies of Scope

- Economies of scope $\equiv$ firm produces multiple outputs more cheaply together than it would each individual output
- Diseconomies of scope $\equiv$ firm produces multiple outputs at a higher cost than it would if it produced each output individually
- Where do they come from?

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- Where do they come from?
- From sharing common inputs or knowledge

Economies of Scope: Bath and Body Works

- What do they produce?

Bath & Body Works®

Economies of Scope: Bath and Body Works

Bath & Body Works®

- What do they produce?
- What could economies of scope be?

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Economies of Scope: Bath and Body Works

Bath & Body Works®

- What do they produce?
- What could economies of scope be?
- *Wall Street Journal* says that onshoring production enhances economies of scope
  - respond more rapid to market changes
  - create lots of flavors

Big Questions for Today

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- How does a firm choose how much to produce?
- How does long run behavior differ from short run behavior?
- Where does the market supply curve come from?
- Which firms get producer surplus?
- Why is competition so valuable?

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- Competitive markets yield most goods at lowest price **to consumers**
- Part of the government is dedicated to preserving competition: antitrust enforcement

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  - Enhance: enforce contracts, assign and ensure property rights
  - Inhibit: limit prices or promote or limit firm behavior

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  - Inhibit: limit prices or promote or limit firm behavior
- Weigh benefits of policy against harms to competition

Where We're Going

1. Perfect competition
2. Profit maximization
3. Short run perfect competition
4. Long run perfect competition

Market Structure and Perfect Competition

Market Characteristics and Types

Key Characteristics of Markets

- Number of firms
- Substitutability of products
- Barriers to entry

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Types of Markets

- Perfectly competitive
- Monopolistic competition
- Oligopoly
- Monopoly

Market Characteristics by Type

	Number of firms	Substitutability of Products	Barriers to Entry
Perfectly Comp.	many	entirely	none
Monopolistic Comp.	many	not entirely	yes
Oligopoly	few	either	some
Monopoly	one	n/a	yes

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Elements of a Perfectly Competitive Market

- Many firms in the market
- Products sold are perfect substitutes
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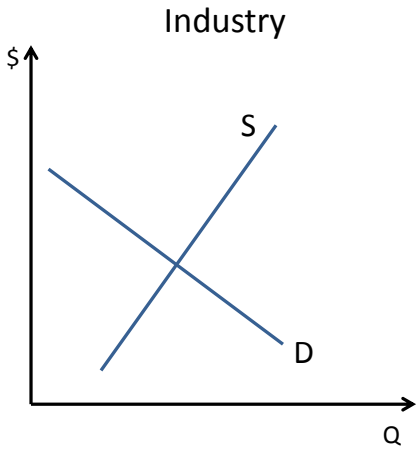
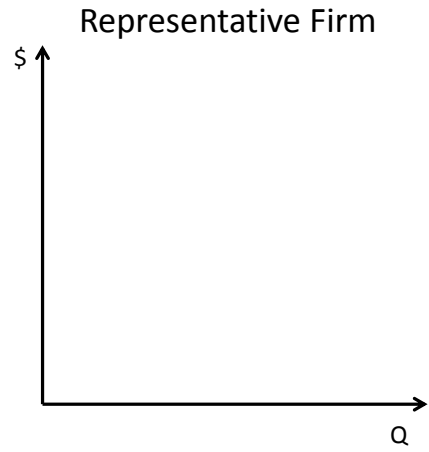
- Very rare
- The closer we get to this, the better off consumers are
- Serves as a baseline "best case scenario"

Demand Curve as Seen By a Price-Taker

- Call a perfectly competitive firm a price-taker
- This firm can't impact price
- To this firm, demand is infinite at market price
- In other words, the firm perceives demand as perfectly elastic at the equilibrium market price

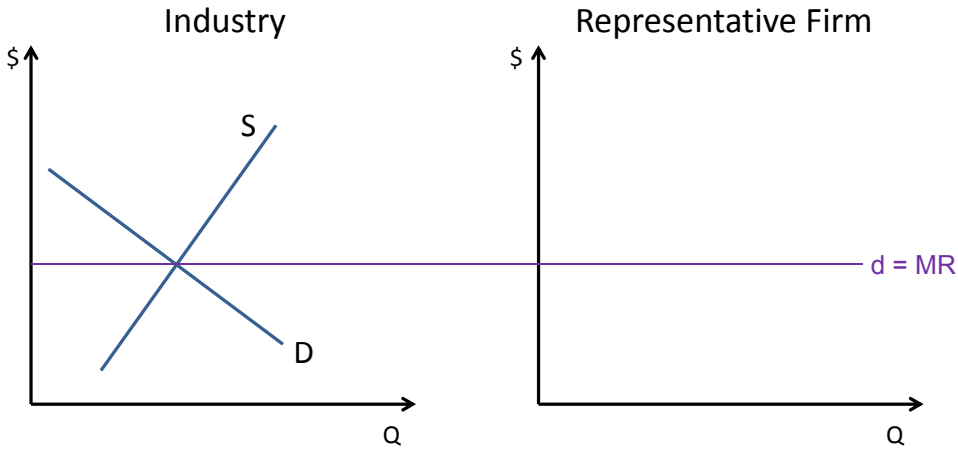
Market Demand vs Demand Perceived by Firm





Market Demand vs Demand Perceived by Firm

Firm's View of Market Equilibrium



Profit Maximization in a Perfectly Competitive Environment

What are Profits?

Profits = total revenue - total cost

$$\pi = TR - TC$$

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$$\begin{aligned} \pi &= TR - TC \\ &= (P * Q) - (ATC * Q) \end{aligned}$$

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  - Lee family bought structure in 1970
  - accounting profit
    - revenues: flower sales
    - costs: salaries, flowers, building upkeep
  - economic profit
    - add opportunity cost of structure to total costs
    - one-story building in a booming area

Marginal Revenue for a Perfectly Competitive Firm

- Marginal revenue $\equiv$ additional revenue from an additional unit of output

Marginal Revenue for a Perfectly Competitive Firm

- Marginal revenue $\equiv$ additional revenue from an additional unit of output
- If the firm perceives the demand curve as constant, then $MR = P$
- Firm cannot affect P

Profit Maximization for All Types of Firms

- Additional cost from an additional unit is MC
- If $MC > MR$...

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- $\rightarrow$ profit is maximized where $MR = MC$

all types of firms maximize profit where $MR = MC$

Profit Maximization for Firms in a Competitive Market

Because competitive firms are price takers

$$P = MR$$

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To maximize profits, firms then set

$$\begin{aligned} MR &= MC \\ \mathbf{P} &= \mathbf{MC} \end{aligned}$$

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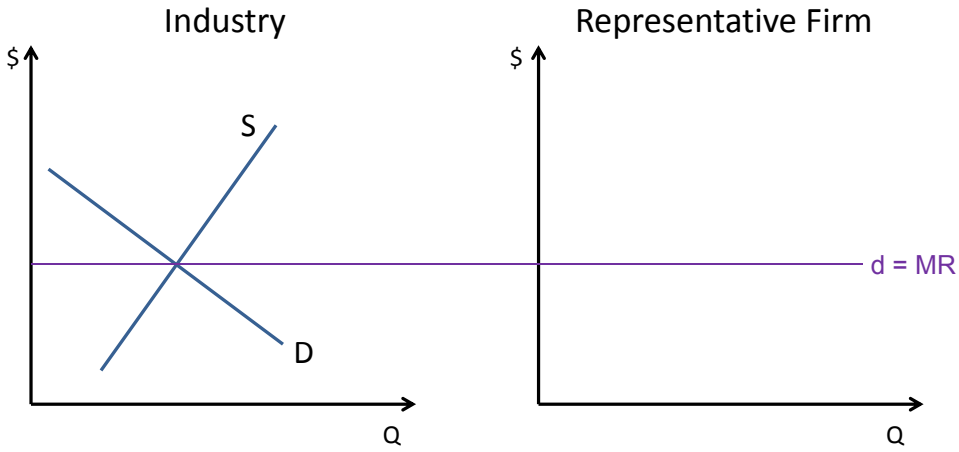
Perfectly competitive firms maximize profits where $P = MC$

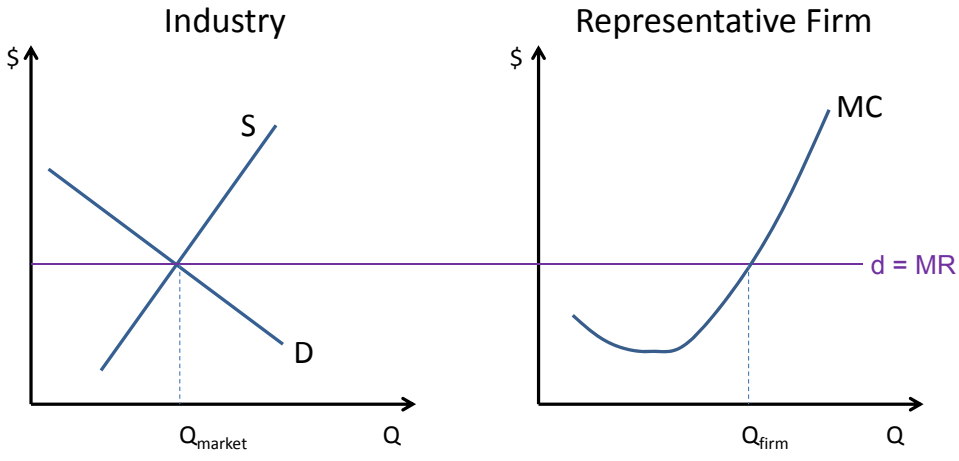
$MR = MC$ in Pictures

Firm's View of Demand



$MR = MC$ in Pictures

Intersecting with Firm's Costs



What are Profits When a Firm is Maximizing Profit?

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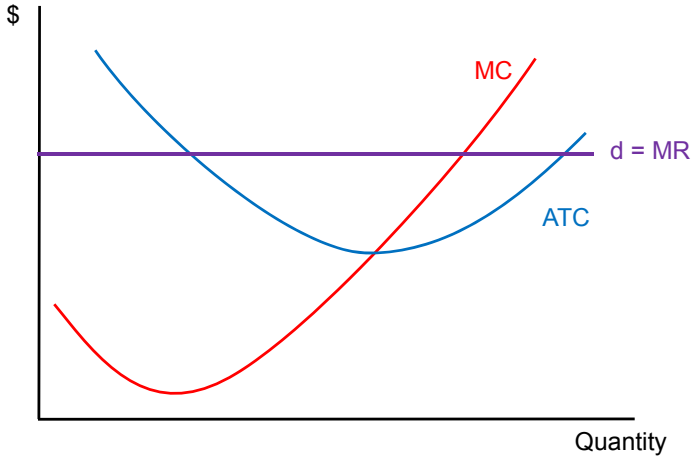
$$\begin{aligned} \pi &= TR - TC \\ &= (P * Q) - (ATC * Q) \\ &= Q(P - ATC) \end{aligned}$$

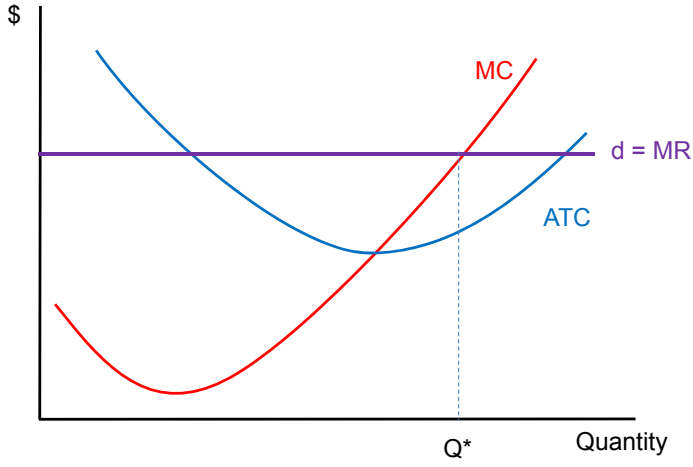
Finding Profit

What is the Profit-Maximing Q?



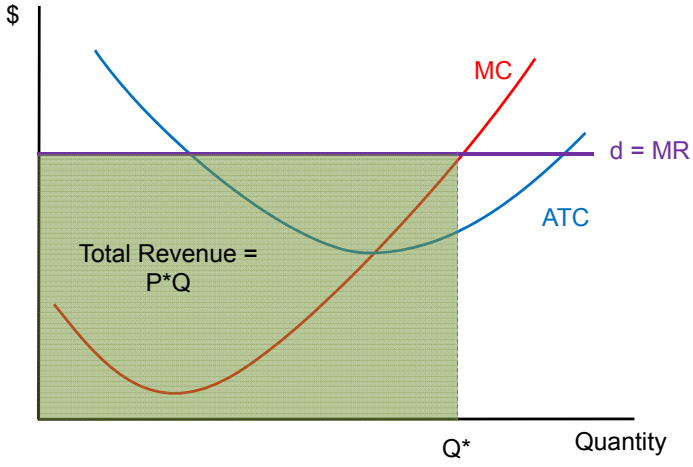
Finding Profit

Where is total revenue?



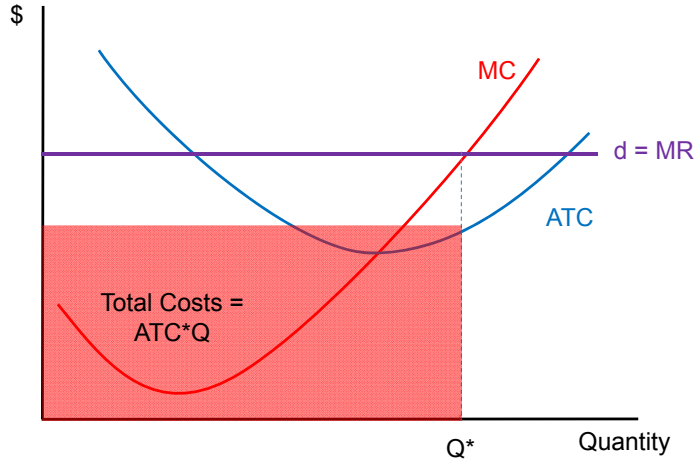
Finding Profit

Where are total costs?



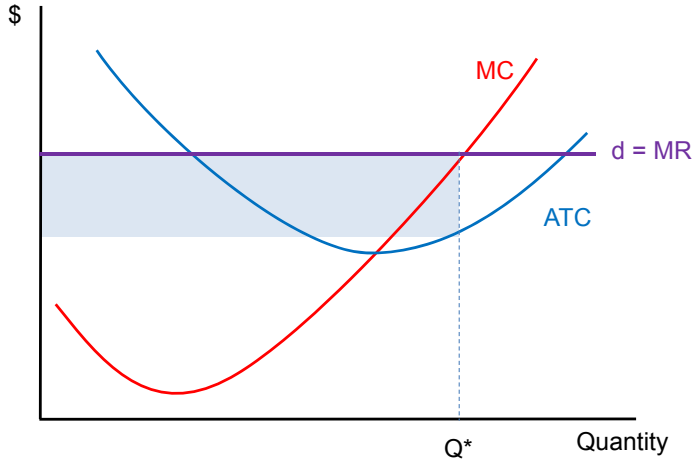
Finding Profit

How do you find profit?



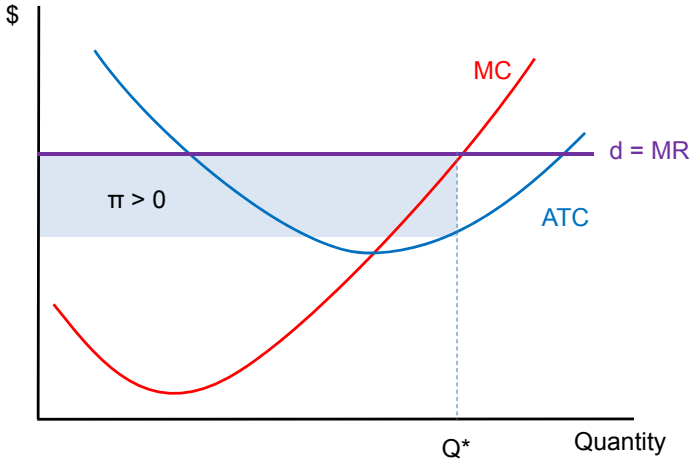
Finding Profit

Is $\pi > 0$ or < 0?



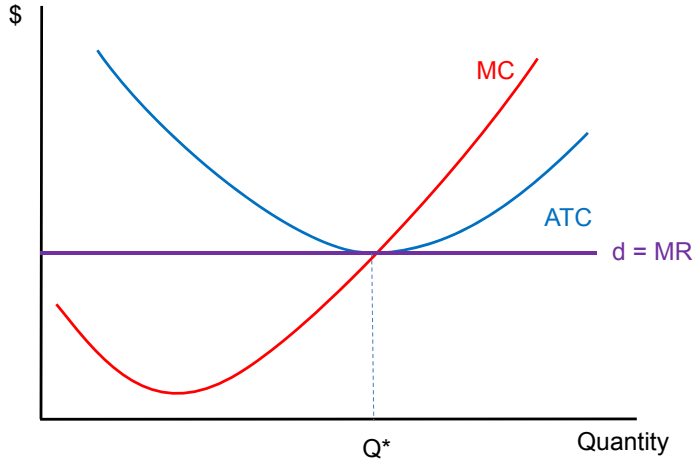
Finding Profit

$\pi > 0$



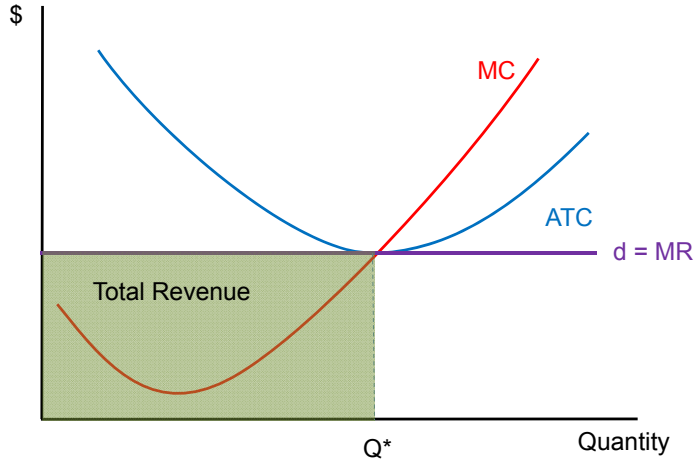
Finding Profit

Profits Now? First find revenues



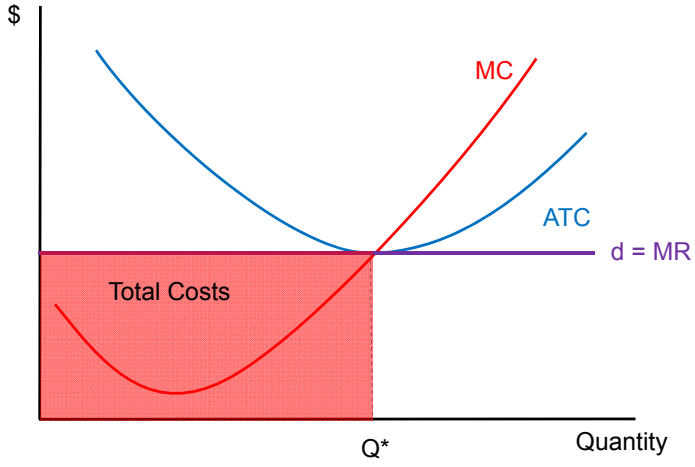
Finding Profit

Profits Now? Now find costs



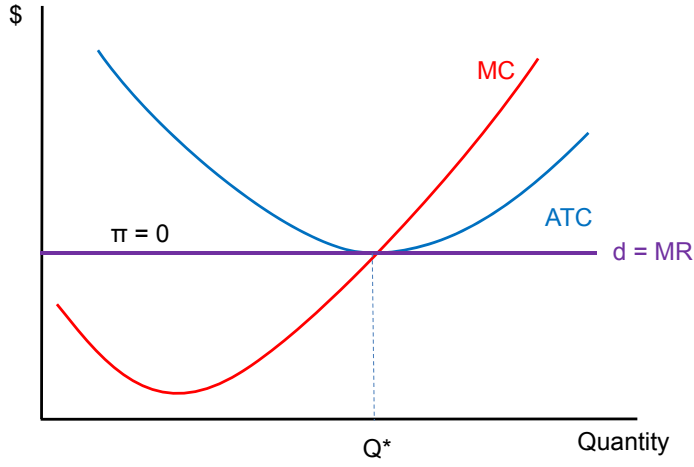
Finding Profit

Profits Now?



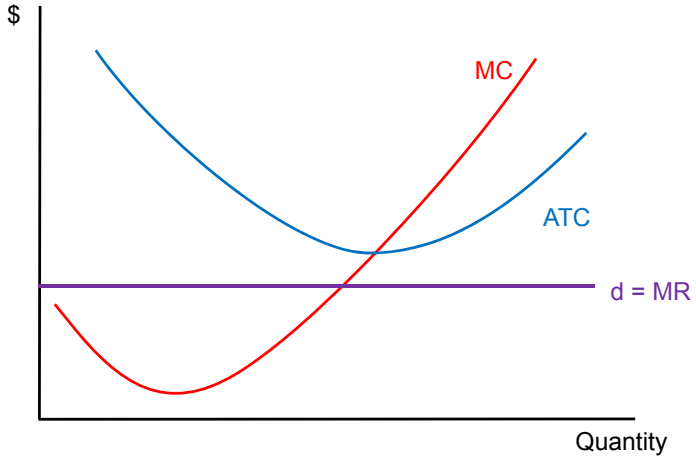
Finding Profit

No Profits to Be Found



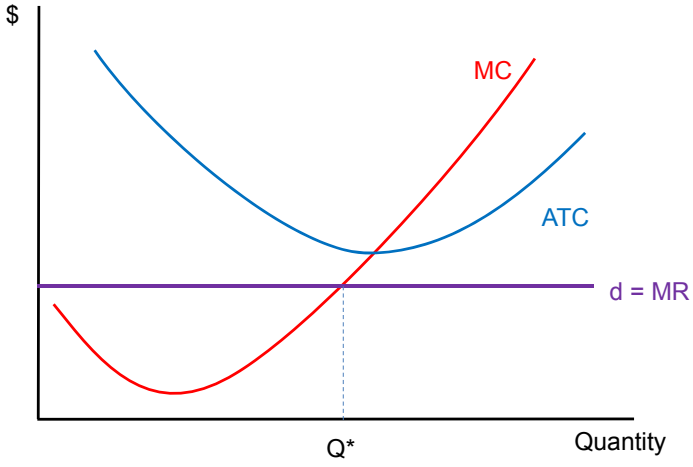
Finding Profit

Price Falls. Profits Now? What is profit maximizing Q?



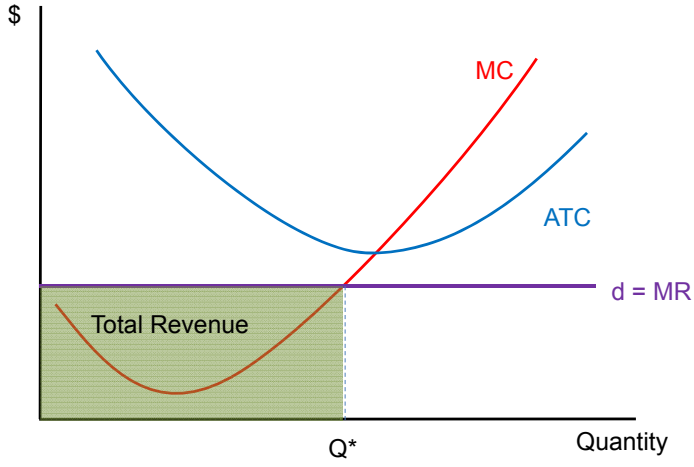
Finding Profit

Profits Now? Find total revenue



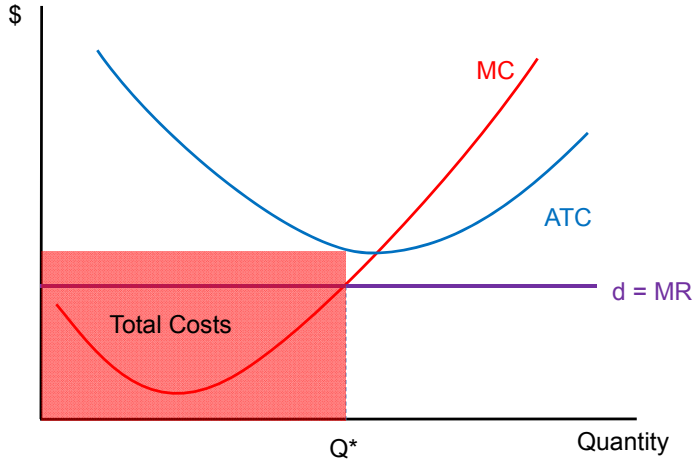
Finding Profit

Profits Now? Find total costs



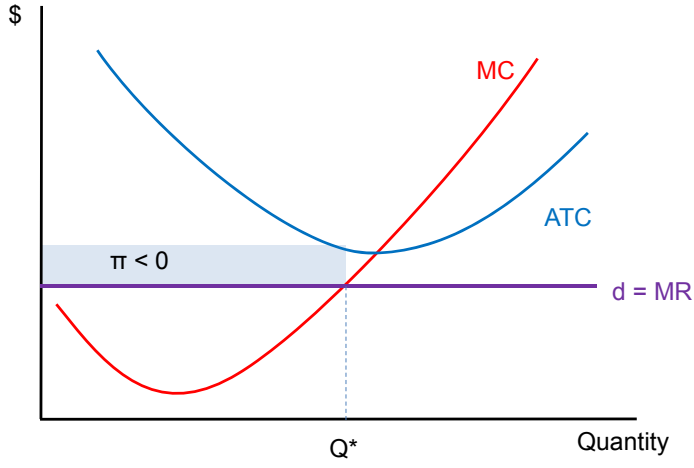
Finding Profit

$\pi > 0$? or $\pi < 0$?



Finding Profit

Profits are negative



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$$\pi_{shutdown} = -FC$$

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$$\pi_{operate} = TR - TC = TR - FC - VC$$

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Firm should operate if

$$\pi_{operate} > \pi_{shutdown}$$

In the Short Run, Should the Firm Shut Down if $\pi < 0$?

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$$\begin{aligned} \pi_{operate} &> \pi_{shutdown} \\ TR - FC - VC &> -FC \end{aligned}$$

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Firm should operate if

$$\begin{aligned} \pi_{operate} &> \pi_{shutdown} \\ TR - FC - VC &> -FC \\ TR - VC &> 0 \\ TR &> VC \end{aligned}$$

In the Short Run, Should the Firm Shut Down if $\pi < 0$?

Firm should operate if

$$\begin{aligned} \pi_{operate} &> \pi_{shutdown} \\ TR - FC - VC &> -FC \\ TR - VC &> 0 \\ TR &> VC \end{aligned}$$

Examples of firms that sometimes operate?

Short Run Operations: Two Equivalent Statements

Operate if

$$TR > VC$$

Short Run Operations: Two Equivalent Statements

Operate if

$$TR > VC$$

We can re-write this as

$$TR \quad > \quad VC$$

Short Run Operations: Two Equivalent Statements

Operate if

$$TR > VC$$

We can re-write this as

$$\begin{aligned} TR &> VC \\ PQ &> VC \end{aligned}$$

Short Run Operations: Two Equivalent Statements

Operate if

$$TR > VC$$

We can re-write this as

$$\begin{aligned} TR &> VC \\ PQ &> VC \\ \frac{PQ}{Q} &> \frac{VC}{Q} \end{aligned}$$

Short Run Operations: Two Equivalent Statements

Operate if

$$TR > VC$$

We can re-write this as

$$\begin{aligned} TR &> VC \\ PQ &> VC \\ \frac{PQ}{Q} &> \frac{VC}{Q} \\ P &> AVC \end{aligned}$$

Short Run Operations: Two Equivalent Statements

Operate if

$$TR > VC$$

We can re-write this as

$$\begin{aligned} TR &> VC \\ PQ &> VC \\ \frac{PQ}{Q} &> \frac{VC}{Q} \\ P &> AVC \end{aligned}$$

Firm should operate when $P > AVC$, same as $TR > VC$.

Review: Keeping the Short-Run Curves Straight

- Maximize profit where $MR = MC$
- Profit is $Q * (P - ATC)$
- Operate if $P > AVC$, same as $TR > VC$

Next Class

- Turn in Problem Set 10
- Second half of Chapter 8
- Market Power and Monopoly: Chapter 9 – update pages as needed