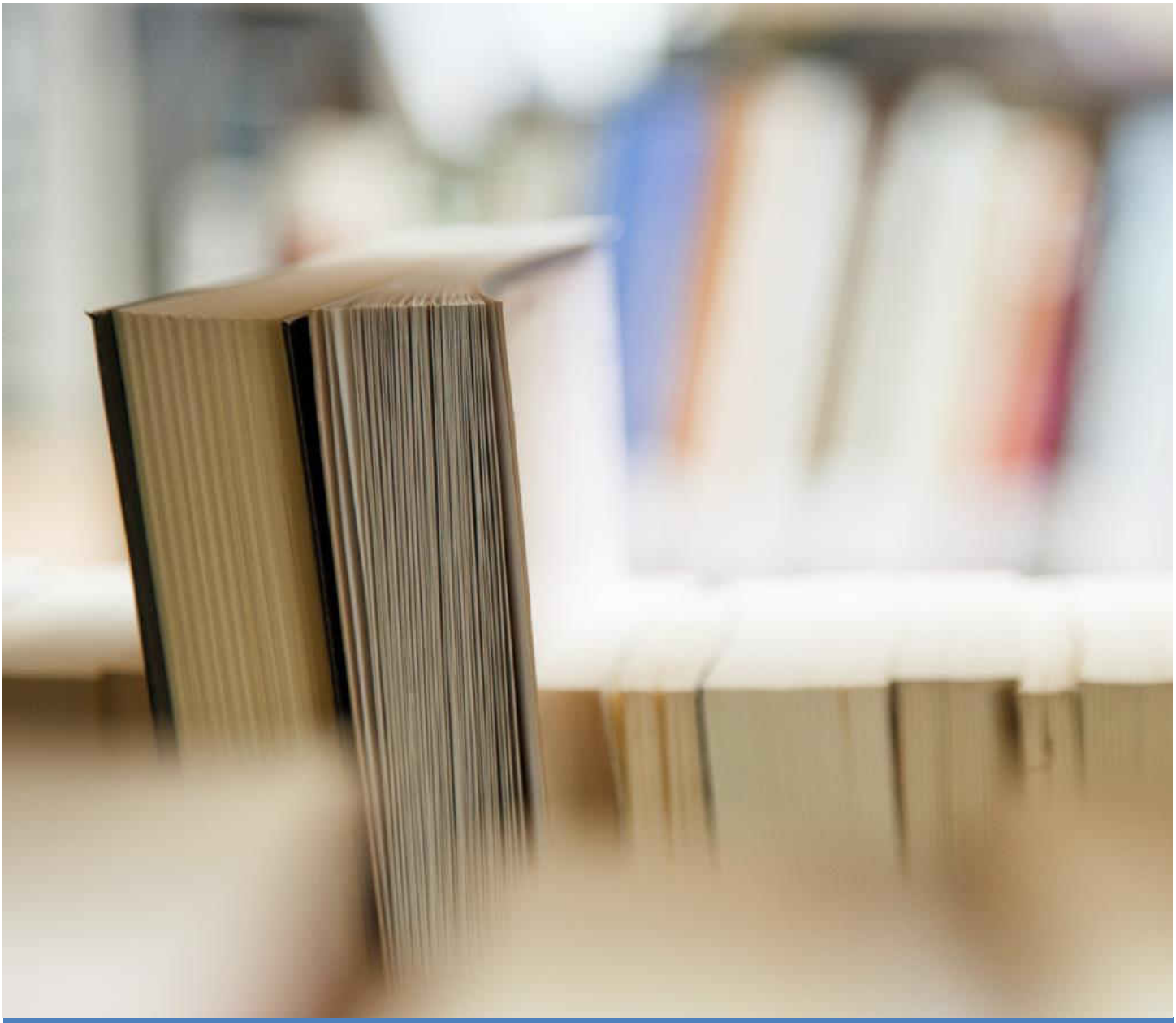


Bahan Ajar Mata Kuliah Pengantar Ekonomi

Muliati, SE., MSc.
Program Studi Ekonomi Pembangunan
Jurusan Ilmu Ekonomi
Universitas Mulawarman
2021

PENGANTAR EKONOMI (2)

Muliati, MSc

Sejarah Ilmu Ekonomi

- Oikos – Nomos
- Economy
- Ekonomi

Sejarah Ilmu: Mahzab Ekonomi Abad 15-18

Merkantilis
(merchant/mercere)

Fisiokrat
(lahan/kekayaan alam)

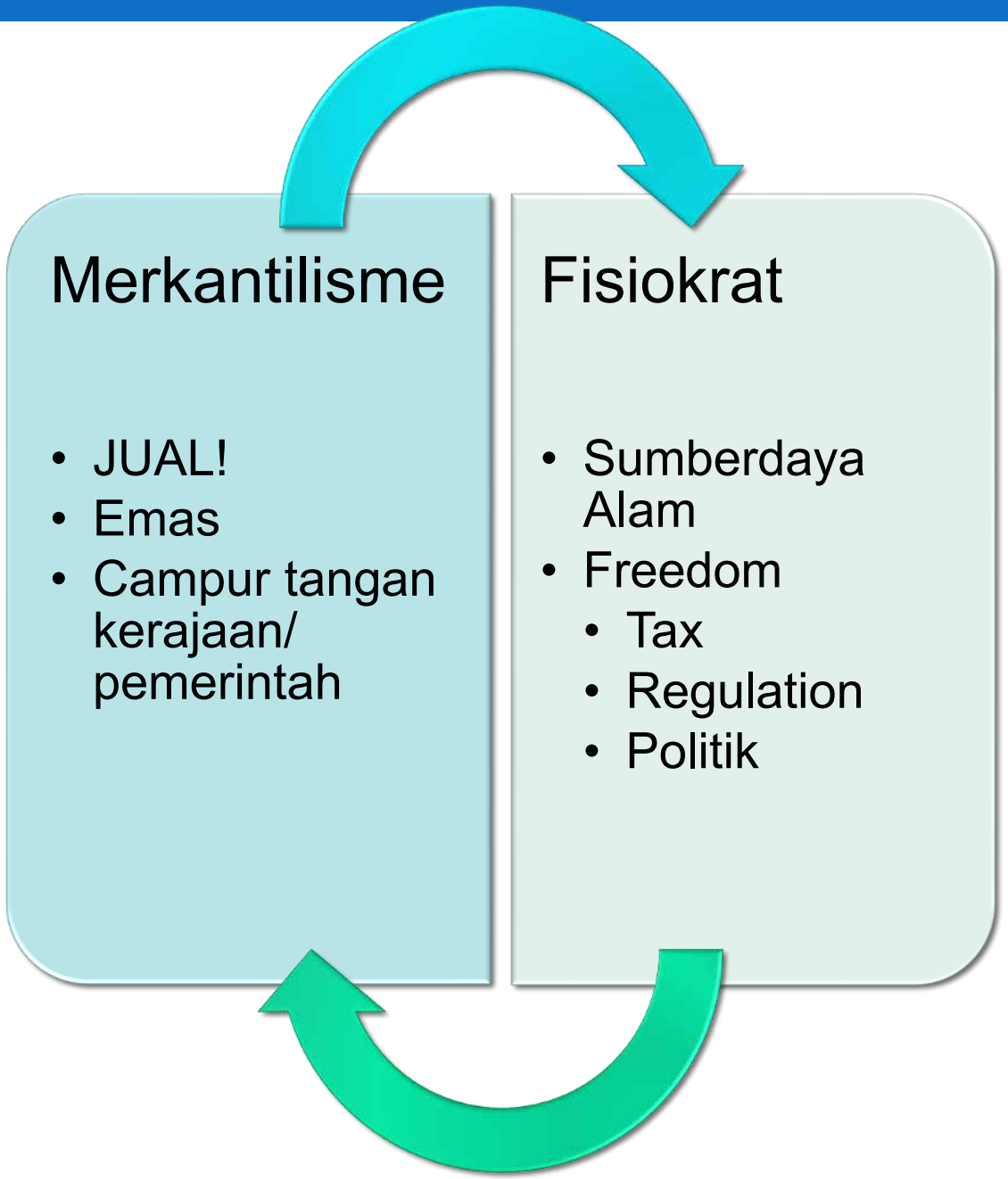
The Legend

Thomas Mun (1571-1641)

- Jean Bodin (1530-1641)
- JB Colbert (1619-1683)

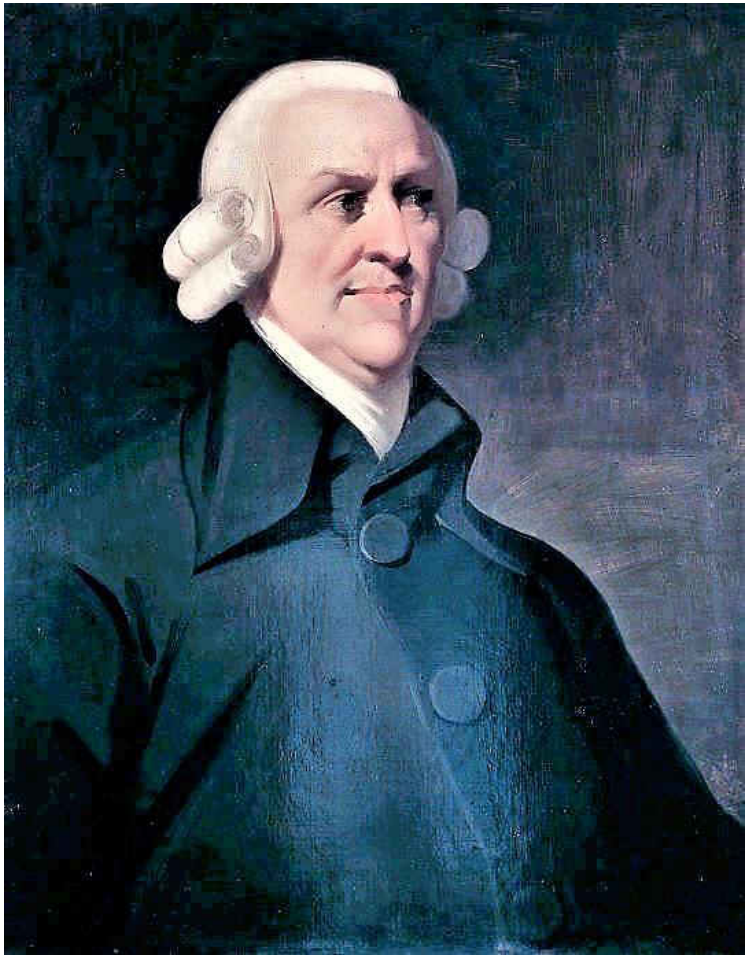
F Quesney (1694-1774)

- David Hume (1711-1776)
- Jacques Turgot (1727-1781)
- Bernard Mandeville (1670-1733)


Merkantilisme
• JUAL!
• Emas
• Campur tangan kerajaan/ pemerintah
Fisiokrat
• Sumberdaya Alam
• Freedom
• Tax
• Regulation
• Politik

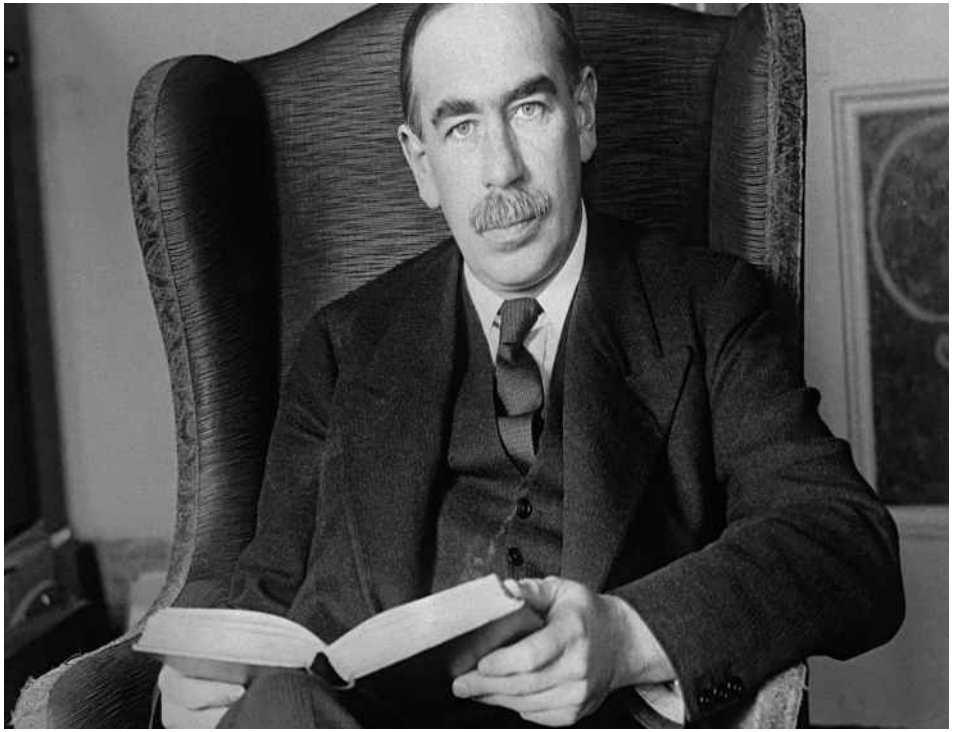
Era Adam Smith (1723-1790)

- The father of Economics
- The father of Capitalism
- *An Inquiry into the Nature and Causes of the Wealth of Nations* (1776)
- Mahzab Klasik/Liberal



Era JM Keynes

- The General Theory of Employment, Interest, and Money
- Fiscal policy
- Keynesian Economics



Era Neo Klasik

- Monetarist
- Monetary policy

Main Problem

Main Problem of Life: Scarcity a.k.a Kelangkaan

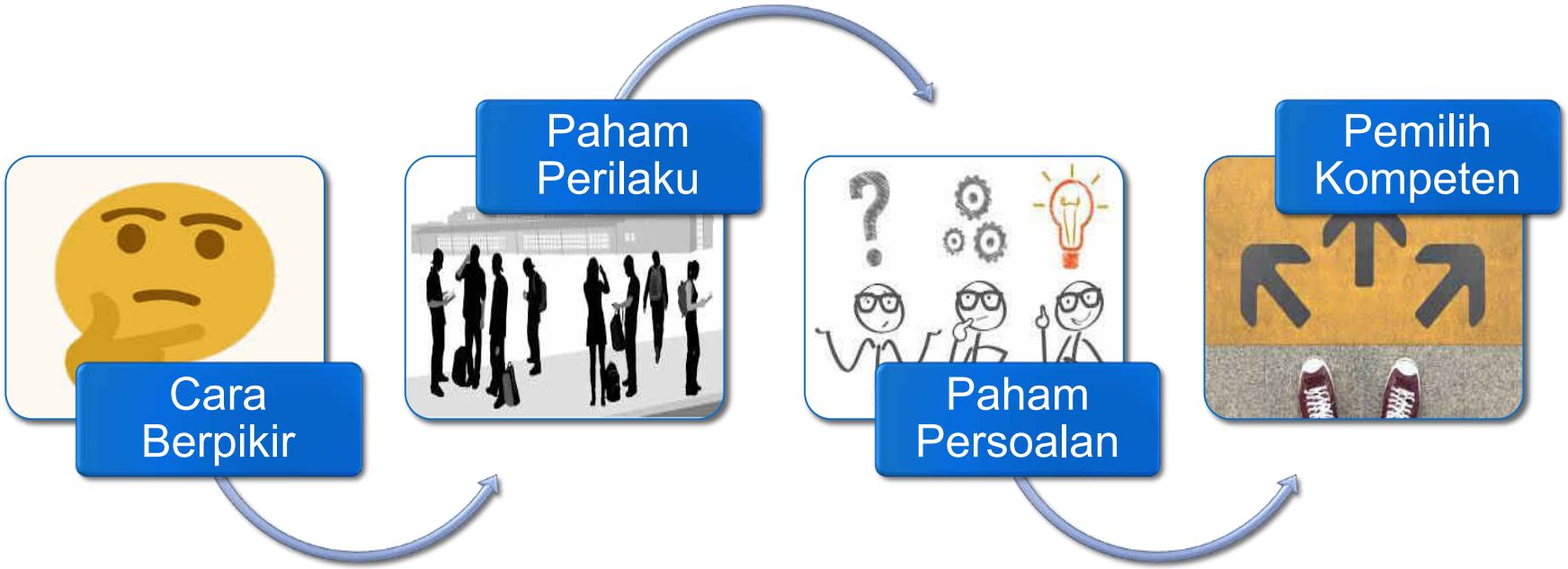
Common A

Common B

Common C

TRAGEDY OF THE COMMON_GARRET HARDIN (1968)

Belajar Ilmu Ekonomi ???

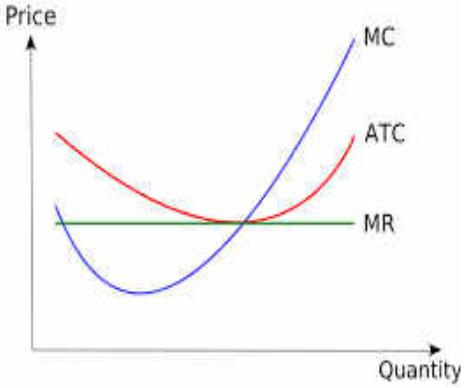


A. CARA BERPIKIR

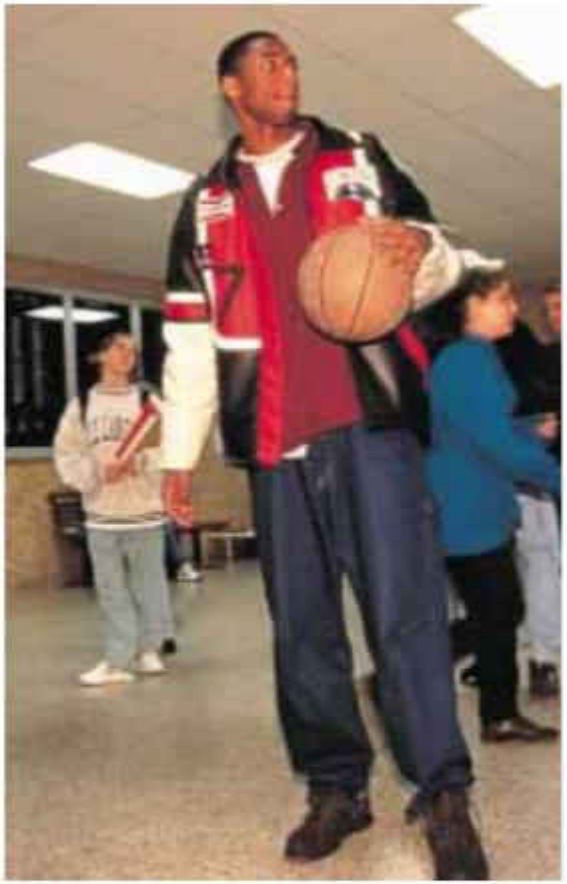
OPPORTUNITY COST

SUNK COST

MARGINAL



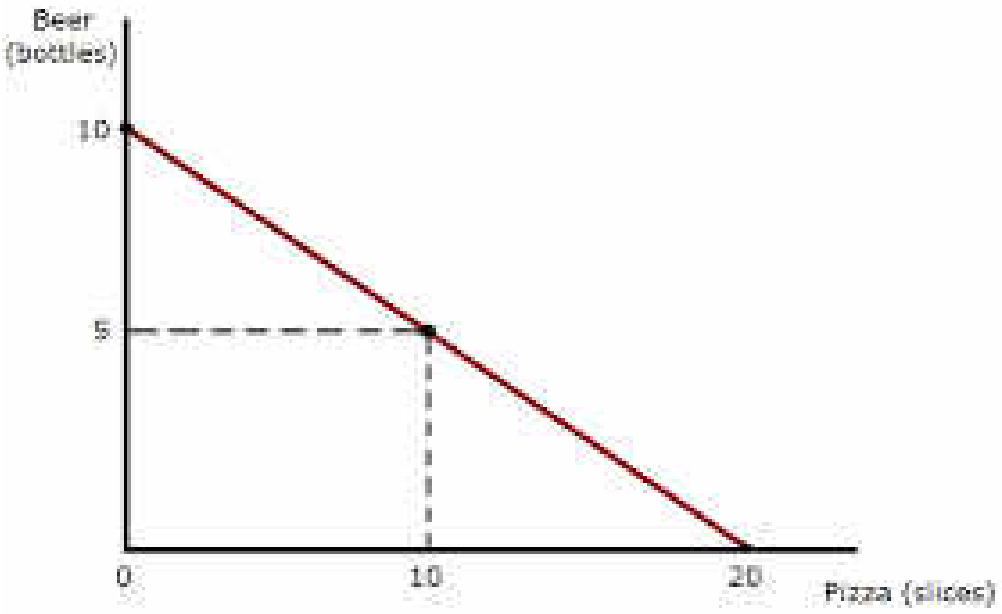
Pasar Efisien



BASKETBALL STAR KOBE BRYANT UNDERSTANDS OPPORTUNITY COST AND INCENTIVES. DESPITE GOOD HIGH SCHOOL GRADES AND SAT SCORES, HE DECIDED TO SKIP COLLEGE AND GO STRAIGHT TO THE NBA, WHERE HE EARNED ABOUT $10 MILLION OVER FOUR YEARS.


Sunk costs are costs which have already been incurred and cannot be replaced.

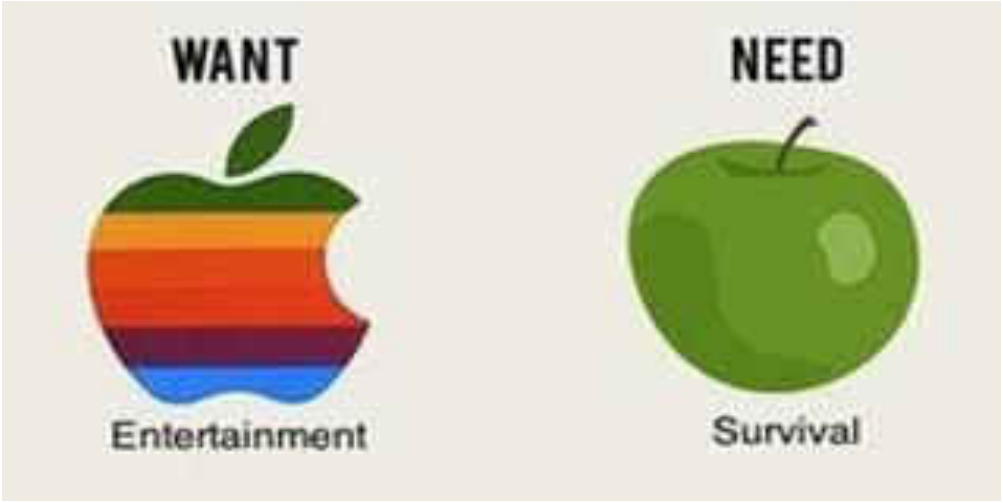
B. PAHAM PERILAKU



NEW

OLD

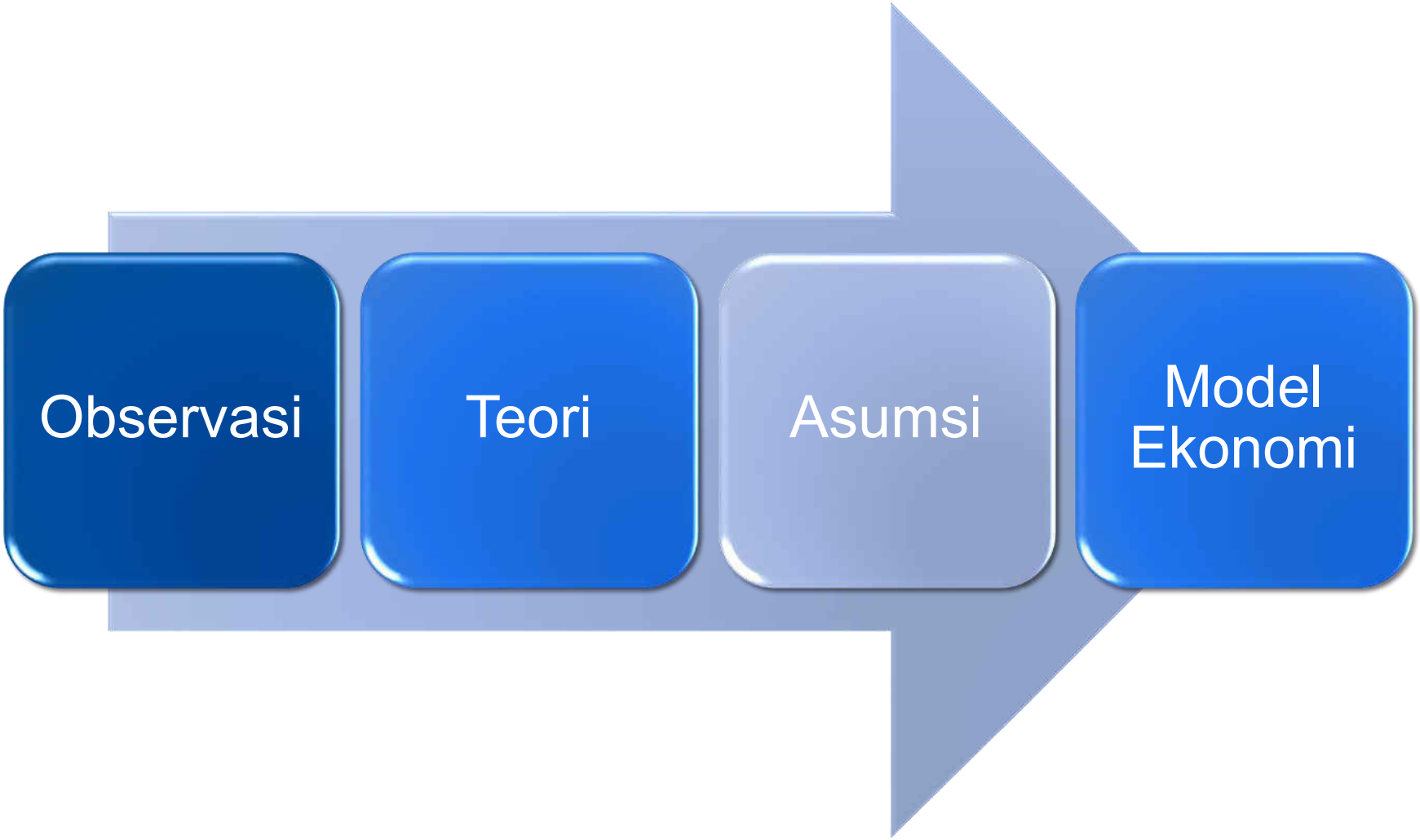
"I'm a social scientist, Michael. That means I can't explain electricity or anything like that, but if you ever want to know about people I'm your man."



C. PAHAM PERSOALAN

D. PEMILIH KOMPETEN

THINKING LIKE AN ECONOMIST



ASUMSI? *skb

Asumsi Sakti Para Ekonom:

Ceteris Paribus

All else equal

$$Y = a + b1X1 + b2X2 + e, \text{ ceteris paribus}$$

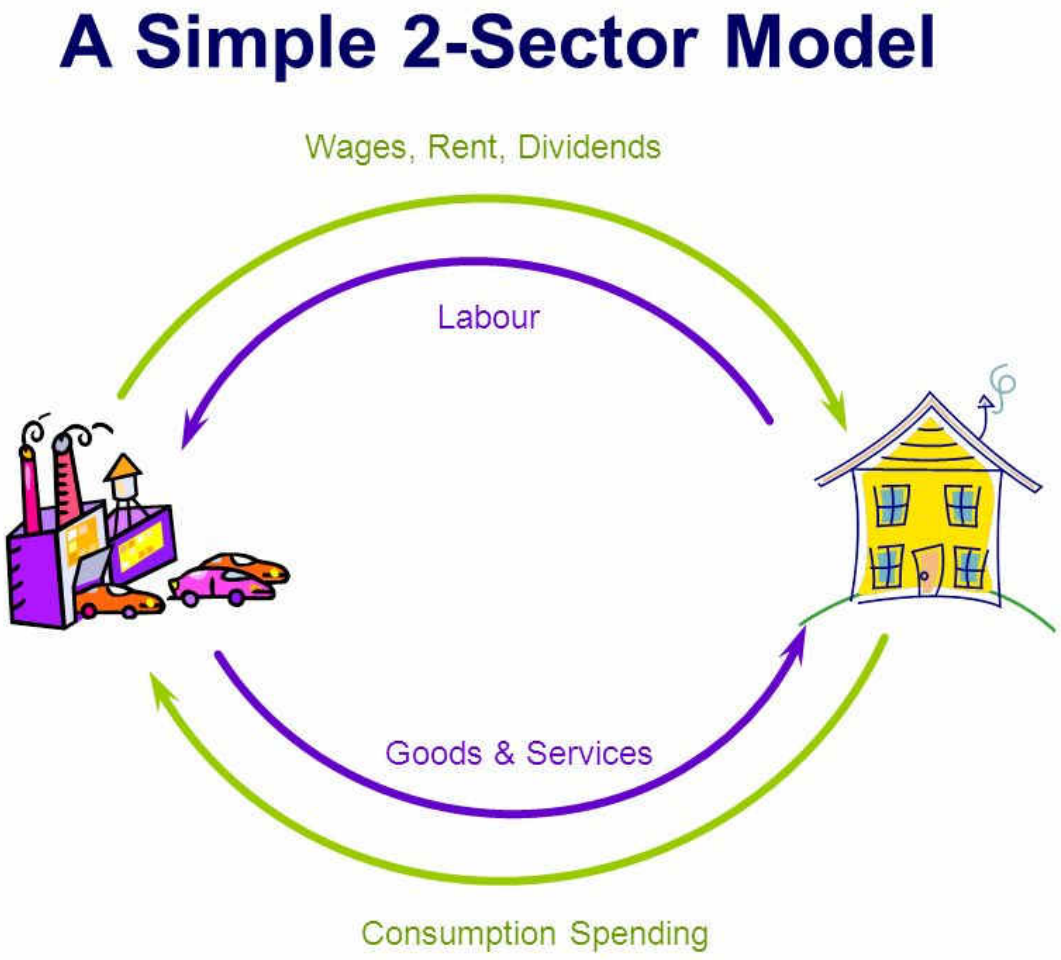
ket:

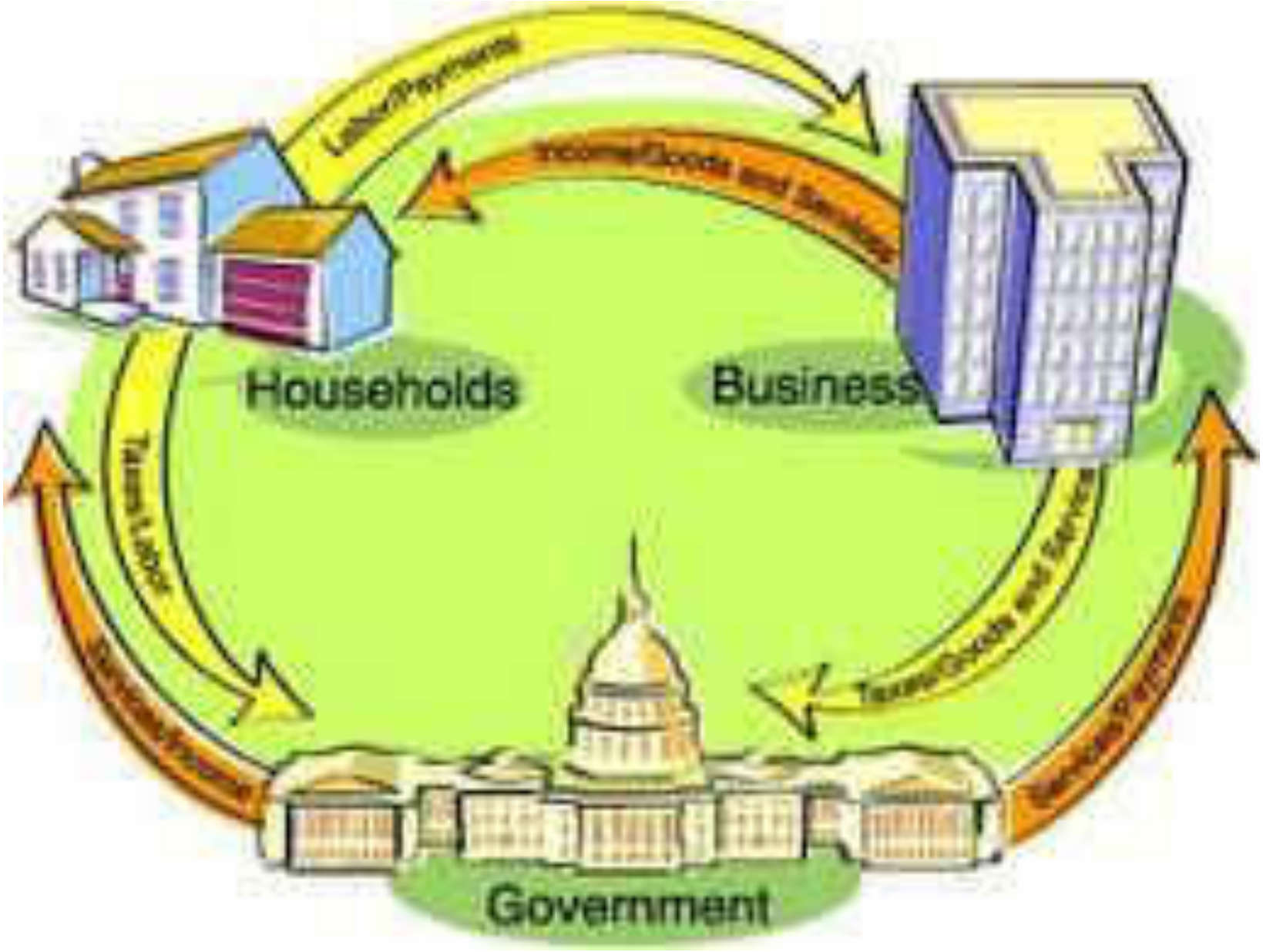
Y Permintaan skincare

X1 Harga skincare

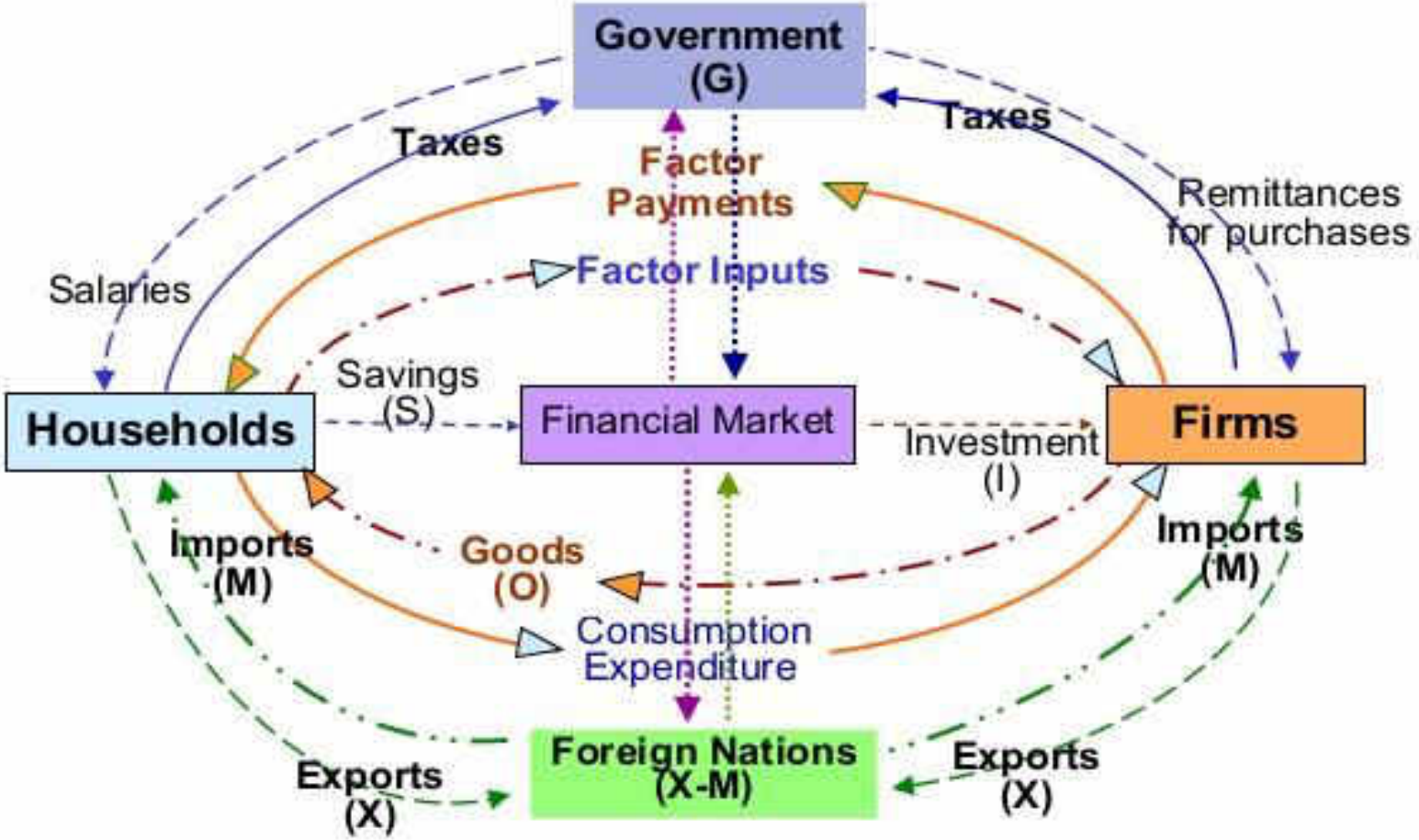
X2 Selera

Model 1: Circular Flow of Economy




Households
Business
Government

Circular Flow of Income
(Four Sector Economy)



National Income=C+I+G+(X-M)

Model 2: Kurva Kemungkinan Produksi

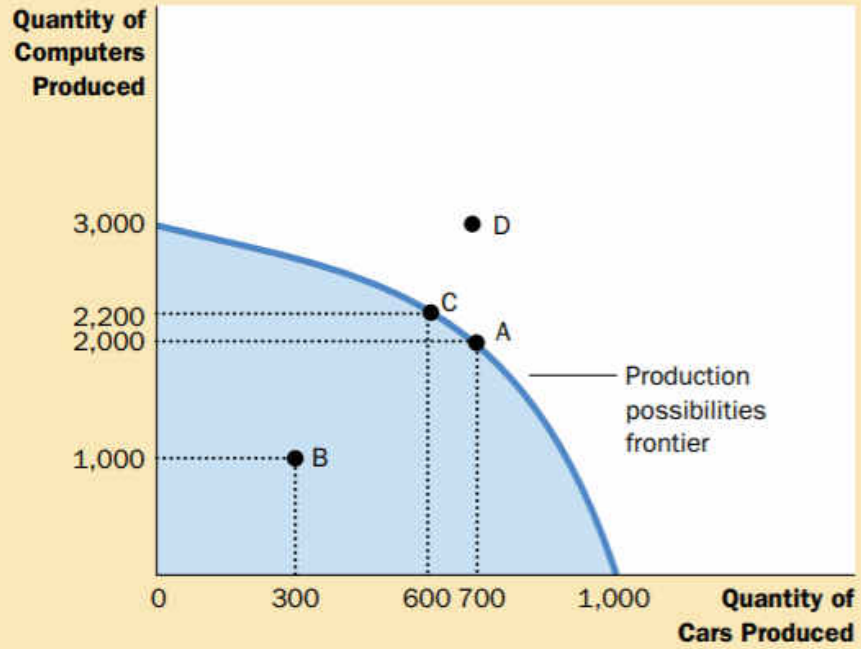
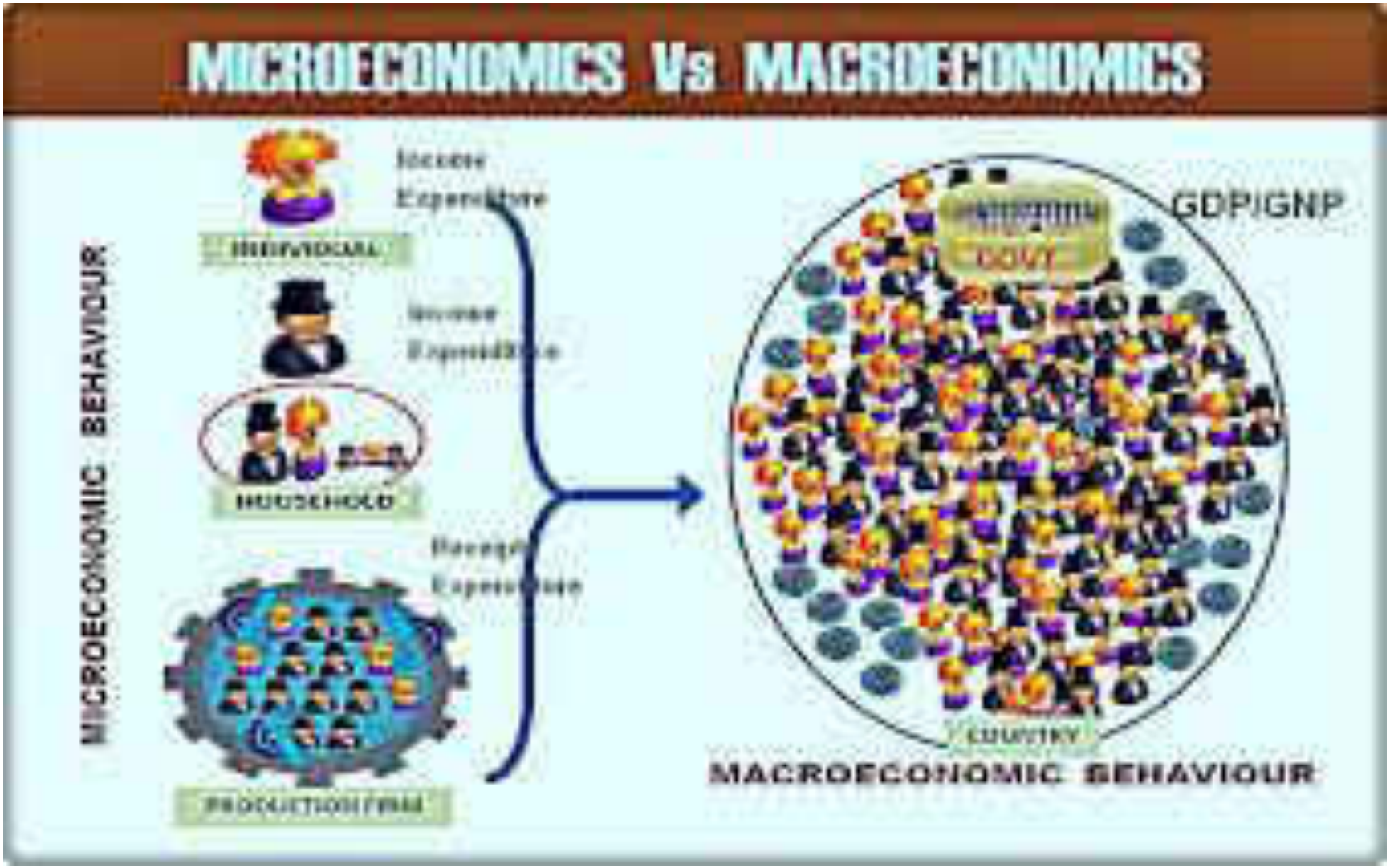


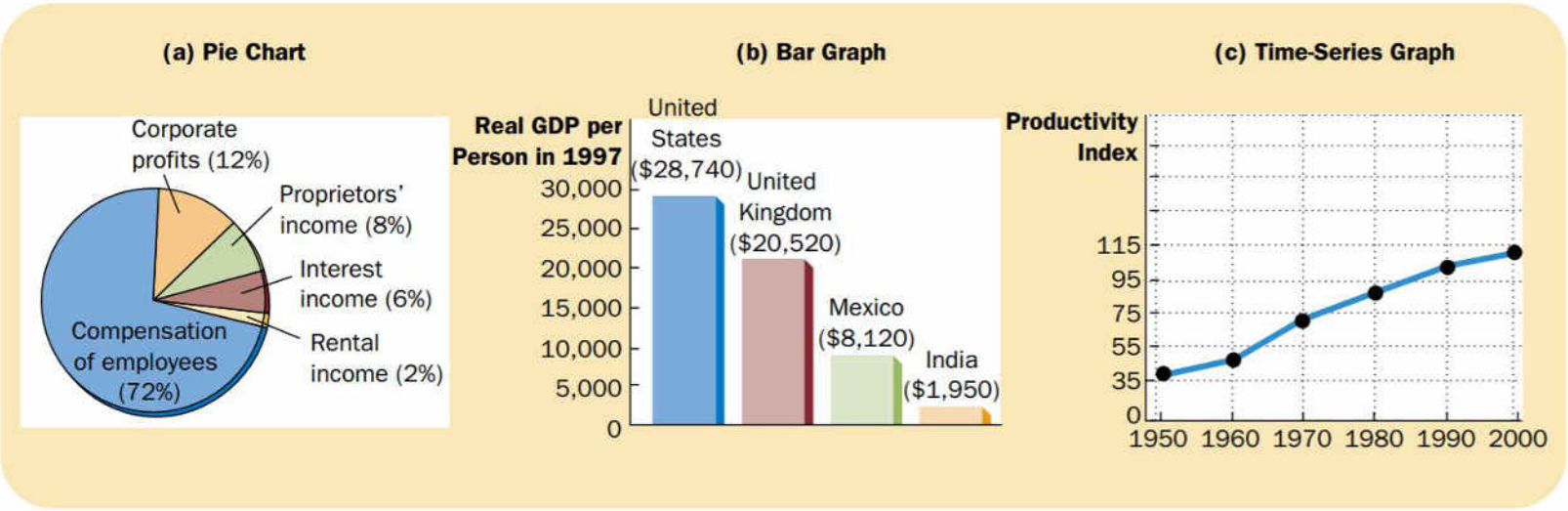
Figure 2-2

THE PRODUCTION POSSIBILITIES FRONTIER. The production possibilities frontier shows the combinations of output—in this case, cars and computers—that the economy can possibly produce. The economy can produce any combination on or inside the frontier. Points outside the frontier are not feasible given the economy's resources.

EKONOMI MAKRO VS MIKRO




MICRO
DEPARTMENT
MACRO
DEPARTMENT
CARTOONSTOCK

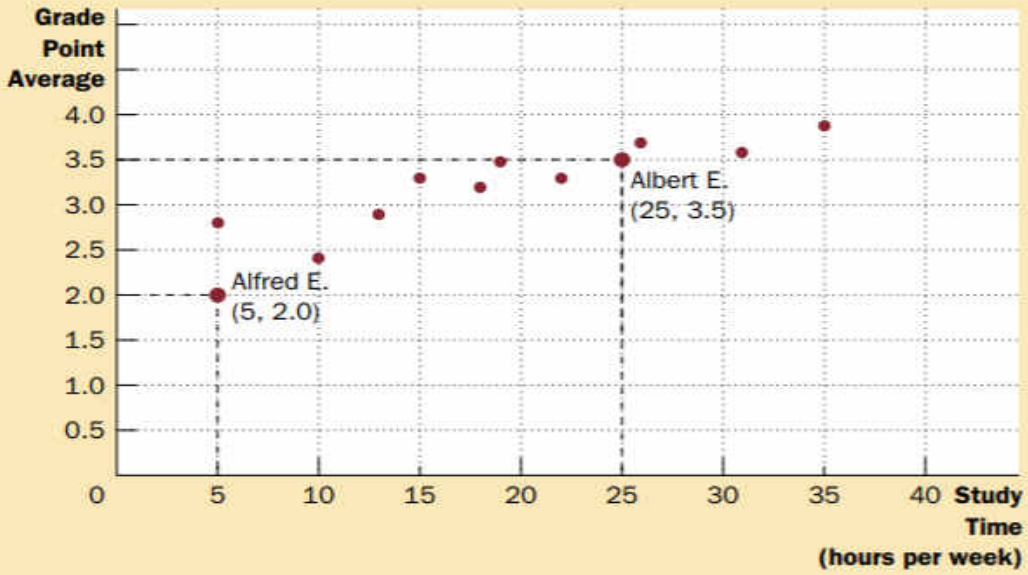


TYPES OF GRAPHS. The pie chart in panel (a) shows how U.S. national income is derived from various sources. The bar graph in panel (b) compares the average income in four countries. The time-series graph in panel (c) shows the growth in productivity of the U.S. business sector from 1950 to 2000.

Figure 2A-1

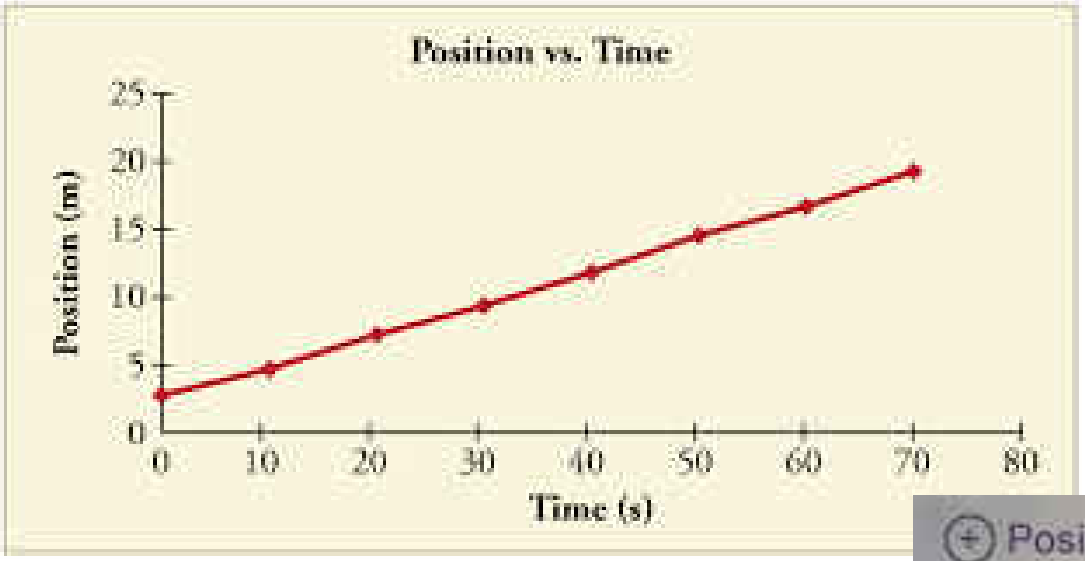
Figure 2A-2

USING THE COORDINATE SYSTEM. Grade point average is measured on the vertical axis and study time on the horizontal axis. Albert E., Alfred E., and their classmates are represented by various points. We can see from the graph that students who study more tend to get higher grades.



correlation. By contrast, if we were to graph party time and grades, we would likely find that higher party time is associated with lower grades; because these variables typically move in opposite directions, we would call this a *negative correlation*. In either case, the coordinate system makes the correlation between the two variables easy to see.

Hubungan +


Position vs. Time
Position (m)
25
20
15
10
5
0
0
10
20
30
40
50
60
70
80
Time (s)


Positive (Uphill)

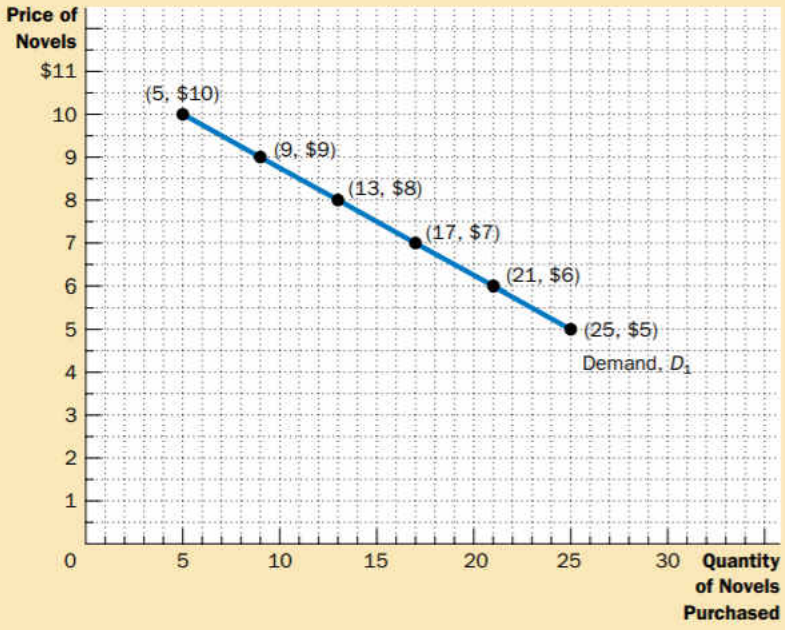


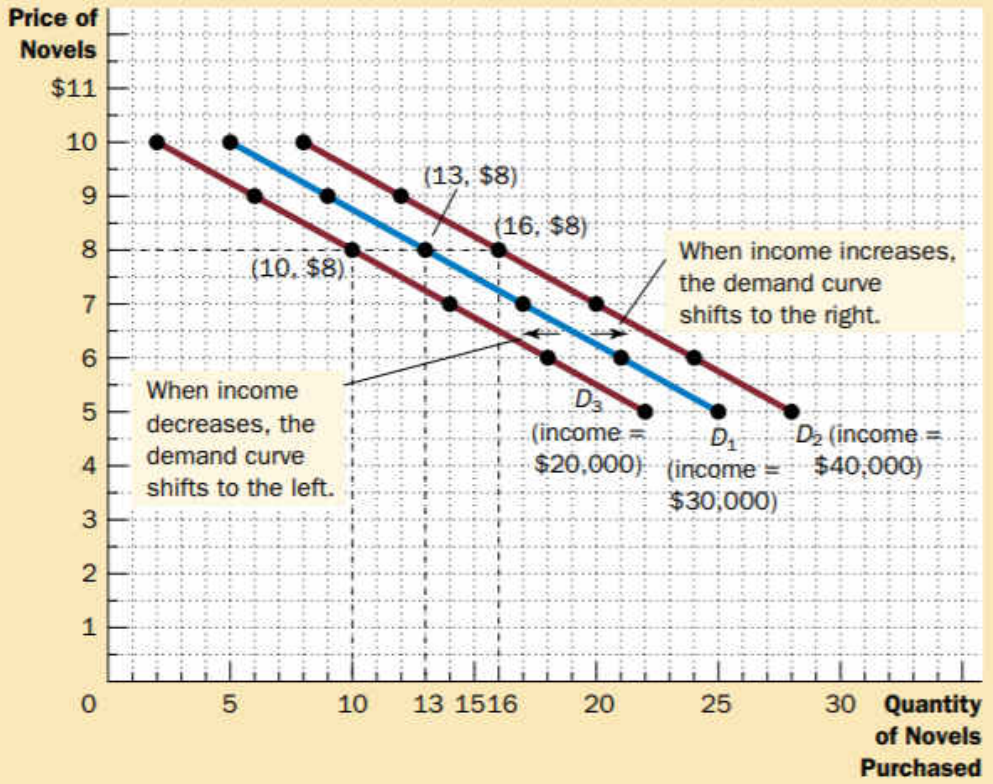
Figure 2A-3

DEMAND CURVE. The line D_1 shows how Emma's purchases of novels depend on the price of novels when her income is held constant. Because the price and the quantity demanded are negatively related, the demand curve slopes downward.

Bergerak sepanjang kurva & pergesaran kurva

Figure 2A-4

SHIFTING DEMAND CURVES. The location of Emma's demand curve for novels depends on how much income she earns. The more she earns, the more novels she will purchase at any given price, and the farther to the right her demand curve will lie. Curve D_1 represents Emma's original demand curve when her income is $30,000 per year. If her income rises to $40,000 per year, her demand curve shifts to D_2. If her income falls to $20,000 per year, her demand curve shifts to D_3.



Slope a.k.a elastisitas

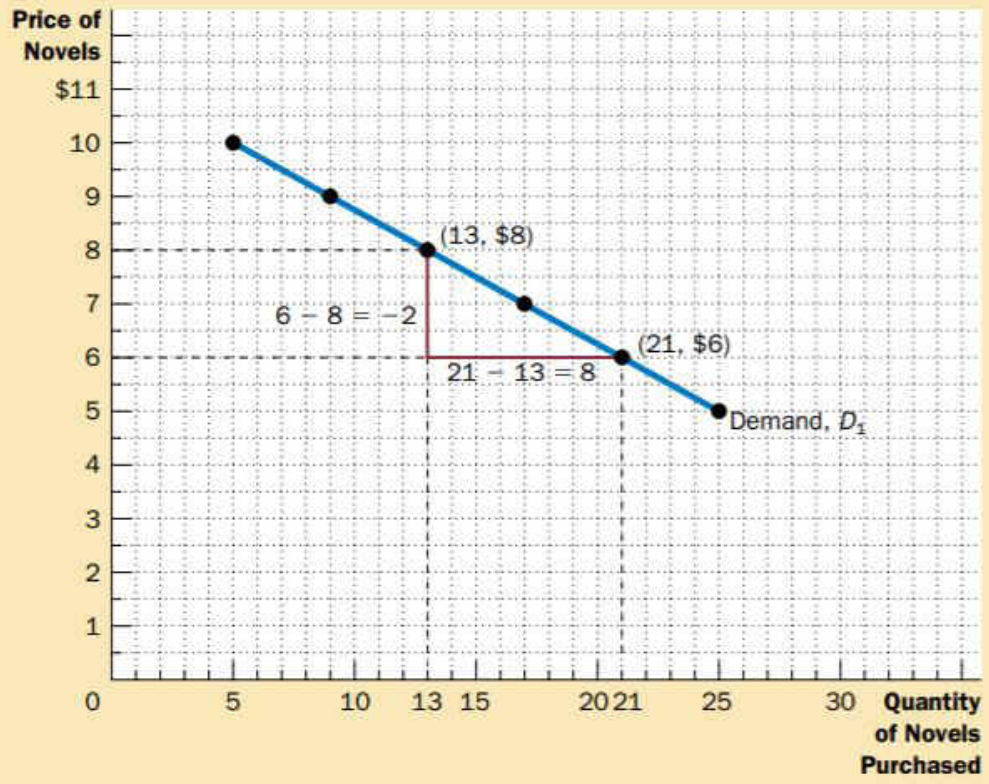


Figure 2A-5

CALCULATING THE SLOPE OF A LINE. To calculate the slope of the demand curve, we can look at the changes in the x- and y-coordinates as we move from the point (21 novels, $6) to the point (13 novels, $8). The slope of the line is the ratio of the change in the y-coordinate (-2) to the change in the x-coordinate ($+8$), which equals $-1/4$.

Omitted variable=variabel yg tdk perlu dipusingkan

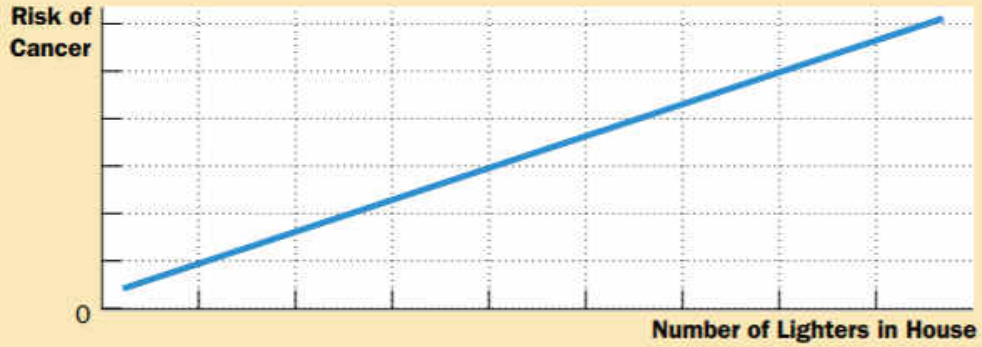


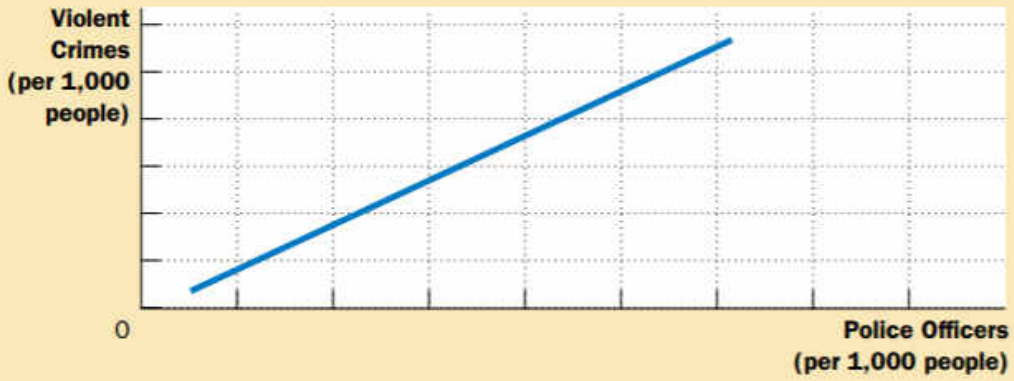
Figure 2A-6

GRAPH WITH AN OMITTED VARIABLE. The upward-sloping curve shows that members of households with more cigarette lighters are more likely to develop cancer. Yet we should not conclude that ownership of lighters causes cancer because the graph does not take into account the number of cigarettes smoked.

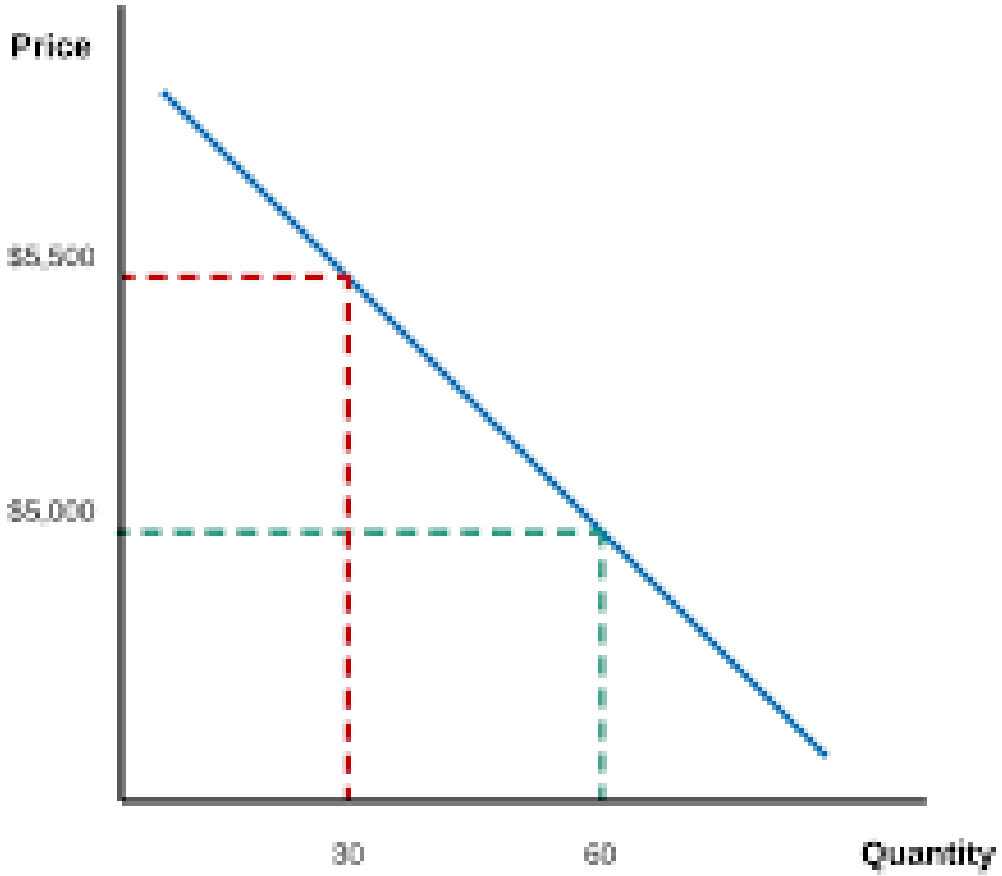
Reserve causality

Figure 2A-7

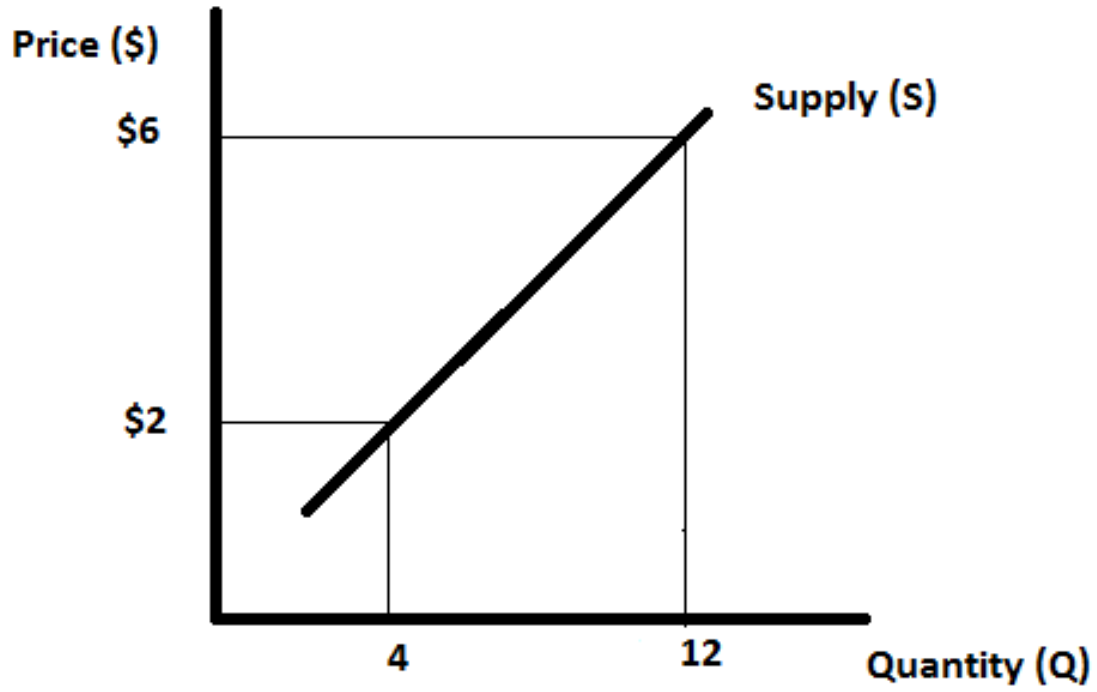
GRAPH SUGGESTING REVERSE CAUSALITY. The upward-sloping curve shows that cities with a higher concentration of police are more dangerous. Yet the graph does not tell us whether police cause crime or crime-plagued cities hire more police.



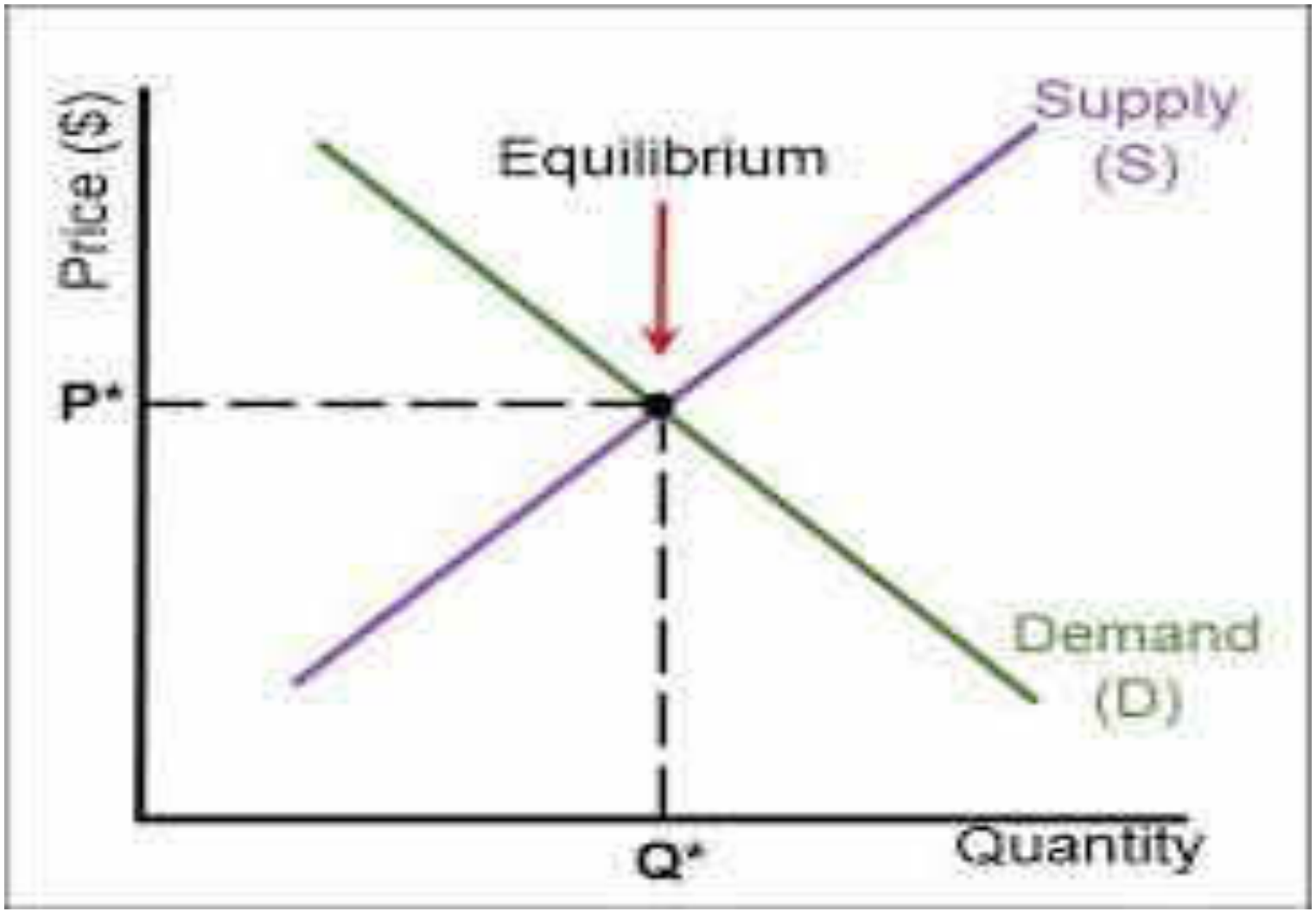
Demand curve, kurva permintaan



Supply curve, kurva penawaran



SUPPLY AND DEMAND



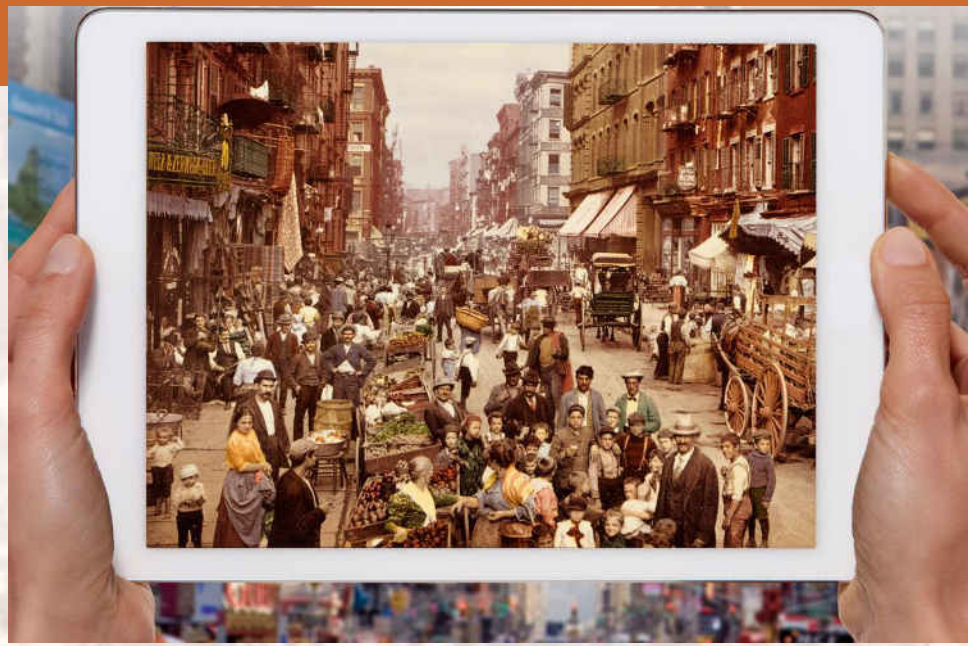

YOU MUST BE CONFUSED
RIGHT NOW
DON'T WORRY IT WON'T
TAKE ALONG

N. GREGORY MANKIW

PRINCIPLES OF

ECONOMICS

Eight Edition



CHAPTER

3

Interdependence and the Gains from Trade

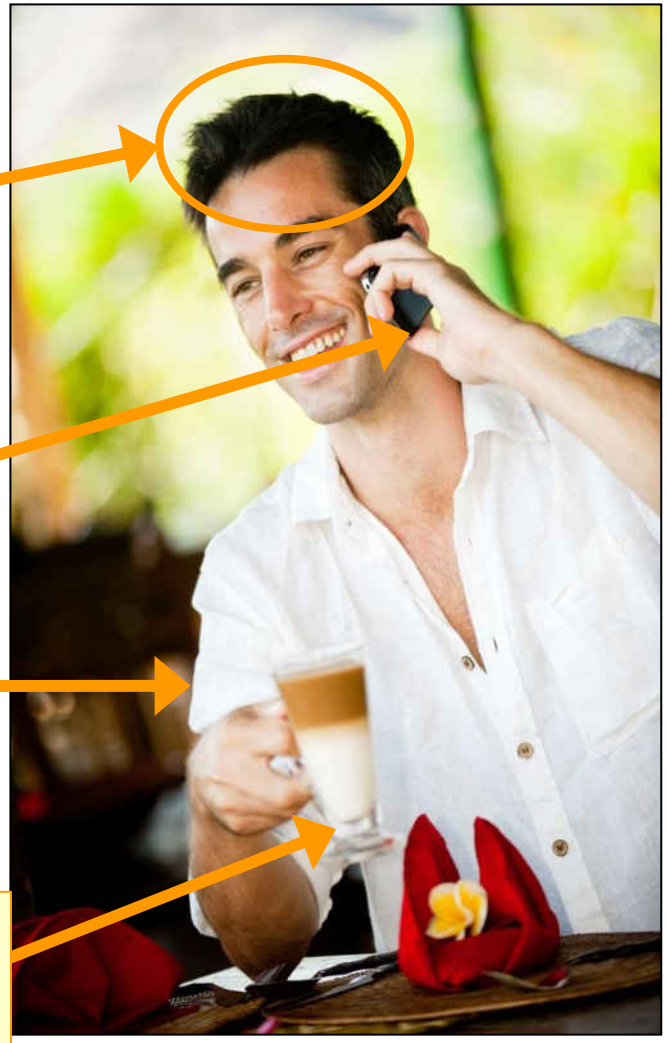
Premium PowerPoint Slides by:
V. Andreea CHIRITESCU
Eastern Illinois University

Look for the answers to these questions:

- Why do people – and nations – choose to be economically interdependent?
- How can trade make everyone better off?
- What is absolute advantage?
- What is comparative advantage?
- How are these concepts similar?
- How are they different?

Interdependence

Every day you rely on many people from around the world, most of whom you've never met, to provide you with the goods and services you enjoy.



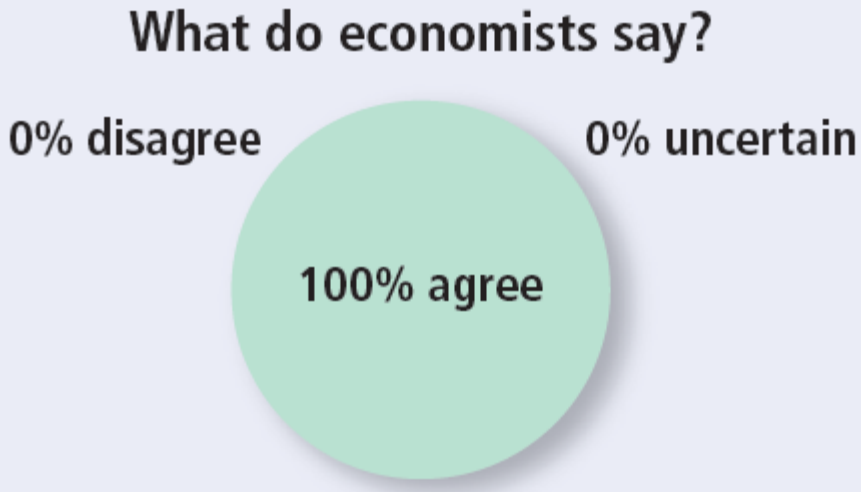
Interdependence

- "Trade can make everyone better off"
  - One of the Ten Principles from Chapter 1
  - We now learn why people – and nations – choose to be interdependent
  - And how they can gain from trade

ASK THE EXPERTS

Trade between China and the United States

"Trade with China makes most Americans better off because, among other advantages, they can buy goods that are made or assembled more cheaply in China."



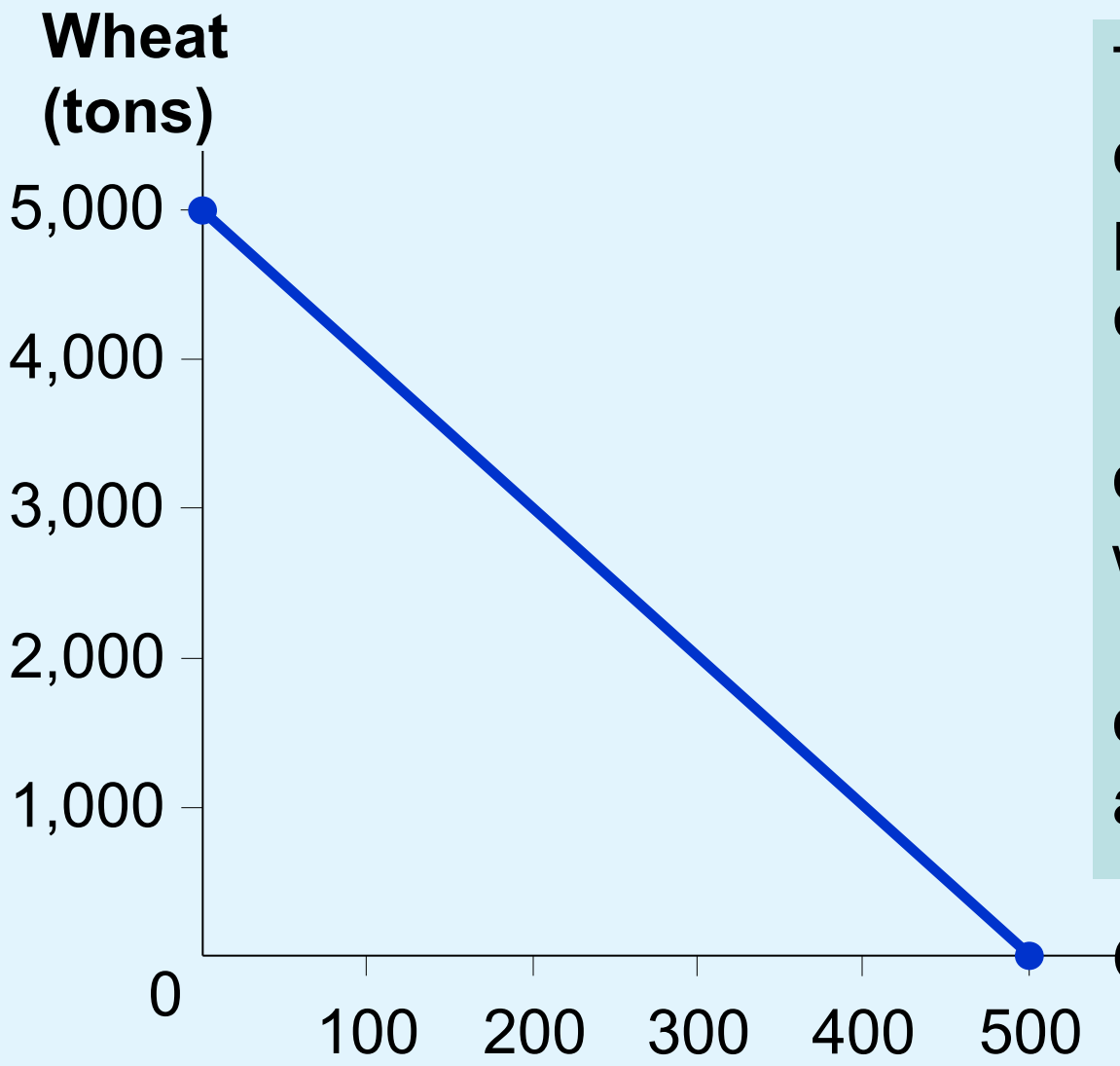
Our Example

- Two countries:
  - The U.S. and Japan
- Two goods:
  - Computers and wheat
- One resource:
  - Labor, measured in hours
- How much of both goods each country produces and consumes
  - If the country chooses to be self-sufficient
  - If it trades with the other country

Our Example

- Production Possibilities in the U.S.
  - The U.S. has 50,000 hours of labor available for production, per month
  - Producing one computer requires 100 hours of labor
  - Producing one ton of wheat requires 10 hours of labor

The U.S. PPF

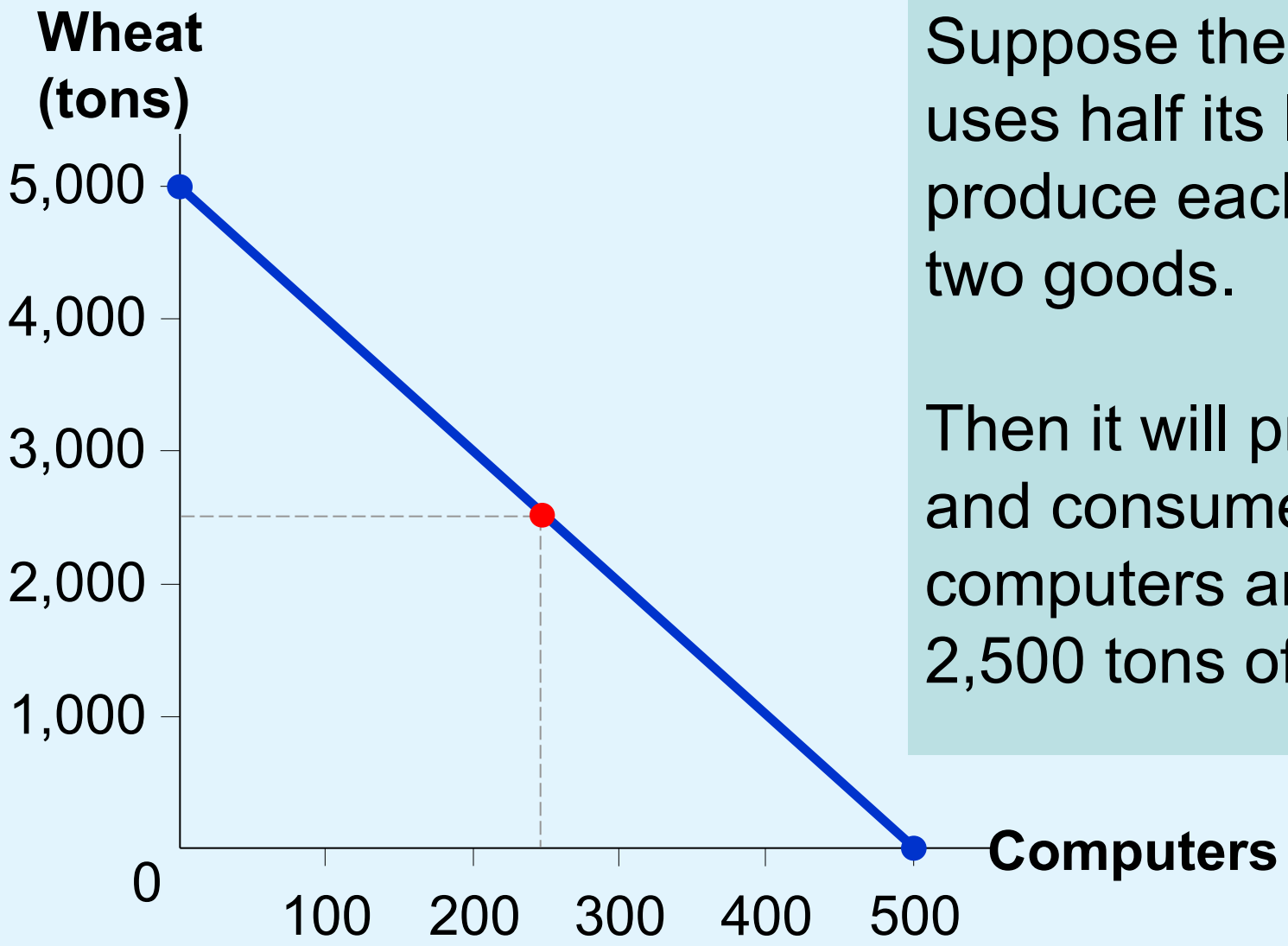


The U.S. has enough labor to produce 500 computers,

or 5,000 tons of wheat,

or any combination along the PPF.

The U.S. Without Trade



Suppose the U.S. uses half its labor to produce each of the two goods.

Then it will produce and consume 250 computers and 2,500 tons of wheat.

Active Learning 1 Derive Japan's PPF

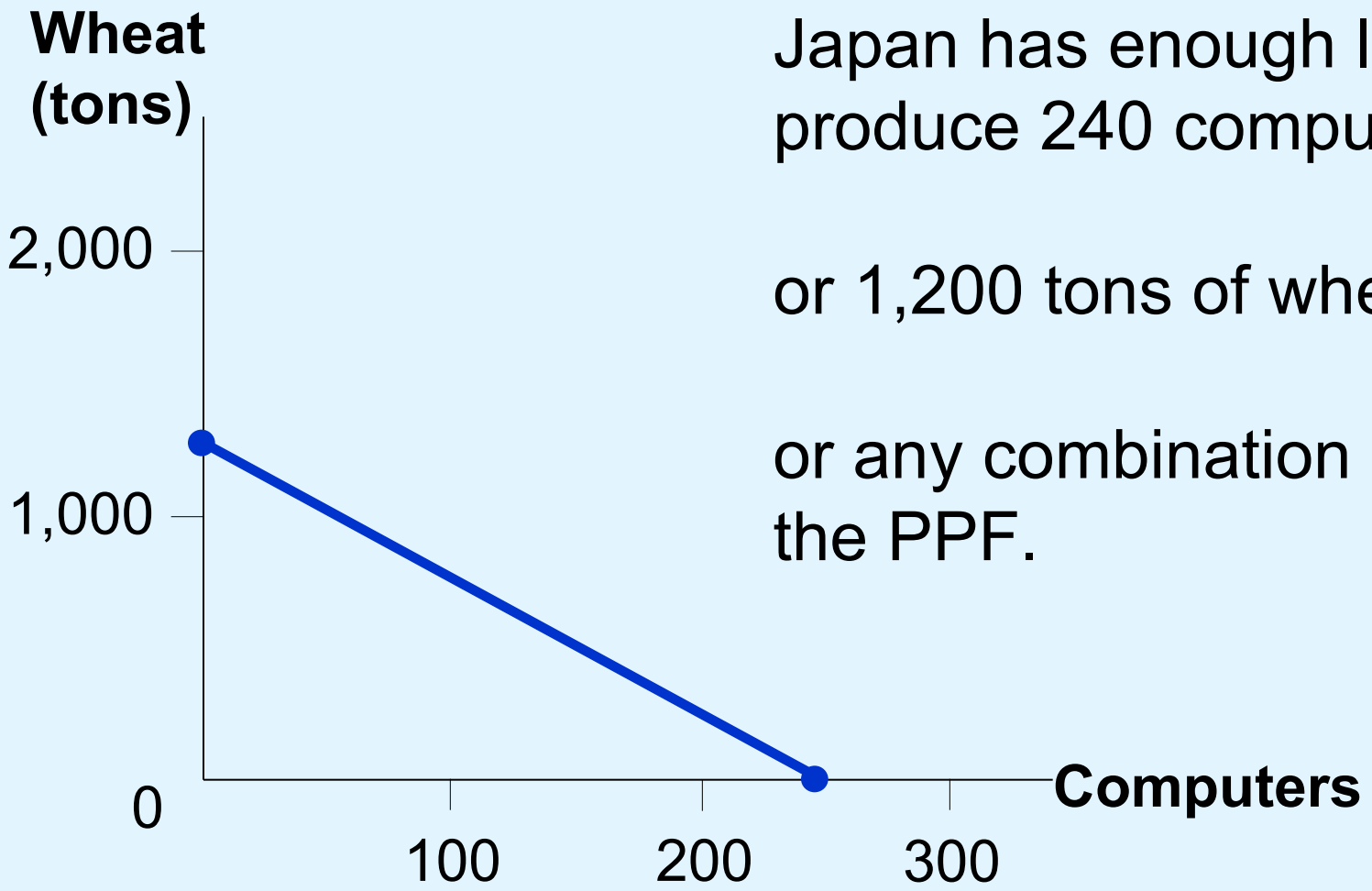
Use the following information to draw Japan's PPF.

- Japan has 30,000 hours of labor available for production, per month.
- Producing one computer requires 125 hours of labor.
- Producing one ton of wheat requires 25 hours of labor.

- Your graph should measure computers on the horizontal axis.

Active Learning 1

Japan's PPF

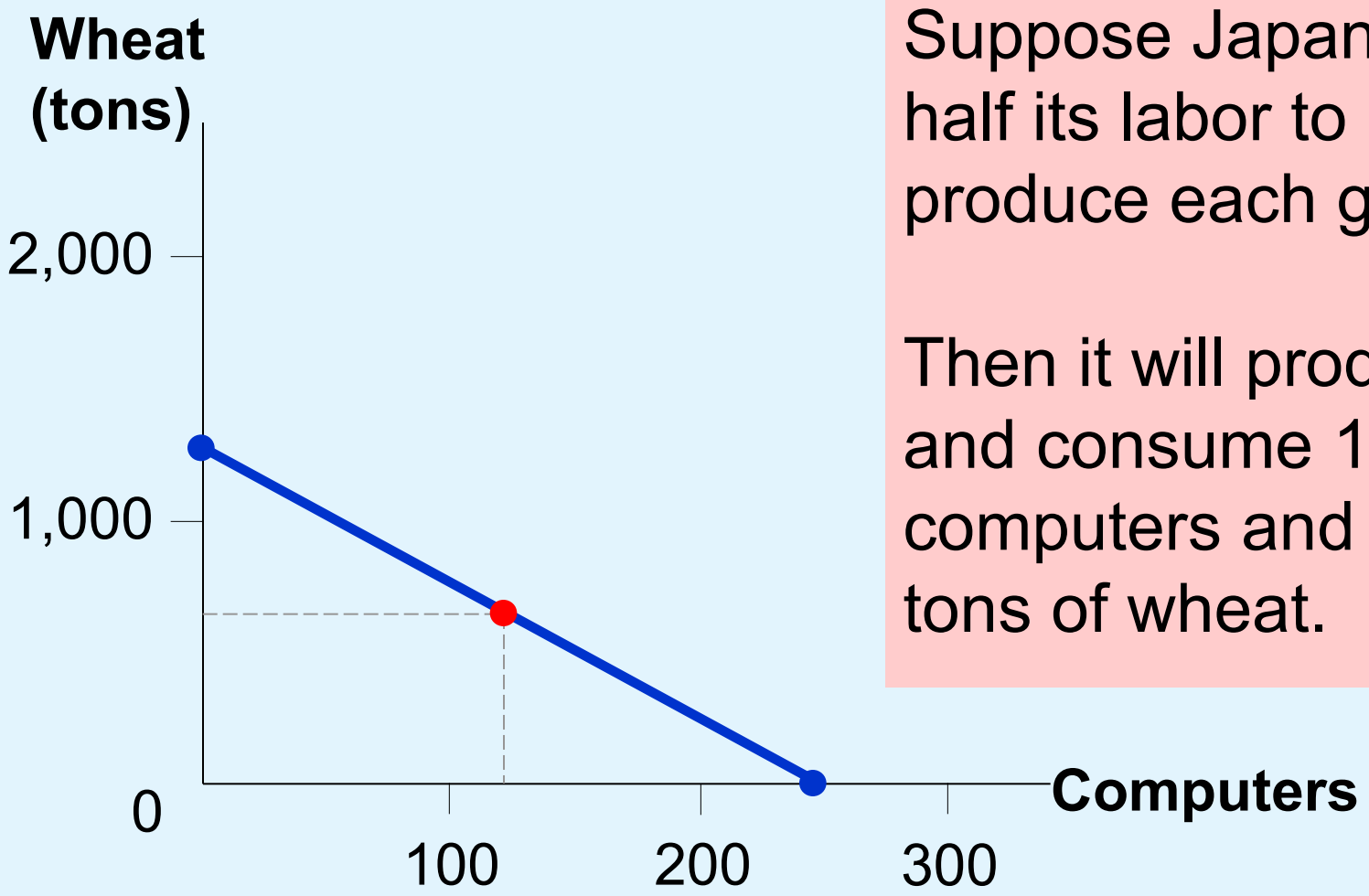


Japan has enough labor to produce 240 computers,

or 1,200 tons of wheat,

or any combination along the PPF.

Japan Without Trade



Suppose Japan uses half its labor to produce each good.

Then it will produce and consume 120 computers and 600 tons of wheat.

Consumption With and Without Trade

- Without trade:
  - U.S. consumers get 250 computers and 2500 tons wheat
  - Japanese consumers get 120 computers and 600 tons wheat
- Comparison
  - Consumption without trade vs. consumption with trade
  - We need to see how much of each good is produced and traded by the two countries

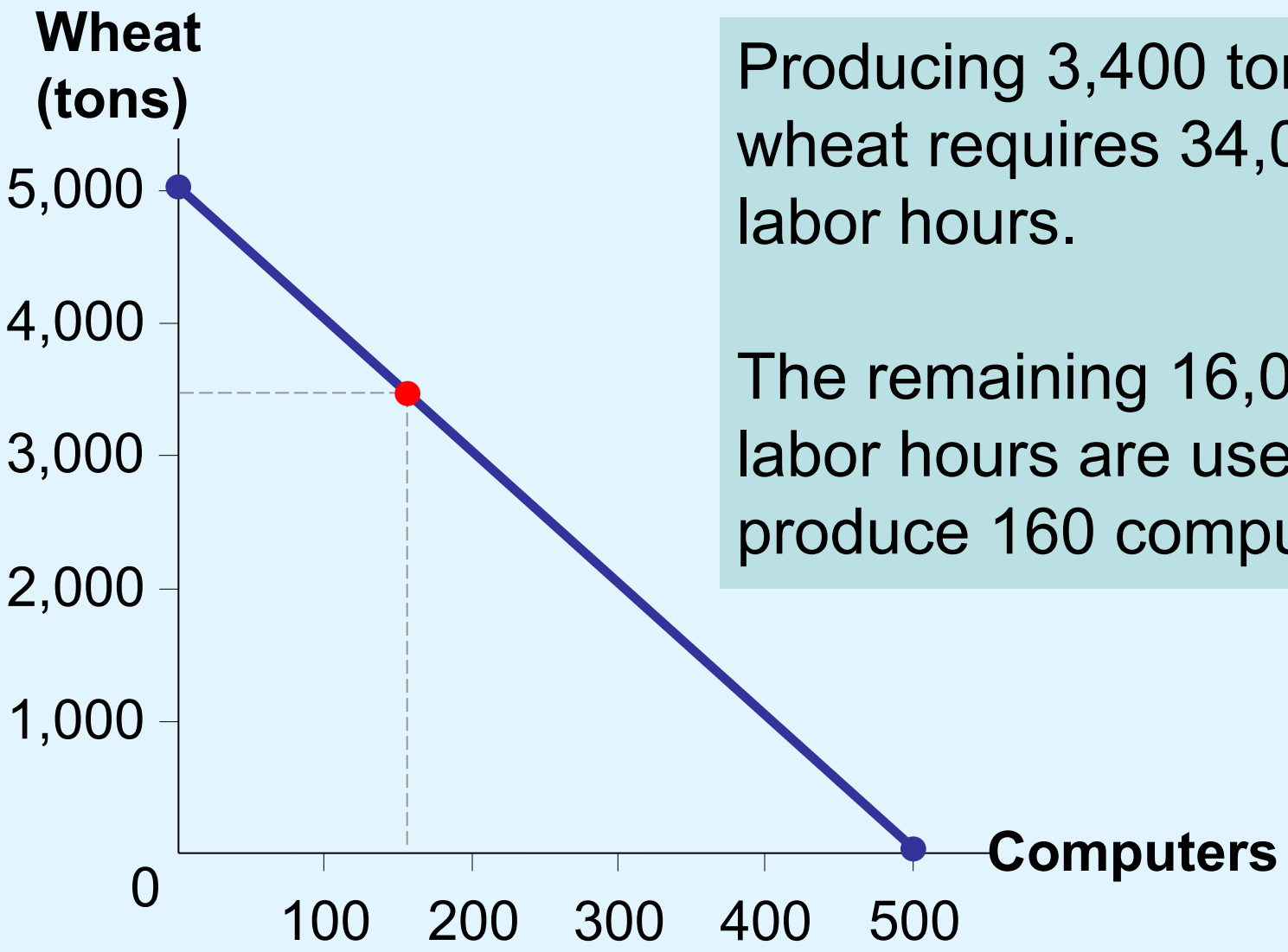
Active Learning 2 Production under trade

A. Suppose the U.S. produces 3400 tons of wheat.
   - How many computers would the U.S. be able to produce with its remaining labor?
   - Draw the point representing this combination of computers and wheat on the U.S. PPF.

B. Suppose Japan produces 240 computers.
   - How many tons of wheat would Japan be able to produce with its remaining labor?
   - Draw this point on Japan's PPF.

Active Learning 2

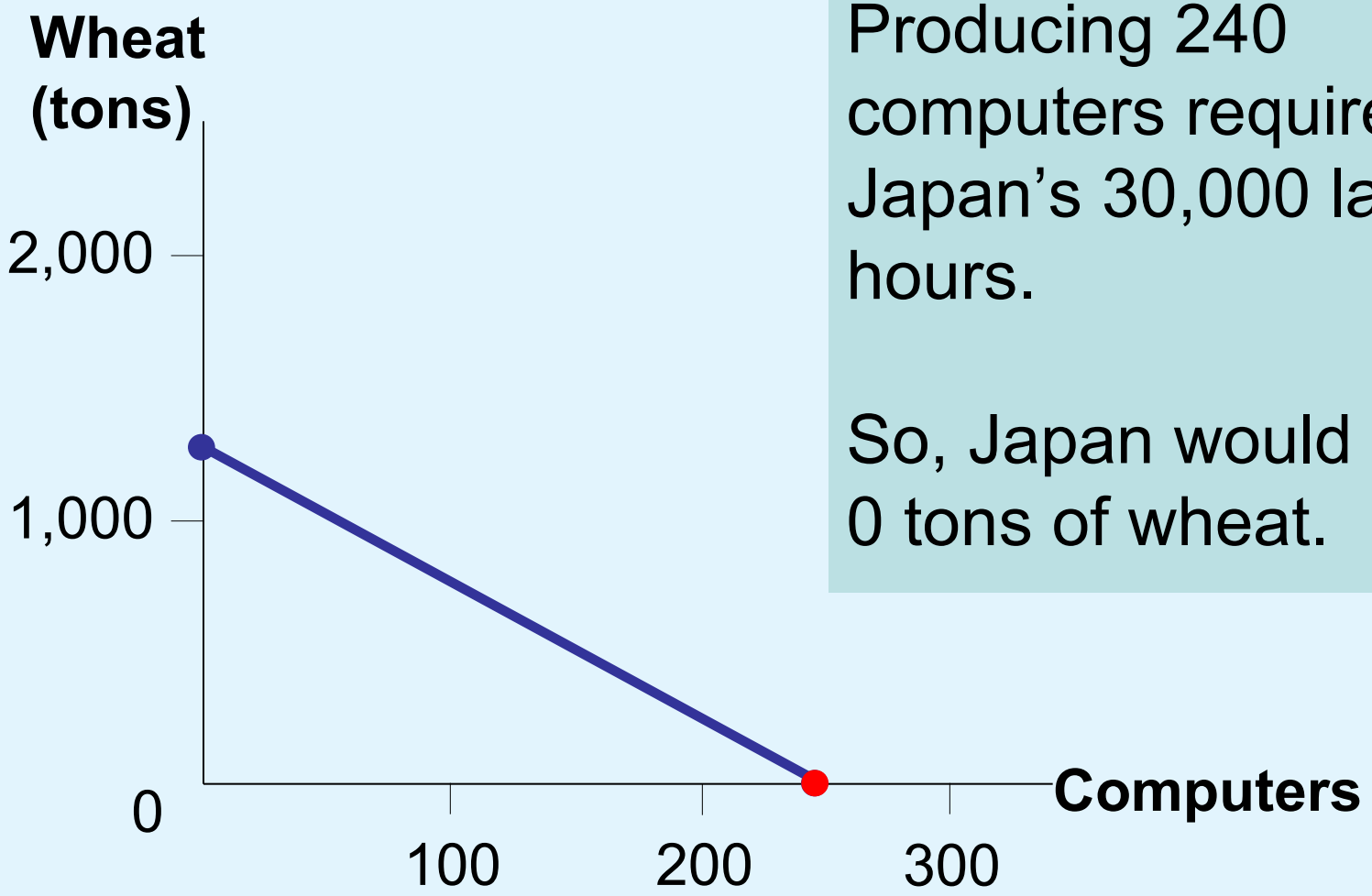
A. U.S. Production With Trade



Producing 3,400 tons of wheat requires 34,000 labor hours.

The remaining 16,000 labor hours are used to produce 160 computers.

Active Learning 2 **B.** Japan's Production With Trade



Producing 240 computers requires all of Japan's 30,000 labor hours.

So, Japan would produce 0 tons of wheat.

Exports and Imports

- Imports
  - Goods produced abroad and sold domestically
- Exports
  - Goods produced domestically and sold abroad

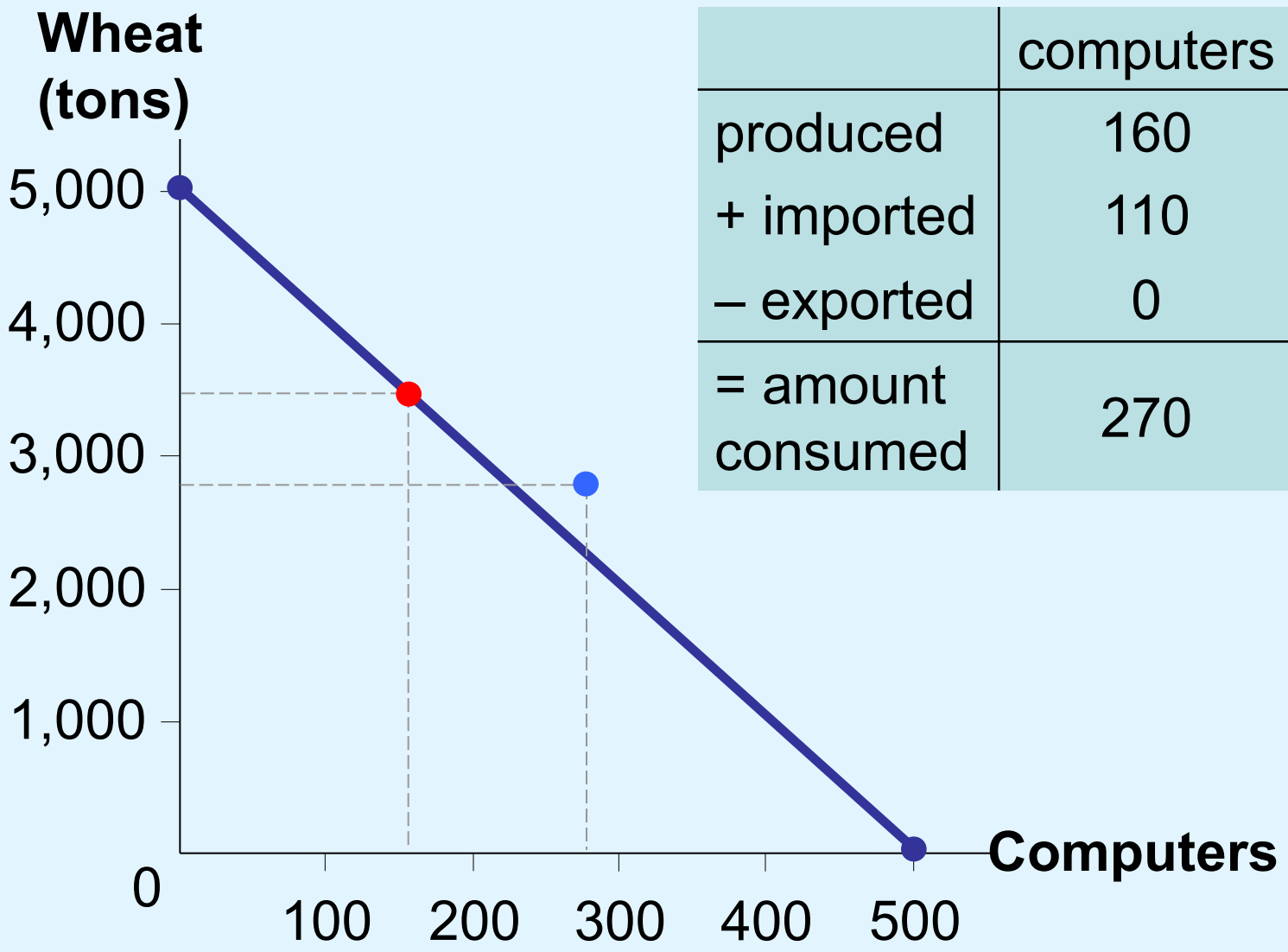
Active Learning 3 Consumption under trade

Suppose the U.S. exports 700 tons of wheat to Japan, and imports 110 computers from Japan. (Japan imports 700 tons wheat and exports 110 computers.)

A. How much of each good is consumed in the U.S.? Plot this combination on the U.S. PPF.

B. How much of each good is consumed in Japan? Plot this combination on Japan's PPF.

Active Learning 3 A. U.S. Consumption With Trade

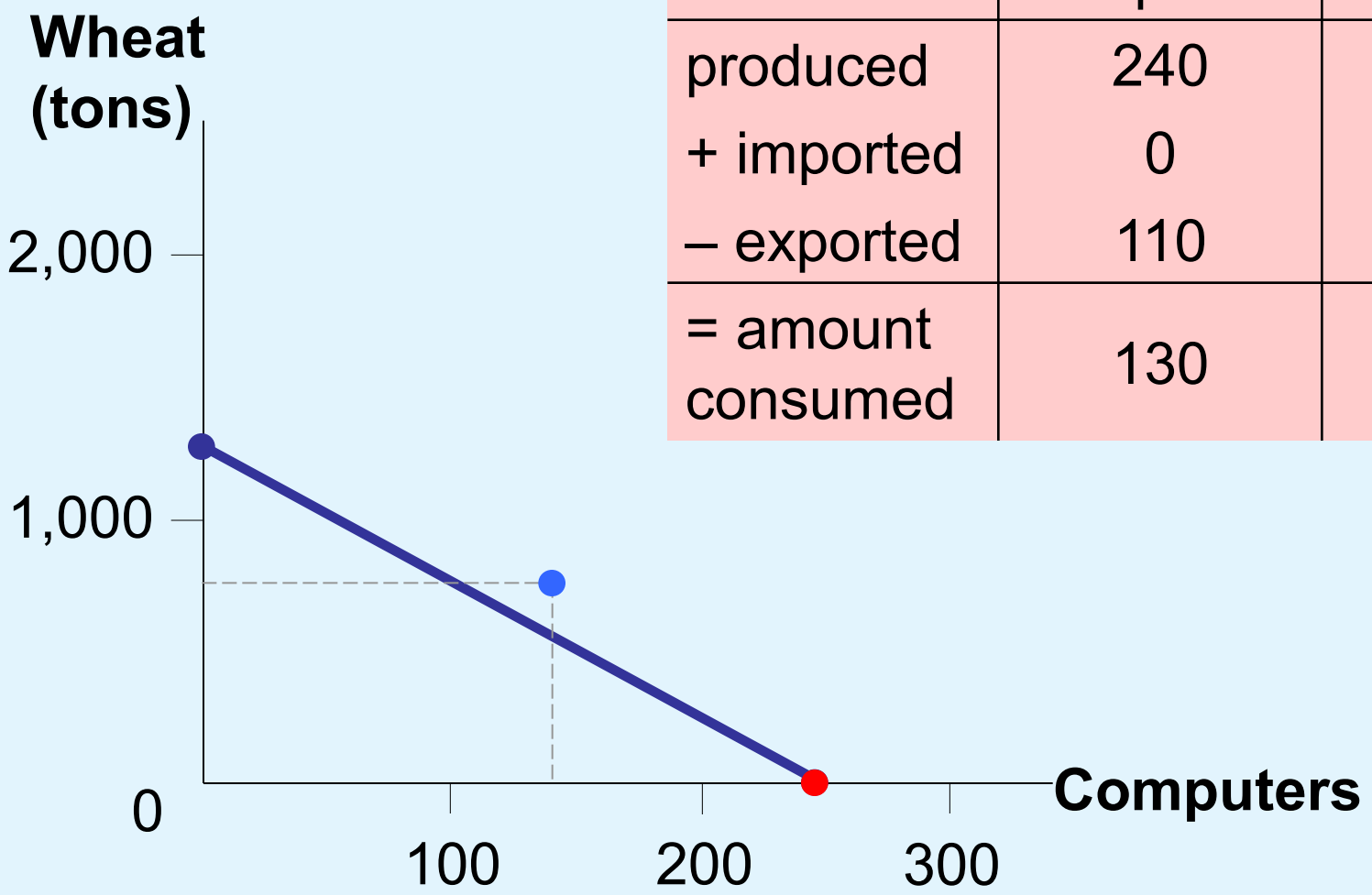


	computers	wheat
produced	160	3400
+ imported	110	0
– exported	0	700
= amount consumed	270	2700

Active Learning 3

B. Japan's Consumption With Trade

	computers	wheat
produced	240	0
+ imported	0	700
– exported	110	0
= amount consumed	130	700



Trade Makes Both Countries Better Off

U.S.			
	consumption without trade	consumption with trade	gains from trade
computers	250	270	**20**
wheat	2500	2700	**200**
Japan			
	consumption without trade	consumption with trade	gains from trade
computers	120	130	**10**
wheat	600	700	**100**

Where Do These Gains Come From?

- Absolute advantage:
  - The ability to produce a good using fewer inputs than another producer
  - The U.S. has absolute advantage in wheat
    - Producing a ton of wheat uses 10 labor hours in the U.S. vs. 25 in Japan
  - The U.S. has absolute advantage in computers
    - Producing one computer requires 125 labor hours in Japan, but only 100 in the U.S.

Where Do These Gains Come From?

The U.S. has an absolute advantage in both goods!

- So why does Japan specialize in computers?
- Why do both countries gain from trade?

- Two countries can gain from trade
  - When each specializes in the good it produces at lowest cost

Two Measures of the Cost of a Good

- Absolute advantage
  - Measures the cost of a good in terms of the inputs required to produce it
- Another measure of cost: opportunity cost
  - The opportunity cost of a computer = amount of wheat that could be produced using the labor needed to produce one computer

Comparative Advantage

- Comparative advantage
  - The ability to produce a good at a lower opportunity cost than another producer
- Principle of comparative advantage
  - Each good should be produced by the individual that has the smaller opportunity cost of producing that good

Specialize according to comparative advantage

Comparative Advantage

- The opportunity cost of a computer is
  - 10 tons of wheat in the U.S.:
    - Producing one computer requires 100 labor hours, which instead could produce 10 tons of wheat
  - 5 tons of wheat in Japan:
    - Producing one computer requires 125 labor hours, which instead could produce 5 tons of wheat

Japan has comparative advantage in computers

Comparative Advantage and Trade

- Gains from trade
  - Arise from comparative advantage (differences in opportunity costs)
- When each country specializes in the good(s) in which it has a comparative advantage
  - Total production in all countries is higher
  - The world's "economic pie" is bigger
  - All countries can gain from trade

Active Learning 4 Absolute and comparative advantage

Argentina, 10,000 hours of labor/month:

- producing 1 lb. coffee requires 2 hours;
- producing 1 bottle wine requires 4 hours

Brazil, 10,000 hours of labor/month:

- producing 1 lb. coffee requires 1 hour
- producing 1 bottle wine requires 5 hours

1. Which country has an absolute advantage in the production of coffee?
2. Which country has a comparative advantage in the production of wine?

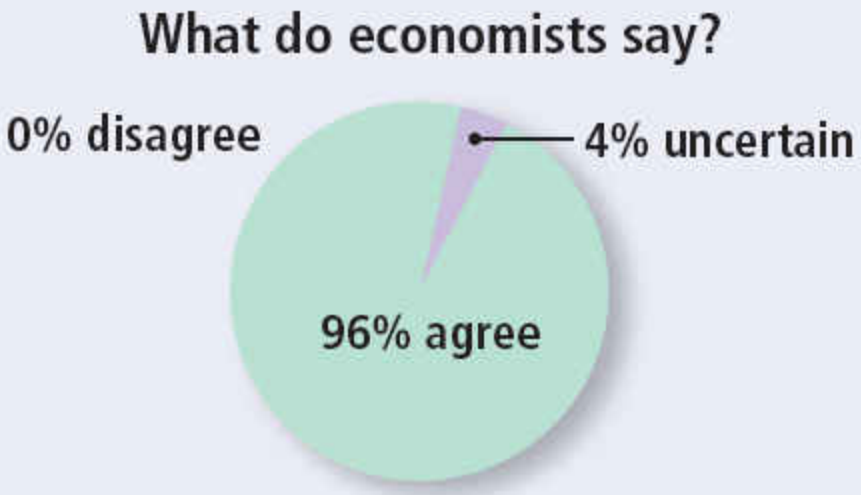
Active Learning 4 Answers

1. Brazil: absolute advantage in coffee
   - Producing 1 lb. coffee:
     - One labor-hour in Brazil, but two in Argentina.
2. Argentina: comparative advantage in wine
   - Argentina's opportunity cost of wine is 2 lb. coffee
     - The four labor-hours required to produce a bottle of wine could instead produce 2 lb. coffee
   - Brazil's opportunity cost of wine is 5 lb. coffee

ASK THE EXPERTS

Trade between China and the United States

"Some Americans who work in the production of competing goods, such as clothing and furniture, are made worse off by trade with China."



Summary

- Interdependence and trade are desirable
  - Allow everyone to enjoy a greater quantity and variety of goods and services
- Comparative advantage: being able to produce a good at a lower opportunity cost
- Absolute advantage: being able to produce a good with fewer inputs
- The gains from trade are based on comparative advantage, not absolute advantage

Summary

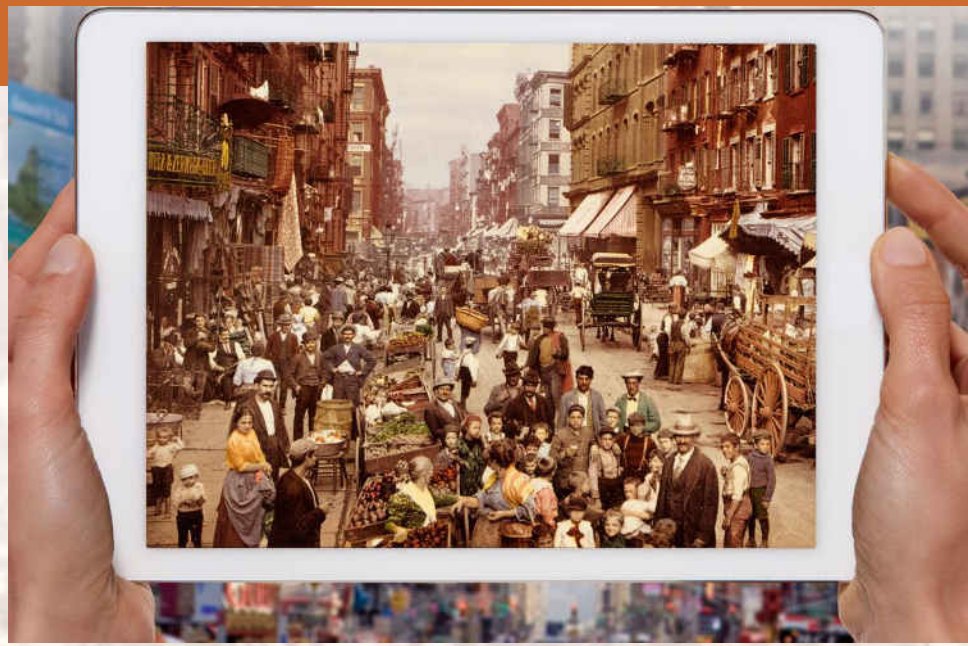
- Trade makes everyone better off
  - It allows people to specialize in those activities in which they have a comparative advantage
- The principle of comparative advantage applies to countries as well as to people
- Economists use the principle of comparative advantage to advocate free trade among countries

N. GREGORY MANKIW

PRINCIPLES OF

ECONOMICS

Eight Edition



CHAPTER

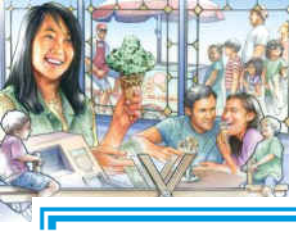
4

The Market Forces of Supply and Demand

Premium PowerPoint Slides by:
V. Andreea CHIRITESCU
Eastern Illinois University

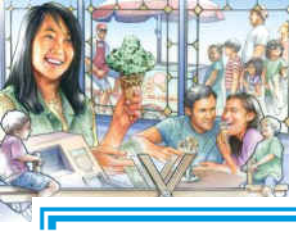
Look for the answers to these questions

- What factors affect buyers' demand for goods?
- What factors affect sellers' supply of goods?
- How do supply and demand determine the price of a good and the quantity sold?
- How do changes in the factors that affect demand or supply affect the market price and quantity of a good?
- How do markets allocate resources?



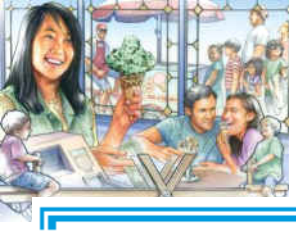
Markets and Competition

- Market
  - A group of buyers and sellers of a particular good or service
  - Buyers as a group
    - Determine the demand for the product
  - Sellers as a group
    - Determine the supply of the product



Markets and Competition

- Competitive market
  - Many buyers and many sellers, each has a negligible impact on market price
- Perfectly competitive market
  - All goods are exactly the same
  - Buyers and sellers are so numerous that no one can affect the market price, “Price takers”



Demand

- Quantity demanded
  - Amount of a good that buyers are willing and able to purchase
- Law of demand
  - Other things equal
  - When the price of a good rises, the quantity demanded of the good falls
  - When the price falls, the quantity demanded rises

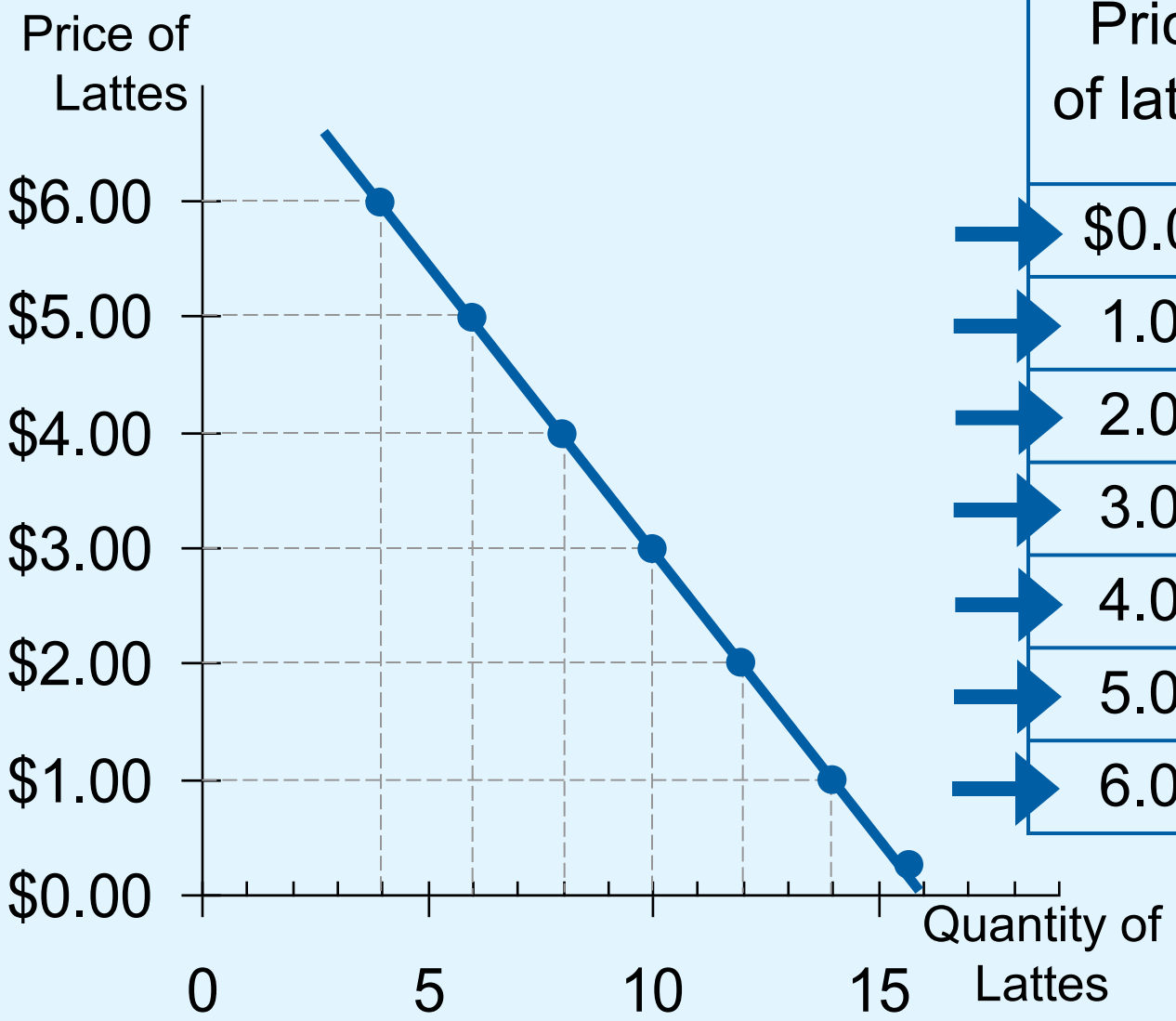
Sam's Demand Schedule

Demand schedule:

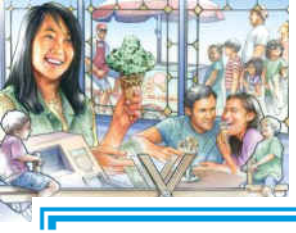
- A table, shows the relationship between the price of a good and the quantity demanded
- Example: Sam's demand for lattes
- Notice that Sam's preferences obey the law of demand.

Price of lattes	Quantity of lattes demanded
$0.00	16
1.00	14
2.00	12
3.00	10
4.00	8
5.00	6
6.00	4

Sam's Demand Schedule and Demand Curve



Price of lattes	Quantity of lattes demanded
$0.00	16
1.00	14
2.00	12
3.00	10
4.00	8
5.00	6
6.00	4



Demand

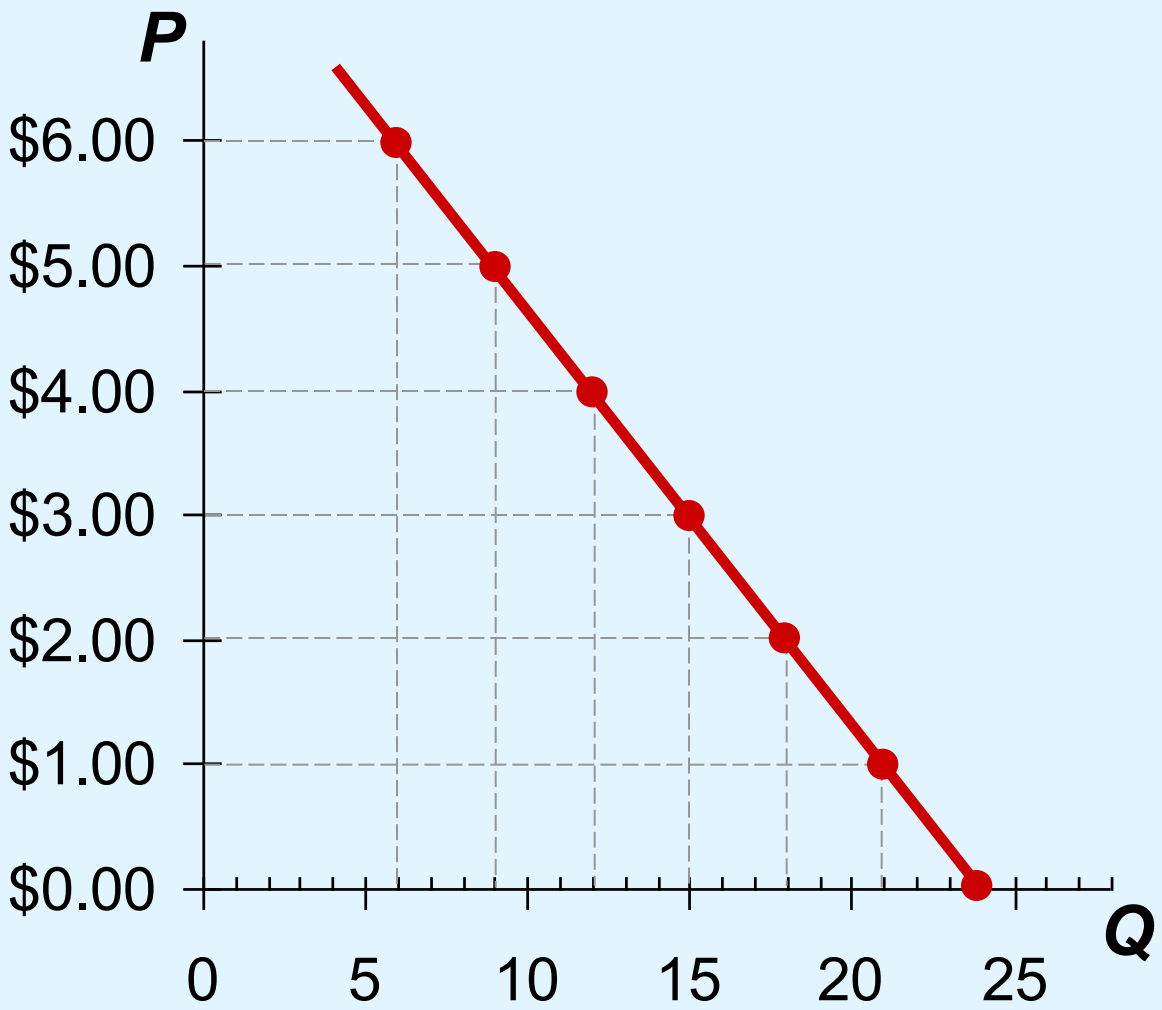
- Market demand
  - Sum of all individual demands for a good or service
  - Market demand curve: sum the individual demand curves horizontally
    - To find the total quantity demanded at any price, we add the individual quantities

Market Demand versus Individual Demand

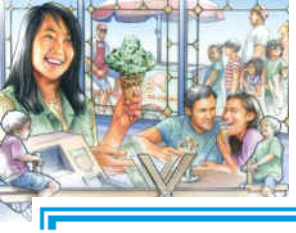
Suppose Sam and Dean are the only two buyers in the market for lattes. (Q^d = quantity demanded)

Price	Sam's Q^d		Dean's Q^d		Market Q^d
$0.00	16	+	8	=	24
1.00	14	+	7	=	21
2.00	12	+	6	=	18
3.00	10	+	5	=	15
4.00	8	+	4	=	12
5.00	6	+	3	=	9
6.00	4	+	2	=	6

The Market Demand Curve for Lattes

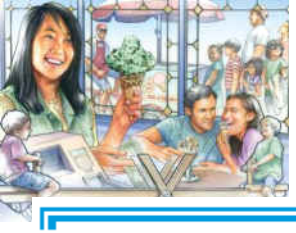


P	Q^d (Market)
$0.00	24
1.00	21
2.00	18
3.00	15
4.00	12
5.00	9
6.00	6



Demand Curve Shifters

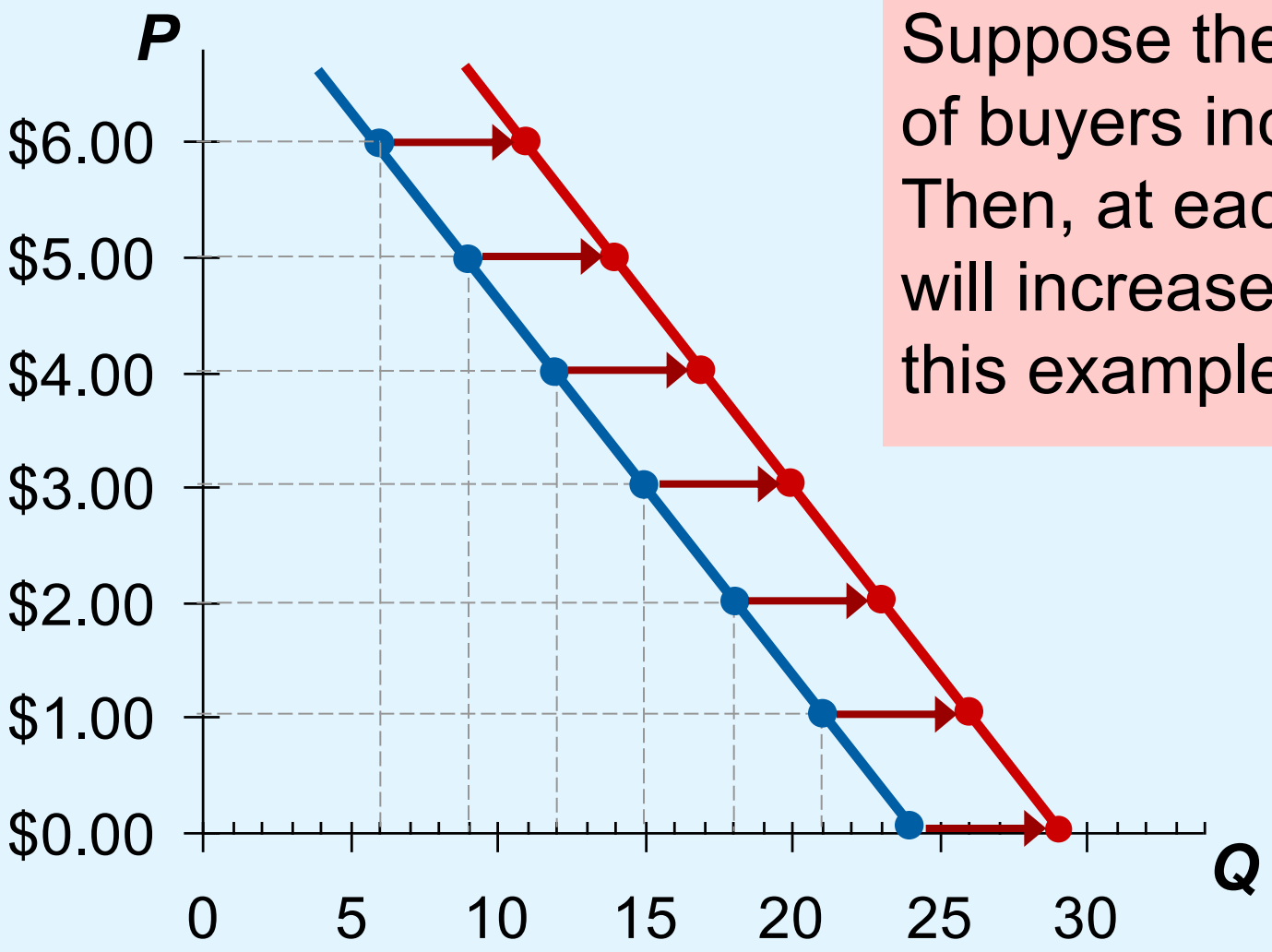
- The demand curve
  - Shows how price affects quantity demanded, other things being equal
- These "other things" are non-price determinants of demand
  - Things that determine buyers' demand for a good, other than the good's price
- Changes in them shift the D curve…



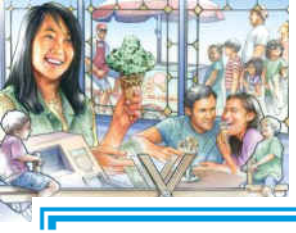
Demand Curve Shifters

- Number of buyers
  - Increase in # of buyers
    - Increases quantity demanded at each price
    - Shifts D curve to the right
  - Decrease in # of buyers
    - Decreases quantity demanded at each price
    - Shifts D curve to the left

Demand Curve Shifters: # of Buyers

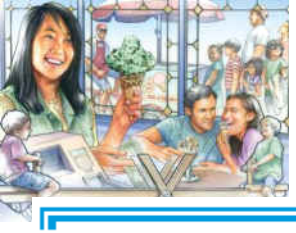


Suppose the number of buyers increases. Then, at each P, Q^d will increase (by 5 in this example).



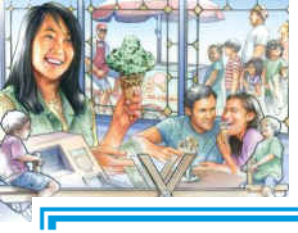
Demand Curve Shifters

- Income
  - Normal good, other things constant
    - An increase in income leads to an increase in demand: Shifts D curve to the right
  - Inferior good, other things constant
    - An increase in income leads to a decrease in demand: Shifts D curve to the left



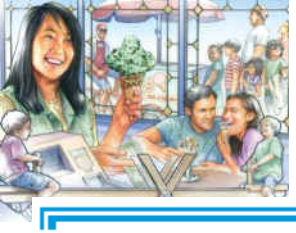
Demand Curve Shifters

- Prices of related goods, substitutes
  - Two goods are substitutes if
    - An increase in the price of one leads to an increase in the demand for the other
  - Example: pizza and hamburgers
    - An increase in the price of pizza increases demand for hamburgers, shifting hamburger demand curve to the right
  - Other examples:
    - Coke and Pepsi, laptops and tablets, music CDs and music downloads



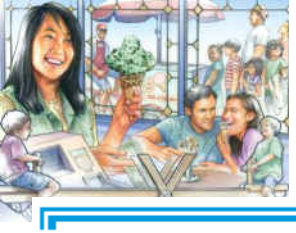
Demand Curve Shifters

- Prices of related goods, complements
  - Two goods are complements if
    - An increase in the price of one leads to a decrease in the demand for the other
  - Example: computers and software
    - If price of computers rises, people buy fewer computers, and therefore less software; Software demand curve shifts left
  - Other examples:
    - College tuition and textbooks, bagels and cream cheese, eggs and bacon



Demand Curve Shifters

- Tastes
  - Anything that causes a shift in tastes toward a good will increase demand for that good and shift its D curve to the right
  - Example:
    - The Atkins diet became popular in the ’90s, caused an increase in demand for eggs, shifted the egg demand curve to the right



Demand Curve Shifters

- Expectations about the future
  - Expect an increase in income, increase in current demand
  - Expect higher prices, increase in current demand
  - Example:
    - If people expect their incomes to rise, their D for meals at expensive restaurants may increase now

Summary: Variables That Influence Buyers

Variable	A Change in This Variable . . .
Price of the good itself	Represents a movement along the demand curve
Income	Shifts the demand curve
Prices of related goods	Shifts the demand curve
Tastes	Shifts the demand curve
Expectations	Shifts the demand curve
Number of buyers	Shifts the demand curve

Active Learning 1

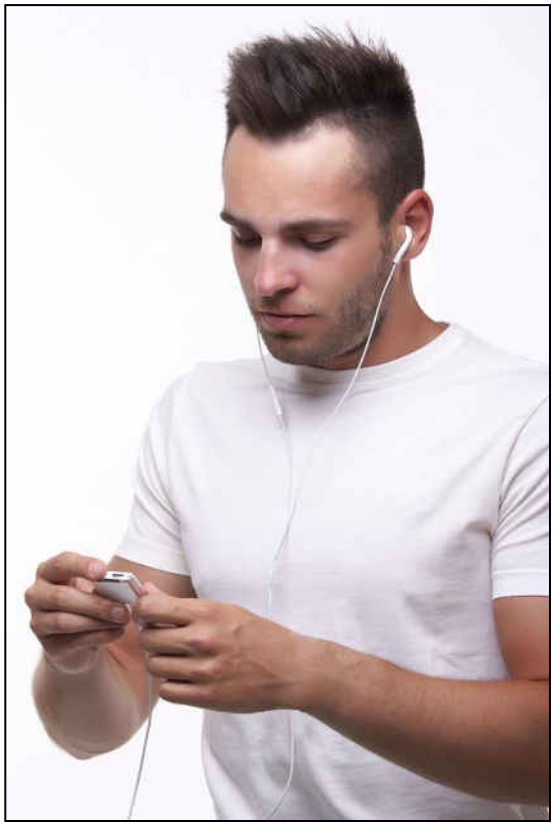
Demand curve

- Draw a demand curve for music downloads
- What happens to it in each of the following scenarios?
- Why?

A. The price of iPods falls

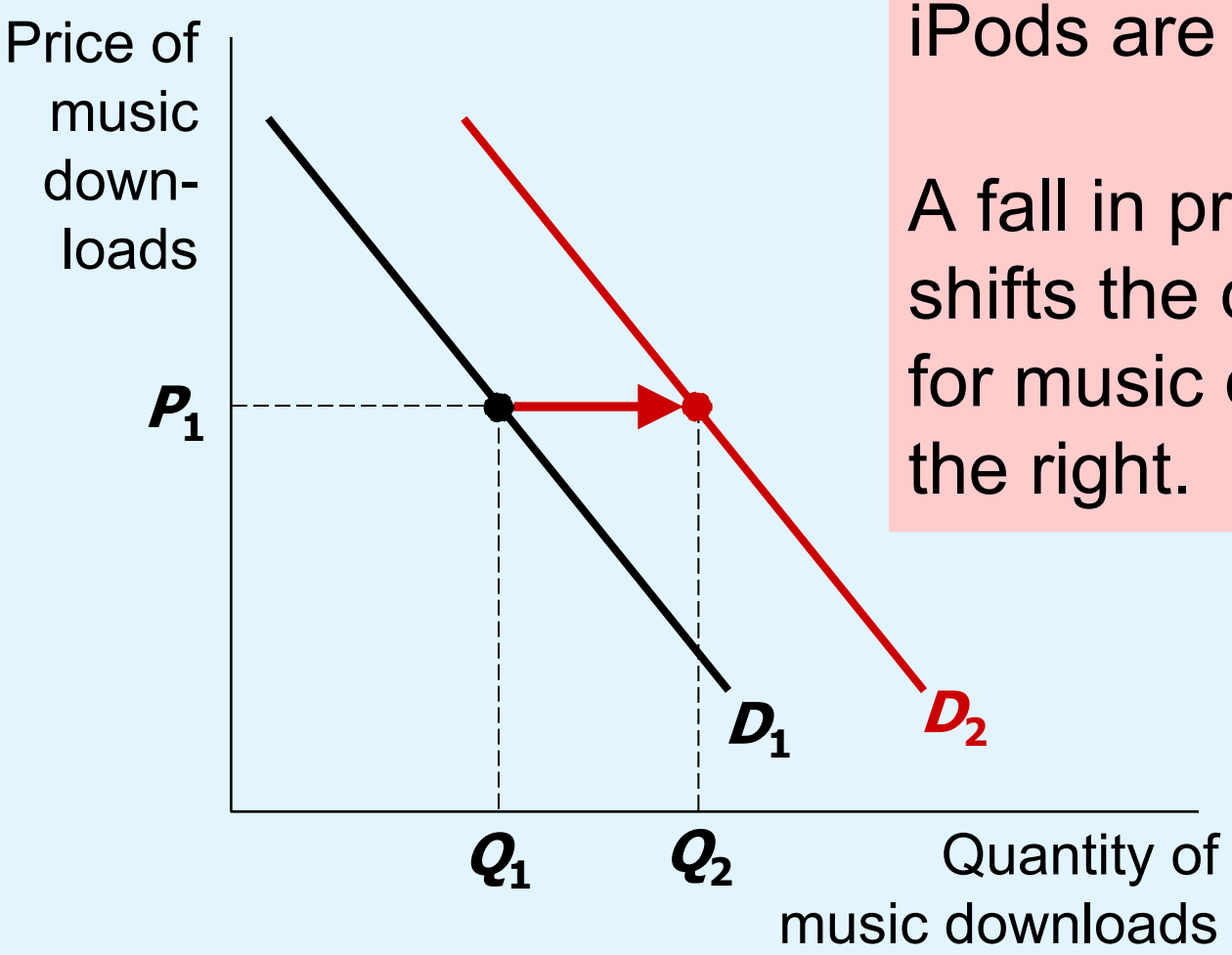
B. The price of music downloads falls

C. The price of music CDs falls



Active Learning 1

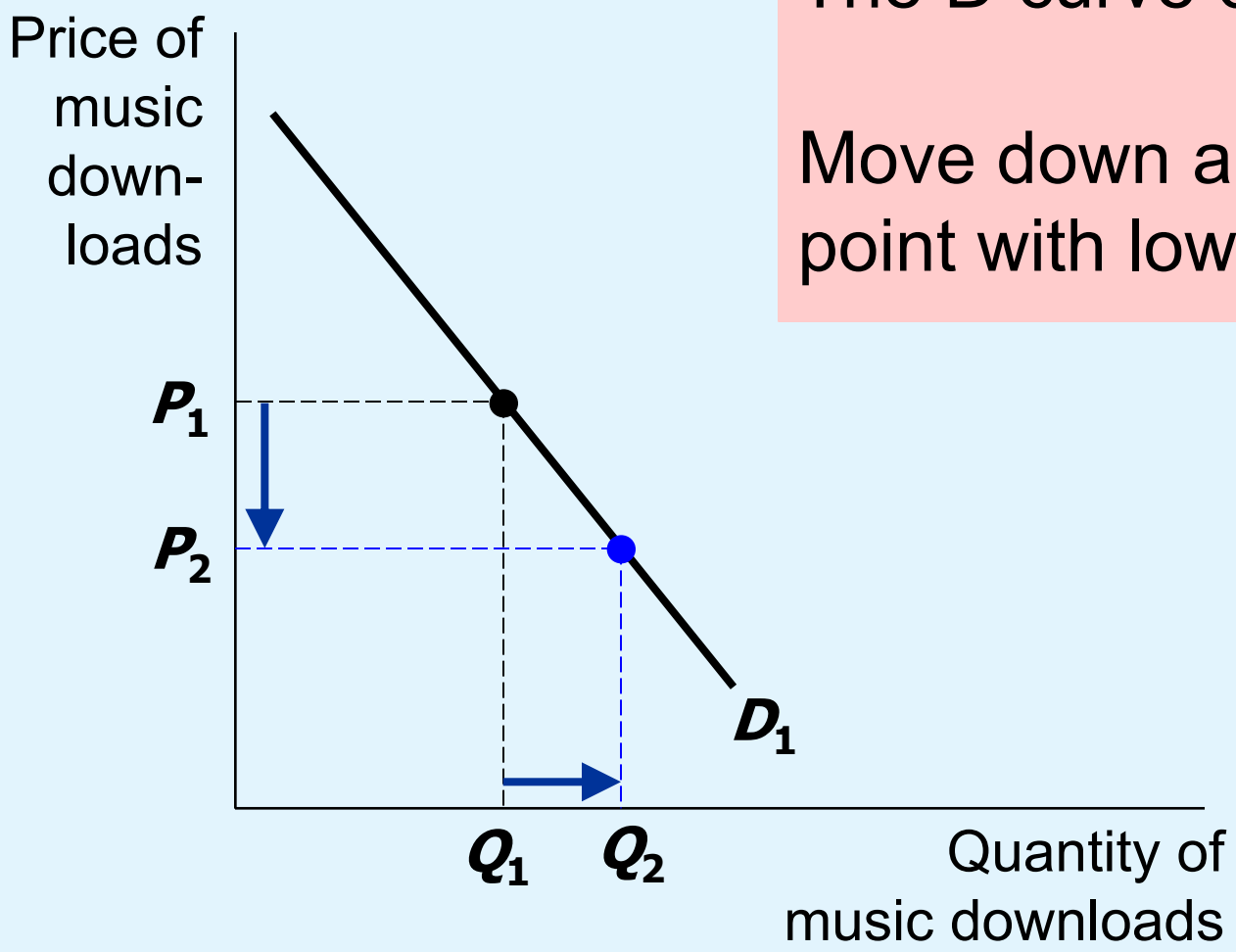
A. The price of iPods falls



Music downloads and iPods are complements.

A fall in price of iPods shifts the demand curve for music downloads to the right.

Active Learning 1 **B.** The price of music downloads falls



The D curve does not shift.

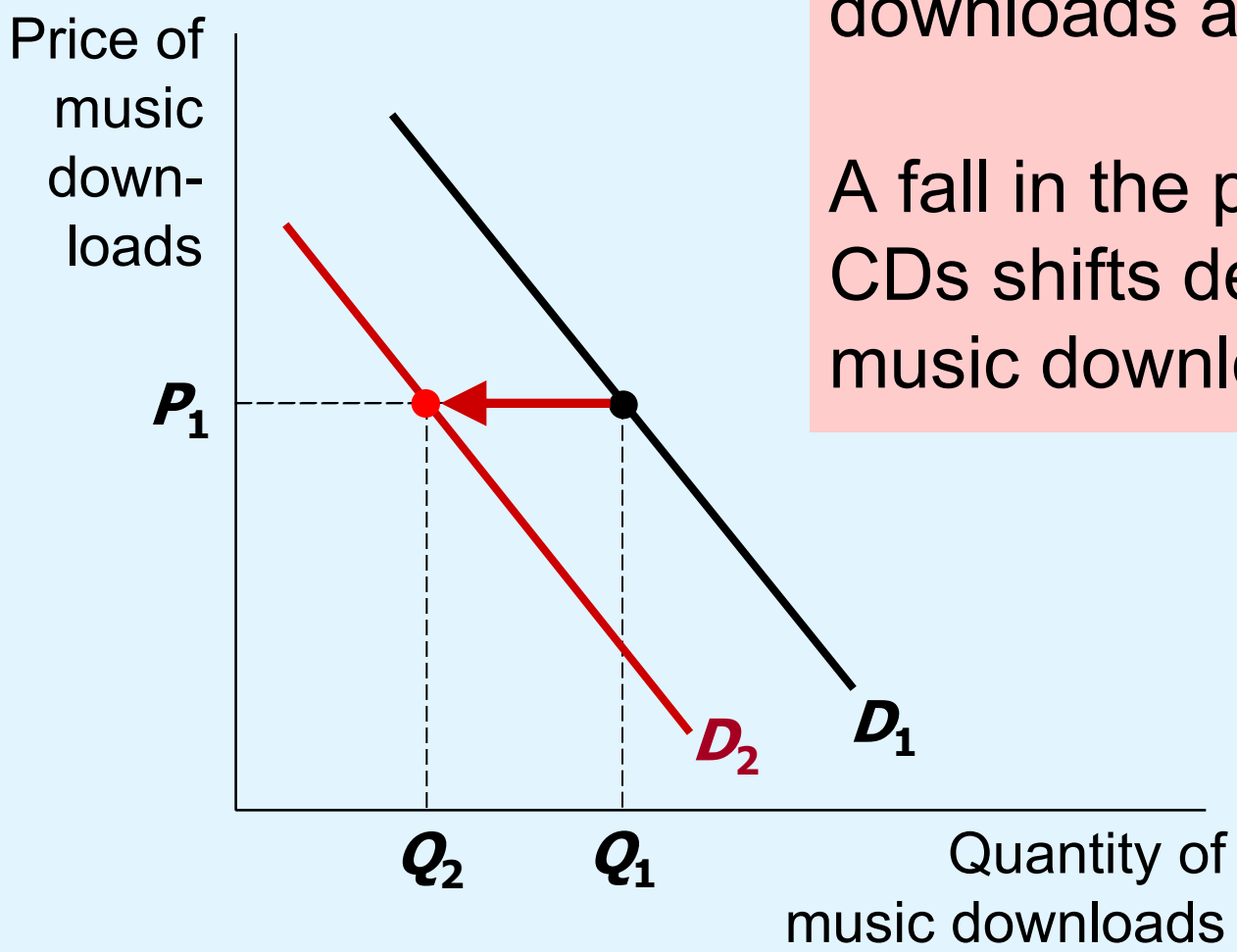
Move down along curve to a point with lower P, higher Q.

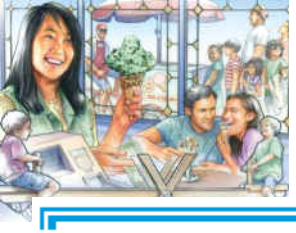
Active Learning 1

C. The price of music CDs falls

Music CDs and music downloads are substitutes.

A fall in the price of music CDs shifts demand for music downloads to the left.





Supply

- Quantity supplied
  - Amount of a good
  - Sellers are willing and able to sell
- Law of supply
  - Other things equal
  - When the price of a good rises, the quantity supplied of the good rises
  - When the price falls, the quantity supplied falls

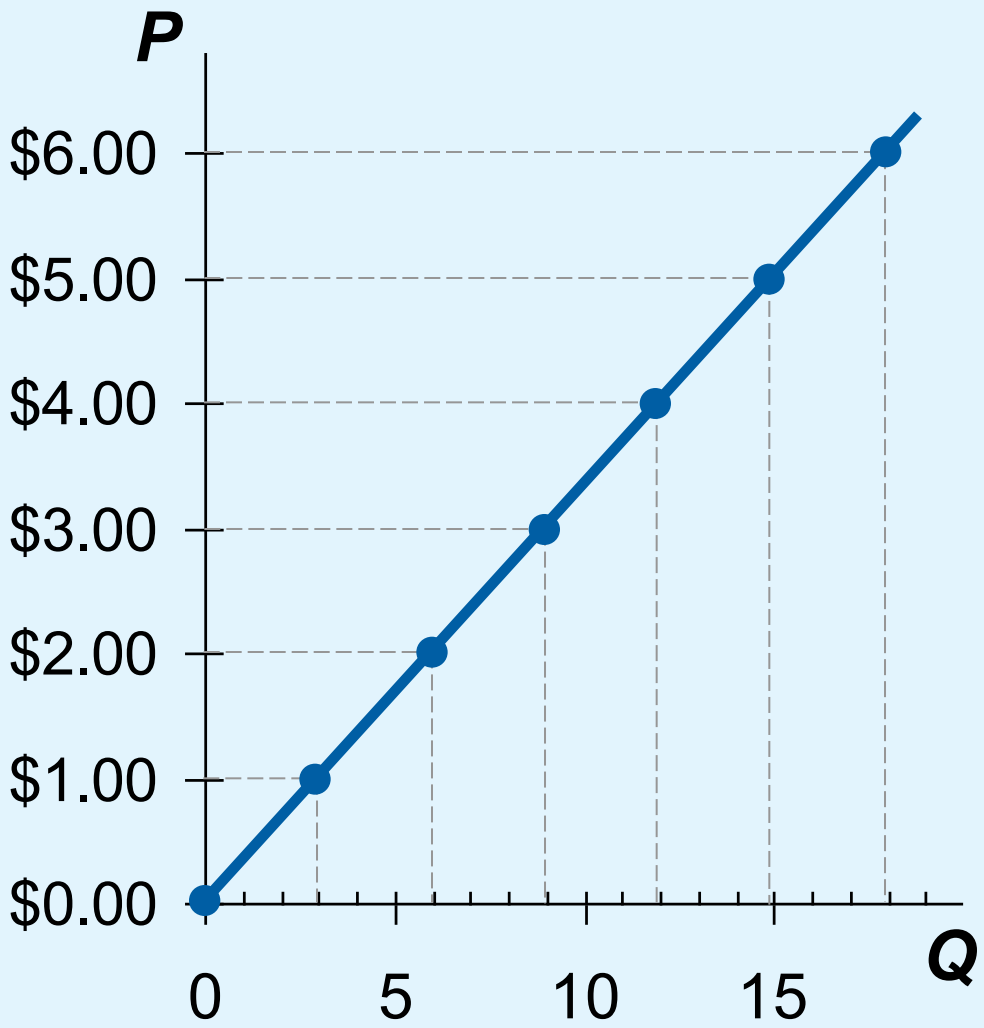
Starbucks' Supply Schedule

Supply schedule:

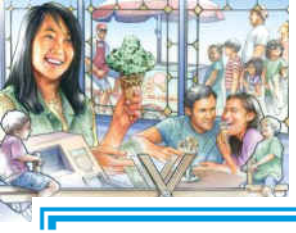
- A table, shows the relationship between the price of a good and the quantity supplied.
- Example: Starbucks' supply of lattes
- Notice that Starbucks' supply schedule obeys the law of supply

Price of lattes	Quantity of lattes supplied
$0.00	0
1.00	3
2.00	6
3.00	9
4.00	12
5.00	15
6.00	18

Starbucks' Supply Schedule and Supply Curve



Price of lattes	Quantity of lattes supplied
$0.00	0
1.00	3
2.00	6
3.00	9
4.00	12
5.00	15
6.00	18



Market Supply vs. Individual Supply

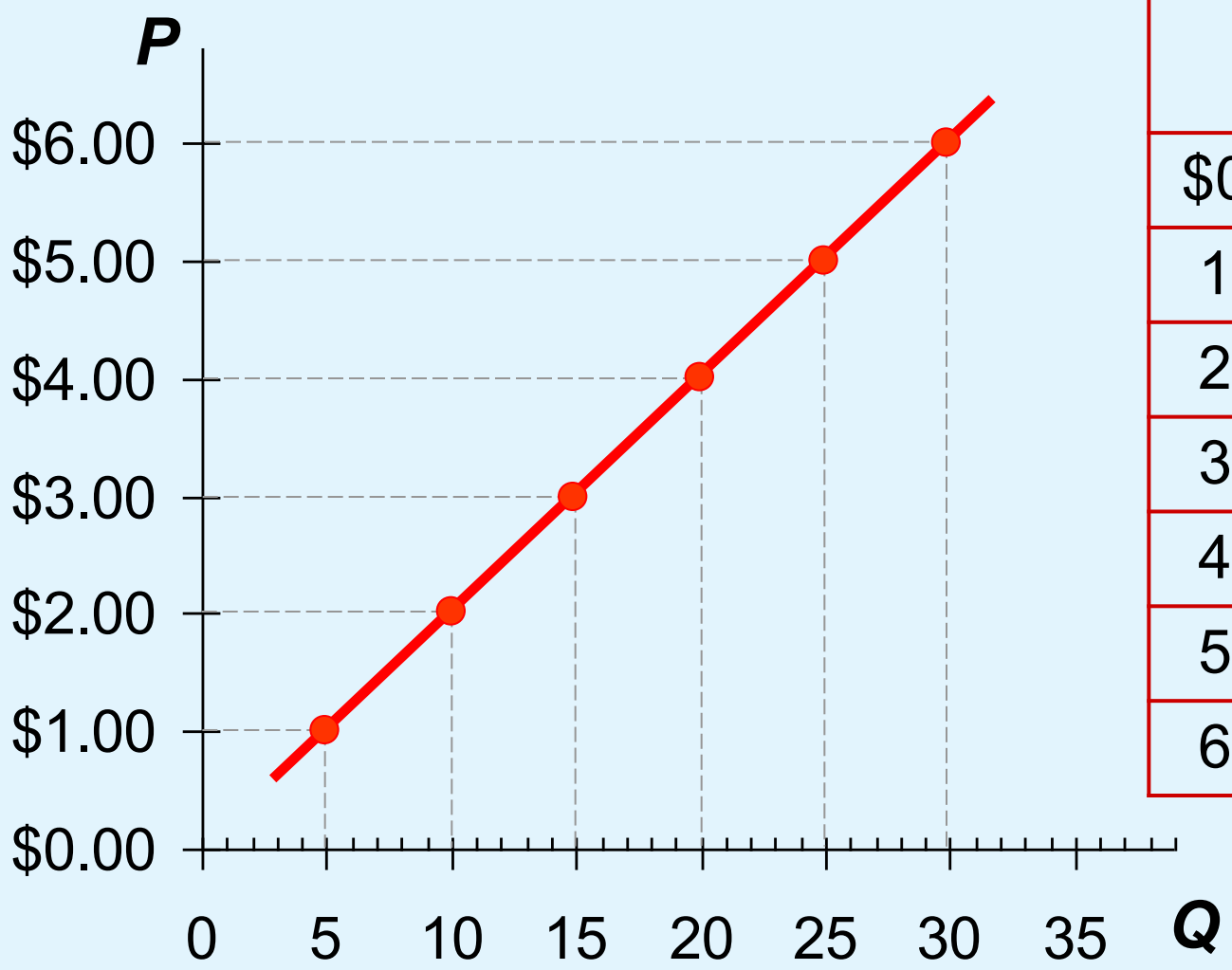
- Market supply
  - Sum of the supplies of all sellers of a good or service
  - Market supply curve: sum of individual supply curves horizontally
    - To find the total quantity supplied at any price, we add the individual quantities

Market Supply vs. Individual Supply

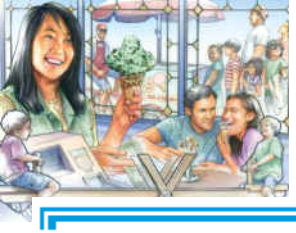
Suppose Starbucks and Peet's are the only two sellers in this market. (Q^s = quantity supplied)

Price	Q^s Starbucks		Q^s Peet's		Market Q^s
$0.00	0	+	0	=	0
1.00	3	+	2	=	5
2.00	6	+	4	=	10
3.00	9	+	6	=	15
4.00	12	+	8	=	20
5.00	15	+	10	=	25
6.00	18	+	12	=	30

The Market Supply Curve

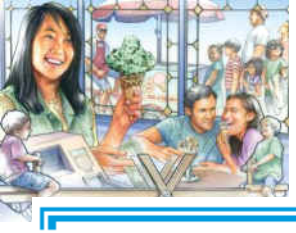


P	Q^S (Market)
$0.00	0
1.00	5
2.00	10
3.00	15
4.00	20
5.00	25
6.00	30



Supply Curve Shifters

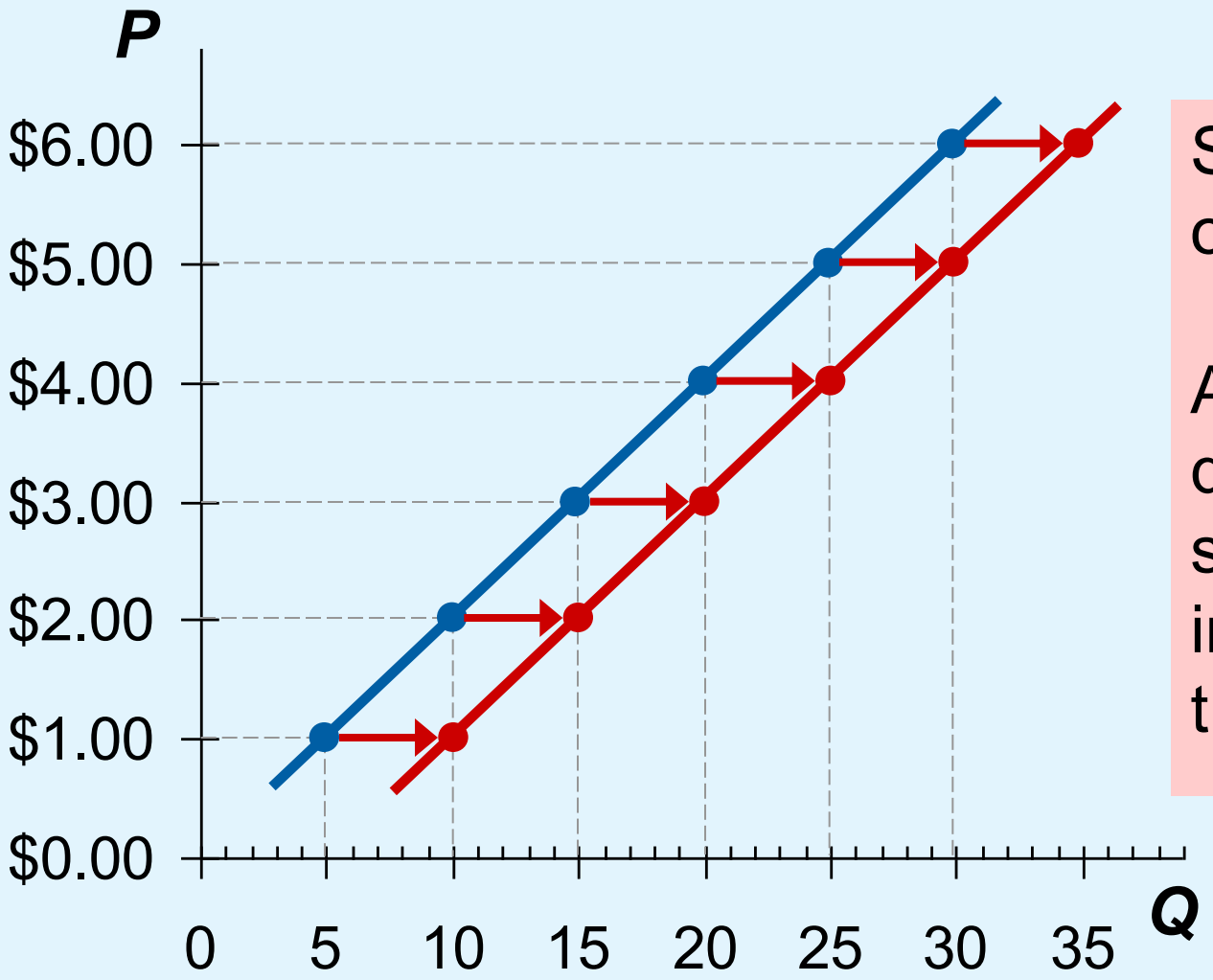
- The supply curve
  - Shows how price affects quantity supplied, other things being equal
- These "other things"
  - Are non-price determinants of supply
- Changes in them shift the S curve…



Supply Curve Shifters

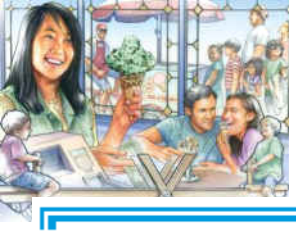
- Input prices
  - Supply is negatively related to prices of inputs
  - Examples of input prices: wages, prices of raw materials
  - A fall in input prices makes production more profitable at each output price
    - Firms supply a larger quantity at each price
    - The S curve shifts to the right

Supply Curve Shifters: Input Prices



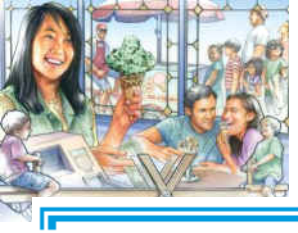
Suppose the price of milk falls.

At each price, the quantity of lattes supplied will increase (by 5 in this example).



Supply Curve Shifters

- Technology
  - Determines how much inputs are required to produce a unit of output
  - A cost-saving technological improvement has the same effect as a fall in input prices, shifts S curve to the right
- Number of sellers
  - An increase in the number of sellers
    - Increases the quantity supplied at each price
    - Shifts S curve to the right



Supply Curve Shifters

- Expectations about future
  - Example: Events in the Middle East lead to expectations of higher oil prices
    - Owners of Texas oilfields reduce supply now, save some inventory to sell later at the higher price
    - S curve shifts left
  - Sellers may adjust supply* when their expectations of future prices change (*If good not perishable)

Summary: Variables That Influence Sellers

Variable	A Change in This Variable . . .
Price of the good itself	Represents a movement along the supply curve
Input prices	Shifts the supply curve
Technology	Shifts the supply curve
Expectations	Shifts the supply curve
Number of sellers	Shifts the supply curve

Active Learning 2

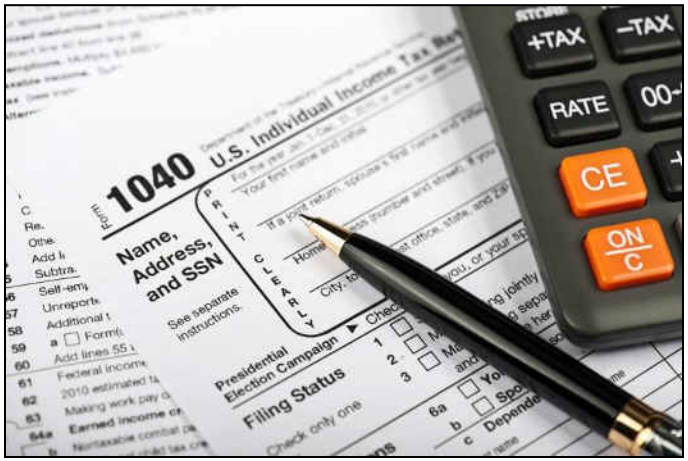
Supply curve

Draw a supply curve for tax return preparation software. What happens to it in each of the following scenarios?

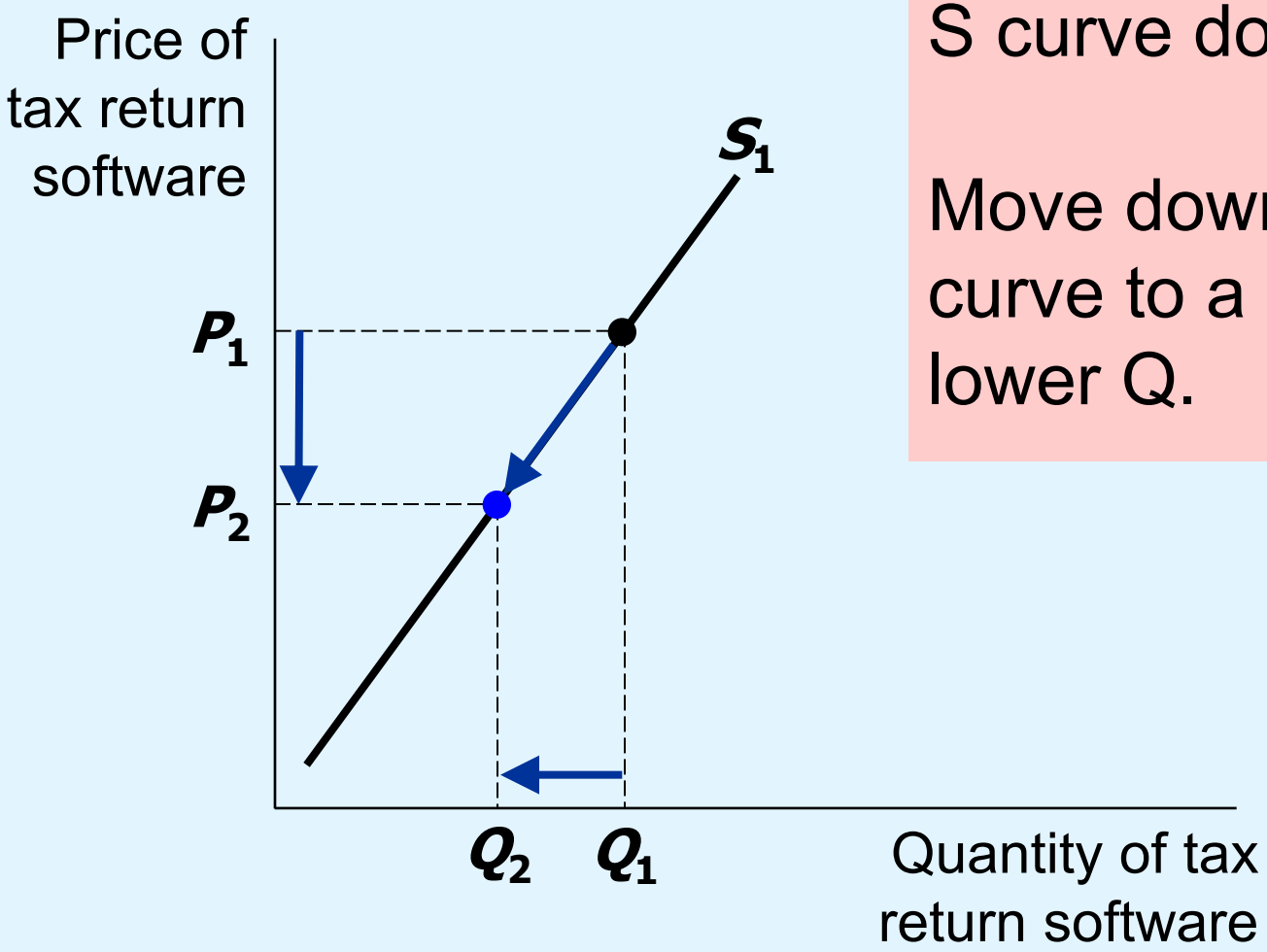
A. Retailers cut the price of the software.

B. A technological advance allows the software to be produced at lower cost.

C. Professional tax return preparers raise the price of the services they provide.



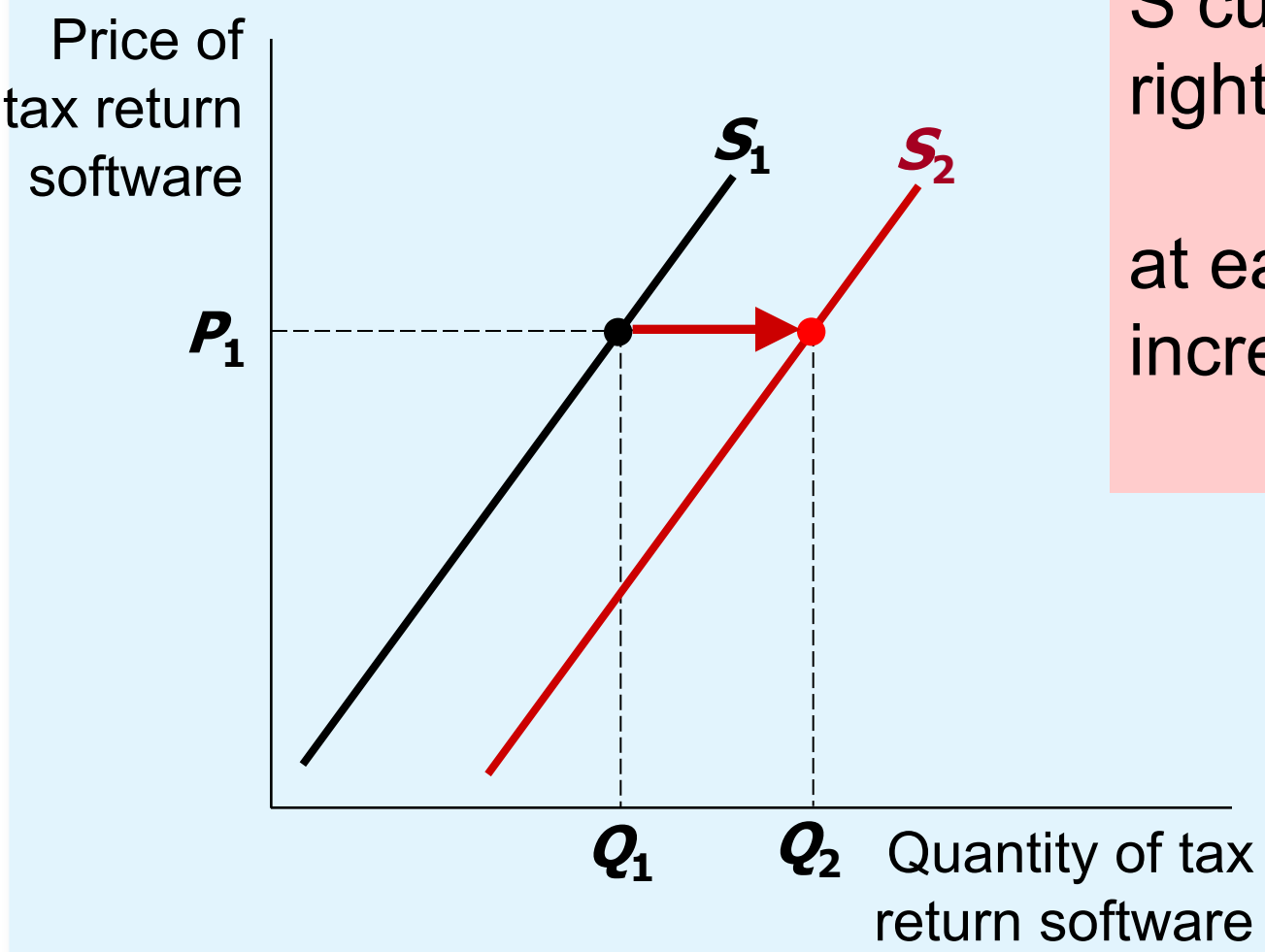
Active Learning 2 **A.** Fall in price of tax return software



S curve does not shift.

Move down along the curve to a lower P and lower Q.

Active Learning 2 **B.** Fall in cost of producing software

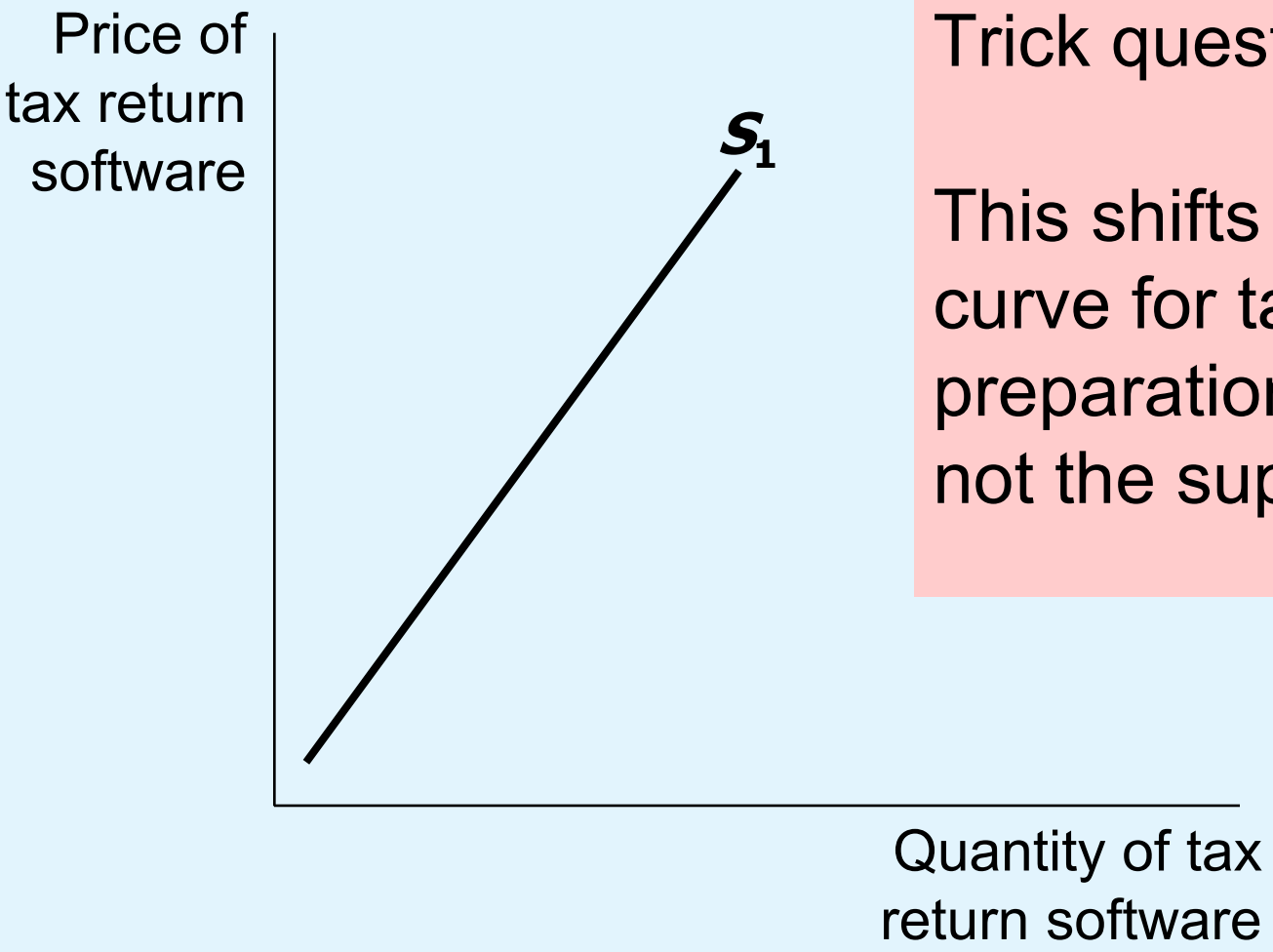


S curve shifts to the right:

at each price, Q increases.

Active Learning 2

C. Professional preparers raise their price

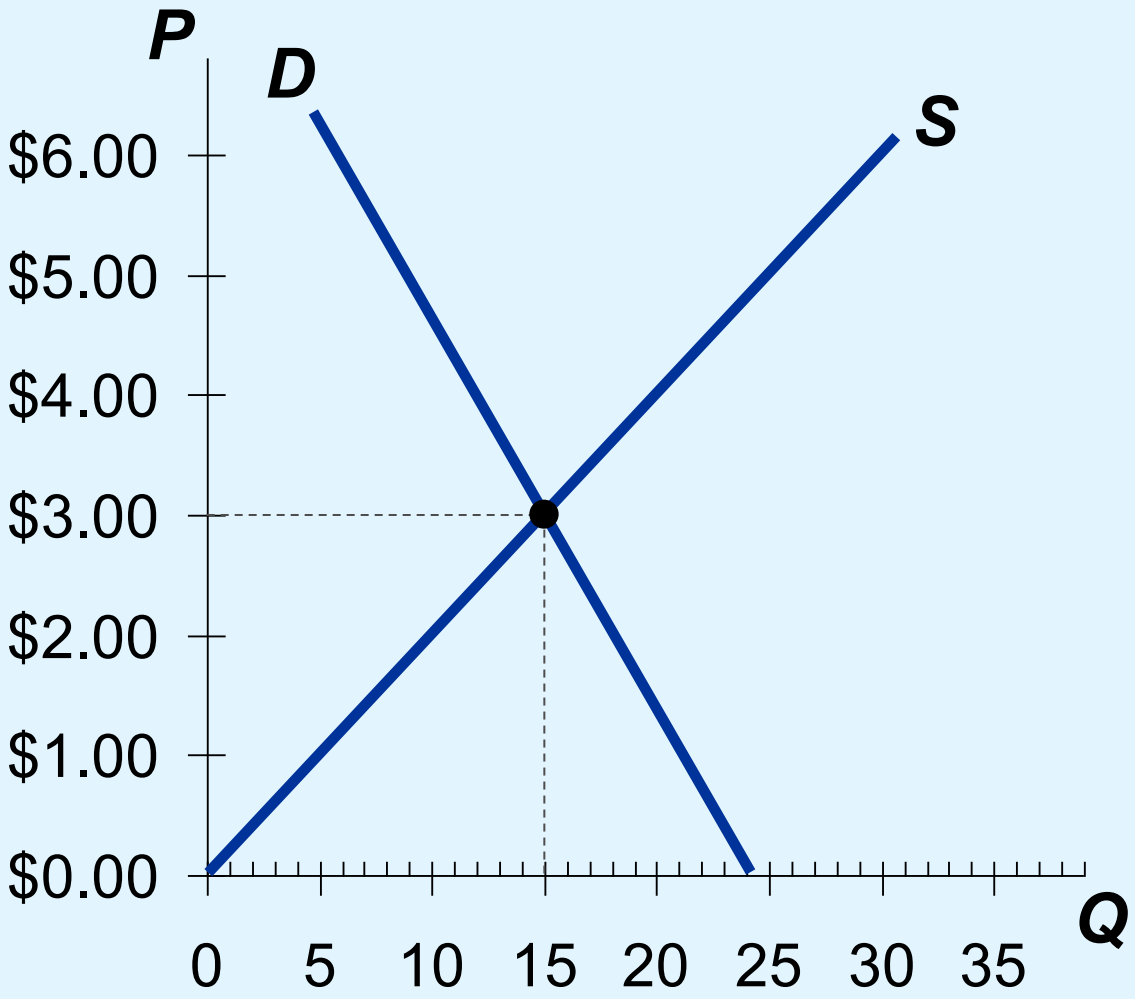


Trick question:

This shifts the demand curve for tax preparation software, not the supply curve.

Supply and Demand Together

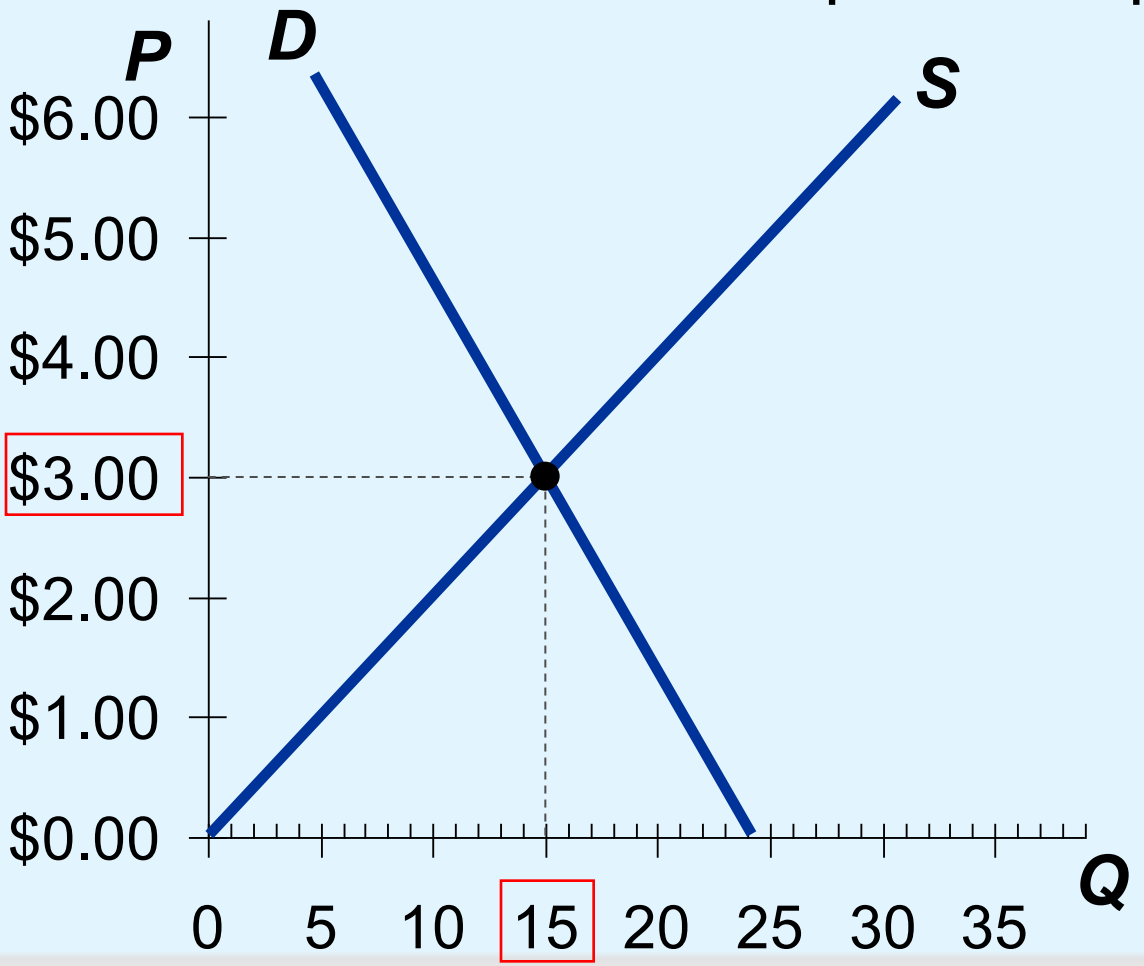
Equilibrium:
Price has reached the level where quantity supplied equals quantity demanded



Supply and Demand Together

Equilibrium price: price where Q supplied = Q demanded

Equilibrium quantity: Q supplied and demanded at the equilibrium price

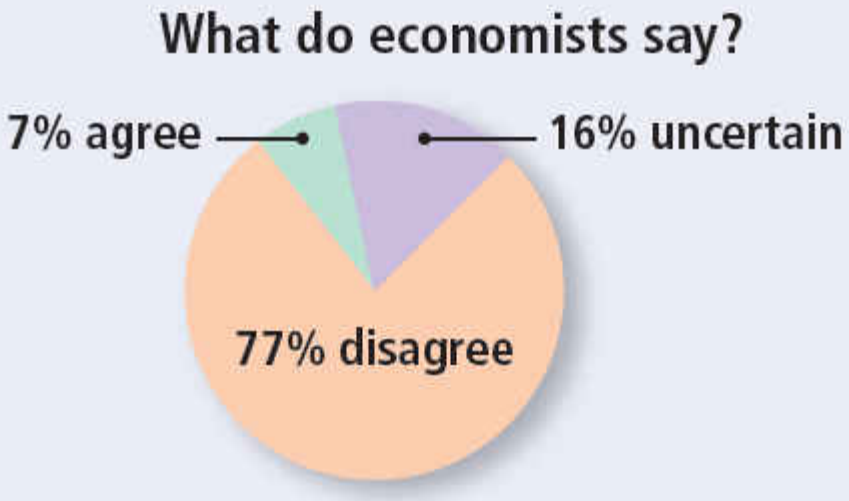


P	Q^D	Q^S
$0	24	0
1	21	5
2	18	10
3	15	15
4	12	20
5	9	25
6	6	30

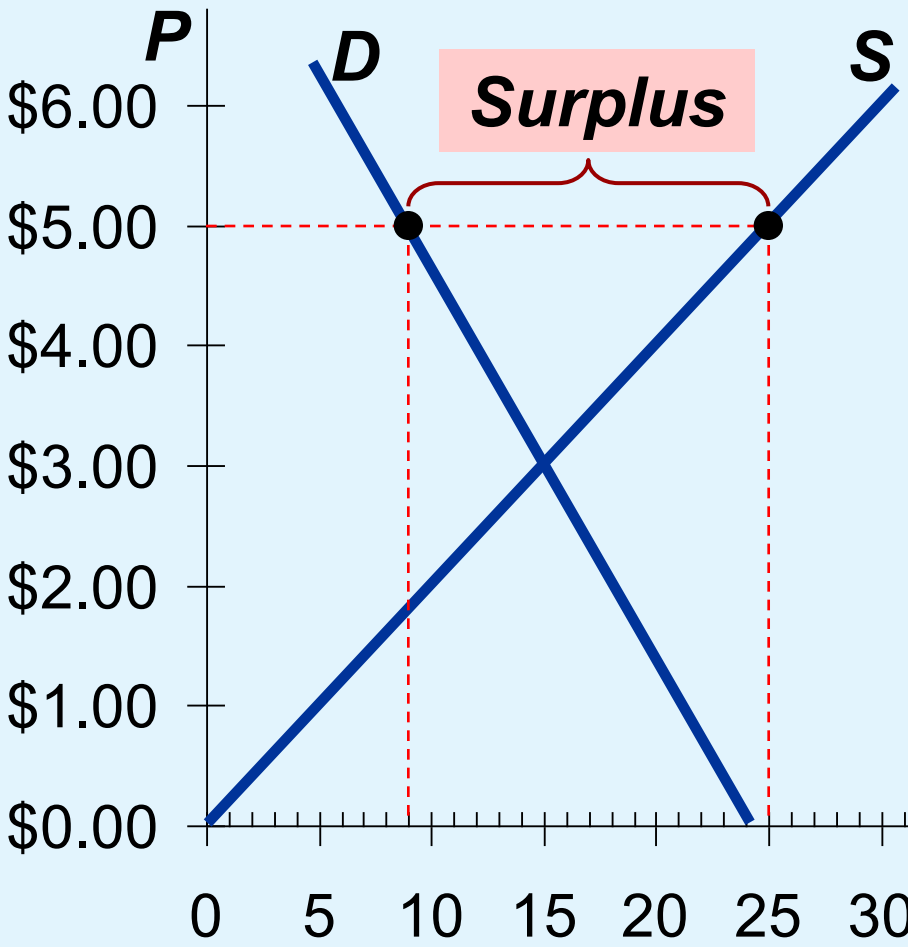
ASK THE EXPERTS

Price Gouging

"Connecticut should pass its Senate Bill 60, which states that during a 'severe weather event emergency, no person within the chain of distribution of consumer goods and services shall sell or offer to sell consumer goods or services for a price that is unconscionably excessive.'"



Markets Not in Equilibrium: Surplus

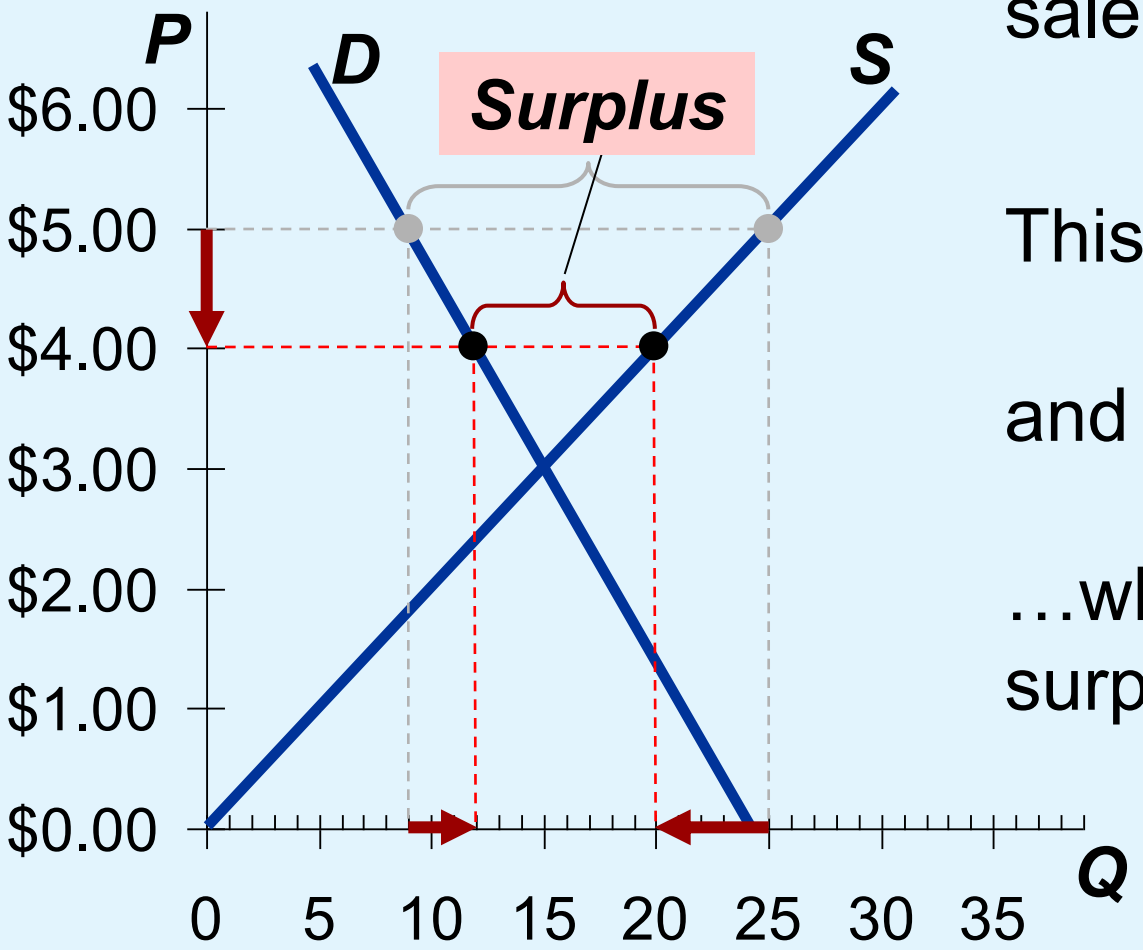


Surplus (excess supply): quantity supplied is greater than quantity demanded

Example: if P = \$5,
then Q^D = 9 lattes
and Q^S = 25 lattes

resulting in a surplus of 16 lattes

Markets Not in Equilibrium: Surplus



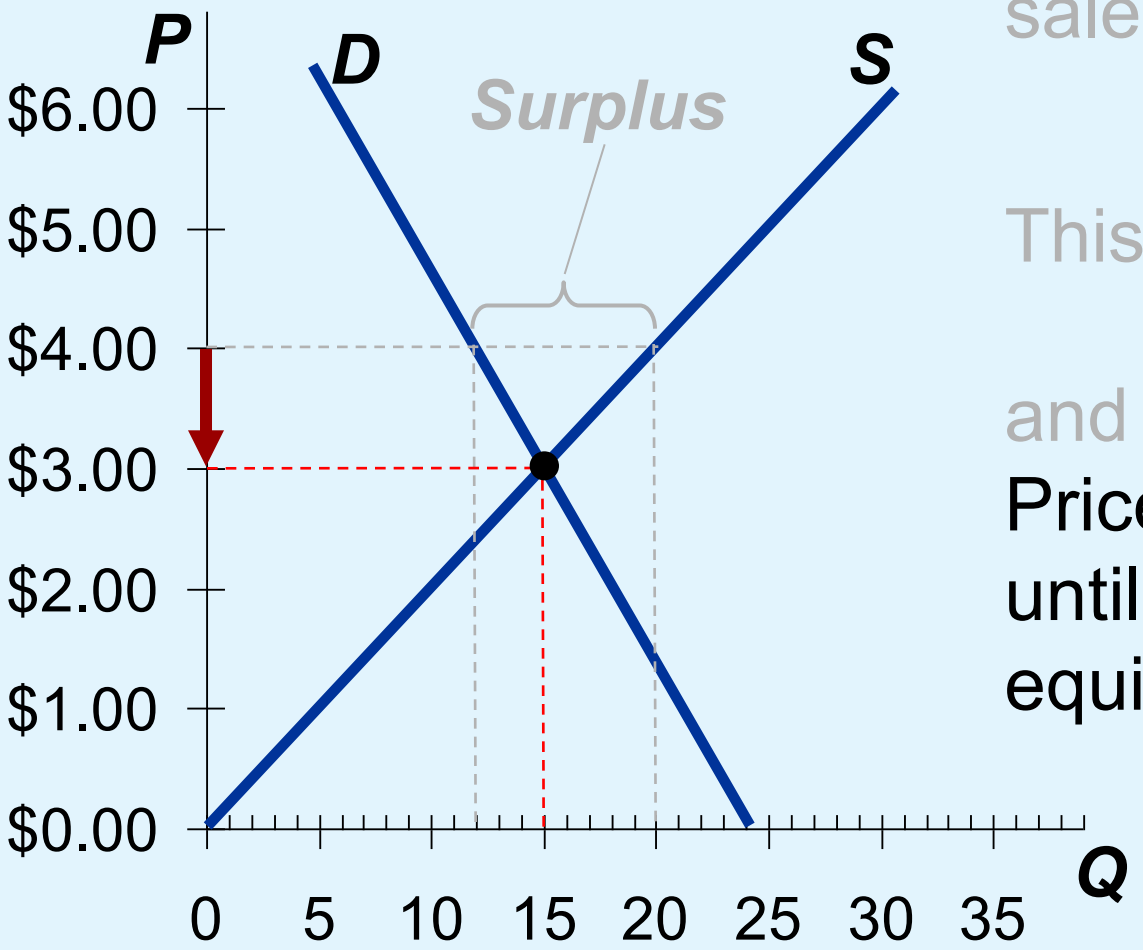
Facing a surplus, sellers try to increase sales by cutting price.

This causes Q^D to rise

and Q^S to fall…

…which reduces the surplus.

Markets Not in Equilibrium: Surplus



Facing a surplus, sellers try to increase sales by cutting price.

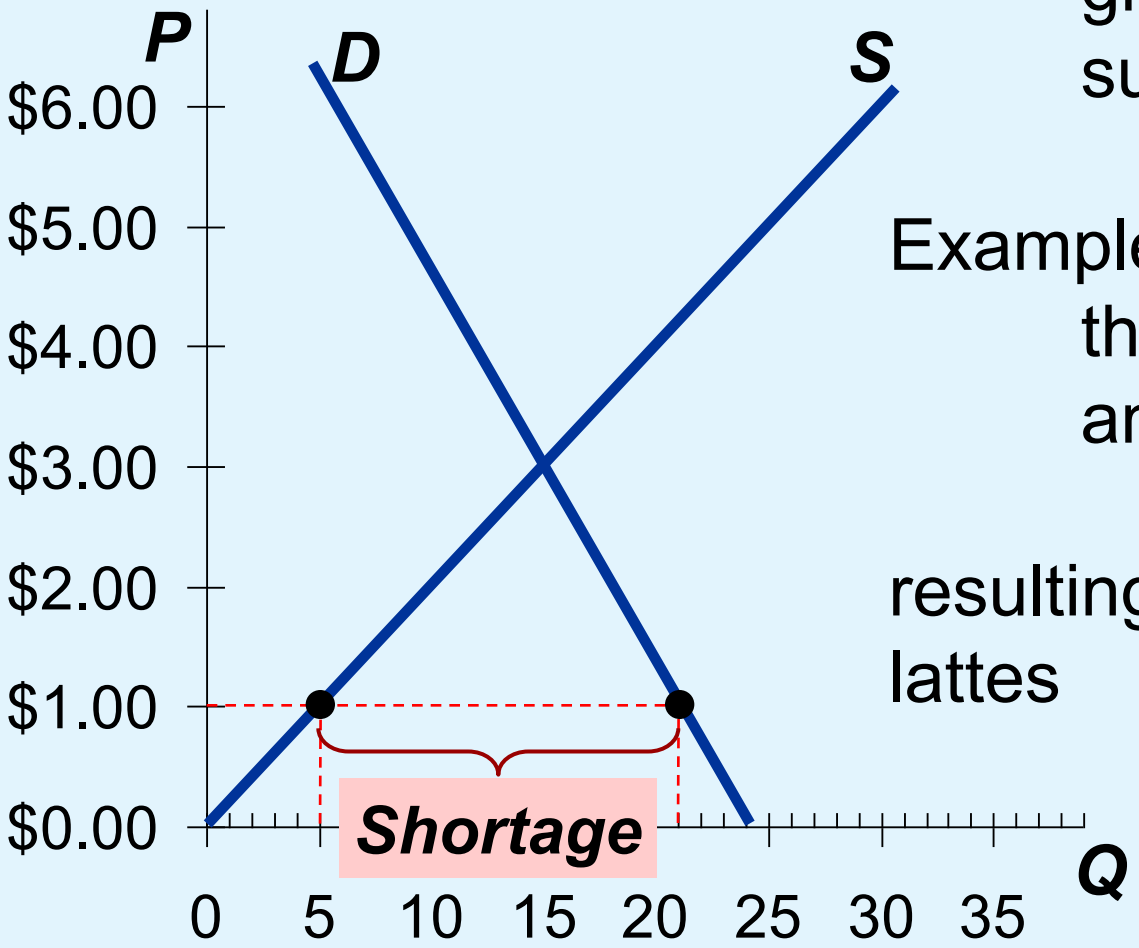
This causes Q^D to rise

and Q^S to fall…

Prices continue to fall until market reaches equilibrium.

Markets Not in Equilibrium: Shortage

Shortage (excess demand): quantity demanded is greater than quantity supplied



Example: if P = \$1,
then Q^D = 21 lattes
and Q^S = 5 lattes

resulting in a shortage of 16 lattes

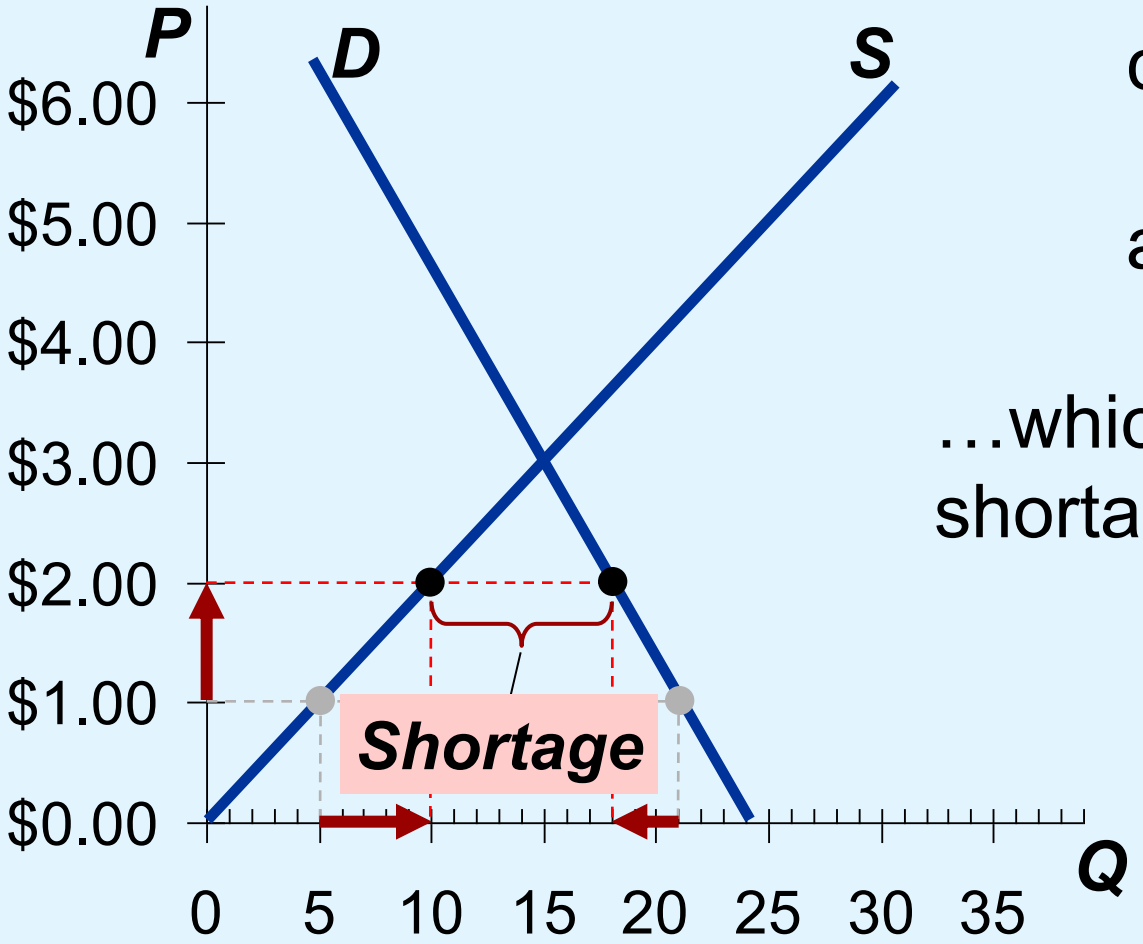
Markets Not in Equilibrium: Shortage

Facing a shortage, sellers raise the price,

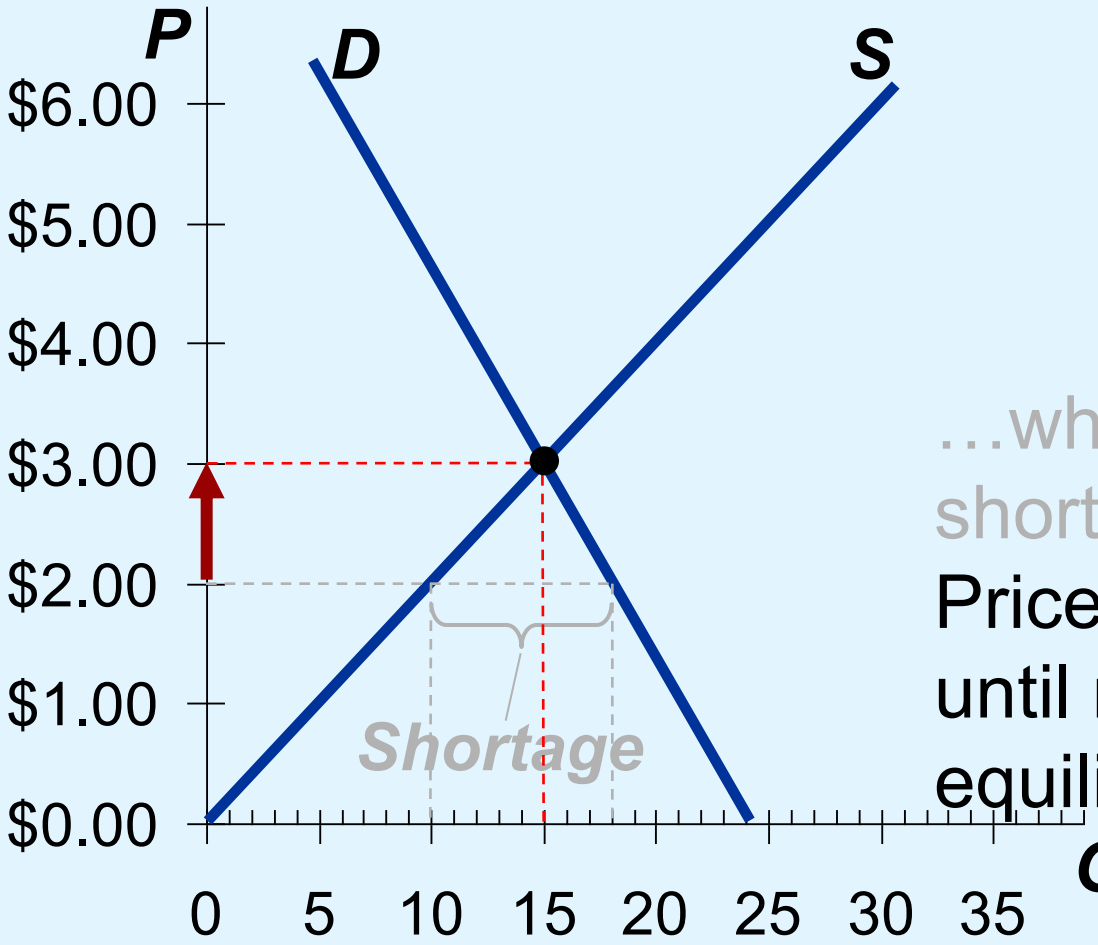
causing Q^D to fall

and Q^S to rise,

…which reduces the shortage.



Markets Not in Equilibrium: Shortage



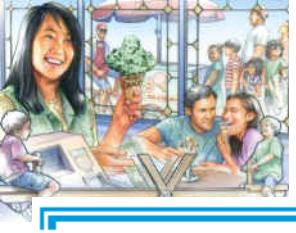
Facing a shortage, sellers raise the price,

causing Q^D to fall

and Q^S to rise,

…which reduces the shortage.

Prices continue to rise until market reaches equilibrium.

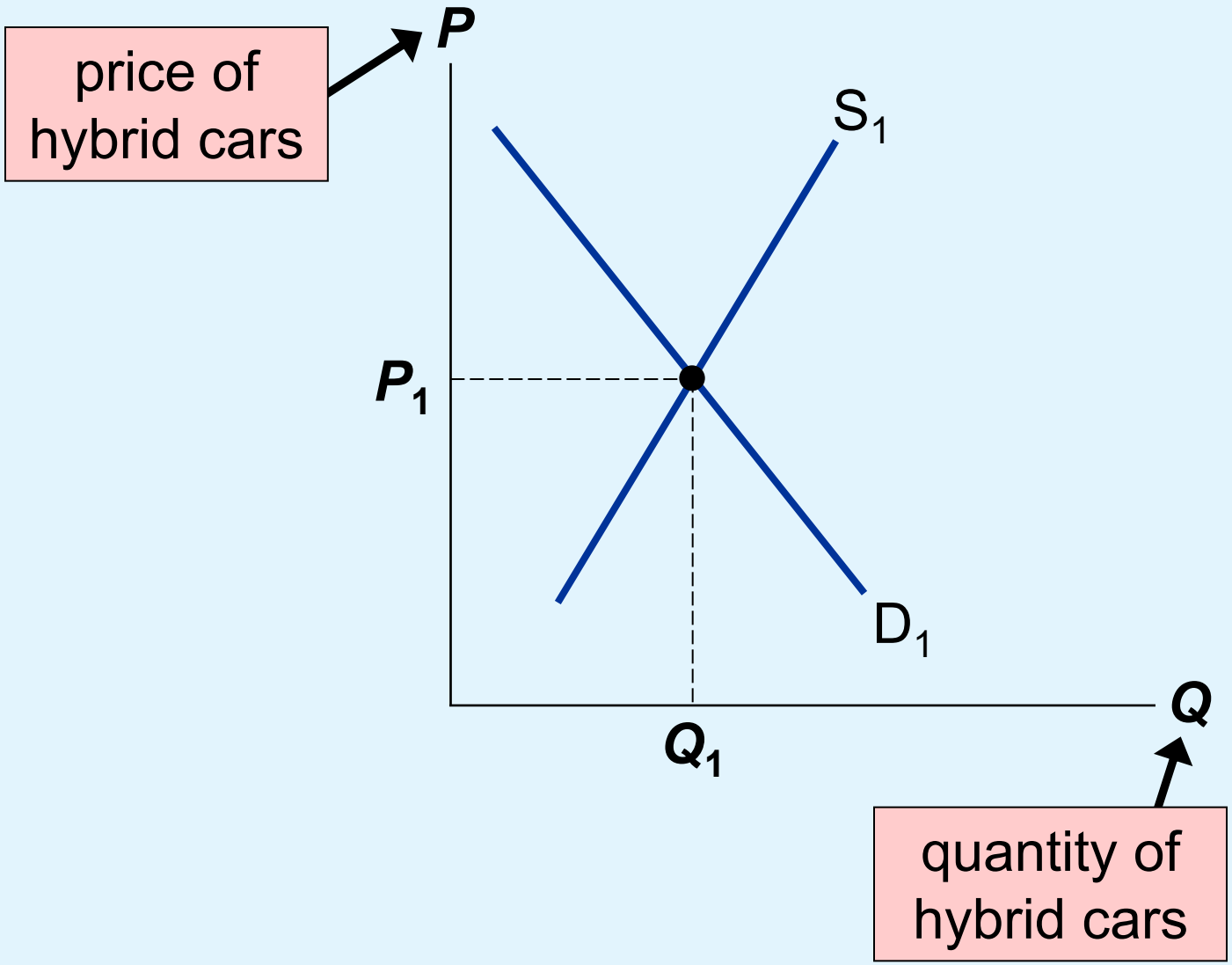


Supply and Demand Together

Three steps to analyzing changes in equilibrium

1. Decide whether the event shifts the supply curve, the demand curve, or, in some cases, both curves
2. Decide whether the curve shifts to the right or to the left
3. Use the supply-and-demand diagram
   - Compare the initial and the new equilibrium
   - Effects on equilibrium price and quantity

EXAMPLE: The Market for Hybrid Cars



EXAMPLE 1: A Shift in Demand

EVENT TO BE ANALYZED:
Increase in the price of gas.

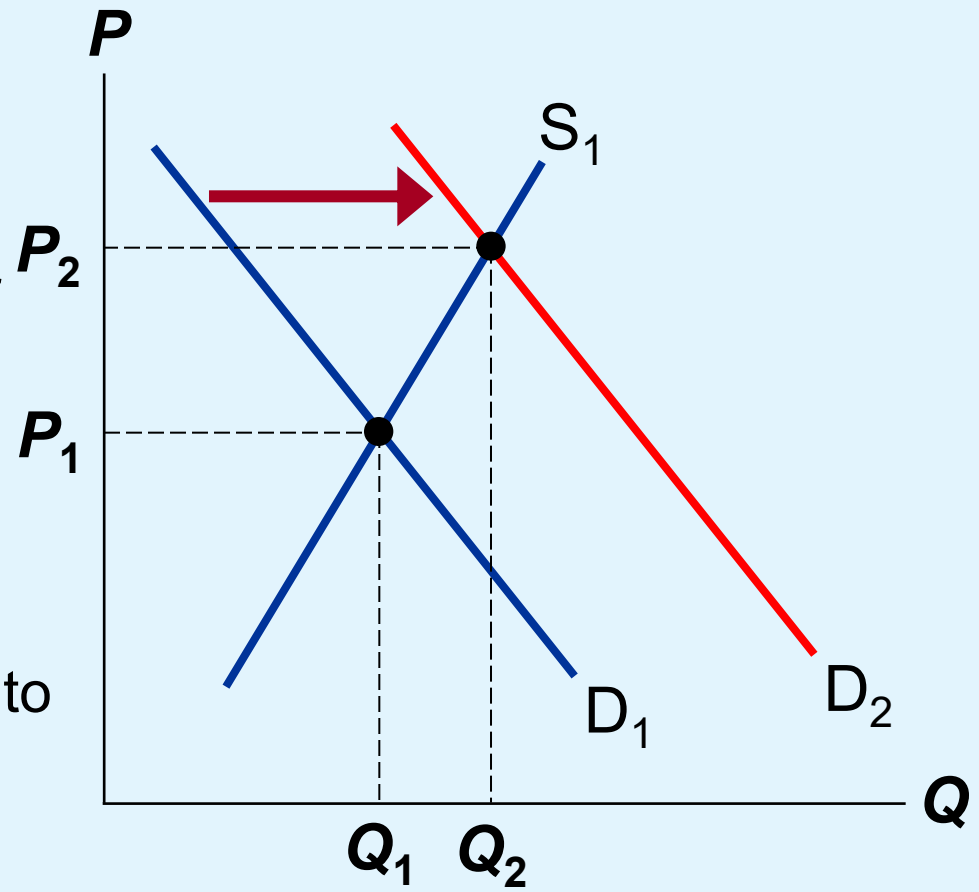
STEP 1: ***D*** curve shifts

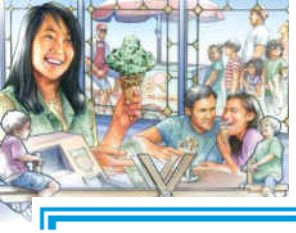
because price of gas affects demand for hybrids. (***S*** curve does not shift, because price of gas does not affect cost of producing hybrids)

STEP 2: ***D*** shifts <u>right</u>

because high gas price makes hybrids more attractive relative to other cars.

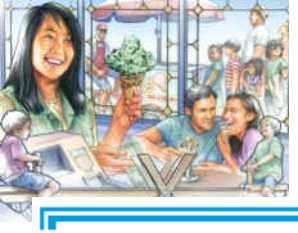
STEP 3: The shift causes an increase in price and quantity of hybrid cars.





Shift vs. Movement Along Curve

- Change in supply:
  - A shift in the S curve
  - Occurs when a non-price determinant of supply changes (like technology or costs)
- Change in the quantity supplied:
  - A movement along a fixed S curve
  - Occurs when P changes



Shift vs. Movement Along Curve

- Change in demand:
  - A shift in the D curve
  - Occurs when a non-price determinant of demand changes (like income or # of buyers)
- Change in the quantity demanded:
  - A movement along a fixed D curve
  - Occurs when P changes

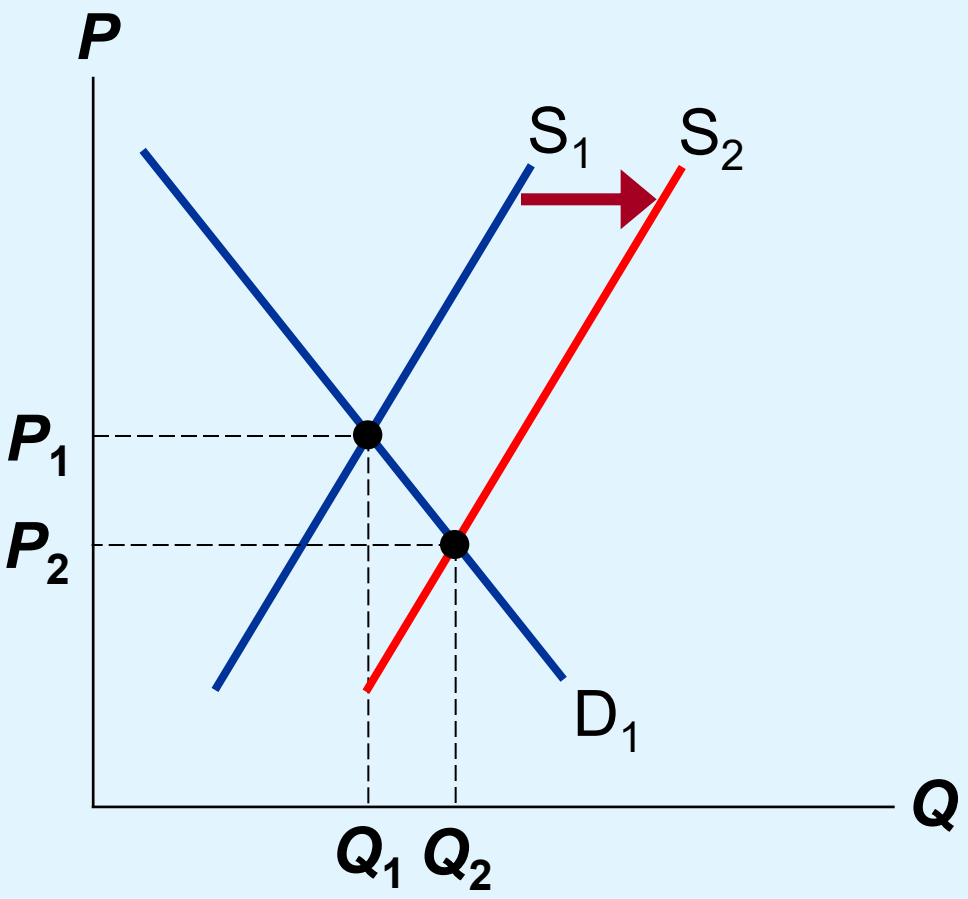
EXAMPLE 2: A Shift in Supply

EVENT: New technology reduces cost of producing hybrid cars.

STEP 1: ***S*** curve shifts because event affects cost of production. (***D*** curve does not shift, because production technology is not one of the factors that affect demand)

STEP 2: ***S*** shifts <u>right</u> because event reduces cost, makes production more profitable at any given price.

STEP 3: The shift causes price to fall and quantity to rise.



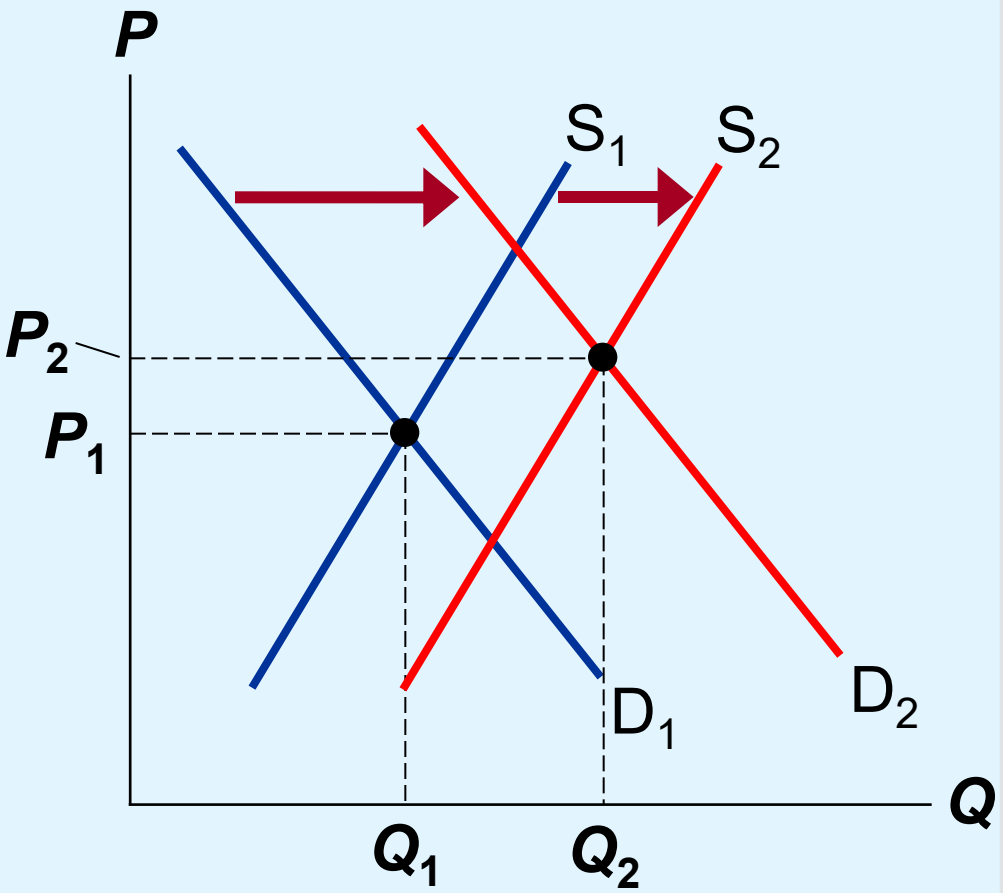
EXAMPLE 3: A Shift in Both Supply and Demand

EVENTS: Price of gas rises AND new technology reduces production costs

STEP 1: Both curves shift.
STEP 2: Both shift to the right.

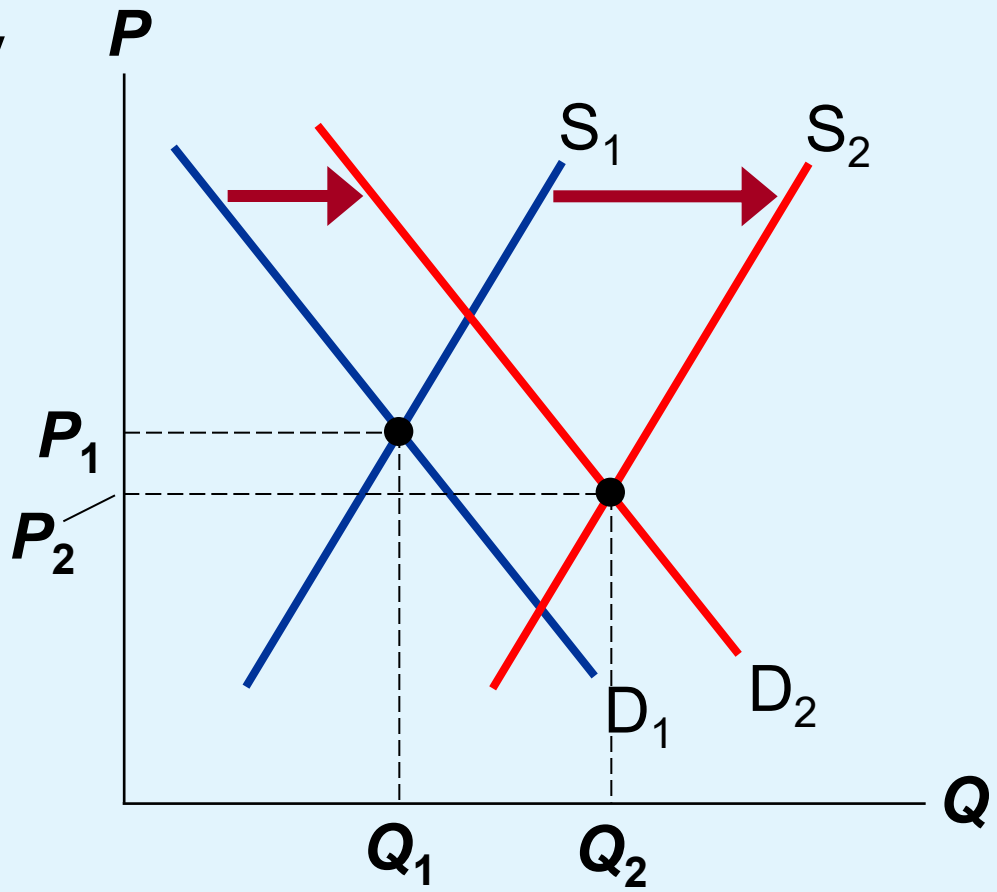
STEP 3: ***Q*** rises, but the effect on ***P*** is ambiguous:

If demand increases more than supply, ***P*** rises.



EXAMPLE 3: A Shift in Both Supply and Demand

EVENTS: Price of gas rises AND new technology reduces production costs



STEP 3: ***Q*** rises, but the <u>effect on ***P*** is ambiguous</u>:

But if supply increases more than demand, ***P*** falls.

Active Learning 3 Shifts in supply and demand

Use the three-step method to analyze the effects of each event on the equilibrium price and quantity of music downloads.

Event A: A fall in the price of music CDs

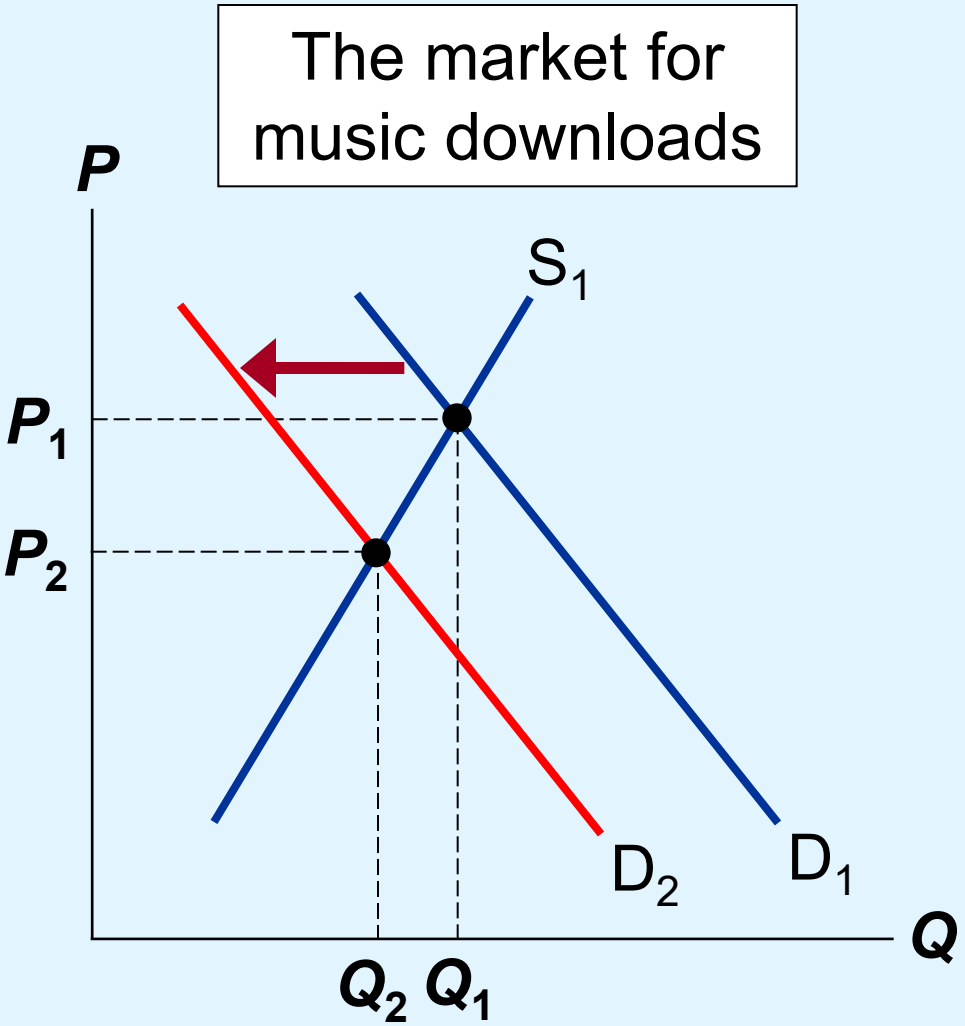
Event B: Sellers of music downloads negotiate a reduction in the royalties they must pay for each song they sell.

Event C: Events A and B both occur.

Active Learning 3 **A.** A fall in the price of music CDs

STEPS:

1. ***D*** curve shifts
2. ***D*** curve shifts left
3. ***P*** and ***Q*** both fall



Active Learning 3

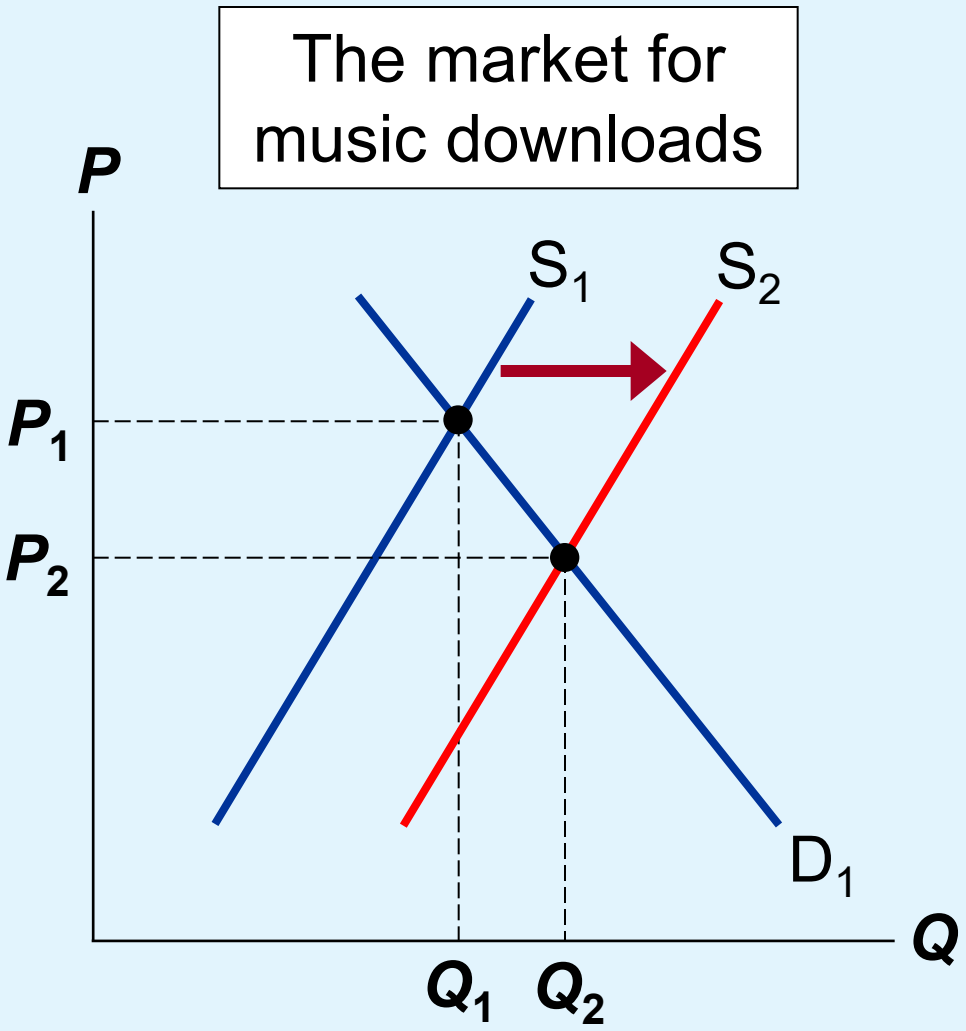
B. Fall in cost of royalties

STEPS:

1. ***S*** curve shifts (Royalties are part of sellers' costs)

2. ***S*** curve shifts right

3. ***P*** falls, ***Q*** rises



Active Learning 3

C. Fall in price of music CDs and fall in cost of royalties

STEPS:

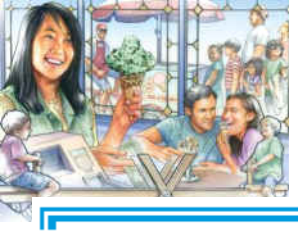
1. Both curves shift (see parts A & B)

2. D shifts left, S shifts right

3. P falls.

   Effect on Q is ambiguous:

   - the fall in demand reduces Q,
   - the increase in supply increases Q.



How Prices Allocate Resources

- "Markets are usually a good way to organize economic activity"
- In market economies
  - Prices adjust to balance supply and demand
- These equilibrium prices
  - Are the signals that guide economic decisions and thereby allocate scarce resources

Summary

- Economists use the model of supply and demand to analyze competitive markets.
  - Many buyers and sellers, all are price takers
- The demand curve shows how the quantity of a good demanded depends on the price.
  - Law of demand: as the price of a good falls, the quantity demanded rises; the ***D*** curve slopes downward
  - Other determinants of demand: income, prices of substitutes and complements, tastes, expectations, and number of buyers.
  - If one of these factors changes, the ***D*** curve shifts

Summary

- The supply curve shows how the quantity of a good supplied depends on the price.
  - Law of supply: as the price of a good rises, the quantity supplied rises; the ***S*** curve slopes upward.
- Other determinants of supply: input prices, technology, expectations, and number of sellers.
  - If one of these factors changes, supply curve shifts.
- The intersection of the supply and demand curves determines the market equilibrium.
  - At the equilibrium price, quantity demanded = quantity supplied

Summary

- The behavior of buyers and sellers naturally drives markets toward their equilibrium.
  - When the market price is above the equilibrium price, there is a surplus of the good, which causes the market price to fall.
  - When the market price is below the equilibrium price, there is a shortage, which causes the market price to rise.

Summary

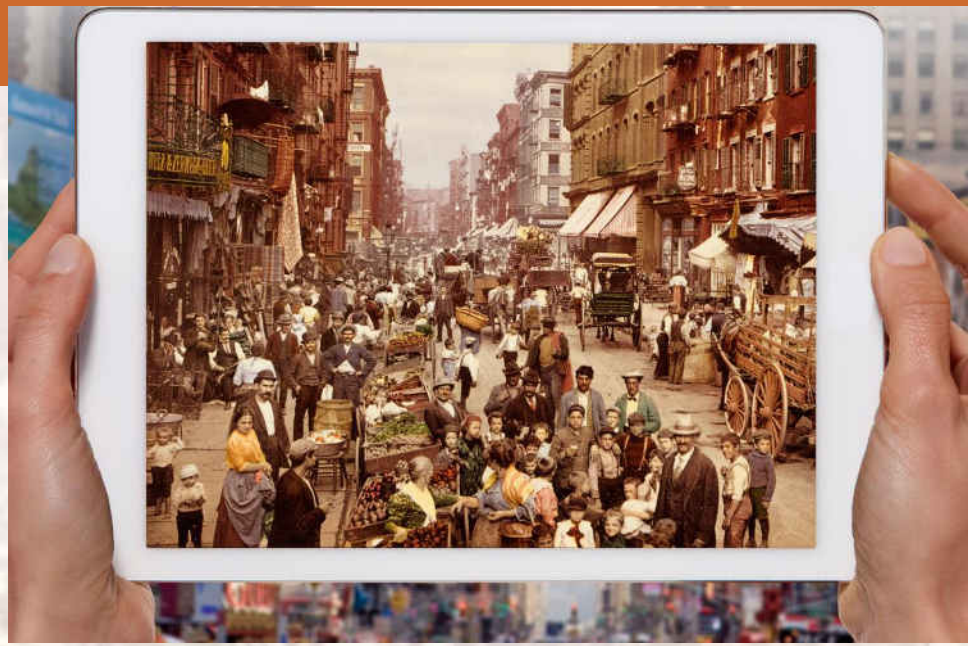
- To analyze how any event influences a market, we use the supply-and-demand diagram to examine how the event affects the equilibrium price and quantity.
  1. Decide whether the event shifts the supply curve or the demand curve (or both).
  2. Decide in which direction the curve shifts.
  3. Compare the new equilibrium with the initial one.
- In market economies, prices are the signals that guide economic decisions and thereby allocate scarce resources.

N. GREGORY MANKIW

PRINCIPLES OF

ECONOMICS

Eight Edition



CHAPTER

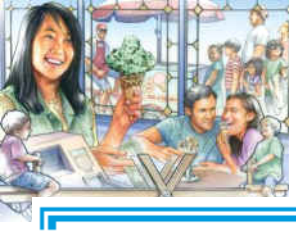
6

Supply, Demand, and Government Policies

Premium PowerPoint Slides by:
V. Andreea CHIRITESCU
Eastern Illinois University

Look for the answers to these questions:

- What are price ceilings and price floors? What are some examples of each?
- How do price ceilings and price floors affect market outcomes?
- How do taxes affect market outcomes? How do the effects depend on whether the tax is imposed on buyers or sellers?
- What is the incidence of a tax? What determines the incidence?



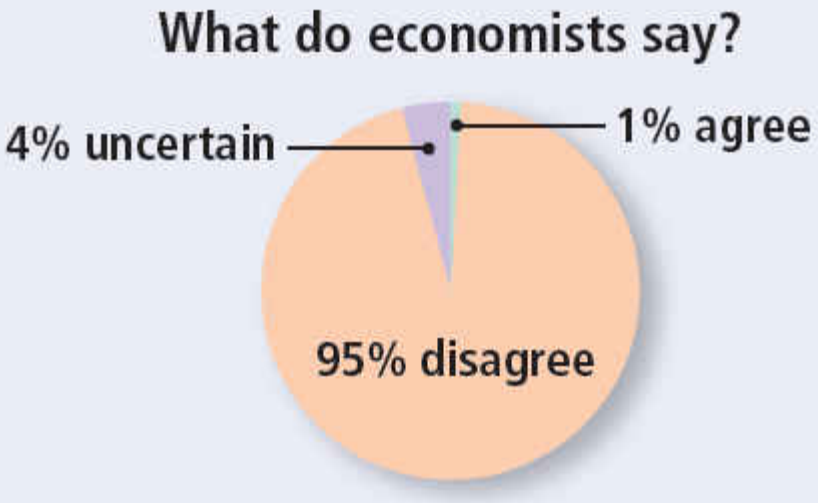
Government Policies That Alter the Private Market Outcome

- Price controls
  - Price ceiling: legal maximum on the price at which a good can be sold
    - Rent-control laws
  - Price floor: legal minimum on the price at which a good can be sold
    - Minimum wage laws
- Taxes: government can make buyers or sellers pay a specific amount on each unit

ASK THE EXPERTS

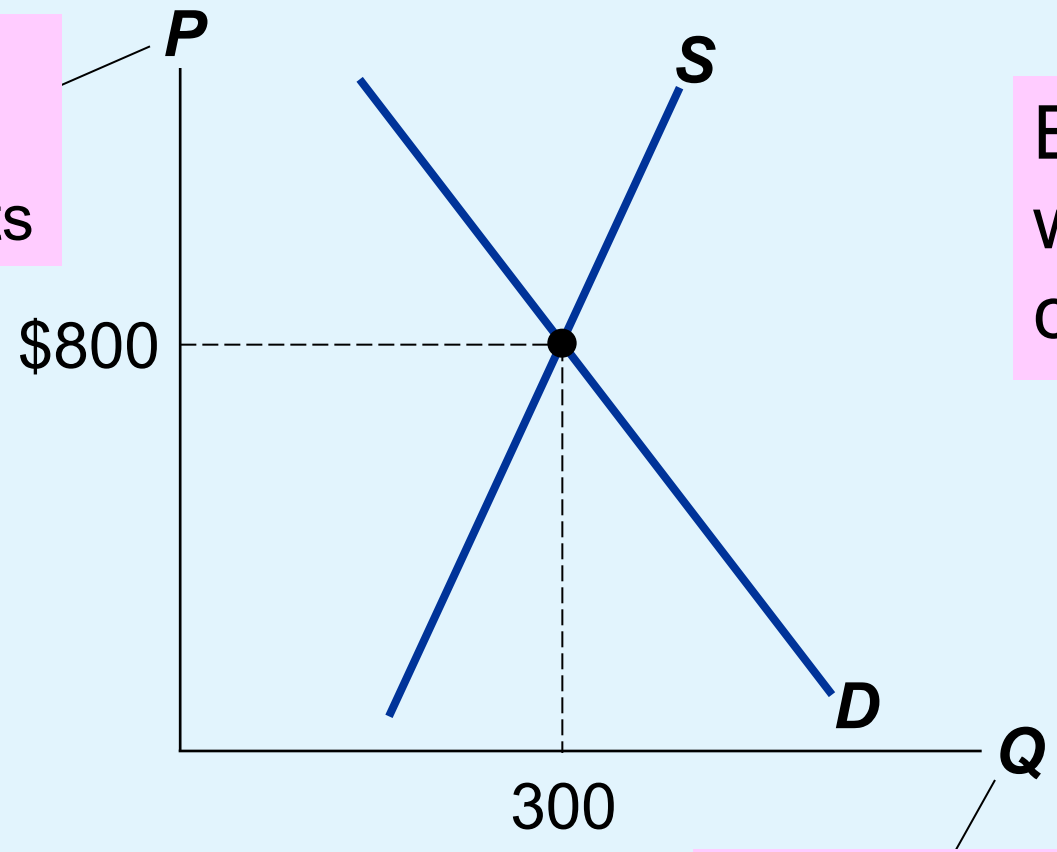
Rent Control

"Local ordinances that limit rent increases for some rental housing units, such as in New York and San Francisco, have had a positive impact over the past three decades on the amount and quality of broadly affordable rental housing in cities that have used them."



EXAMPLE 1: The Market for Apartments

Rental price of apartments

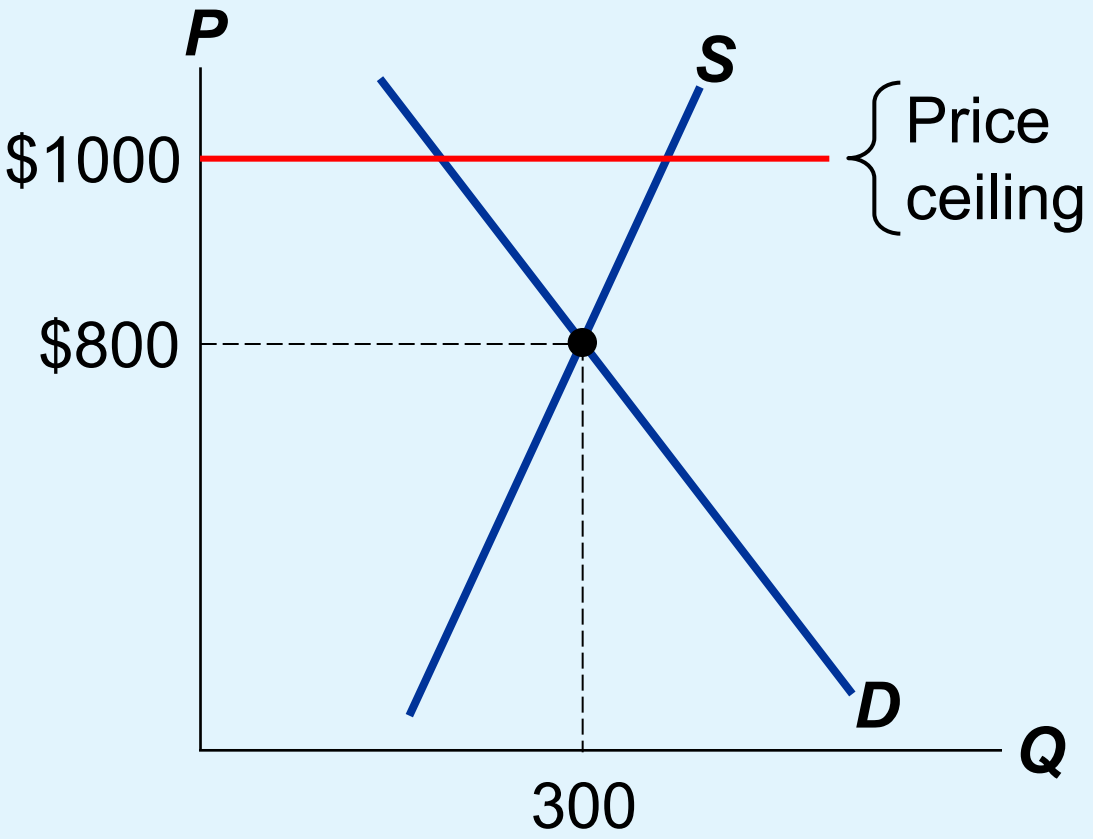


Equilibrium without price controls

Quantity of apartments

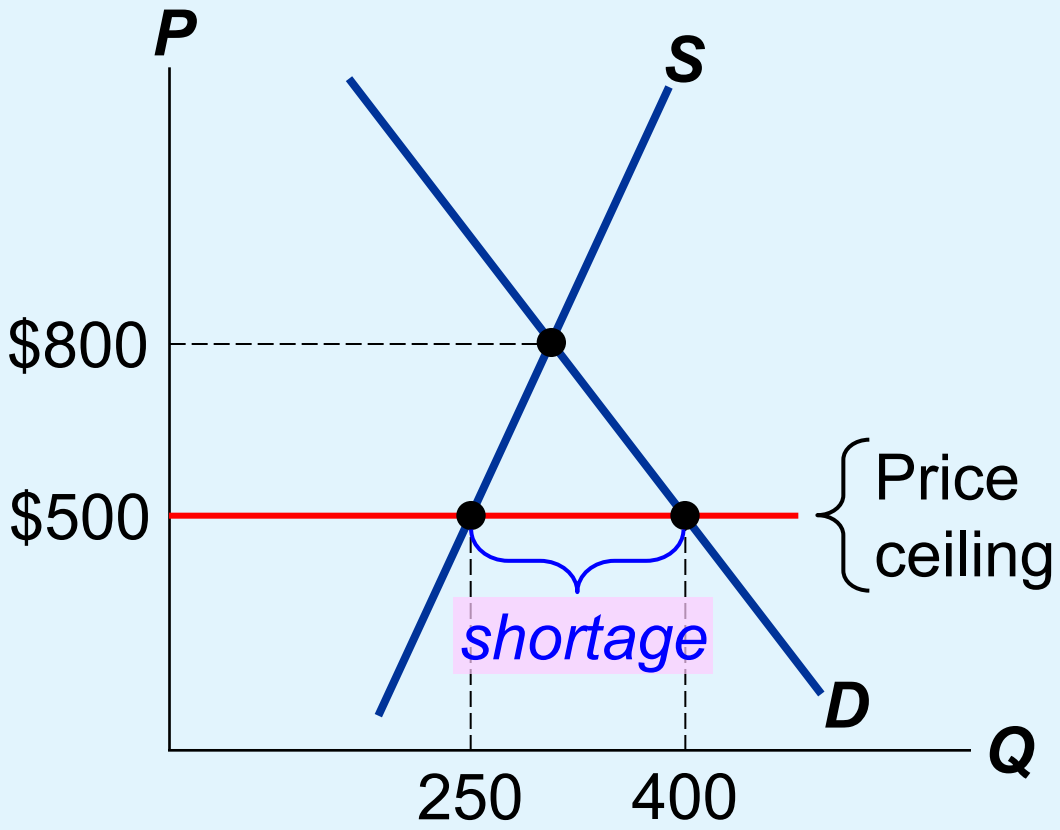
How Price Ceilings Affect Market Outcomes

A price ceiling above the equilibrium price is **not binding**— has no effect on the market outcome.



How Price Ceilings Affect Market Outcomes

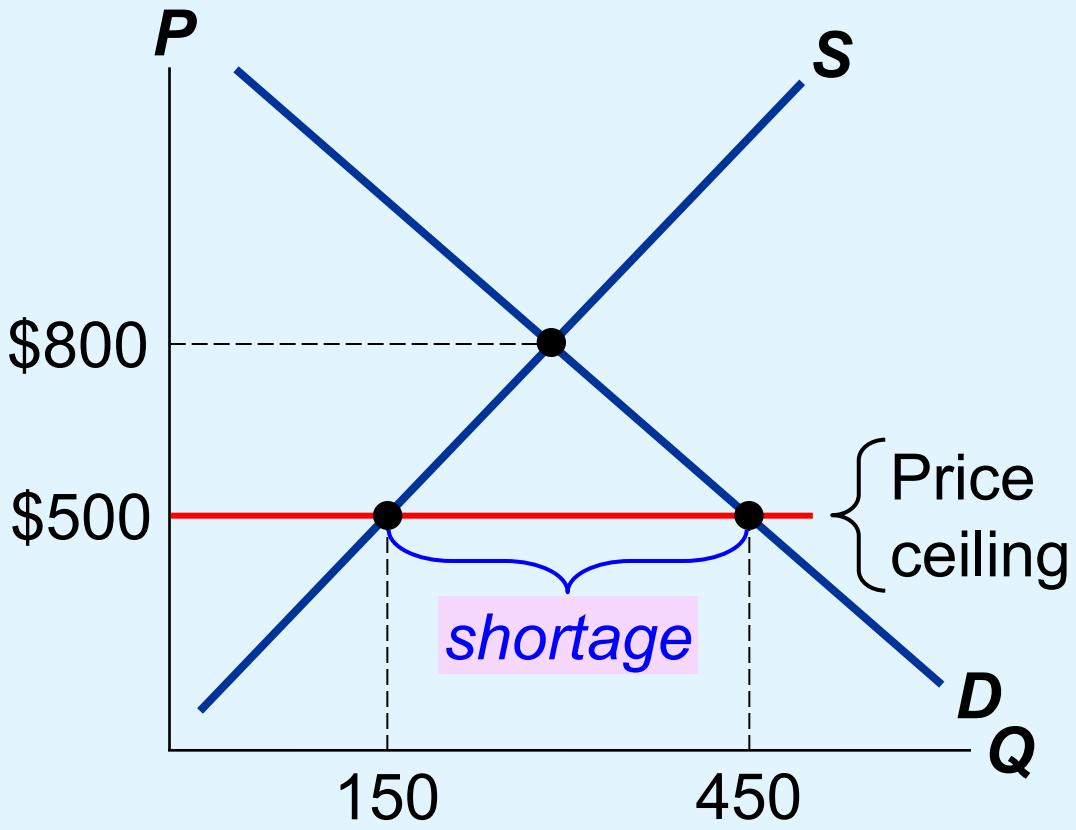
The equilibrium price ($800) is above the ceiling and therefore illegal.
The price ceiling is **binding**, causes a shortage.

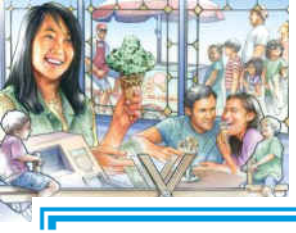


How Price Ceilings Affect Market Outcomes

In the long run, supply and demand of rental apartments are more price-elastic.

So, the shortage is larger.



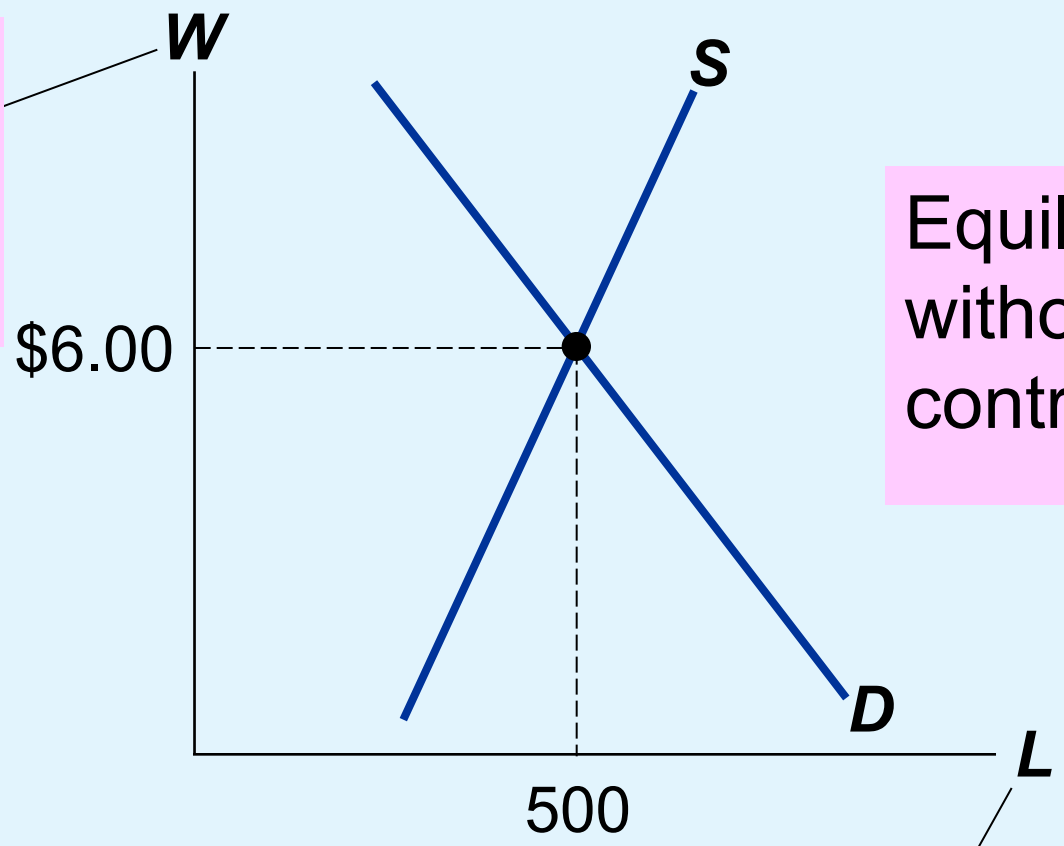


Shortages and Rationing

- Because of shortage
  - Sellers must ration the goods among buyers
- Some rationing mechanisms:
    - Long lines
    - Discrimination according to sellers' biases
  - Are often unfair and inefficient
    - The goods do not necessarily go to the buyers who value them most highly

EXAMPLE 2: The Market for Unskilled Labor

Wage paid to unskilled workers

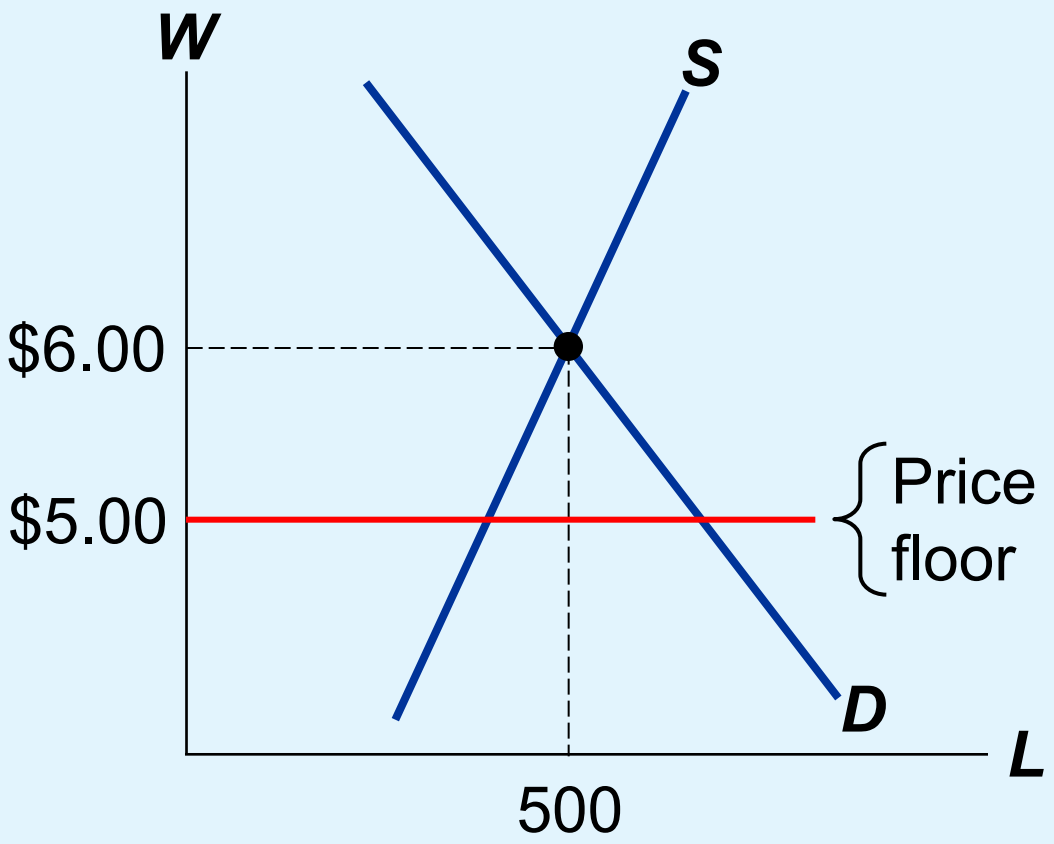


Equilibrium without price controls

Quantity of unskilled workers

How Price Floors Affect Market Outcomes

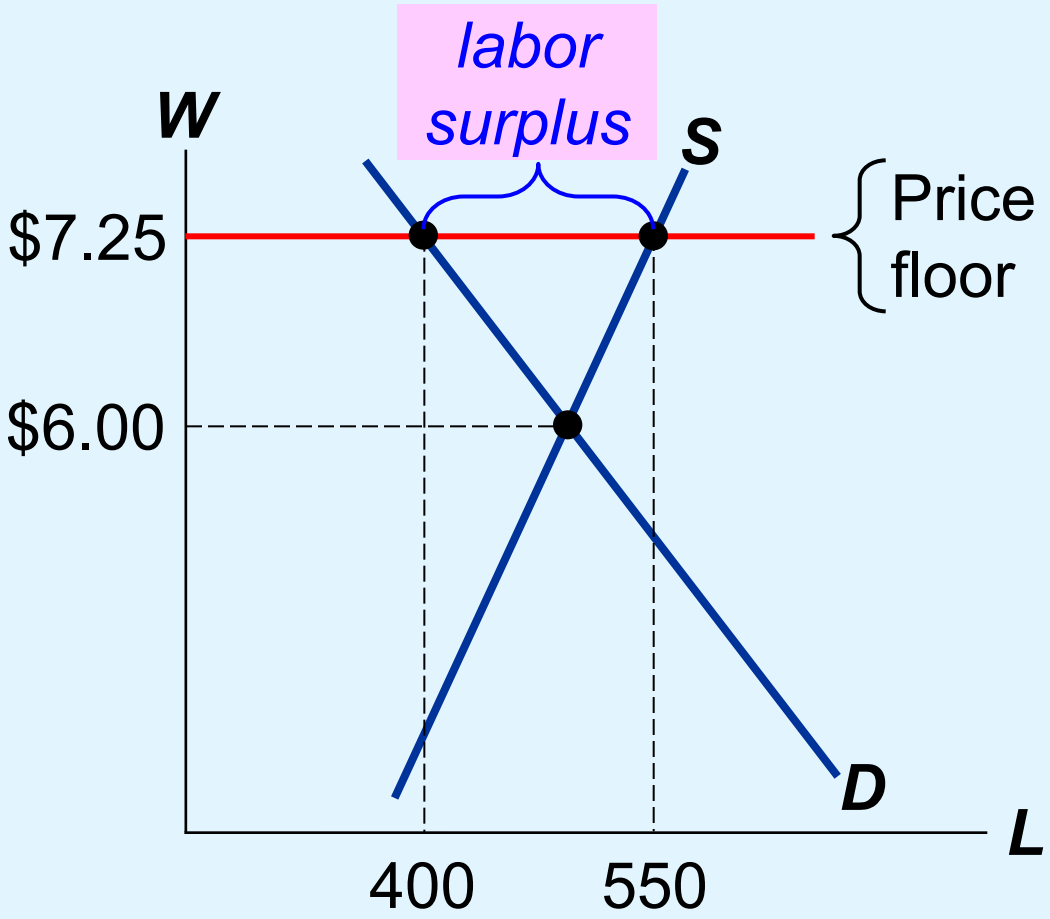
A price floor below the equilibrium price is **not binding** – has no effect on the market outcome.



How Price Floors Affect Market Outcomes

The equilibrium wage ($6) is below the floor and therefore illegal.
The price floor is **binding**, causes a surplus (i.e., unemployment).

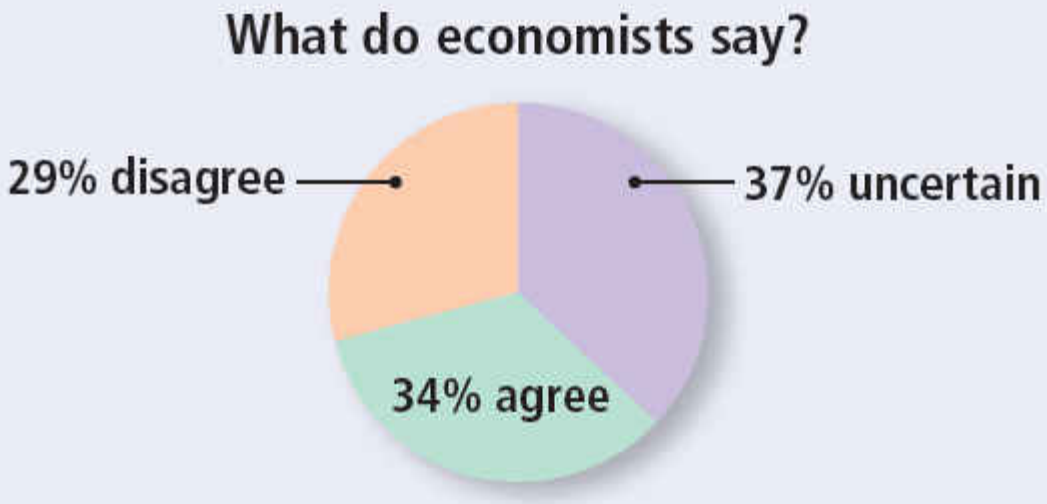
Minimum wage laws do not affect highly skilled workers. They do affect teen workers. A 10% increase in the minimum wage raises teen unemployment by 1–3%.



ASK THE EXPERTS

The Minimum Wage

"If the federal minimum wage is raised gradually to $15-per-hour by 2020, the employment rate for low-wage U.S. workers will be substantially lower than it would be under the status quo."



Active Learning 1

Price controls

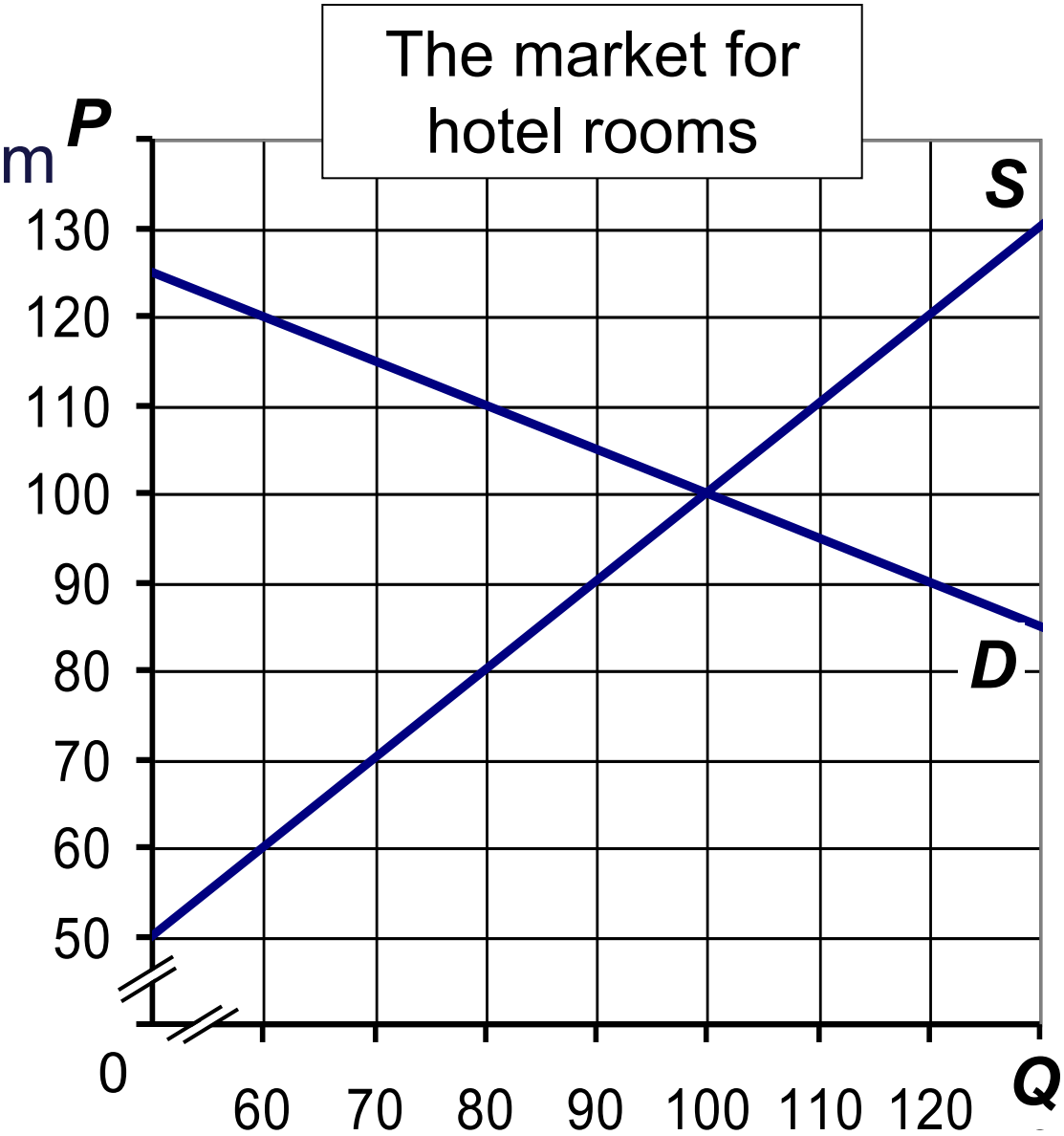
The market for hotel rooms is in equilibrium as in the graph.

- Determine the effects of:

A. $90 price ceiling

B. $90 price floor

C. $120 price floor

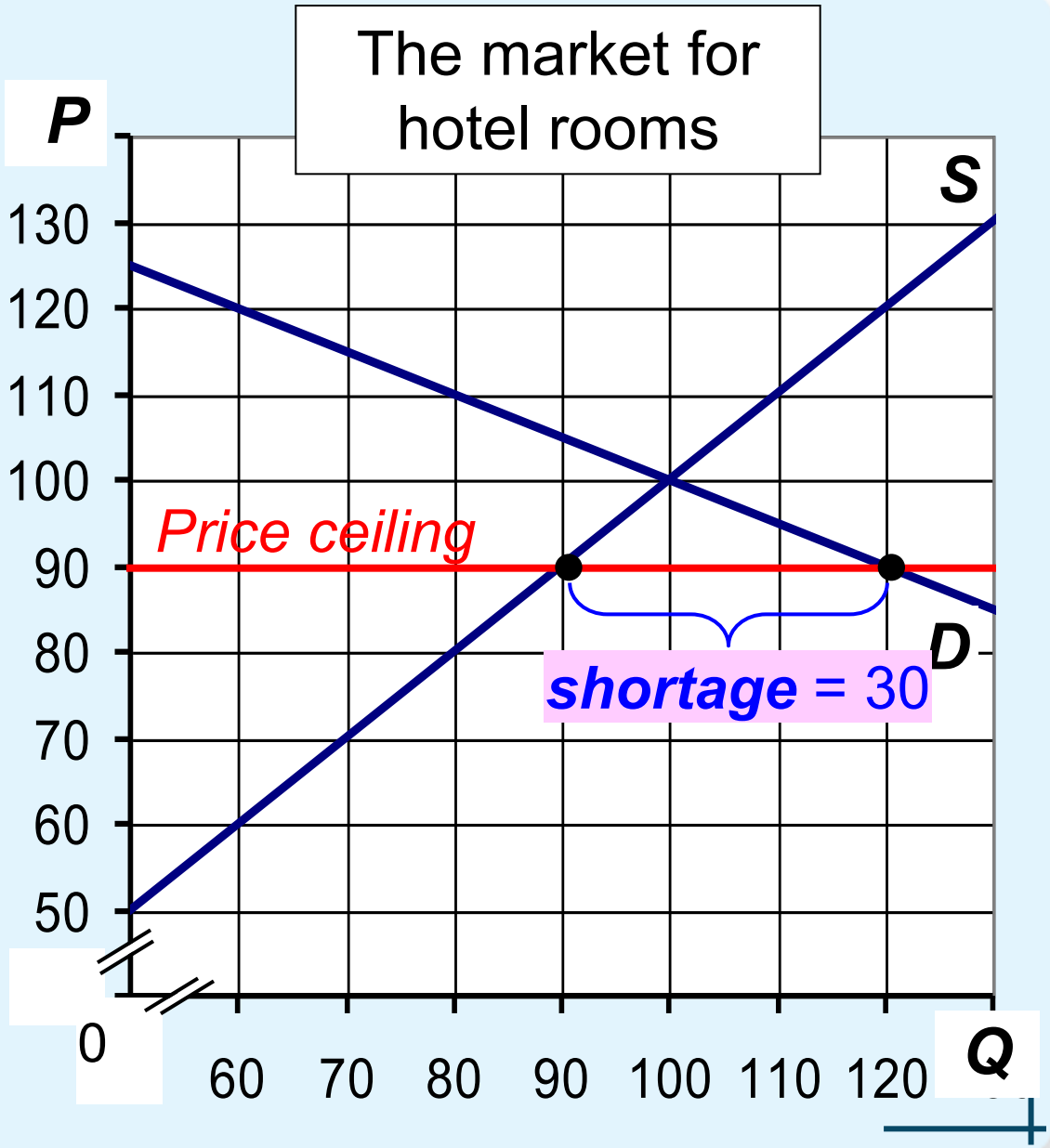


Active Learning 1

A. $90 price ceiling

The price falls to $90. (binding price ceiling below the equilibrium)

Buyers demand 120 rooms, sellers supply 90, leaving a shortage.

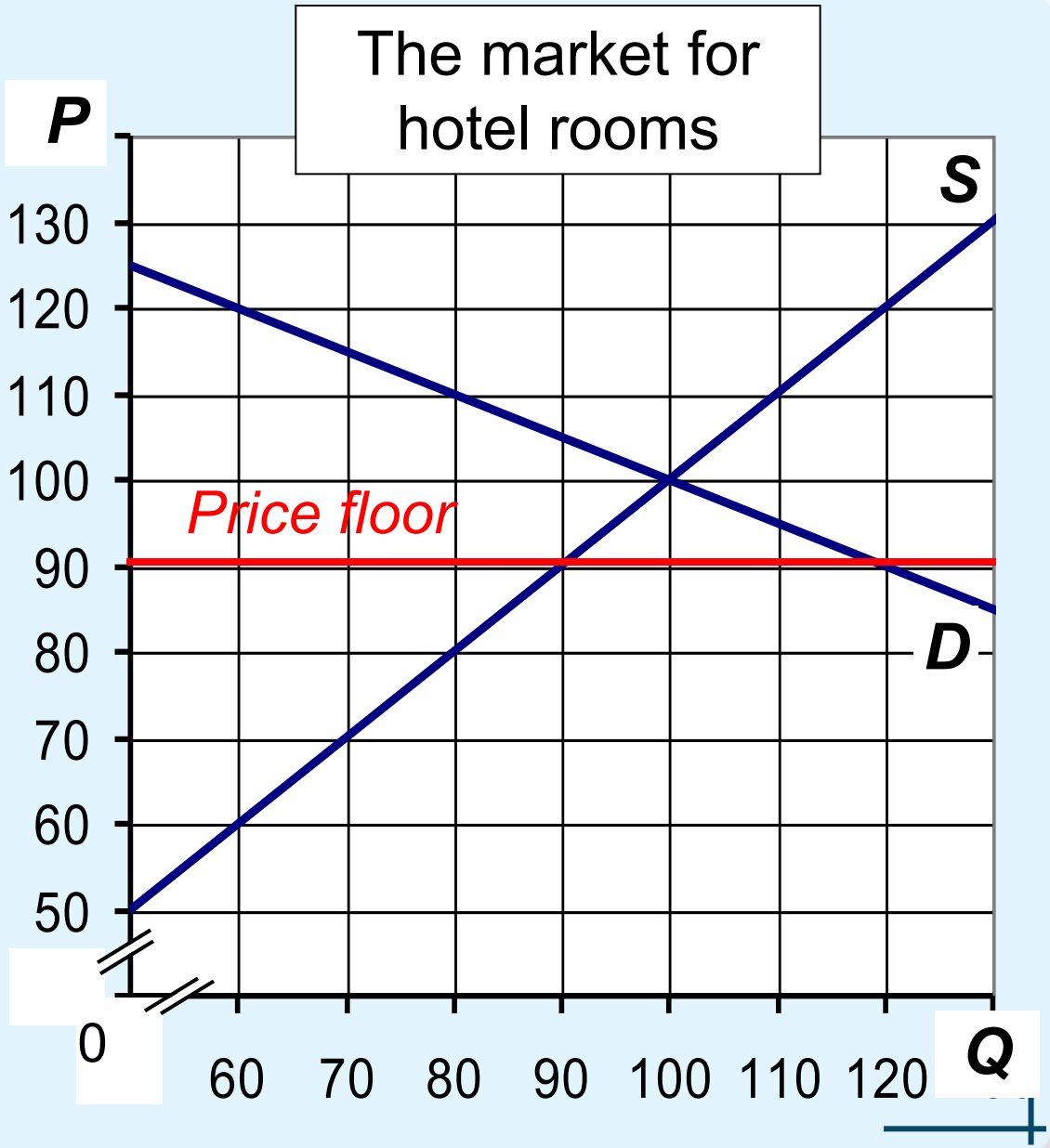


Active Learning 1

B. $90 price floor

Equilibrium price is above the $90 price floor, so the price floor is not binding.

P = $100,
Q = 100 rooms.

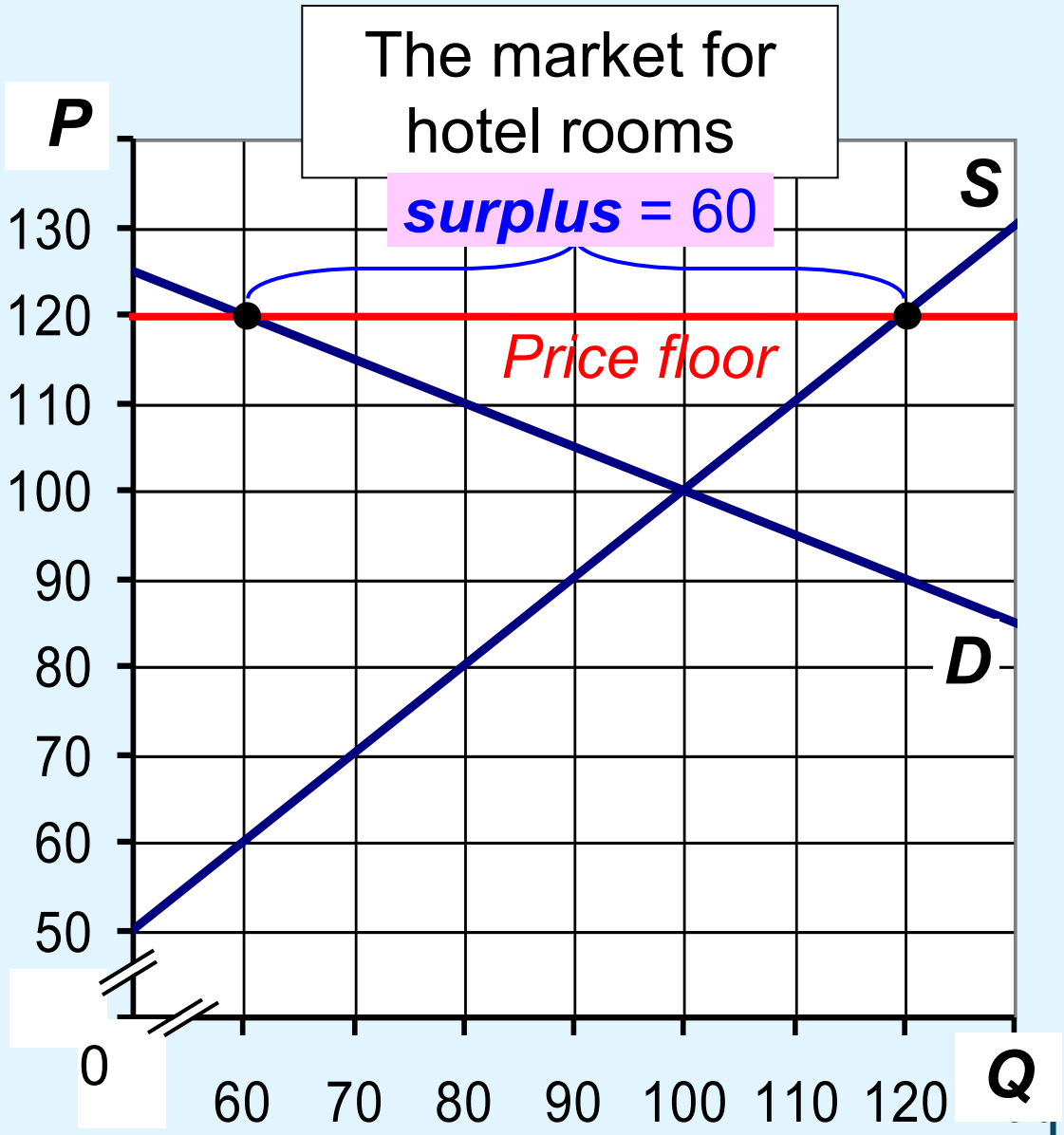


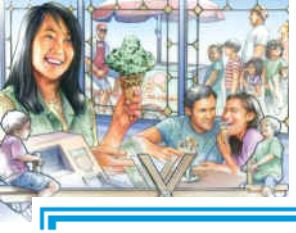
Active Learning 1

C. $120 price floor

The price rises to $120. (binding price floor above the equilibrium)

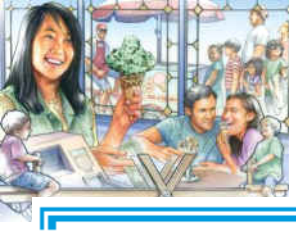
Buyers demand 60 rooms, sellers supply 120, causing a surplus.





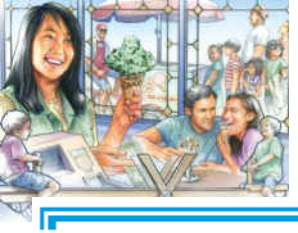
Evaluating Price Controls

- Markets are usually a good way to organize economic activity
  - Economists usually oppose price ceilings and price floors
  - Prices are not the outcome of some haphazard process
  - Prices have the crucial job of balancing supply and demand
    - Coordinating economic activity



Evaluating Price Controls

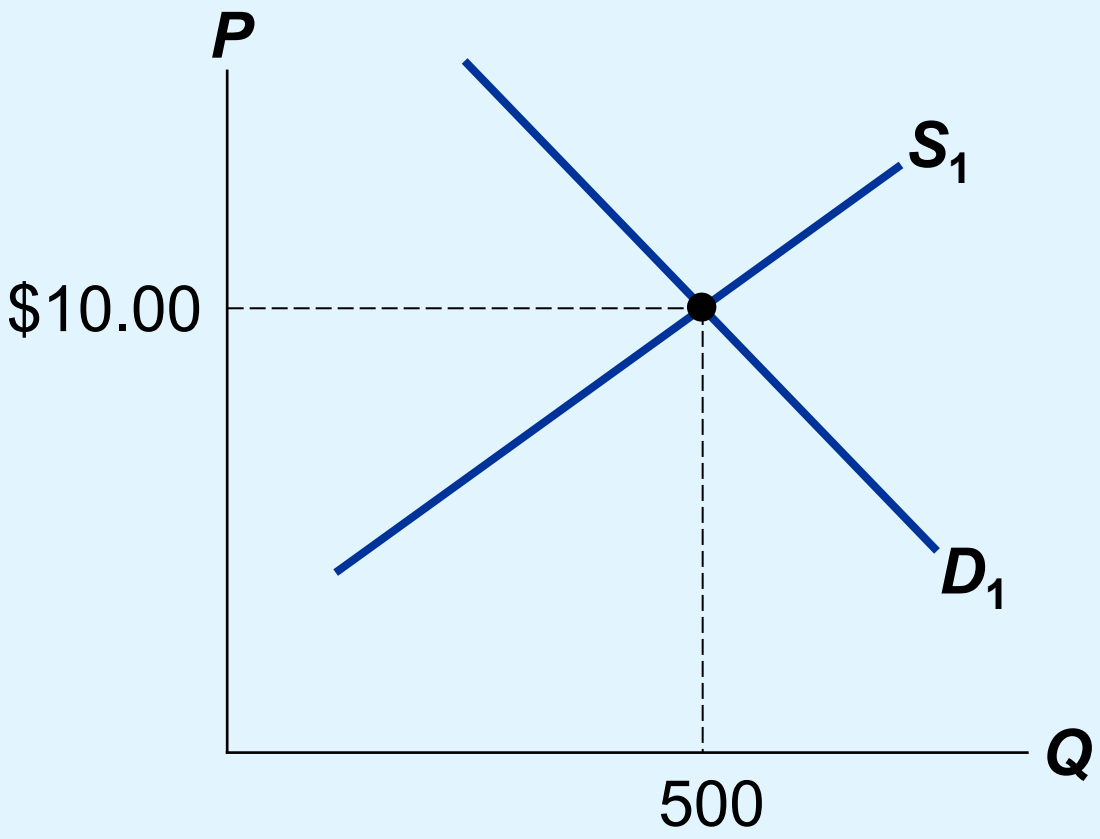
- Governments can sometimes improve market outcomes
  - Want to use price controls
    - Because of unfair market outcome
    - Aimed at helping the poor
  - Often hurt those they are trying to help
  - Other ways of helping those in need
    - Rent subsidies
    - Wage subsidies (earned income tax credit)



Taxes

- Government uses taxes
  - To raise revenue for public projects
    - Roads, schools, and national defense
- Tax incidence
  - Manner in which the burden of a tax is shared among participants in a market
    - The government can make the seller or the buyer to pay the tax

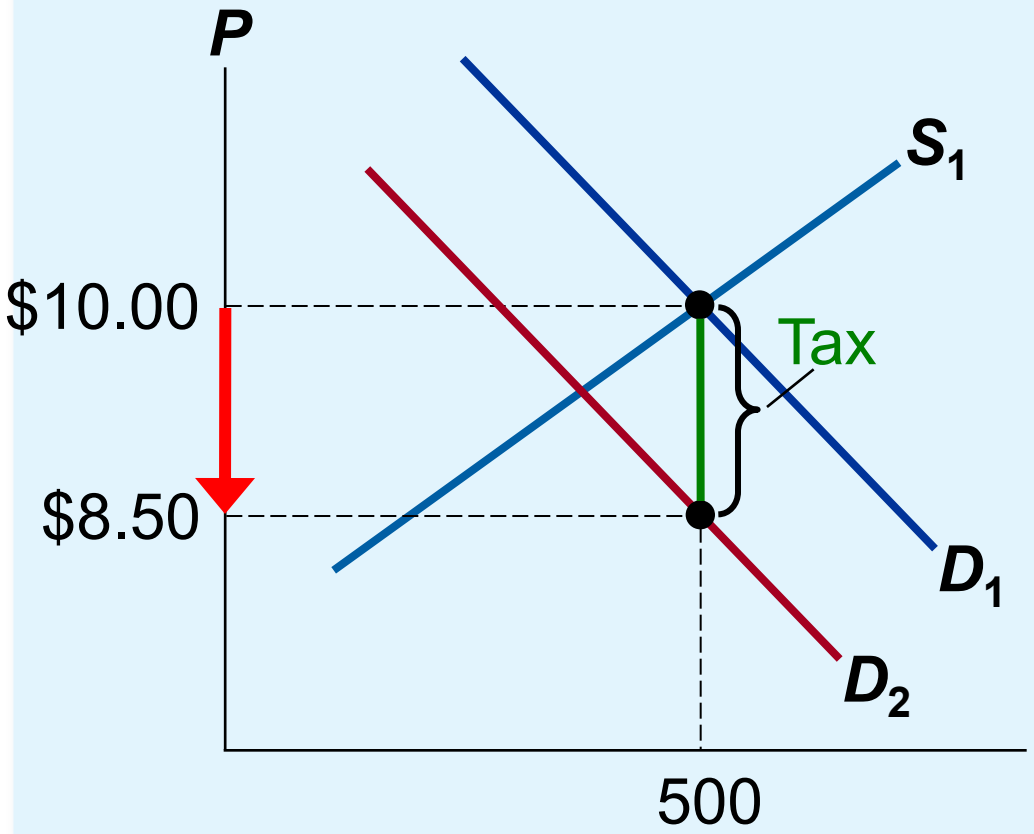
EXAMPLE 3: The Market for Pizza



Equilibrium without tax

A Tax on Buyers

Effects of a $1.50 per unit tax on buyers



Hence, a tax on buyers shifts the *D* curve down by the amount of the tax.

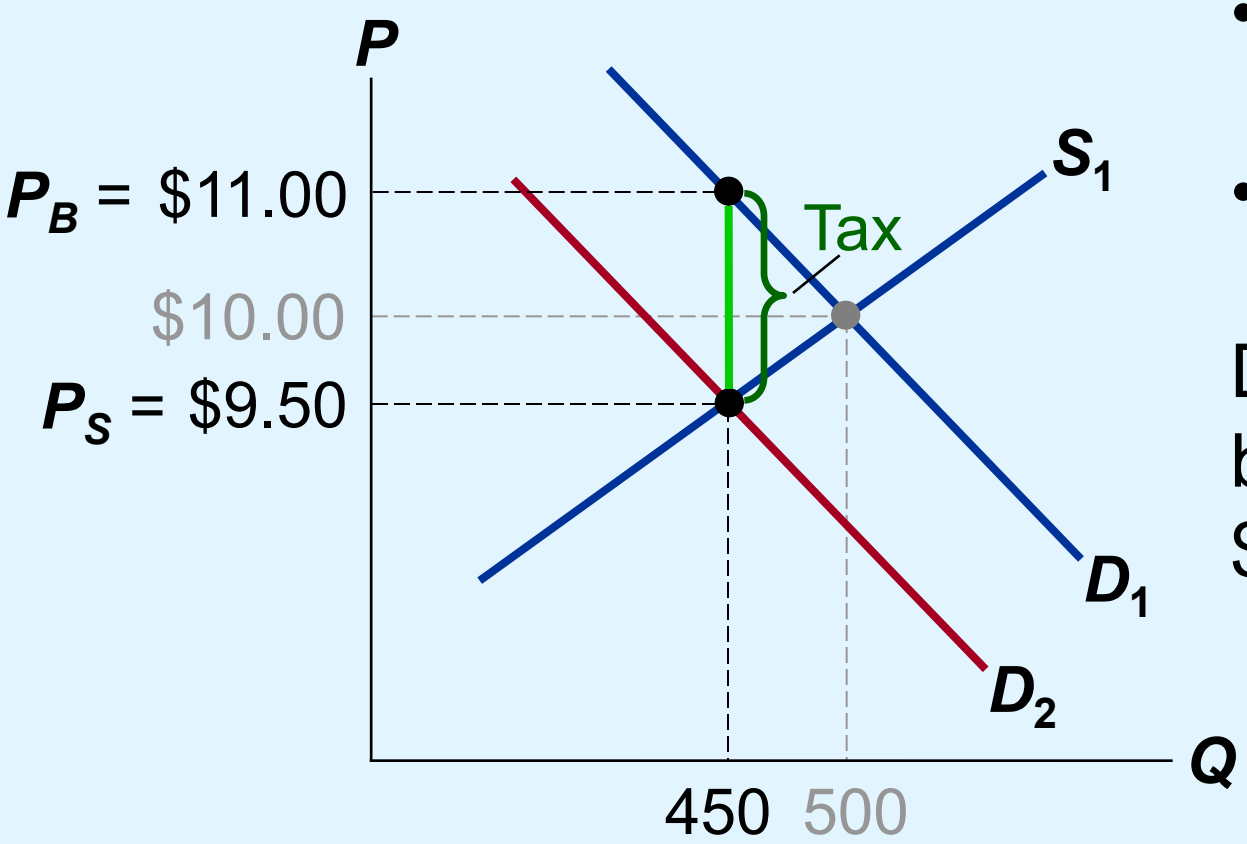
The price buyers pay is now $1.50 higher than the market price ***P***.

P would have to fall by $1.50 to make buyers willing to buy same ***Q*** as before.

- *E.g.*, if ***P*** falls from $10.00 to $8.50, buyers are still willing to purchase 500 pizzas.

A Tax on Buyers

Effects of a $1.50 per unit tax on buyers



New equilibrium:

- Q = 450
- Sellers receive P_S = $9.50
- Buyers pay P_B = $11.00

Difference between them = $1.50 = tax

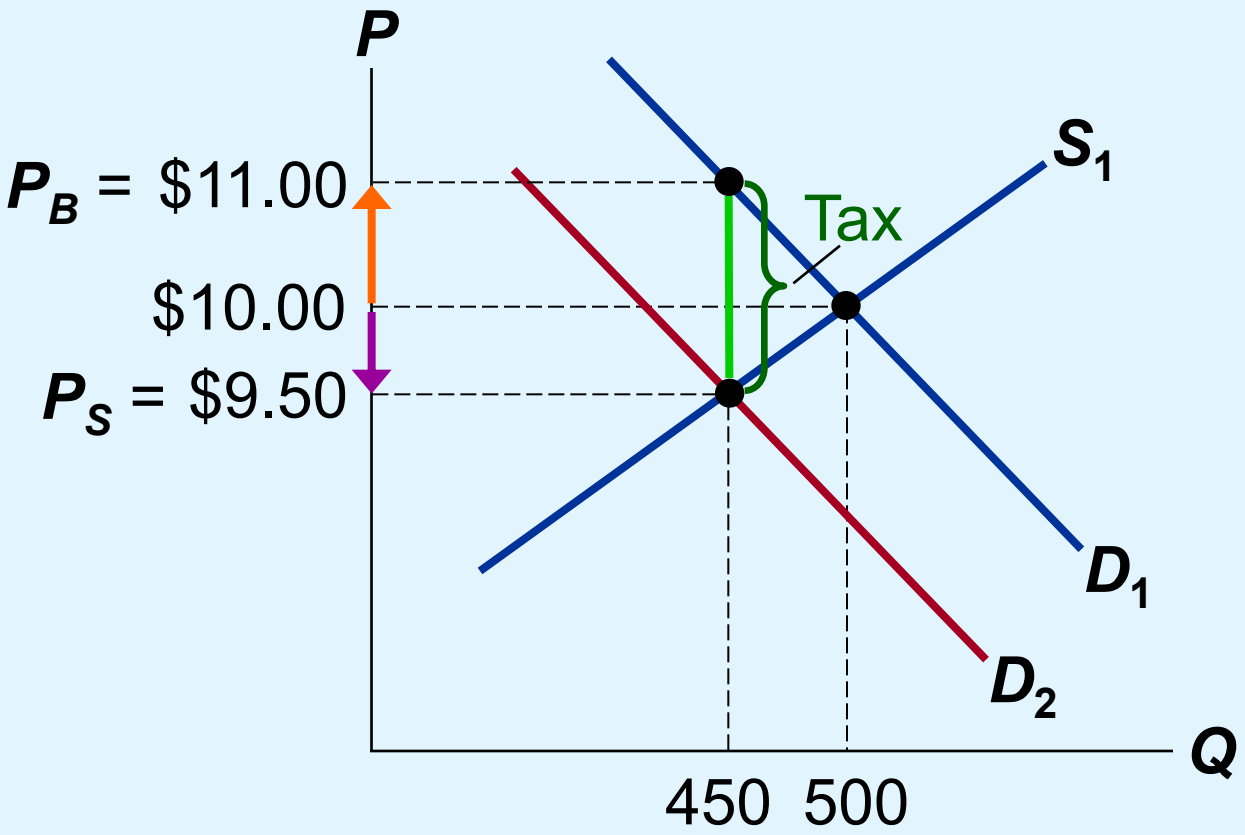
The **Incidence** of a Tax:

how the burden of a tax is shared among market participants

In our example,

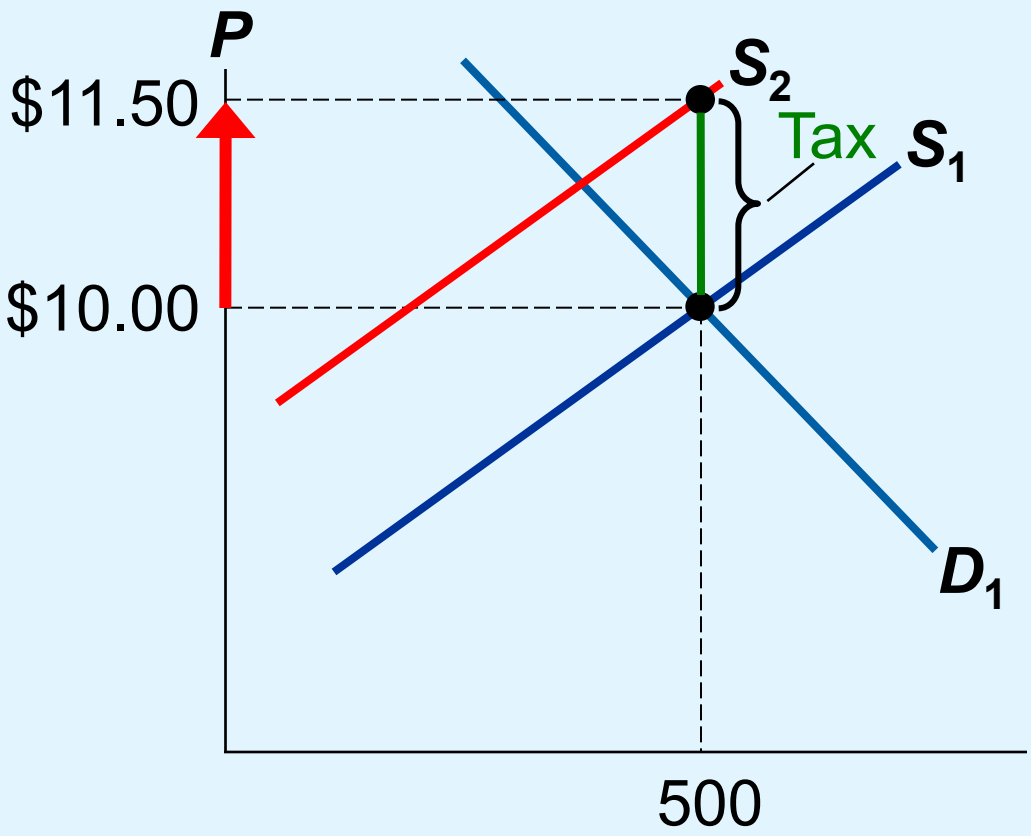
buyers pay $1.00 more,

sellers get $0.50 less.



A Tax on Sellers

Effects of a $1.50 per unit tax on sellers



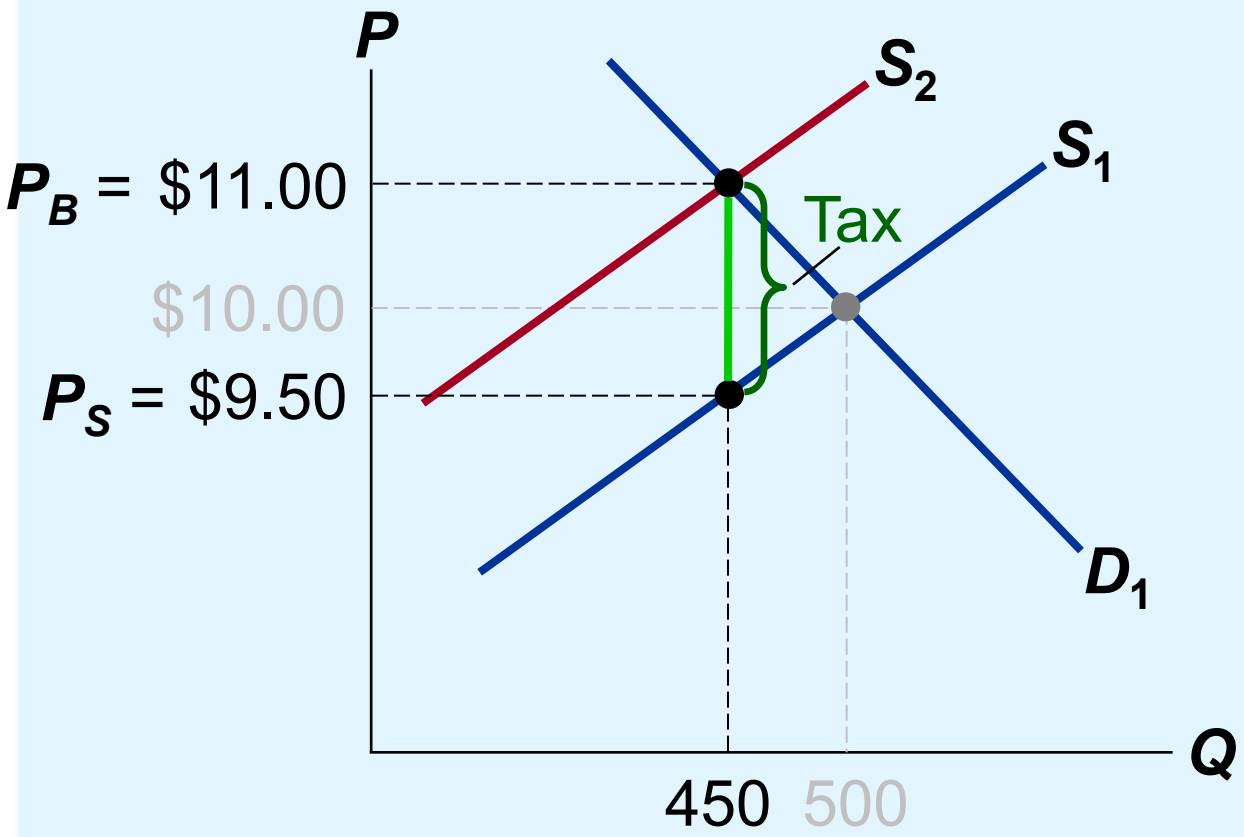
The tax effectively raises sellers' costs by $1.50 per pizza.

Sellers will supply 500 pizzas only if ***P*** rises to $11.50, to compensate for this cost increase.

Hence, a tax on sellers shifts the *S* curve up by the amount of the tax.

A Tax on Sellers

Effects of a $1.50 per unit tax on sellers



New equilibrium:

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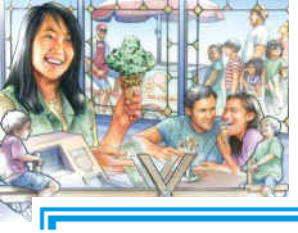
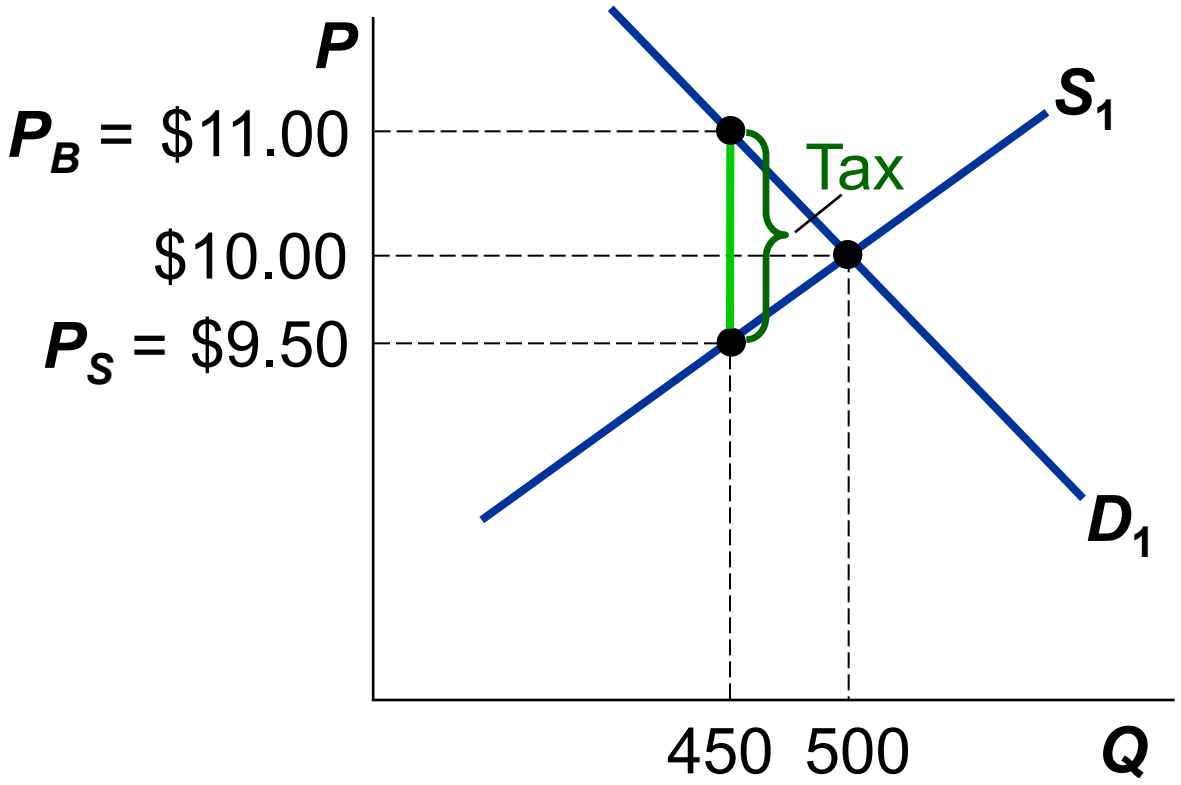
Difference between them = $1.50 = tax



The Outcome Is the Same in Both Cases!

- The effects on P and Q, and the tax incidence are the same whether the tax is imposed on buyers or sellers!

A tax drives a wedge between the price buyers pay and the price sellers receive.

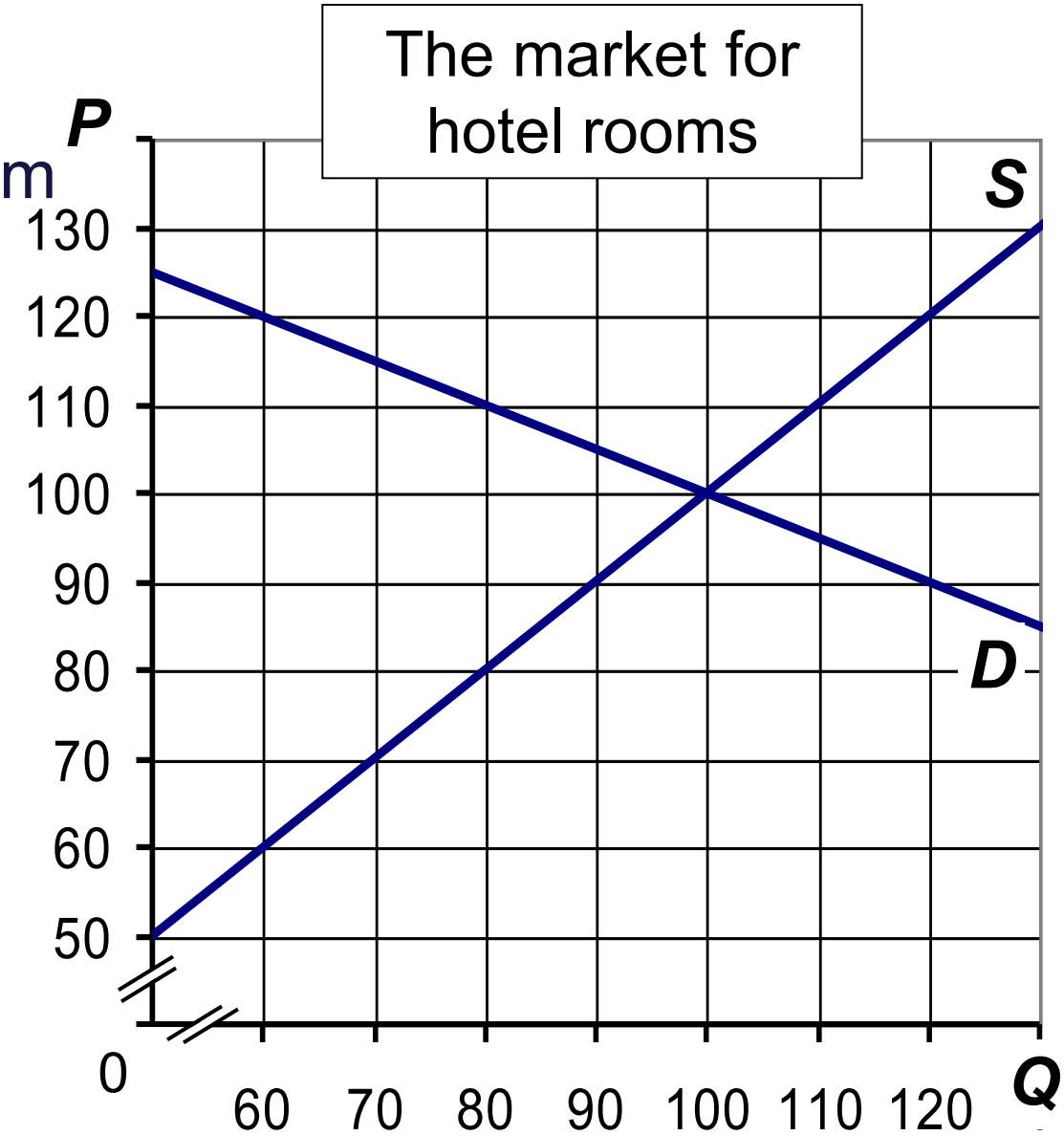


Active Learning 2

Effects of a tax

The market for hotel rooms is in equilibrium as in the graph.

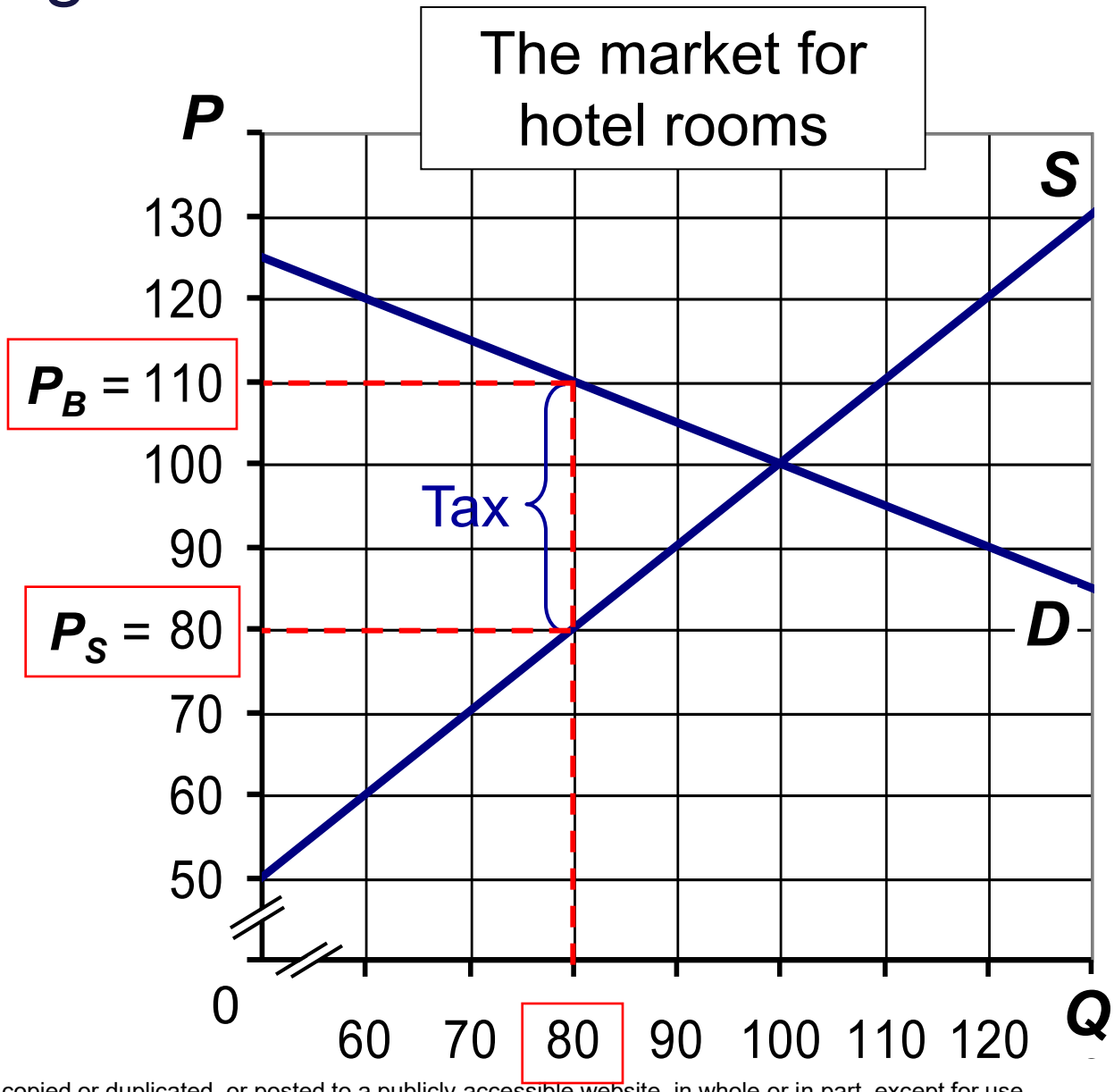
- Suppose the government imposes a tax on buyers of $30 per room
- Find the new Q, P_B, P_S, and incidence of tax.



Active Learning 2

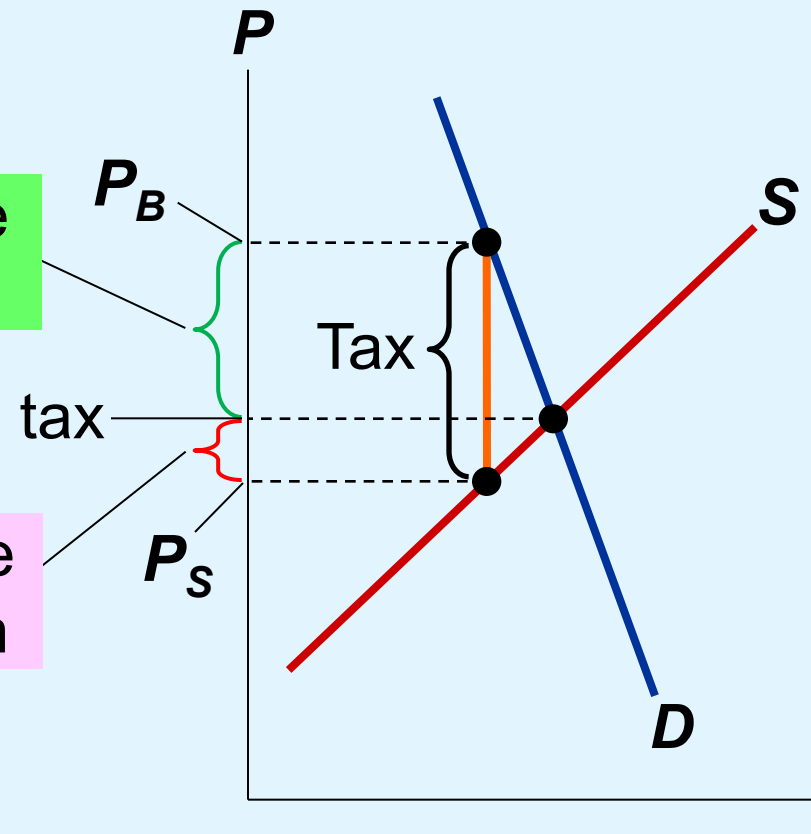
Answers

- Q = 80
- P_B = \$110
- P_S = \$80
- Incidence
  - buyers: \$10
  - sellers: \$20



Elasticity and Tax Incidence

CASE 1: Supply is more elastic than demand



Buyers' share of tax burden

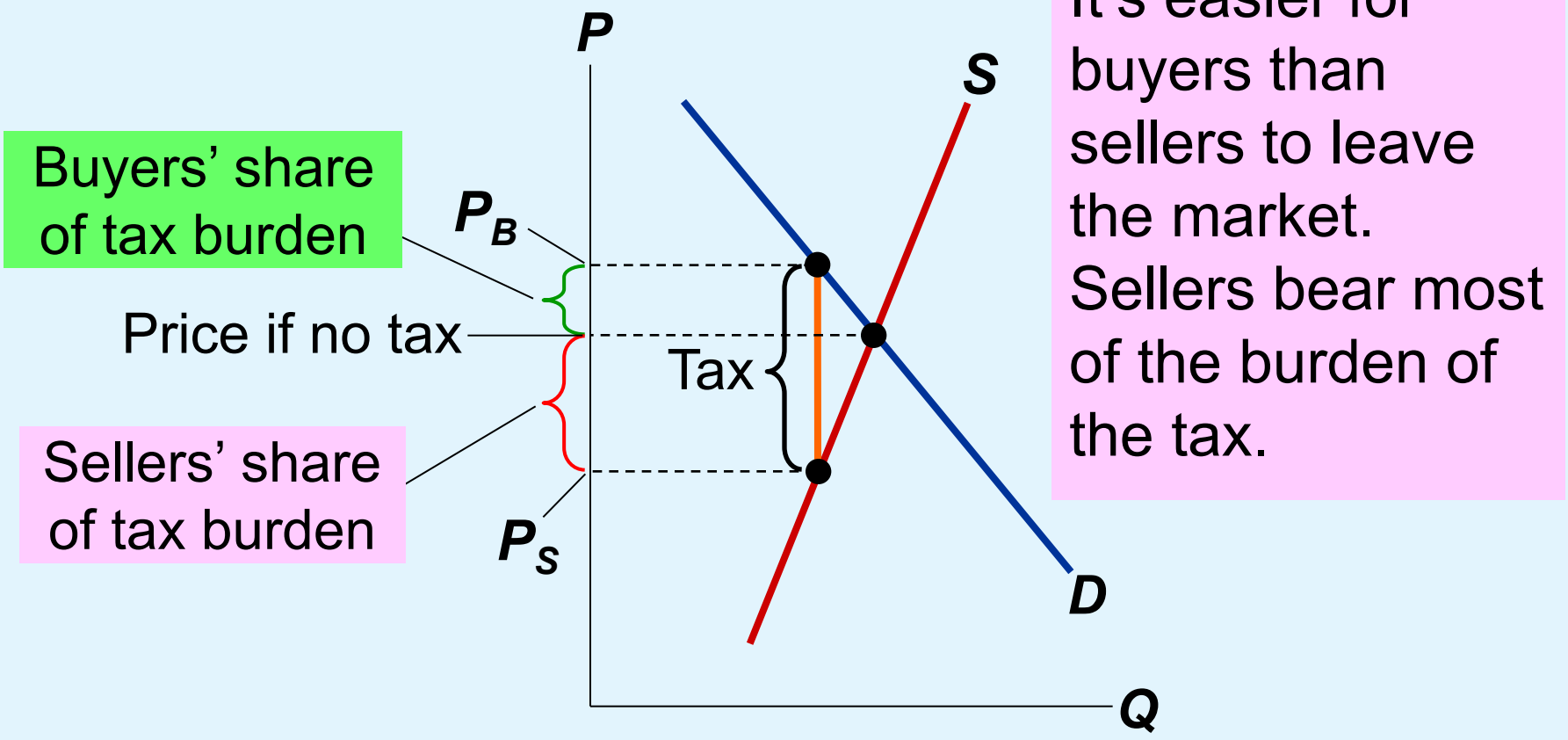
Sellers' share of tax burden

It's easier for sellers than buyers to leave the market.

So buyers bear most of the burden of the tax.

Elasticity and Tax Incidence

CASE 2: Demand is more elastic than supply



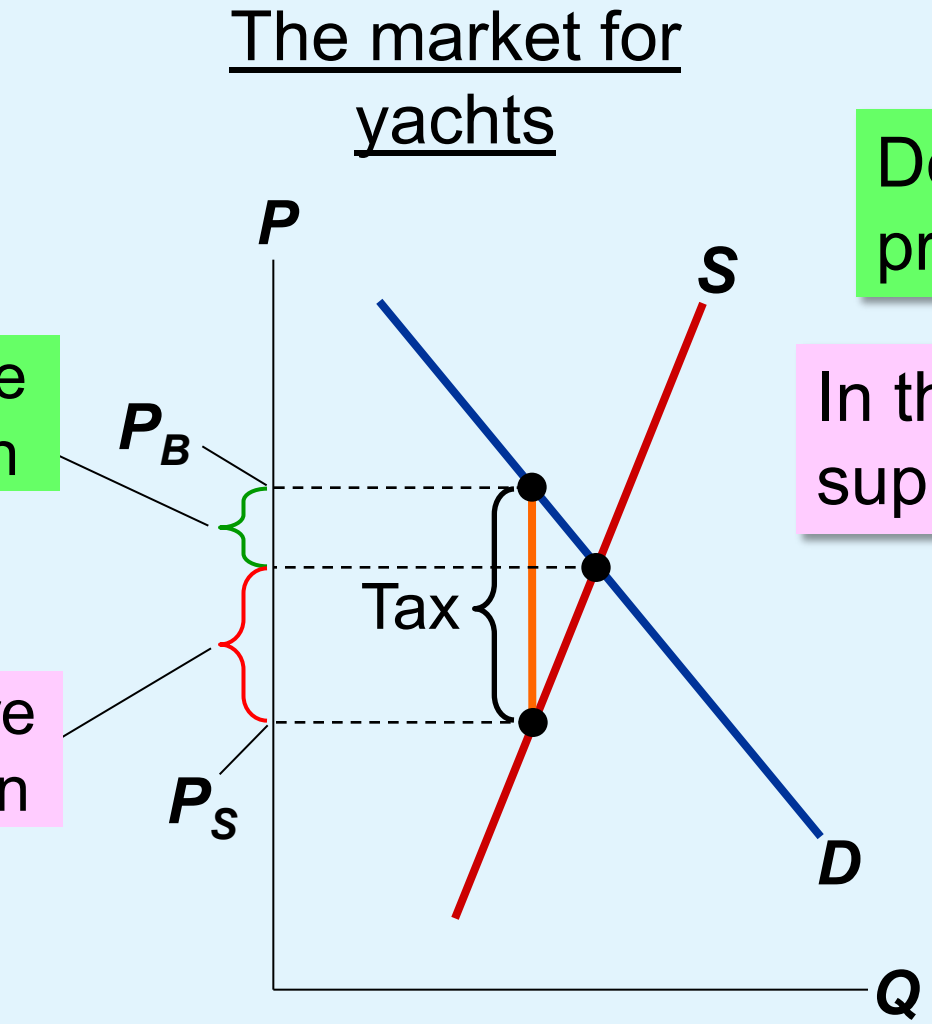
It's easier for buyers than sellers to leave the market. Sellers bear most of the burden of the tax.

CASE STUDY

Who pays the luxury tax?

- 1990, Congress adopted a new luxury tax
  - On yachts, private airplanes, furs, jewelry, expensive cars
  - Goal: to raise revenue from those who could most easily afford to pay
  - Luxury items
    - Demand is quite elastic
    - Supply is relatively inelastic

CASE STUDY: Who Pays the Luxury Tax?



Buyers' share of tax burden

Sellers' share of tax burden

Demand is price-elastic.

In the short run, supply is inelastic.

Hence, companies that build yachts pay most of the tax.

Active Learning 3 The 2011 payroll tax cut

Prior to 2011, the Social Security payroll tax was 6.2% taken from workers' pay and 6.2% paid by employers (total 12.4%). The Tax Relief Act (2010) reduced the worker's portion from 6.2% to 4.2% in 2011, but left the employer's portion at 6.2%.

- Should this change have increased the typical worker's take-home pay by exactly 2%, more than 2%, or less than 2%? Do any elasticities affect your answer? Explain.
- FOLLOW-UP QUESTION: Who gets the bigger share of this tax cut, workers or employers? How do elasticities determine the answer?

Active Learning 3 Answers

- As long as labor supply and labor demand both have price elasticity > 0, the tax cut will be shared by workers and employers, i.e., workers' take-home pay will rise less than 2%.
- The answer does NOT depend on whether labor demand is more or less elastic than labor supply.

FOLLOW-UP QUESTION :

- If labor demand is more elastic than labor supply, workers get more of the tax cut than employers.
- If labor demand is less elastic than labor supply, employers get the larger share of the tax cut.

Summary

- A price ceiling is a legal maximum on the price of a good. An example is rent control. If the price ceiling is below the equilibrium price, it is binding and causes a shortage.
- A price floor is a legal minimum on the price of a good. An example is the minimum wage. If the price floor is above the equilibrium price, it is binding and causes a surplus. The labor surplus caused by the minimum wage is unemployment.

Summary

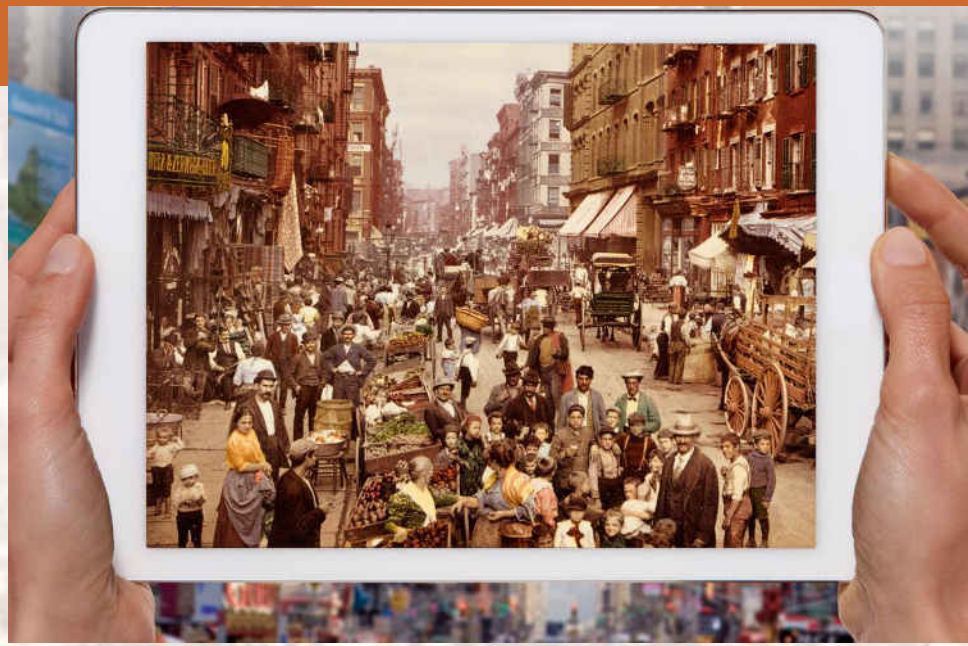
- A tax on a good places a wedge between the price buyers pay and the price sellers receive, and causes the equilibrium quantity to fall, whether the tax is imposed on buyers or sellers.
- The incidence of a tax is the division of the burden of the tax between buyers and sellers, and does not depend on whether the tax is imposed on buyers or sellers.
- The incidence of the tax depends on the price elasticities of supply and demand.

N. GREGORY MANKIW

PRINCIPLES OF

ECONOMICS

Eight Edition



CHAPTER

10

Externalities

Premium PowerPoint Slides by:
V. Andreea CHIRITESCU
Eastern Illinois University

Look for the answers to these questions:

- What is an externality?
- Why do externalities make market outcomes inefficient?
- What public policies aim to solve the problem of externalities?
- How can people sometimes solve the problem of externalities on their own? Why do such private solutions not always work?

Externalities

- 'Markets are usually a good way to organize economy activity'
  - In absence of market failures, the competitive market outcome is efficient, maximizes total surplus
- Externality: one type of market failure
  - The uncompensated impact of one person's actions on the well-being of a bystander

Externalities

- Negative externality
  - Impact on the bystander is adverse
- Positive externality
  - Impact on the bystander is beneficial
- Self-interested buyers and sellers
  - Neglect the external costs or benefits of their actions
  - So the market outcome is not efficient

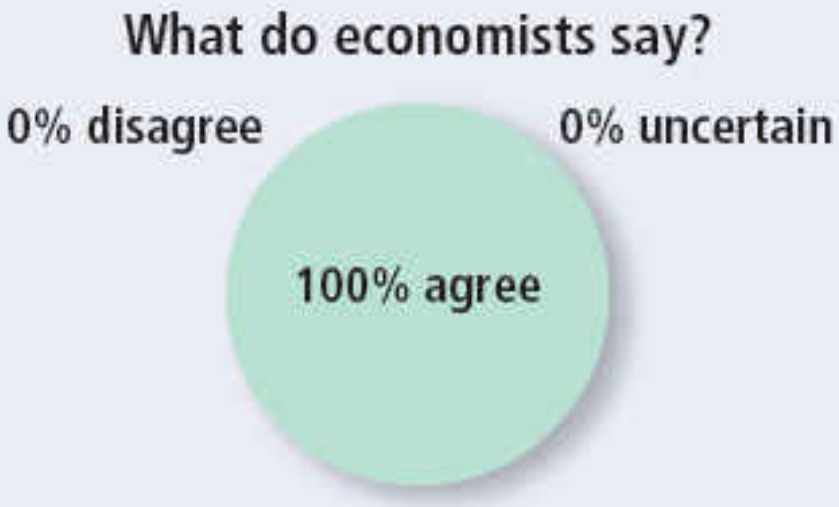
Externalities

- 'Government action can sometimes improve upon market outcomes'
  - Why markets sometimes fail to allocate resources efficiently
  - How government policies can potentially improve the market's allocation
  - What kinds of policies are likely to work best

ASK THE EXPERTS

Vaccines

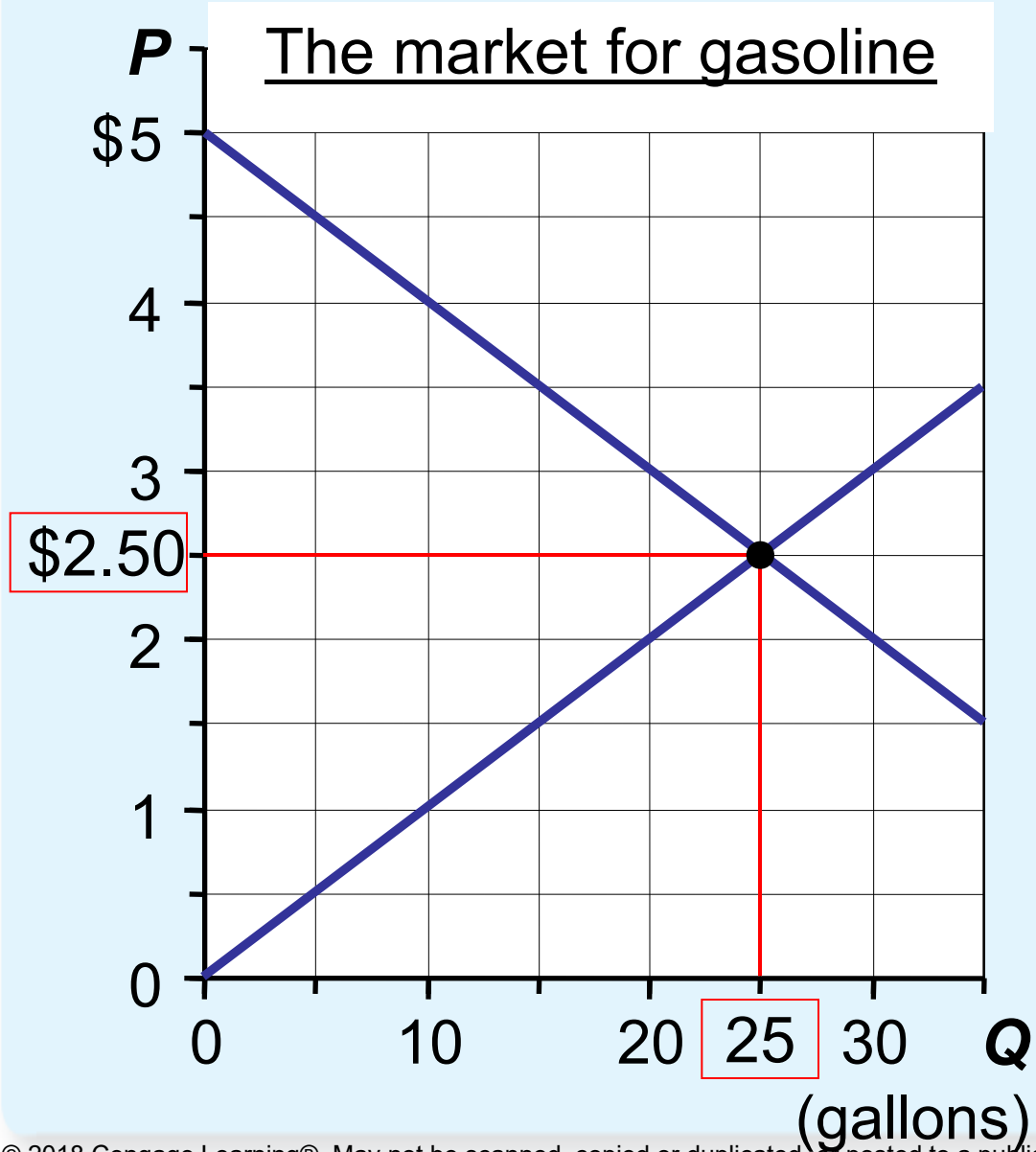
"Declining to be vaccinated against contagious diseases such as measles imposes costs on other people, which is a negative externality."



Negative Externalities

- Examples of negative externalities
  - Air pollution from a factory
  - The neighbor's barking dog
  - Late-night stereo blasting from the dorm room next to yours
  - Noise pollution from construction projects
  - Health risk to others from second-hand smoke
  - Talking on cell phone while driving makes the roads less safe for others

Recap of Welfare Economics

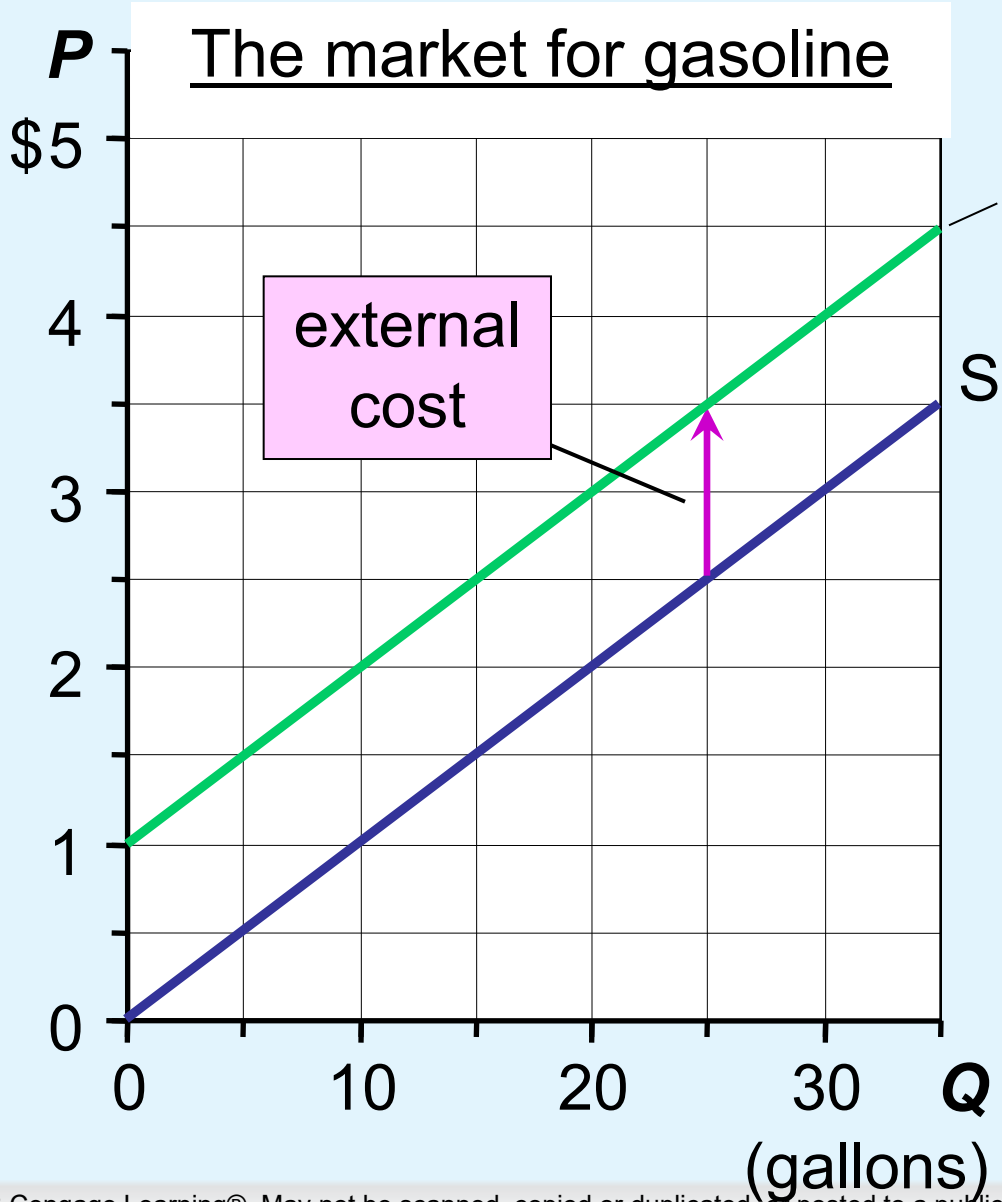


The market equilibrium maximizes consumer + producer surplus.

Supply curve shows **private cost**, the costs directly incurred by sellers.

Demand curve shows **private value**, the value to buyers (the prices they are willing to pay).

Analysis of a Negative Externality



Social cost
= private + external cost

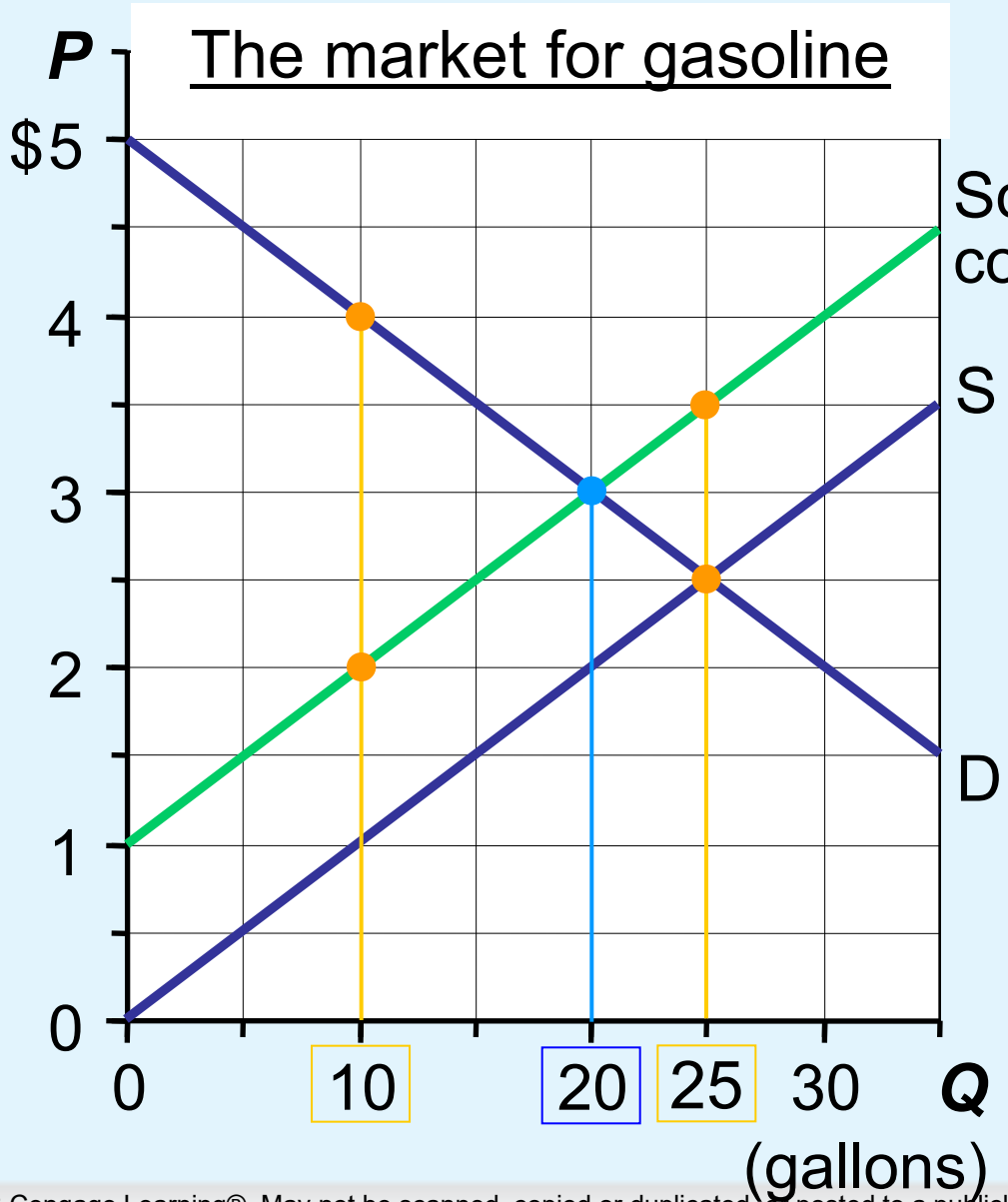
Supply (private cost)

External cost

= value of the negative impact on bystanders

= $1 per gallon (value of harm from smog, greenhouse gases)

Analysis of a Negative Externality

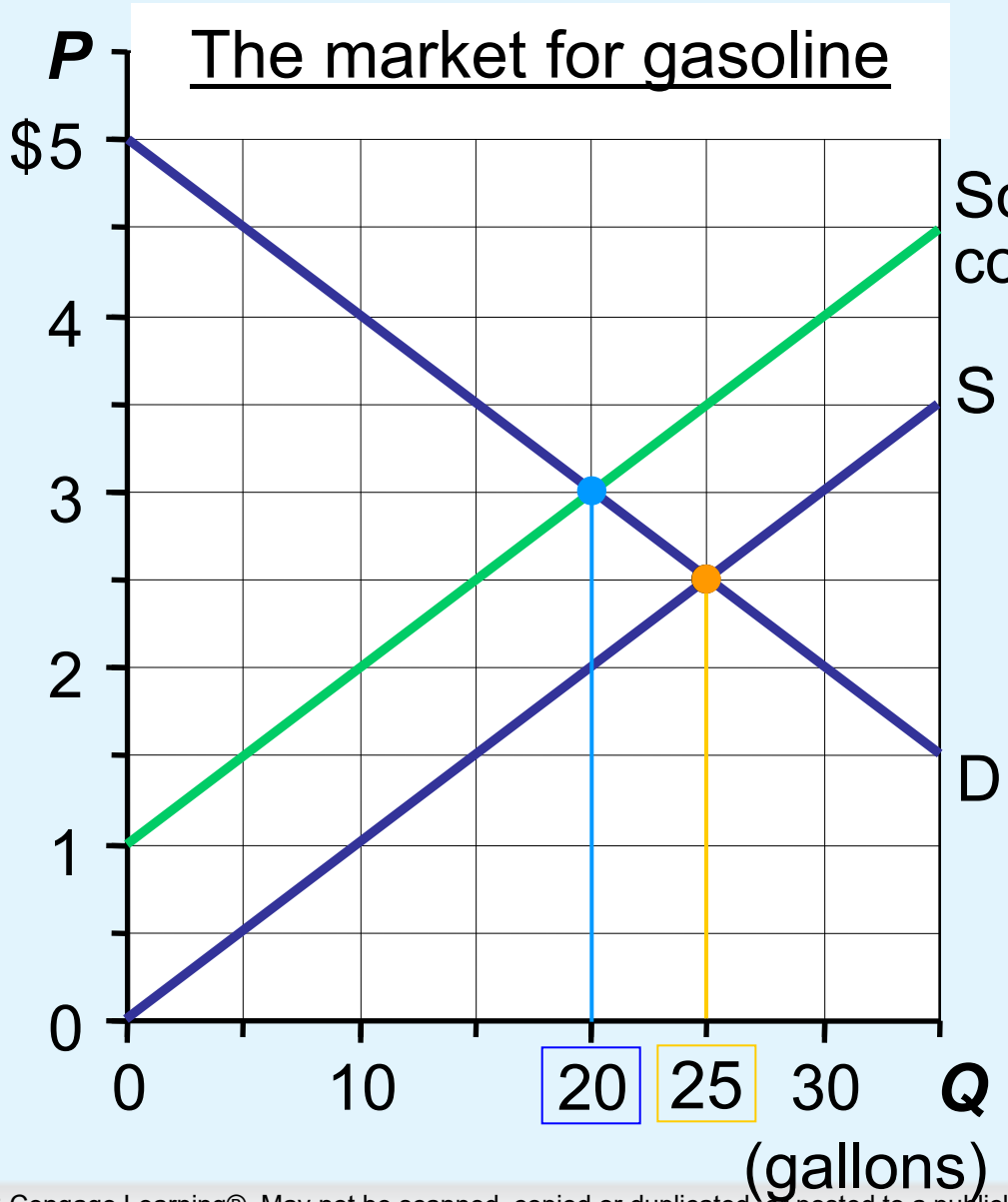


The socially optimal quantity is 20 gallons.

At any ***Q*** < 20, value of additional gas exceeds social cost.

At any ***Q*** > 20, social cost of the last gallon is greater than its value to society.

Analysis of a Negative Externality



Market equilibrium (***Q*** = 25) is greater than social optimum (***Q*** = 20).

One solution: tax sellers $1/gallon, would shift ***S*** curve up $1.

Externalities

- Internalizing the externality:
  - Altering incentives so that people take into account the external effects of their actions
  - In our example, the $1/gallon tax on sellers makes sellers' costs = social costs.
- If market participants pay social costs
  - Market equilibrium = social optimum

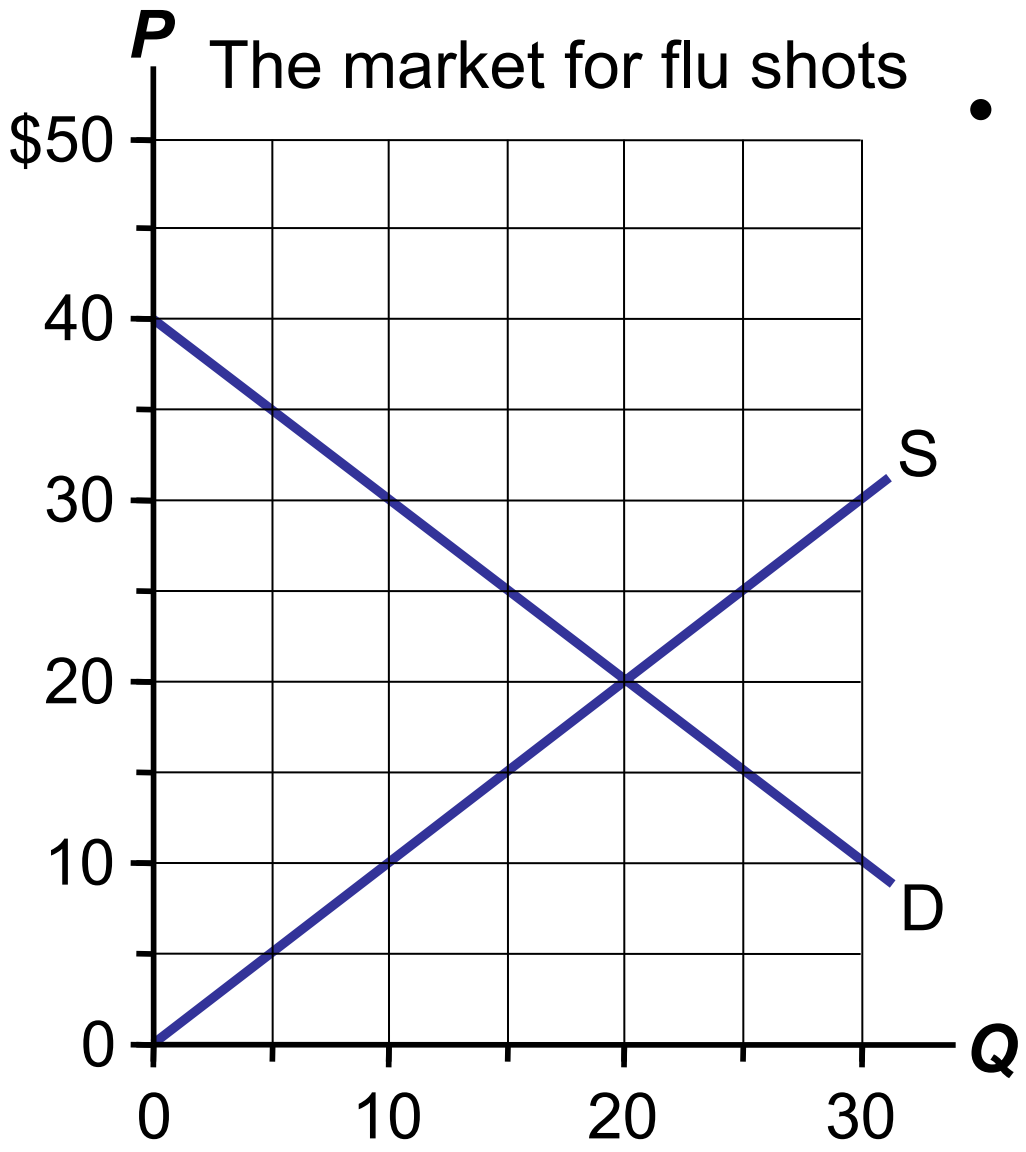
Positive Externalities

- Examples of positive externalities
  - Being vaccinated against contagious diseases protects not only you, but people who visit the salad bar or produce section after you
  - Research and development creates knowledge others can use
  - People going to college raise the population's education level, which reduces crime and improves government

Positive Externalities

- With a positive externality
  - The social value of a good includes
    - Private value – the direct value to buyers
    - External benefit – the value of the positive impact on bystanders
- The socially optimal Q maximizes welfare:
    - At any lower Q, the social value of additional units exceeds their cost.
    - At any higher Q, the cost of the last unit exceeds its social value.

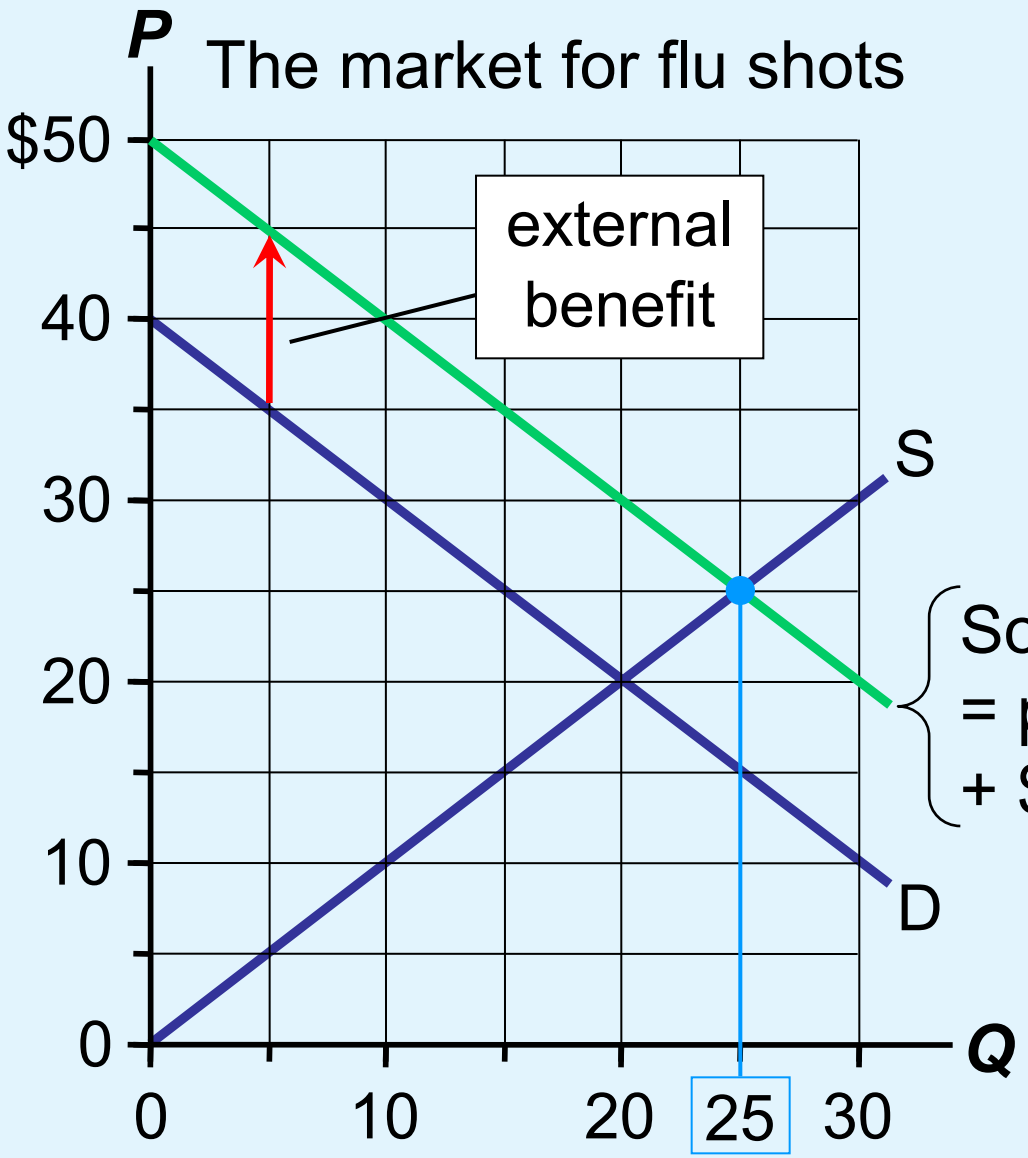
Active Learning 1 Analysis of a positive externality



- External benefit = $10/shot
  - Draw the social value curve.
  - Find the socially optimal Q.
  - What policy would internalize this externality?

Active Learning 1

Answers



Socially optimal **Q** = 25 shots.

To internalize the externality, use subsidy = $10/shot.

Social value
= private value
+ $10 external benefit

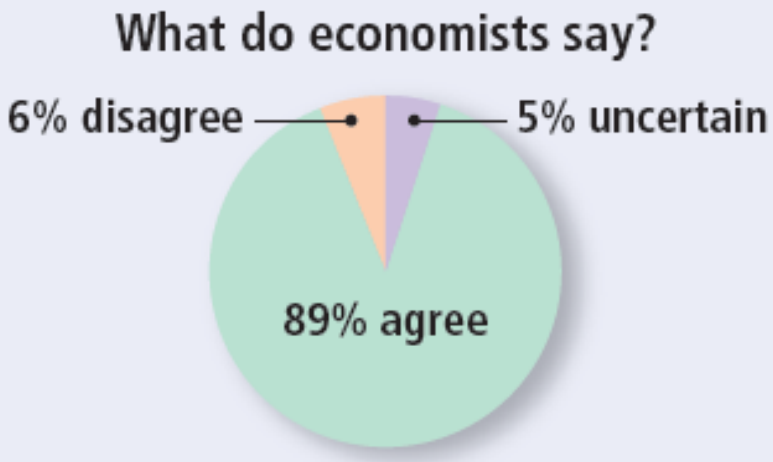
Effects of Externalities: Summary

- If negative externality
  - Market quantity larger than socially desirable
- If positive externality
  - Market quantity smaller than socially desirable
- To remedy the problem, "internalize the externality"
  - Tax goods with negative externalities
  - Subsidize goods with positive externalities

ASK THE EXPERTS

Vaccines

"Considering the costs of restricting free choice, and the share of people in the US who choose not to vaccinate their children for measles, the social benefit of mandating measles vaccines for all Americans (except those with compelling medical reasons) would exceed the social cost."



Public Policies Toward Externalities

- Command-and-control policies
  - Regulate behavior directly
    - Limits on quantity of pollution emitted
    - Requirements that firms adopt a particular technology to reduce emissions
- Market-based policies
  - Incentives so that private decision makers will choose to solve the problem on their own
    - Corrective taxes and subsidies
    - Tradable pollution permits

Public Policies Toward Externalities

- Corrective taxes and subsidies
  - Corrective taxes (*Pigovian taxes)*
  - Induce private decision makers to take account of the social costs that arise from a negative externality
  - Places a price on the right to pollute
  - Reduce pollution at a lower cost to society
  - Raise revenue for the government
  - Enhance economic efficiency

Corrective Taxes vs. Regulations

- Different firms
  - Have different costs of pollution abatement
- Efficient outcome
  - Firms with the lowest abatement costs reduce pollution the most

Corrective Taxes vs. Regulations

- A pollution tax is efficient:
  - Firms with low abatement costs will reduce pollution to reduce their tax burden.
  - Firms with high abatement costs have greater willingness to pay tax.
- Regulation requiring all firms to reduce pollution by a specific amount
  - Is not efficient

Corrective Taxes vs. Regulations

- Corrective taxes are better for the environment:
  - The corrective tax gives firms incentive to continue reducing pollution as long as the cost of doing so is less than the tax
    - If a cleaner technology becomes available, the tax gives firms an incentive to adopt it
  - In contrast, firms have no incentive for further reduction beyond the level specified in a regulation

Example of a Corrective Tax: The Gas Tax

CASE STUDY

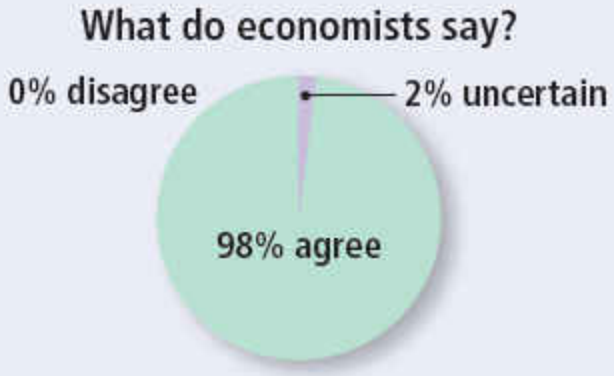
The gas tax targets three negative externalities:

- Congestion
  The more you drive, the more you contribute to congestion.
- Accidents
  Larger vehicles cause more damage in an accident.
- Pollution
  Burning fossil fuels produces greenhouse gases.

ASK THE EXPERTS

Carbon Taxes

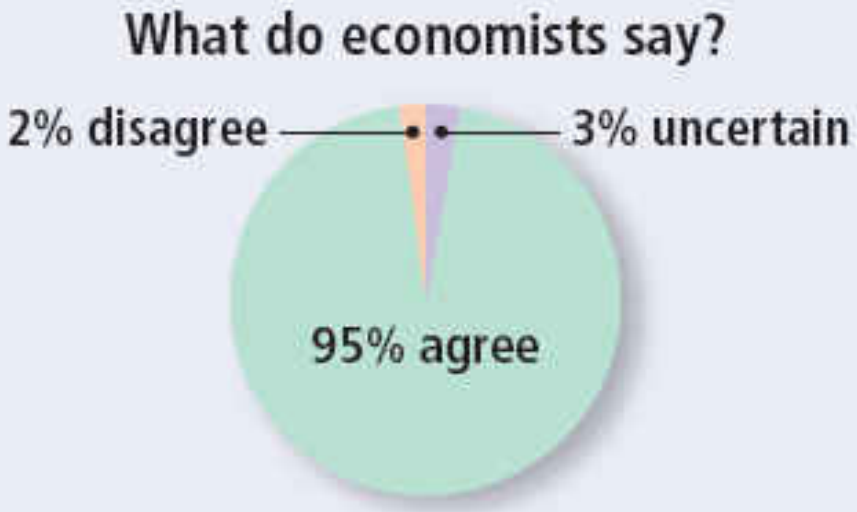
"The Brookings Institution recently described a U.S. carbon tax of $20 per ton, increasing at 4 percent per year, which would raise an estimated $150 billion per year in federal revenues over the next decade. Given the negative externalities created by carbon dioxide emissions, a federal carbon tax at this rate would involve fewer harmful net distortions to the U.S. economy than a tax increase that generated the same revenue by raising marginal tax rates on labor income across the board."



ASK THE EXPERTS

Carbon Taxes

"A tax on the carbon content of fuels would be a less expensive way to reduce carbon-dioxide emissions than would a collection of policies such as 'corporate average fuel economy' requirements for automobiles."



Active Learning 2 Reducing pollution

Acme and US Electric run coal-burning power plants. Each emits 40 tons of sulfur dioxide per month, total emissions = 80 tons/month.

- Goal: Reduce SO2 emissions 25%, to 60 tons/month
- Cost of reducing emissions:
  - $100/ton for Acme
  - $200/ton for US Electric

Active Learning 2

A. Regulation

- Policy option 1: Regulation
  Every firm must cut its emissions 25% (10 tons).
- Your task: Compute the cost to each firm and total cost of achieving goal using this policy.

Active Learning 2 — A. Answers

Each firm must reduce emissions by 10 tons.

Cost of reducing emissions: $100/ton for Acme, $200/ton for US Electric.

- Compute cost of achieving goal with this policy:
  - Cost to Acme: (10 tons) x ($100/ton) = $1000
  - Cost to USE: (10 tons) x ($200/ton) = $2000
  - Total cost of achieving goal = $3000

Active Learning 2 B. Tradeable pollution permits

- Policy option 2: Tradable pollution permits
  - Issue 60 permits, each allows one ton SO2 emissions.
  - Give 30 permits to each firm.
  - Establish market for trading permits.
  - Each firm may use all its permits to emit 30 tons, may emit < 30 tons and sell leftover permits, or may purchase extra permits to emit > 30 tons.
- Your task: Compute cost of achieving goal if Acme uses 20 permits and sells 10 to USE for $150 each.

Active Learning 2 B. Answers

Goal: reduce emissions from 80 to 60 tons

Cost of reducing emissions: $100/ton for Acme, $200/ton for USE.

- Compute cost of achieving goal for Acme:
  - Sells 10 permits to USE for $150 each, gets $1500
  - Uses 20 permits, emits 20 tons SO2
  - Spends $2000 to reduce emissions by 20 tons
  - Net cost to Acme: $2000 − $1500 = $500

Active Learning 2 B. Answers

- Compute cost of achieving goal for USE:
  - Buys 10 permits from acme, spends $1500
  - Uses these 10 plus original 30 permits, emits 40 tons
  - Spends nothing on abatement
  - Net cost to USE = $1500

Total cost of achieving goal =$500+$1500=$2000

- Using tradable permits, goal is achieved at lower total cost and lower cost to each firm than using regulation.

Public Policies Toward Externalities

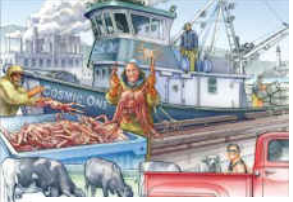
- Tradable pollution permits system
  - Reduces pollution at lower cost than regulation
    - Firms with low cost of reducing pollution do so and sell their unused permits
    - Firms with high cost of reducing pollution buy permits
  - Result: Pollution reduction is concentrated among those firms with lowest costs

Public Policies Toward Externalities

- Reducing pollution using pollution permits or corrective taxes
  - Firms pay for their pollution
    - Corrective taxes: pay to the government
    - Pollution permits: pay to buy permits
  - Internalize the externality of pollution

Public Policies Toward Externalities

- Objections to the economic analysis of pollution
  - "We cannot give anyone the option of polluting for a fee." - by late Senator Edmund Muskie
- People face trade-offs
  - Eliminating all pollution is impossible
  - Clean water and clean air – opportunity cost: lower standard of living



Public Policies Toward Externalities

- Clean environment is a normal good
  - Positive income elasticity
    - Rich countries can afford a cleaner environment
    - More rigorous environmental protection
  - Clean air and clean water - law of demand
    - The lower the price of environmental protection
    - The more the public will want it

Private Solutions to Externalities

- The types of private solutions
  - Moral codes and social sanctions
  - Charities
  - Self-interest of the relevant parties
    - Integrating different types of businesses
  - Interested parties can enter into a contract

Private Solutions to Externalities

- The Coase theorem
  - If private parties can bargain without cost over the allocation of resources
    - They can solve the problem of externalities on their own
- Whatever the initial distribution of rights
  - Interested parties can reach a bargain:
    - Everyone is better off
    - Outcome is efficient

Private Solutions to Externalities

1. Dick has the legal right to keep a barking dog (Spot).

- Dick gets a $500 benefit from the dog
- Jane bears an $800 cost from the barking
- Efficient outcome:
  - Jane can offer Dick $600 to get rid of the dog
  - Dick will gladly accept
  - Bye-bye Spot!
  - Both are better off

Private Solutions to Externalities

2. Dick has the legal right to keep a barking dog (Spot).

- Dick gets a $1,000 benefit from the dog
- Jane bears an $800 cost from the barking
- Efficient outcome:
  - Dick turns down any offer below $1,000
  - Jane will not offer any amount above $800
  - Dick keeps the dog

Private Solutions to Externalities

3. Jane can legally compel Dick to get rid of the dog (Spot)

- Dick gets a $800 benefit from the dog
- Jane bears an $500 cost from the barking
- Efficient outcome
  - Dick keeps Spot
  - Private outcome: Dick pays Jane $600 to put up with Spot's barking

The private market achieves the efficient outcome regardless of the initial distribution of rights

Active Learning 3 — Applying Coase

Collectively, the 1000 residents of Green Valley value swimming in Blue Lake at $100,000.

A nearby factory pollutes the lake water, and would have to pay $50,000 for non-polluting equipment.

A. Describe a Coase-like private solution.

B. Can you think of any reasons why this solution might not work in the real world?

Private Solutions to Externalities

Why private solutions do not always work

- High transaction costs
  - Costs that parties incur in the process of agreeing to and following through on a bargain
- Stubbornness: bargaining simply breaks down
- Coordination problems
  - Large number of interested parties
  - Coordinating everyone is costly

Summary

- When a transaction between a buyer and seller directly affects a third party, the effect is called an externality.
  - If an activity yields negative externalities, such as pollution, the socially optimal quantity in a market is less than the equilibrium quantity.
  - If an activity yields positive externalities, such as technology spillovers, the socially optimal quantity is greater than the equilibrium quantity.

Summary

- Governments pursue various policies to remedy the inefficiencies caused by externalities.
  - Regulating behavior
  - Internalizes an externality using corrective taxes
  - Issue permits (similar results to imposing corrective taxes on polluters)

Summary

- According to the Coase theorem, if people can bargain without cost, then they can always reach an agreement in which resources are allocated efficiently.
  - In many cases, however, reaching a bargain among the many interested parties is difficult, so the Coase theorem does not apply.

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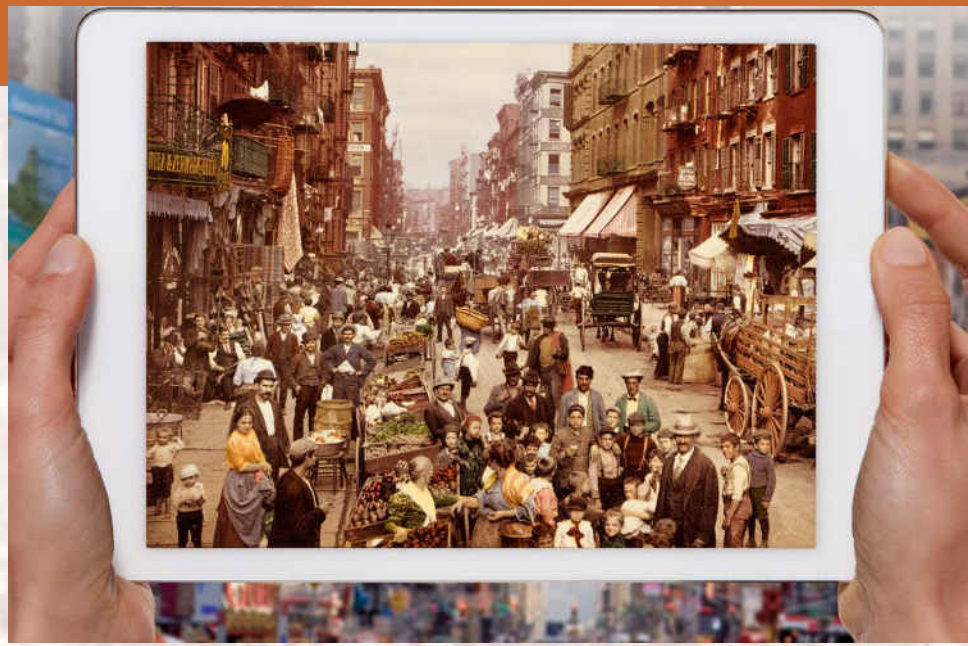


CHAPTER

11

Public Goods and Common Resources

Premium PowerPoint Slides by:
V. Andreea CHIRITESCU
Eastern Illinois University

Look for the answers to these questions:

- What are public goods?
- What are common resources? Give examples of each.
- Why do markets generally fail to provide the efficient amounts of these goods?
- How might the government improve market outcomes in the case of public goods or common resources?

Introduction

- We consume many goods without paying:
  - Parks, national defense, clean air & water
  - When goods have no prices, the market forces that normally allocate resources are absent
  - The private market may fail to provide the socially efficient quantity of such goods
- 'Governments can sometimes improve market outcomes'

The Different Kinds of Goods

- Excludability
  - Property of a good whereby a person can be prevented from using it
  - *Excludable*: fish tacos, wireless Internet access
  - *Not excludable*: radio signals, national defense
- Rivalry in consumption
  - Property of a good whereby one person's use diminishes other people's use
  - *Rival*: fish tacos
  - *Not rival*: An MP3 file of Lady Gaga's latest single

The Different Kinds of Goods

- Private goods
  - Excludable & Rival in consumption (food)
- Public goods
  - Not excludable & Not rival in consumption (national defense)
- Common resources
  - Rival in consumption & Not excludable (fish in the ocean)
- Club goods
  - Excludable & Not rival in consumption (cable TV)

Active Learning 1 — Categorizing Roads

- A road is which of the four kinds of goods?
- *Hint*: The answer depends on whether the road is congested or not, and whether it's a toll road or not. Consider the different cases.

Active Learning 1 Answers

- Rival in consumption? Only if congested.
- Excludable? Only if a toll road.

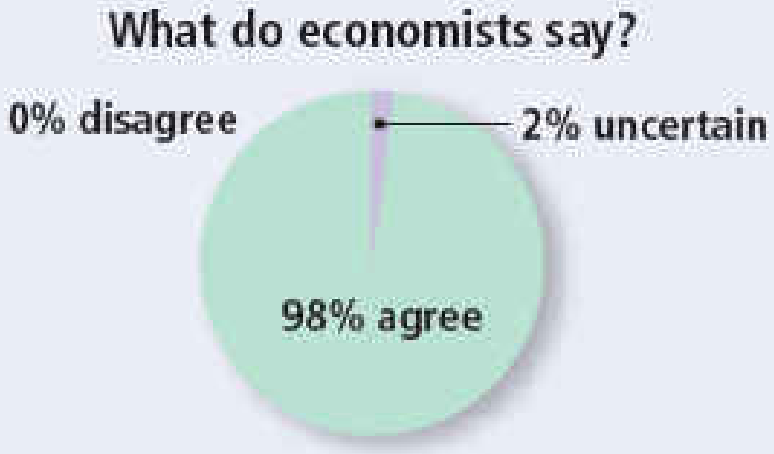
Four possibilities:

- Uncongested non-toll road: public good
- Uncongested toll road: club good
- Congested non-toll road: common resource
- Congested toll road: private good

ASK THE EXPERTS

Congestion Pricing

"In general, using more congestion charges in crowded transportation networks — such as higher tolls during peak travel times in cities, and peak fees for airplane takeoff and landing slots — and using the proceeds to lower other taxes would make citizens on average better off."



The Different Kinds of Goods

- Public goods and common resources
  - Externalities arise because something of value has no price attached to it
  - Private decisions about consumption and production can lead to an inefficient outcome
  - Public policy can potentially raise economic well-being

Public Goods

- Free rider
  - Person who receives the benefit of a good but avoids paying for it
- The free-rider problem
  - Public goods are not excludable, so people have an incentive to be free riders
  - Prevents the private market from supplying the goods
  - Market failure

Public Goods

- Government can remedy the free-rider problem
  - If total benefits of a public good exceeds its costs
  - Provide the public good
  - Pay for it with tax revenue
  - Make everyone better off
  - Problem: Measuring the benefit is usually difficult

Public Goods

- Cost–benefit analysis
  - Compare the costs and benefits to society of providing a public good
  - Doesn't have any price signals to observe
  - Government findings: rough approximations at best
  - Cost-benefit analyses are imprecise, so the efficient provision of public goods is more difficult than that of private goods

Public Goods

- Some important public goods
  - National defense
    - Very expensive public good
    - $748 billion in 2014
  - Basic research
    - General knowledge
    - Subsidized by government
    - The public sector fails to pay for the right amount and the right kinds

Public Goods

- Some important public goods
  - Antipoverty programs financed by taxes
    - Welfare system (Temporary Assistance for Needy Families program, TANF)
      - Provides a small income for some poor families
    - Food stamps (Supplemental Nutrition Assistance Program, SNAP)
      - Subsidize the purchase of food for those with low incomes
    - Government housing programs
      - Make shelter more affordable

Common Resources

- Common resources are not excludable
  - Cannot prevent free riders from using
  - Little incentive for firms to provide
  - Role for government: seeing that they are provided
- Common resources: rival in consumption
  - Each person's use reduces others' ability to use
  - Role for government: ensuring they are not overused

Common Resources

- The tragedy of the commons
  - Parable that shows why common resources are used more than desirable
    - Medieval town where sheep graze on common land
    - As the population grows, the number of sheep grows
    - The amount of land is fixed, the grass begins to disappear from overgrazing

Common Resources

- The tragedy of the commons
  - Social and private incentives differ
    - The private incentives (using the land for free) outweigh the social incentives (using it carefully)
  - Arises because of a negative externality
    - Allowing one's flock to graze on the common land reduces its quality for other families
  - People neglect this external cost, resulting in overuse of the land

Active Learning 2

Policy options for common resources

- What could the townspeople (or their government) have done to prevent the tragedy?
- Try to think of two or three options.

Active Learning 2 Answers

- Impose a corrective tax on the use of the land to “internalize the externality.”
- Regulate use of the land (the “command-and-control” approach).
- Auction off permits allowing use of the land.
- Divide the land, sell lots to individual families; each family will have incentive not to overgraze its own land.

Policy Options to Prevent Overconsumption of Common Resources

- Regulate use of the resource
- Impose a corrective tax to internalize the externality
  - Hunting & fishing licenses, entrance fees for congested national parks

Policy Options to Prevent Overconsumption of Common Resources

- Auction off permits allowing use of the resource
  - Example: spectrum auctions by the U.S. Federal Communications Commission
- If the resource is land, convert to a private good
  - By dividing and selling parcels to individuals

Common Resources

- Some important common resources
  - Clean air and water
    - Negative externality: pollution
    - Regulations or corrective taxes
  - Congested roads
    - Negative externality: congestion
    - Corrective tax: charge drivers a tool
    - Tax on gasoline

Common Resources

- Some important common resources
  - Fish, whales, and other wildlife
    - Oceans: the least regulated common resource
      - Needs international cooperation
      - Difficult to enforce an agreement
    - Fishing and hunting licenses
    - Limits on fishing and hunting seasons
    - Limits on size of fish
    - Limits on quantity of animals killed

CASE STUDY

"You've Got Spam!"

- Some firms use spam e-mails to advertise their products.
  - Spam is not excludable: firms cannot be prevented from spamming
  - Spam is rival: as more companies use spam, it becomes less effective.
- Thus, spam is a common resource.
  - Like most common resources, spam is overused – which is why we get so much of it!

Importance of Property Rights

- Market fails to allocate resources efficiently
  - Because property rights are not well established
  - Some item of value does not have an owner with the legal authority to control it

Importance of Property Rights

- The government can potentially solve the problem
  - Help define property rights and thereby unleash market forces
  - Regulate private behavior
  - Use tax revenue to supply a good that the market fails to supply

Summary

- Goods differ in whether they are excludable and whether they are rival in consumption.
  - A good is excludable if it is possible to prevent someone from using it.
  - A good is rival in consumption if one person's use of the good reduces others' ability to use the same unit of the good.
  - Markets work best for private goods, which are both excludable and rival in consumption.
  - Markets do not work as well for other types of goods.

Summary

- Public goods are neither rival in consumption nor excludable.
  - Examples of public goods include fireworks displays, national defense, and the discovery of fundamental knowledge.
  - Because people are not charged for their use of the public good, they have an incentive to free ride, making private provision of the good untenable.
  - Therefore, governments provide public goods, basing their decision about the quantity of each good on cost–benefit analysis.

Summary

- Common resources are rival in consumption but not excludable.
  - Examples include common grazing land, clean air, and congested roads.
  - Because people are not charged for their use of common resources, they tend to use them excessively.
  - Therefore, governments use various methods, such as regulations and corrective taxes, to limit the use of common resources.

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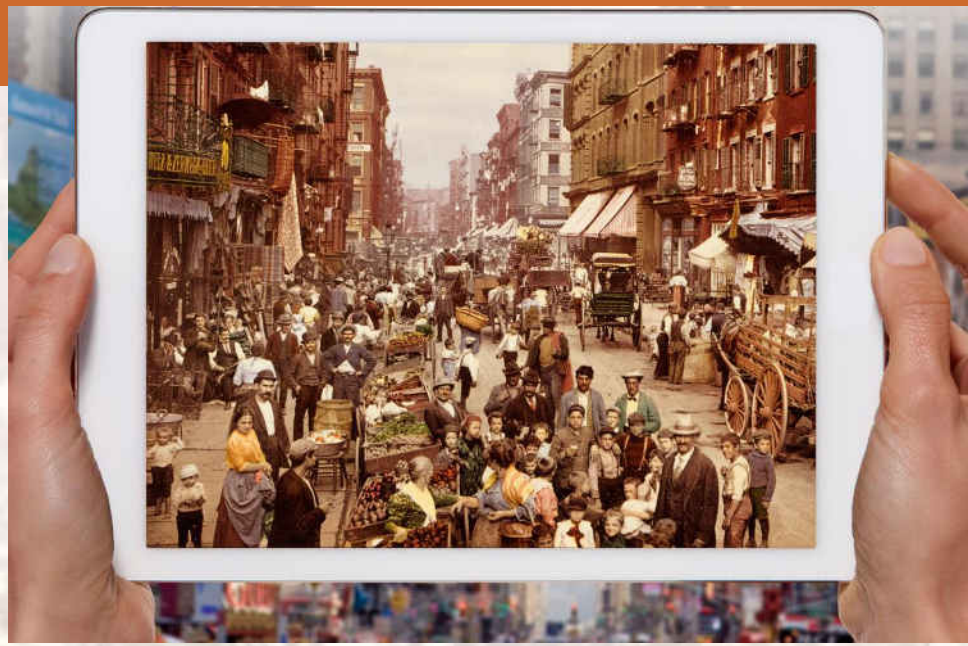


CHAPTER

14

Firms in Competitive Markets

Premium PowerPoint Slides by:
V. Andreea CHIRITESCU
Eastern Illinois University

Look for the answers to these questions:

- What is a perfectly competitive market?
- What is marginal revenue? How is it related to total and average revenue?
- How does a competitive firm determine the quantity that maximizes profits?
- When might a competitive firm shut down in the short run? Exit the market in the long run?
- What does the market supply curve look like in the short run? In the long run?

Introduction: A Scenario

Three years after graduating, you run your own business. You must decide how much to produce, what price to charge, how many workers to hire, etc.

- What factors should affect these decisions?
  - Your costs (studied in preceding chapter)
  - How much competition you face

We begin by studying the behavior of firms in perfectly competitive markets.

What is a Competitive Market?

Perfectly competitive market:

1. Market with many buyers and sellers
2. Trading identical products
   - Because of the first two: each buyer and seller is a price taker (takes the price as given)
3. Firms can freely enter or exit the market

Revenue of a Competitive Firm

- Total revenue, TR = P x Q
- Average revenue, AR = TR / Q
- Marginal revenue, MR = ΔTR / ΔQ
  - Change in TR from an additional unit sold
- For competitive firms
  - AR = P
  - MR = P

Active Learning 1 Calculating TR, AR, MR

Fill in the empty spaces of the table.

Q	***P***	*TR*	*AR*	*MR*
0	$10		n/a	
1	$10		$10	
2	$10			
3	$10			
4	$10	$40		$10
5	$10	$50		

Active Learning 1 Answers

Q	P	$TR = P \times Q$	$AR = \frac{TR}{Q}$	$MR = \frac{\Delta TR}{\Delta Q}$
0	$10	$0	n/a	
1	$10	$10	$10	$10
2	$10			$10
3	$10	$30	$10	$10
4	$10	$40	$10	$10
5	$10	$50	$10	$10

Notice that $MR = P$

MR = P for a Competitive Firm

- A competitive firm
  - Can keep increasing its output without affecting the market price.
  - So, each one-unit increase in ***Q*** causes revenue to rise by ***P***, i.e., $MR = P$.

$MR = P$ is only true for firms in competitive markets

Profit Maximization

- What Q maximizes a firm's profit?
  - Think at the margin
  - If Q increases by one unit
    - Revenue rises by MR, cost rises by MC
- Compare marginal revenue with marginal cost
  - If MR > MC: increase Q to raise profit
  - If MR < MC: decrease Q to raise profit
  - Maximize profit for Q where MR = MC

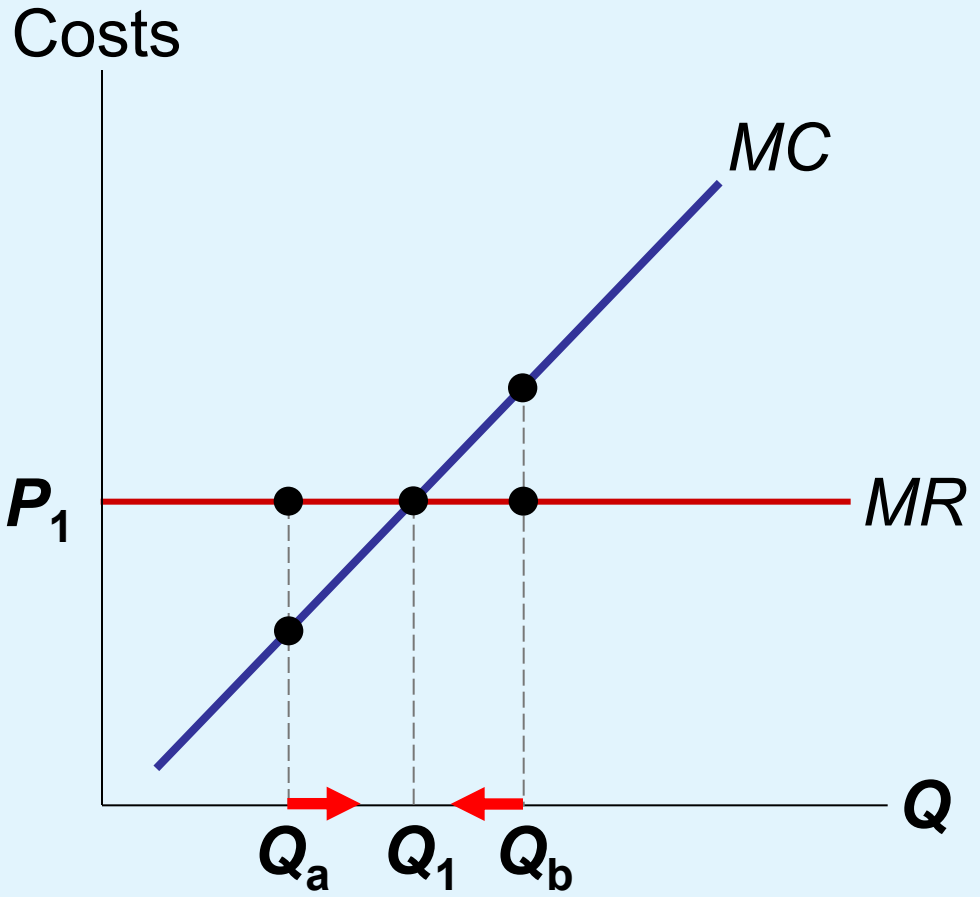
MC and the Firm's Supply Decision

Rule: *MR* = *MC* at the profit-maximizing **Q**.

At $\boldsymbol{Q_a}$, *MC* < *MR*.
So, increase **Q**
to raise profit.

At $\boldsymbol{Q_b}$, *MC* > *MR*.
So, reduce **Q**
to raise profit.

At $\boldsymbol{Q_1}$, *MC* = *MR*.
Changing **Q**
would lower profit.



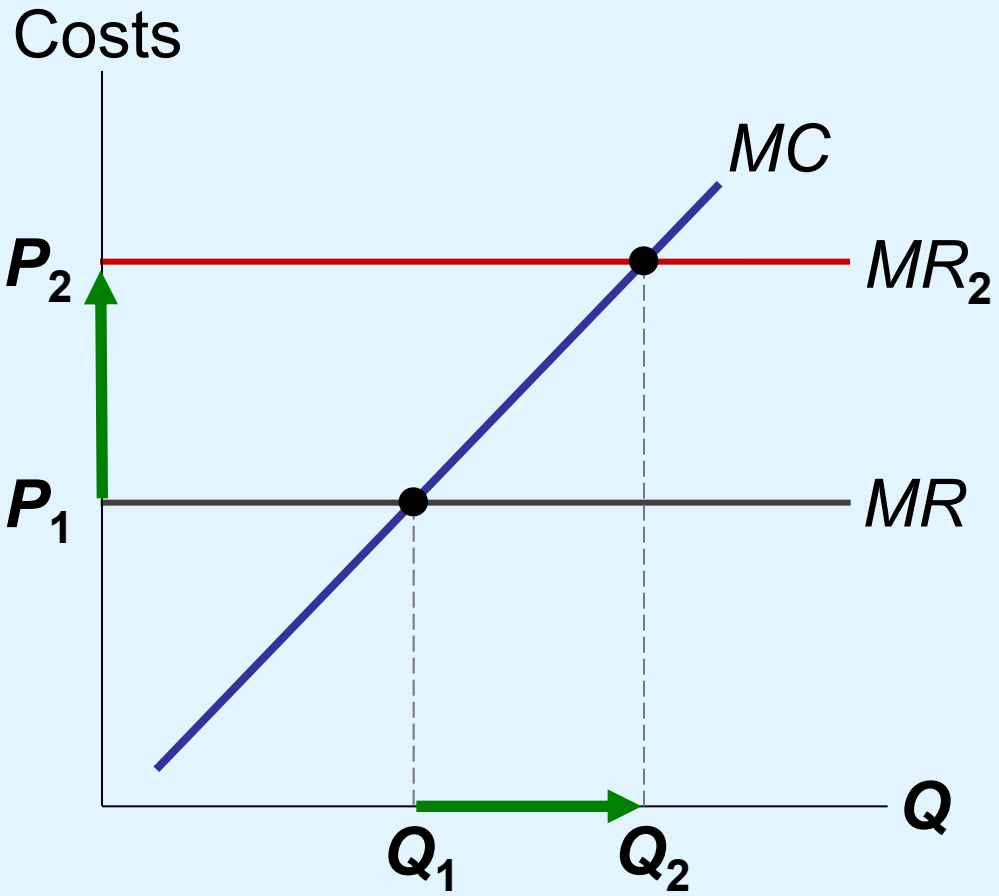
MC and the Firm's Supply Decision

If price rises to P_2, then the profit-maximizing quantity rises to Q_2.

The *MC* curve determines the firm's **Q** at any price.

Hence, the MC curve is the firm's supply curve

the *MC* curve is the firm's supply curve.



Shutdown vs. Exit

- Shutdown:
  - A short-run decision not to produce anything because of market conditions.
- Exit:
  - A long-run decision to leave the market.
- A key difference:
  - If shut down in SR, must still pay FC.
  - If exit in LR, zero costs.

Short-run Decision to Shut Down

- Should a firm shut-down in the short run?
  - Cost of shutting down = revenue loss
    = TR
  - Benefit of shutting down = cost savings
    = VC

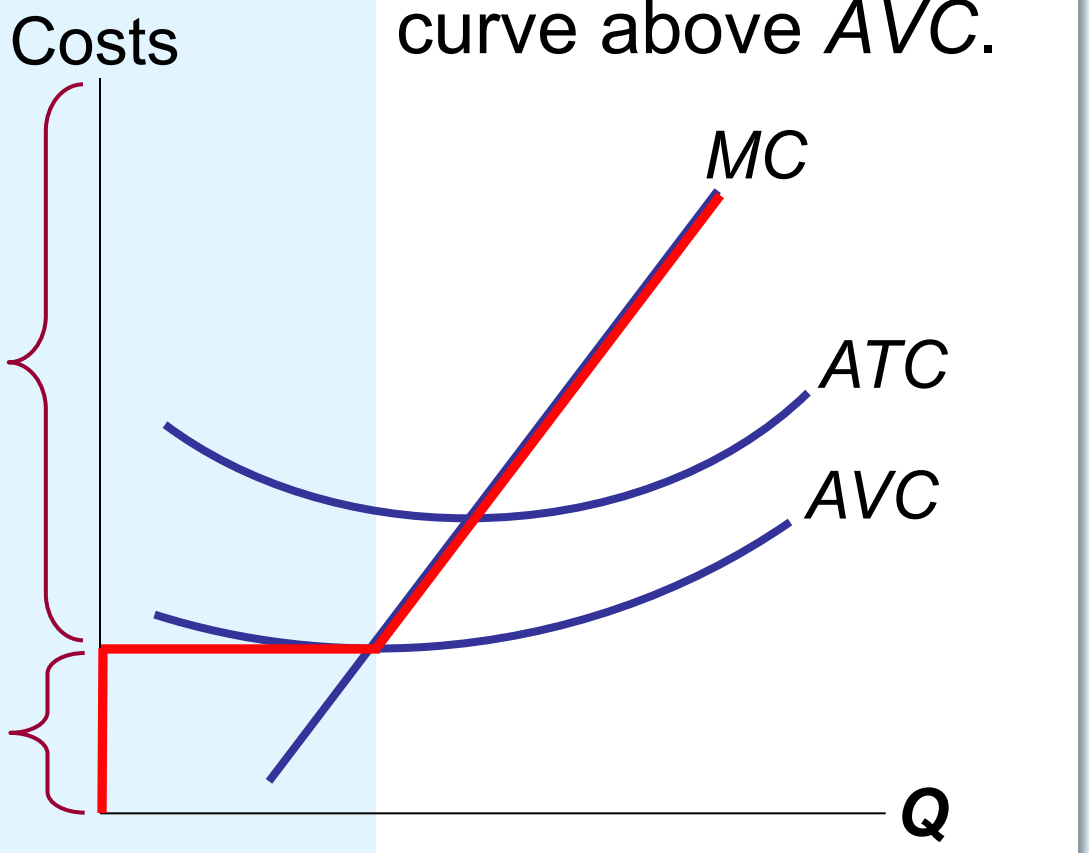
  (because the firm must still pay FC)
- Shut down if TR < VC, or *P < AVC*

A Competitive Firm's SR Supply Curve

The firm's short run supply curve is the portion of its *MC* curve above *AVC*.

If ***P*** > *AVC*, then firm produces ***Q*** where ***P*** = *MC*.

If ***P*** < *AVC*, then firm shuts down (produces ***Q*** = 0).



The Irrelevance of Sunk Costs

- Sunk cost
  - A cost that has already been committed and cannot be recovered
  - Should be ignored when making decisions
  - You must pay them regardless of your choice
  - In the short run, FC are sunk costs
    - So, FC should not matter in the decision to shut down

A Firm's Long-Run Decision

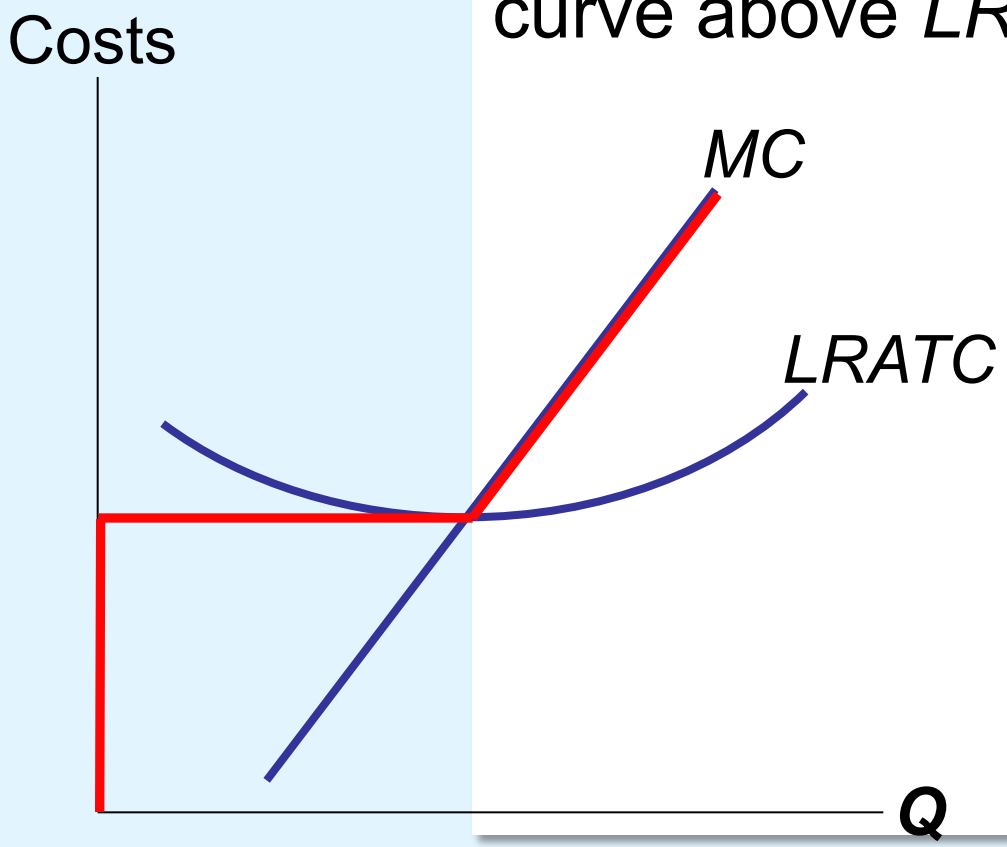
- Should a firm exit or enter in the long run?
  - Cost of exiting market = revenue loss = TR
  - Benefit of exiting market = cost savings = TC (remember, FC = 0 in long run)
- Firm's long-run decision
  - Exit the market if: TR < TC

    (same as: P < ATC)
  - Enter the market if: TR > TC

    (same as: P > ATC)

The Competitive Firm's LR Supply Curve

The firm's LR supply curve is the portion of its *MC* curve above *LRATC*.

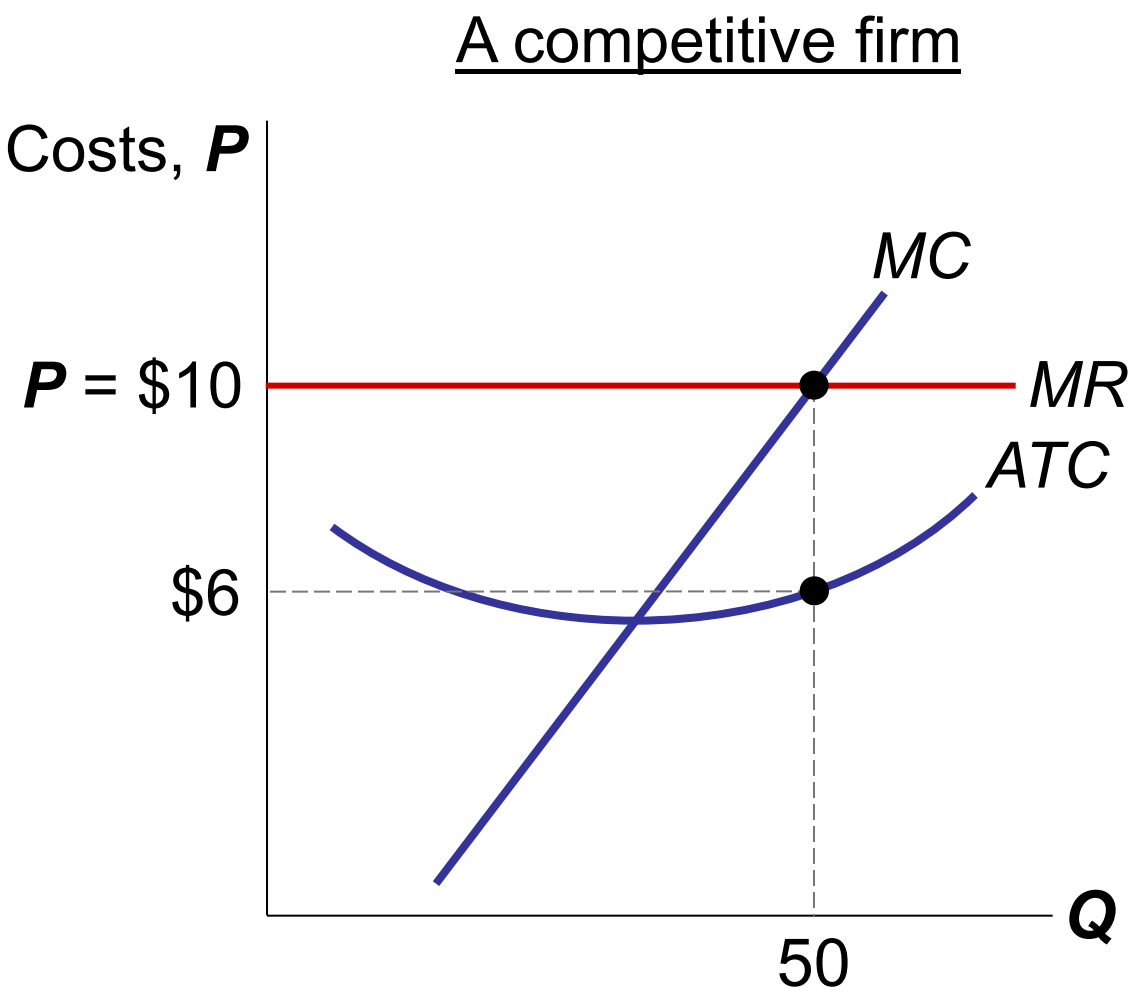


Active Learning 2

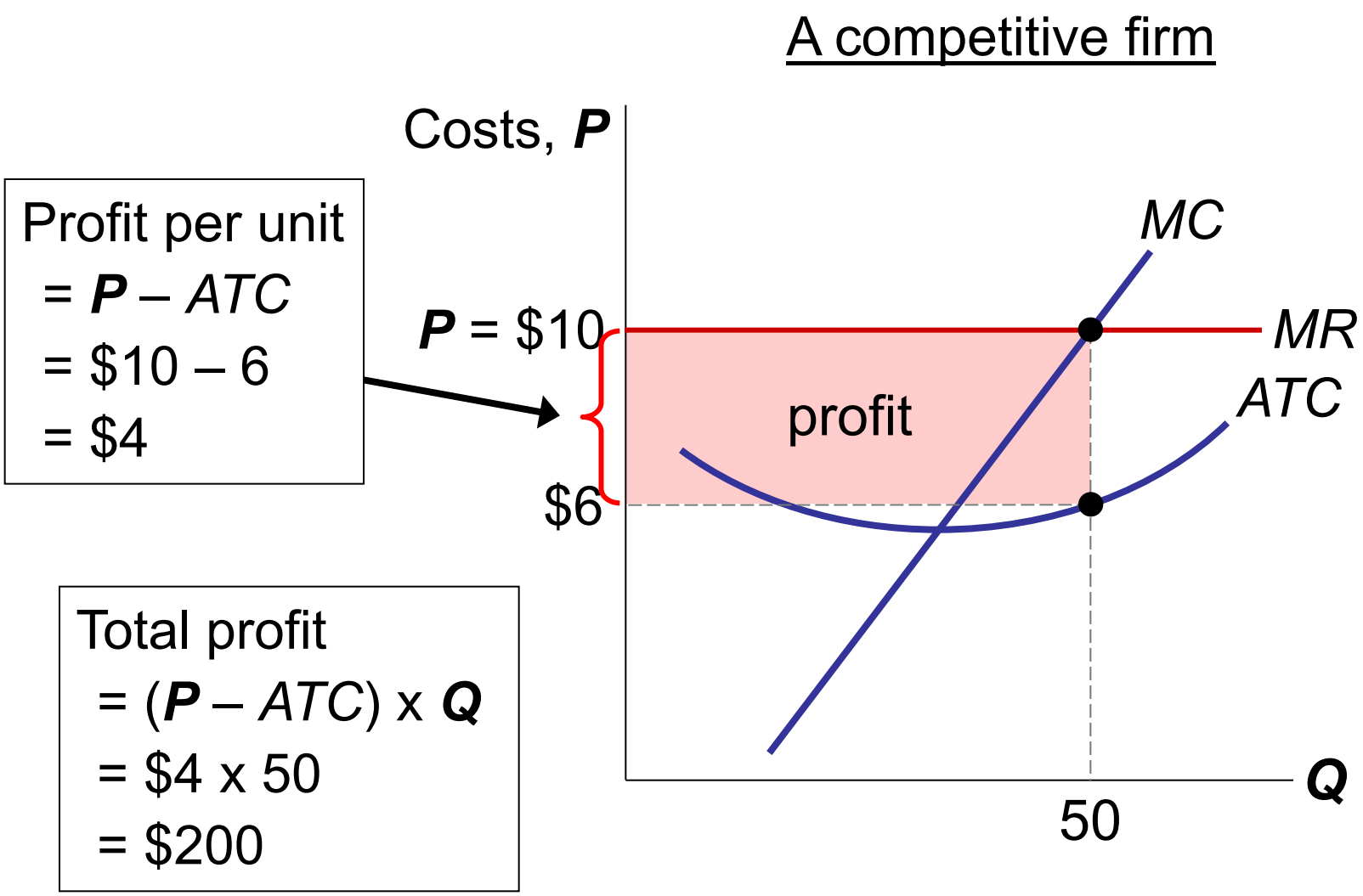
Identifying a firm's profit

Determine this firm's total profit.

Identify the area on the graph that represents the firm's profit.



Active Learning 2 Answers

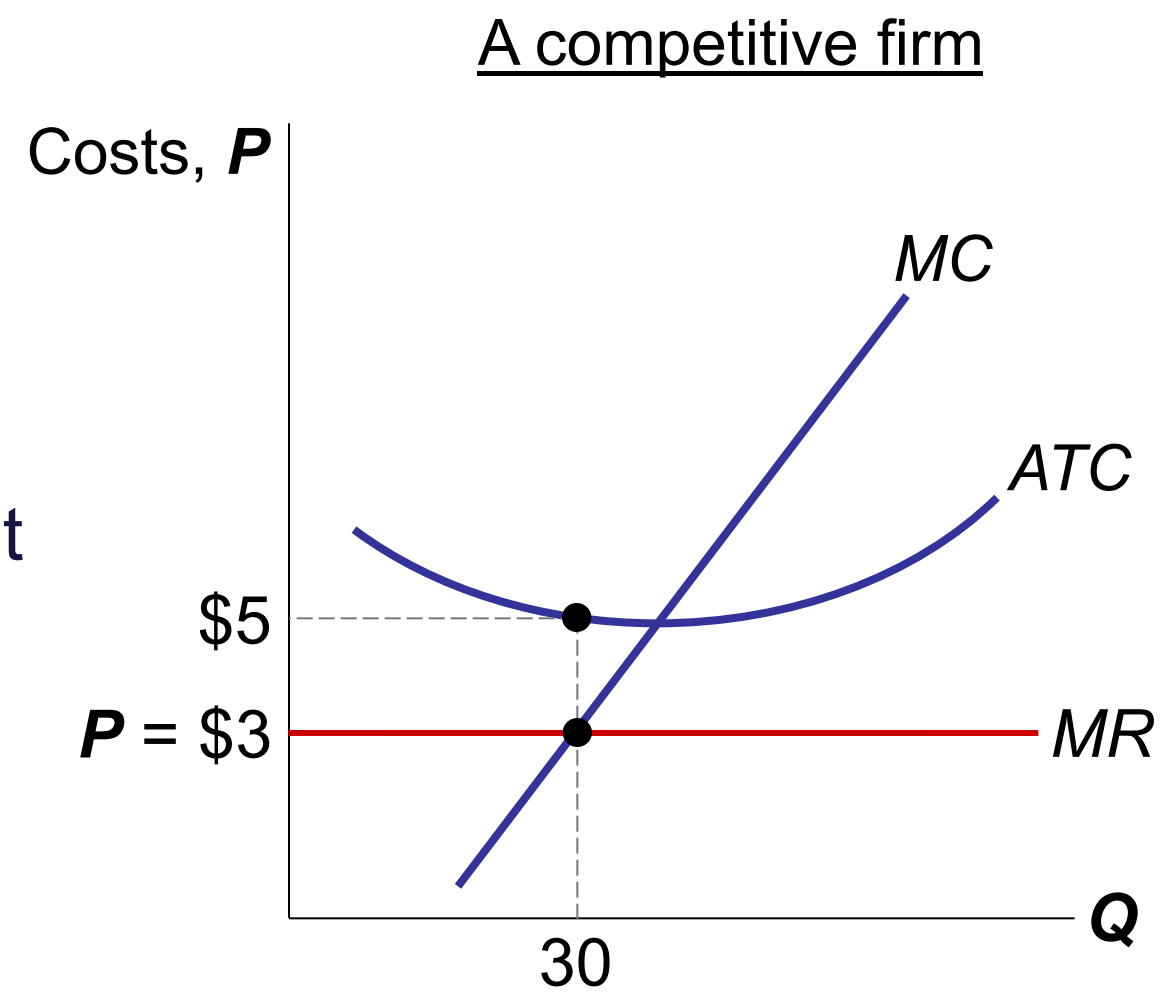


Active Learning 3

Identifying a firm's loss

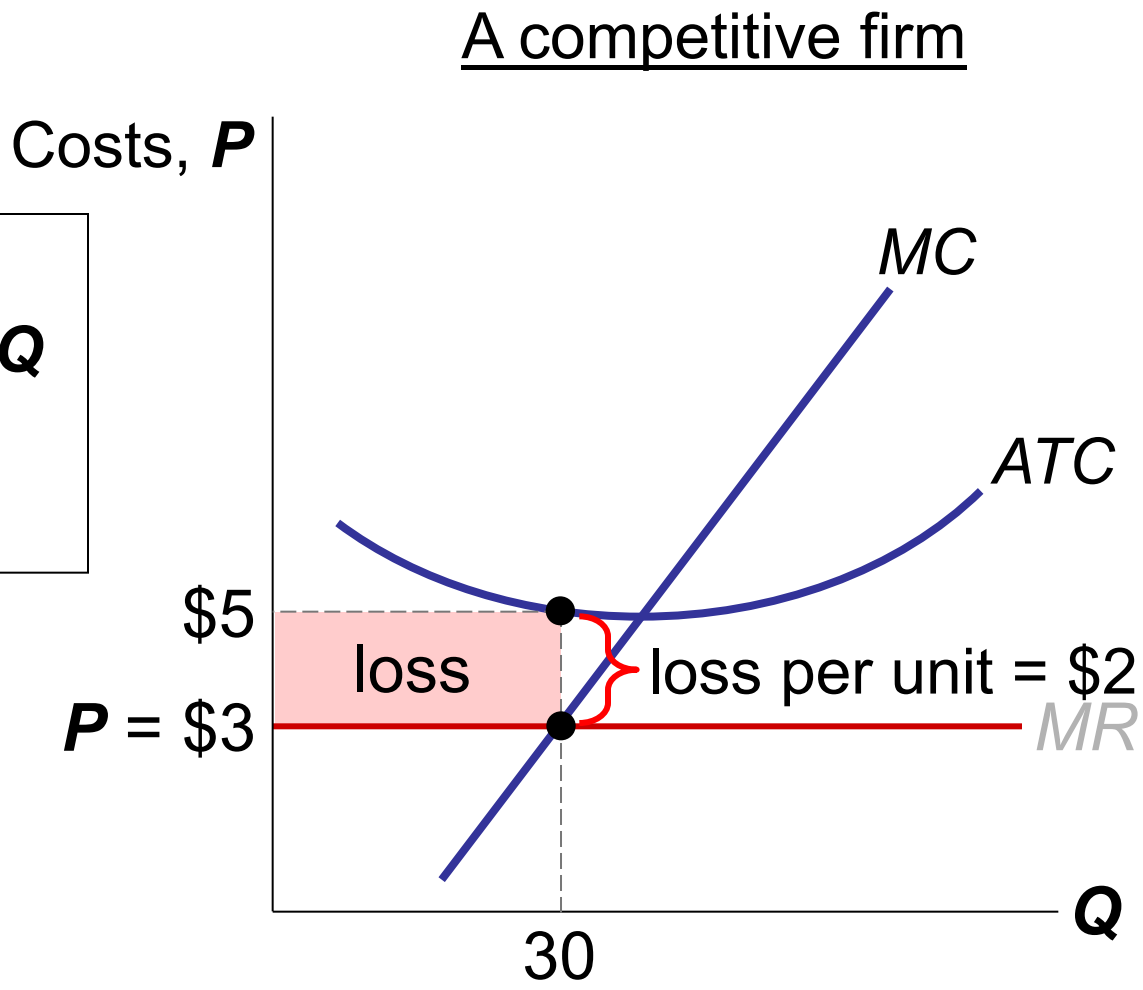
Determine this firm's total loss, assuming AVC < $3.

Identify the area on the graph that represents the firm's loss.



Active Learning 3 Answers

Total loss
= (*ATC* – ***P***) x ***Q***
= $2 x 30
= $60



Market Supply: Assumptions

1. All existing firms and potential entrants have identical costs.
2. Each firm's costs do not change as other firms enter or exit the market.
3. The number of firms in the market is
   - fixed in the short run (due to fixed costs)
   - variable in the long run (due to free entry and exit)

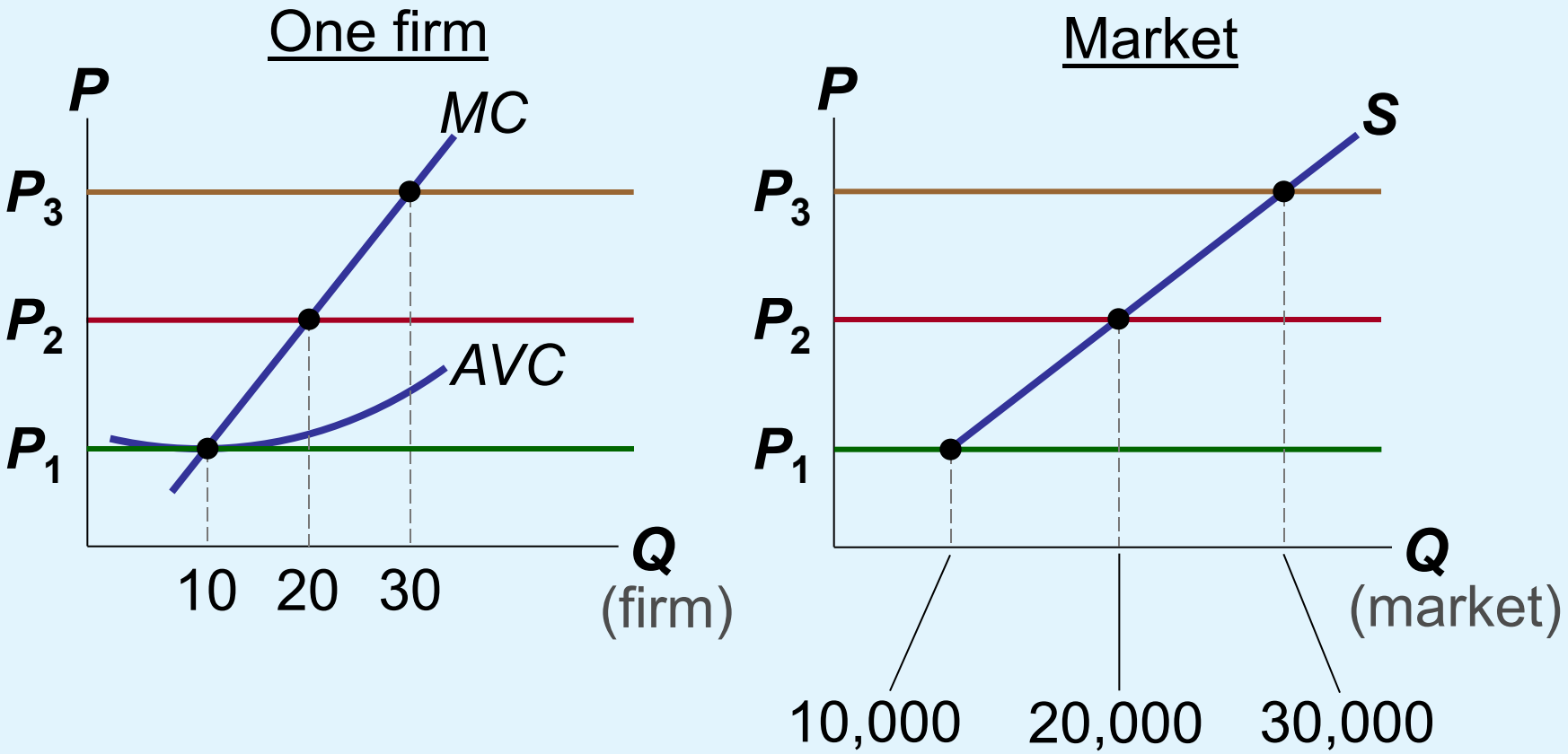
The SR Market Supply Curve

- As long as P ≥ AVC
  - Each firm will produce its profit-maximizing quantity, where MR = MC.
- Recall from Chapter 4:
  - At each price, the market quantity supplied is the sum of quantities supplied by all firms

The SR Market Supply Curve

Example: 1000 identical firms

At each ***P***, market Q^s = 1000 x (one firm's Q^s)



Entry & Exit in the Long Run

- In the long run, the number of firms can change due to entry and exit:
  - If existing firms earn positive economic profit:
    - New firms enter, SR market supply shifts right
    - P falls, reducing profits and slowing entry
  - If existing firms incur losses:
    - Some firms exit, SR market supply shifts left
    - P rises, reducing remaining firms' losses

The Zero-Profit Condition

- Long-run equilibrium:
  - The process of entry or exit is complete
  - Remaining firms earn zero economic profit
- Zero economic profit: when P = ATC
  - Since firms produce where P = MR = MC
  - The zero-profit condition is P = MC = ATC
  - Recall that MC intersects ATC at min ATC
  - Hence, in the long run, P = min ATC

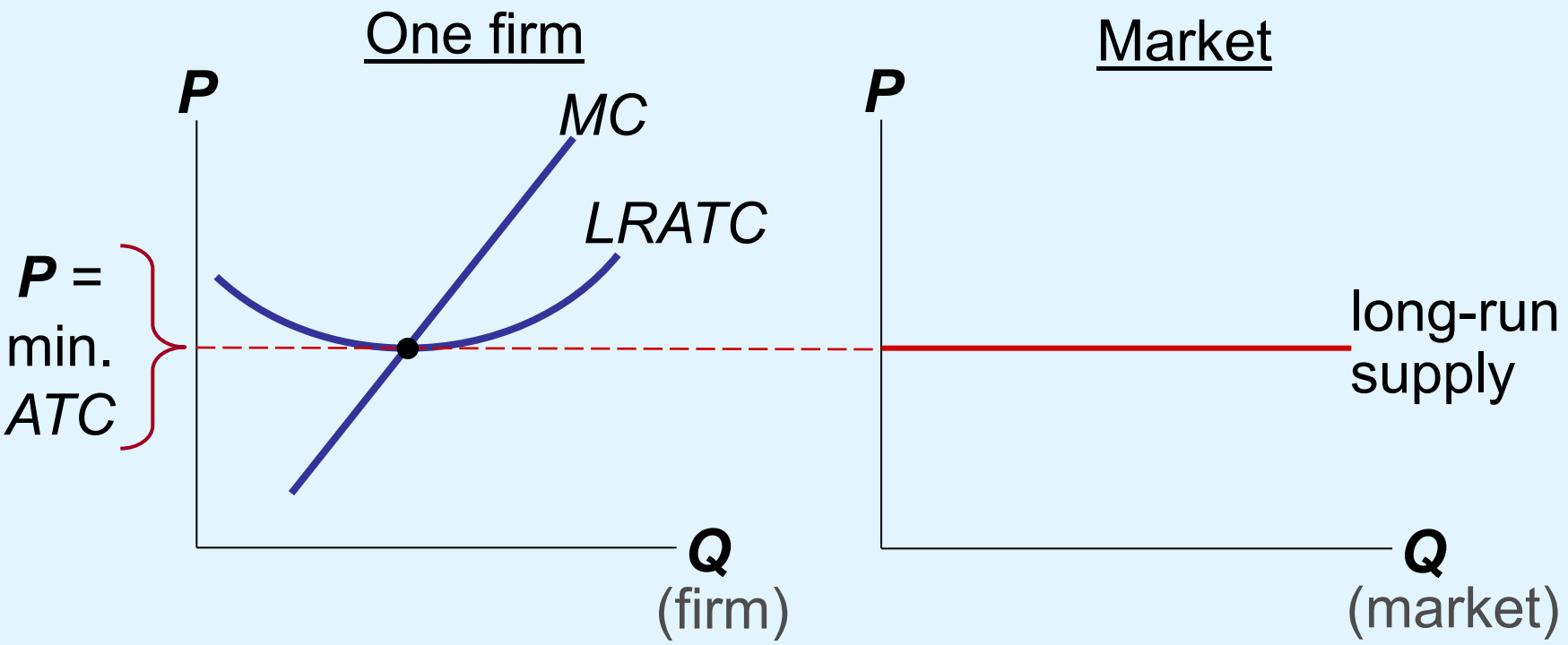
The Zero-Profit Condition

- Why do competitive firms stay in business if they make zero profit?
  - Profit = total revenue – total cost
  - Total cost includes all implicit costs like the opportunity cost of the owner's time and money
  - Zero-profit equilibrium
    - Economic profit is zero
    - Accounting profit is positive

The LR Market Supply Curve

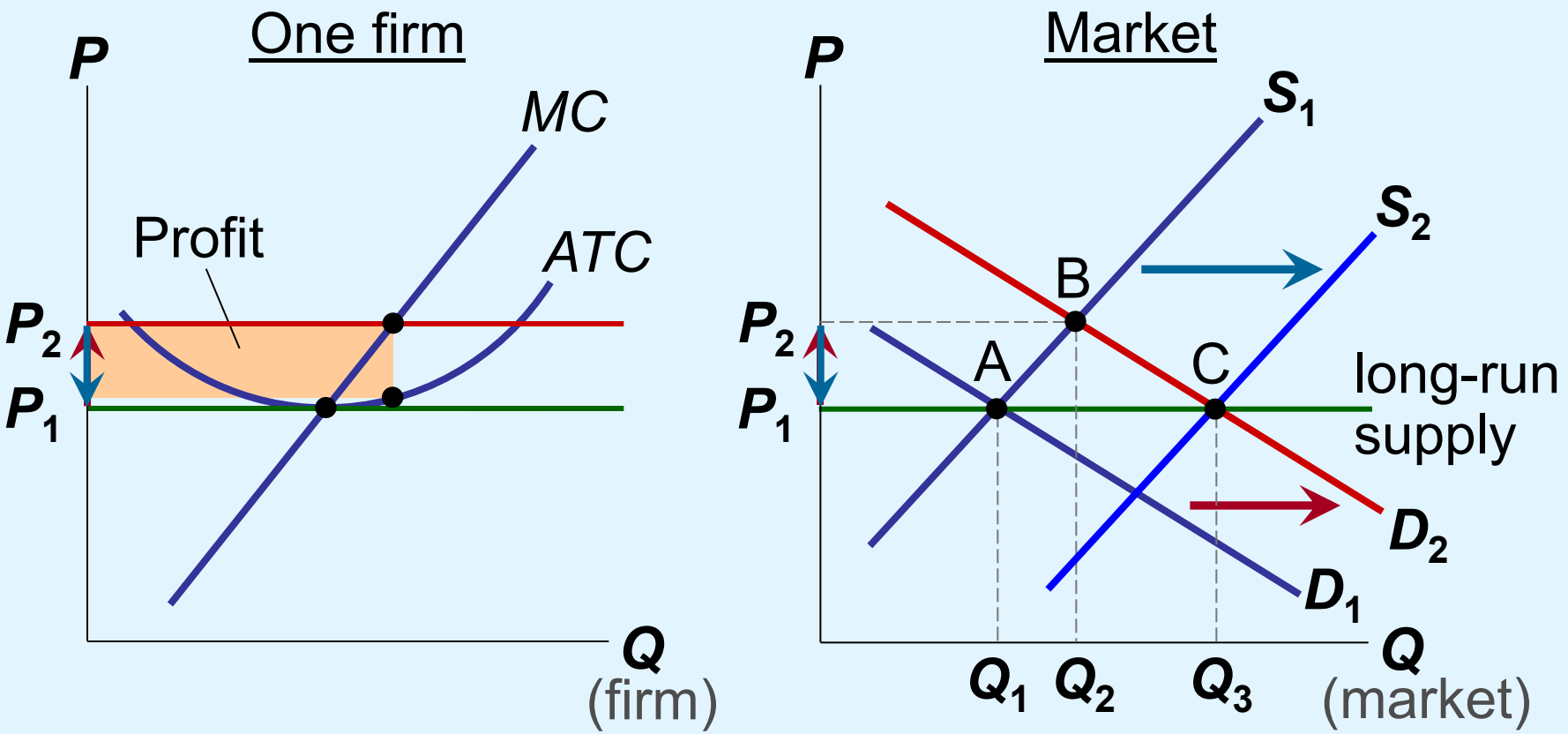
In the long run, the typical firm earns zero profit.

The LR market supply curve is horizontal at ***P*** = minimum *ATC*.



SR & LR Effects of an Increase in Demand

A firm begins in … but then an increase …leading t …driving profits to zero duce entry, profits for t and restoring long-run eq'm. ıt, reducing ***P***…



Long-Run Supply Curve

- Long-run supply curve is horizontal if:
  - All firms have identical costs, and
  - And costs do not change as other firms enter or exit the market
- Long-run supply curve might slope upward if:
  - Firms have different costs
  - Or costs rise as firms enter the market

Long-Run Supply Curve

- Firms have different costs
  - As P rises, firms with lower costs enter the market before those with higher costs.
  - Further increases in P make it worthwhile for higher-cost firms to enter the market, which increases market quantity supplied.
  - Hence, LR market supply curve slopes upward

Long-Run Supply Curve

- Costs rise as firms enter the market
  - In some industries, the supply of a key input is limited (e.g., amount of land suitable for farming is fixed).
  - The entry of new firms increases demand for this input, causing its price to rise.
  - This increases all firms' costs.
  - Hence, an increase in P is required to increase the market quantity supplied, so the supply curve is upward-sloping.

Efficiency of a Competitive Market

- Profit-maximization: Q where MC = MR
  - Perfect competition: P = MR
  - So, in the competitive equilibrium: P = MC
- The competitive equilibrium is efficient
  - Maximizes total surplus because P = MC
    - MC is the cost of producing the marginal unit
    - P is value to buyers of the marginal unit

Summary

- A competitive firm is a price taker
  - Its revenue is proportional to the amount of output it produces.
  - P = MR = AR
  - The firm's marginal-cost curve is its supply curve
- Short run: a firm cannot recover its FC
  - Shut down temporarily if P < AVC
- Long run: the firm can recover both FC and VC
  - Exit if P < ATC

Summary

- In a market with free entry and exit, profit is driven to zero in the long run.
  - All firms produce at efficient scale, P = min ATC
  - The number of firms adjusts to satisfy the quantity demanded at this price.
- Changes in demand have different effects over different time horizons.
  - Short run, an increase in demand raises prices and leads to profits (a decrease in demand lowers prices and leads to losses).
  - Long run: zero-profit equilibrium

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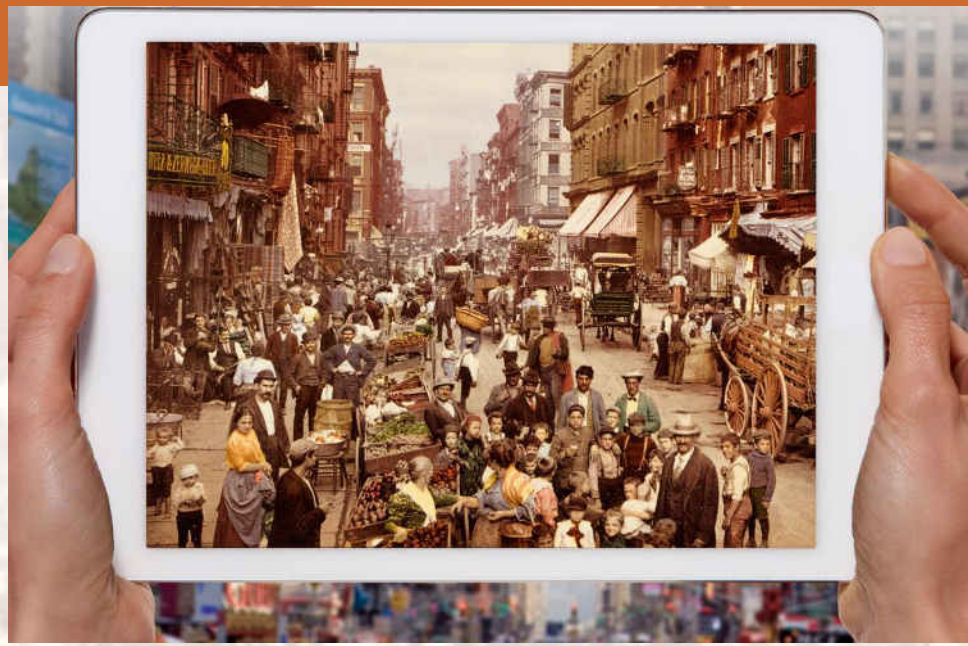


CHAPTER

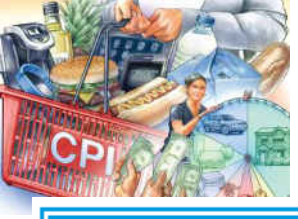
24

Measuring the Cost of Living

Premium PowerPoint Slides by:
V. Andreea CHIRITESCU
Eastern Illinois University

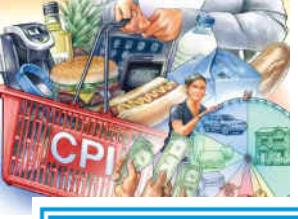
Look for the answers to these questions:

- What is the Consumer Price Index (CPI)? How is it calculated? What's it used for?
- What are the problems with the CPI? How serious are they?
- How does the CPI differ from the GDP deflator?
- How can we use the CPI to compare dollar amounts from different years? Why would we want to do this, anyway?
- How can we correct interest rates for inflation?



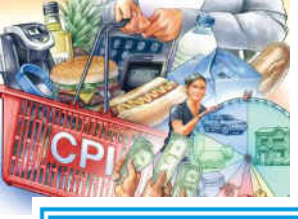
The Consumer Price Index

- Consumer price index (CPI)
  - Measure of the overall level of prices
  - Measure of the overall cost of goods and services
    - Bought by a typical consumer
  - Computed and reported every month by the Bureau of Labor Statistics



Calculating CPI

1. Fix the basket
   - The Bureau of Labor Statistics (BLS) surveys consumers to determine what's in the typical consumer's "shopping basket."
2. Find the prices
   - The BLS collects data on the prices of all the goods in the basket.
3. Compute the basket's cost
   - Use the prices to compute the total cost of the basket



Calculating CPI

4. Chose a base year and compute the CPI
   - Cost of basket of goods and services in current year divided by cost of basket in base year
   - Times 100
5. Compute the inflation rate
   - The percentage change in the CPI from the preceding period

$$\textit{Inflation rate} = \frac{\textit{CPI this year} - \textit{CPI last year}}{\textit{CPI last year}} \times 100$$

EXAMPLE: basket: {4 pizzas, 10 lattes}

year	*price of pizza*	*price of latte*	*cost of basket*
2014	\$10	\$2.00	\$10 x 4 + \$2 x 10 = \$60
2015	\$11	\$2.50	\$11 x 4 + \$2.5 x 10 = \$69
2016	\$12	\$3.00	\$12 x 4 + \$3 x 10 = \$78

Compute CPI in each year (2014 base year)

2014: 100 x (\$60/\$60) = 100

2015: 100 x (\$69/\$60) = 115

2016: 100 x (\$78/\$60) = 130

Inflation rate:

$$15\% = \frac{115 - 100}{100} \times 100\%$$

$$13\% = \frac{130 - 115}{115} \times 100\%$$

Active Learning 1 Calculating the CPI

CPI basket:
{10 lbs beef,
20 lbs chicken}

The CPI basket cost $120 in 2014, the base year.

	price of beef	*price of chicken*
2014	$4	$4
2015	$5	$5
2016	$9	$6

A. Compute the CPI in 2015.

B. What was the CPI inflation rate from 2015–2016?

Active Learning 1 Answers

CPI basket:
{10 lbs beef,
20 lbs chicken}

The CPI basket cost $120 in 2014, the base year.

	price of beef	*price of chicken*
2014	$4	$4
2015	$5	$5
2016	$9	$6

A. Compute the CPI in 2015.

Cost of CPI basket in 2015=($5x10)+($5x20)= $150

CPI in 2015 = 100 x ($150/$120) = 125

Active Learning 1 Answers

CPI basket:
{10 lbs beef,
20 lbs chicken}

The CPI basket cost $120 in 2014, the base year.

	price of beef	*price of chicken*
2014	$4	$4
2015	$5	$5
2016	$9	$6

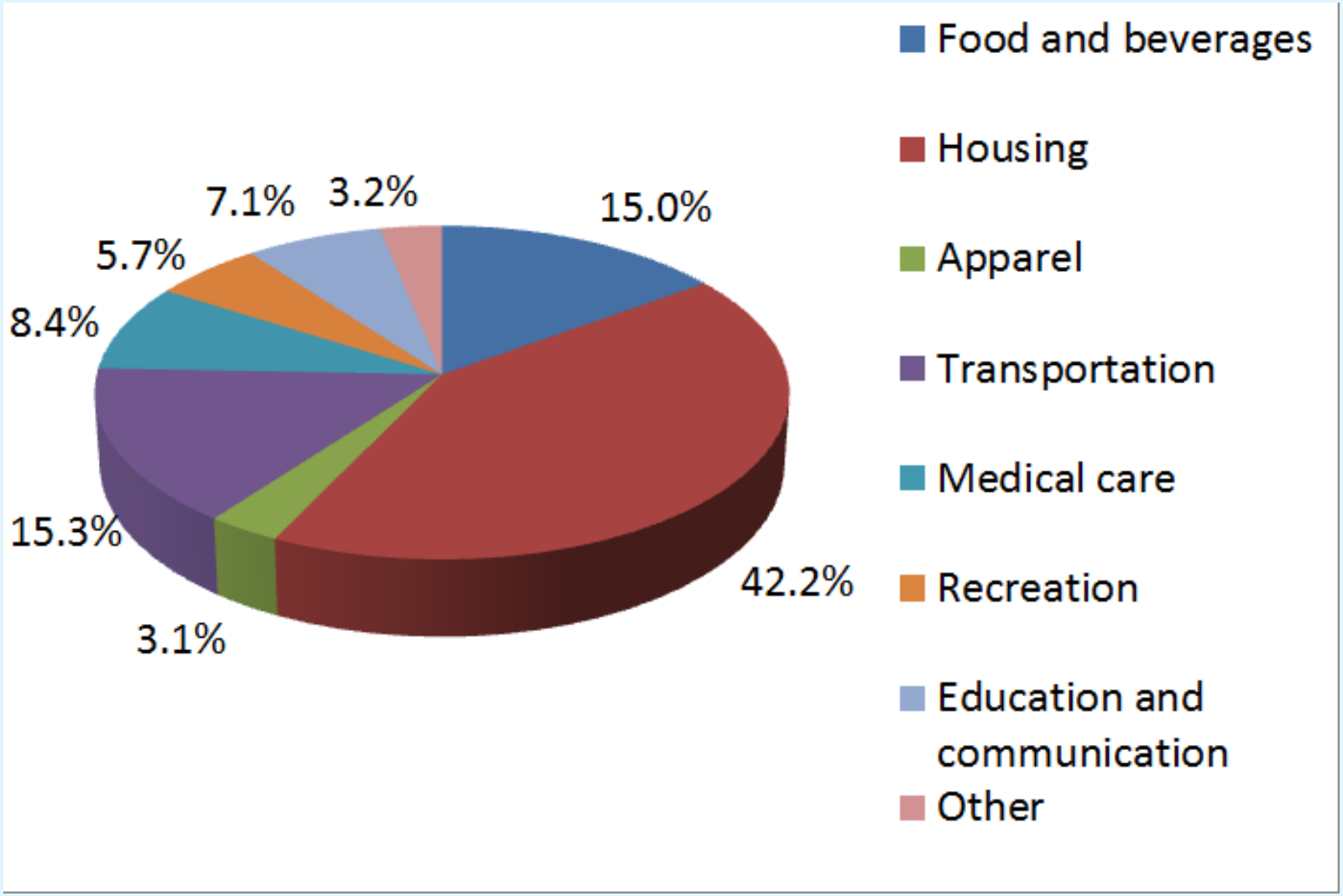
B. What was the CPI inflation rate from 2015–2016?

Cost of CPI basket in 2016=($9 x10)+($6 x20)= $210

CPI in 2016 = 100 x ($210/$120) = 175

CPI inflation rate = (175 – 125)/125 = 40%

What's in the CPI's Basket?



Active Learning 2 Substitution bias

CPI basket:
{10 lbs beef,
20 lbs chicken}

In 2014 and 2015, households bought CPI basket.

	beef	*chicken*	*cost of CPI basket*
2014	$4	$4	$120
2015	$5	$5	$150
2016	$9	$6	$210

In 2016, households bought {5 lbs beef, 25 lbs chicken}.

A. Compute cost of the 2016 household basket.

B. Compute % increase in cost of household basket over 2015–2016, compare to CPI inflation rate.

Active Learning 2 Answers

CPI basket:
{10 lbs beef,
20 lbs chicken}

In 2014 and 2015, households bought CPI basket.

	beef	*chicken*	*cost of CPI basket*
2014	$4	$4	$120
2015	$5	$5	$150
2016	$9	$6	$210

In 2016, households bought {5 lbs beef, 25 lbs chicken}.

A. Compute cost of the 2016 household basket.

($9 x 5) + ($6 x 25) = $195

Active Learning 2 Answers

CPI basket:
{10 lbs beef,
20 lbs chicken}

In 2014 and 2015, households bought CPI basket.

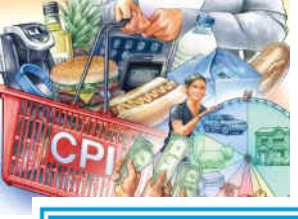
	beef	*chicken*	*cost of CPI basket*
2014	$4	$4	$120
2015	$5	$5	$150
2016	$9	$6	$210

In 2016, households bought {5 lbs beef, 25 lbs chicken}.

B. Compute % increase in cost of household basket over 2015–2016, compare to CPI inflation rate.

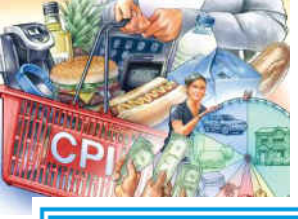
Rate of increase: ($195 – $150)/$150 = 30%

CPI inflation rate from previous problem = 40%



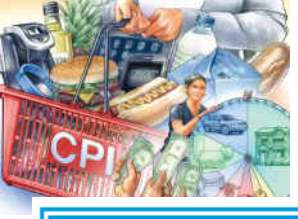
Problems with the CPI

- Substitution Bias
  - Over time, some prices rise faster than others
  - Consumers substitute toward goods that become relatively cheaper, mitigating the effects of price increases.
  - The CPI misses this substitution because it uses a fixed basket of goods.
  - Thus, the CPI overstates increases in the cost of living.



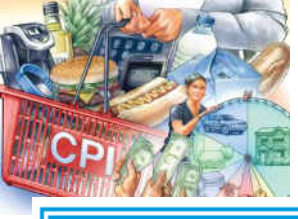
Problems with the CPI

- Introduction of New Goods
  - The introduction of new goods increases variety, allows consumers to find products that more closely meet their needs.
  - In effect, dollars become more valuable.
  - The CPI misses this effect because it uses a fixed basket of goods.
  - Thus, the CPI overstates increases in the cost of living.



Problems with the CPI

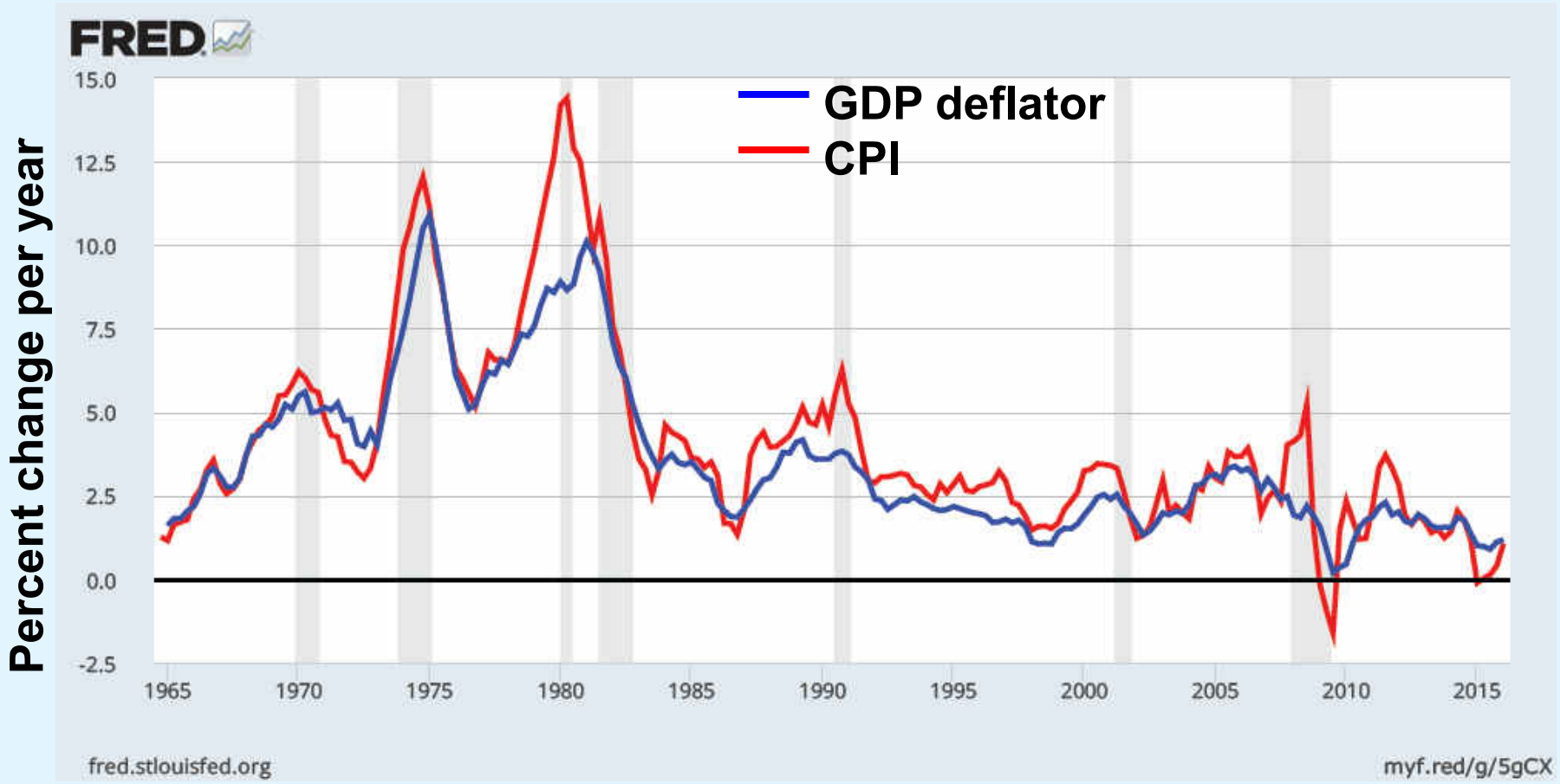
- Unmeasured Quality Change
  - Improvements in the quality of goods in the basket increase the value of each dollar.
  - The BLS tries to account for quality changes but probably misses some, as quality is hard to measure.
  - Thus, the CPI overstates increases in the cost of living.

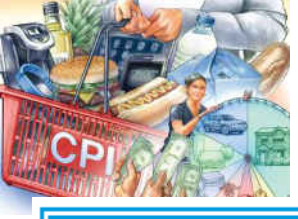


Problems with the CPI

- Each of these problems causes the CPI to overstate cost of living increases.
  - The BLS has made technical adjustments, but the CPI probably still overstates inflation by about 0.5 percent per year.
  - This is important because Social Security payments and many contracts have COLAs tied to the CPI.

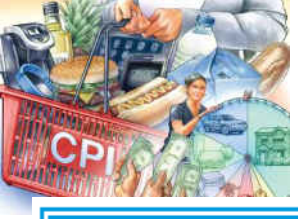
Two Measures of Inflation, 1965–2016





Contrasting the CPI and GDP Deflator

- Imported consumer goods:
  - Included in CPI
  - Excluded from GDP deflator
- Capital goods:
  - Excluded from CPI
  - Included in GDP deflator (if produced domestically)



Contrasting the CPI and GDP Deflator

- The basket:
  - CPI uses fixed basket
  - GDP deflator uses basket of currently produced goods & services
  - This matters if different prices are changing by different amounts.

Active Learning 3 CPI vs. GDP deflator

In each scenario, determine the effects on the CPI and the GDP deflator.

A. Starbucks raises the price of Frappuccinos.

B. Caterpillar raises the price of the industrial tractors it manufactures at its Illinois factory.

C. Armani raises the price of the Italian jeans it sells in the U.S.

Active Learning 3 Answers

A. Starbucks raises the price of Frappuccinos.

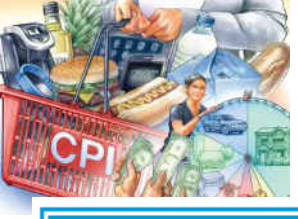
The CPI and GDP deflator both rise.

B. Caterpillar raises the price of the industrial tractors it manufactures at its Illinois factory.

The GDP deflator rises, the CPI does not.

C. Armani raises the price of the Italian jeans it sells in the U.S.

The CPI rises, the GDP deflator does not.



Correcting Variables for Inflation

- Comparing dollar figures from different times
  - Inflation makes it harder to compare dollar amounts from different times.
    - Example: the minimum wage
    - $1.25 in Dec 1963
    - $7.25 in Dec 2013
  - Did min wage have more purchasing power in Dec 1963 or Dec 2013?
  - To compare, use CPI to convert 1963 figure into “2013 dollars”…

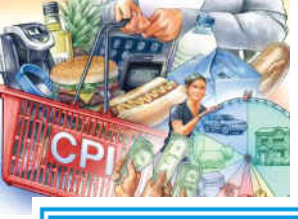
Correcting Variables for Inflation

- Dollar figures from different times

$$\text{Amount } \textit{in today's dollars} = \text{Amount } \textit{in year T dollars} \times \frac{\textit{Price level today}}{\textit{Price level in year T}}$$

- In our example:
  - "year T " is 1963, "today" is 2013
  - Min wage was $1.25 in year T
  - CPI = 30.9 in year T, CPI = 234.6 today
  - The minimum wage in 1963 was"

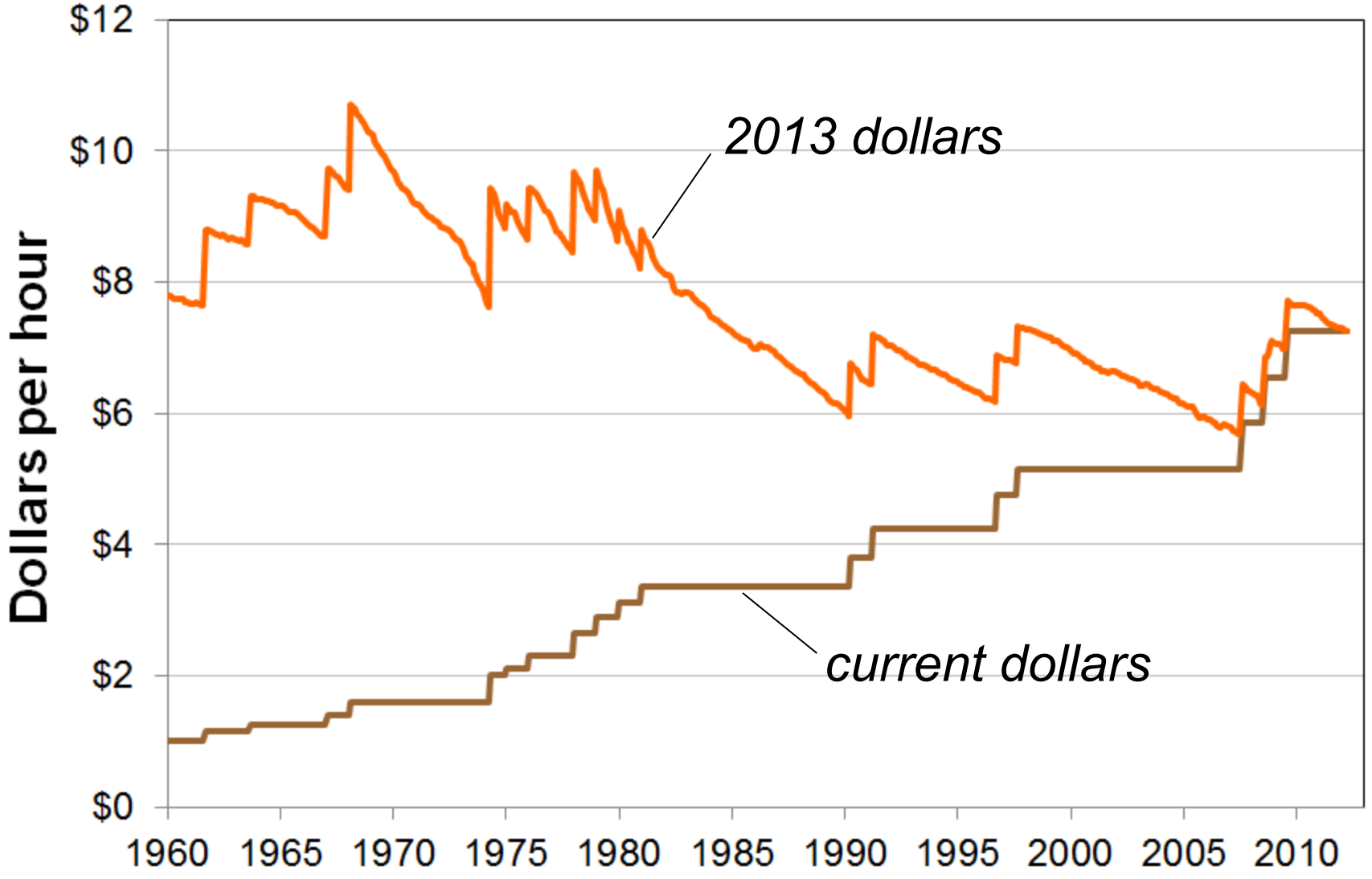
  $1.25 x 234.6/30.9 = $9.49 in 2013 dollars.



Correcting Variables for Inflation

- Comparing dollar figures from different times
  - Researchers, business analysts, and policymakers often use this technique to convert a time series of current-dollar (nominal) figures into constant-dollar (real) figures.
  - They can then see how a variable has changed over time after correcting for inflation.
  - Example: the minimum wage…

The U.S. Minimum Wage in Current Dollars and Today's Dollars, 1960–2013



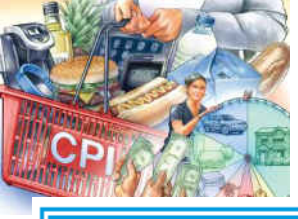
Active Learning 4 Comparing tuition increases

Tuition and Fees at U.S. Colleges and Universities		
	1990	2015
Private non-profit 4-year	$9,340	$32,405
Public 4-year	$1,908	$9,410
Public 2-year	$906	$3,435
CPI	130.7	237.7

- Express the 1990 tuition figures in 2015 dollars, then compute the percentage increase in real terms for all three types of schools.
- Which type experienced the largest increase in real tuition costs?

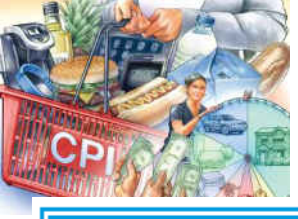
Active Learning 4 Answers

	1990	2015	% change
CPI	130.7	237.7	81.9%
Private non-profit 4-year (current $)	$9,340	$32,405	
Private non-profit 4-year (in 2015 $)	$16,986	$32,405	90.8%
Public 4-year (current $)	$1,908	$9,410	
Public 4-year (in 2015 $)	$3,470	$9,410	171.2%
Public 2-year (current $)	$906	$3,435	
Public 2-year (in 2015 $)	$1,648	$3,435	108.4%



Correcting Variables for Inflation

- Indexation
  - A dollar amount is indexed for inflation if it is automatically corrected for inflation by law or in a contract.
- The increase in CPI automatically determines:
  - The COLA in many multi-year labor contracts.
  - Adjustments in Social Security payments and federal income tax brackets.



Correcting Variables for Inflation

Real vs. Nominal Interest Rates

- The nominal interest rate:
  - Interest rate not corrected for inflation
  - Rate of growth in the dollar value of a deposit or debt
- The real interest rate:
  - Corrected for inflation
  - Rate of growth in the purchasing power of a deposit or debt

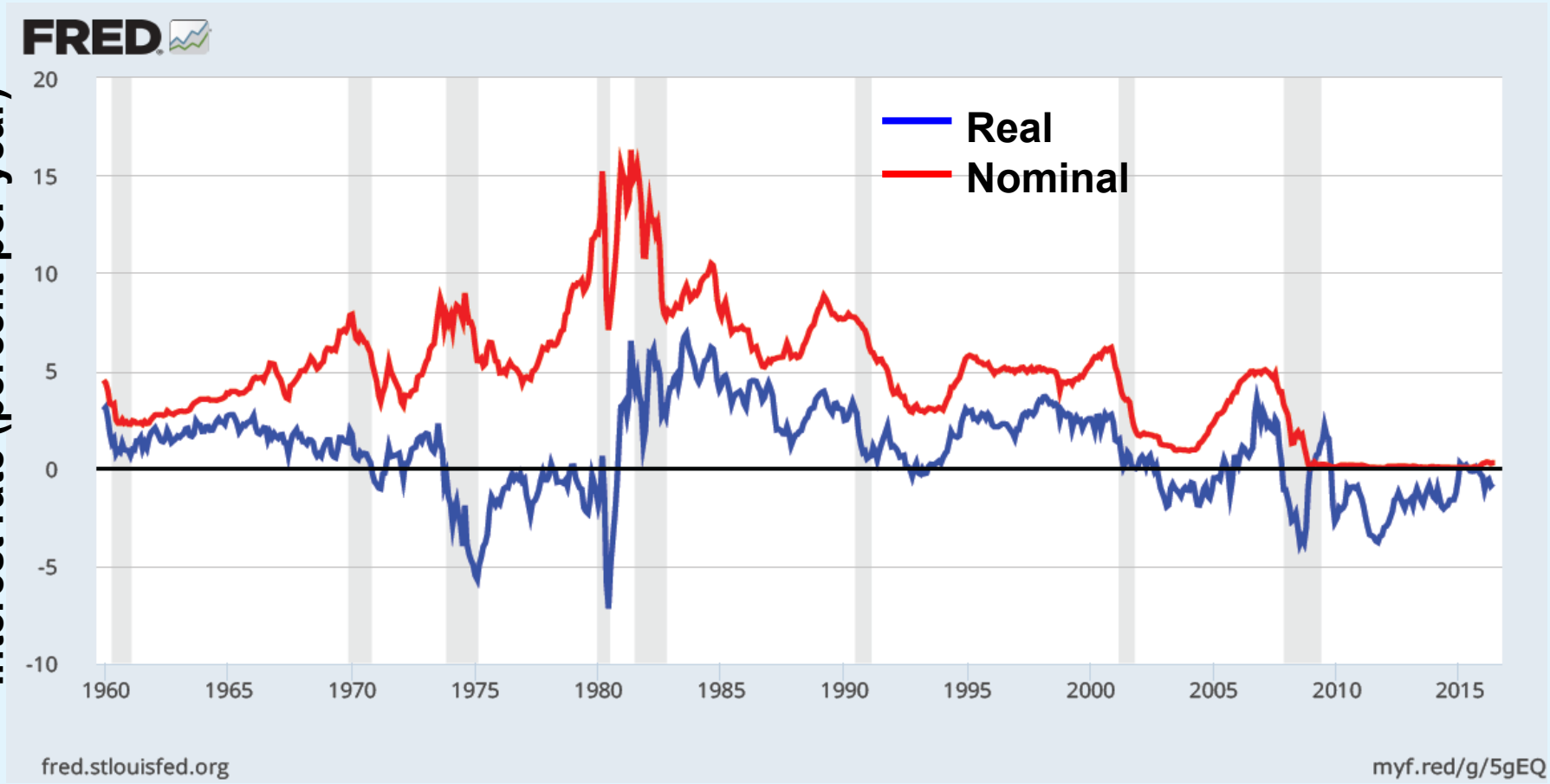
Real interest rate=(nominal interest rate)–(inflation rate)

Real vs. Nominal Interest Rates

Example:

- Deposit $1,000 for one year.
- Nominal interest rate is 9%.
- During that year, inflation is 3.5%.
- Real interest rate
  = Nominal interest rate – Inflation
  = 9.0% – 3.5% = 5.5%
- The purchasing power of the $1000 deposit has grown 5.5%.

Real and Nominal Interest Rates in the U.S., 1960–2015



Summary

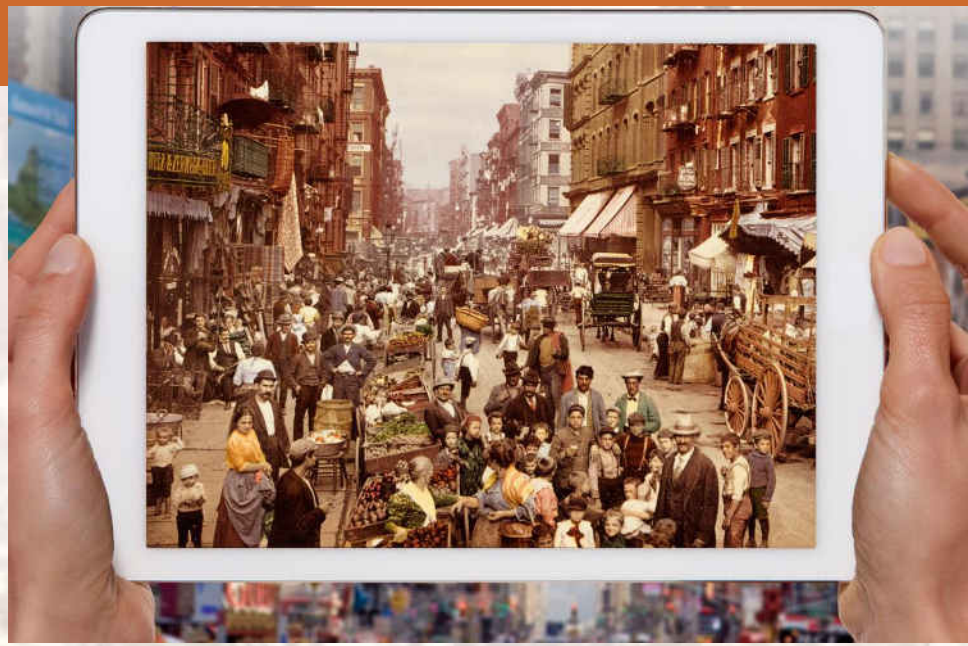
- The Consumer Price Index is a measure of the cost of living. The CPI tracks the cost of the typical consumer's "basket" of goods & services.
- The CPI is used to make Cost of Living Adjustments and to correct economic variables for the effects of inflation.
- The real interest rate is corrected for inflation and is computed by subtracting the inflation rate from the nominal interest rate.

N. GREGORY MANKIW

PRINCIPLES OF

ECONOMICS

Eighth Edition



CHAPTER

25

Production and Growth

Premium PowerPoint Slides by:
V. Andreea CHIRITESCU
Eastern Illinois University

Look for the answers to these questions:

- What are the facts about living standards and growth rates around the world?
- Why does productivity matter for living standards?
- What determines productivity and its growth rate?
- How can public policy affect growth and living standards?

CASE STUDY

A Picture Is Worth a Thousand Statistics

A typical family with all their possessions in the U.K., an advanced economy.

GDP per capita = $39,040

Child mortality rate = 0.4%

Access to modern sanitation facilities = 100%

Educational attainment =60% enrolled in higher education

CASE STUDY

A Picture Is Worth a Thousand Statistics

A typical family with all their possessions in Mexico, a middle income country

GDP per capita = $16,640

Child mortality rate = 1.3%

Access to modern sanitation facilities = 85%

Educational attainment =30%

CASE STUDY

A Picture Is Worth a Thousand Statistics

A typical family with all their possessions in Mali, a poor country

GDP per capita = $1,510

Child mortality rate = 11.5%

Access to modern sanitation facilities = 25%

Educational attainment =7%

Incomes and Growth Around the World

Country	Period	Real GDP per Person: At Beginning of Period[a]	Real GDP per Person: At End of Period[a]	Growth Rate (per year)
Brazil	1900–2014	$ 828	$15,590	2.61%
Japan	1890–2014	1,600	37,920	2.59
China	1900–2014	762	13,170	2.53
Mexico	1900–2014	1,233	16,640	2.31
Germany	1870–2014	2,324	46,850	2.11
Indonesia	1900–2014	948	10,190	2.10
Canada	1870–2014	2,527	43,360	1.99
India	1900–2014	718	5,630	1.82
United States	1870–2014	4,264	55,860	1.80
Pakistan	1900–2014	785	5,090	1.65
Argentina	1900–2014	2,440	12,510	1.44
Bangladesh	1900–2014	663	3,330	1.43
United Kingdom	1870–2014	5,117	39,040	1.42

[a]Real GDP is measured in 2014 dollars.

FACT 1: Vast differences in living standards around the world.
FACT 2: Great variation in growth rates across countries.

Economic Growth around the World

- Because of differences in growth rates
  - Ranking of countries by income changes substantially over time
    - Poor countries are not necessarily doomed to poverty forever, e.g. Singapore incomes were low in 1960 and are quite high now
    - Rich countries can't take their status for granted: They may be overtaken by poorer but faster-growing countries

Economic Growth around the World

- Questions:
  - Why are some countries richer than others?
  - Why do some countries grow quickly while others seem stuck in a poverty trap?
  - What policies may help raise growth rates and long-run living standards?

Productivity

A country's standard of living depends on its ability to produce goods and services

- Productivity
  - Quantity of goods and services
  - Produced from each unit of labor input
  - Productivity = Y/L (output per worker), where
    - Y = real GDP = quantity of output produced
    - L = quantity of labor

Productivity

- Why productivity is so important
  - Key determinant of living standards
    - When a nation's workers are very productive, real GDP is large and incomes are high
  - Growth in productivity is the key determinant of growth in living standards
    - When productivity grows rapidly, so do living standards
  - An economy's income is the economy's output

Determinants of Productivity

- Physical capital, K
  - Stock of equipment and structures used to produce goods and services
- Physical capital per worker, K/L
  - Productivity is higher when the average worker has more capital (machines, equipment, etc.).
    - An increase in K/L causes an increase in Y/L

Determinants of Productivity

- Human capital, H
  - Knowledge and skills workers acquire through education, training, and experience
- Human capital per worker, H/L
  - Productivity is higher when the average worker has more human capital (education, skills, etc.).
    - An increase in H/L causes an increase in Y/L.

Determinants of Productivity

- Natural resources, N
  - Inputs into production that nature provides (land, rivers, and mineral deposits)
- Natural resources per worker, N/L
  - Other things equal, more N allows a country to produce more Y
    - An increase in N/L causes an increase in Y/L

Determinants of Productivity

- Technological knowledge
  - Society's understanding of the best ways to produce goods and services
  - Technological progress means:
    - A faster computer, a higher-definition TV, or a smaller cell phone
    - Also, any advance in knowledge that boosts productivity: allows society to get more output from its resources
    - e.g., Henry Ford and the assembly line.

Determinants of Productivity

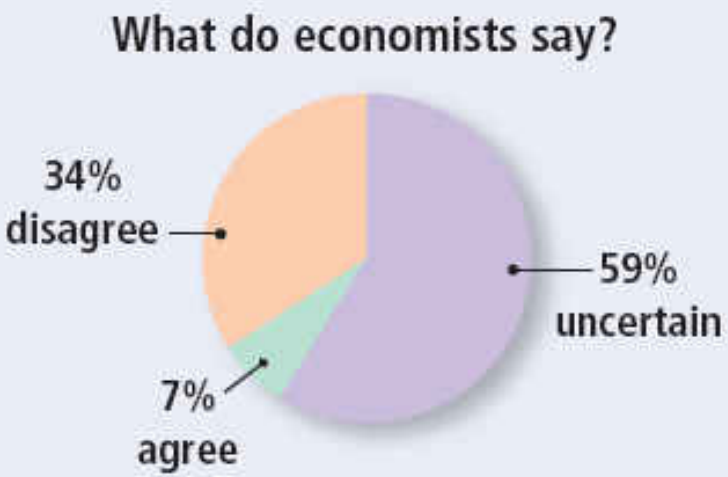
Technological knowledge vs. Human capital

- Technological knowledge
  - Refers to society's understanding of how to produce goods and services
- Human capital
  - Results from the effort people expend to acquire this knowledge
- Both are important for productivity

ASK THE EXPERTS

Innovation and Growth

"Future innovations worldwide will not be transformational enough to promote sustained per-capita economic growth rates in the United States and western Europe over the next century as high as those over the past 150 years."



The Production Function

- The production function $Y = A\,F(L, K, H, N)$
  - A graph or equation showing the relation between output and inputs
  - F( ) is a function that shows how inputs are combined to produce output
  - "A" is the level of technology
  - "A" multiplies the function F( ), so improvements in technology (increases in "A") allow more output (Y) to be produced from any given combination of inputs.

The Production Function $Y = A\,F(L, K, H, N)$

- The production function has the property constant returns to scale:
  - Changing all inputs by the same percentage causes output to change by that percentage.
    - Doubling all inputs (multiplying each by 2) causes output to double:

      $$2\mathbf{Y} = \mathbf{A}\,\mathbf{F}(2\mathbf{L}, 2\mathbf{K}, 2\mathbf{H}, 2\mathbf{N})$$

    - Increasing all inputs 10% (multiplying each by 1.1) causes output to increase by 10%:

      $$1.1Y = A\,F(1.1L, 1.1K, 1.1H, 1.1N)$$

The Production Function $Y = A F(L, K, H, N)$

- If we multiply each input by 1/L, then output is multiplied by 1/L:

  $$Y/L = A F(1, K/L, H/L, N/L)$$

- This equation shows that productivity (Y/L, output per worker) depends on:
  - The level of technology, A
  - Physical capital per worker, K/L
  - Human capital per worker, H/L
  - Natural resources per worker, N,L

Active Learning 1 Discussion question

Which of the following policies do you think would be most effective at boosting growth and living standards in a poor country over the long run?

a. Offer tax incentives for investment by local firms
b. Offer tax incentives for investment by foreign firms
c. Give cash payments for good school attendance
d. Crack down on government corruption
e. Restrict imports to protect domestic industries
f. Allow free trade
g. Give away condoms

Economic Growth and Public Policy

- The ways public policy can affect long-run growth in productivity and living standards:
  - Saving and investment
  - Diminishing returns and the catch-up effect
  - Investment from abroad; Education
  - Health and nutrition
  - Property rights and political stability
  - Free trade; Research and development
  - Population growth

Saving and Investment

- Raise future productivity
  - Invest more current resources in the production of capital, K
  - Trade-off: since resources scarce, producing more capital requires producing fewer consumption goods
  - Reducing consumption = increasing saving
    - This extra saving funds the production of investment goods (More details in the next chapter.)

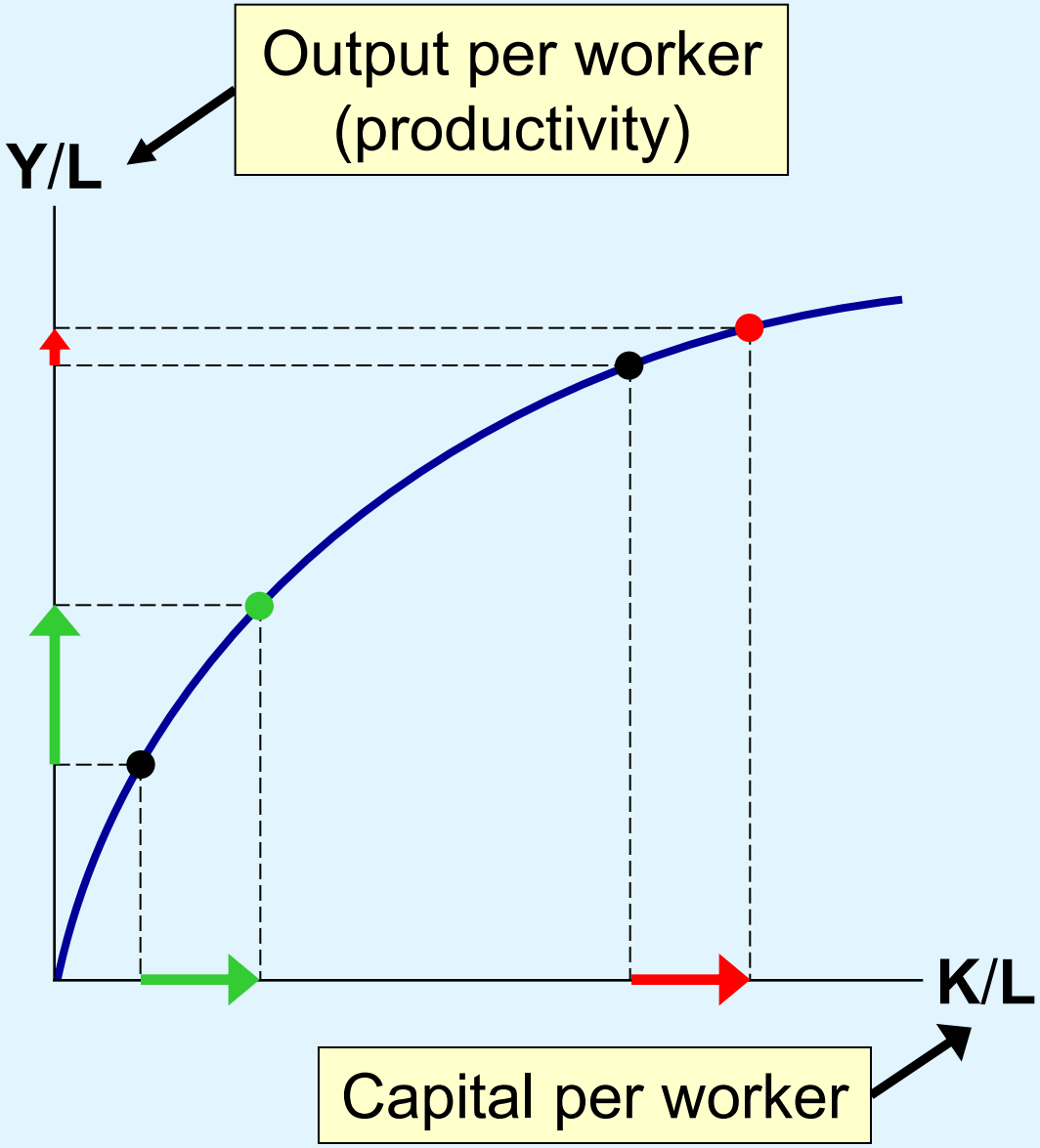
Diminishing Returns

- Policies that raise saving and investment
  - Fewer resources are used to make consumption goods
  - More resources: to make capital goods
  - K increases, rising productivity and living standards
  - This faster growth is temporary, due to diminishing returns to capital: As K rises, the extra output from an additional unit of K falls….

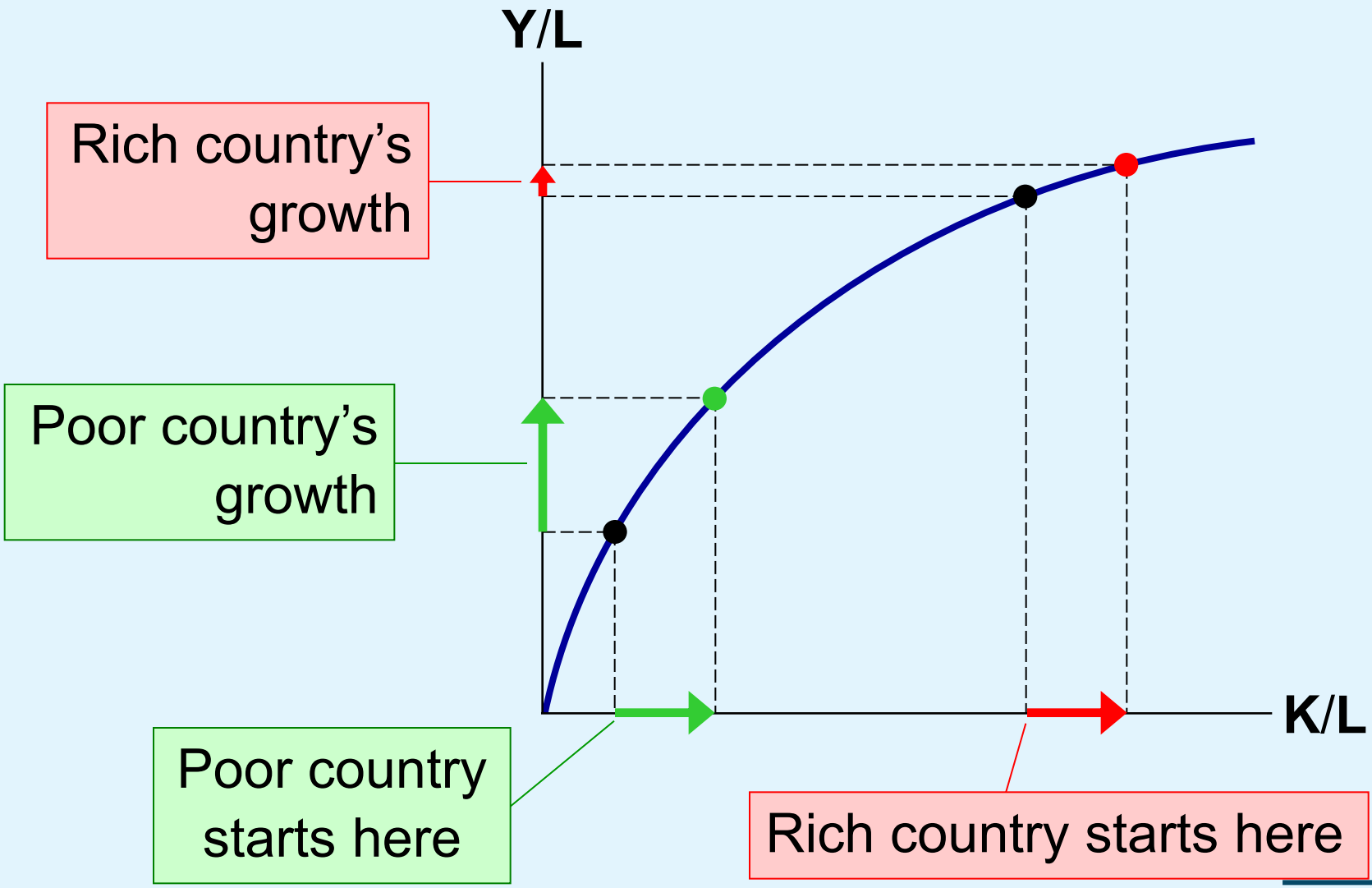
The Production Function & Diminishing Returns

If workers have little **K**, giving them more increases their productivity a lot.

If workers already have a lot of **K**, giving them more increases productivity fairly little.



The catch-up effect: the property whereby poor countries tend to grow more rapidly than rich ones



Example of the Catch-Up Effect

- 1960–1990
  - The U.S. and S. Korea devoted a similar share of GDP to investment
    - Expect: similar growth performance
  - But growth was >6% in Korea and only 2% in the U.S.
  - Explanation: the catch-up effect
    - In 1960, K/L was far smaller in Korea than in the U.S., hence Korea grew faster

Investment from Abroad

- Investment from abroad
  - Another way for a country to invest in new capital
  - Foreign direct investment
    - Capital investment that is owned and operated by a foreign entity
  - Foreign portfolio investment
    - Investment financed with foreign money but operated by domestic residents

Investment from Abroad

- Benefits from investment from abroad
  - Some benefits flow back to the foreign capital owners
  - Increase the economy's stock of capital
  - Higher productivity and higher wages
  - State-of-the-art technologies developed in other countries
  - Especially good for poor countries that cannot generate enough saving to fund investment projects themselves

Education

- Education, investment in human capital
  - Gap between wages of educated and uneducated workers
    - In the U.S., each year of schooling raises a worker's wage by 10%
  - Opportunity cost: wages forgone
    - Spending a year in school requires sacrificing a year's wages now to have higher wages later
- Problem for poor countries: Brain drain

Health and Nutrition

- Health care expenditure
  - Is a type of investment in human capital: healthier workers are more productive
- In countries with significant malnourishment, raising workers' caloric intake raises productivity:
  - 1962–1995, caloric consumption rose 44% in S. Korea, and economic growth was spectacular.
  - Nobel winner Robert Fogel: 30% of Great Britain's growth from 1790–1980 was due to improved nutrition

Health and Nutrition

- Vicious circle in poor countries
  - Poor countries are poor because their populations are not healthy
  - Populations are not healthy because they are poor and cannot afford better healthcare and nutrition
- Virtuous circle
  - Policies that lead to more rapid economic growth would naturally improve health outcomes, which in turn would further promote economic growth

Property Rights and Political Stability

Markets are usually a good way to organize economic activity

- To foster economic growth
  - Protect property rights (the ability of people to exercise authority over the resources they own)
    - Courts – enforce property rights
  - Promote political stability
- Property rights:
  - Prerequisite for the price system to work

Property Rights and Political Stability

- Lack of property rights, a major problem
  - Contracts are hard to enforce
  - Fraud, corruption often goes unpunished
    - Firms must bribe government officials for permits
- Political instability (e.g., frequent coups)
  - Creates uncertainty over whether property rights will be protected in the future

Property Rights and Political Stability

- When people fear their capital may be stolen by criminals/confiscated by a corrupt government
  - Less investment, including from abroad, and the economy functions less efficiently
  - Result: lower living standards
- Economic stability, efficiency, and healthy growth
  - Require law enforcement, effective courts, a stable constitution, honest government officials

Free Trade

Trade can make everyone better off

- Inward-oriented policies
  - i.e. tariffs, limits on investment from abroad
  - Aim to raise living standards by avoiding interaction with other countries
- Outward-oriented policies
  - i.e. elimination of restrictions on trade or foreign investment
  - Promote integration with the world economy

Free Trade

- Trade has similar effects as discovering new technologies
  - Improves productivity and living standards
- Countries with inward-oriented policies
  - Have generally failed to create growth.
    - e.g., Argentina during the 20th century.
- Countries with outward-oriented policies
  - Have often succeeded
    - e.g., South Korea, Singapore, Taiwan after 1960

Research and Development

- Technological progress
  - Main reason why living standards rise over the long run
- Knowledge is a public good
  - Ideas can be shared freely, increasing the productivity of many
- Policies to promote technological progress:
  - Patent laws; Tax incentives or direct support for private sector R&D
  - Grants for basic research at universities

Population Growth

- Large population
  - More workers to produce goods and services: larger total output of goods and services
  - More consumers
- Population growth may affect living standards in 3 different ways…

Population Growth

1. Stretching natural resources

- 200 years ago, Malthus argued that population growth will:
  - Strain society's ability to provide for itself
  - Mankind - doomed to forever live in poverty
- Since then, the world population has increased sixfold and living standards increased
  - Malthus failed to account for technological progress and productivity growth

Population Growth

2. Diluting the capital stock

- High population growth (higher L)
- Spread the capital stock more thinly (lower K/L)
- Lower productivity and living standards

- To combat this, many developing countries use policy to control population growth
  - Government regulation (China's one child law)
  - Increased awareness of birth control
  - Equal opportunities for women (Promote female literacy to raise opportunity cost of having babies)

Population Growth

3. Promoting technological progress

- World population growth
  - Engine for technological progress and economic prosperity
  - More people = More scientists, more inventors, more engineers = More frequent discoveries

- Michael Kremer, human history:
  - Growth rates increased as the world's population increased
  - More populated regions grew faster than less populated ones

Active Learning 2 Review productivity concepts

- List the determinants of productivity.
- List three policies that attempt to raise living standards by increasing one of the determinants of productivity.

Active Learning 2 Answers

- Determinants of productivity:
  - K/L, physical capital per worker
  - H/L, human capital per worker
  - N/L, natural resources per worker
  - A, technological knowledge
- Policies to boost productivity:
  - Encourage saving and investment, to raise K/L
  - Encourage investment from abroad, to raise K/L
  - Provide public education, to raise H/L
  - Patent laws or grants, to increase A
  - Control population growth, to increase K/L

CASE STUDY

Are Natural Resources a Limit to Growth?

- Some argue that population growth
  - Is depleting the Earth's non-renewable resources
  - And thus will limit growth in living standards.
- But technological progress often yields ways to avoid these limits:
  - Hybrid cars use less gas.
  - Better insulation in homes reduces the energy required to heat or cool them.

CASE STUDY

Are Natural Resources a Limit to Growth?

- Market economy, scarcity is reflected in market prices
  - If the world were running out of natural resources, their prices would be rising over time
  - In real terms, the prices of most natural resources are stable or falling
  - It appears that our ability to conserve these resources is growing more rapidly than their supplies are dwindling

Conclusion

- In the long run
  - Living standards are determined by productivity
- Policies that affect the determinants of productivity
  - Will therefore affect the next generation's living standards
- One of these determinants: saving & investment
  - Next chapter: how saving and investment are determined, and how policies can affect them

Summary

- There are great differences across countries in living standards and growth rates.
- Productivity (output per unit of labor) is the main determinant of living standards in the long run.
- Productivity depends on physical and human capital per worker, natural resources per worker, and technological knowledge.
- Growth in these factors—especially technological progress—causes growth in living standards over the long run.

Summary

- Policies can affect the following, each of which has important effects on growth:
  - Saving and investment; International trade
  - Education, health & nutrition
  - Property rights and political stability
  - Research and development
  - Population growth
- Because of diminishing returns to capital, growth from investment eventually slows down, and poor countries may “catch up” to rich ones.

30 Money Growth and Inflation

PRINCIPLES OF

ECONOMICS

FOURTH EDITION

N. GREGORY MANKIW

Premium PowerPoint® Slides
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2008 update

In this chapter, look for the answers to these questions:

- How does the money supply affect inflation and nominal interest rates?
- Does the money supply affect real variables like real GDP or the real interest rate?
- How is inflation like a tax?
- What are the costs of inflation? How serious are they?

Introduction

- This chapter introduces the **quantity theory of money** to explain one of the Ten Principles of Economics from Chapter 1:

  Prices rise when the govt prints too much money.

- Most economists believe the quantity theory is a good explanation of the long run behavior of inflation.

The Value of Money

- ***P*** = the price level
  (*e.g.*, the CPI or GDP deflator)

  P is the price of a basket of goods, measured in money.
- 1/***P*** is the value of $1, measured in goods.
- Example: basket contains one candy bar.
  - If ***P*** = $2, value of $1 is 1/2 candy bar
  - If ***P*** = $3, value of $1 is 1/3 candy bar
- Inflation drives up prices, and drives down the value of money.

The Quantity Theory of Money

- Developed by 18th century philosopher David Hume, and the classical economists.
- Advocated more recently by Nobel Prize Laureate Milton Friedman.
- Asserts that the quantity of money determines the value of money.
- We study this theory using two approaches:
  1. a supply-demand diagram
  2. an equation

Money Supply (MS)

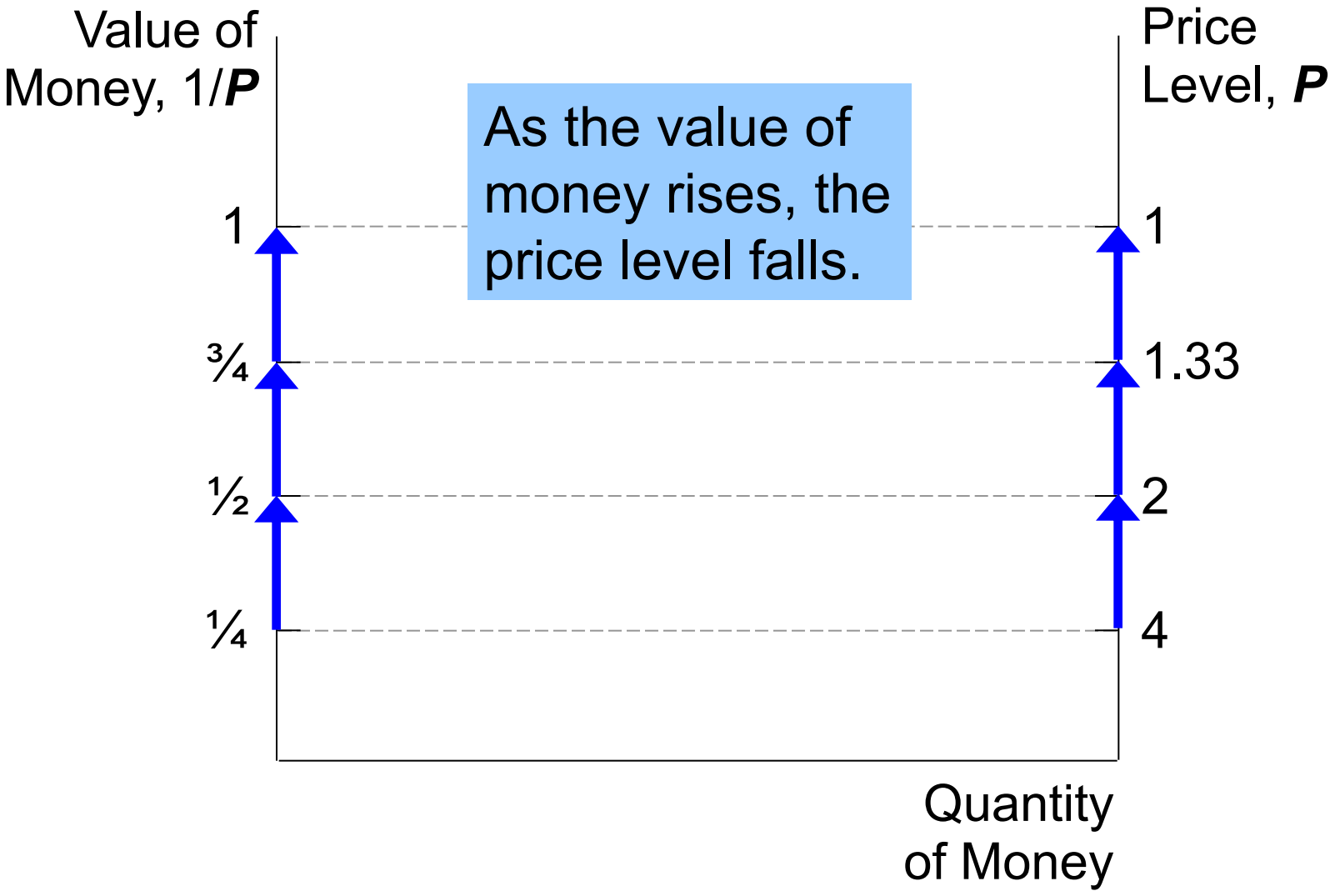
- In real world, determined by Federal Reserve, the banking system, consumers.
- In this model, we assume the Fed precisely controls MS and sets it at some fixed amount.

Money Demand (MD)

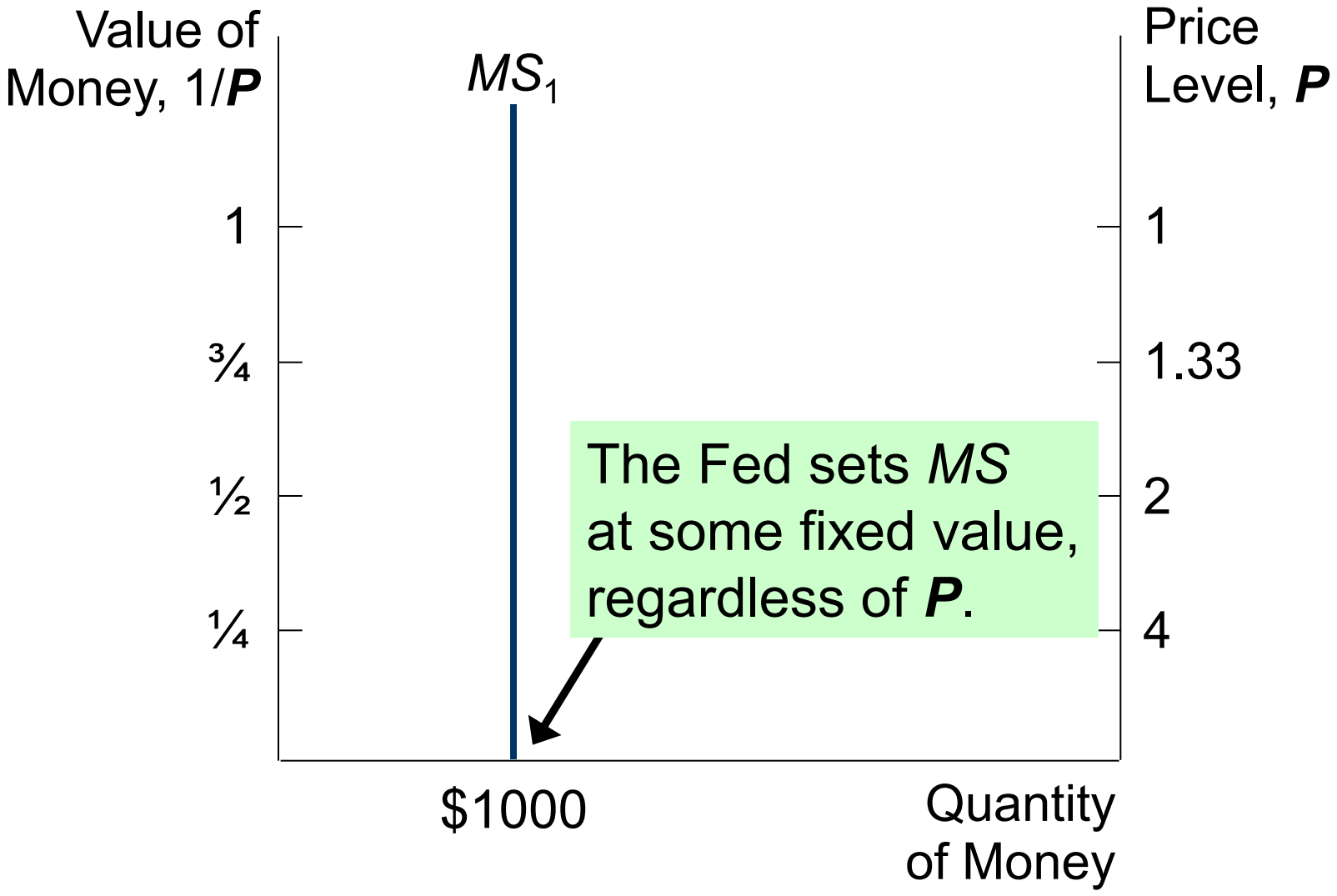
- Refers to how much wealth people want to hold in liquid form.
- Depends on ***P***:
  An increase in ***P*** reduces the value of money, so more money is required to buy g&s.
- Thus, quantity of money demanded is negatively related to the value of money and positively related to ***P***, other things equal.

  (These "other things" include real income, interest rates, availability of ATMs.)

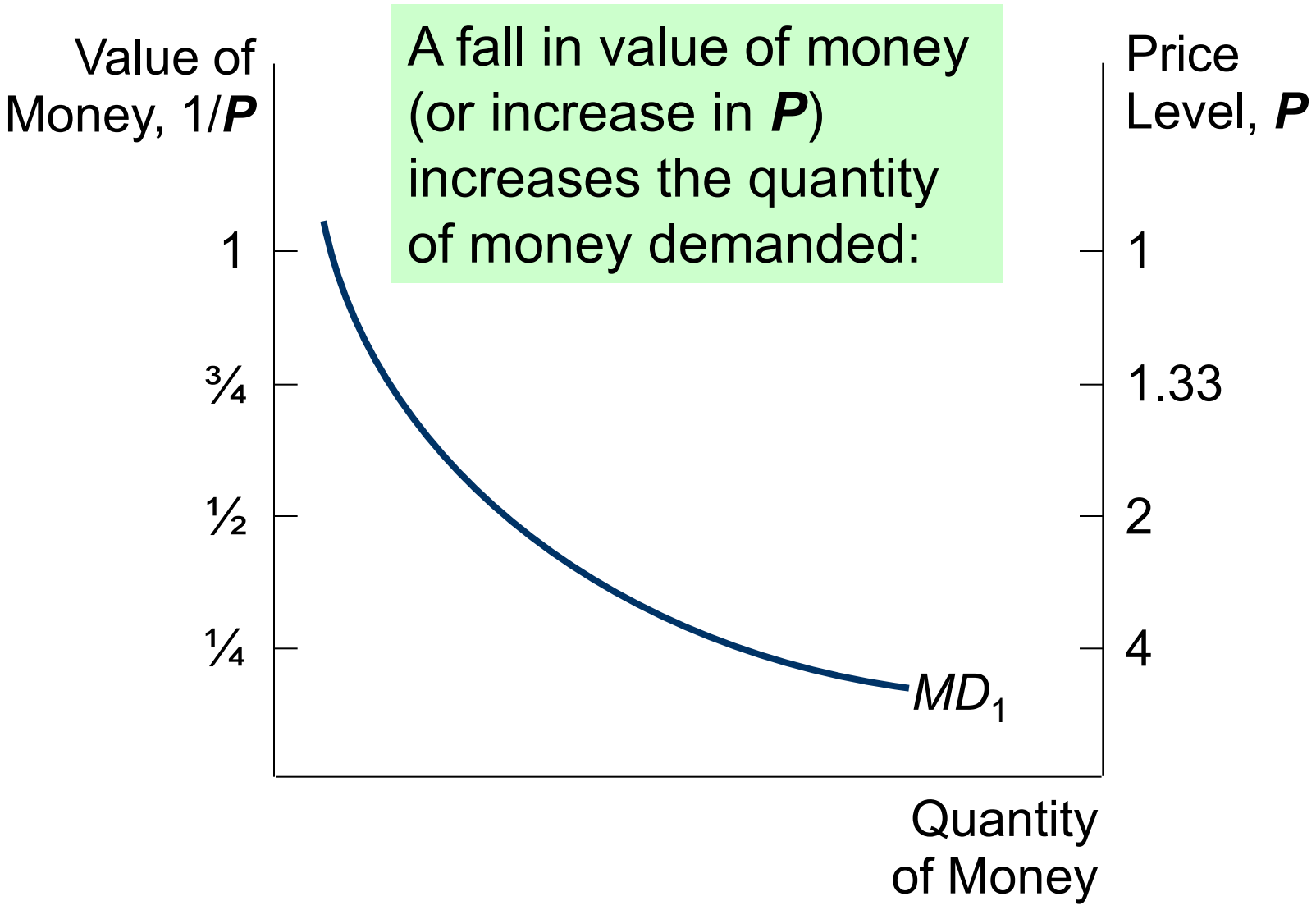
The Money Supply-Money Demand Diagram



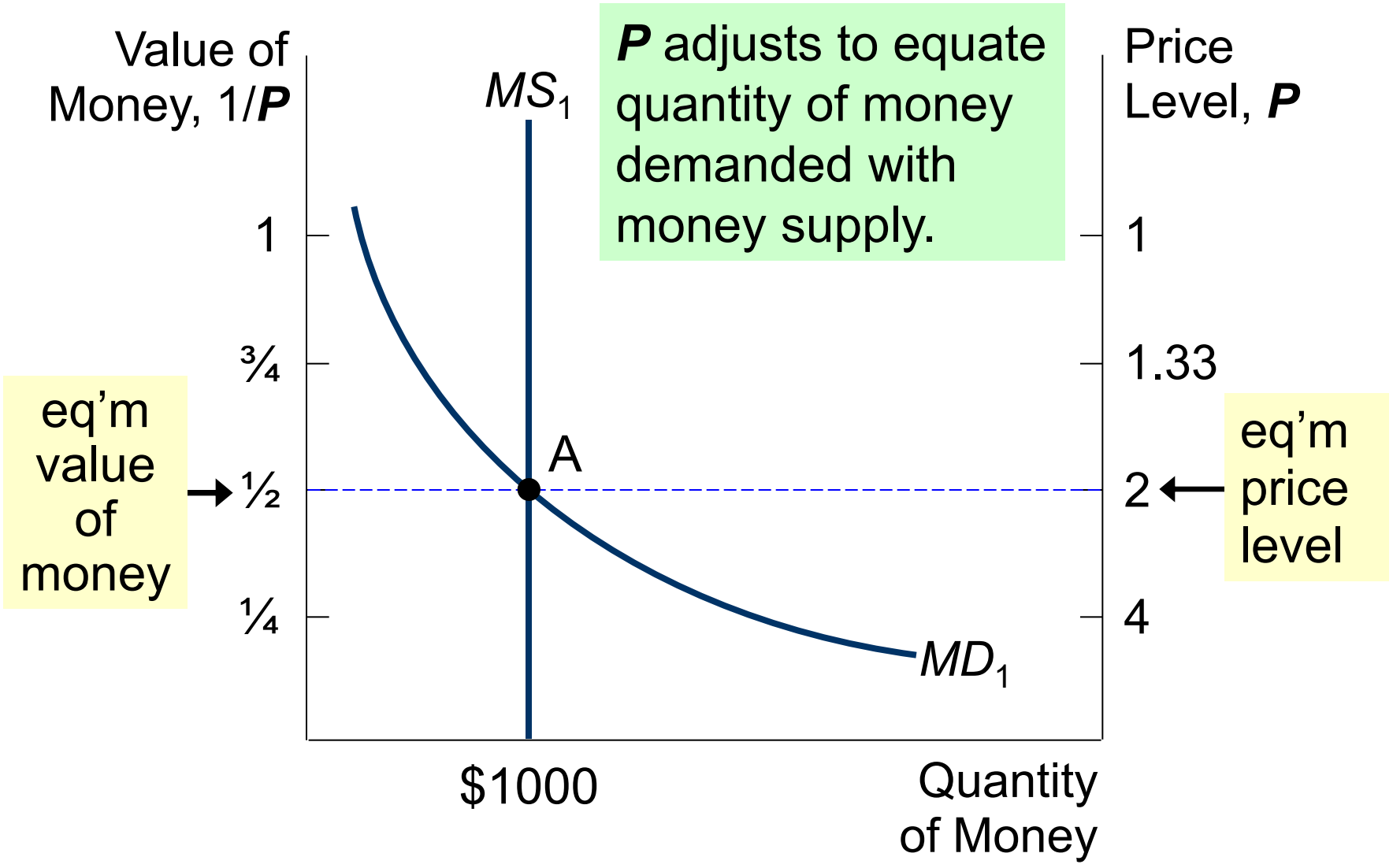
The Money Supply-Demand Diagram



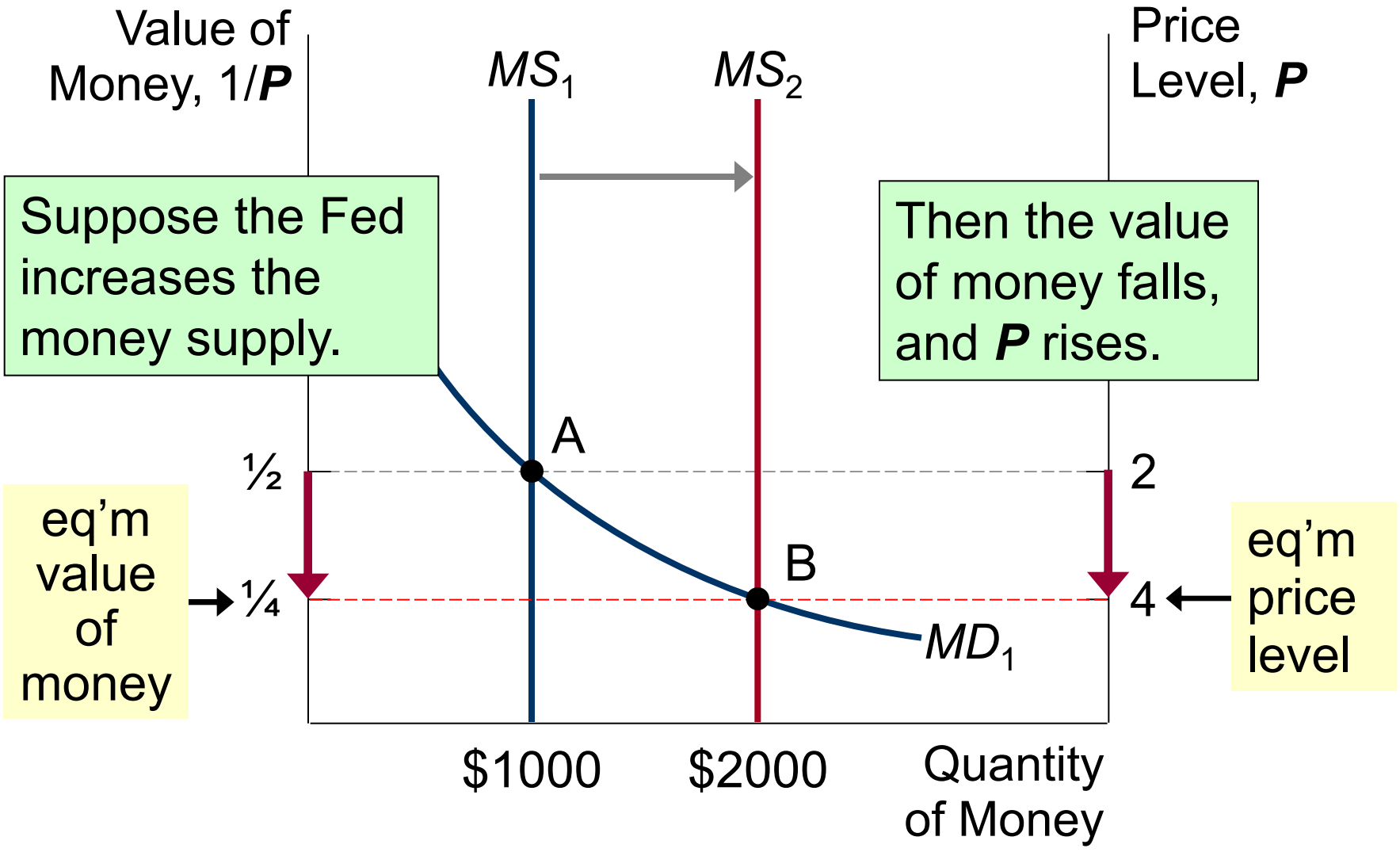
The Money Supply-Demand Diagram



The Money Supply-Demand Diagram



The Effects of a Monetary Injection



A Brief Look at the Adjustment Process

Result from graph: Increasing MS causes ***P*** to rise.

How does this work? Short version:

- At the initial ***P***, an increase in MS causes excess supply of money.
- People get rid of their excess money by spending it on g&s or by loaning it to others, who spend it. Result: increased demand for goods.
- But supply of goods does not increase, so prices must rise.

(Other things happen in the short run, which we will study in later chapters.)

Real vs. Nominal Variables

- **Nominal variables** are measured in monetary units.

  examples: nominal GDP,
  nominal interest rate (rate of return measured in $)
  nominal wage ($ per hour worked)

- **Real variables** are measured in physical units.

  examples: real GDP,
  real interest rate (measured in output)
  real wage (measured in output)

Real vs. Nominal Variables

Prices are normally measured in terms of money.

- Price of a compact disc: $15/cd
- Price of a pepperoni pizza: $10/pizza

A **relative price** is the price of one good relative to (divided by) another:

- Relative price of CDs in terms of pizza:

$$\frac{\text{price of cd}}{\text{price of pizza}} = \frac{\$15/\text{cd}}{\$10/\text{pizza}} = \boxed{1.5 \text{ pizzas per cd}}$$

Relative prices are measured in physical units, so they are real variables.

Real vs. Nominal Wage

An important relative price is the real wage:

W = nominal wage = price of labor, *e.g.,* \$15/hour

P = price level = price of g&s, *e.g.,* \$5/unit of output

Real wage is the price of labor relative to the price of output:

$$\frac{W}{P} = \frac{\$15/\text{hour}}{\$5/\text{unit of output}} = 3 \text{ units output per hour}$$

The Classical Dichotomy

- **Classical dichotomy**: the theoretical separation of nominal and real variables
- Hume and the classical economists suggested that monetary developments affect nominal variables, but not real variables.
- If central bank doubles the money supply, Hume & classical thinkers contend
  - all nominal variables – including prices – will double.
  - all real variables – including relative prices – will remain unchanged.

The Neutrality of Money

- **Monetary neutrality**: the proposition that changes in the money supply do not affect real variables
- Doubling money supply causes all nominal prices to double; what happens to relative prices?
- Initially, relative price of cd in terms of pizza is

$$\frac{\text{price of cd}}{\text{price of pizza}} = \frac{\$15/\text{cd}}{\$10/\text{pizza}} = 1.5 \text{ pizzas per cd}$$

- After nominal prices double,

$$\frac{\text{price of cd}}{\text{price of pizza}} = \frac{\$30/\text{cd}}{\$20/\text{pizza}} = 1.5 \text{ pizzas per cd}$$

The relative price is unchanged.

The Neutrality of Money

- **Monetary neutrality**: the proposition that changes in the money supply do not affect real variables
- Similarly, the real wage ***W***/***P*** remains unchanged, so
  - quantity of labor supplied does not change
  - quantity of labor demanded does not change
  - total employment of labor does not change
- The same applies to employment of capital and other resources.
- Since employment of all resources is unchanged, total output is also unchanged by the money supply.

The Neutrality of Money

- Most economists believe the classical dichotomy and neutrality of money describe the economy in the long run.
- In later chapters, we will see that monetary changes can have important *short-run* effects on real variables.

The Velocity of Money

- **Velocity of money**: the rate at which money changes hands
- Notation:

  $P \times Y$ = nominal GDP

  = (price level) x (real GDP)

  M = money supply

  V = velocity

- Velocity formula: $V = \dfrac{P \times Y}{M}$

The Velocity of Money

Velocity formula: $V = \frac{P \times Y}{M}$

Example with one good: pizza.
In 2006,

Y = real GDP = 3000 pizzas

P = price level = price of pizza = \$10

$P \times Y$ = nominal GDP = value of pizzas = \$30,000

M = money supply = \$10,000

V = velocity = \$30,000/\$10,000 = 3

The average dollar was used in 3 transactions.

ACTIVE LEARNING 1:
Exercise

One good: corn.

The economy has enough labor, capital, and land to produce $Y = 800$ bushels of corn.

V is constant.

In 2005, MS = \$2000, P = \$5/bushel.

Compute nominal GDP and velocity in 2005.

ACTIVE LEARNING 1:
Answers

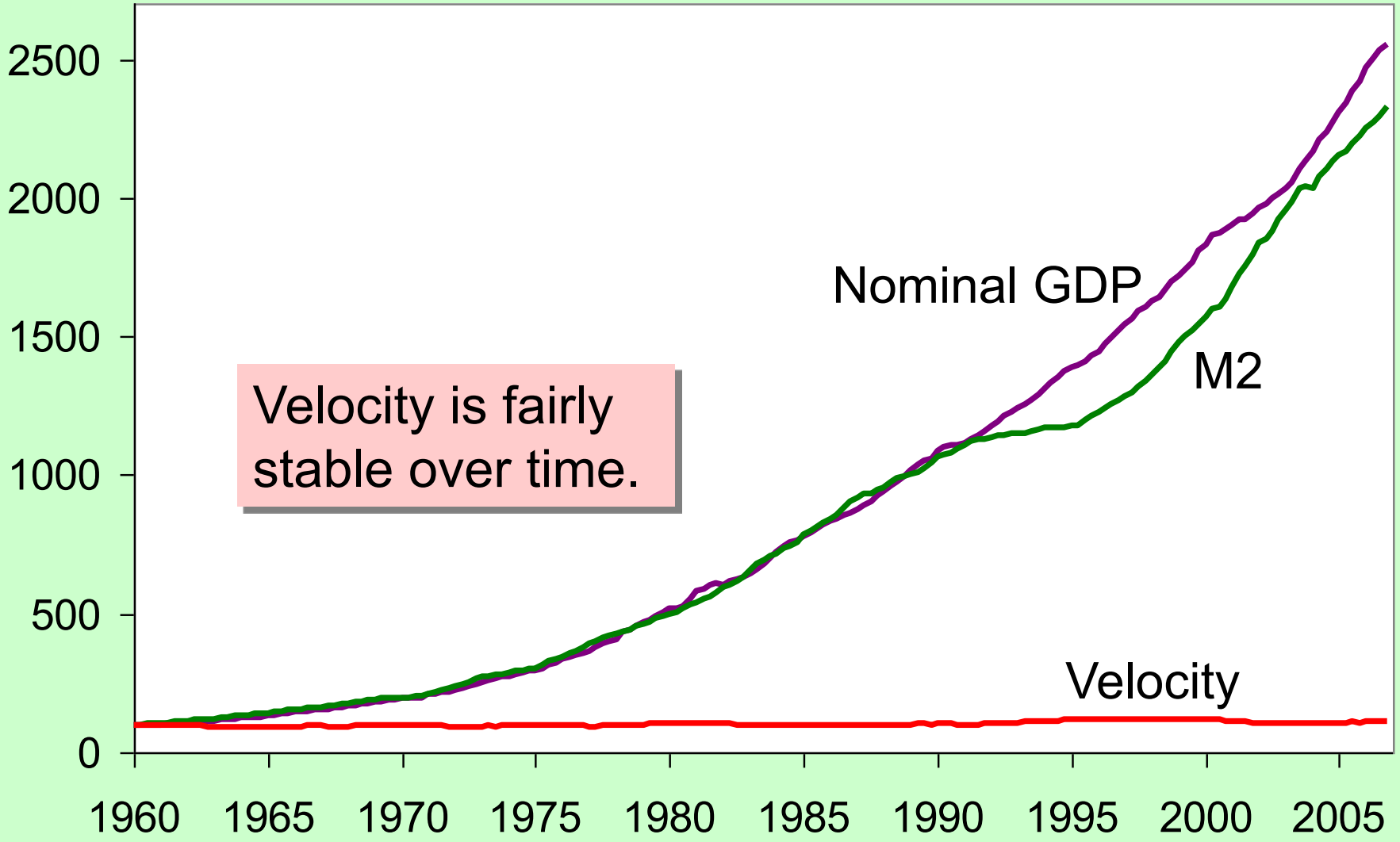
Given: $Y = 800$, V is constant,
MS = \$2000 and P = \$5 in 2005.

Compute nominal GDP and velocity in 2005.

Nominal GDP = $P \times Y$ = \$5 x 800 = **\$4000**

$$V = \frac{P \times Y}{M} = \frac{\$4000}{\$2000} = \boxed{2}$$

U.S. Nominal GDP, M2, and Velocity (1960=100)
1960-2007



The Quantity Equation

Velocity formula: $V = \frac{P \times Y}{M}$

- Multiply both sides of formula by M:

$$M \times V = P \times Y$$

- Called the **quantity equation**

The Quantity Theory in 5 Steps

Start with quantity equation: $M \times V = P \times Y$

1. V is stable.
2. So, a change in M causes nominal GDP ($P \times Y$) to change by the same percentage.
3. A change in M does not affect Y:
   money is neutral,
   Y is determined by technology & resources
4. So, P changes by same percentage as $P \times Y$ and M.
5. Rapid money supply growth causes rapid inflation.

ACTIVE LEARNING 2:
Exercise

One good: corn. The economy has enough labor, capital, and land to produce ***Y*** = 800 bushels of corn. ***V*** is constant. In 2005, MS = \$2000, ***P*** = \$5/bushel.

For 2006, the Fed increases MS by 5%, to \$2100.

a. Compute the 2006 values of nominal GDP and ***P***. Compute the inflation rate for 2005-2006.

b. Suppose tech. progress causes ***Y*** to increase to 824 in 2006. Compute 2005-2006 inflation rate.

ACTIVE LEARNING 2:
Answers

Given: $Y = 800$, V is constant,
MS = \$2000 and $P = \$5$ in 2005.

For 2006, the Fed increases MS by 5%, to \$2100.

a. Compute the 2006 values of nominal GDP and P.
Compute the inflation rate for 2005-2006.

Nominal GDP $= P \times Y = M \times V$ (Quantity Eq'n)

$= \$2100 \times 2 = \boxed{\$4200}$

$$P = \frac{P \times Y}{Y} = \frac{\$4200}{800} = \boxed{\$5.25}$$

$$\text{Inflation rate} = \frac{\$5.25 - 5.00}{5.00} = \boxed{5\%} \text{ (same as MS!)}$$

ACTIVE LEARNING 2:
Answers

Given: $Y = 800$, V is constant,
MS = \$2000 and $P = \$5$ in 2005.

For 2006, the Fed increases MS by 5%, to \$2100.

b. Suppose tech. progress causes Y to increase 3% in 2006, to 824. Compute 2005-2006 inflation rate.

First, use Quantity Eq'n to compute P:

$$P = \frac{M \times V}{Y} = \frac{\$4200}{824} = \$5.10$$

$$\text{Inflation rate} = \frac{\$5.10 - 5.00}{5.00} = \boxed{2\%}$$

ACTIVE LEARNING 2:
Summary & lessons about the Quantity Theory of Money

- If real GDP is constant, then inflation rate = money growth rate.
- If real GDP is growing, then inflation rate < money growth rate.
- The bottom line:
  - Economic growth increases # of transactions.
  - Some money growth is needed for these extra transactions.
  - Excessive money growth causes inflation.

Hyperinflation

- Hyperinflation is generally defined as inflation exceeding 50% per month.
- Recall one of the Ten Principles from Chapter 1: *Prices rise when the government prints too much money.*

- Excessive growth in the money supply always causes hyperinflation.

The Inflation Tax

- When tax revenue is inadequate and ability to borrow is limited, govt may print money to pay for its spending.
- Almost all hyperinflations start this way.
- The revenue from printing money is the **inflation tax**: printing money causes inflation, which is like a tax on everyone who holds money.
- In the U.S., the inflation tax today accounts for less than 3% of total revenue.

The Fisher Effect

- Rearrange the definition of the real interest rate:

nominal interest rate	=	inflation rate	+	real interest rate

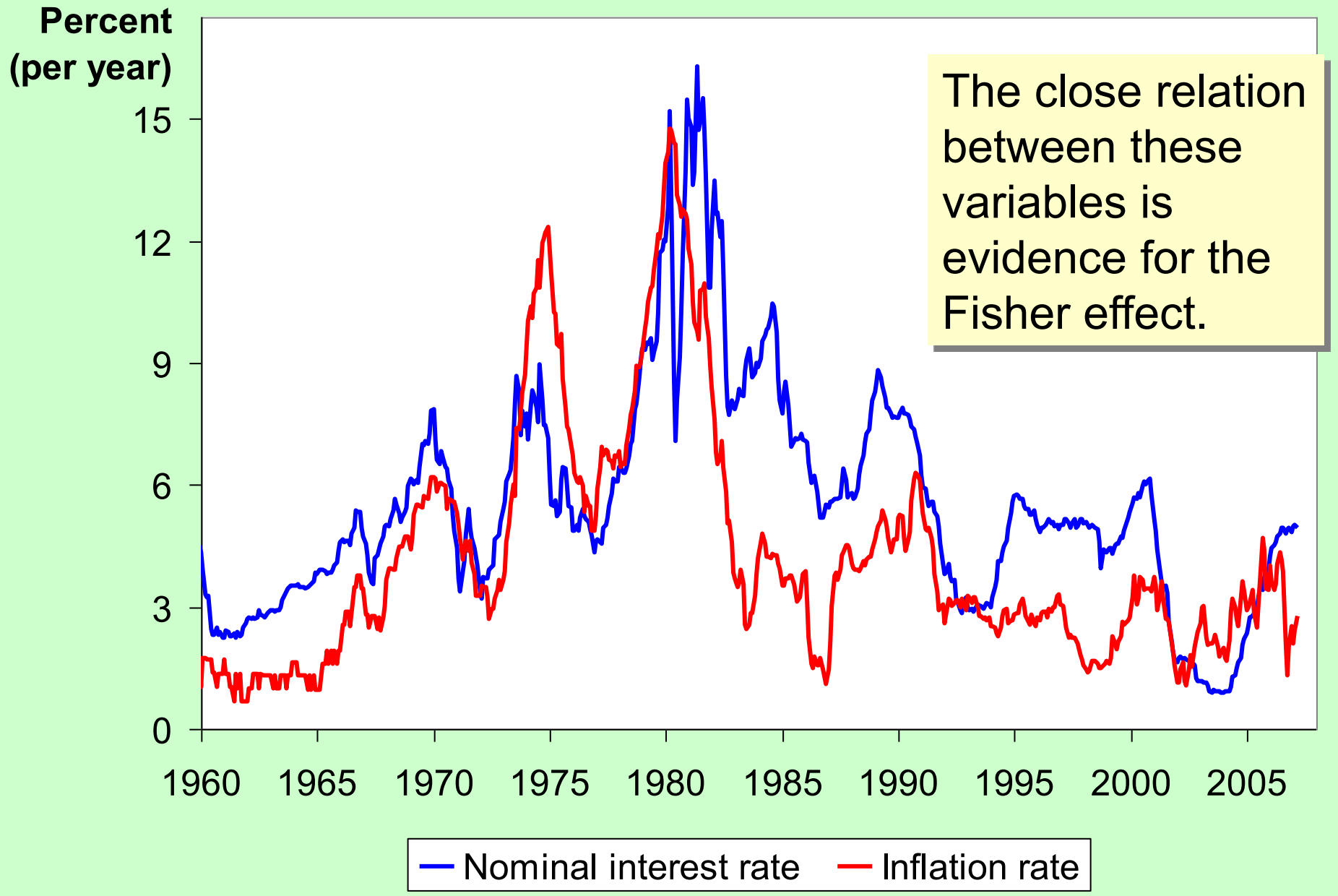
- The real interest rate is determined by saving & investment in the loanable funds market.
- Money supply growth determines inflation rate.
- So, this equation shows how the nominal interest rate is determined.

The Fisher Effect

nominal interest rate	=	inflation rate	+	real interest rate

- In the long run, money is neutral, so a change in the money growth rate affects the inflation rate but not the real interest rate.
- So, the nominal interest rate adjusts one-for-one with changes in the inflation rate.
- This relationship is called the **Fisher effect** after Irving Fisher, who studied it.

U.S. Nominal Interest & Inflation Rates, 1960-2007



The Fisher Effect & the Inflation Tax

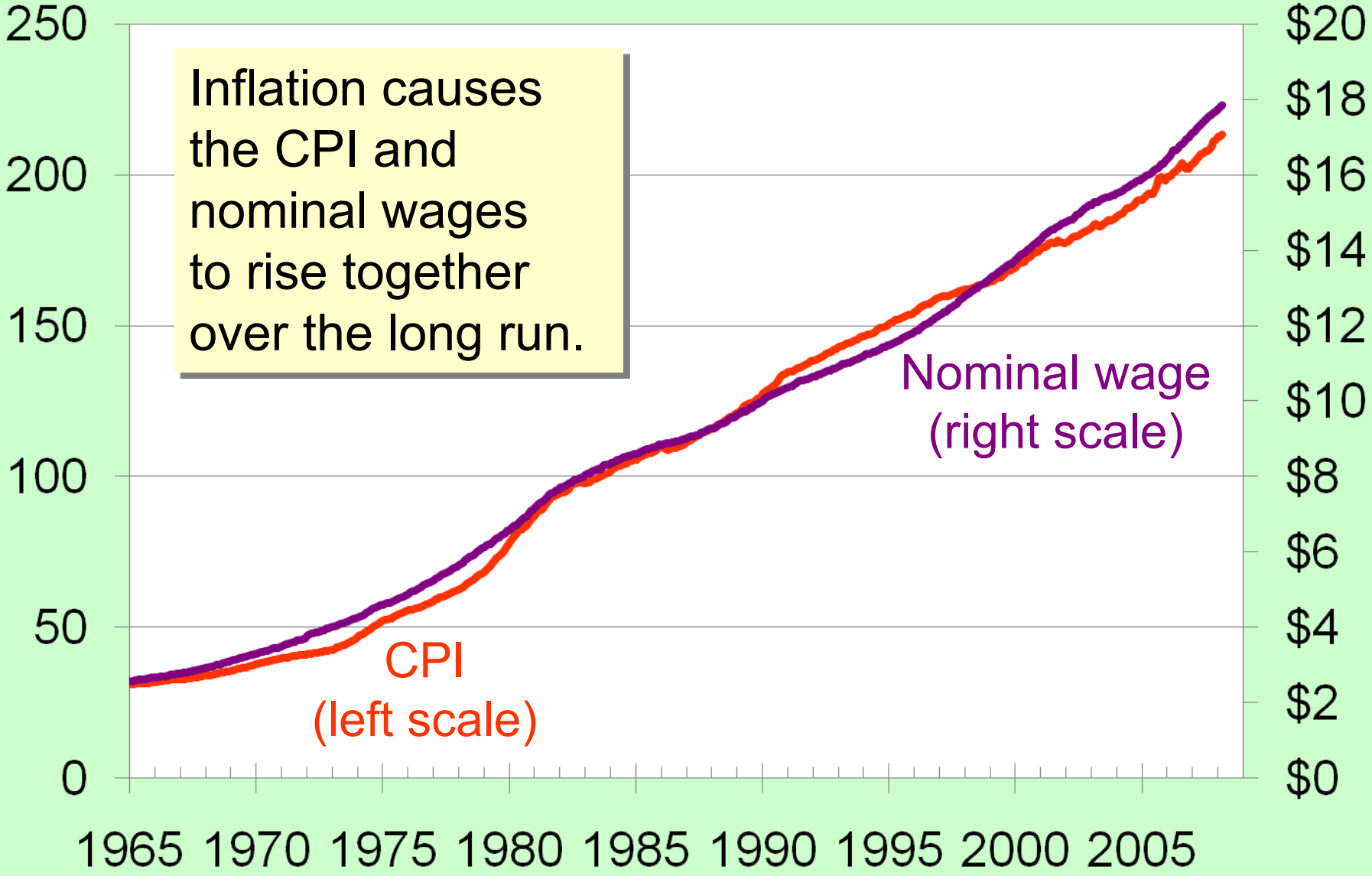
nominal interest rate	=	inflation rate	+	real interest rate

- The inflation tax applies to people's holdings of money, not their holdings of wealth.
- The Fisher effect: an increase in inflation causes an equal increase in the nominal interest rate, so the real interest rate (on wealth) is unchanged.

The Costs of Inflation

- The inflation fallacy: most people think inflation erodes real incomes.
- But inflation is a general increase in prices, of the things people buy and the things they sell (*e.g.,* their labor).
- In the long run, real incomes are determined by real variables, not the inflation rate.

U.S. Average Hourly Earnings & the CPI



The Costs of Inflation

- **Shoeleather costs**: the resources wasted when inflation encourages people to reduce their money holdings
  - includes the time and transactions costs of more frequent bank withdrawals
- **Menu costs**: the costs of changing prices
  - printing new menus, mailing new catalogs, etc.

The Costs of Inflation

- **Misallocation of resources from relative-price variability**: Firms don't all raise prices at the same time, so relative prices can vary…

  which distorts the allocation of resources.

- **Confusion & inconvenience**: Inflation changes the yardstick we use to measure transactions.

  Complicates long-range planning and the comparison of dollar amounts over time.

The Costs of Inflation

- **Tax distortions**:

  Inflation makes nominal income grow faster than real income.

  Taxes are based on nominal income, and some are not adjusted for inflation.

  So, inflation causes people to pay more taxes even when their real incomes don't increase.

ACTIVE LEARNING 3:
Tax distortions

You deposit $1000 in the bank for one year.

CASE 1: inflation = 0%, nom. interest rate = 10%

CASE 2: inflation = 10%, nom. interest rate = 20%

a. In which case does the real value of your deposit grow the most?

Assume the tax rate is 25%.

b. In which case do you pay the most taxes?

c. Compute the after-tax nominal interest rate, then subtract off inflation to get the after-tax real interest rate for both cases.

ACTIVE LEARNING 3:
Answers

Deposit = $1000.

CASE 1: inflation = 0%, nom. interest rate = 10%

CASE 2: inflation = 10%, nom. interest rate = 20%

a. In which case does the real value of your deposit grow the most?

In both cases, the real interest rate is 10%, so the real value of the deposit grows 10% (before taxes).

ACTIVE LEARNING 3:
Answers

Deposit = $1000. Tax rate = 25%.

CASE 1: inflation = 0%, nom. interest rate = 10%

CASE 2: inflation = 10%, nom. interest rate = 20%

b. In which case do you pay the most taxes?

CASE 1: interest income = $100,
so you pay $25 in taxes.

CASE 2: interest income = $200,
so you pay $50 in taxes.

ACTIVE LEARNING 3:
Answers

Deposit = $1000. Tax rate = 25%.

CASE 1: inflation = 0%, nom. interest rate = 10%

CASE 2: inflation = 10%, nom. interest rate = 20%

c. Compute the after-tax nominal interest rate, then subtract off inflation to get the after-tax real interest rate for both cases.

CASE 1: nominal = 0.75 x 10% = 7.5%

real = 7.5% – 0% = 7.5%

CASE 2: nominal = 0.75 x 20% = 15%

real = 15% – 10% = 5%

ACTIVE LEARNING 3:
Summary & lessons

Deposit = $1000. Tax rate = 25%.

CASE 1: inflation = 0%, nom. interest rate = 10%

CASE 2: inflation = 10%, nom. interest rate = 20%

Inflation…

- raises nominal interest rates (Fisher effect) but not real interest rates
- increases savers' tax burdens
- lowers the after-tax real interest rate

A Special Cost of Unexpected Inflation

- **Arbitrary redistributions of wealth**
  Higher-than-expected inflation transfers purchasing power from creditors to debtors: Debtors get to repay their debt with dollars that aren't worth as much.

  Lower-than-expected inflation transfers purchasing power from debtors to creditors.

  High inflation is more variable and less predictable than low inflation.

  So, these arbitrary redistributions are frequent when inflation is high.

The Costs of Inflation

- All these costs are quite high for economies experiencing hyperinflation.
- For economies with low inflation (< 10% per year), these costs are probably much smaller, though their exact size is open to debate.

CONCLUSION

- This chapter explains one of the Ten Principles of economics:

  Prices rise when the govt prints too much money.

- We saw that money is neutral in the long run, affecting only nominal variables.
- In later chapters, we will see that money has important effects in the short run on real variables like output and employment.

CHAPTER SUMMARY

- To explain inflation in the long run, economists use the quantity theory of money. According to this theory, the price level depends on the quantity of money, and the inflation rate depends on the money growth rate.
- The classical dichotomy is the division of variables into real & nominal. The neutrality of money is the idea that changes in the money supply affect nominal variables, but not real ones. Most economists believe these ideas describe the economy in the long run.

CHAPTER SUMMARY

- The inflation tax is the loss in the real value of people's money when the government causes inflation by printing money.
- The Fisher effect is the one-for-one relation between changes in the inflation rate and changes in the nominal interest rate.
- The costs of inflation include menu costs, shoeleather costs, confusion and inconvenience, distortions in relative prices and the allocation of resources, tax distortions, and arbitrary redistributions of wealth.

31 Open-Economy Macroeconomics: Basic Concepts

PRINCIPLES OF

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2008 update

In this chapter, look for the answers to these questions:

- How are international flows of goods and assets related?
- What's the difference between the real and nominal exchange rate?
- What is "purchasing-power parity," and how does it explain nominal exchange rates?

Introduction

- One of the Ten Principles of Economics from Chapter 1:

  Trade can make everyone better off.

- This chapter introduces basic concepts of international macroeconomics:
  - the trade balance (trade deficits, surpluses)
  - international flows of assets
  - exchange rates

Closed vs. Open Economies

- A **closed economy** does not interact with other economies in the world.
- An **open economy** interacts freely with other economies around the world.

The Flow of Goods & Services

- **Exports**:
  domestically-produced g&s sold abroad
- **Imports**:
  foreign-produced g&s sold domestically
- **Net exports (NX)**, aka the **trade balance**
  = value of exports – value of imports

ACTIVE LEARNING 1:
Variables that affect NX

What do you think would happen to U.S. net exports if:

A. Canada experiences a recession (falling incomes, rising unemployment)

B. U.S. consumers decide to be patriotic and buy more products "Made in the U.S.A."

C. Prices of goods produced in Mexico rise faster than prices of goods produced in the U.S.

Variables that Influence Net Exports

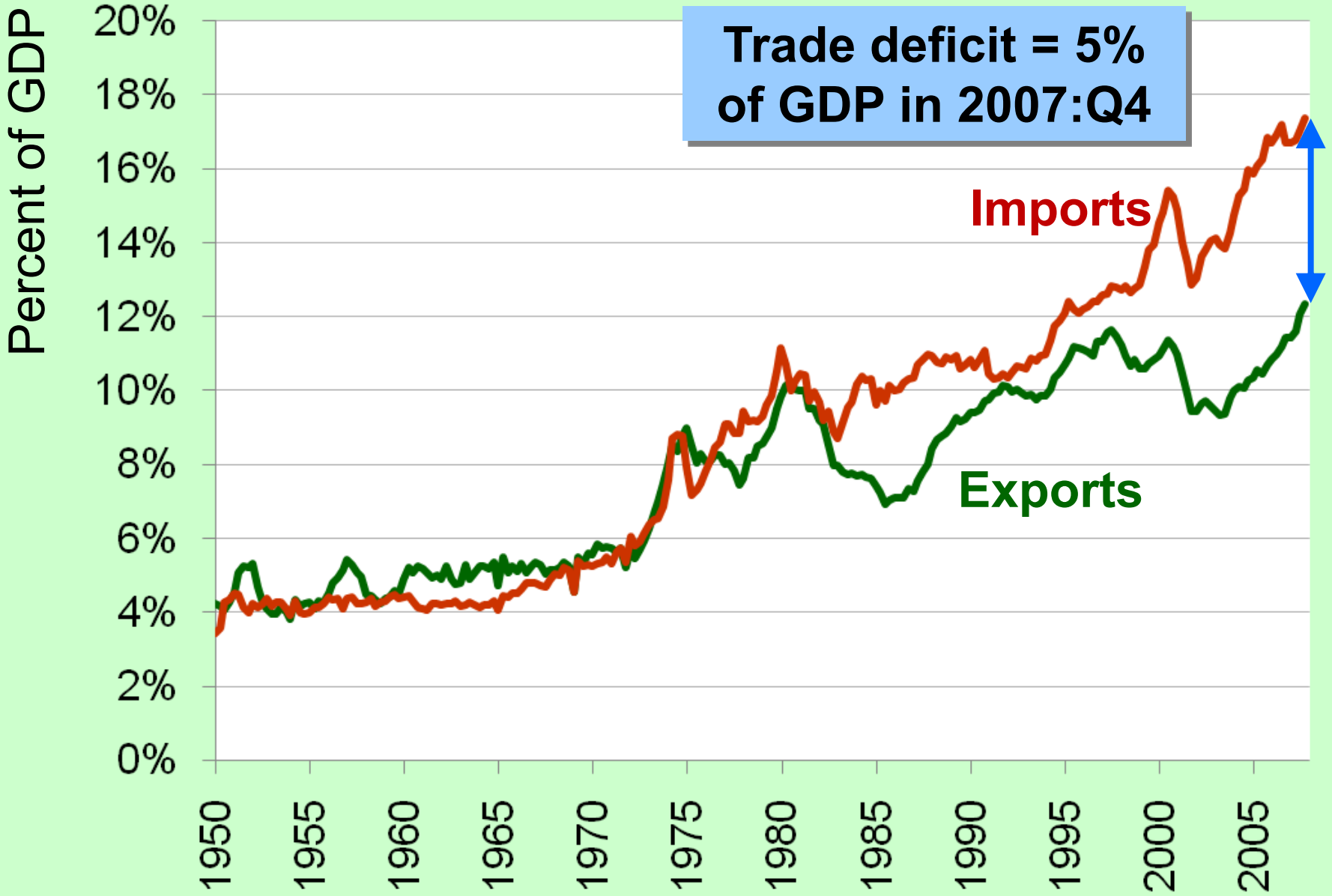
- consumers' preferences for foreign and domestic goods
- prices of goods at home and abroad
- incomes of consumers at home and abroad
- the exchange rates at which foreign currency trades for domestic currency
- transportation costs
- govt policies

Trade Surpluses & Deficits

NX measures the imbalance in a country's trade in goods and services.

- **Trade deficit**:
  an excess of imports over exports
- **Trade surplus**:
  an excess of exports over imports
- **Balanced trade**:
  when exports = imports

The U.S. Economy's Increasing Openness



The Flow of Capital

- **Net capital outflow (NCO)**:
  domestic residents' purchases of foreign assets
  minus
  foreigners' purchases of domestic assets
- ***NCO*** is also called **net foreign investment**.

The Flow of Capital

The flow of capital abroad takes two forms:

- **Foreign direct investment**:
  Domestic residents actively manage the foreign investment, *e.g.,* McDonalds opens a fast-food outlet in Moscow.
- **Foreign portfolio investment**:
  Domestic residents purchase foreign stocks or bonds, supplying "loanable funds" to a foreign firm.

The Flow of Capital

NCO measures the imbalance in a country's trade in assets:

- When ***NCO*** > 0, "capital outflow"
  Domestic purchases of foreign assets exceed foreign purchases of domestic assets.
- When ***NCO*** < 0, "capital inflow"
  Foreign purchases of domestic assets exceed domestic purchases of foreign assets.

Variables that Influence NCO

- real interest rates paid on foreign assets
- real interest rates paid on domestic assets
- perceived risks of holding foreign assets
- govt policies affecting foreign ownership of domestic assets

The Equality of NX and NCO

- An accounting identity: ***NCO*** = ***NX***
  - arises because every transaction that affects ***NX*** also affects ***NCO*** by the same amount (and vice versa)
- When a foreigner purchases a good from the U.S.,
  - U.S. exports and ***NX*** increase
  - the foreigner pays with currency or assets, so the U.S. acquires some foreign assets, causing ***NCO*** to rise.

The Equality of NX and NCO

- An accounting identity: ***NCO*** = ***NX***
  - arises because every transaction that affects ***NX*** also affects ***NCO*** by the same amount (and vice versa)
- When a U.S. citizen buys foreign goods,
  - U.S. imports rise, ***NX*** falls
  - the U.S. buyer pays with U.S. dollars or assets, so the other country acquires U.S. assets, causing U.S. ***NCO*** to fall.

Saving, Investment, and International Flows of Goods & Assets

$Y = C + I + G + NX$ accounting identity

$Y - C - G = I + NX$ rearranging terms

$S = I + NX$ since $S = Y - C - G$

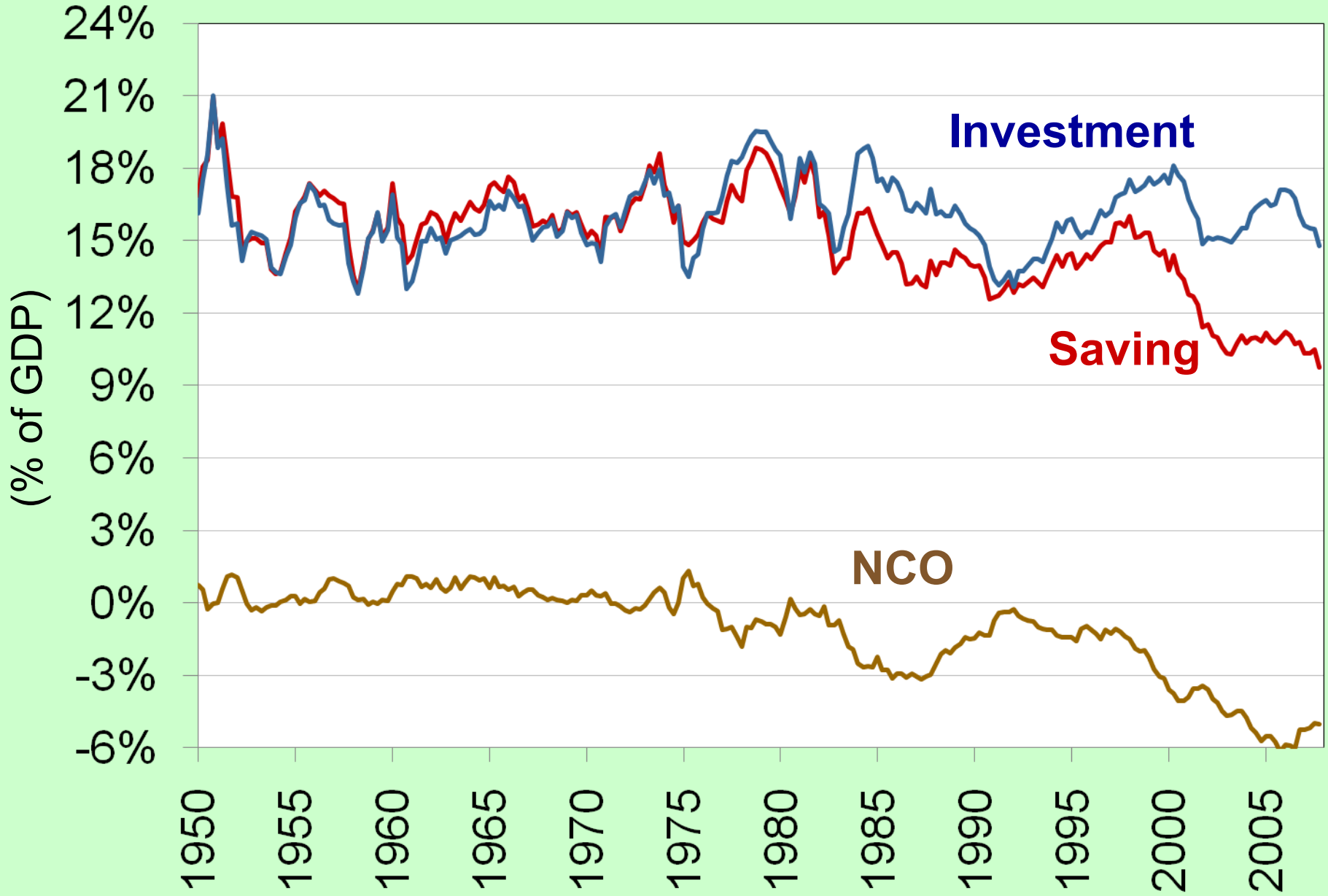
$S = I + NCO$ since $NX = NCO$

- When $S > I$, the excess loanable funds flow abroad in the form of positive net capital outflow.
- When $S < I$, foreigners are financing some of the country's investment, and $NCO < 0$.

Case Study: The U.S. Trade Deficit

- In 2006, the U.S. had a record trade deficit.
- Recall, $NX = S - I = NCO$.
  A trade deficit means $I > S$,
  so the nation borrows the difference
  from foreigners.
- In 2006, foreign purchases of U.S. assets exceeded U.S. purchases of foreign assets by $800 million.
- Such deficits have been the norm since 1980…

U.S. Saving, Investment, and NCO, 1950-2007



Case Study: The U.S. Trade Deficit

Why U.S. saving has been less than investment:

- In the 1980s and early 2000s,
  huge budget deficits and low private saving depressed national saving.
- In the 1990s,
  national saving increased as the economy grew, but domestic investment increased even faster due to the information technology boom.

Case Study: The U.S. Trade Deficit

- **Trade with China : 2008** *All figures millions of $U.S.*

Month	**Exports**	**Imports**	**Balance**
January	5,854.9	26,167.7	-20,312.8
February	5,773.9	24,128.6	-18,354.7
March	6,354.1	22,432.0	-16,077.9
April	5,680.6	25,919.3	-20,238.6
May	6,614.3	27,663.6	-21,049.4
June	6,413.7	27,843.3	-21,429.6
July	6,437.3	31,314.0	-24,876.8
August	6,506.7	31,840.2	-25,333.5
September	5,320.4	33,086.4	-27,765.9
TOTAL	**54,955.9**	**250,395.1**	**-195,439.2**

Case Study: The U.S. Trade Deficit

- Is the U.S. trade deficit a problem?
  - The extra capital stock from the ’90s investment boom may well yield large returns
  - The fall in saving of the ’80s and ’00s, while not desirable, at least did not depress domestic investment, as firms could borrow from abroad
- A country, like a person, can go into debt for good reasons or bad ones.
  A trade deficit is not necessarily a problem, but might be a symptom of a problem.

The Nominal Exchange Rate

- **Nominal exchange rate**: the rate at which one country's currency trades for another
- We express all exchange rates as foreign currency per unit of domestic currency.
- Some exchange rates (all per $US) as of 5 December 2008 and (June 1, 2008)

Canadian dollar:	1.27	(.99)
Euro:	0.79	(.64)
Japanese yen:	92.83	(105.52)
Chinese Yuan:	6.88	(6.94)

Appreciation and Depreciation

- **Appreciation** (or "strengthening"):
  an increase in the value of a currency
  as measured by the amount of foreign currency
  it can buy
- **Depreciation** (or "weakening"):
  a decrease in the value of a currency
  as measured by the amount of foreign currency
  it can buy
- Examples: During 2007, the U.S. dollar…
  - depreciated 9.5% against the Euro
  - appreciated 1.5% against the S. Korean Won

US - China Currency Issues

- **China 'agrees' yuan should continue to appreciate - Paulson**
- 12.05.08, BEIJING (XFN-ASIA) - China 'agrees' the yuan should continue to appreciate, US Treasury Secretary Henry Paulson said.
- Paulson made the remarks at the conclusion of the fifth Strategic Economic Dialogue between the US and China.
- The US has been concerned about its mounting trade deficit with China and has in the past called for China to allow the yuan to appreciate faster.
- The yuan had been rising steadily until about July when Chinese policy makers decided to halt the yuan's advance against the dollar because of fears over flagging exports.
- More recently the US has played down its concern over the yuan amid the global financial crisis.
- Earlier today Paulson told Chinese officials that the US had noted China's progress in reforming the yuan exchange rate regime.
- The US treasury secretary stressed that the US hoped China would continue with such reforms.

The Real Exchange Rate

- **Real exchange rate**: the rate at which the g&s of one country trade for the g&s of another
- Real exchange rate = $\frac{e \times P}{P^*}$

  where

  P = domestic price

  P^* = foreign price (in foreign currency)

  e = nominal exchange rate, *i.e.,* foreign currency per unit of domestic currency

Example With One Good

- A Big Mac costs \$2.50 in U.S., 400 yen in Japan
- e = 120 yen per \$
- $e \times P$ = price in yen of a U.S. Big Mac

  = (120 yen per \$) x (\$2.50 per Big Mac)

  = 300 yen per U.S. Big Mac
- Compute the real exchange rate:

$$\frac{e \times P}{P^*} = \frac{\text{300 yen per U.S. Big Mac}}{\text{400 yen per Japanese Big Mac}}$$

$$= 0.75 \text{ Japanese Big Macs per US Big Mac}$$

Interpreting the Real Exchange Rate

"The real exchange rate =
0.75 Japanese Big Macs per U.S. Big Mac"

Correct interpretation:
To buy a Big Mac in the U.S.,
a Japanese citizen must sacrifice
an amount that could purchase
0.75 Big Macs in Japan.

The Real Exchange Rate With Many Goods

P = U.S. price level, *e.g.,* Consumer Price Index, which measures the price of a basket of goods

P* = foreign price level

Real exchange rate
= (***e*** x ***P***)/***P****
= price of a domestic basket of goods relative to price of a foreign basket of goods

- If U.S. real exchange rate appreciates, U.S. goods become more expensive relative to foreign goods.

The Law of One Price

- **Law of one price**: the notion that a good should sell for the same price in all markets
  - Suppose coffee sells for $4/pound in Seattle and $5/pound in Boston,
    and can be costlessly transported.
  - There is an opportunity for **arbitrage**, making a quick profit by buying coffee in Seattle and selling it in Boston.
  - Such arbitrage drives up the price in Seattle and drives down the price in Boston, until the two prices are equal.

Purchasing-Power Parity (PPP)

- **Purchasing-power parity**:
  a theory of exchange rates whereby a unit of any currency should be able to buy the same quantity of goods in all countries
- based on the law of one price
- implies that nominal exchange rates adjust to equalize the price of a basket of goods across countries

Purchasing-Power Parity (PPP)

- Example: The "basket" contains a Big Mac.

  P = price of US Big Mac (in dollars)

  P^* = price of Japanese Big Mac (in yen)

  e = exchange rate, yen per dollar

- According to PPP, $e \times P = P^*$

  $e \times P$: price of US Big Mac, in yen

  P^*: price of Japanese Big Mac, in yen

- Solve for e:

$$e = \frac{P^*}{P}$$

PPP and Its Implications

- PPP implies that the nominal exchange rate between two countries should equal the ratio of price levels.

$$e = \frac{P^*}{P}$$

- If the two countries have different inflation rates, then ***e*** will change over time:
  - If inflation is higher in Mexico than in the U.S., then ***P**** rises faster than ***P***, so ***e*** rises – the dollar appreciates against the peso.
  - If inflation is higher in the U.S. than in Japan, then ***P*** rises faster than ***P****, so ***e*** falls – the dollar depreciates against the yen.

Limitations of PPP Theory

Two reasons why exchange rates do not always adjust to equalize prices across countries:

- Many goods cannot easily be traded
  - Examples: haircuts, going to the movies
  - Price differences on such goods cannot be arbitraged away
- Foreign, domestic goods not perfect substitutes
  - *E.g.,* some U.S. consumers prefer Toyotas over Chevys, or vice versa
  - Price differences reflect taste differences

Limitations of PPP Theory

- Nonetheless, PPP works well in many cases, especially as an explanation of long-run trends.
- For example, PPP implies:
  the greater a country's inflation rate,
  the faster its currency should depreciate
  (relative to a low-inflation country like the US).