Lecture 11:
Supply in a Competitive Market 2

November 10, 2026

Course Administration

Three lectures to go after today!

1. Lecture 12: Market power & Quiz 2
2. Lecture 13: Externalities
3. Lecture 14: Public goods

Quiz 2

- Analyze data
- Relate to lectures on costs

If you have accommodations and want more than ten minutes for the quiz, request at DSS **today**.

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1. Midterms
   - Please see me if your score is < 62
   - Added office hours Nov. 12 10:15 to 11:30
2. Final
   - Exam December 15
     - PHIL 108: 3:00 to 5:00
     - MON 250: 5:20 to 7:20 pm
   - Posted last year's final
   - Review session December 10, 6 to 8 pm
3. Any questions?

Next next Week: Ripped from the Headlines

Send article by next Wednesday midnight.

Afternoon

Finder	Presenter
Saniya J.	Ali W.
Anders S.	Beylie I.

Evening

Finder	Presenter
Dylan W.	Arayaa T.
Sarah T.	Bianca G.

This Week: Ripped from the Headlines

Afternoon

Finder	Presenter
Bridget V.	Michelle G.
Jimmy G.	Nash K.
Kendell Y.	Or Nash G.

Evening

Finder	Presenter
Muriel A.	Dejau T.
Tucker B.	Dylan W.
Dejau T.	Shoshana M.

Today: How perfectly competitive firms behave

1. Recap from last class
2. Perfect competition in the short run
3. Perfect competition in the long run

Recap of Lecture 10's Profit Maximization

Review: Keeping the Short-Run Curves Straight

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

Perfect Competition in the Short Run

Describing Supply from First Principles

In the short run

- Firm's supply curve
- Industry's supply curve
- Producer surplus for a firm
- Producer surplus for the industry

Finding a Firm's Short Run Supply Curve

- We now know that the firm supplies only when $TR > VC$
- What does this imply about MC?

$$TR \quad > VC$$

Finding a Firm's Short Run Supply Curve

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$$\begin{aligned} TR &> VC \\ P * Q &> VC \end{aligned}$$

Finding a Firm's Short Run Supply Curve

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$$\begin{aligned} TR &> VC \\ P * Q &> VC \\ MC * Q &> VC \end{aligned}$$

Finding a Firm's Short Run Supply Curve

- We now know that the firm supplies only when $TR > VC$
- What does this imply about MC?

$$\begin{aligned} TR &> VC \\ P * Q &> VC \\ MC * Q &> VC \\ MC &> VC/Q \end{aligned}$$

Finding a Firm's Short Run Supply Curve

- We now know that the firm supplies only when $TR > VC$
- What does this imply about MC?

$$
\begin{aligned}
TR &> VC \\
P * Q &> VC \\
MC * Q &> VC \\
MC &> VC/Q \\
MC &> AVC
\end{aligned}
$$

Finding a Firm's Short Run Supply Curve

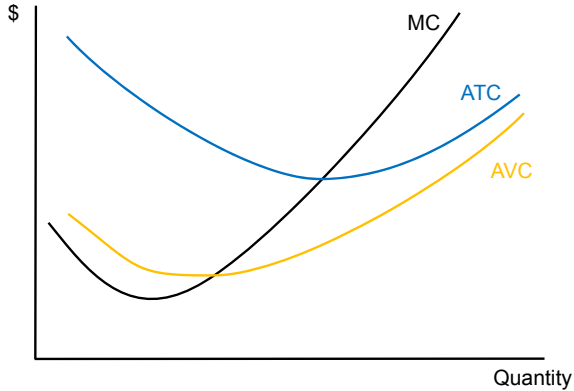
- We now know that the firm supplies only when $TR > VC$
- What does this imply about MC?

$$\begin{aligned} TR &> VC \\ P * Q &> VC \\ MC * Q &> VC \\ MC &> VC/Q \\ MC &> AVC \end{aligned}$$

$\rightarrow$ Firm supplies only when $MC > VC/Q$

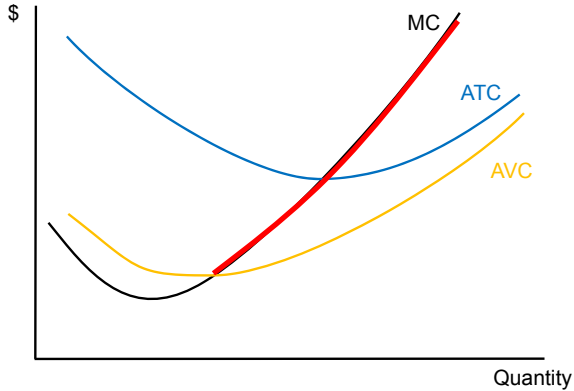
Finding a Firm's Short Run Supply Curve

What Quantities Would the Firm Produce?



Finding a Firm's Short Run Supply Curve

An Individual Firm's Supply Curve

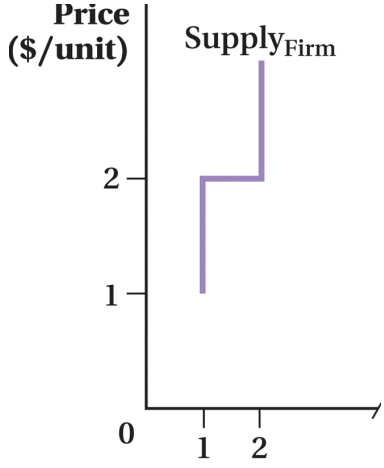


Finding Industry Supply

- Recall that we found market demand by summing individual demands
- Now we find market supply by adding firm supply, given prices
- Find market supply
  - Firm A: $Q_A = f(P)$
  - Firm B: $Q_B = g(P)$
  - Market supply: $Q_M = f(P) + g(P)$

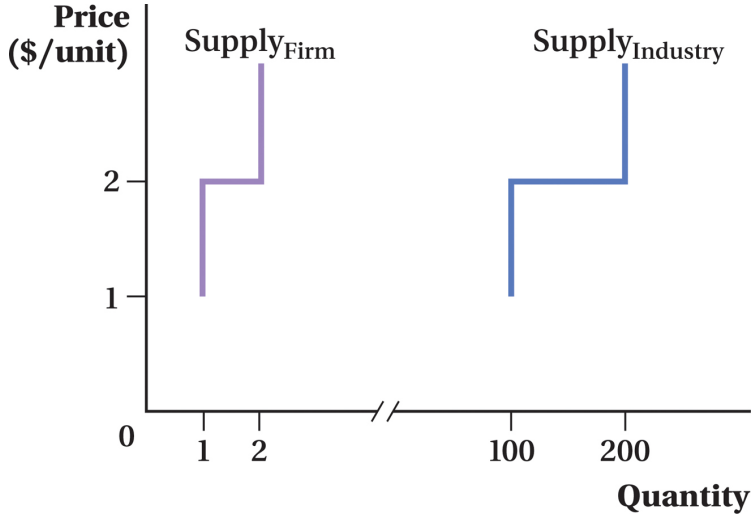
Finding Industry Supply in Pictures

When Firms Have the Same Supply Curve: What Would 100 Firms' Supply Be?



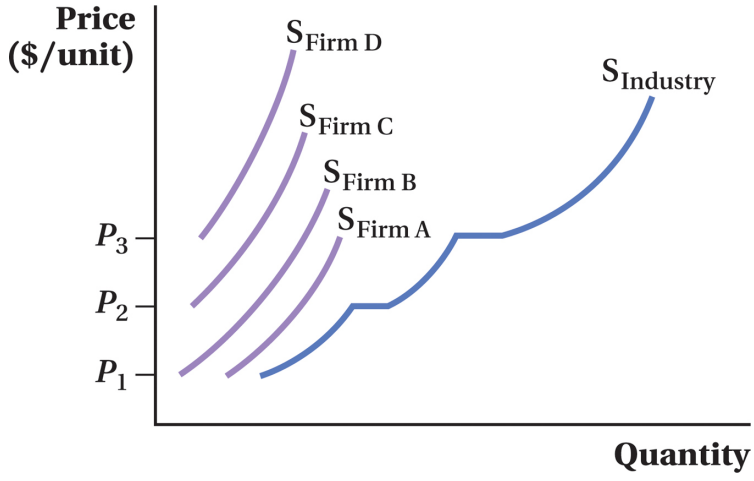
Finding Industry Supply in Pictures

When Firms Have the Same Supply Curve: Here 100 Firms



Finding Industry Supply in Pictures

When Firms Have Different Supply Curves



Adding Up Market Supply

- Supply starts at lowest price is that offered by any firm
- Total quantity at any price is Q offered by all firms

In-Class Problem: Tortillas

Assume the industry for flour tortillas in Denver is perfectly competitive. There are 200 firms. Seventy-five of the firms are "high-cost," with short-run supply curves $Q_{hc} = 5P$. The others are "low-cost," with short- run supply curves $Q_{lc} = 8P$.

1. What is the short-run industry supply curve for tortillas if there are only low cost firms?
2. What is the short-run industry supply curve for tortillas if there are only high cost firms?
3. What is the total short-run industry supply Q_S if both types of firms exist?
4. Assume the market demand curve for tortillas is given by $Q_D = 10,000 - 625P$. Find the market equilibrium price and quantity.
5. At this price, how many dozens of tortillas are produced by the high- and low-cost firms, respectively?

In-Class Problem: Tortillas

Assume the industry for flour tortillas in Denver is perfectly competitive. There are 200 firms. Seventy-five of the firms are "high-cost," with short-run supply curves $Q_{hc} = 5P$. The others are "low-cost," with short- run supply curves $Q_{lc} = 8P$.

1. What is the short-run industry supply curve for tortillas Q_S?

$$\begin{aligned} S_{sr} &= 125 * Q_{lc} + 75 * Q_{hc} \\ &= 125(8P) + 75(5P) \\ &= 1000P + 375P \\ &= 1375P \end{aligned}$$

In-Class Problem: Answer, Cont'd

2. Assume the market demand curve for tortillas is given by $Q_D = 10,000 - 625P$. Find the market equilibrium price and quantity.

$$\begin{aligned} Q_S &= Q_D \\ 1375P &= 10,000 - 625P \\ 2000P &= 10000 \\ P &= 5 \end{aligned}$$

Find quantity using either curve

$$\begin{aligned} Q_D &= 10,000 - 625P \\ &= 10000 - 625(5) \\ &= 10000 - 3125 \\ &= 6875 \end{aligned}$$

In-Class Problem: Answer, Cont'd

3. At this price, how many dozens of tortillas are produced by the high- and low-cost firms, respectively? Use their supply curves

$$\begin{aligned} Q_{hc} &= 5P = 5(5) = 25 \\ Q_{lc} &= 8P = 8(5) = 40 \end{aligned}$$

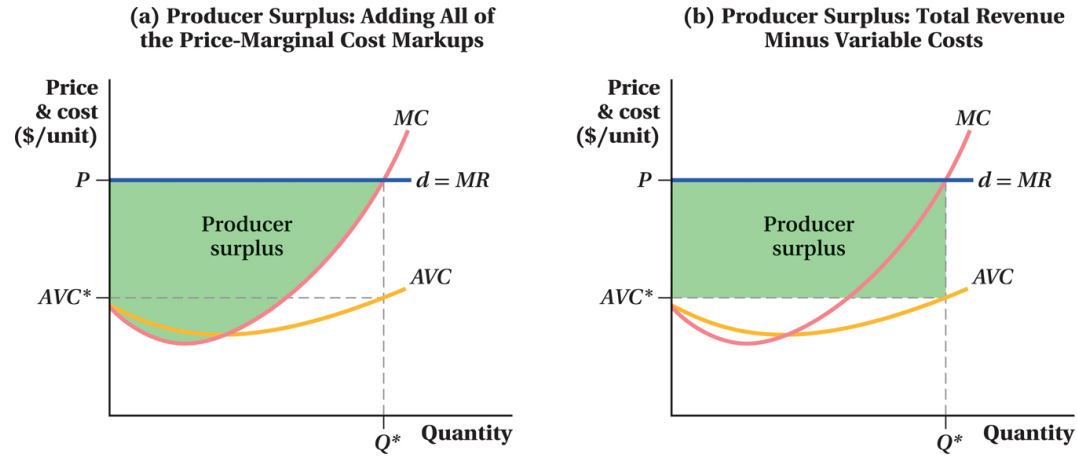
4. Determine total industry surplus at the equilibrium. Area above the supply curve and below market price. Q intercept is at zero, so

$$\begin{aligned} PS &= \frac{1}{2}bh \\ &= \frac{1}{2}6875(5) \\ &= 17,187.50 \end{aligned}$$

Producer Surplus from a Competitive Firm

- Like before, the sum of the benefit from each unit
- Two equivalent ways to think about this
  - The difference between market price and supply
  - The difference between $Q * AVC$ and PQ

Producer Surplus for a Firm: Pictures



Producer Surplus vs. Profit

- Profit

$$\pi =$$

Producer Surplus vs. Profit

- Profit

$$\pi = TR - TC = TR - (FC + VC)$$

Producer Surplus vs. Profit

- Profit

$$\pi = TR - TC = TR - (FC + VC)$$

- Surplus

$$PS = TR - VC$$

Producer Surplus vs. Profit

- Profit

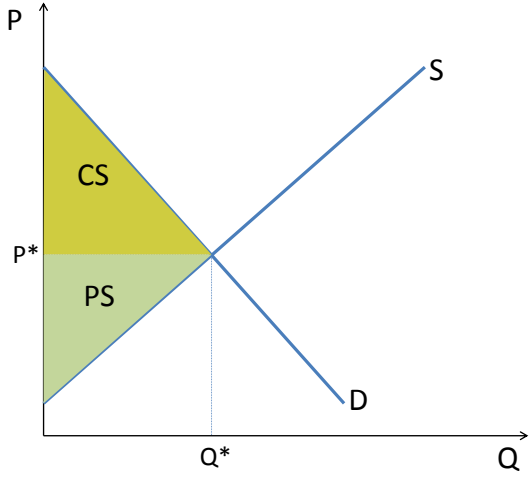
$$\pi = TR - TC = TR - (FC + VC)$$

- Surplus

$$PS = TR - VC$$

Remember, $\pi \neq PS$

Producer Surplus for a Competitive Industry



Perfect Competition in the Long Run

What Makes the Long Run Different?

- All costs are variable
- Firms enter
- Firms exit

Entry in the Long Run

- Free entry $\equiv$ when firms can easily enter the market
  - No legal barriers
  - No technical barriers

Entry in the Long Run

- Free entry $\equiv$ when firms can easily enter the market
  - No legal barriers
  - No technical barriers
- Long run profits
  - Difference between price and long-run total cost
  - $\pi = P * Q - LATC * Q = Q * (P - LATC)$

Entry in the Long Run

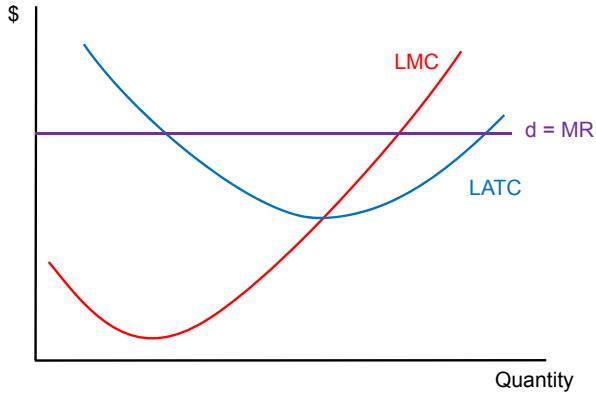
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- When $\pi > 0$, we anticipate entry by new firms, until $\pi = 0$

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  - Difference between price and long-run total cost
  - $\pi = P * Q - LATC * Q = Q * (P - LATC)$
- When $\pi > 0$, we anticipate entry by new firms, until $\pi = 0$
- Long-run competitive equilibrium $\equiv$ point at which $P = LATC$, and there are no gains to entry for additional firms

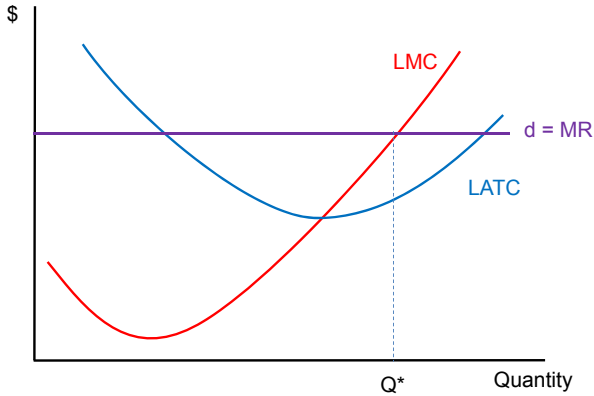
Profits and Entry

What is the long-run profit-maximizing Q?



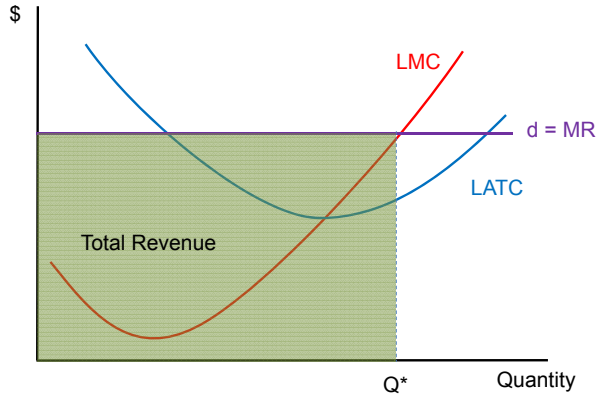
Profits and Entry

And where are total revenues?



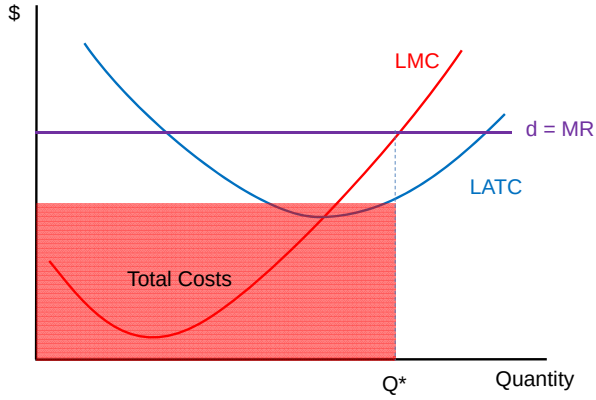
Profits and Entry

Total costs?



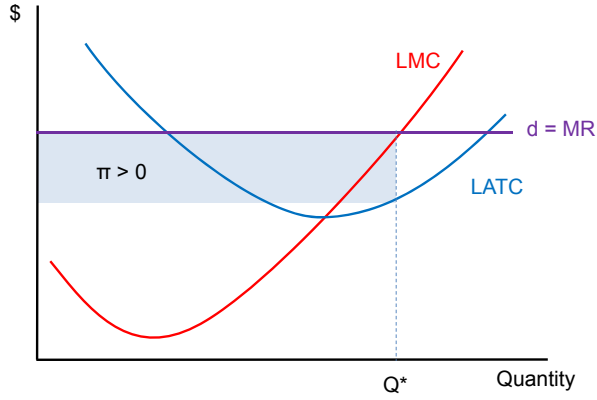
Profits and Entry

Where is profit?



Profits and Entry

Positive profits: Stay in business



If economic profit exists, what should other firms do?

Profits and Entry

What will entry change in this figure?

In the Long Run

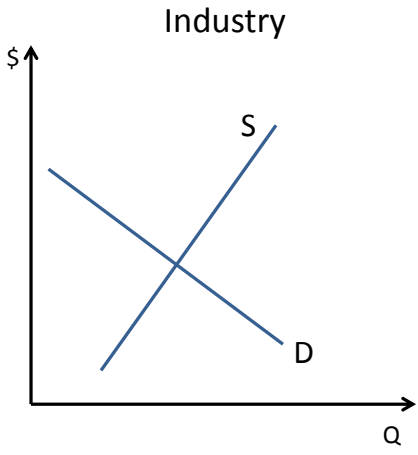
- Firms make zero profit
- This occurs when firms produce at minimum of $LATC$
- Minimum of $LATC$ is also where $MC = LATC$

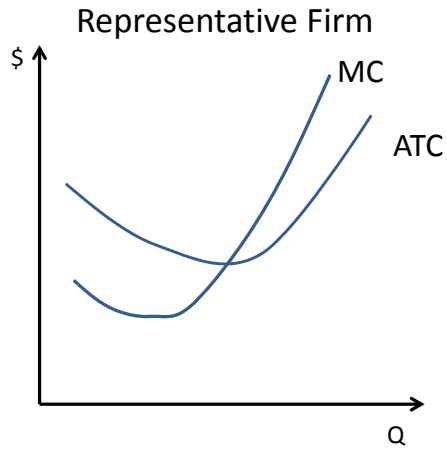
Long-Run Exit

- Free exit $\equiv$ ability of firm to exit an industry without legal or technical barriers
- When should a firm exit the market? When $P < LATC$

What Happens When Demand Increases?

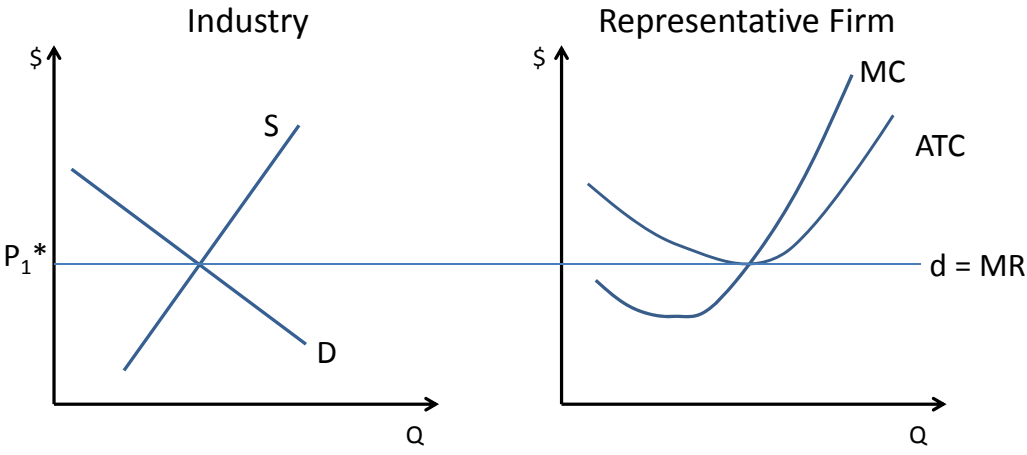
Original Equilibrium





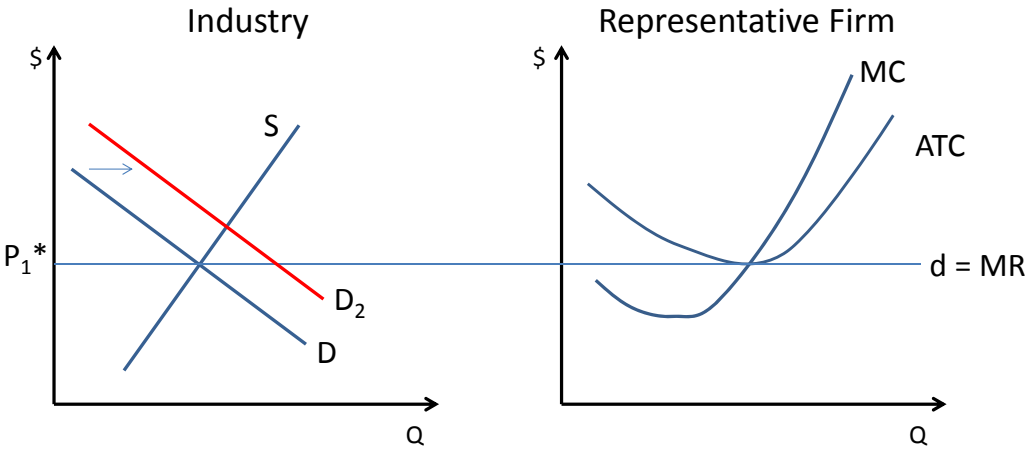
What Happens When Demand Increases?

Note Zero Profits



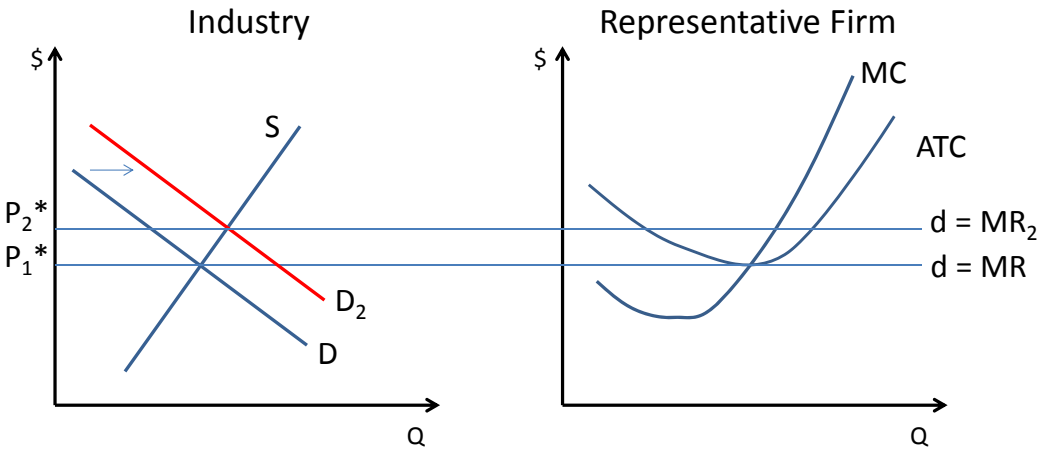
What Happens When Demand Increases?

Demand Increases. Profits?



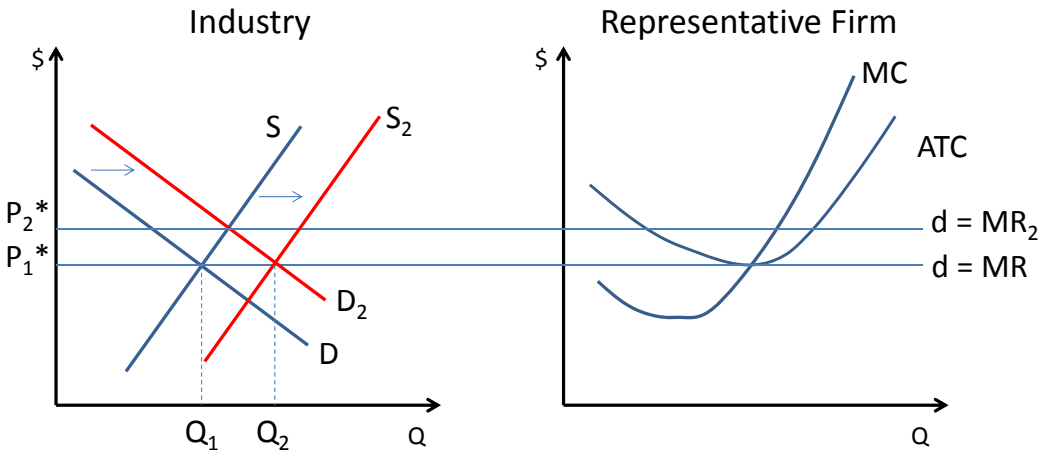
What Happens When Demand Increases?

Firms Enter, Prices and Profits Fall



What Happens When Demand Increases?

Supply Increases to Offset Change in Demand



Finding the Long-Run Supply Curve

Recap: Suppose demand increases. What happens

- in the short run to prices?

Finding the Long-Run Supply Curve

Recap: Suppose demand increases. What happens

- in the short run to prices? increase
- in the long run to firm entry?

Finding the Long-Run Supply Curve

Recap: Suppose demand increases. What happens

- in the short run to prices? increase
- in the long run to firm entry? increases
- and in the long run to prices?

Finding the Long-Run Supply Curve

Recap: Suppose demand increases. What happens

- in the short run to prices? increase
- in the long run to firm entry? increases
- and in the long run to prices? return to market equilibrium

Finding the Long-Run Supply Curve

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- and in the long run to prices? return to market equilibrium

$\rightarrow$ the long-run supply curve is perfectly elastic

Finding the Long-Run Supply Curve

Suppose costs fall. What happens

- in the short run to prices?

Finding the Long-Run Supply Curve

Suppose costs fall. What happens

- in the short run to prices? decrease
- in the short run to firm profits?

Finding the Long-Run Supply Curve

Suppose costs fall. What happens

- in the short run to prices? decrease
- in the short run to firm profits? possibly increase, if lower costs not passed to consumers
- in the long run to firm entry?

Finding the Long-Run Supply Curve

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- in the short run to prices? decrease
- in the short run to firm profits? possibly increase, if lower costs not passed to consumers
- in the long run to firm entry? increases, if lower costs not passed to consumers
- and in the long run to prices?

Finding the Long-Run Supply Curve

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- in the long run to firm entry? increases, if lower costs not passed to consumers
- and in the long run to prices? be a function of the new, lower costs

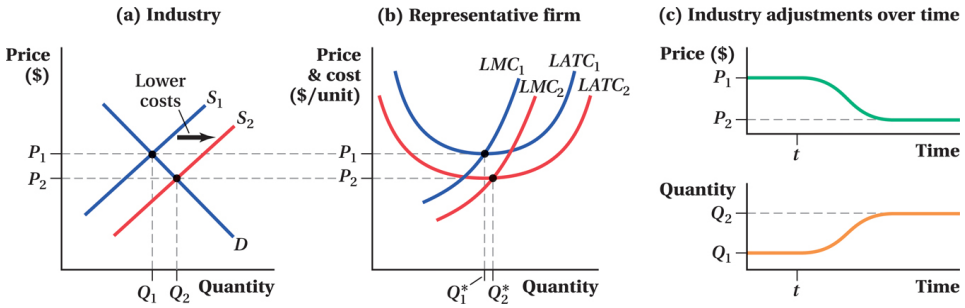
Finding the Long-Run Supply Curve

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$\rightarrow$ the long-run supply curve is perfectly elastic

When Costs Fall

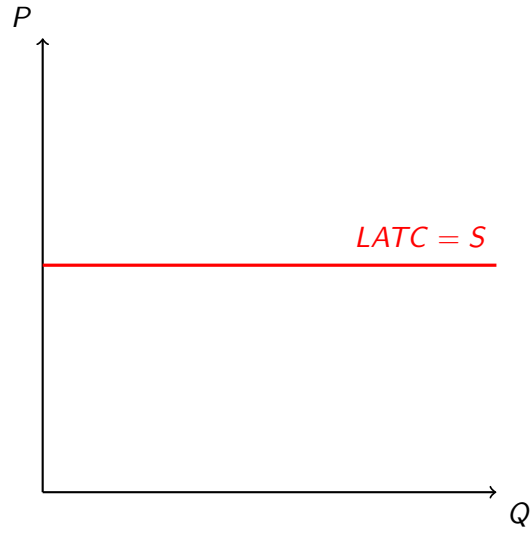


In Sum, In the Long Run

- Firms can enter
- Firms can exit
- Profits are zero
- $P = LATC$
- Firms produce at minimum of $LATC$
- Supply is perfectly elastic

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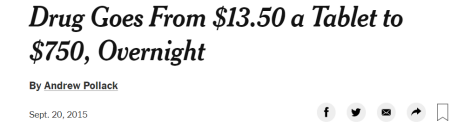
Big Idea: What Does Perfect Competition Get You?

- products sold at marginal cost
- everyone who wants the product at market price can buy it
- consumer surplus high
- consumer demand drives firm decisions
- social welfare – producer plus consumer surplus – maximized

Why Is Competition Important?

Martin Shkreli, CEO, Turing Pharmaceuticals

- business plan is to buy out-of-patent medications
- increase prices
- Dataprim is an AIDS drug
- "But what Shkreli recognized was that, even with a generic drug, regulatory barriers and a lack of competition can make big price hikes possible. " *New Yorker*, October 5, 2015
- lots of media chat about antitrust response



Drug Goes From $13.50 a Tablet to $750, Overnight

By Andrew Pollack

Sept. 20, 2015

From *New York Times*

While the Antitrust Wheels of Government are Grinding Along

HEALTHCARE FINANCE

FOR PAYERS | R

REIMBURSEMENT | REVENUE CYCLE MANAGEMENT | STRATEGIC PLANNING | CAPITAL FINANCE | SUPPLY CHAIN

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Shkreli has said the price hike was not the result of corporate greed

Long Run Supply and Demand Shifts

Suppose the market for the pain reliever aspirin is in long-run equilibrium at a price of \$3/bottle. New scientific research links aspirin with a reduced risk of heart disease.

1. In the short run, what happens to the price of aspirin? Explain using a diagram for both the industry and the representative firm.
2. In the short run, how do firms respond to the change in price described in (1)? What will happen to profits? Explain using the same diagrams.
3. Given the situation described in (2), what can we expect to happen to the number of aspirin producers in the long run?

Recap of Today

- Market structure and perfect competition in the short run
- Profit maximization in a competitive market
- Perfect competition in the short run
- Perfect competition in the long run

Next Class

- Turn in Problem Set 10
- Chapter 9, no Lerner Index