

CHAPTER 4

The Market Forces of Supply and Demand

PRINCIPLES OF Microeconomics N. Gregory Mankiw



**In this chapter,
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

- 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 (*identical/homogenous – products of different sellers are not different in terms of quality and/or product characteristics*)
 - 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. *Demand without ability is need.*
- **Law of demand:** the claim that the quantity demanded of a good falls when the price of the good rises, *other things (that affect demand) equal/unchanged.*

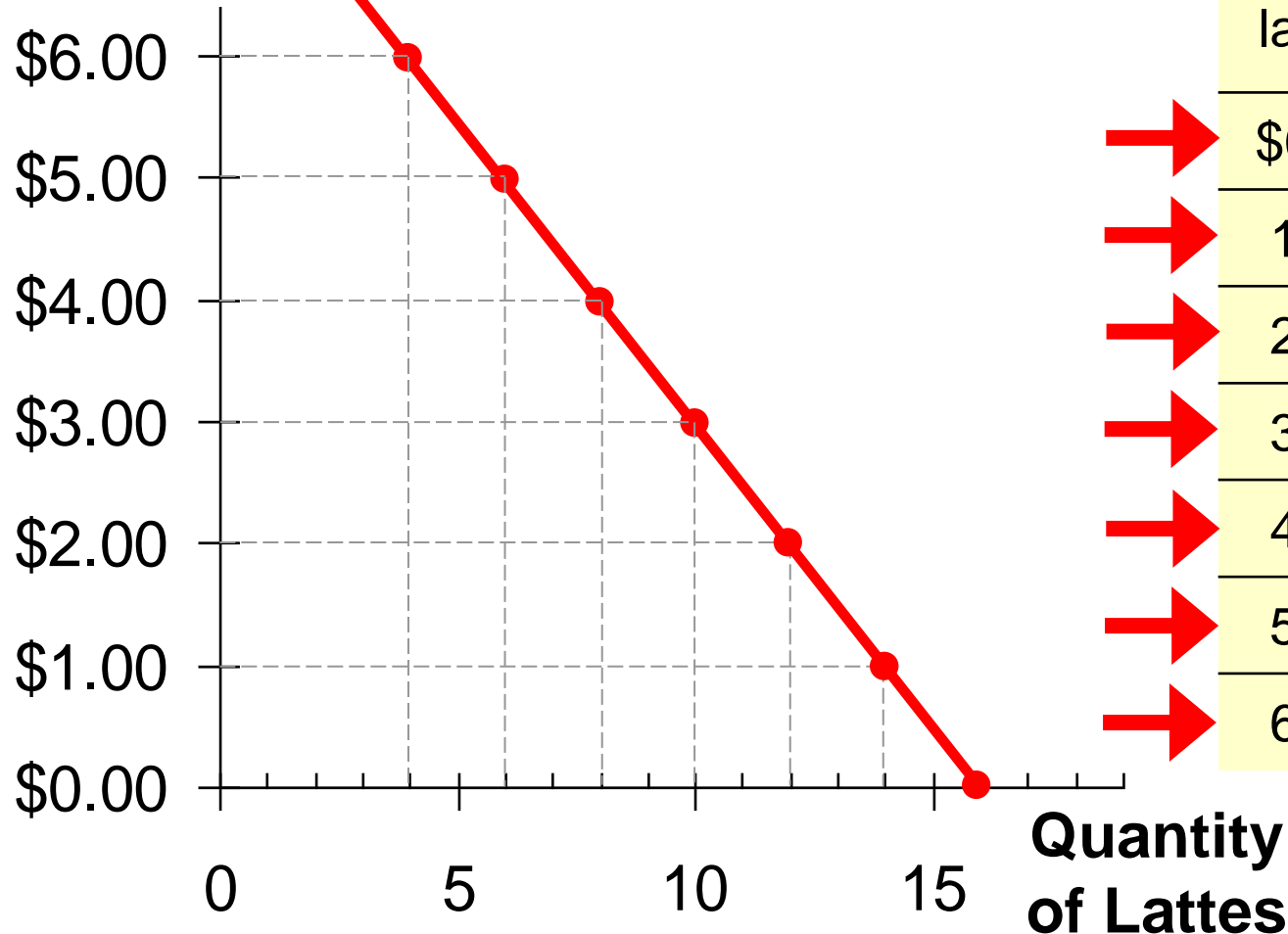
The Demand Schedule

- **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**



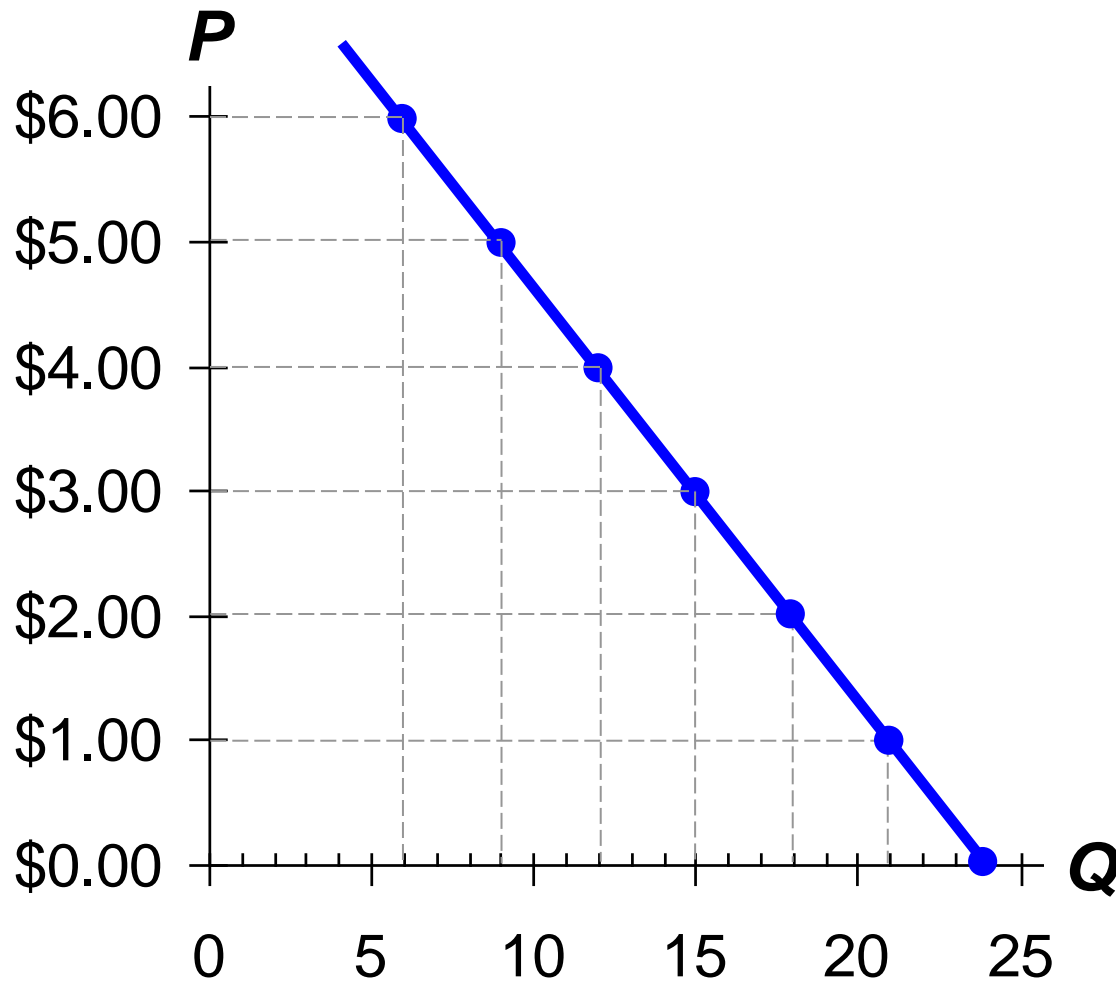
Price of lattes	Quantity of lattes demanded
\$0.00	16
1.00	14
2.00	12
3.00	10
4.00	8
5.00	6
6.00	4

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

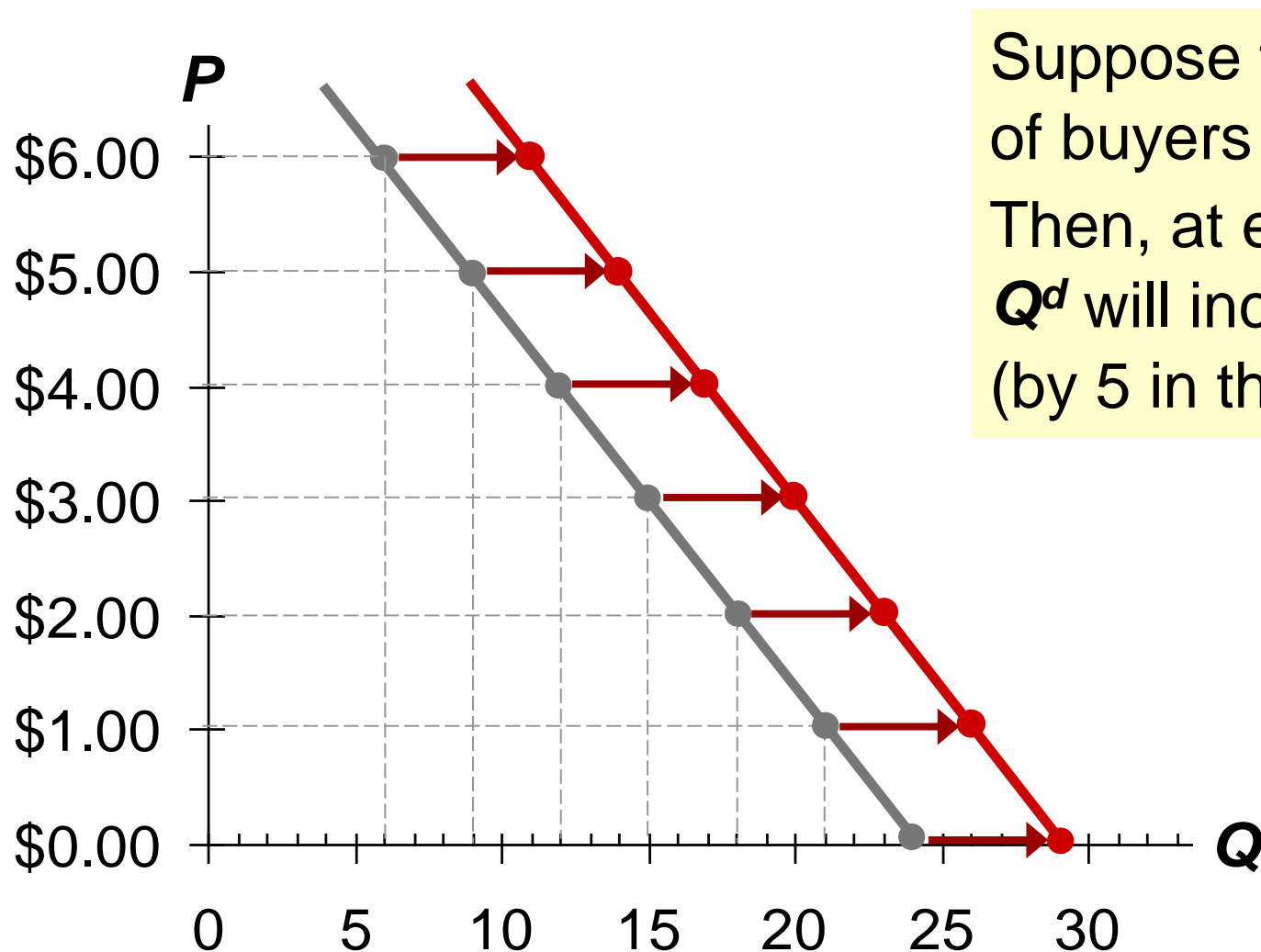
Demand Curve Shifters

- 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.). *Goods of inferior quality.*

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.

Price of Pizza (up) = Demand for Pizza (down) = Demand for hamburgers (up) = Right shift

Price of Pizza (down) = Demand for Pizza (up) = Demand for hamburgers (down) = Left shift

- 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. *Jointly consumed.*
- Example: computers and software. If price of computers rises, people buy fewer computers, and therefore less software. Software demand curve shifts left.

Price of PC (up) = demand for PC (down) = demand for software (down) = Left shift

Price of PC (down) = demand for PC (up) = demand for software (up) = Right shift

- 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**

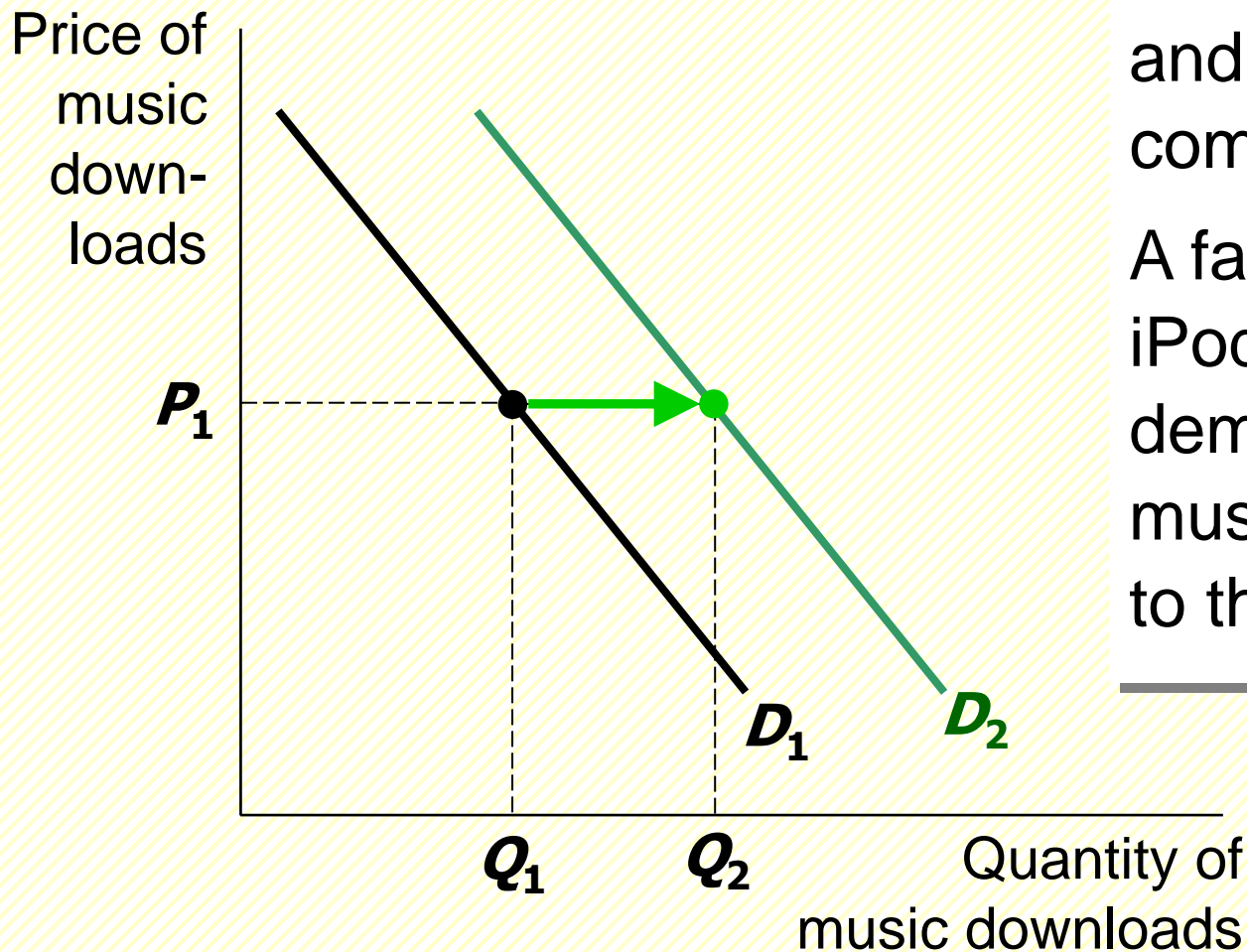
Demand Curve

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 CDs falls

ACTIVE LEARNING 1

A. Price of iPods falls

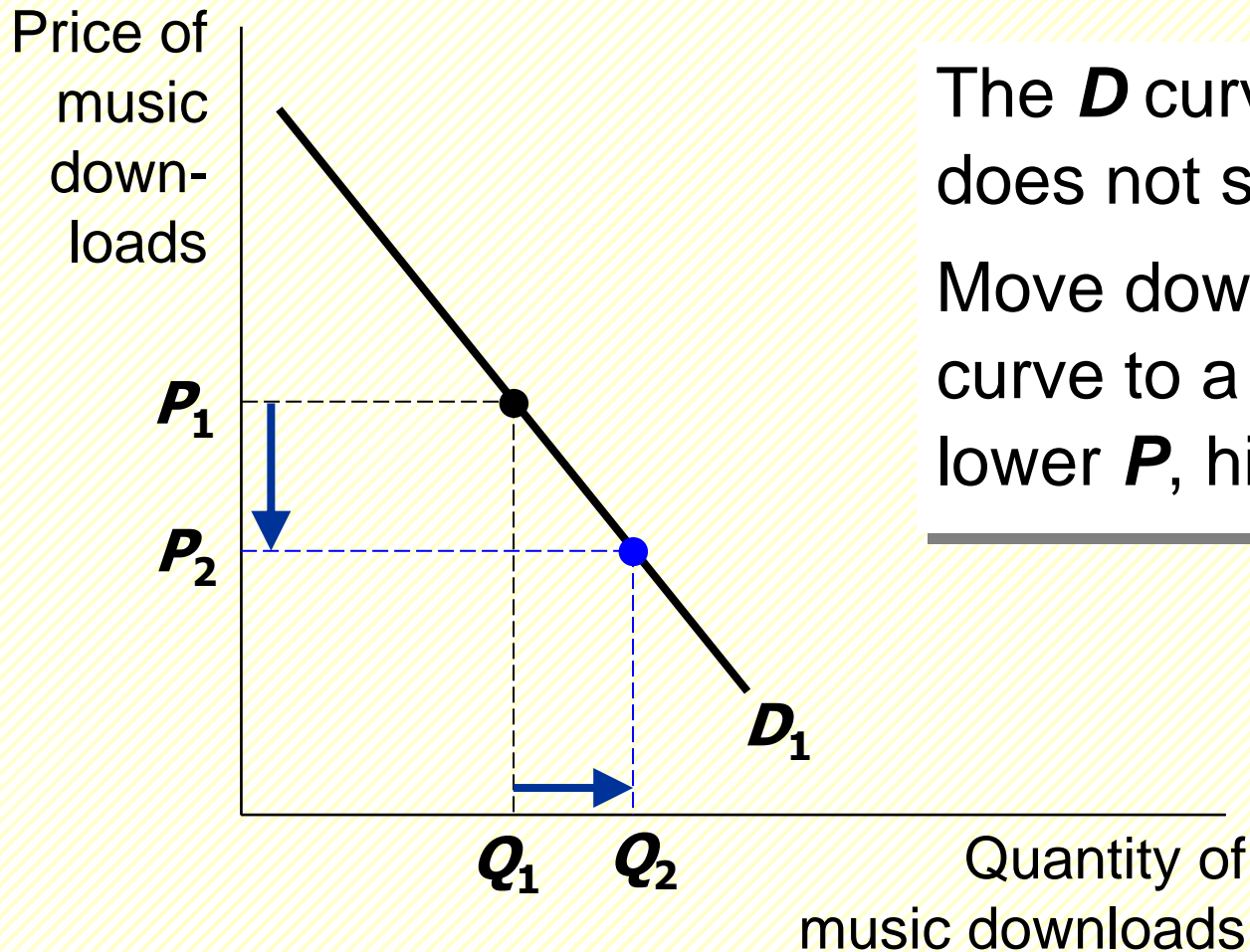


Music downloads and iPods are complements.

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

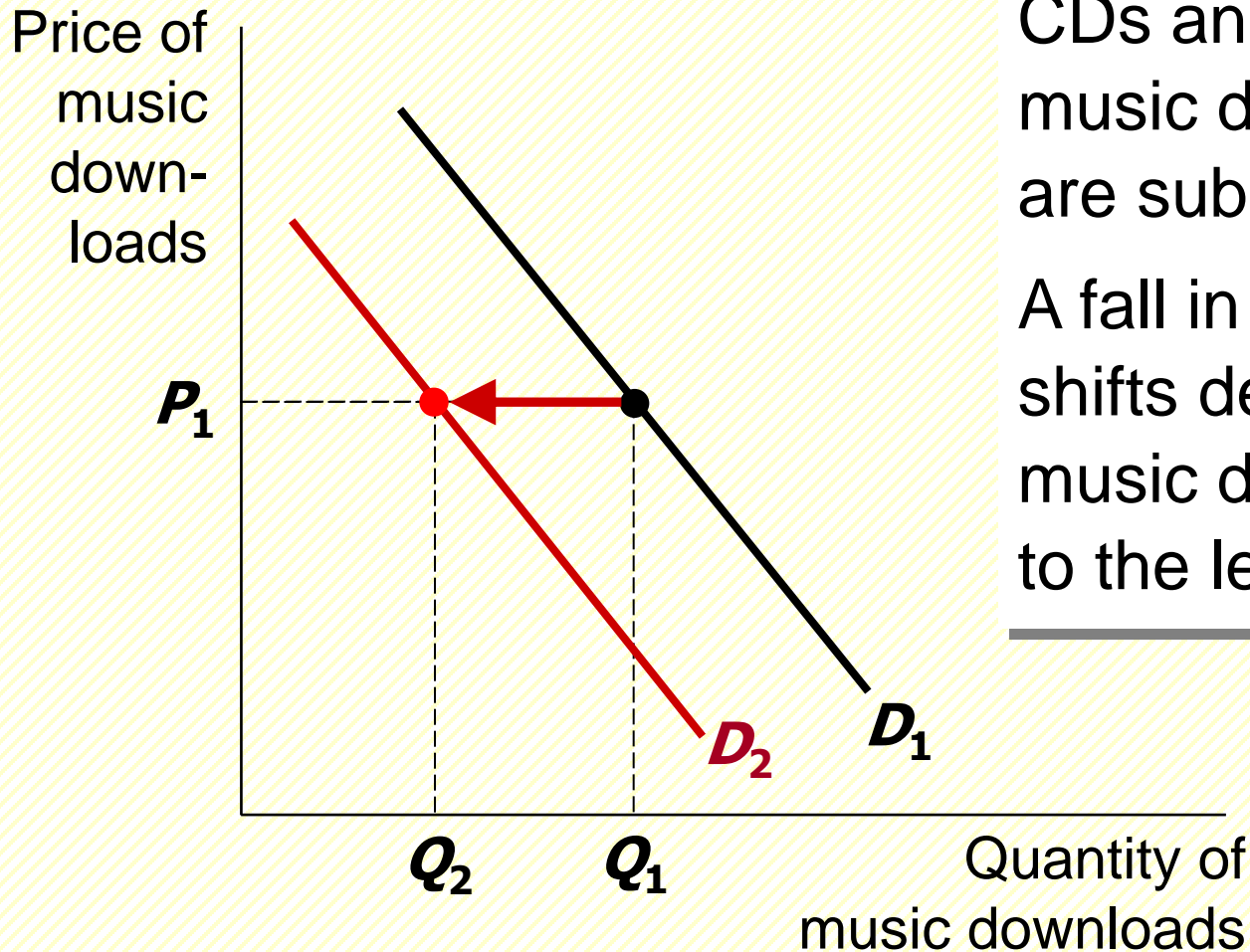


The **D** curve does not shift.

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

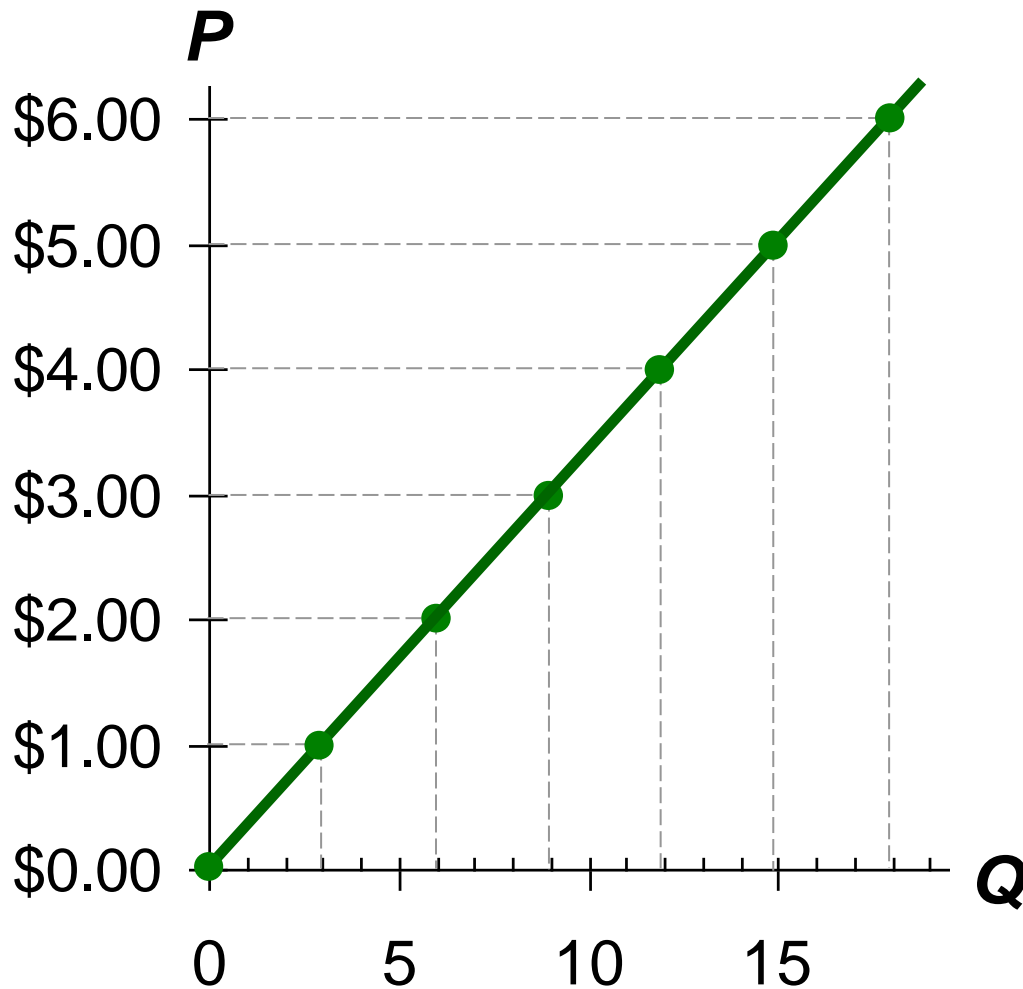
- The **quantity supplied** of any good is the amount that sellers are *willing* and *able* to sell.
- **Law of supply**: the claim that the quantity supplied of a good rises when the price of the good rises, other things equal

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



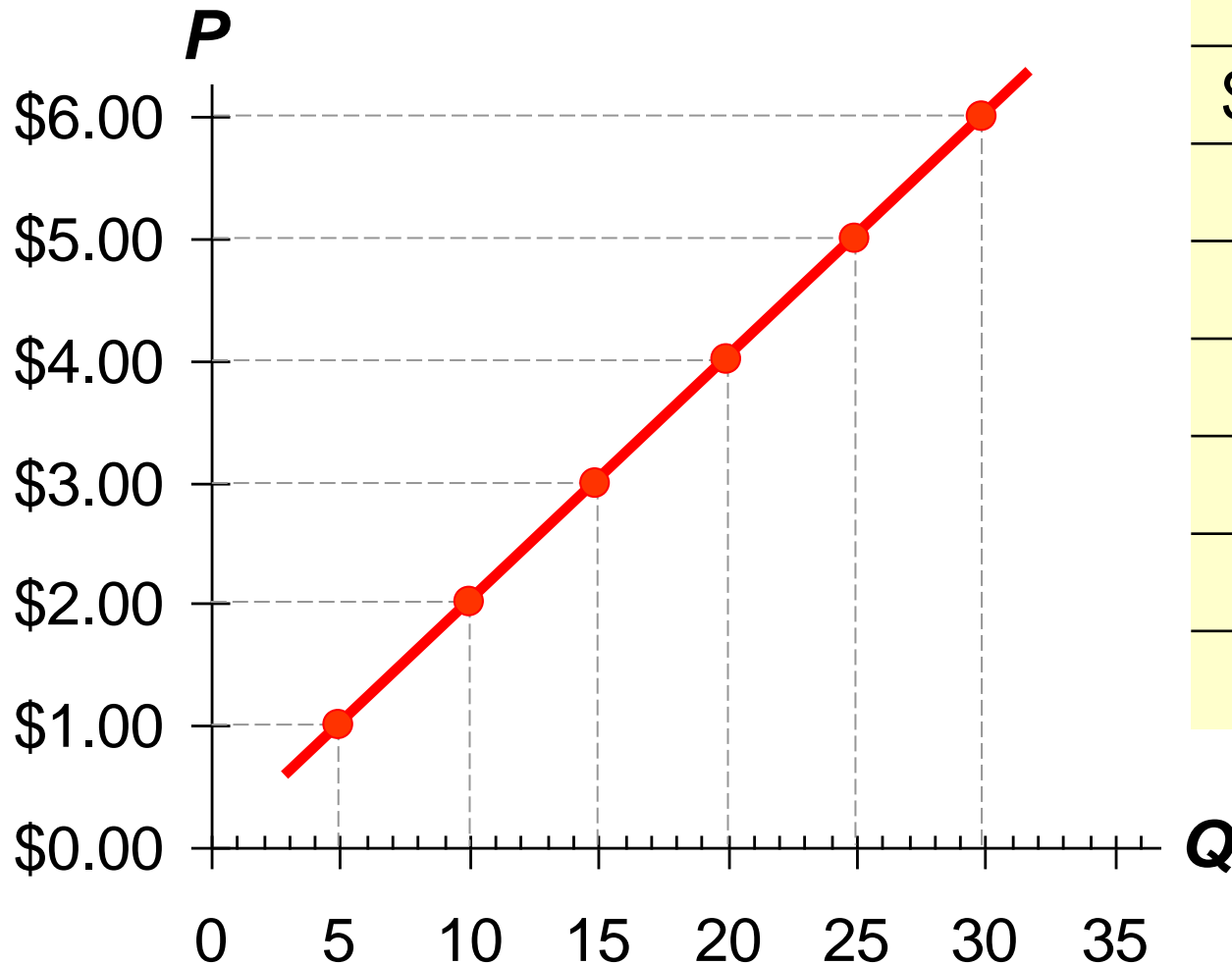
	Price of lattes	Quantity of lattes supplied
→	\$0.00	0
→	1.00	3
→	2.00	6
→	3.00	9
→	4.00	12
→	5.00	15
→	6.00	18

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

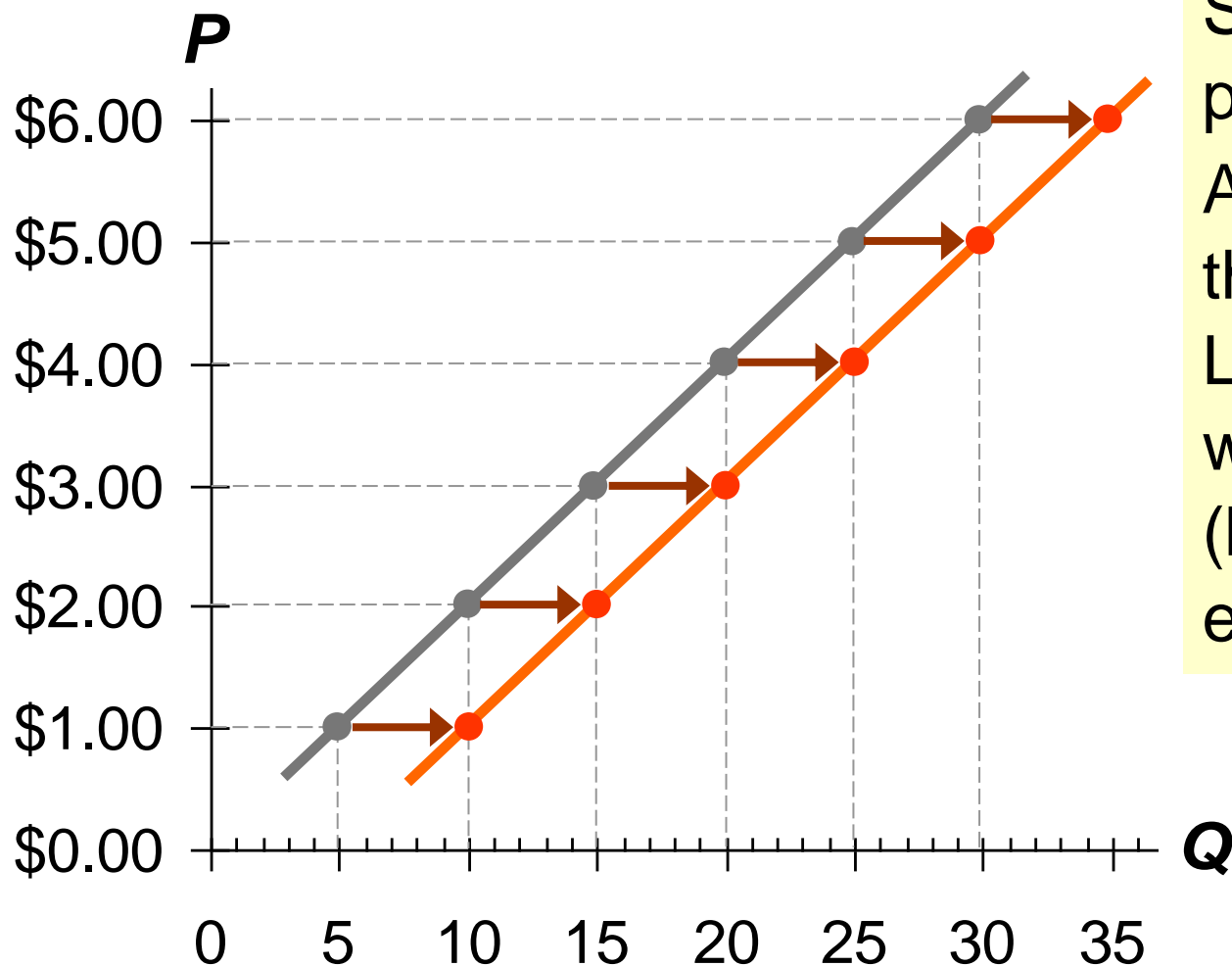
Supply Curve Shifters

- 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

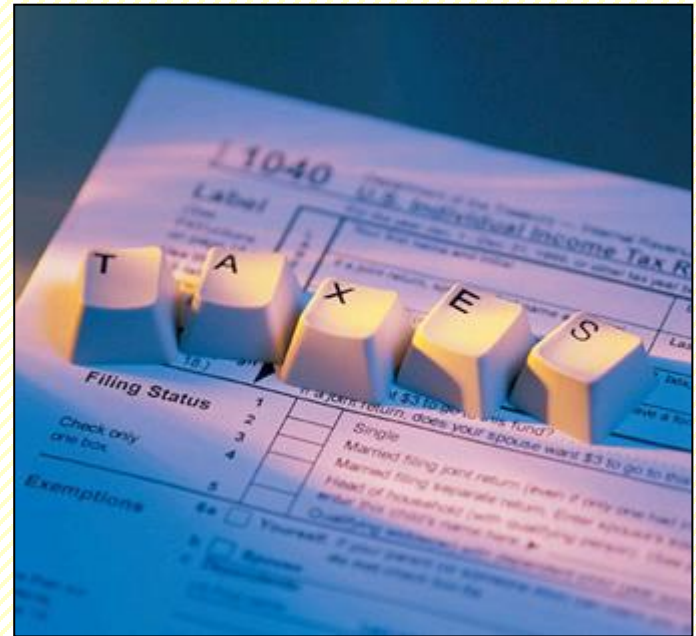
Variable	A change in this variable...
Price	...causes a movement along the S curve
Input Prices	...shifts the S curve
Technology	...shifts the S curve
# of Sellers	...shifts the S curve
Expectations	...shifts the S curve

ACTIVE LEARNING 2

Supply Curve

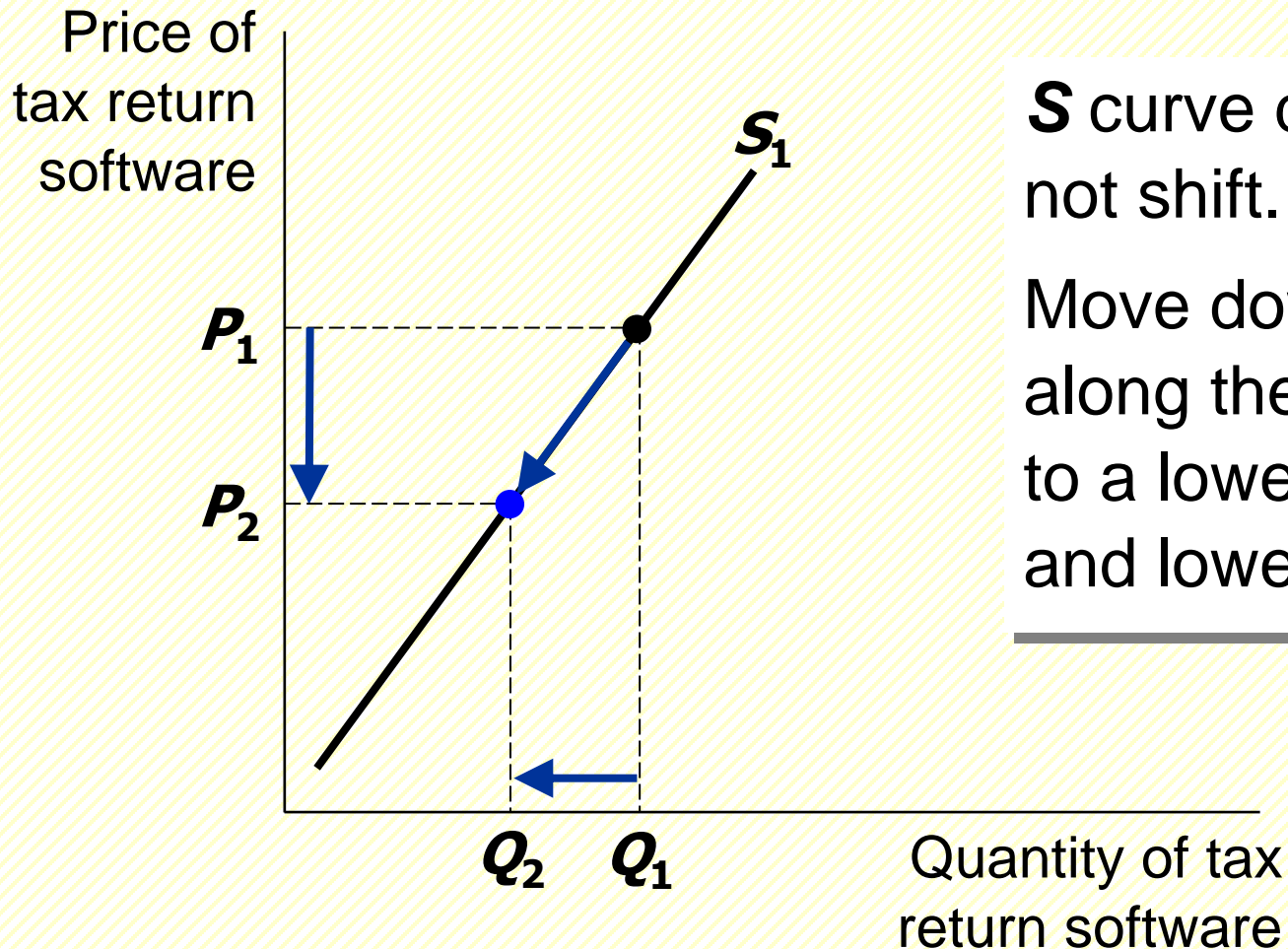
Draw a supply curve for tax return preparation software. What happens to it in each of the following scenarios?

- 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

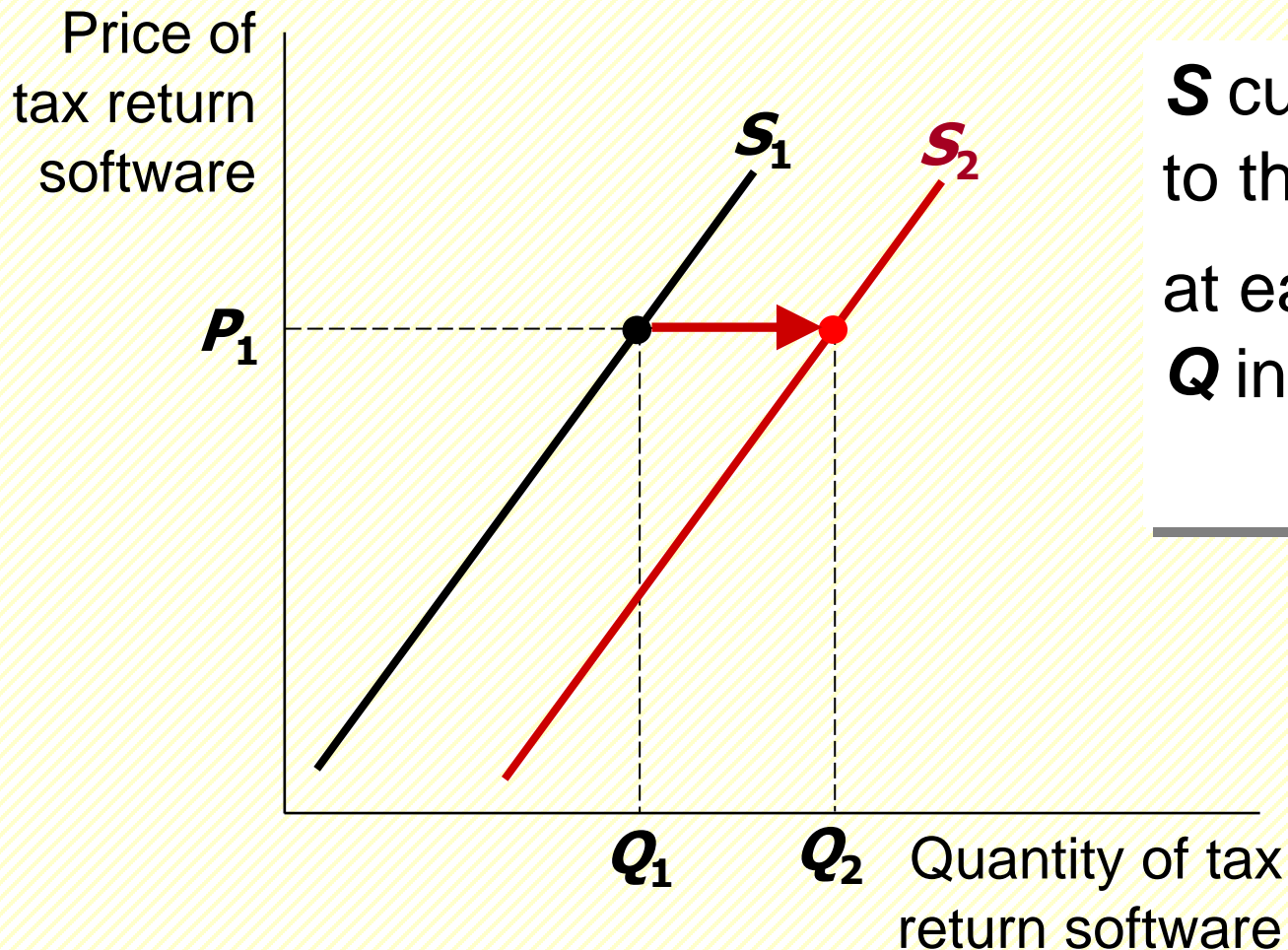


S curve does not shift.

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

ACTIVE LEARNING 2

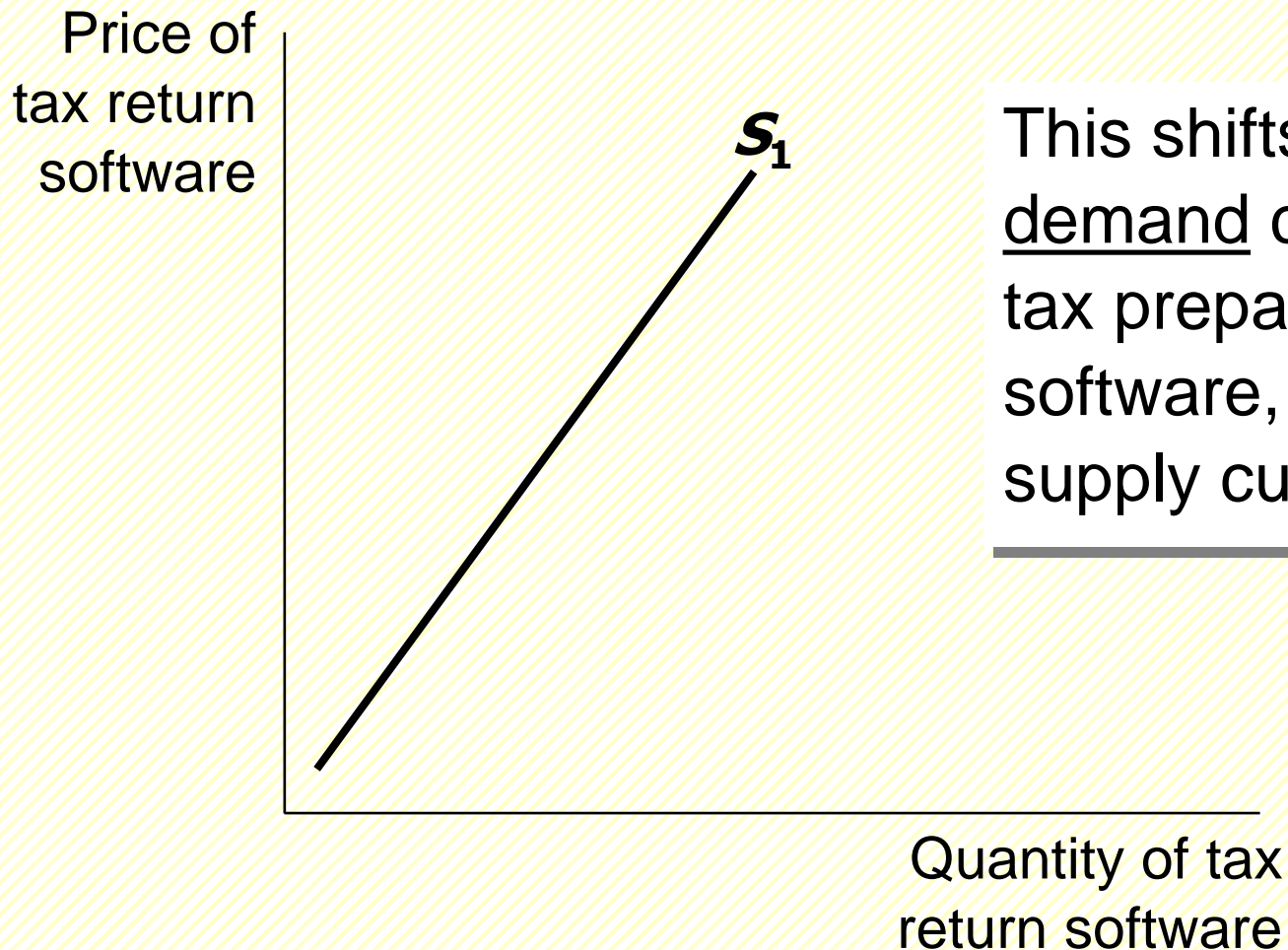
B. Fall in cost of producing the software



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

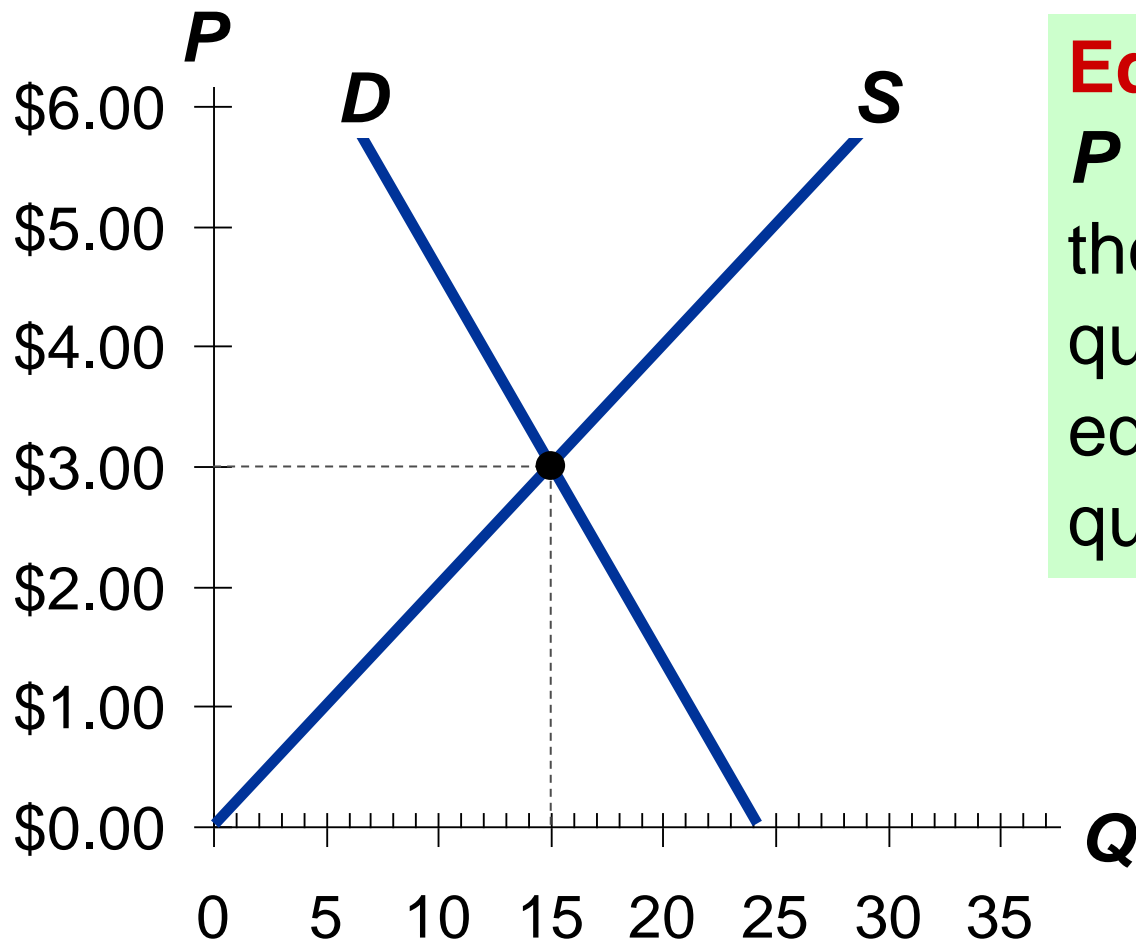
ACTIVE LEARNING 3

C. Professional preparers raise their price



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

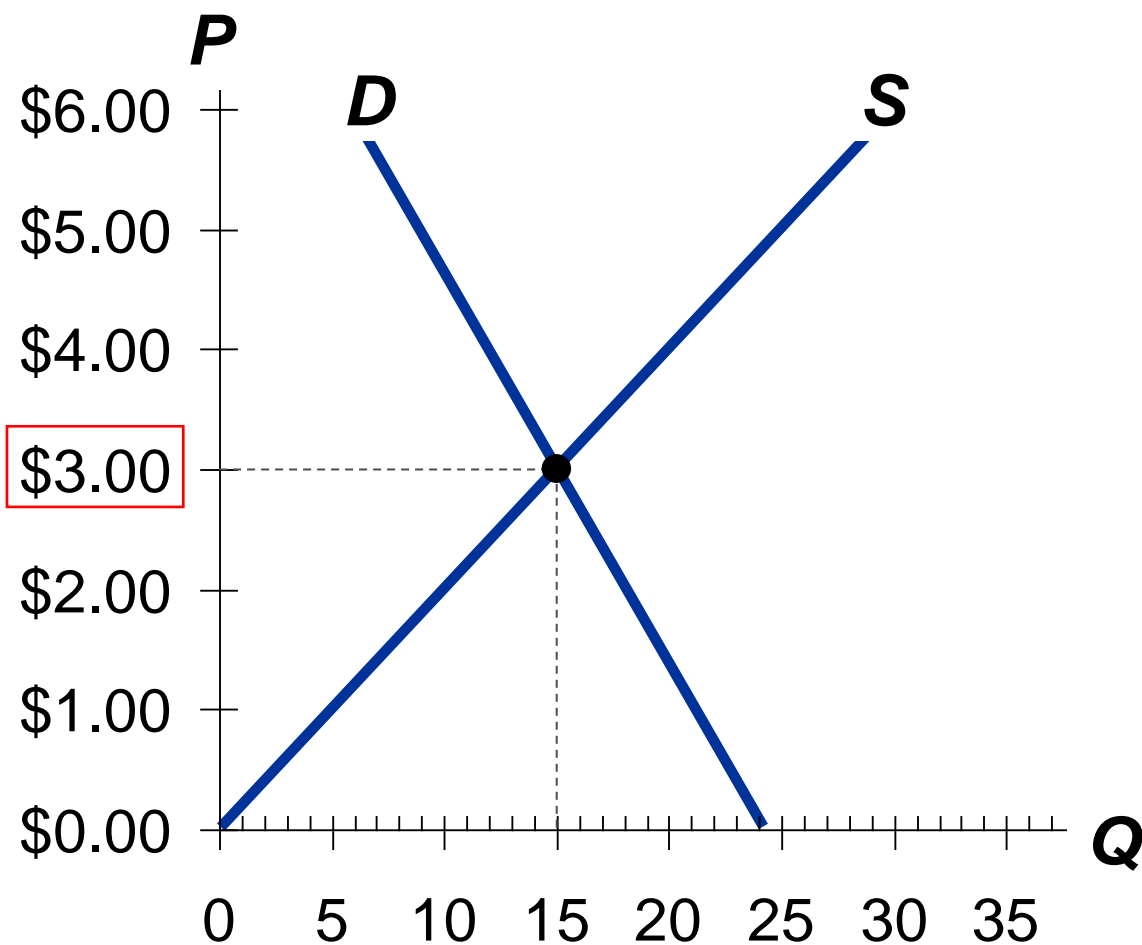
Supply and Demand Together



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

Equilibrium price:

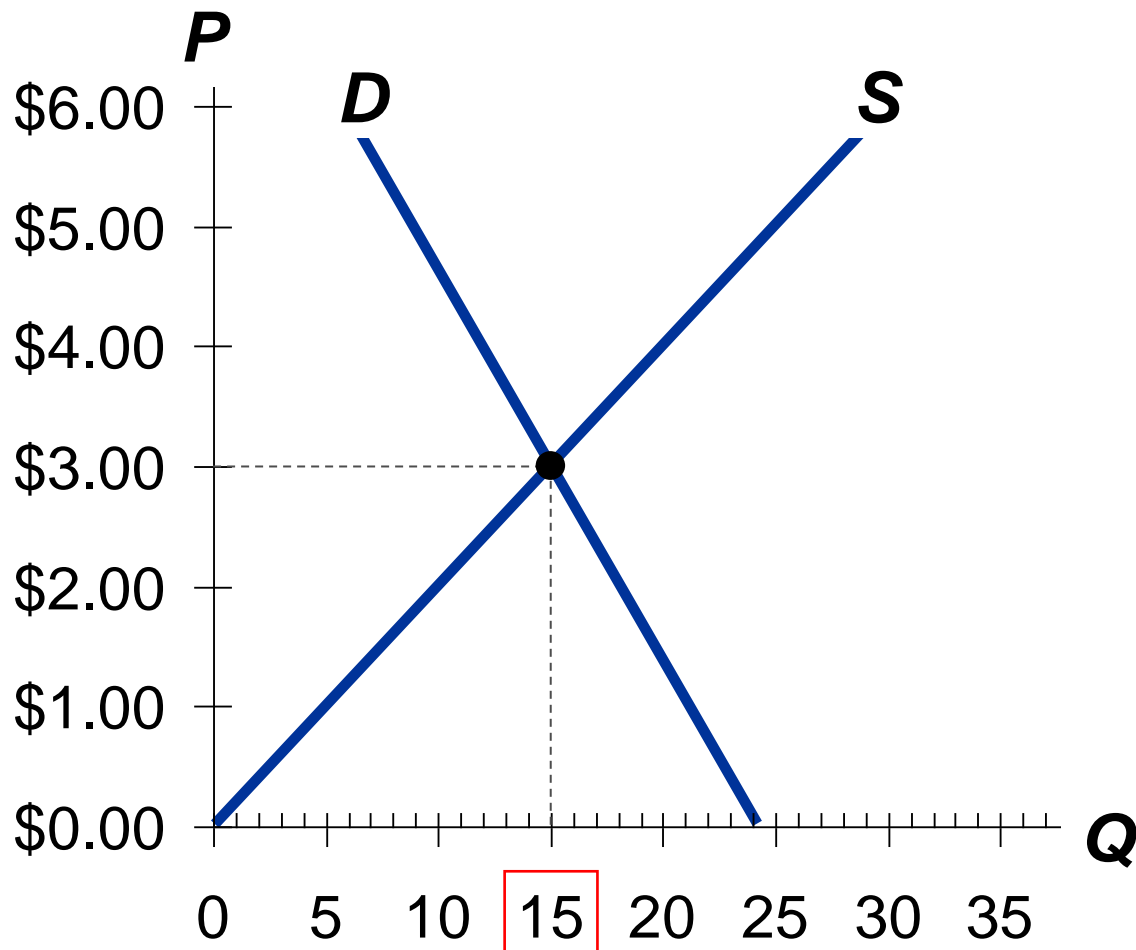
the price that equates quantity supplied with quantity demanded



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:

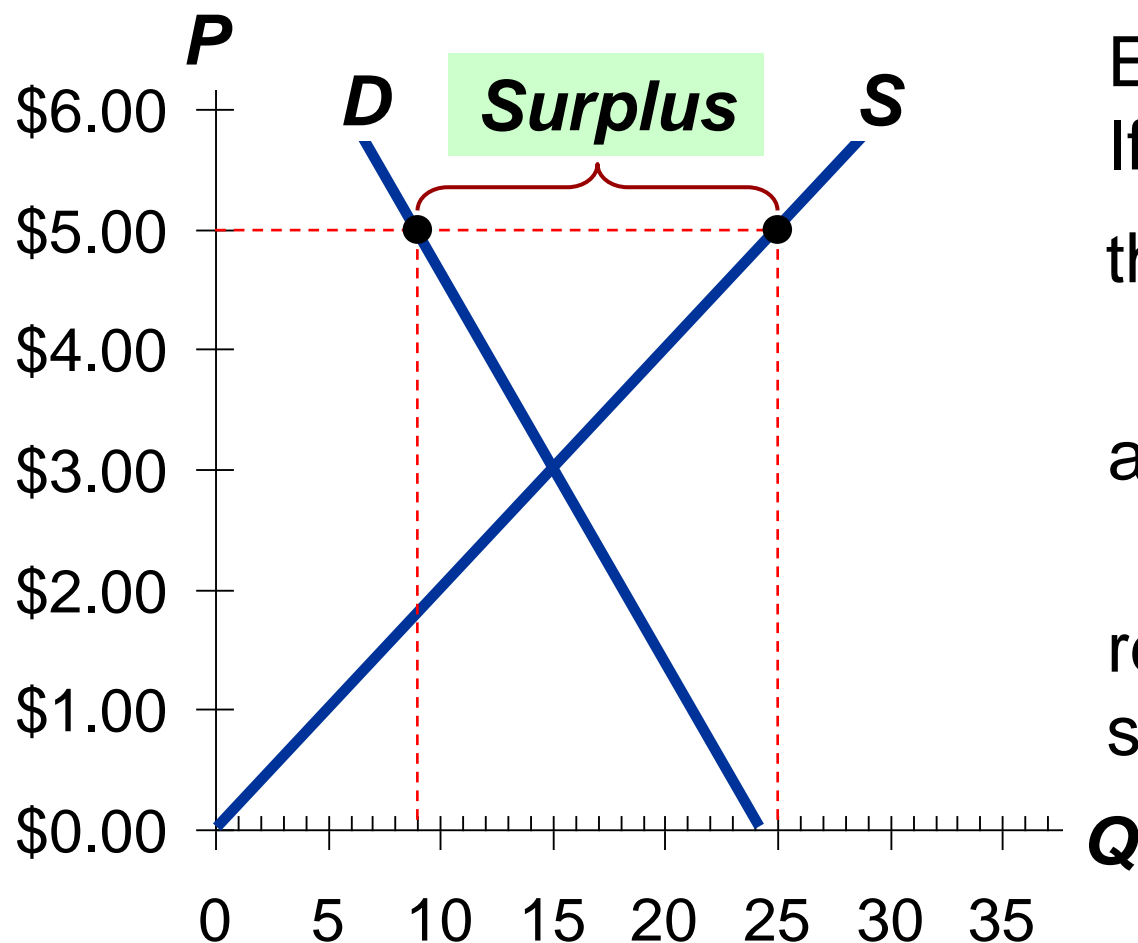
the quantity supplied and quantity demanded at the equilibrium price



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

$Q^D = 9$ lattes

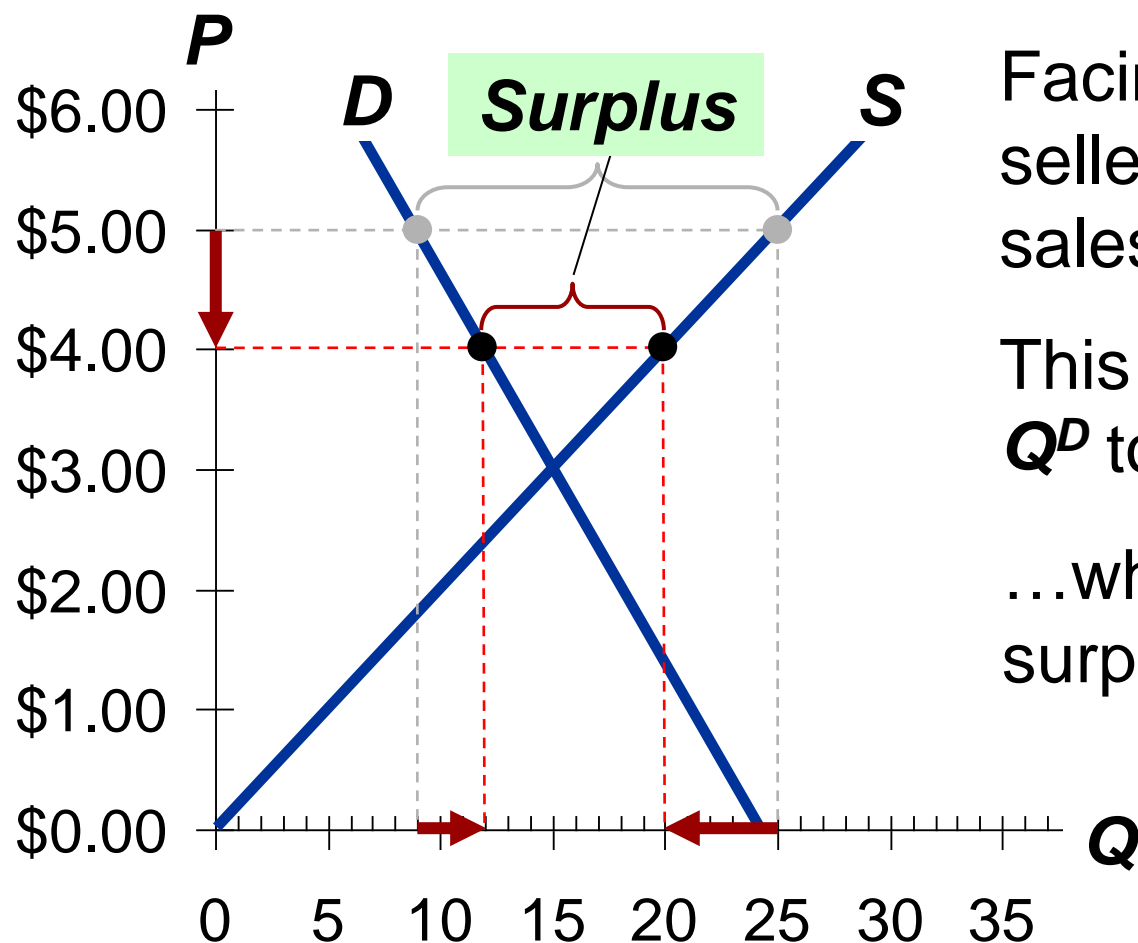
and

$Q^S = 25$ lattes

resulting in a
surplus of 16 lattes

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

when quantity supplied is greater than quantity demanded

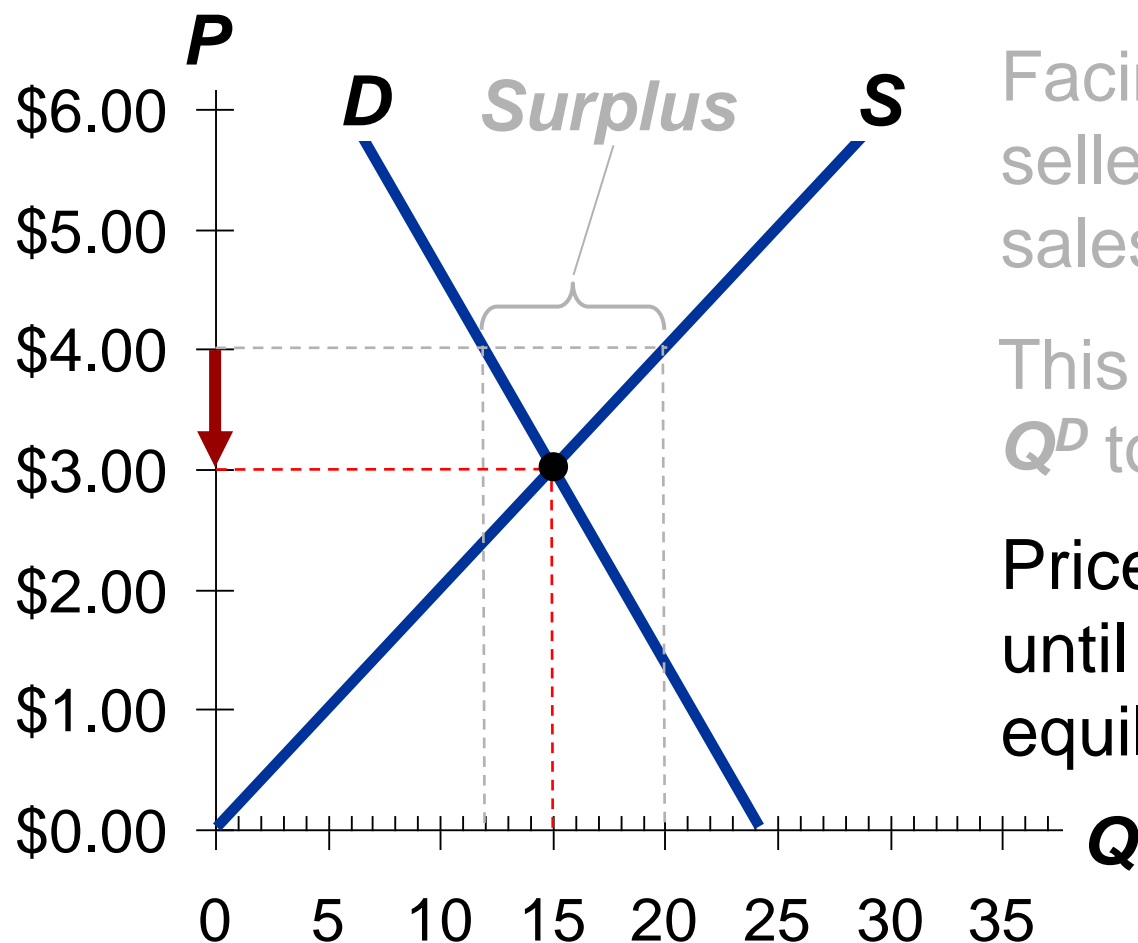


Facing a surplus, sellers try to increase sales by cutting price.

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



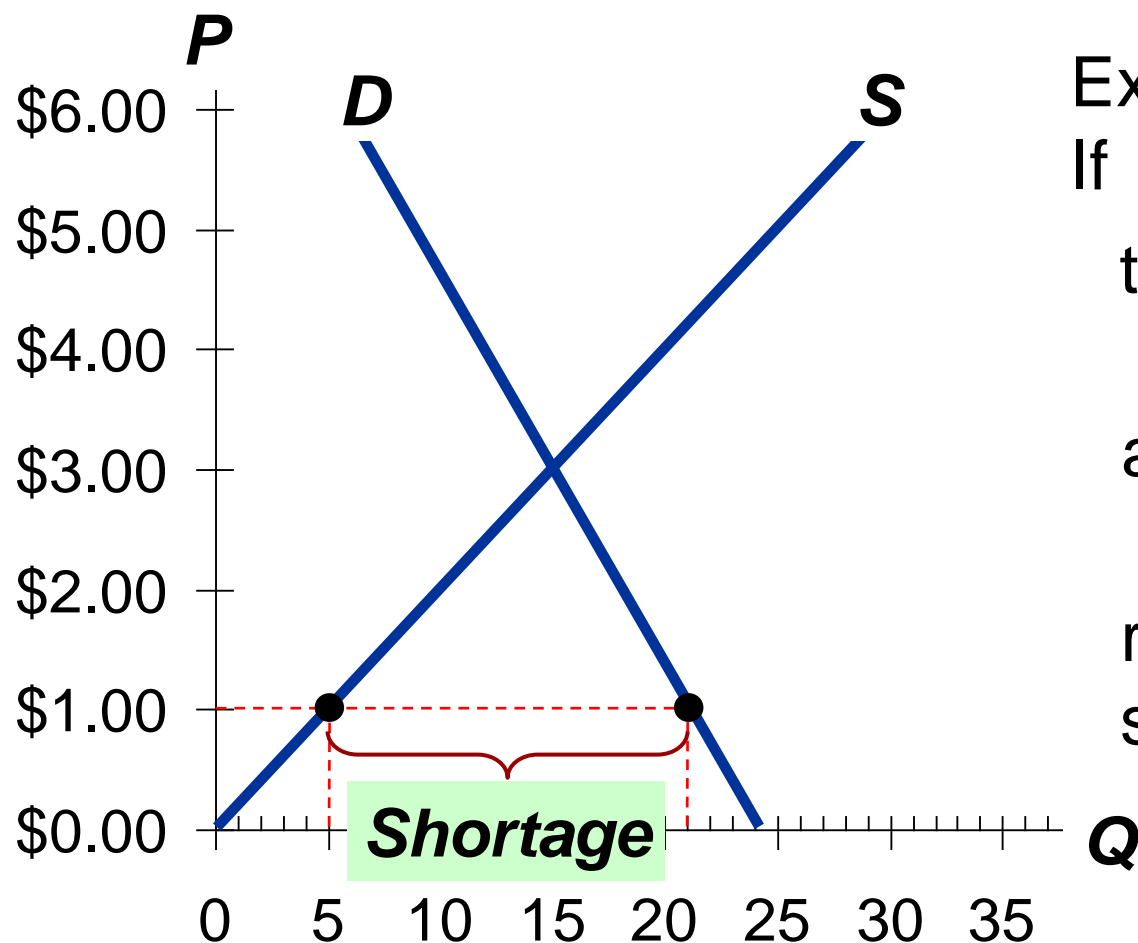
Facing a surplus, sellers try to increase sales by cutting price.

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

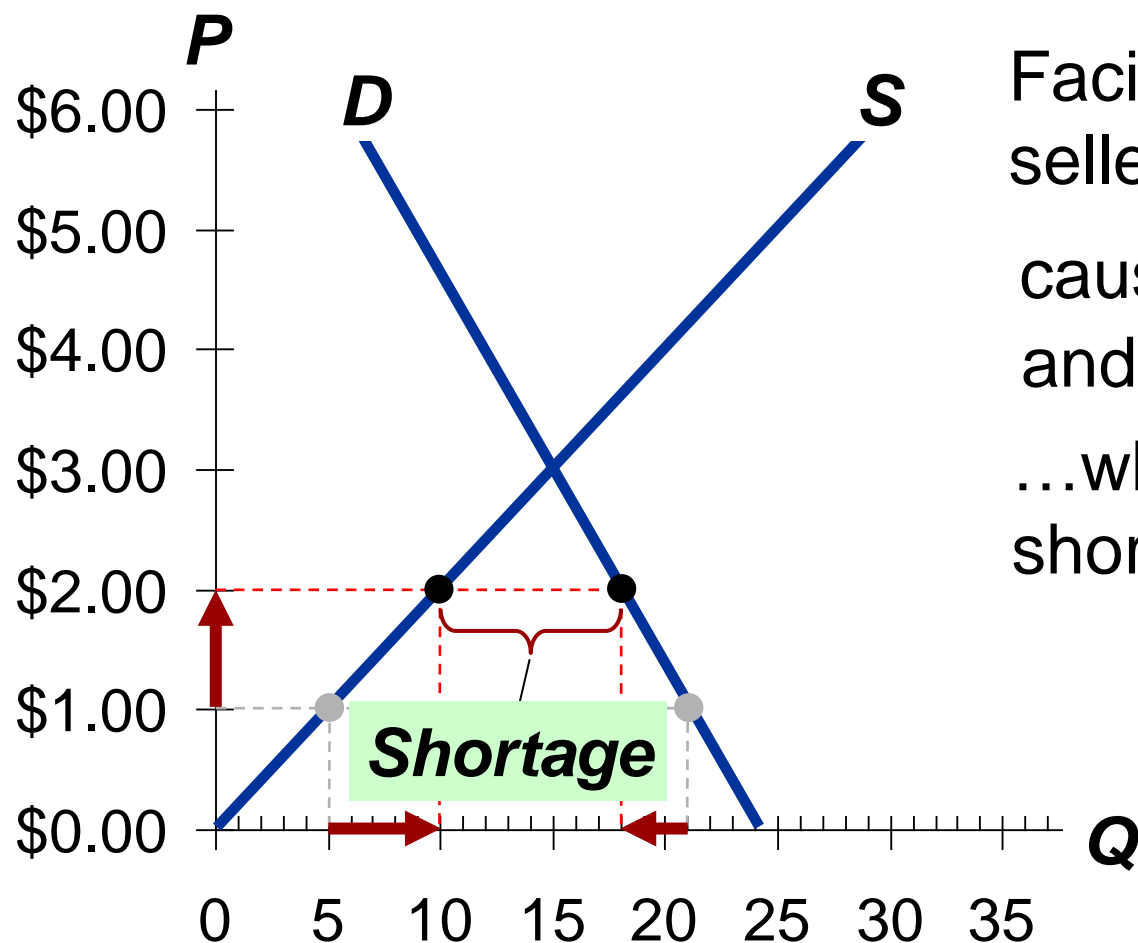
and

$Q^S = 5$ lattes

resulting in a
shortage of 16 lattes

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

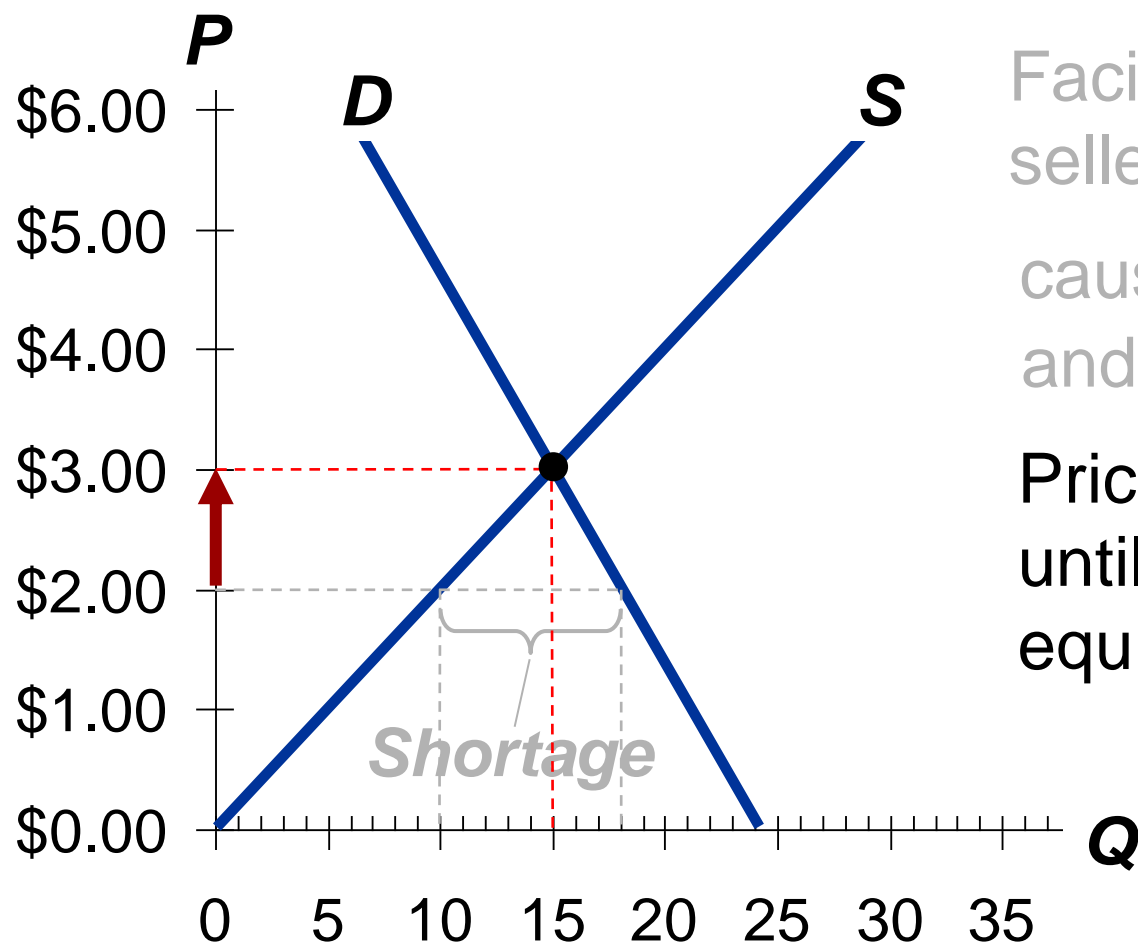
when quantity demanded is greater than quantity supplied



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.

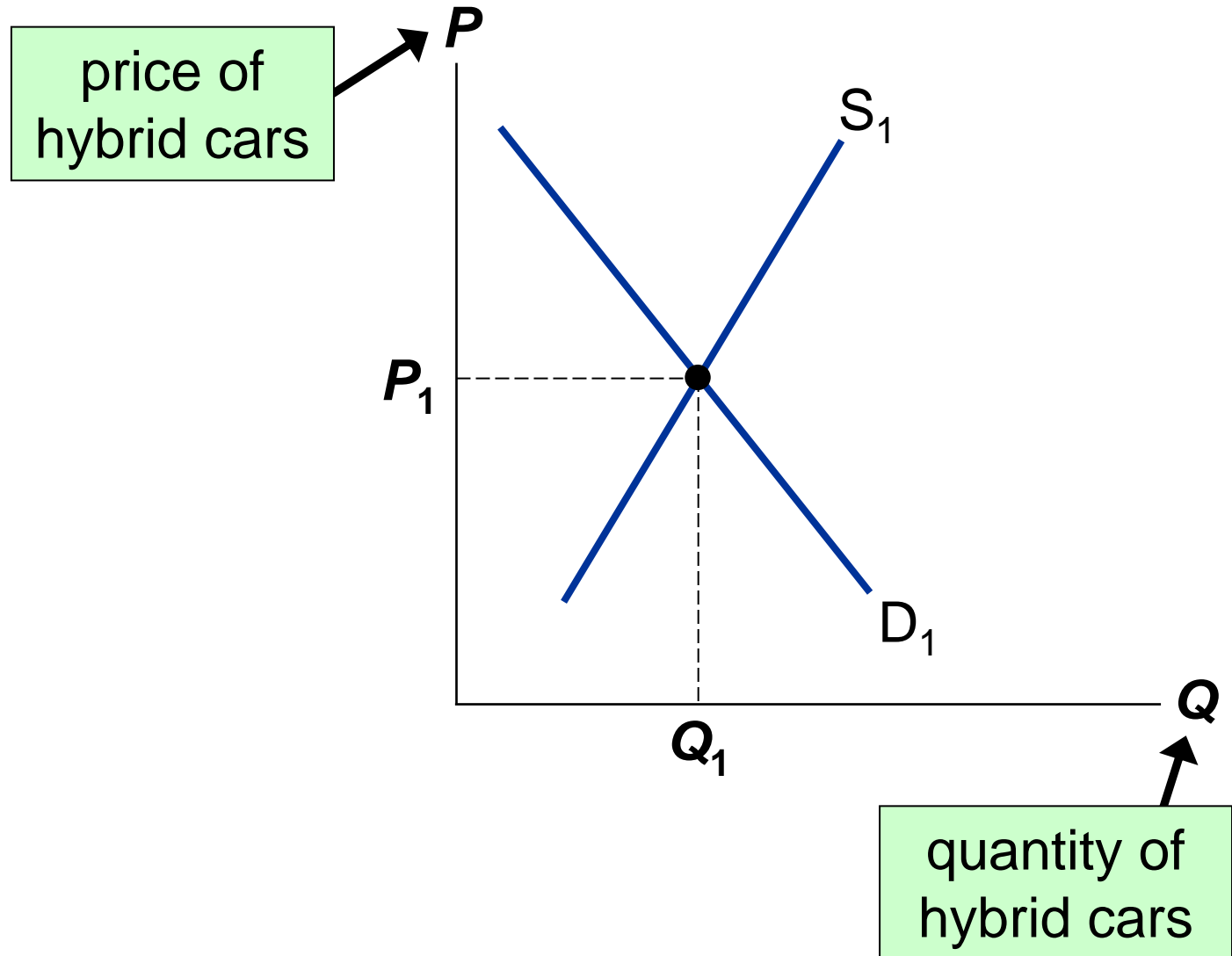
Prices continue to rise until market reaches equilibrium.

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:

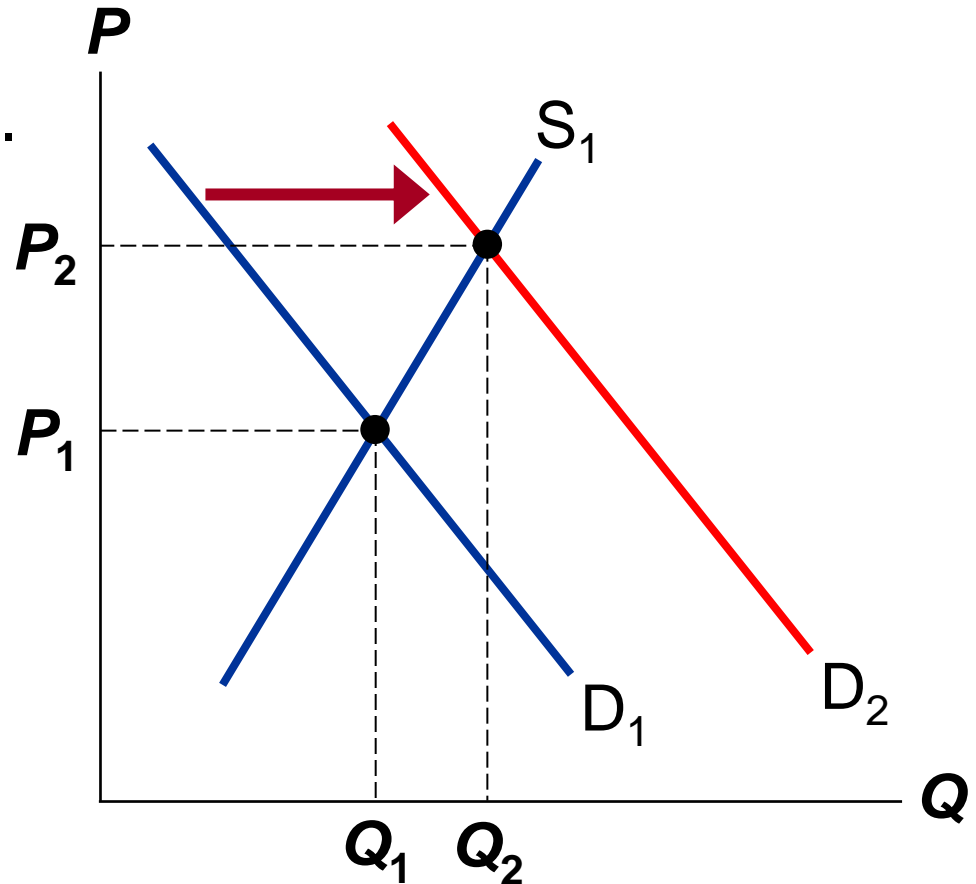
D curve shifts

STEP 2:

D shifts right

STEP 3:

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

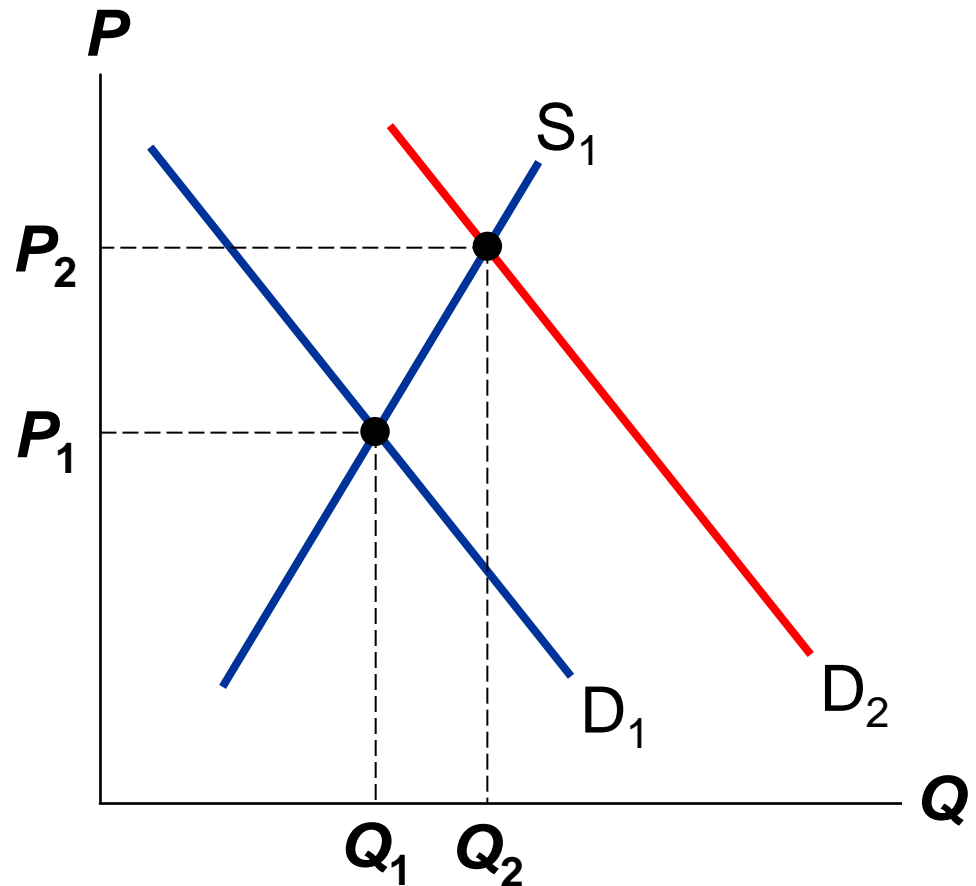


EXAMPLE 1: A Shift in Demand

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:

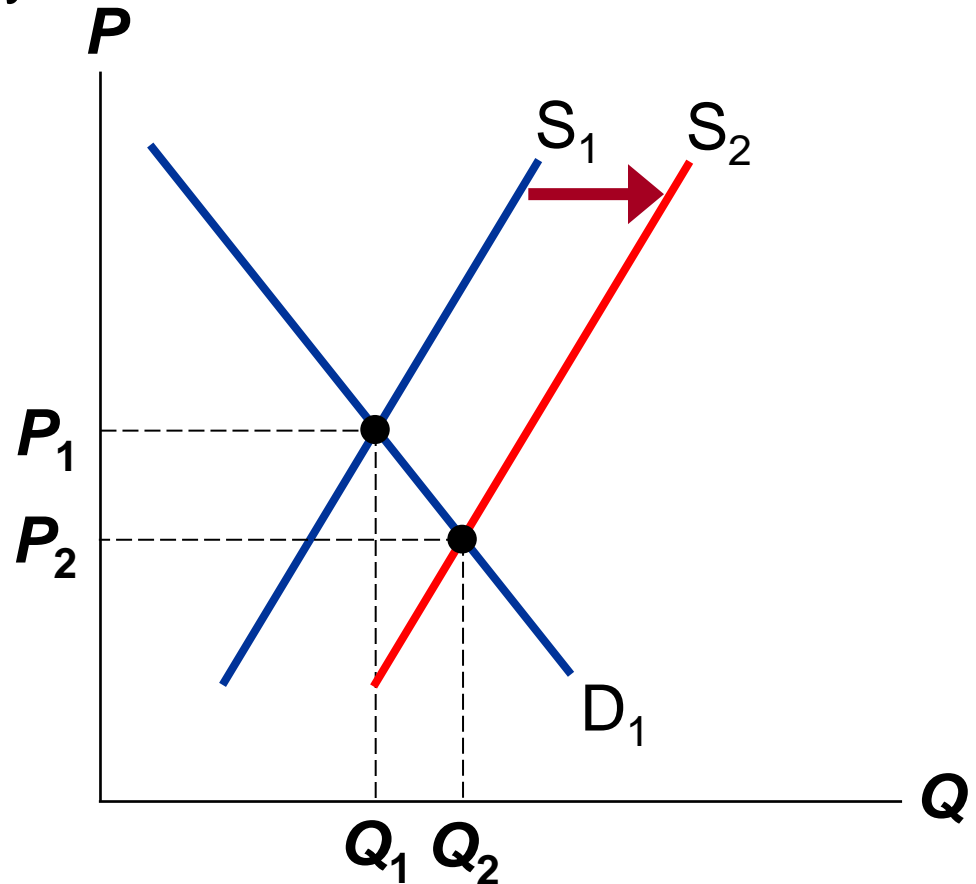
S curve shifts

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:

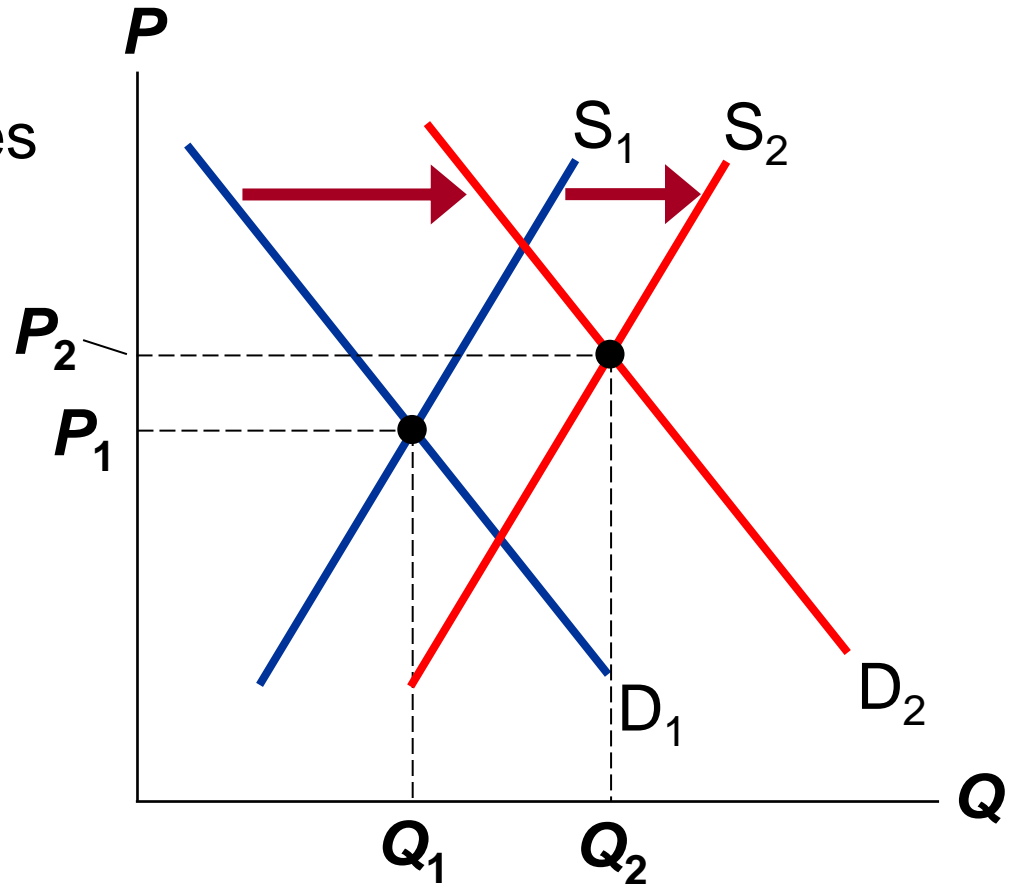
Both curves shift.

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.



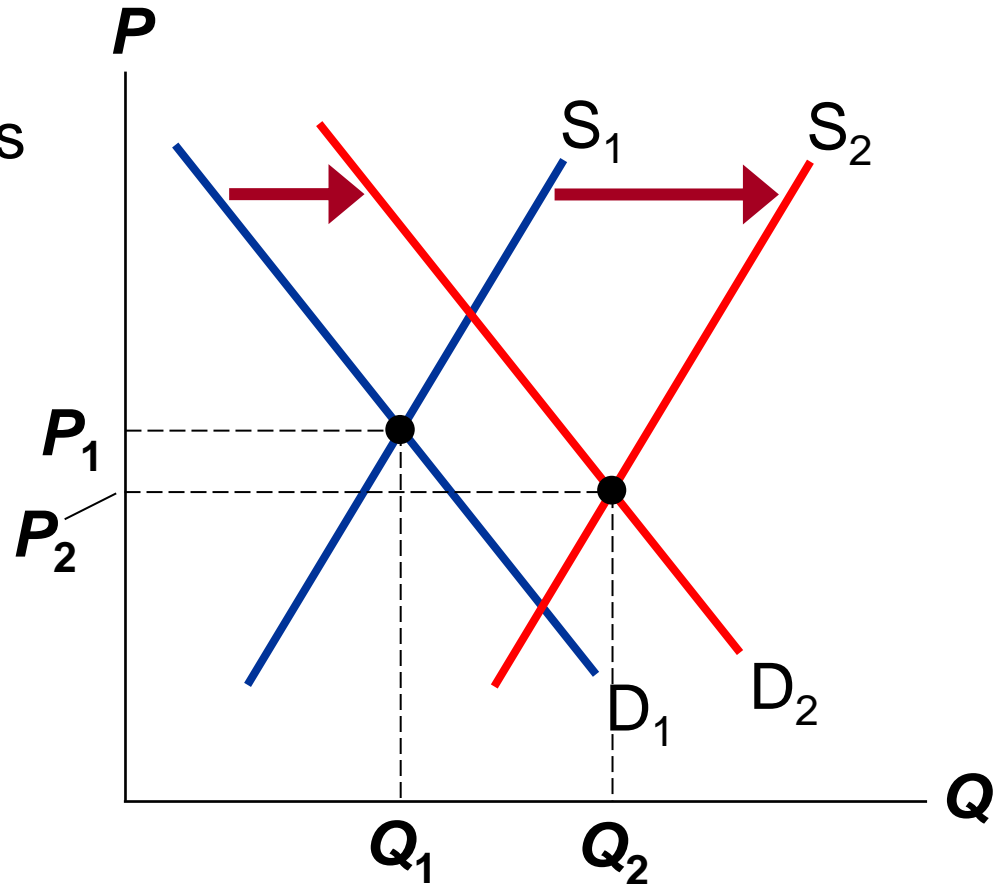
EXAMPLE 3: A Shift in Both Supply and Demand

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.

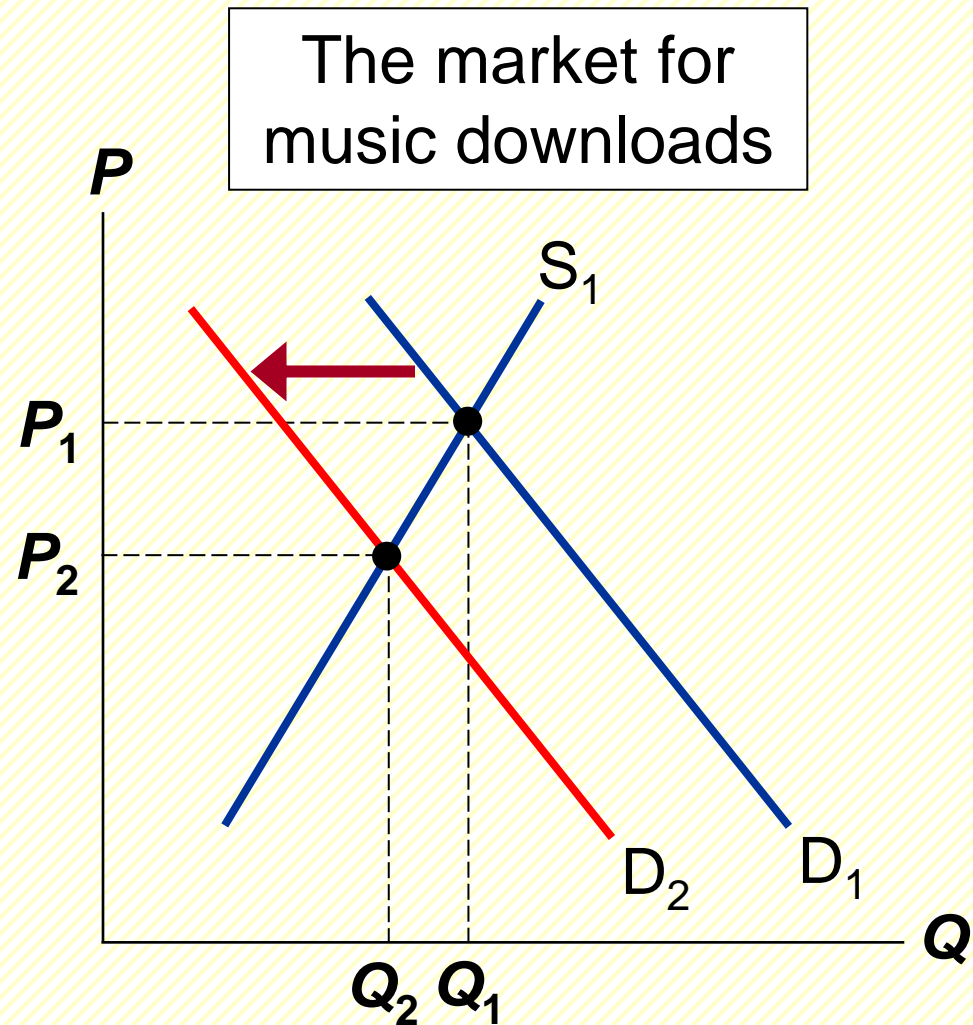
Event C: Events A and B both occur.

ACTIVE LEARNING 3

A. Fall in price of CDs

STEPS

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

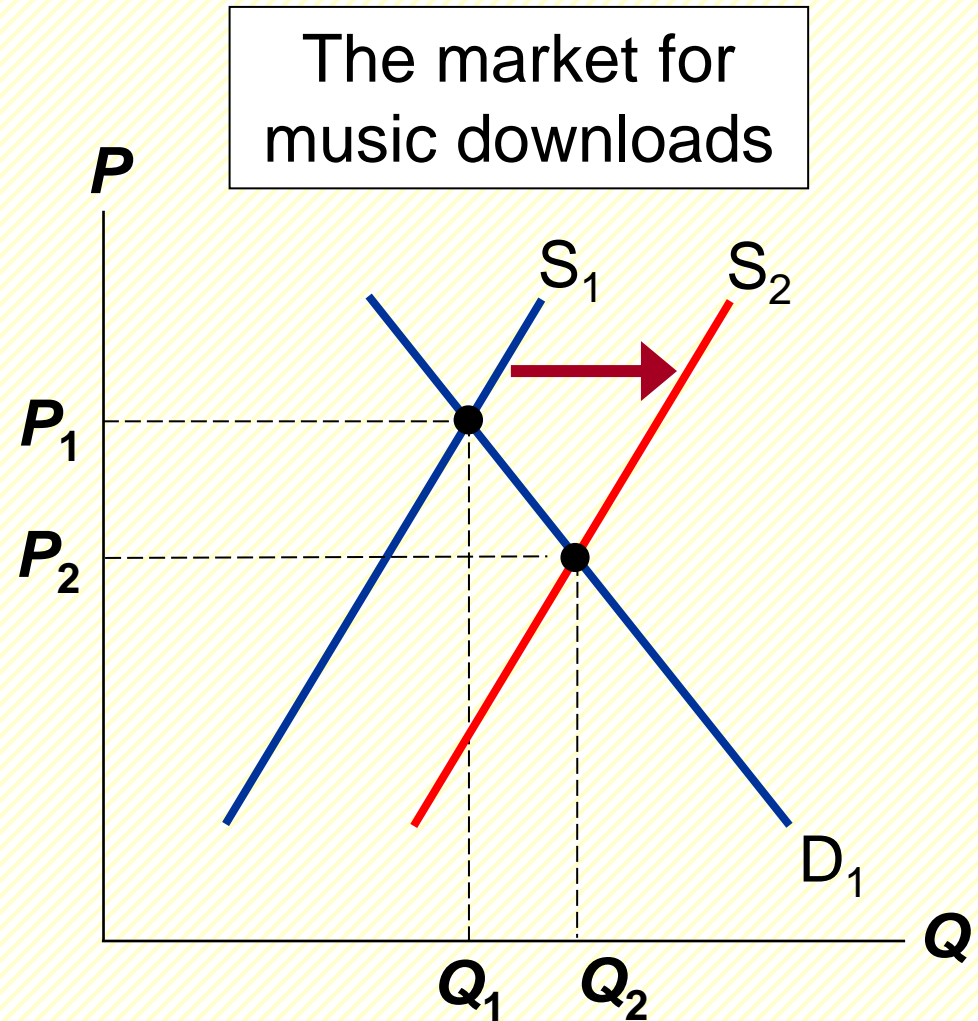


ACTIVE LEARNING 3

B. Fall in cost of royalties

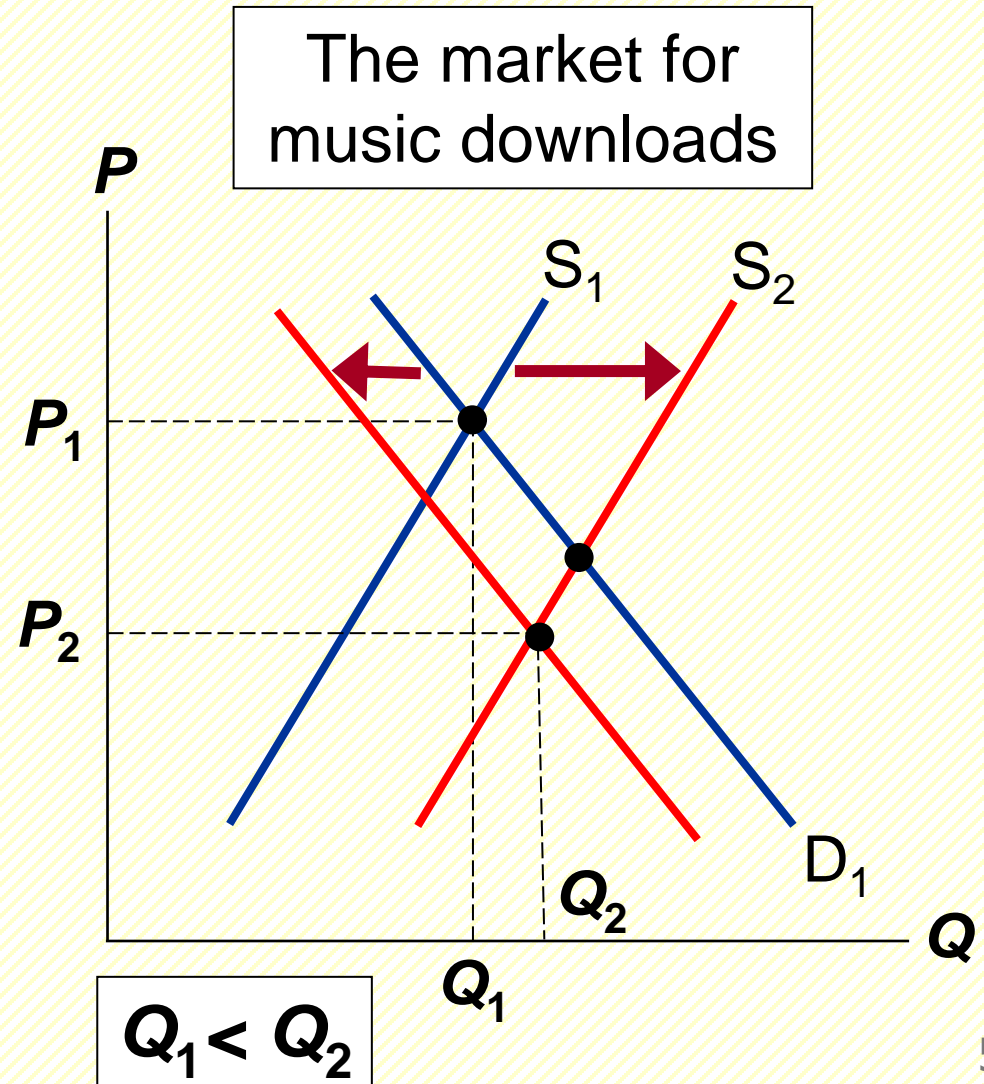
STEPS

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



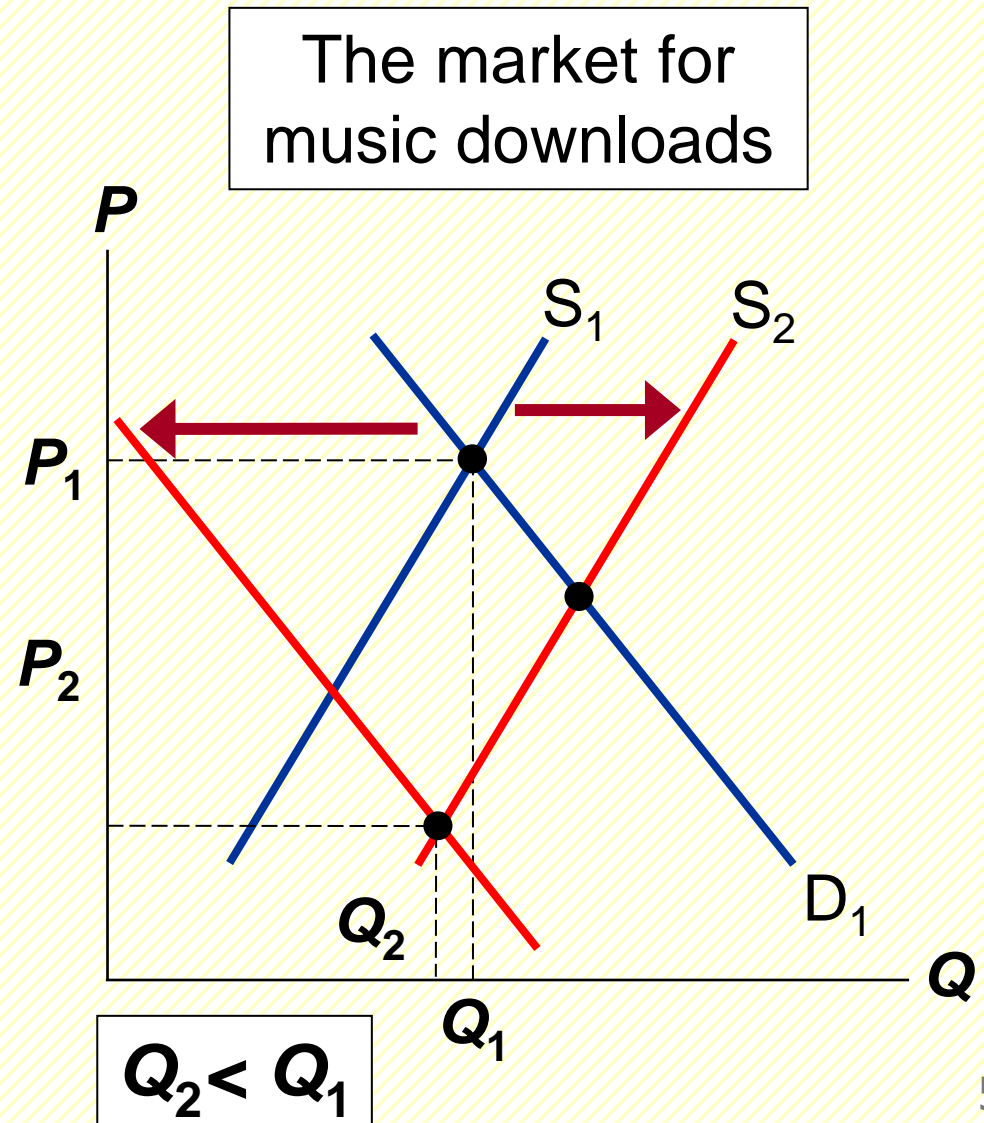
ACTIVE LEARNING 3

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



ACTIVE LEARNING 3

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



ACTIVE LEARNING 3

C. Fall in price of 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*** definitely falls.

Effect on ***Q*** is ambiguous:

The fall in demand reduces ***Q***,
the increase in supply increases ***Q***.