

Chapter 3 – Interdependence and Gains from Trade

***In this chapter,
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

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

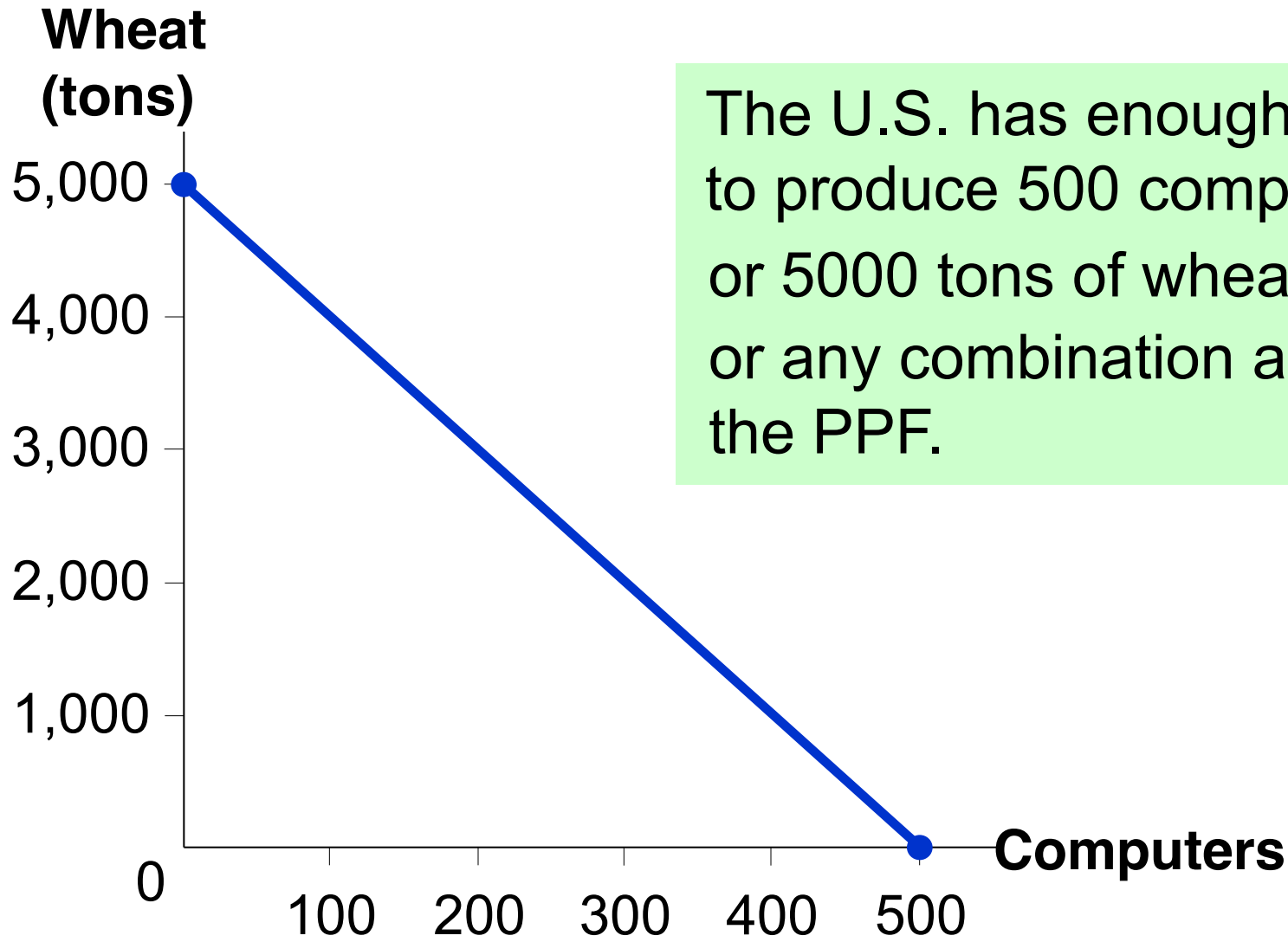
Our Example

- Two countries: the U.S. and Japan
- Two goods: computers and wheat
- One resource: labor, measured in hours
- We will look at 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

Production Possibilities in the U.S.

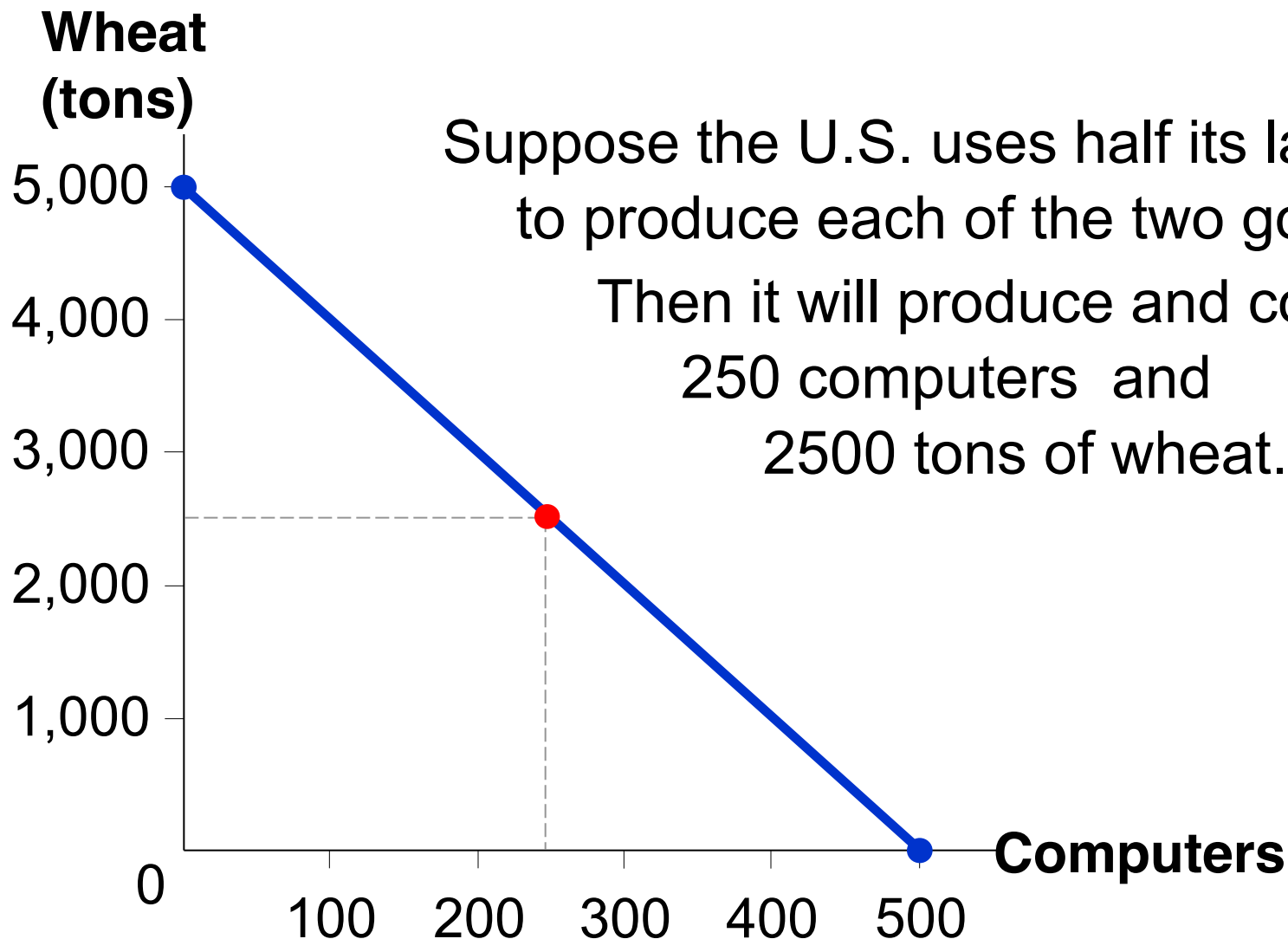
- The U.S. has 50,000 hours of labor available for production, per month.
- Producing one computer requires 100 hours of labor.
- Producing one ton of wheat requires 10 hours of labor.

The U.S. PPF



The U.S. has enough labor to produce 500 computers, or 5000 tons of wheat, or any combination along the PPF.

The U.S. Without Trade



ACTIVE LEARNING 1

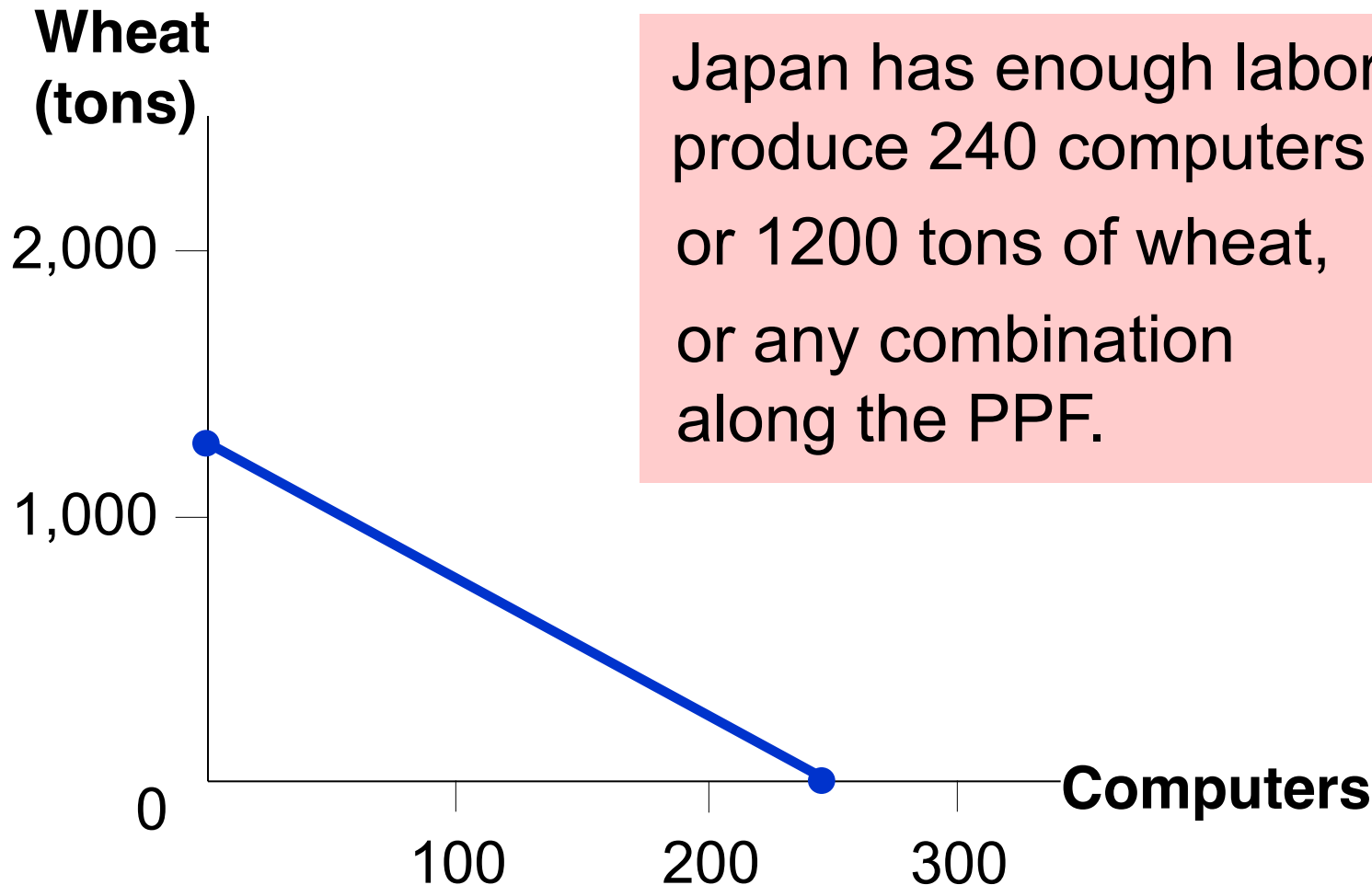
Derive Japan's PPF

Use the following information to draw Japan's PPF.

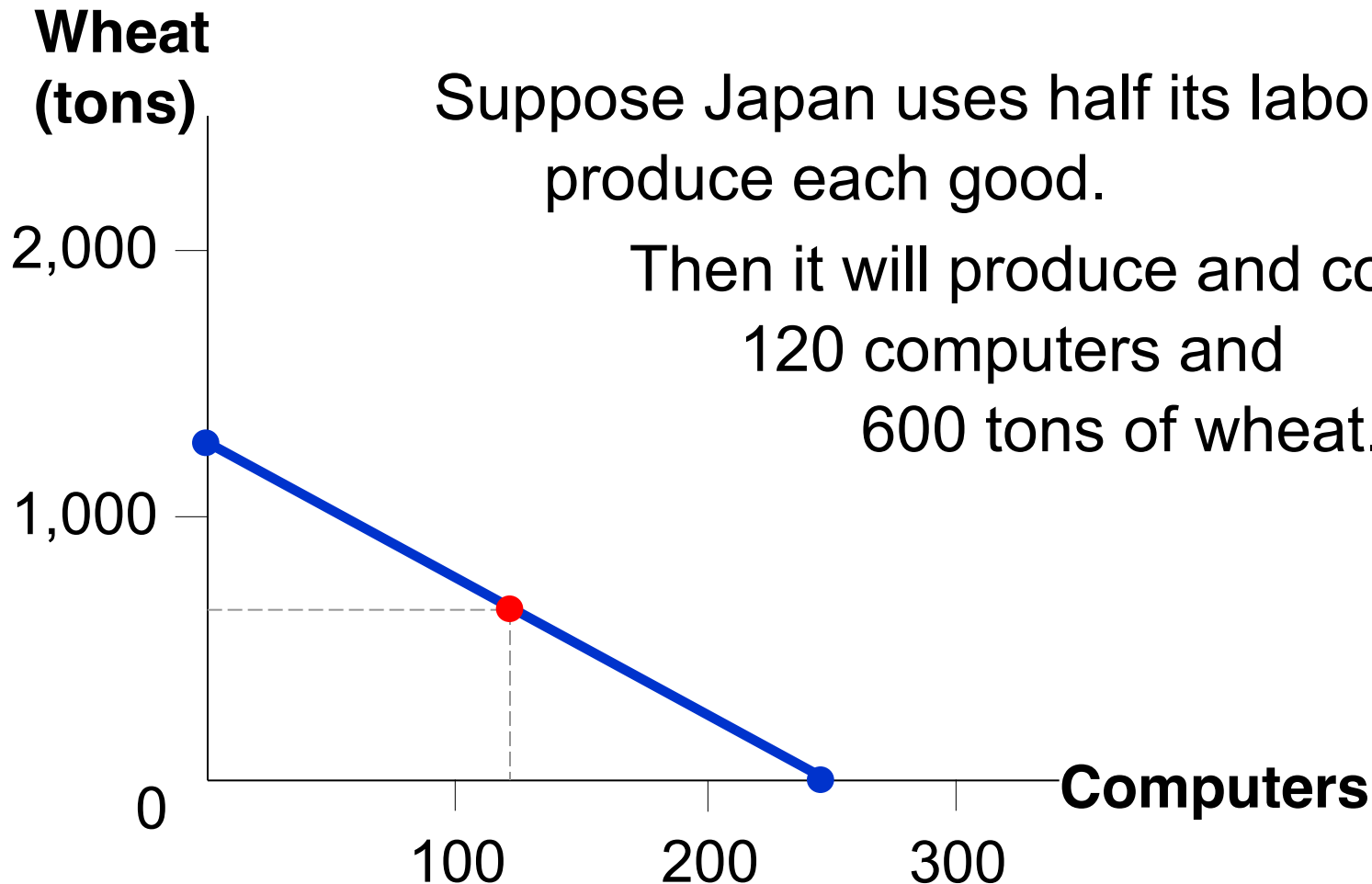
- Japan has 30,000 hours of labor available for production, per month.
- Producing one computer requires 125 hours of labor.
- Producing one ton of wheat requires 25 hours of labor.

Your graph should measure computers on the horizontal axis.

Japan's PPF



Japan Without Trade



Consumption With and Without Trade

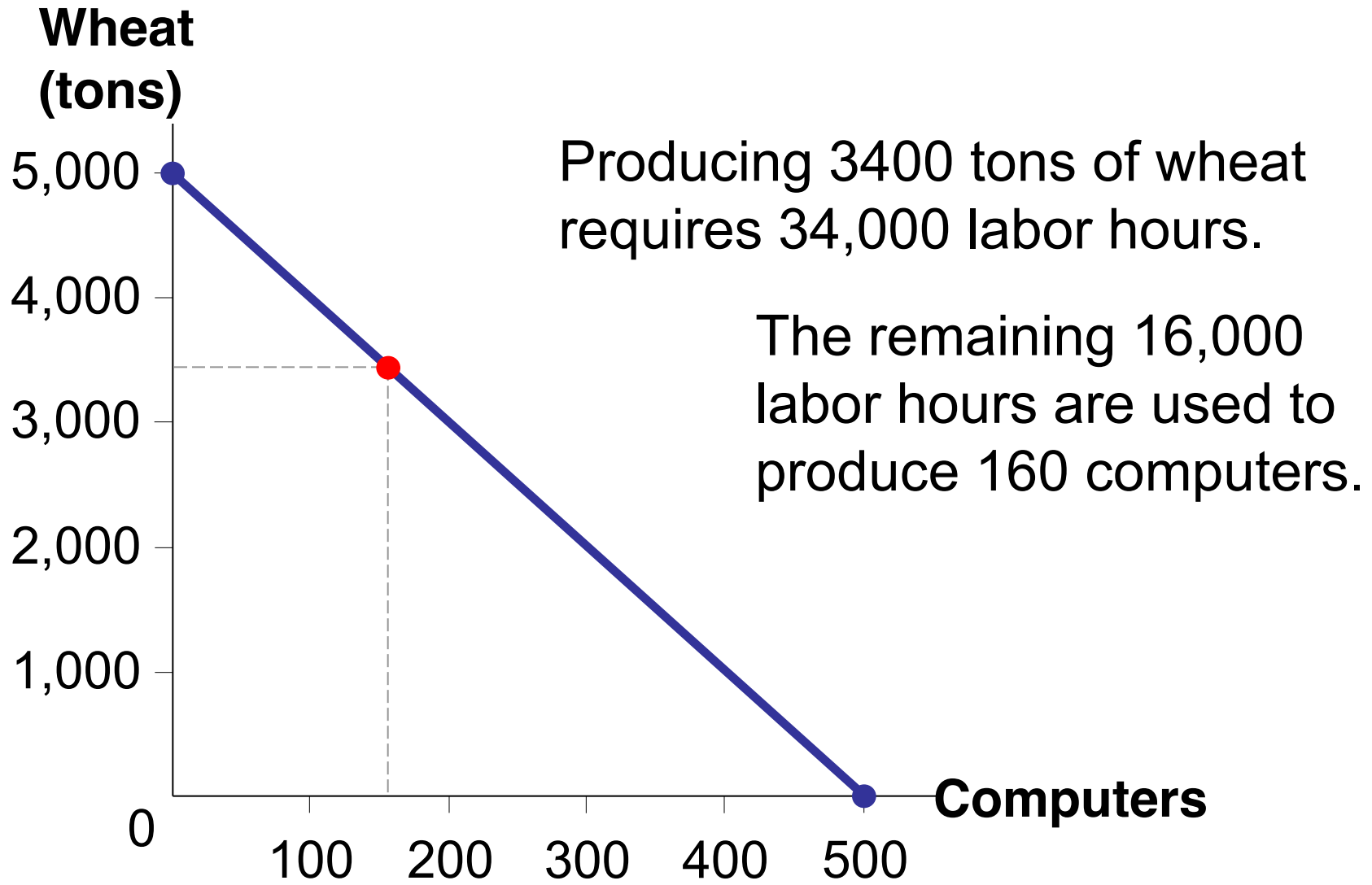
- Without trade,
 - U.S. consumers get 250 computers and 2500 tons wheat.
 - Japanese consumers get 120 computers and 600 tons wheat.
- We will compare consumption without trade to consumption with trade.
- First, we need to see how much of each good is produced and traded by the two countries.

ACTIVE LEARNING 2

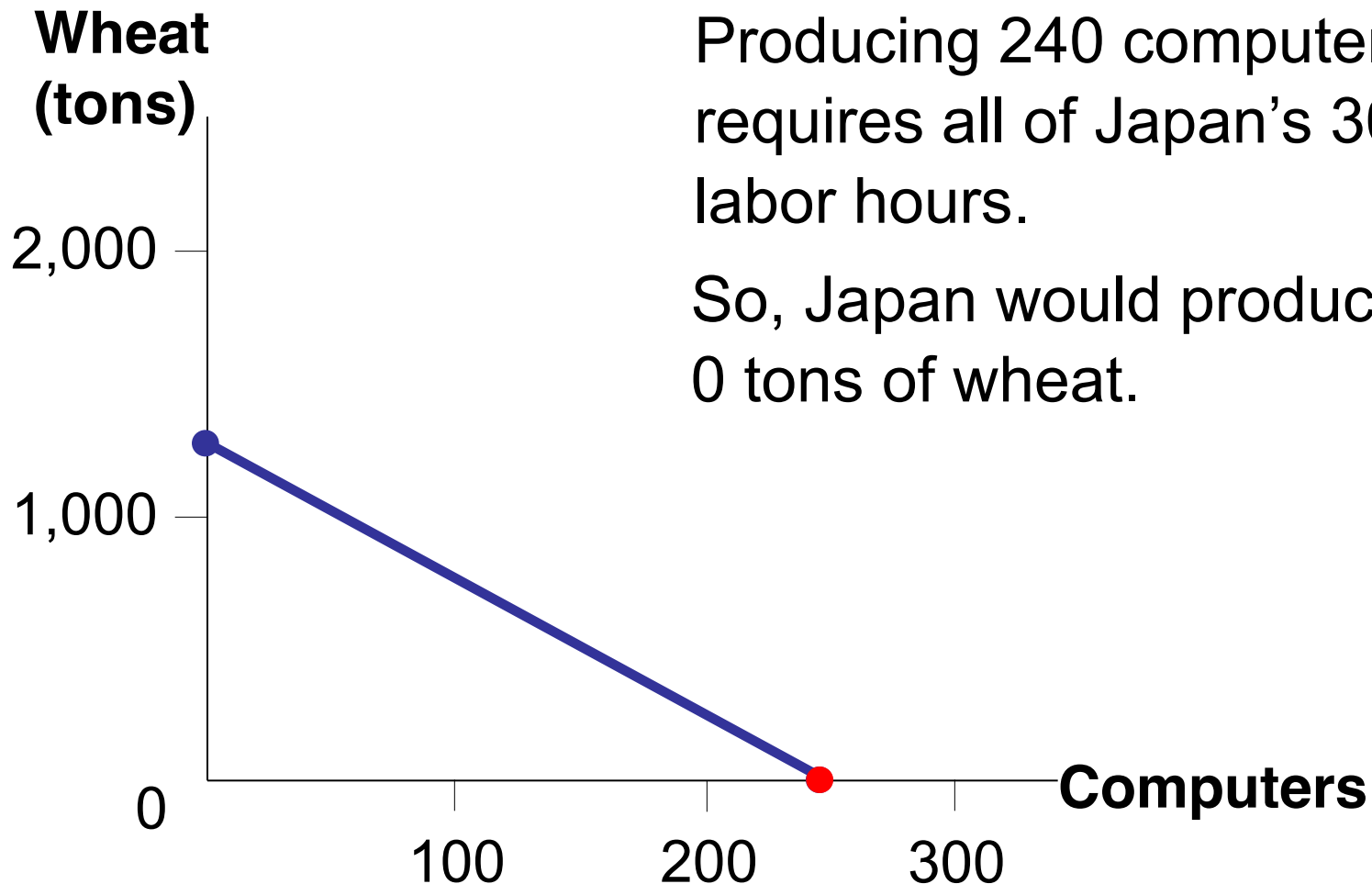
Production under trade

1. 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.
2. 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.

U.S. Production With Trade



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 & Imports

- **Exports:**

goods produced domestically and sold abroad

To export means to sell domestically produced goods abroad.

- **Imports:**

goods produced abroad and sold domestically

To import means to purchase goods produced in other countries.

ACTIVE LEARNING 3

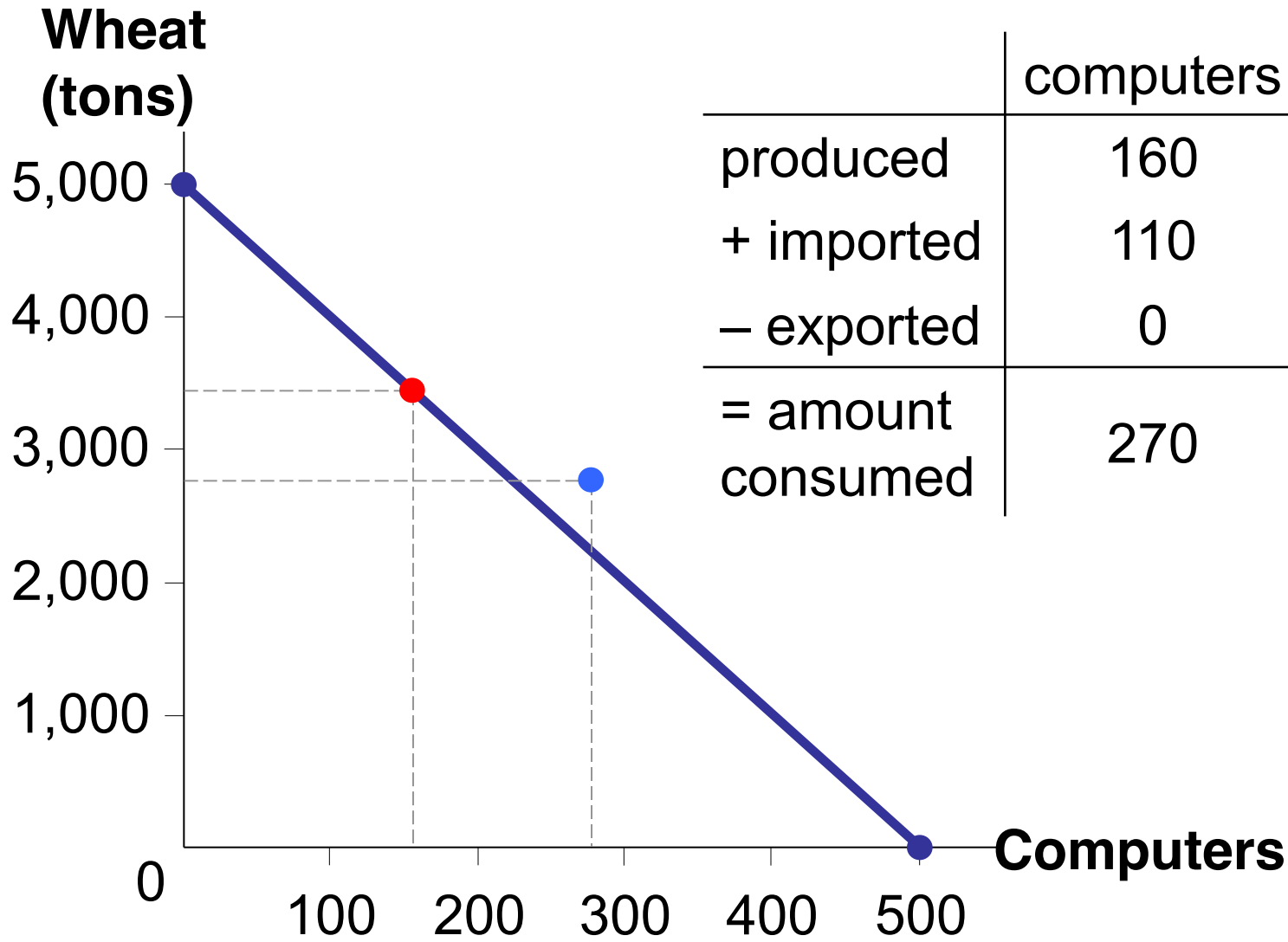
Consumption under trade

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

(So, Japan imports 700 tons wheat and exports 110 computers.)

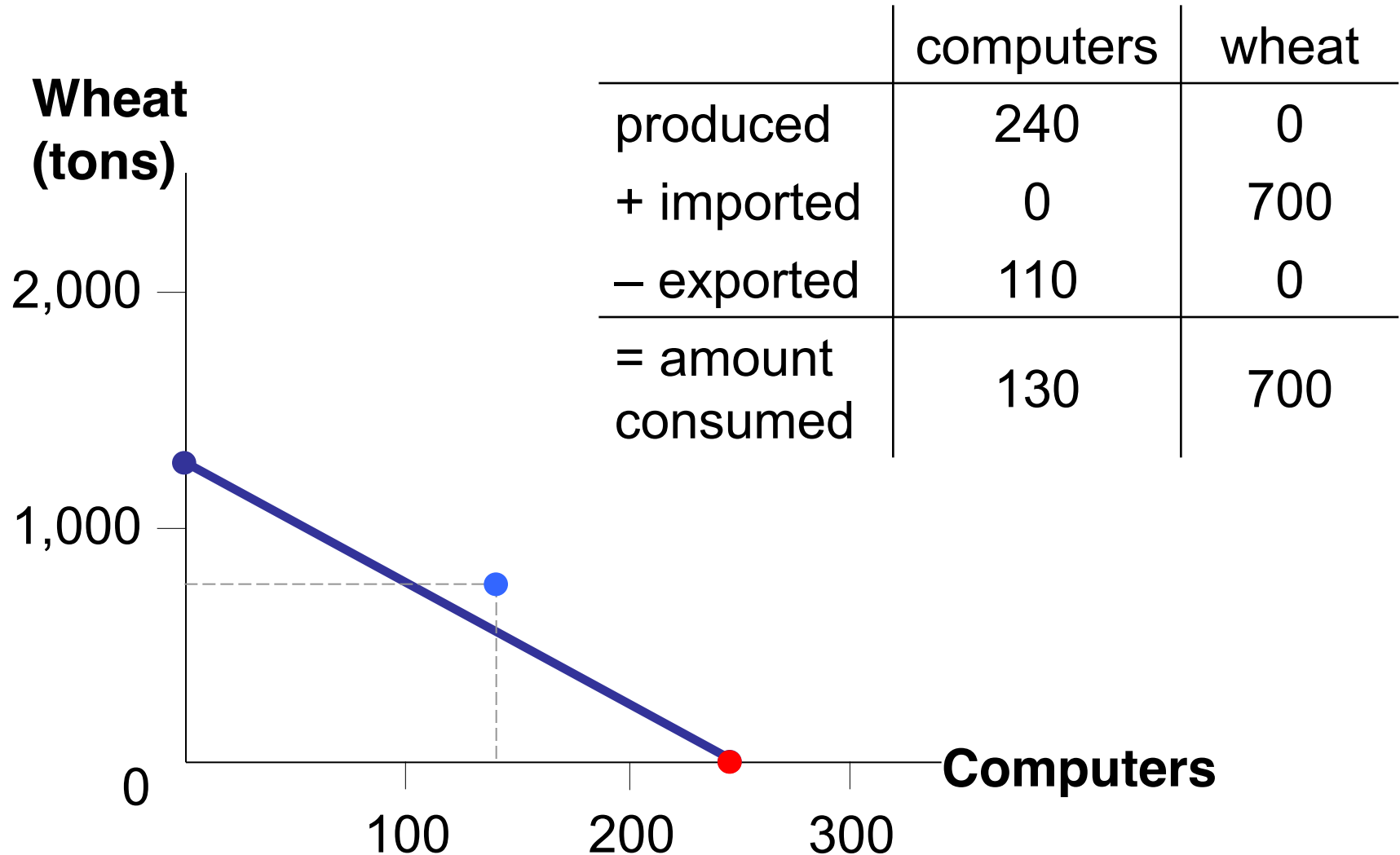
- How much of each good is consumed in the U.S.? Plot this combination on the U.S. PPF.
- How much of each good is consumed in Japan? Plot this combination on Japan's PPF.

U.S. Consumption With Trade



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

Japan's Consumption With Trade



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 an absolute advantage in wheat: producing a ton of wheat uses 10 labor hours in the U.S. vs. 25 in Japan.
- If each country has an absolute advantage in one good and specializes in that good, then both countries can gain from trade.

Where Do These Gains Come From?

- Which country has an absolute advantage in computers?
- Producing one computer requires 125 labor hours in Japan, but only 100 in the U.S.
- 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 Measures of the Cost of a Good

- Two countries can gain from trade when each specializes in the good it produces at lowest cost.
- Absolute advantage measures the cost of a good in terms of the inputs required to produce it.
- Recall:
Another measure of cost is *opportunity cost*.
- In our example, the opportunity cost of a computer is the amount of wheat that could be produced using the labor needed to produce one computer.

Opportunity Cost and Comparative Advantage

- **Comparative advantage:** the ability to produce a good at a lower opportunity cost than another producer
- Which country has the comparative advantage in computers?
- To answer this, must determine the opportunity cost of a computer in each country.

Opportunity Cost and Comparative Advantage

- The opportunity cost of a computer is
 - 10 tons of wheat in the U.S., because producing one computer requires 100 labor hours, which instead could produce 10 tons of wheat.
 - 5 tons of wheat in Japan, because producing one computer requires 125 labor hours, which instead could produce 5 tons of wheat.
- So, Japan has a comparative advantage in computers. *Lesson: Absolute advantage is not necessary for comparative advantage!*

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, and all countries can gain from trade.
- The same applies to individual producers (like the farmer and the rancher) specializing in different goods and trading with each other.

ACTIVE LEARNING 4

Absolute and comparative advantage

Argentina and Brazil each have 10,000 hours of labor per month.

In Argentina,

- producing one pound coffee requires 2 hours
- producing one bottle wine requires 4 hours

In Brazil,

- producing one pound coffee requires 1 hour
- producing one bottle wine requires 5 hours

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

ACTIVE LEARNING 4

Answers

Brazil has an absolute advantage in coffee:

- Producing a pound of coffee requires only one labor-hour in Brazil, but two in Argentina.

Argentina has a comparative advantage in wine:

- Argentina's opp. cost of wine is two pounds of coffee, because the four labor-hours required to produce a bottle of wine could instead produce two pounds of coffee.
- Brazil's opp. cost of wine is five pounds of coffee.

Unanswered Questions...

- We made a lot of assumptions about the quantities of each good that each country produces, trades, and consumes, and the price at which the countries trade wheat for computers.
- In the real world, these quantities and prices would be determined by the preferences of consumers and the technology and resources in both countries.
- We will begin to study this in the next chapter.
- For now, though, our goal was merely to see how ***trade can make everyone better off.***

Chapter 4 – The Market Forces of Demand and Supply

Markets and Competition

- A **market** is a group of buyers and sellers of a particular product.
- A **competitive market** is one with many buyers and sellers, each has a negligible effect on price.
- In a **perfectly competitive** market:
 - All goods exactly the same
 - Buyers & sellers so numerous that no one can affect market price—each is a “**price taker**”
- In this chapter, we assume markets are perfectly competitive.

Demand

- The **quantity demanded** of any good is the amount of the good that buyers are willing and able to purchase.
- **Law of demand**: the claim that the quantity demanded of a good falls when the price of the good rises, other things equal

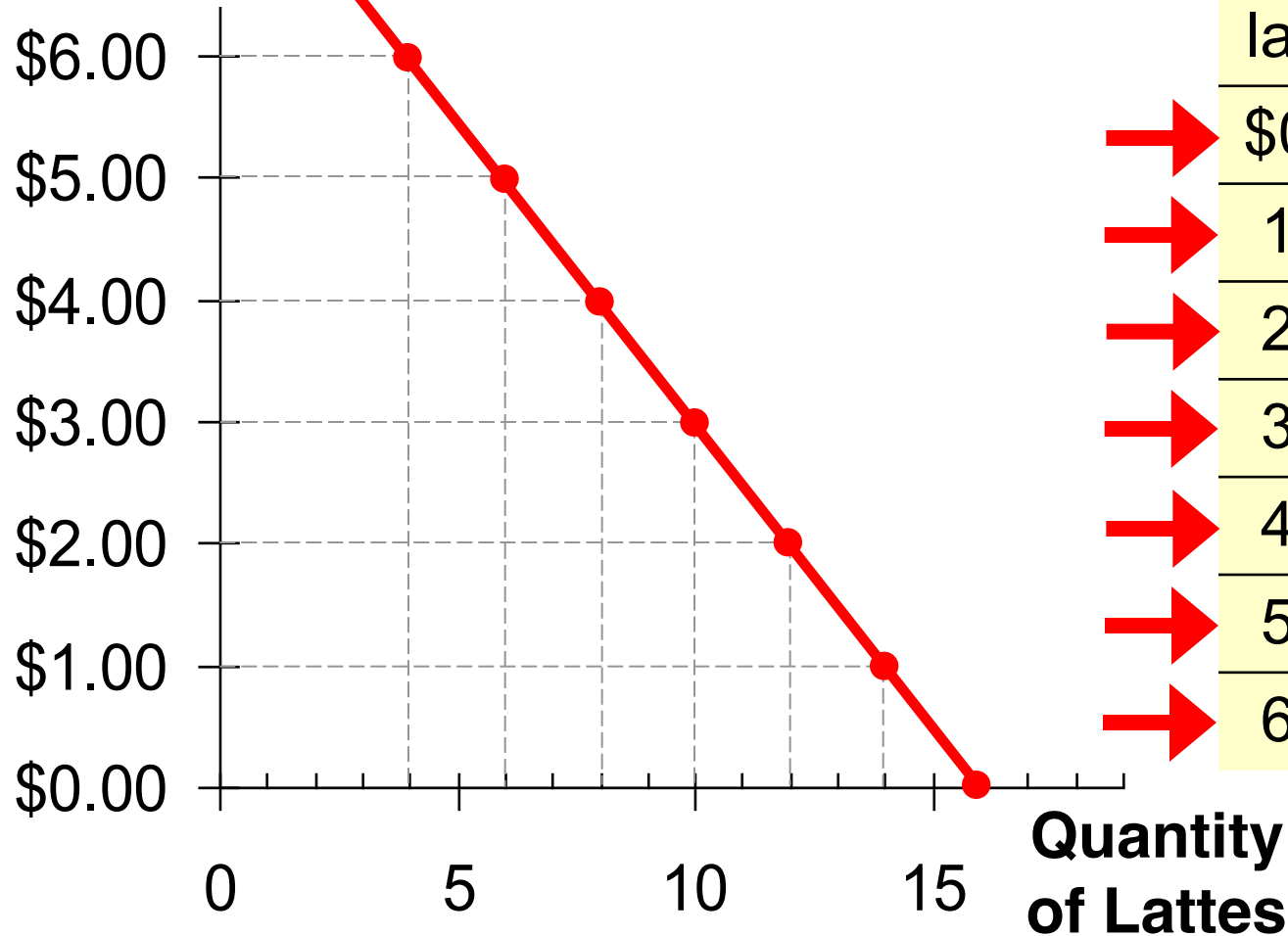
The Demand Schedule

- **Demand schedule:**
a table that shows the relationship between the price of a good and the quantity demanded
- Example:
Helen's demand for lattes.
- Notice that Helen'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

Helen's Demand Schedule & Curve

**Price of
Lattes**



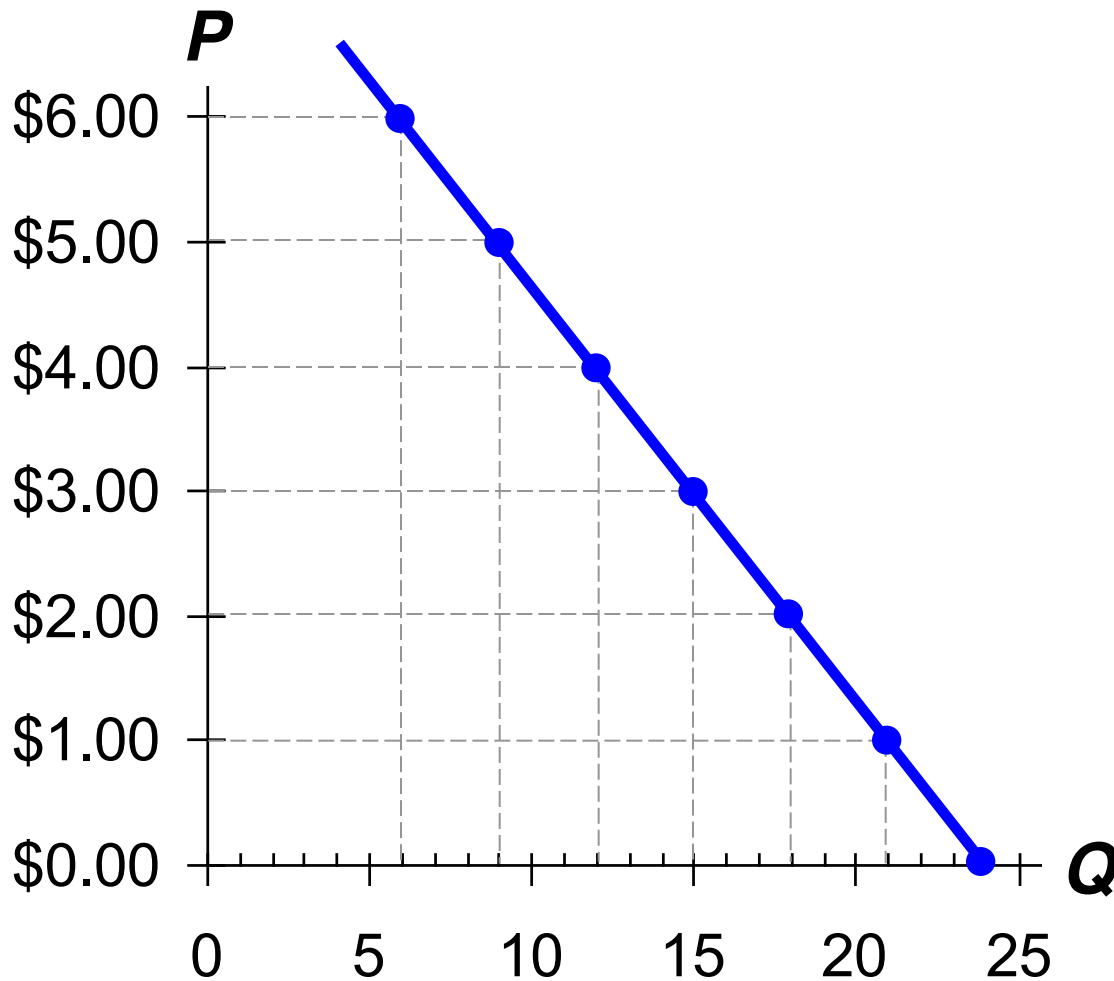
Price of lattes	Quantity of lattes demanded
\$0.00	16
1.00	14
2.00	12
3.00	10
4.00	8
5.00	6
6.00	4

Market Demand versus Individual Demand

- The quantity demanded in the market is the sum of the quantities demanded by all buyers at each price.
- Suppose Helen and Ken are the only two buyers in the Latte market. (Q^d = quantity demanded)

Price	Helen's Q^d		Ken'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

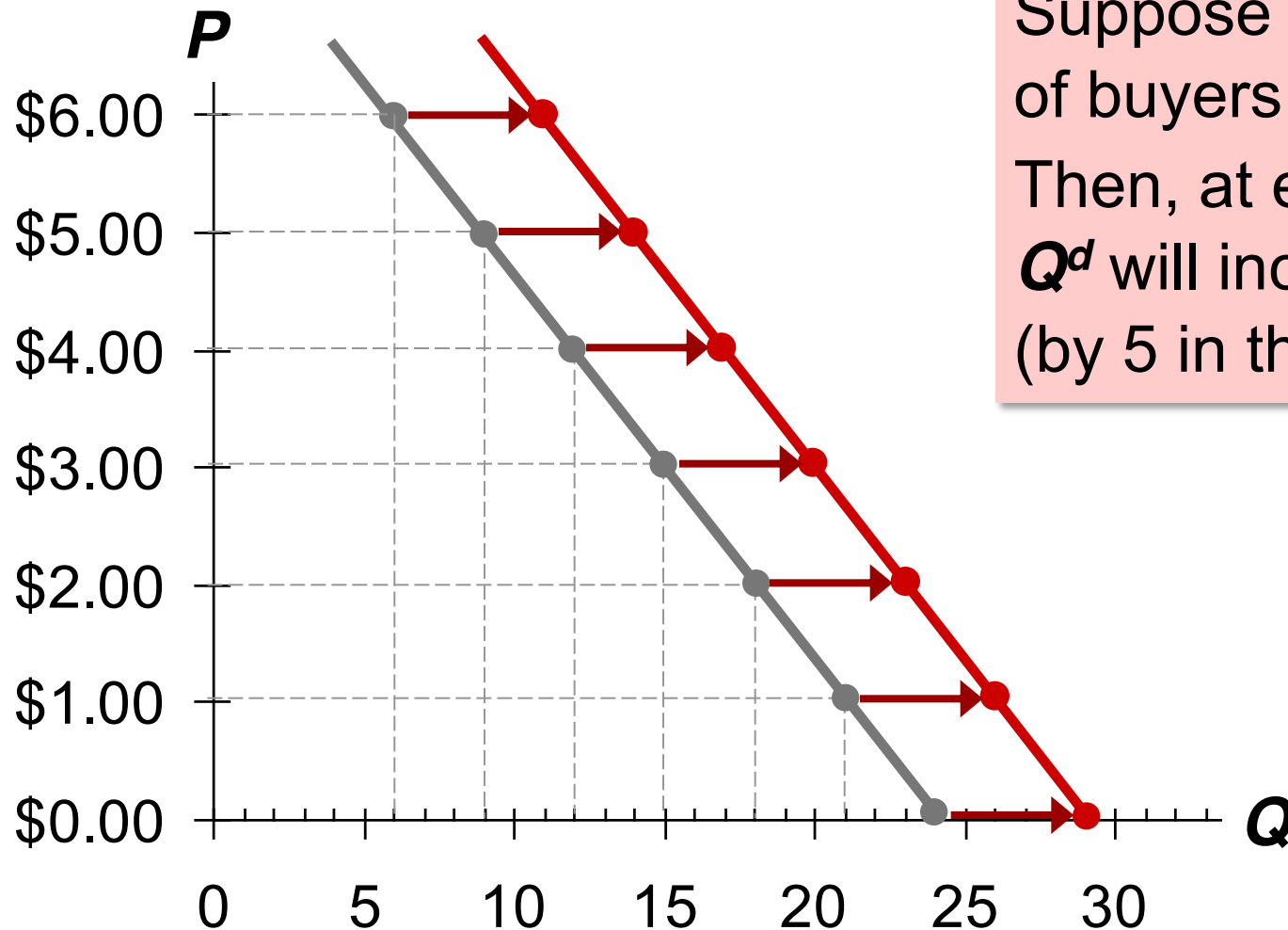
Demand Curve Shifters

- The demand curve shows how price affects quantity demanded, *other things being equal*.
- These “other things” are non-price determinants of demand (i.e., things that determine buyers’ demand for a good, other than the good’s price).
- Changes in them shift the ***D*** curve...

Demand Curve Shifters: # of Buyers

- Increase in # of buyers
increases quantity demanded at each price,
shifts ***D*** curve to the right.

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

- Demand for a **normal good** is positively related to income.
 - Increase in income causes increase in quantity demanded at each price, shifts ***D*** curve to the right.

(Demand for an **inferior good** is negatively related to income. An increase in income shifts ***D*** curves for inferior goods to the left.)

Demand Curve Shifters: Prices of Related Goods

- Two goods are **substitutes** if an increase in the price of one causes an increase in 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 desktop computers, CDs and music downloads

Demand Curve Shifters: Prices of Related Goods

- Two goods are **complements** if an increase in the price of one causes a fall in 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

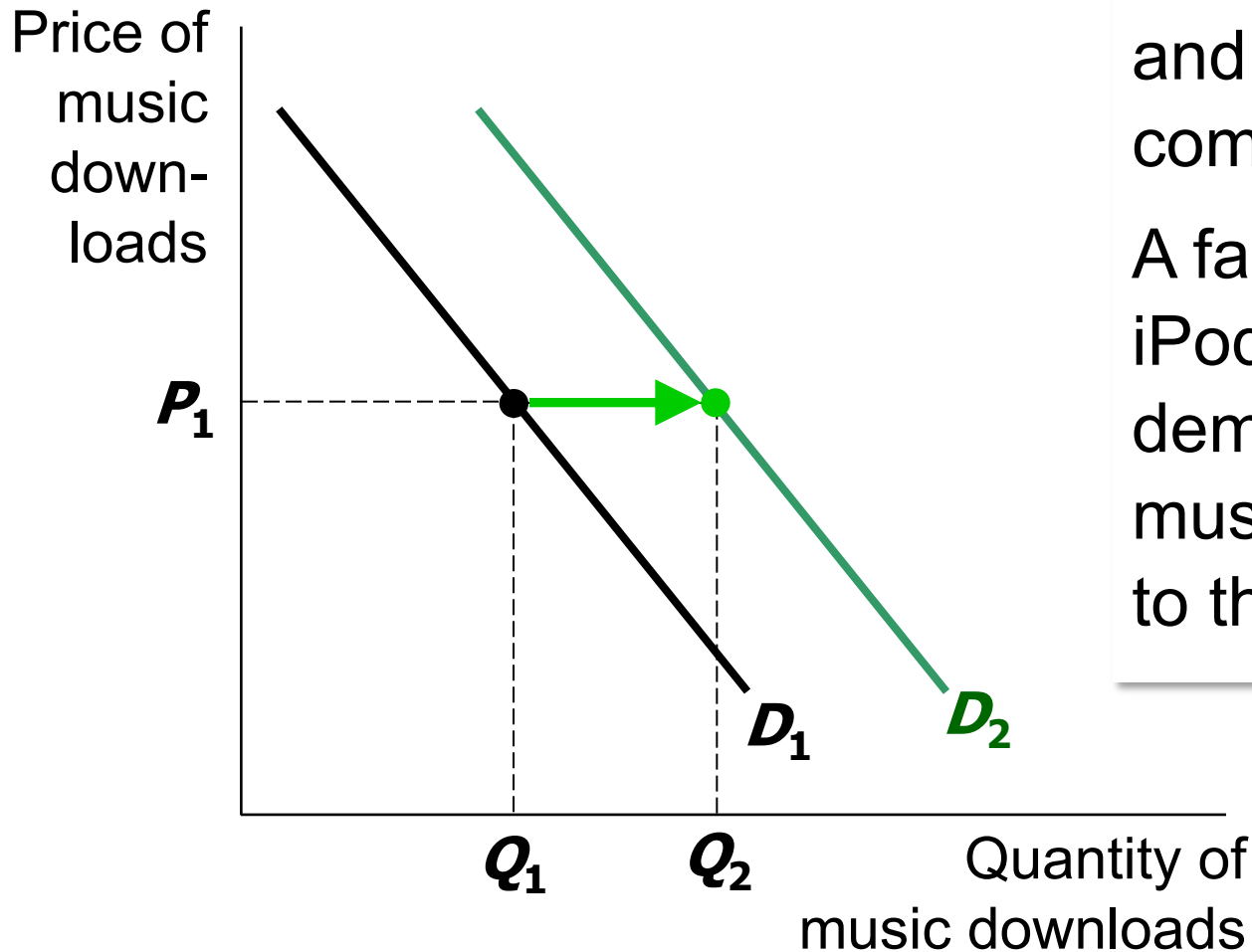
- Expectations affect consumers' buying decisions.
- Examples:
 - If people expect their incomes to rise, their demand for meals at expensive restaurants may increase now.
 - If the economy sours and people worry about their future job security, demand for new autos may fall now.

Summary: Variables That Influence Buyers

Variable	A change in this variable...
Price	...causes a movement along the D curve
# of buyers	...shifts the D curve
Income	...shifts the D curve
Price of related goods	...shifts the D curve
Tastes	...shifts the D curve
Expectations	...shifts the D curve

ACTIVE LEARNING 1

A. Price of iPods falls

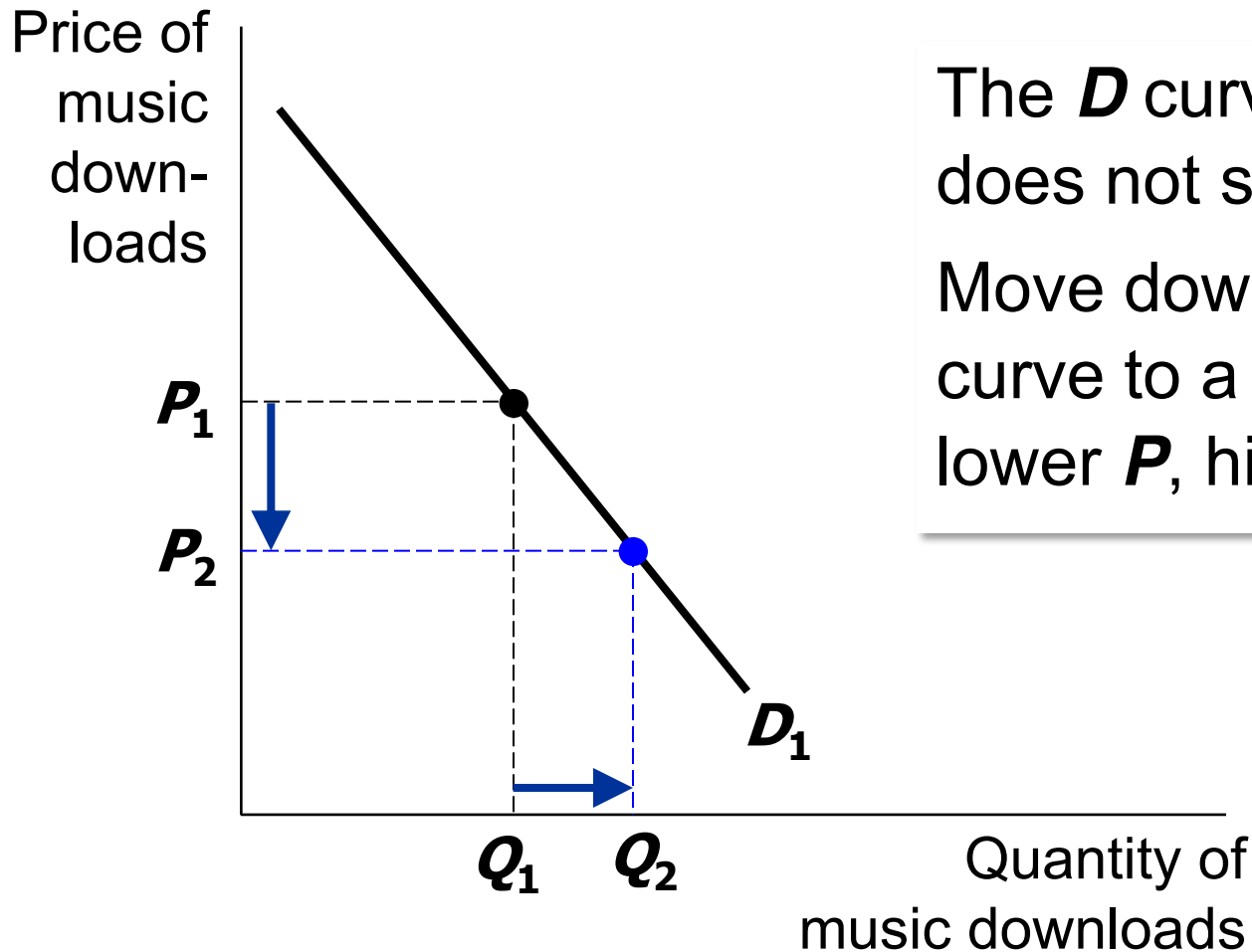


Music downloads and iPods are complements.

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

ACTIVE LEARNING 1

B. Price of music downloads falls

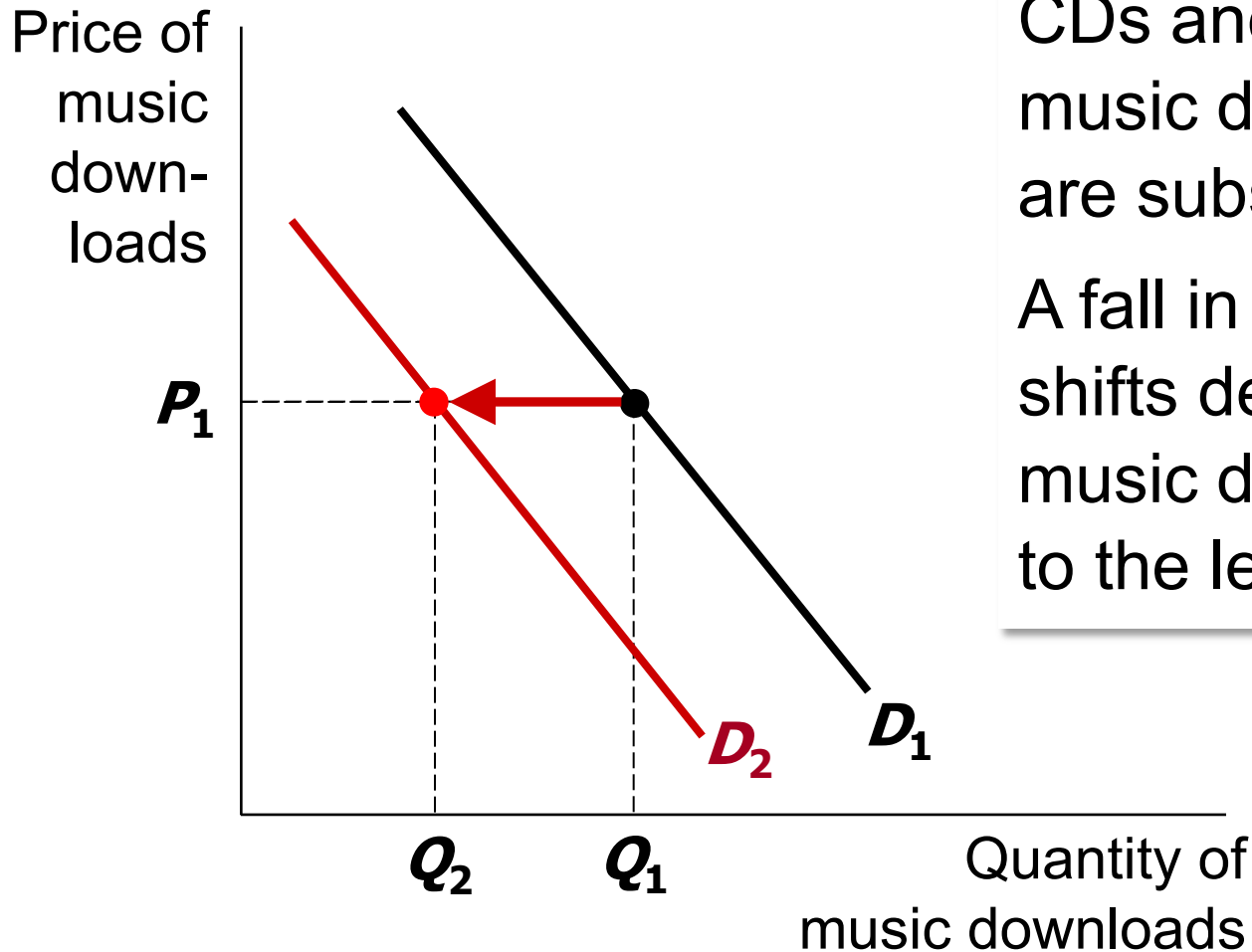


The **D** curve does not shift.

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

ACTIVE LEARNING 1

C. Price of CDs falls



CDs and music downloads are substitutes.

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

Supply

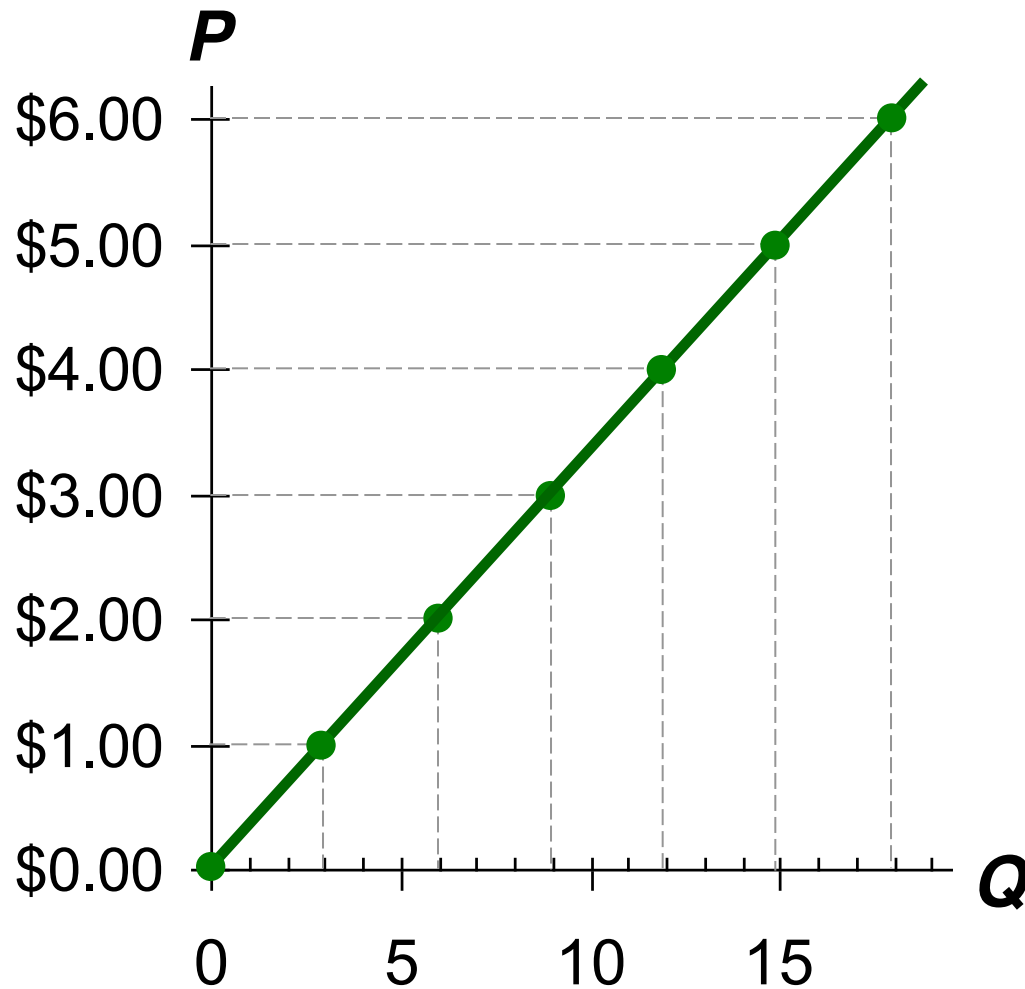
- The **quantity supplied** of any good is the amount that sellers are willing and able to sell.
- **Law of supply**: the claim that the quantity supplied of a good rises when the price of the good rises, other things equal

The Supply Schedule

- **Supply schedule:**
A table that 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 & Curve



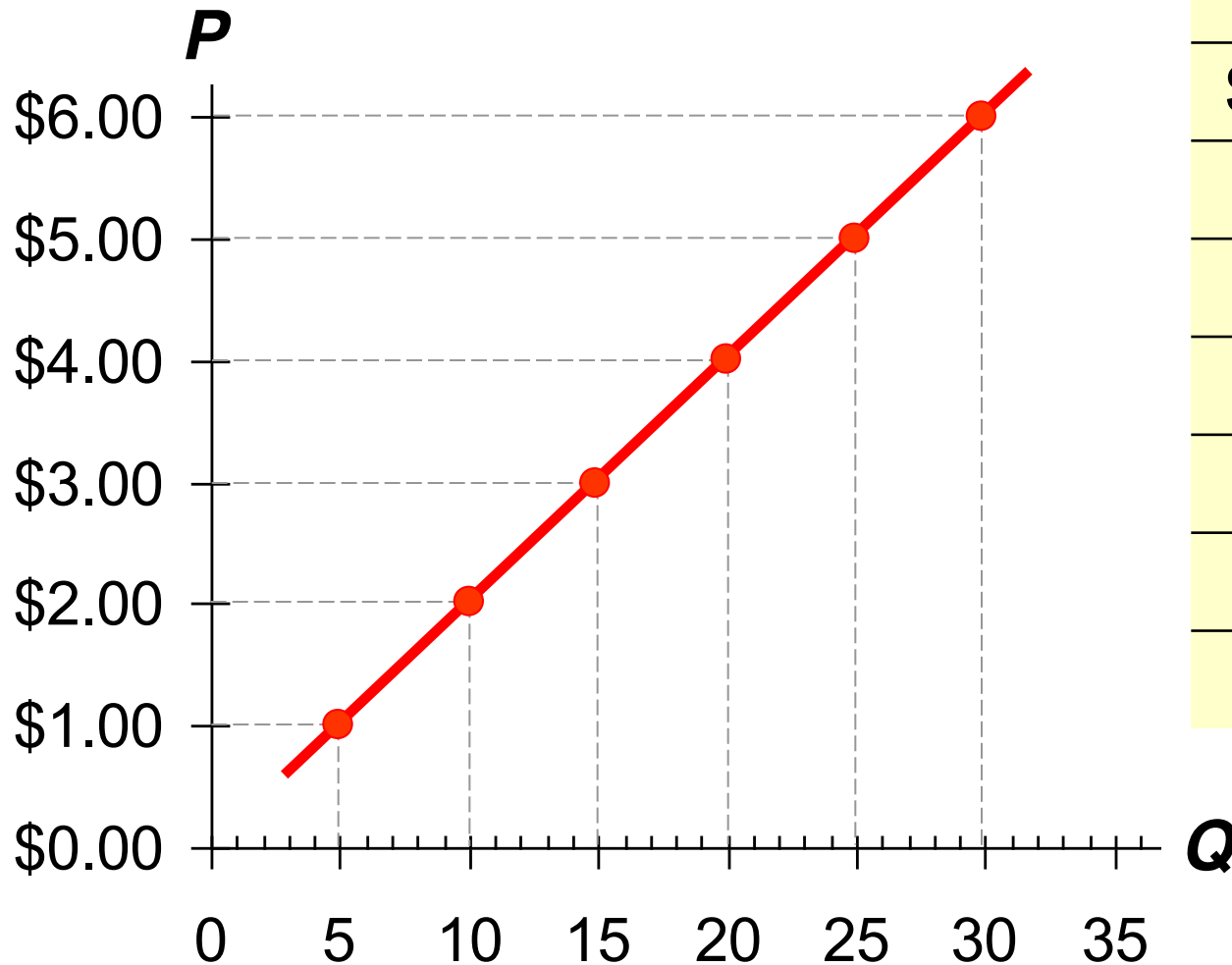
	Price of lattes	Quantity of lattes supplied
→	\$0.00	0
→	1.00	3
→	2.00	6
→	3.00	9
→	4.00	12
→	5.00	15
→	6.00	18

Market Supply versus Individual Supply

- The quantity supplied in the market is the sum of the quantities supplied by all sellers at each price.
- Suppose Starbucks and Jitters are the only two sellers in this market. (Q^s = quantity supplied)

Price	Starbucks		Jitters		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

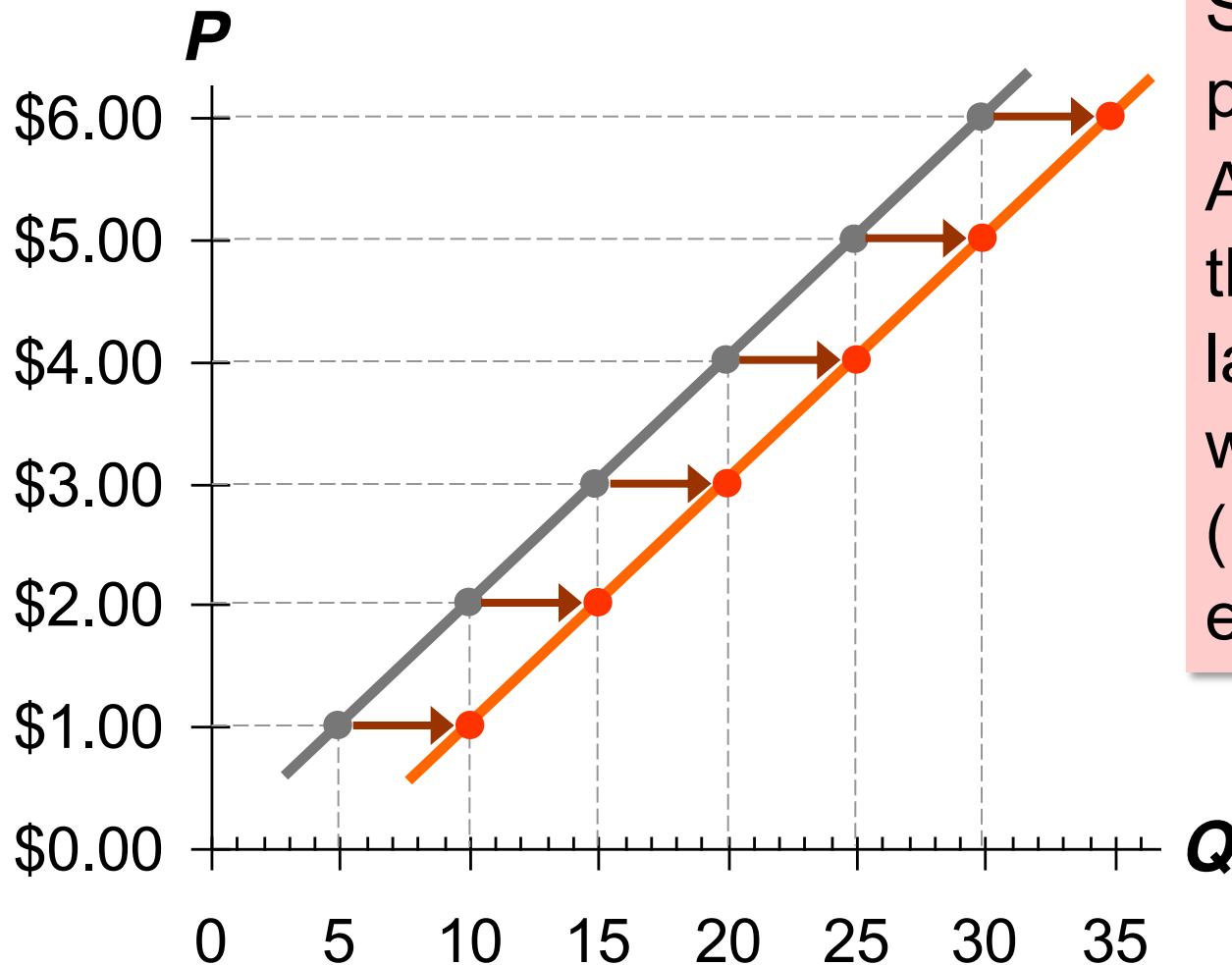
Supply Curve Shifters

- 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

- Examples of input prices:
wages, prices of raw materials.
- A fall in input prices makes production more profitable at each output price, so firms supply a larger quantity at each price, and 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

- 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.

Supply Curve Shifters: # 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

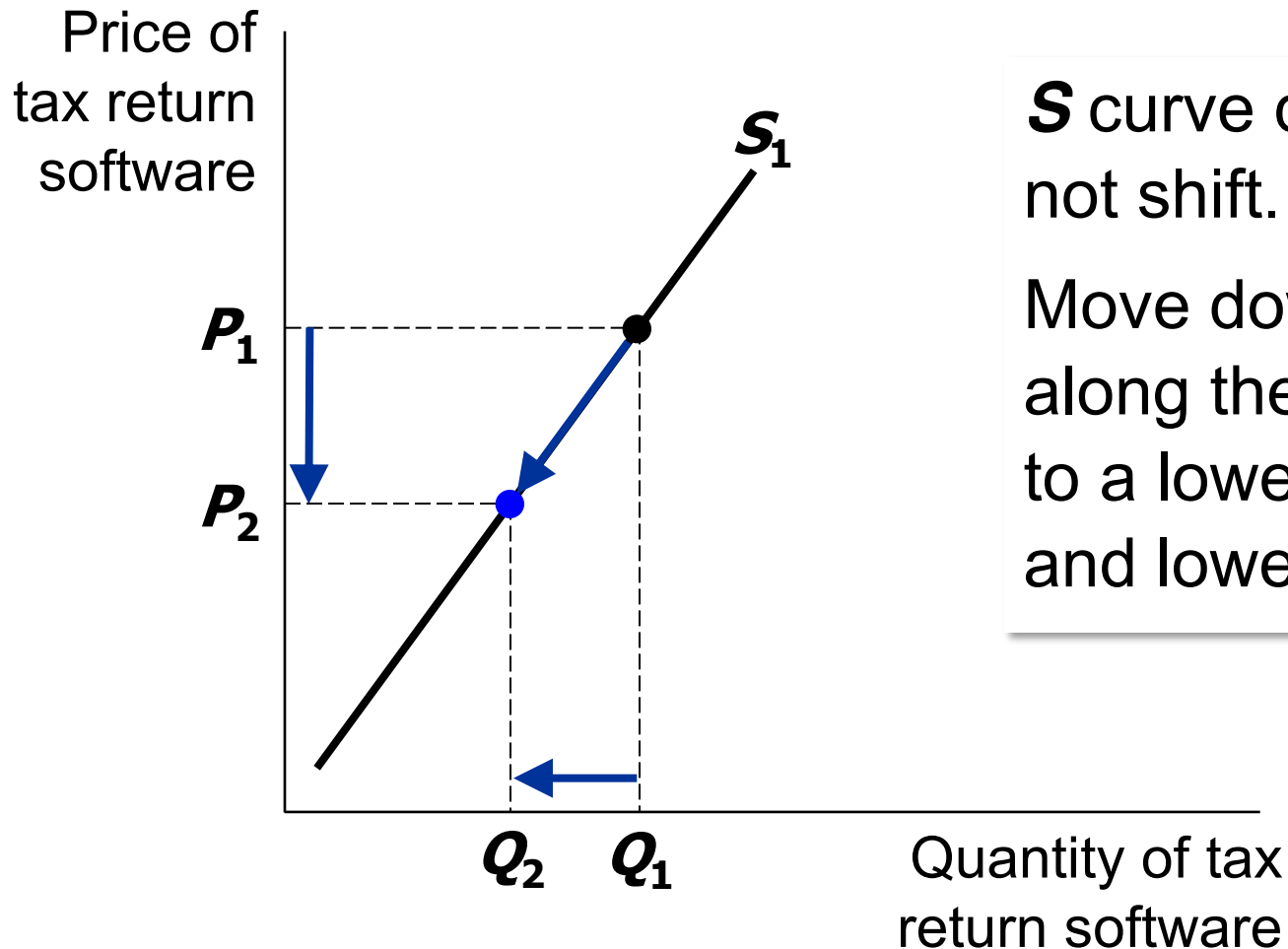
- Example:
 - Events in the Middle East lead to expectations of higher oil prices.
 - In response, owners of Texas oilfields reduce supply now, save some inventory to sell later at the higher price.
 - **S** curve shifts left.
- In general, sellers may adjust supply* when their expectations of future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

Summary: Variables that Influence Sellers

Variable	A change in this variable...
Price	...causes a movement along the S curve
Input Prices	...shifts the S curve
Technology	...shifts the S curve
# of Sellers	...shifts the S curve
Expectations	...shifts the S curve

ACTIVE LEARNING 2

A. Fall in price of tax return software

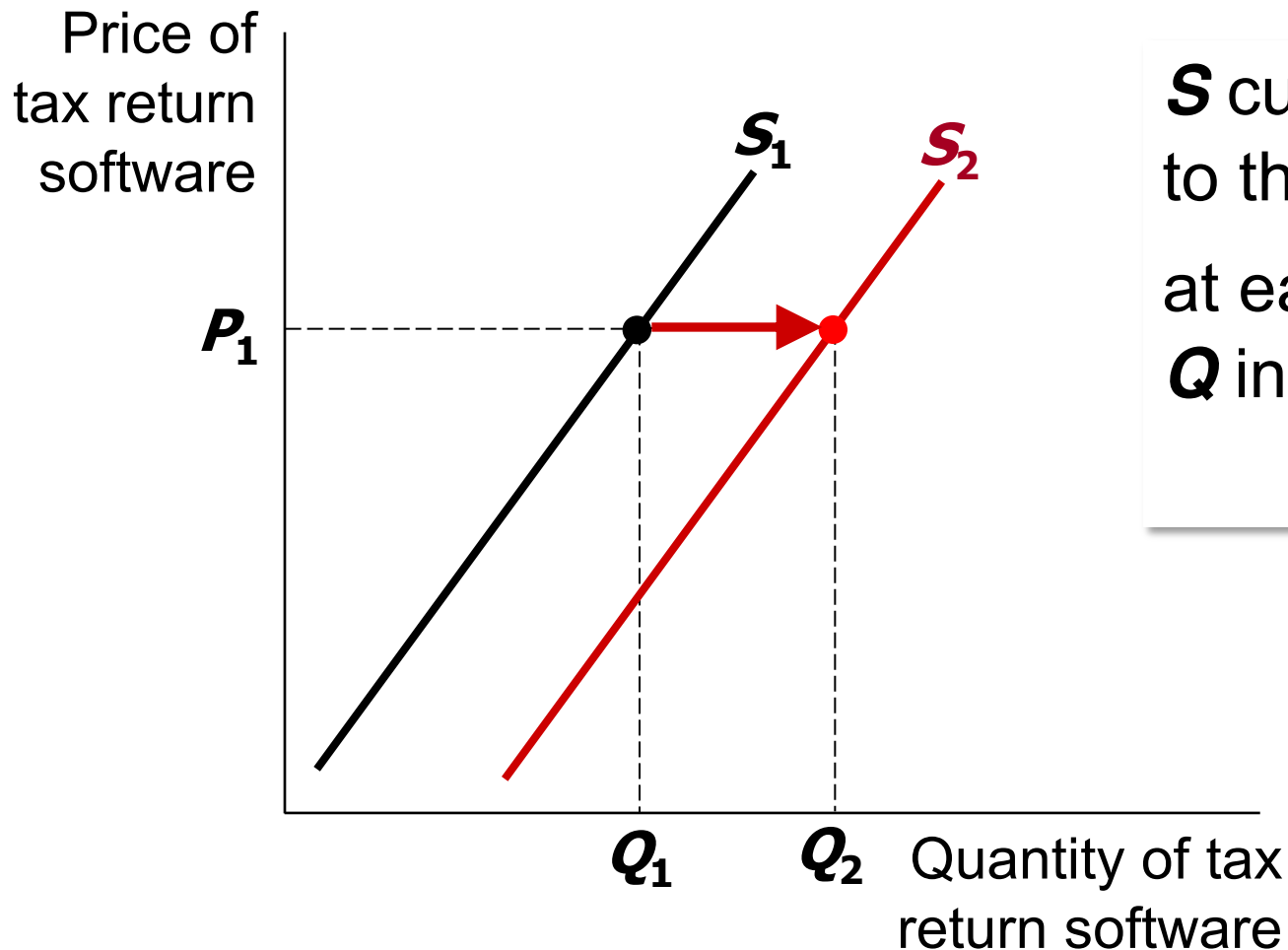


S curve does not shift.

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

ACTIVE LEARNING 2

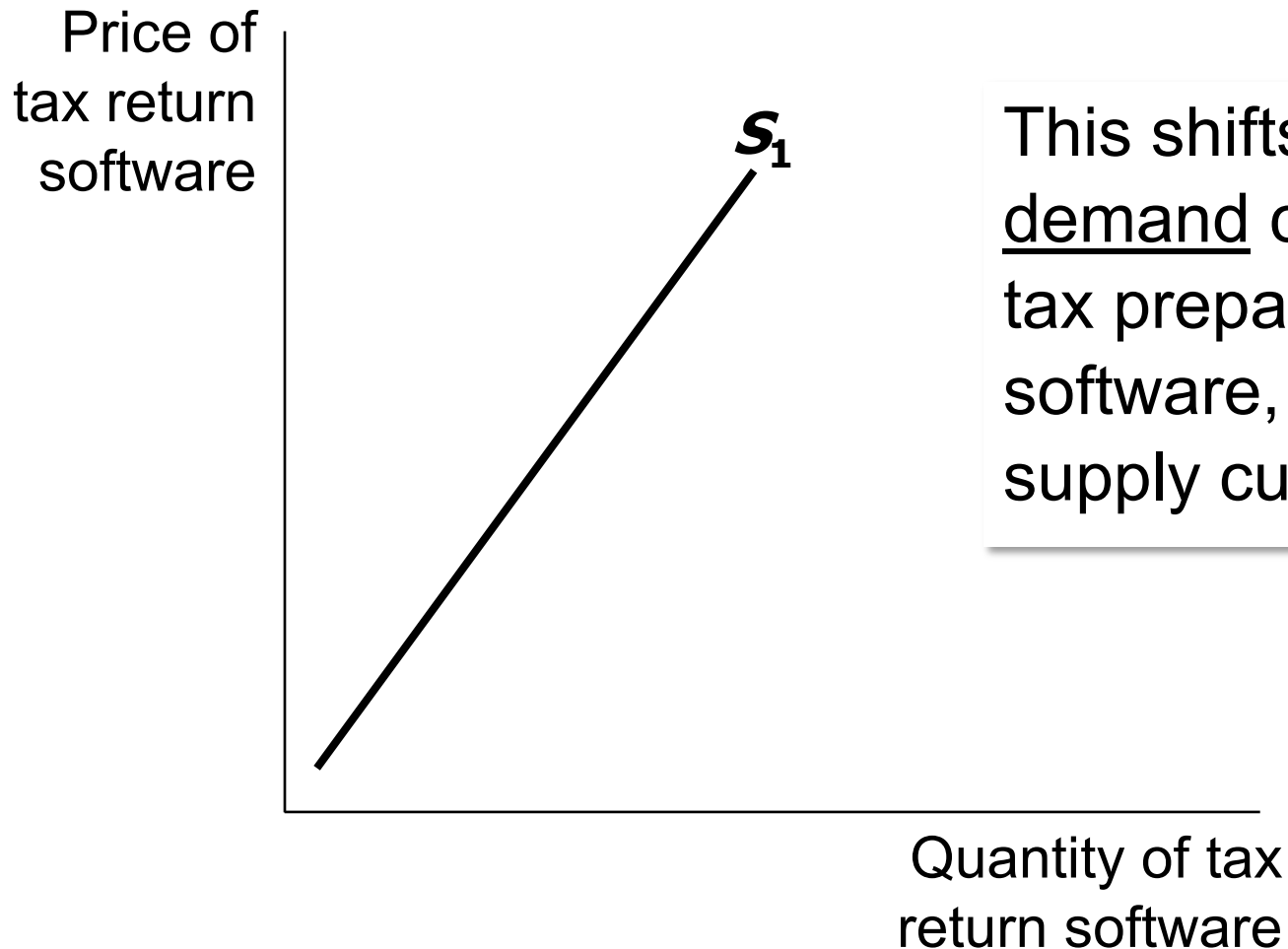
B. Fall in cost of producing the software



S curve shifts to the right:
at each price, **Q** increases.

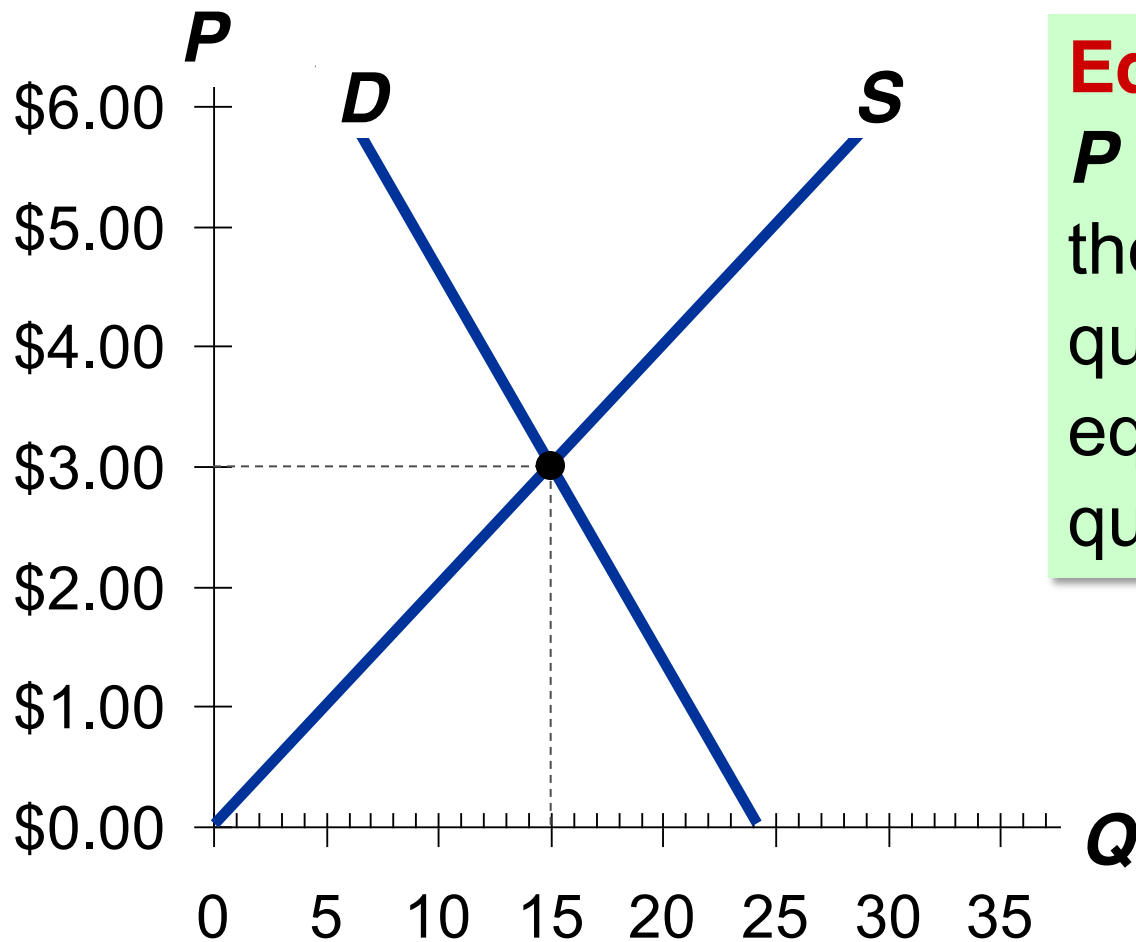
ACTIVE LEARNING 2

C. Professional preparers raise their price



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

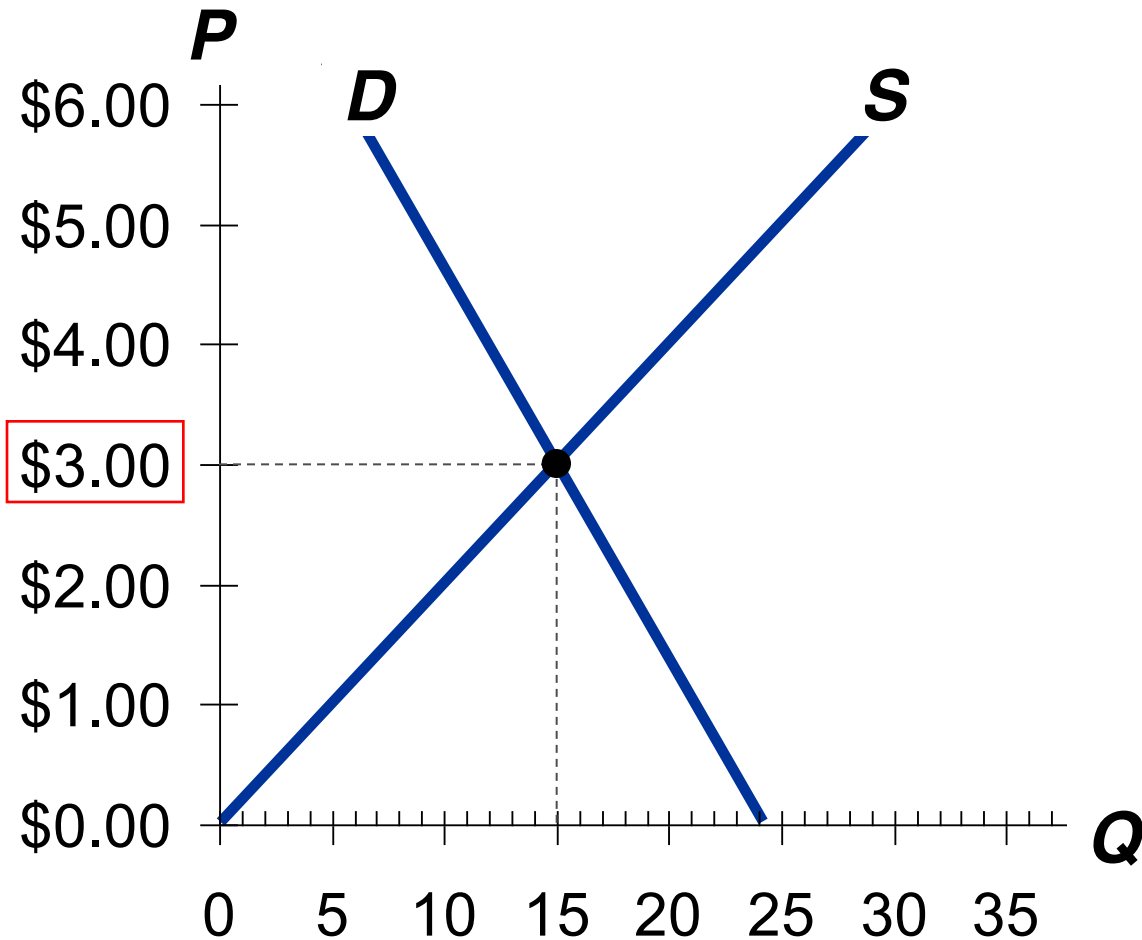
Supply and Demand Together



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

Equilibrium price:

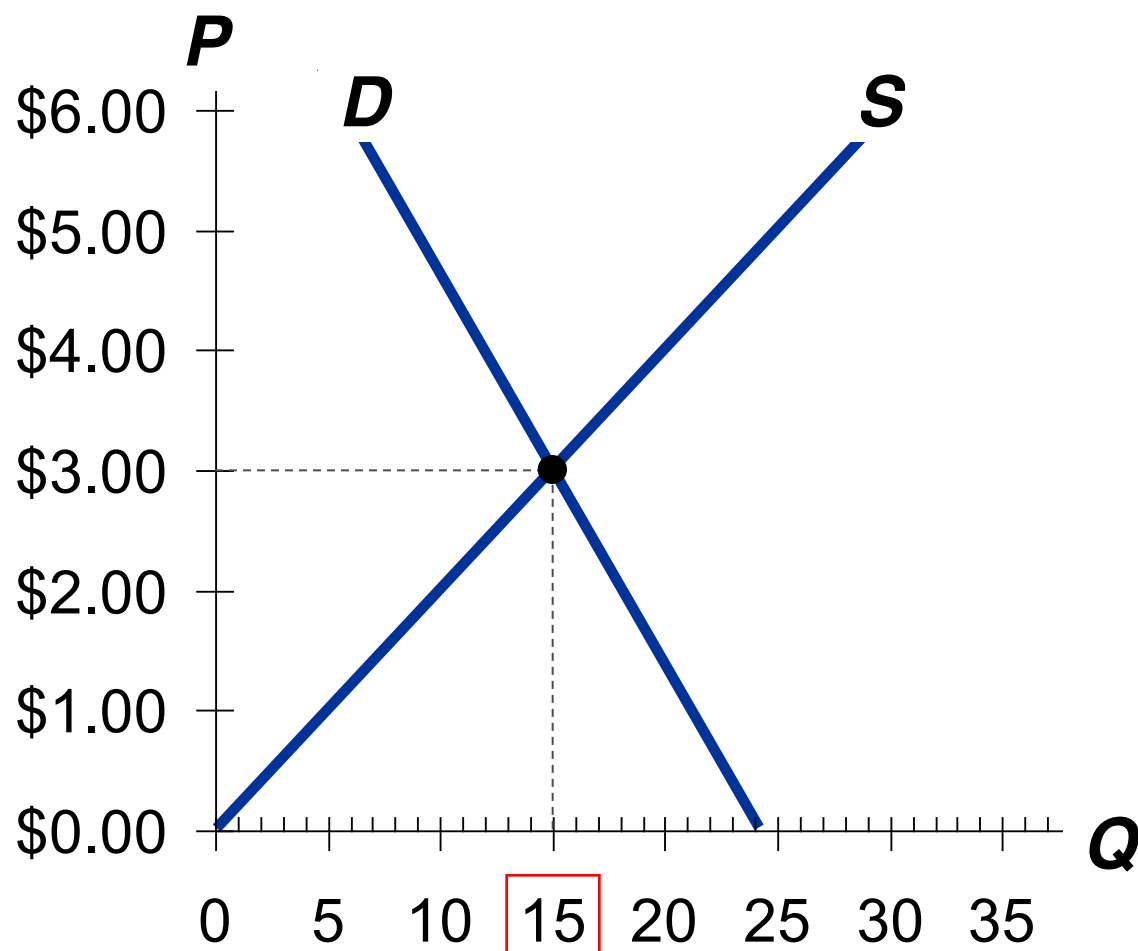
the price that equates quantity supplied with quantity demanded



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

Equilibrium quantity:

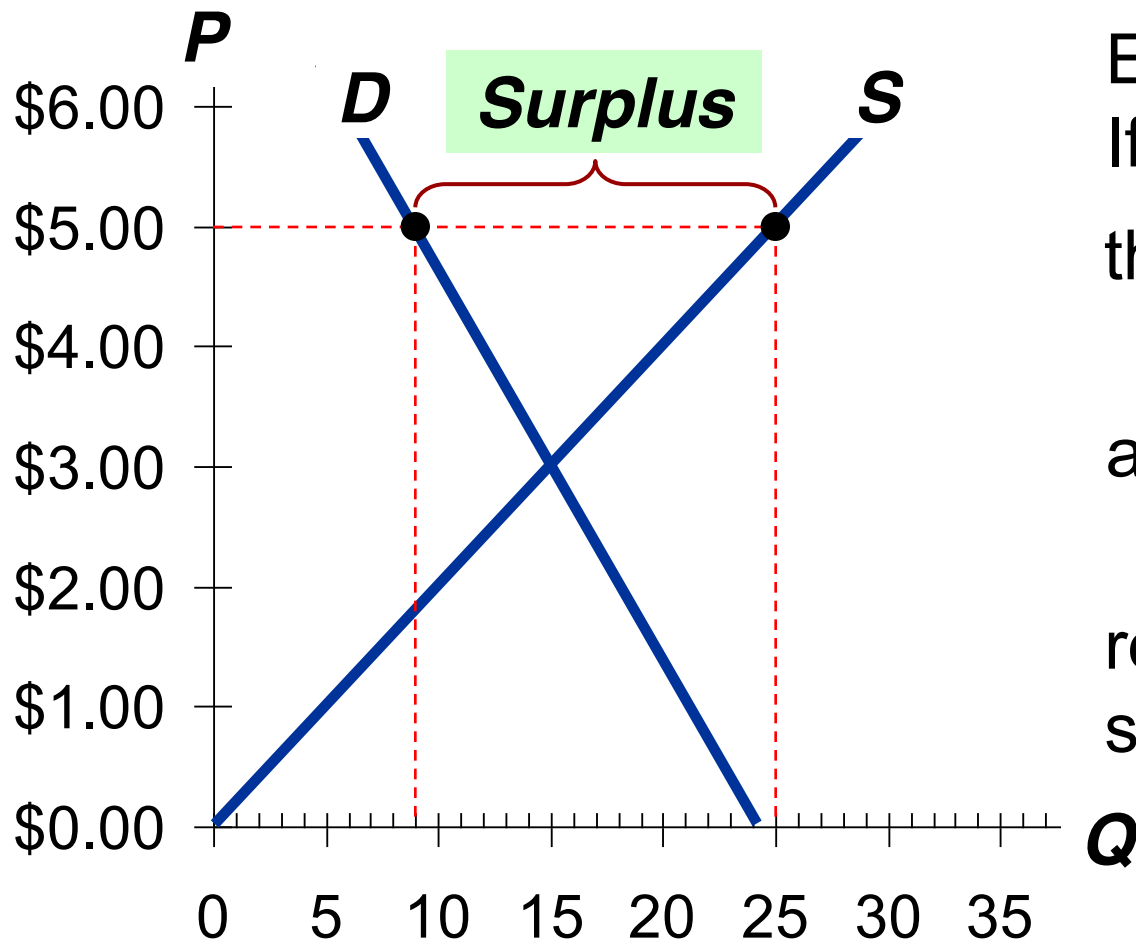
the quantity supplied and quantity demanded at the equilibrium price



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

Surplus (a.k.a. excess supply):

when quantity supplied is greater than quantity demanded



Example:

If $P = \$5$,

then

$$Q^D = 9 \text{ lattes}$$

and

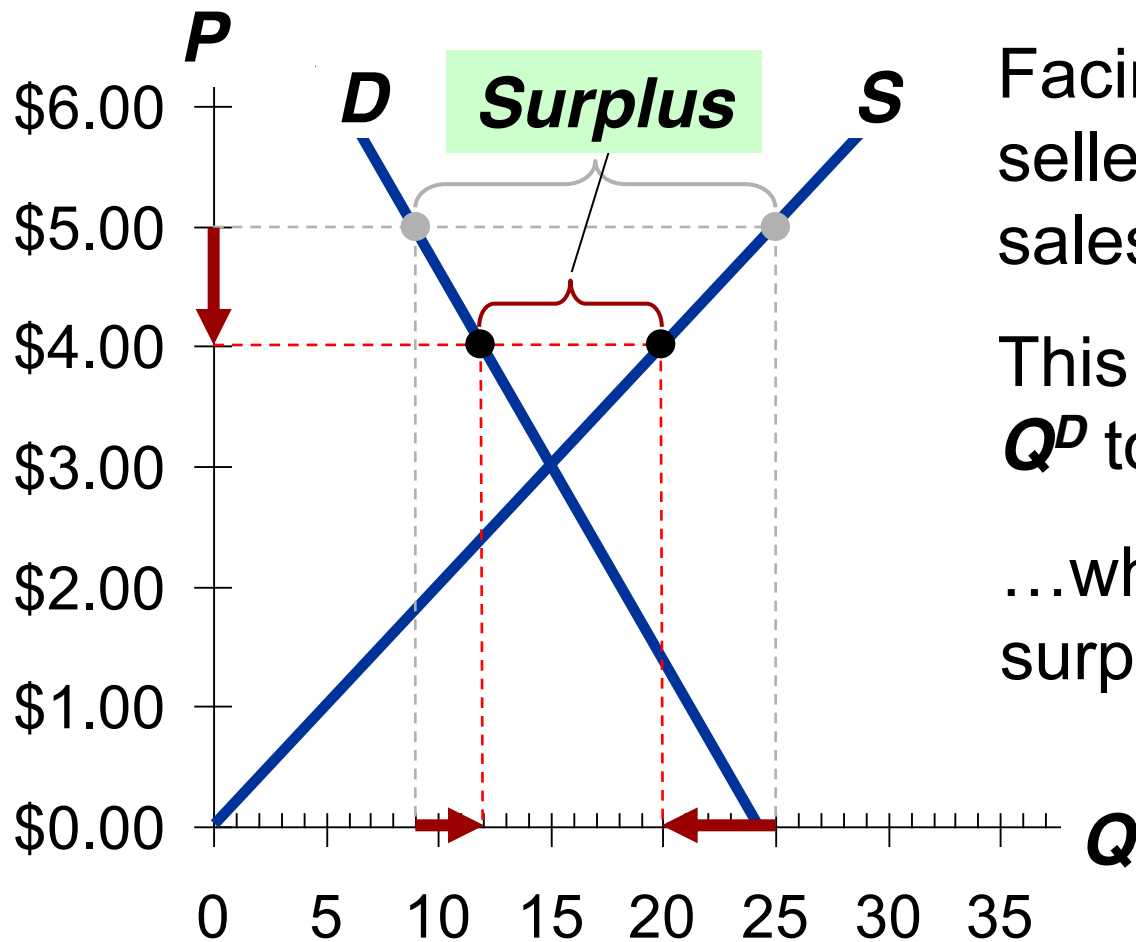
$$Q^S = 25 \text{ lattes}$$

resulting in a
surplus of 16 lattes

Q

Surplus (a.k.a. excess supply):

when quantity supplied is greater than quantity demanded

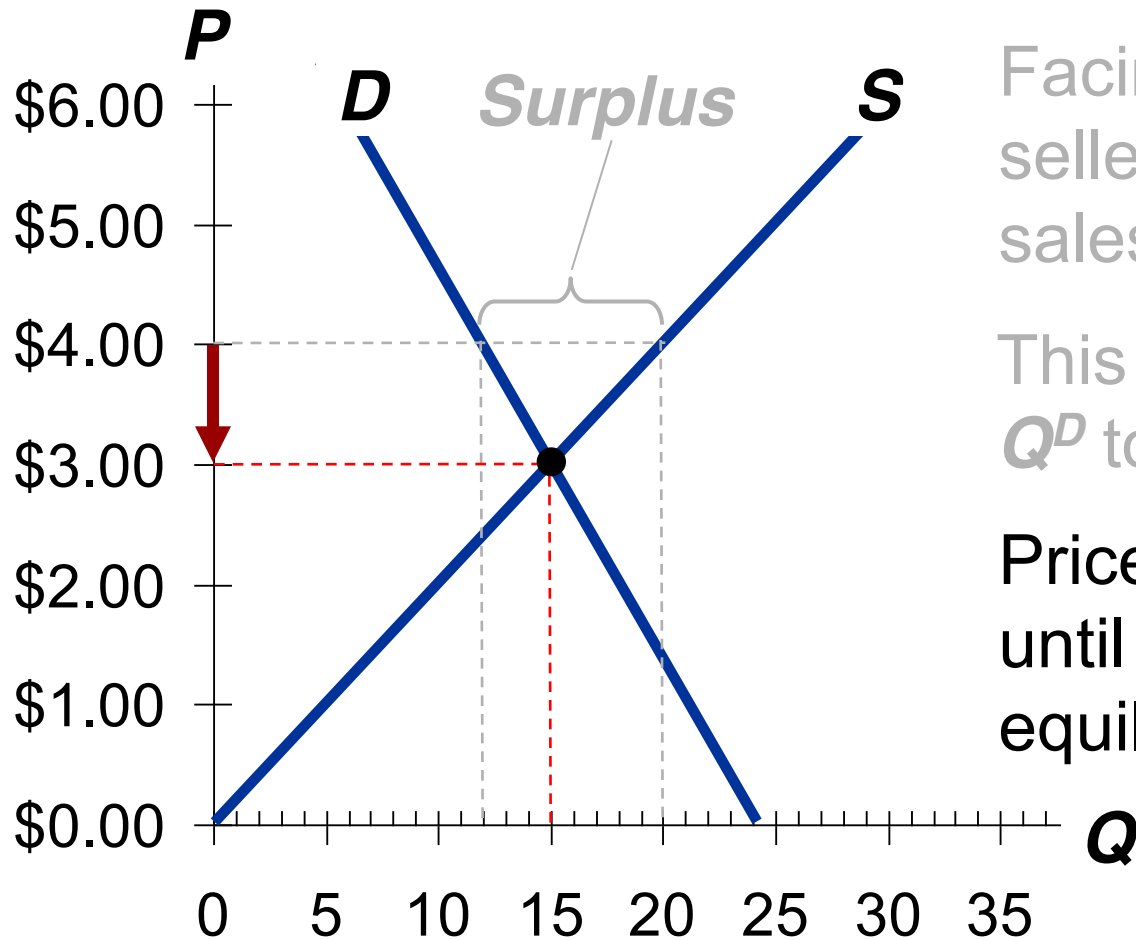


Facing a surplus, sellers try to increase sales by cutting price.

This causes Q^D to rise and Q^S to fall...
...which reduces the surplus.

Surplus (a.k.a. excess supply):

when quantity supplied is greater than quantity demanded



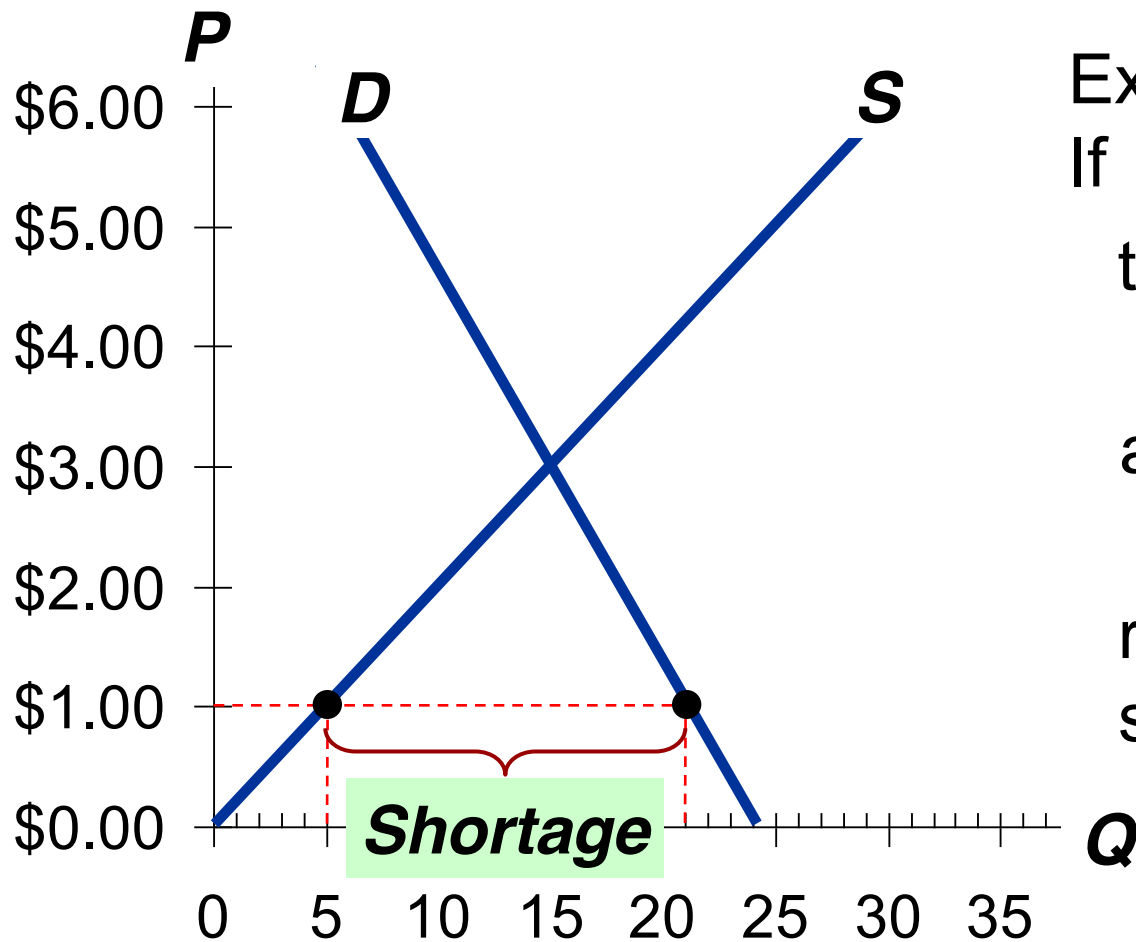
Facing a surplus, sellers try to increase sales by cutting price.

This causes Q^D to rise and Q^S to fall.

Prices continue to fall until market reaches equilibrium.

Shortage (a.k.a. excess demand):

when quantity demanded is greater than quantity supplied



Example:

If $P = \$1$,

then

$Q^D = 21$ lattes

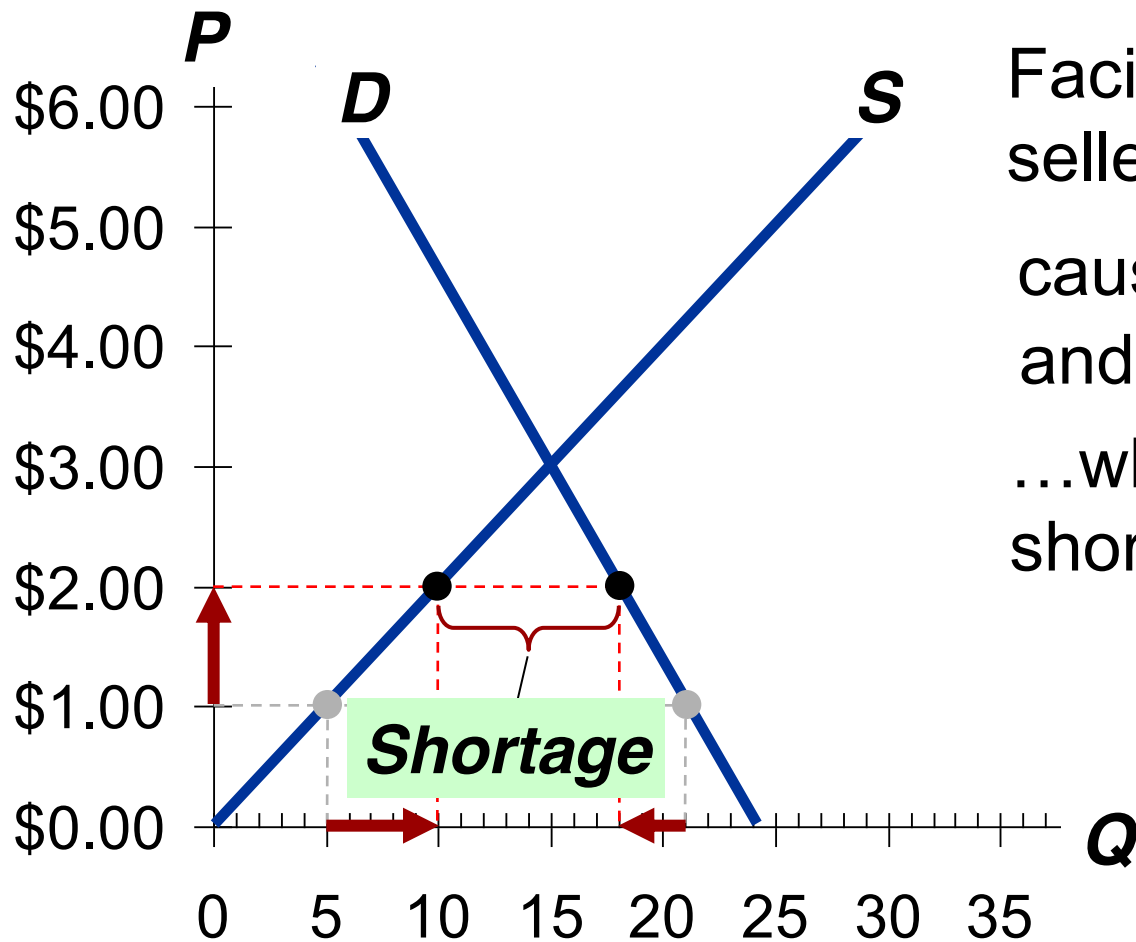
and

$Q^S = 5$ lattes

resulting in a
shortage of 16 lattes

Shortage (a.k.a. excess demand):

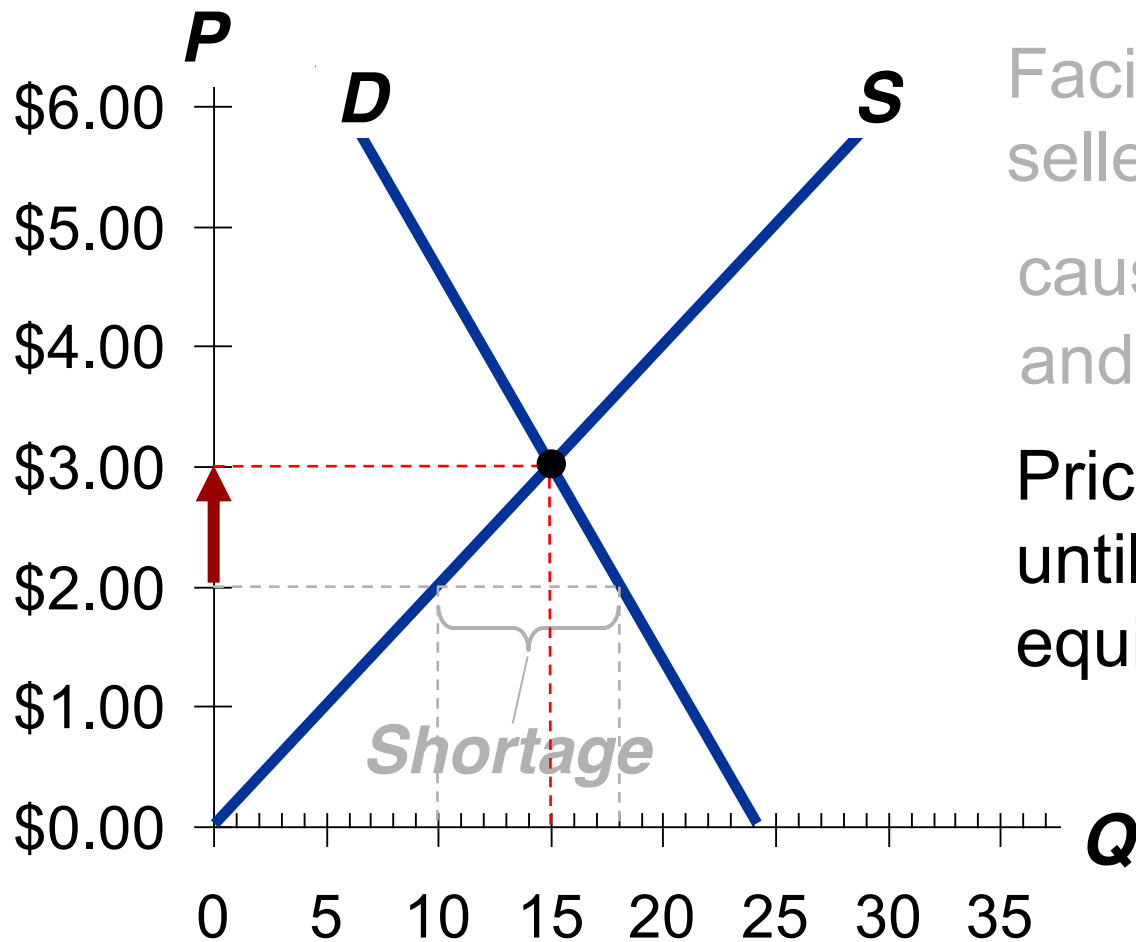
when quantity demanded is greater than quantity supplied



Facing a shortage, sellers raise the price, causing Q^D to fall and Q^S to rise, ...which reduces the shortage.

Shortage (a.k.a. excess demand):

when quantity demanded is greater than quantity supplied



Facing a shortage, sellers raise the price, causing Q^D to fall and Q^S to rise.

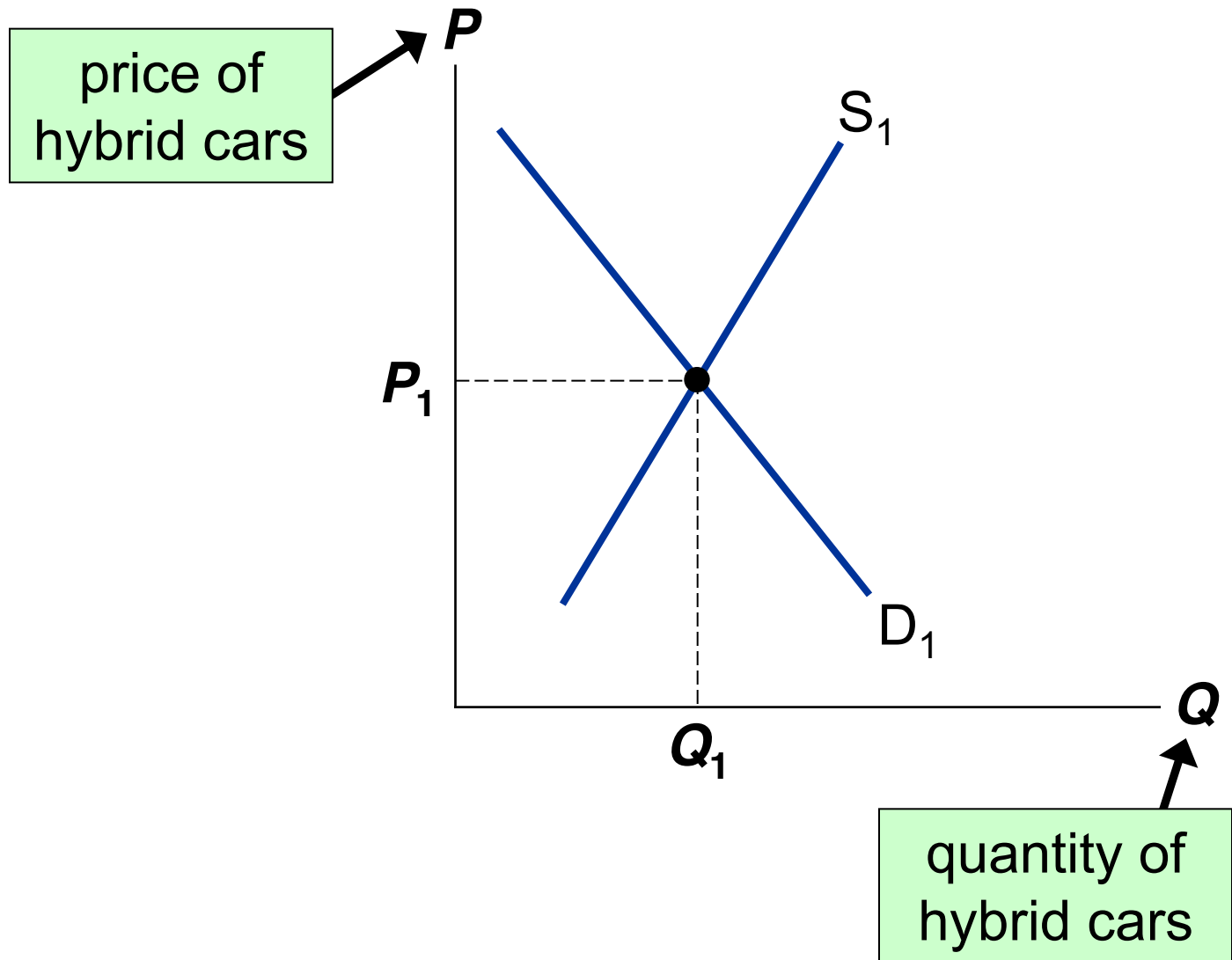
Prices continue to rise until market reaches equilibrium.

Three Steps to Analyzing Changes in Eq'm

To determine the effects of any event,

1. Decide whether event shifts **S** curve, **D** curve, or both.
2. Decide in which direction curve shifts.
3. Use supply—demand diagram to see how the shift changes eq'm **P** and **Q**.

EXAMPLE: The Market for Hybrid Cars



EXAMPLE 1: A Shift in Demand

EVENT TO BE ANALYZED:

Increase in price of gas.

STEP 1:

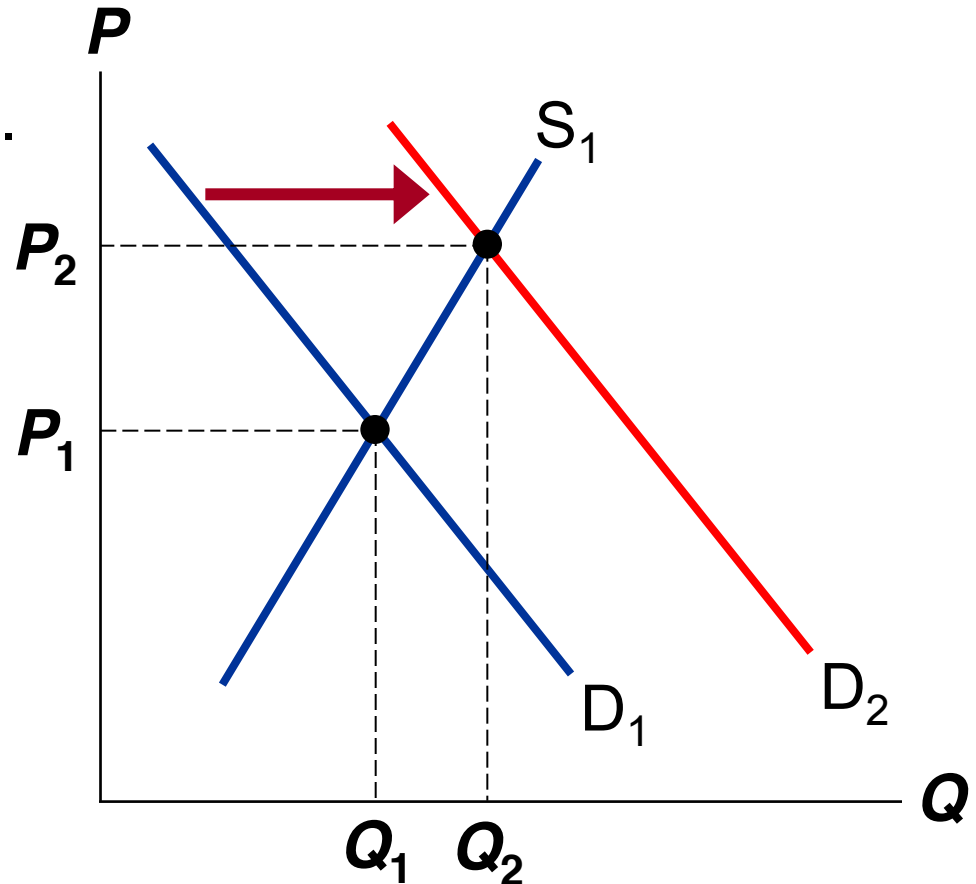
D curve shifts

STEP 2:

D shifts right

STEP 3:

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

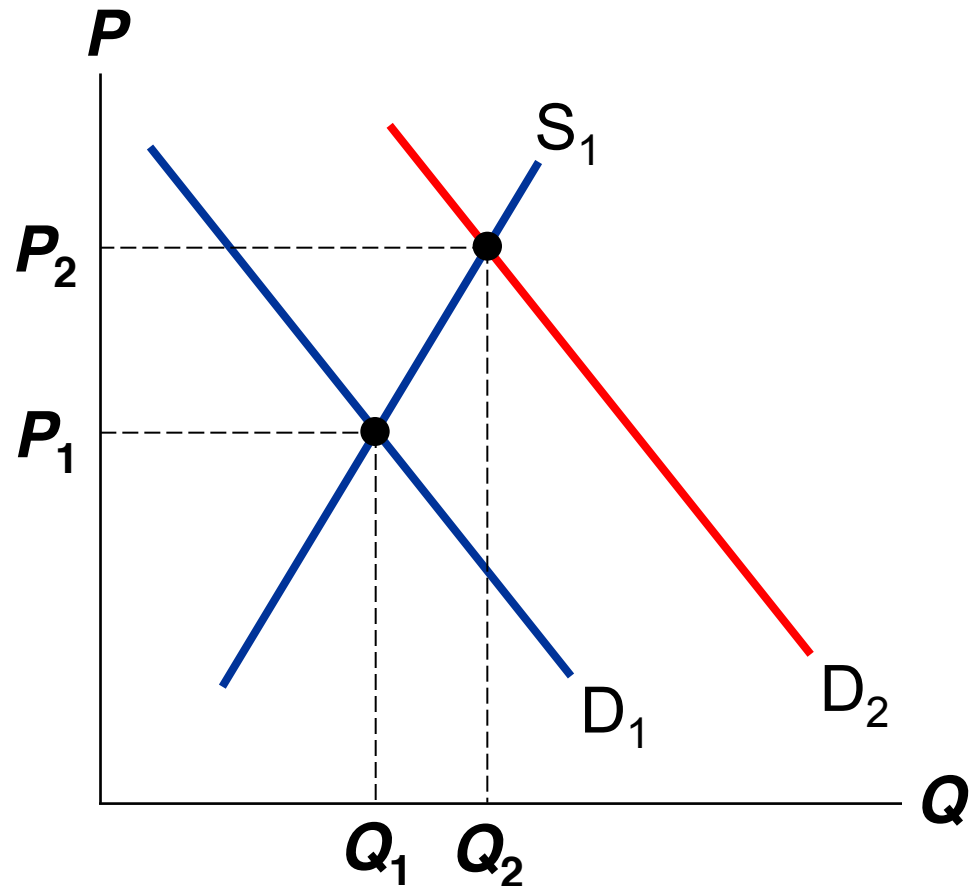


EXAMPLE 1: A Shift in Demand

Notice:

When P rises, producers supply a larger quantity of hybrids, even though the S curve has not shifted.

Always be careful to distinguish b/w a shift in a curve and a movement along the curve.



Terms for 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
- **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:

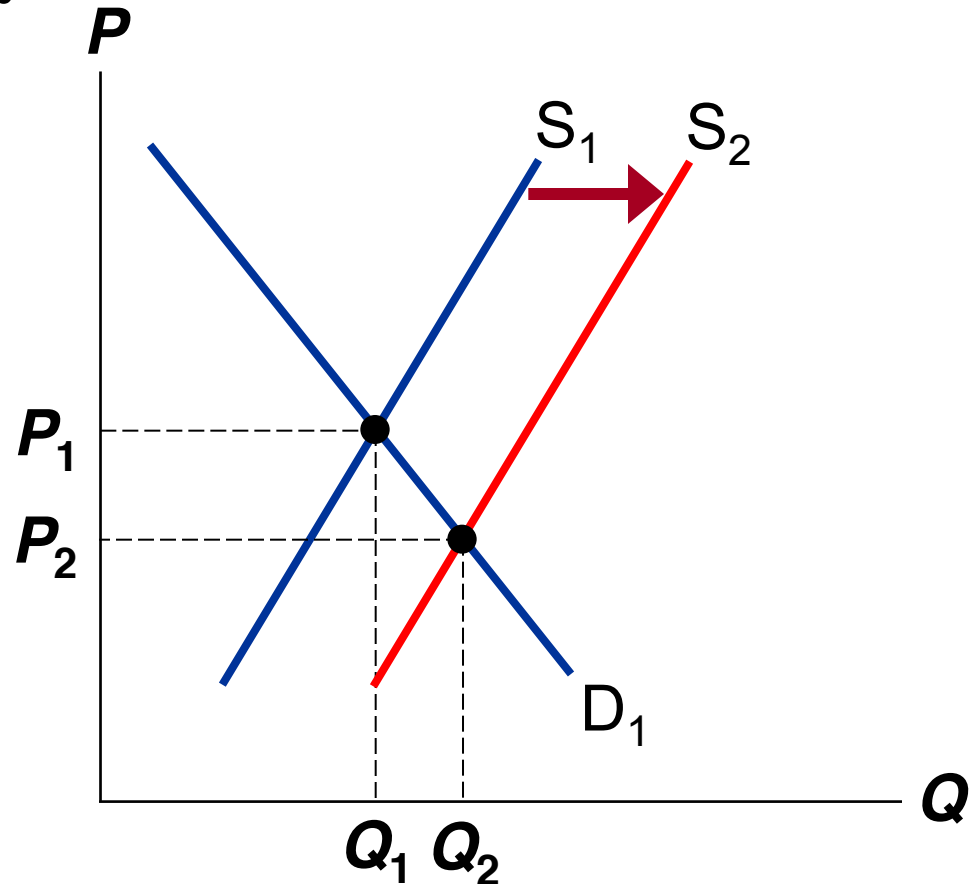
S curve shifts

STEP 2:

S shifts right

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:

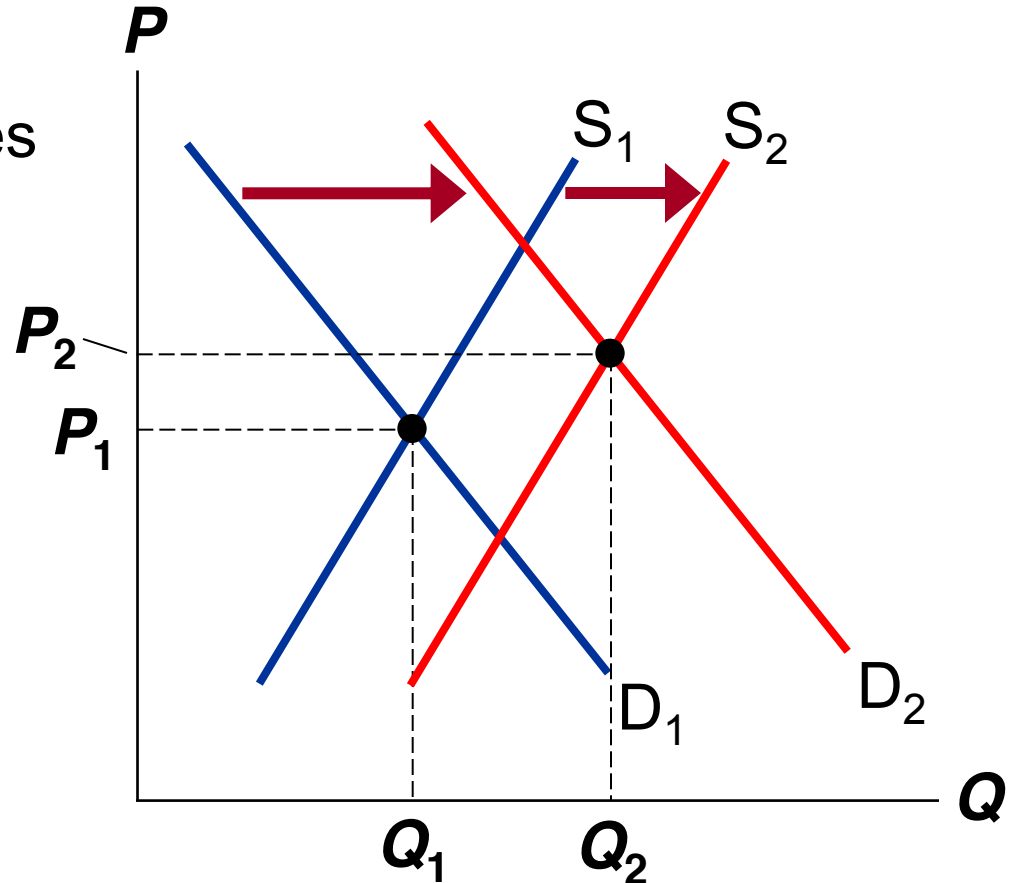
Both curves shift.

STEP 2:

Both shift to the right.

STEP 3:

Q rises, but effect
on P is ambiguous:
If demand increases more
than supply, P rises.



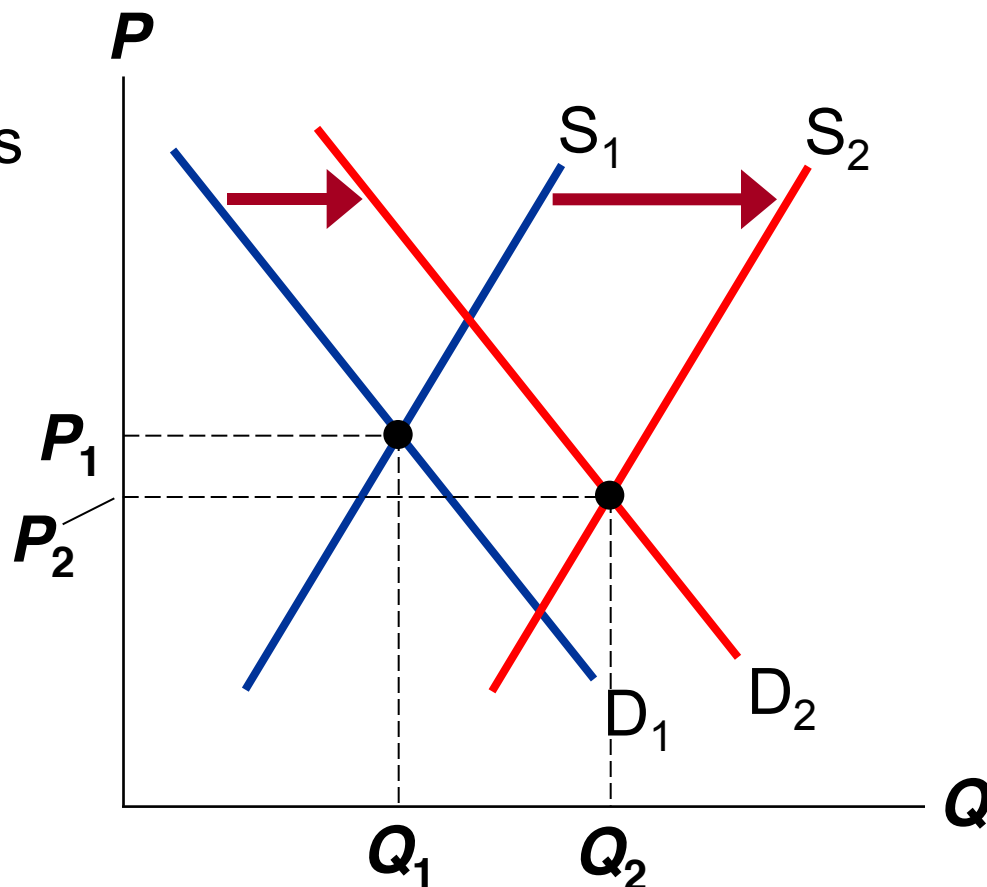
EXAMPLE 3: A Shift in Both Supply and Demand

EVENTS:

price of gas rises AND
new technology reduces
production costs

STEP 3, cont.

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 CDs

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

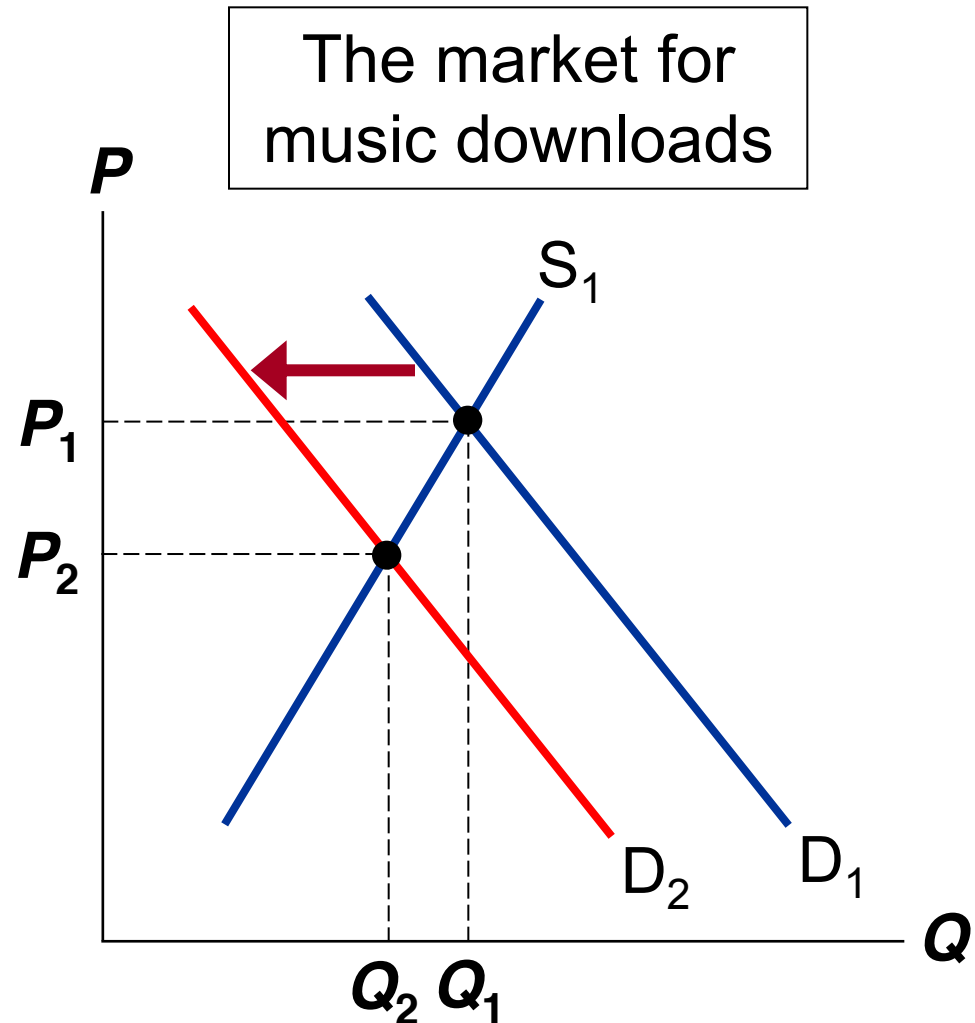
Event C: Events A and B both occur.

ACTIVE LEARNING 3

A. Fall in price of CDs

STEPS

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

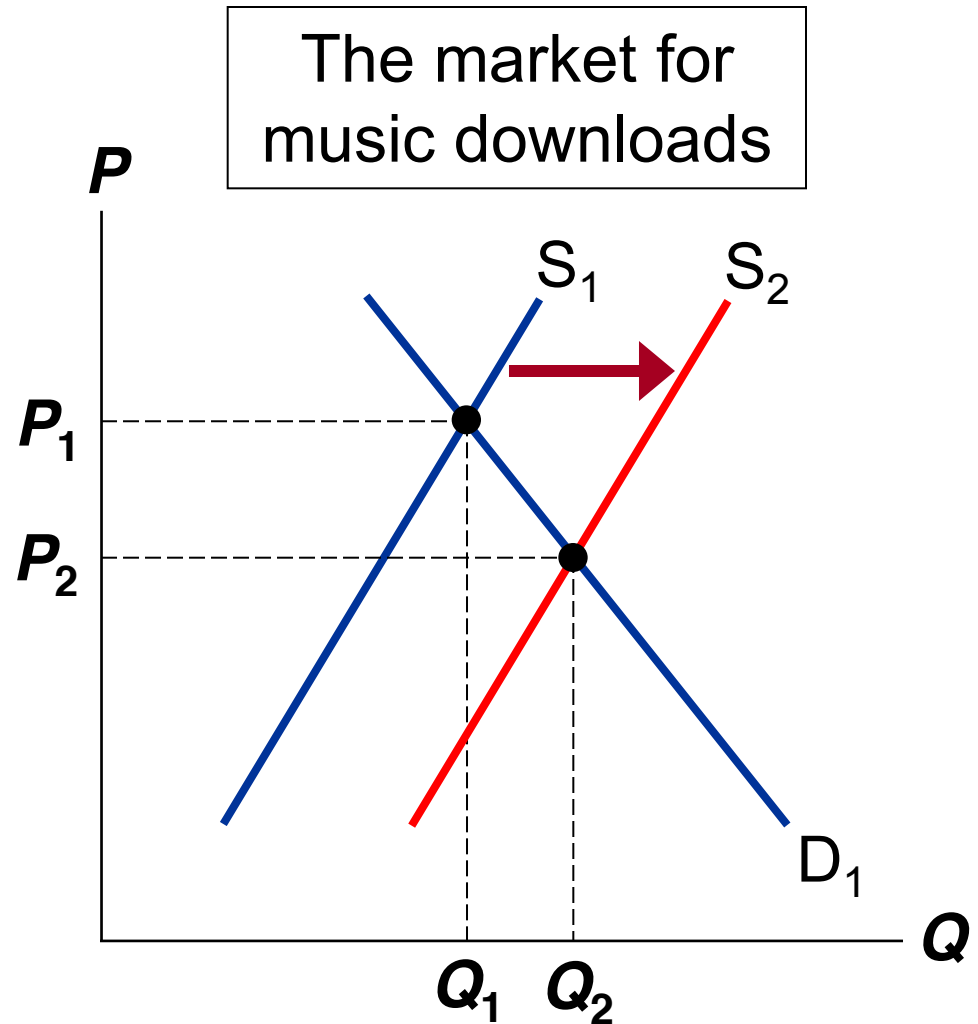


ACTIVE LEARNING 3

B. Fall in cost of royalties

STEPS

1. **S** curve shifts
2. (Royalties are part of sellers' costs)
S shifts right
3. **P** falls,
Q rises.



CONCLUSION:

How Prices Allocate Resources

- One of the Ten Principles from Chapter 1:
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

- Besides price, demand depends on buyers' incomes, tastes, expectations, the prices of substitutes and complements, and number of buyers.
If one of these factors changes, the **D** curve shifts.
- The upward-sloping supply curve reflects the Law of Supply, which states that the quantity sellers supply depends positively on the good's price.
- Other determinants of supply include input prices, technology, expectations, and the # of sellers.
Changes in these factors shift the **S** curve.