

- The Market Forces of Supply and Demand

# Demand

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

# Demand Schedule and Demand Curve

- **Demand schedule:**
  - A table that shows the relationship between the price of a good and the quantity demanded
- **Demand curve**
  - A graph of the relationship between the price of a good and the quantity demanded

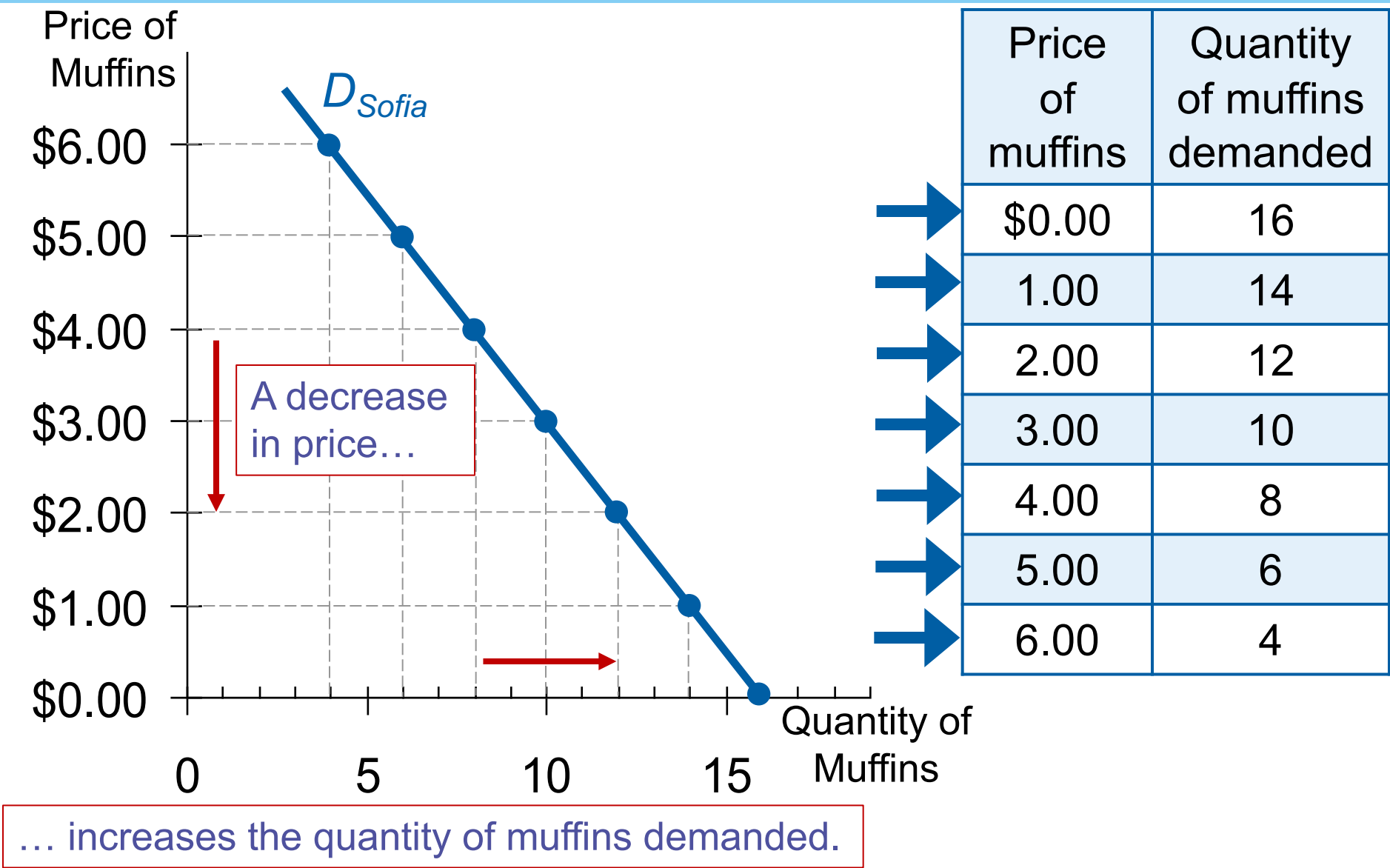
## EXAMPLE 1A: Sofia's demand for muffins

### Sofia's demand schedule for muffins

- Notice that Sofia's preferences obey the law of demand.

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

# EXAMPLE 1B: Sofia's D schedule and D curve



# Market Demand

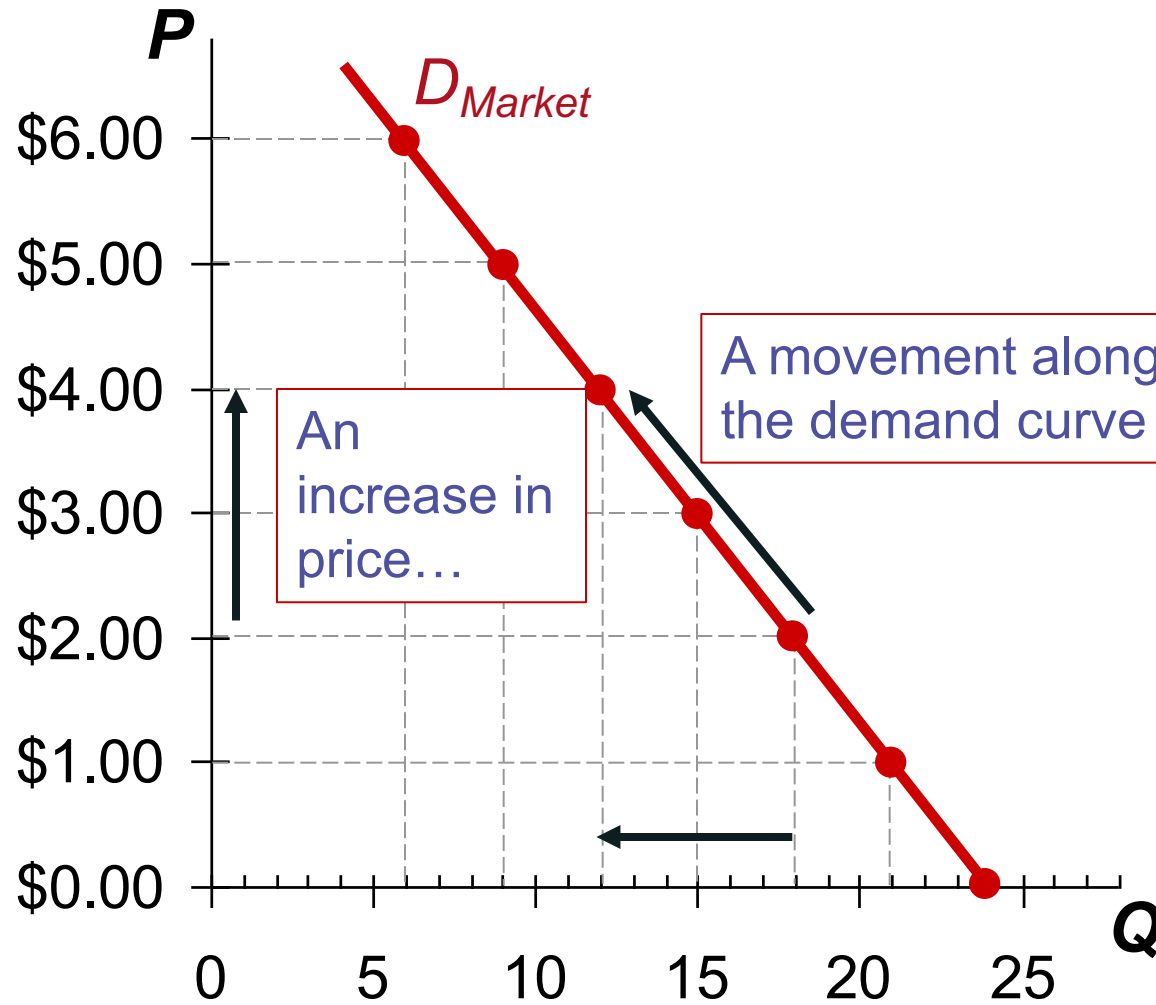
- Market demand
  - Sum of all individual demands for a good or service
- Market demand curve: sum the individual demand curves horizontally
  - To find the total quantity demanded at any price, we add the individual quantities demanded (on the horizontal axis)

## EXAMPLE 1C: Market vs. individual demand

Suppose Sofia and Diego are the only two buyers in the market for muffins. ( $Q^d$  = quantity demanded)

| Price  | Sofia's $Q^d$ |   | Diego'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            |

# EXAMPLE 1D: Market demand curve for muffins



| $P$    | $Q^d$<br>(Market) |
|--------|-------------------|
| \$0.00 | 24                |
| 1.00   | 21                |
| 2.00   | 18                |
| 3.00   | 15                |
| 4.00   | 12                |
| 5.00   | 9                 |
| 6.00   | 6                 |

... decreases the quantity of muffins demanded.



# Shifts in the Demand Curve – 1

- 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

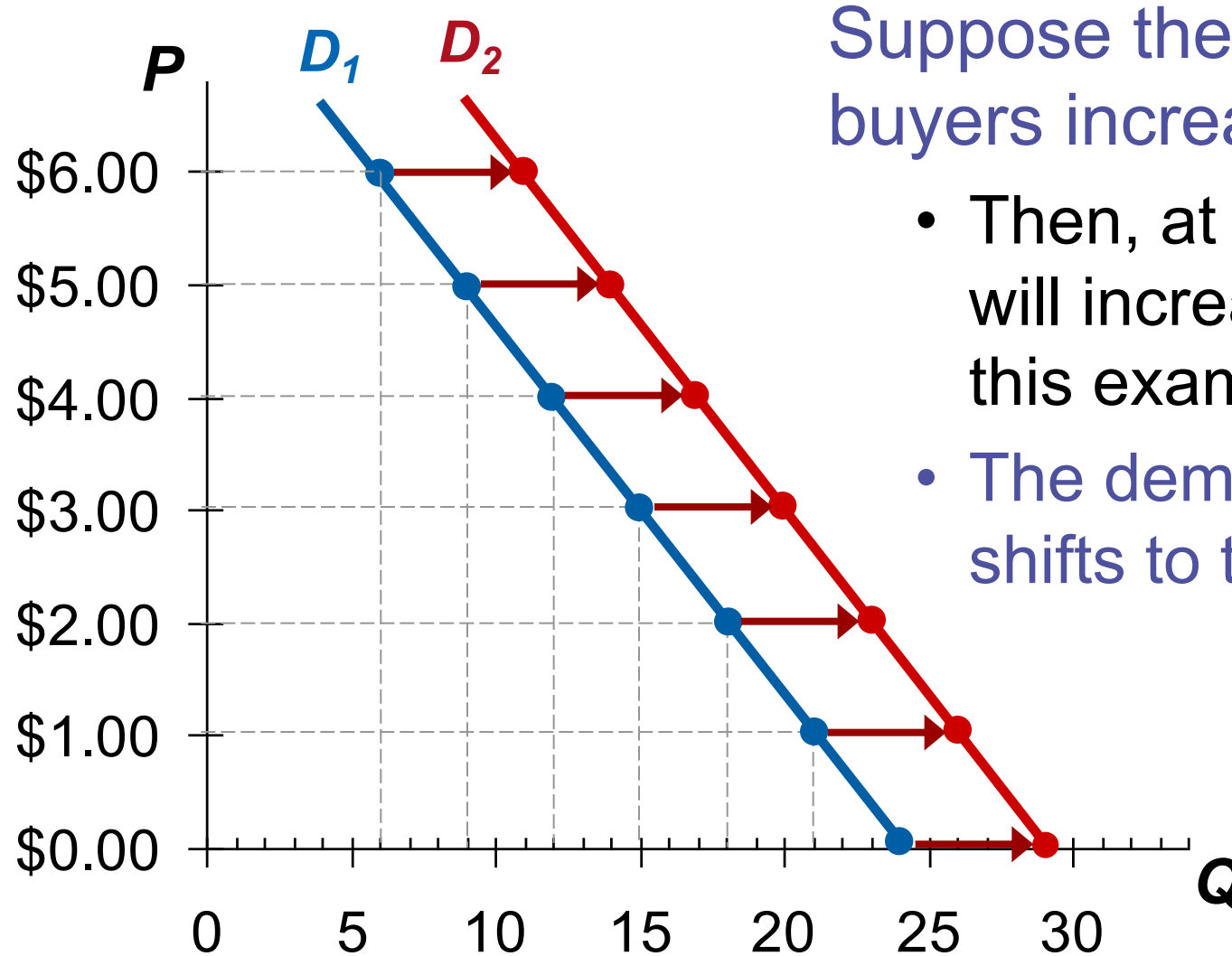
# Shifts in the Demand Curve – 2

- Shifts in the demand curve are caused by changes in:
  - Number of buyers
  - Income
  - Prices of related goods
  - Tastes
  - Expectations

# Changes in Number of Buyers

- **Increase in number of buyers**
  - Increases the quantity demanded at each price
  - Shifts the demand curve to the right
- **Decrease in number of buyers**
  - Decreases the quantity demanded at each price
  - Shifts the demand curve to the left

## EXAMPLE 1E: Demand curve shifts



Suppose the number of buyers increases.

- Then, at each  $P$ ,  $Q^d$  will increase (by 5 in this example).
- The demand curve shifts to the right

# Changes in Income

- Normal good, other things being equal
  - An increase in income leads to an increase in demand
  - Shifts the demand curve to the right
- Inferior good, other things being equal
  - An increase in income leads to a decrease in demand
  - Shifts the demand curve to the left

# Changes in Prices of Related Goods – 1

- 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, movie streaming and movie theater

# Changes in Prices of Related Goods – 2

- Two goods are complements, if
  - An increase in the price of one leads to a decrease in the demand for the other
- Example: smartphones and apps
  - If price of smartphones rises, people buy fewer smartphones, and therefore fewer apps; App demand curve shifts to the left
- Other examples:
  - College tuition and textbooks, bagels and cream cheese, milk and cookies

# Changes in Tastes

- Tastes

- Anything that causes a shift in tastes toward a good will increase demand for that good and shift its demand curve to the right

- Example:

- Advertising convinces consumers that drinking 3 glasses of orange juice a day will help lower cholesterol: demand for orange juice increases



# Expectations about the Future

- People expect an increase in income
  - The current demand increases
- People expect higher prices
  - The current demand increases
- Example:
  - If people expect their incomes to rise (because they got a promotion at work), their demand for meals at expensive restaurants may increase now

# Shift vs. Movement Along Curve

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

# Summary: variables that influence buyers

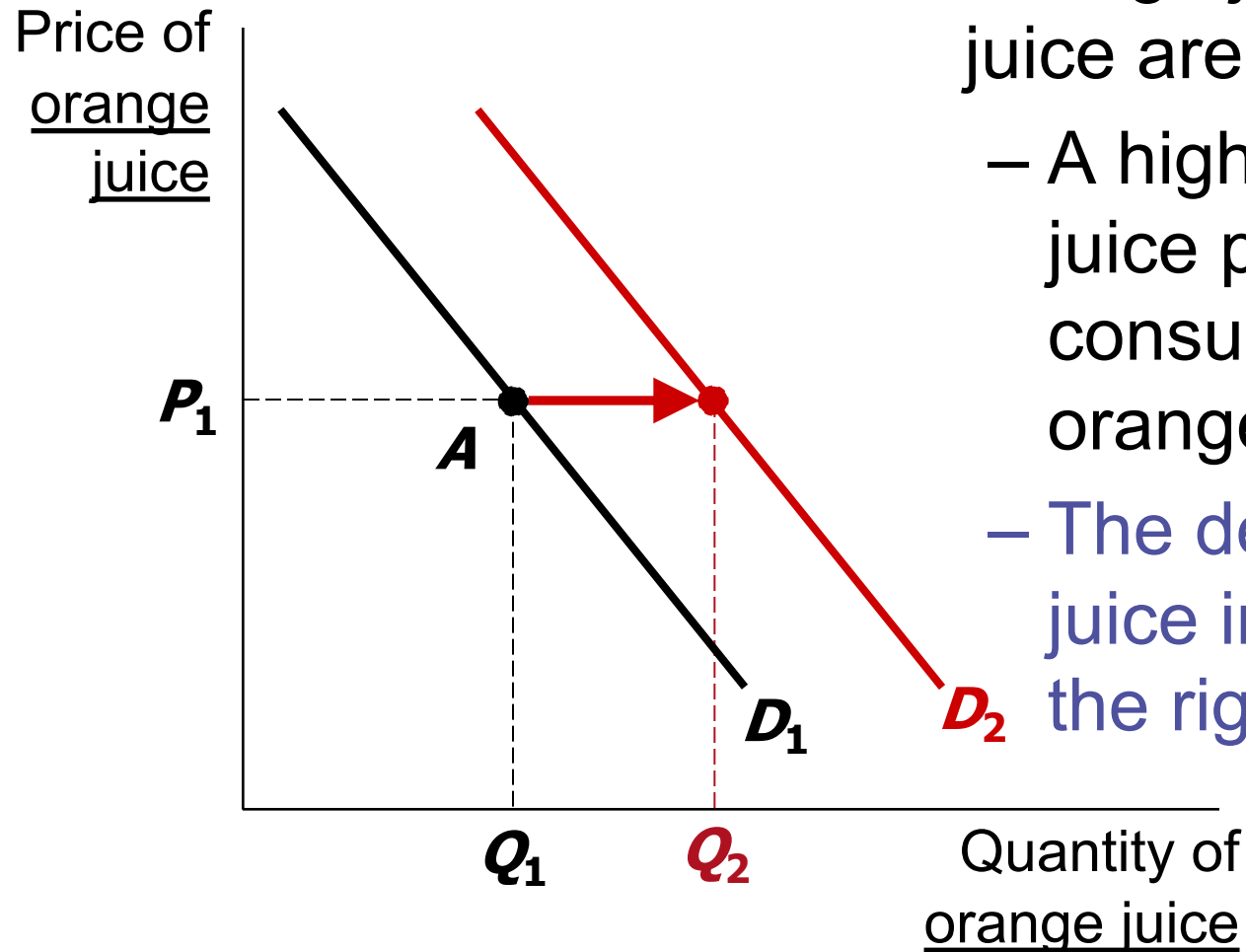
| Variable                 | A Change in This Variable . . .              |
|--------------------------|--|
| Price of the good itself | Represents a movement along the demand curve |
| Income                   | Shifts the demand curve                      |
| Prices of related goods  | Shifts the demand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

## Active Learning 1: The demand curve, $D$

Draw the demand curve for orange juice,  $D_1$ , and choose a point  $A$  ( $P_1$ ,  $Q_1$ ) on the demand curve. What happens in each of the following scenarios? Why?

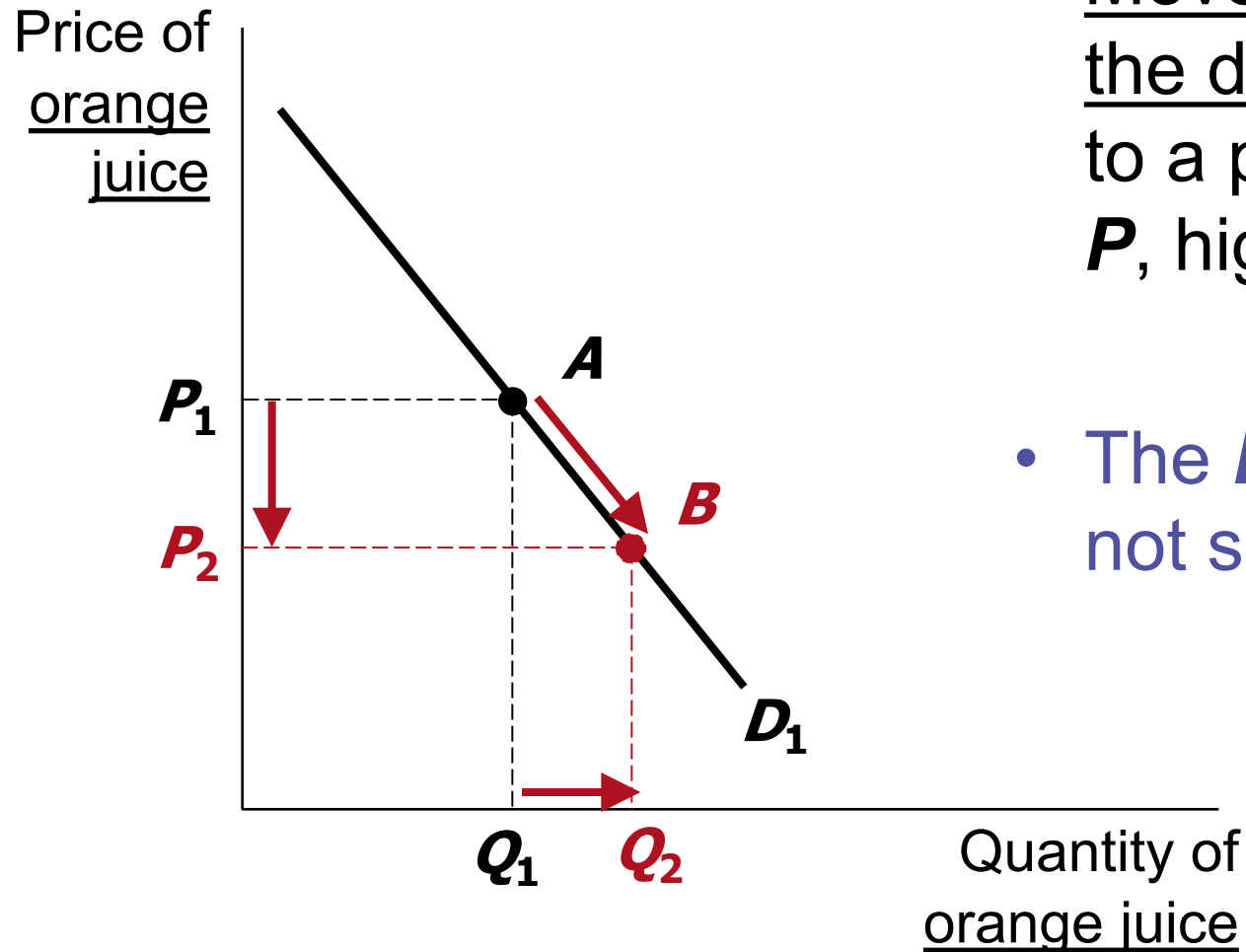
- A. The price of apple juice increases
- B. The price of orange juice falls
- C. Consumers' income falls (and orange juice is a normal good)

# Active Learning 1A: Price of apple juice increases



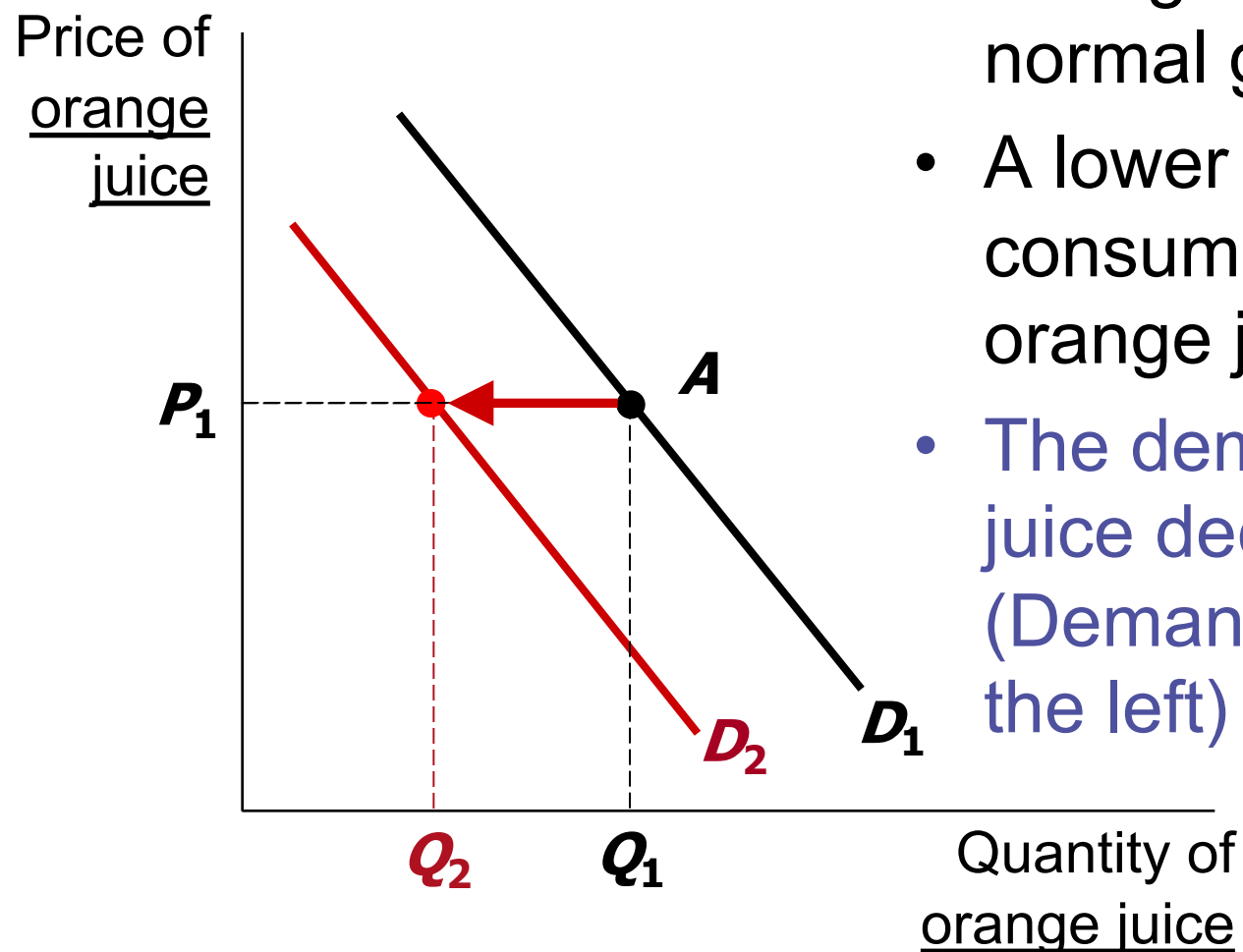
- Orange juice and apple juice are **substitutes**.
  - A higher price of apple juice prompts consumers to buy more orange juice (at  $P_1$ )
  - The demand for orange juice increases (shifts to the right)

# Active Learning 1B: The price of orange juice falls



- Move down along the demand curve to a point with lower  $P$ , higher  $Q$ .
- The  $D$  curve does not shift.

# Active Learning 1C: Consumers' income falls



- Orange juice is a normal good.
- A lower income prompts consumers to buy less orange juice (at  $P_1$ ).
- The demand for orange juice decreases (Demand curve shifts to the left)

# Supply

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



# Supply Schedule and Supply Curve

- **Supply schedule:**
  - A table that shows the relationship between the price of a good and the quantity supplied
- **Supply curve**
  - A graph of the relationship between the price of a good and the quantity supplied

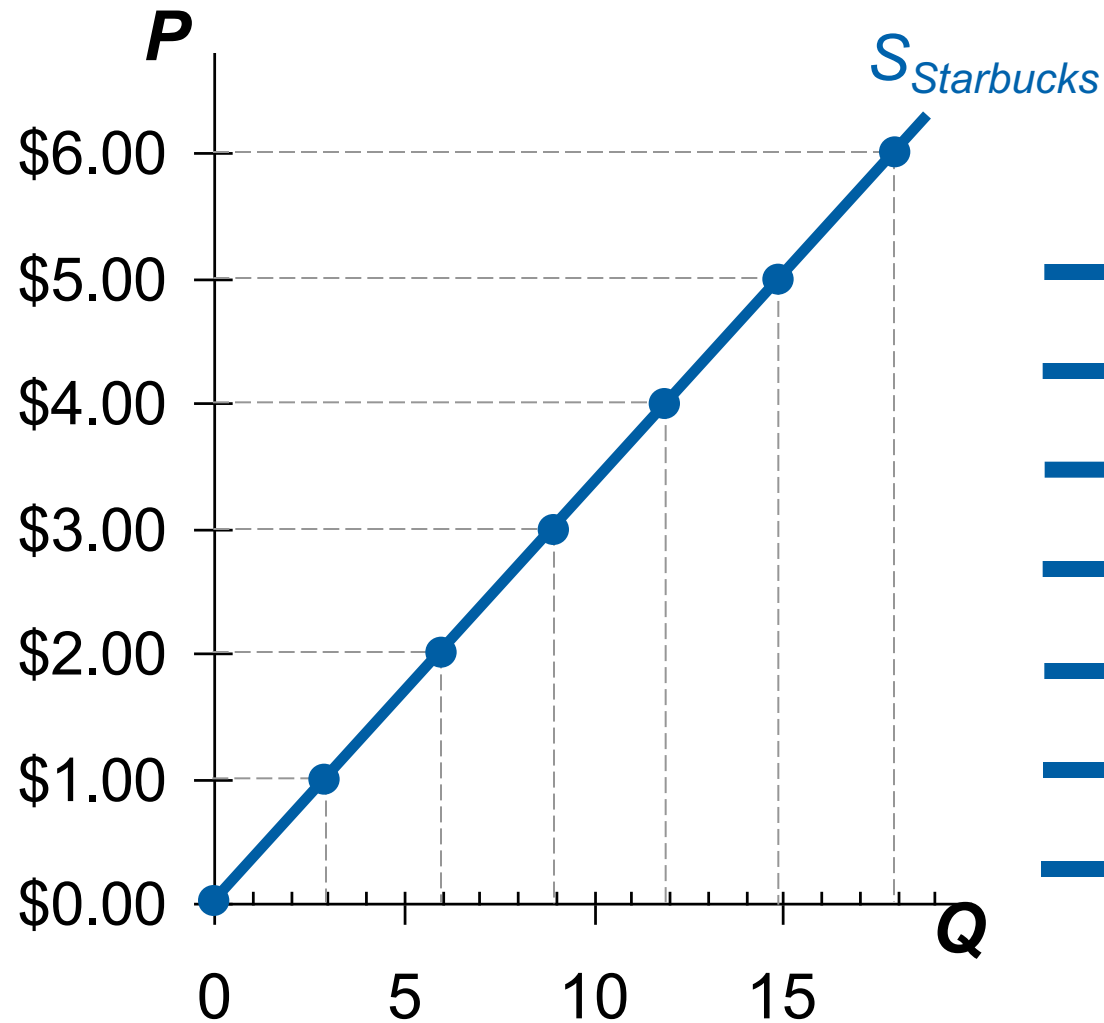
## EXAMPLE 2A: Starbucks' supply of muffins

### Starbucks' supply schedule of muffins

- Notice that Starbucks' supply schedule obeys the law of supply

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

## EXAMPLE 2B: Starbucks' S schedule and S curve



| Price of muffins | Quantity of muffins 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

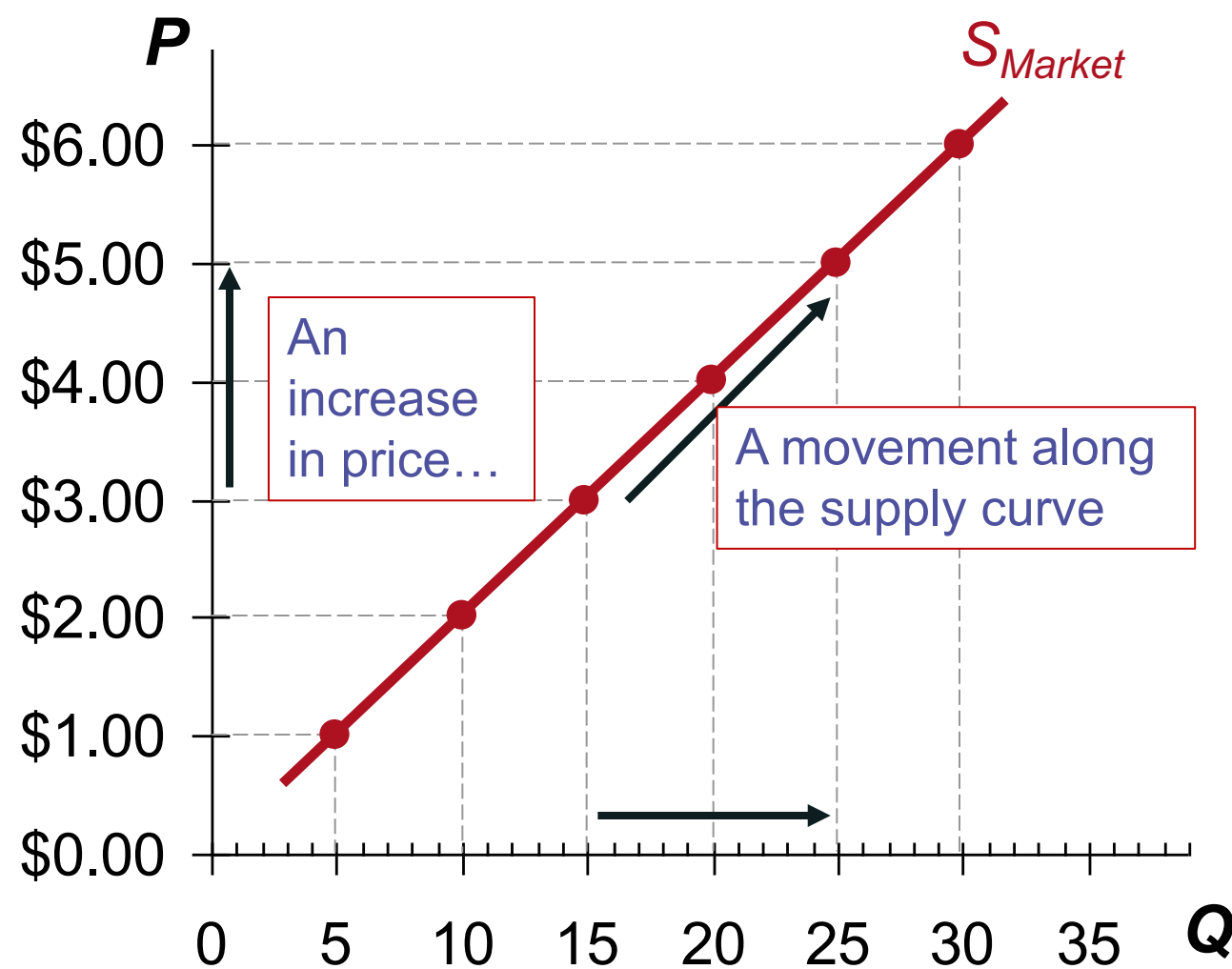
- **Market supply**
  - Sum of the supplies of all sellers of a good or service
- **Market supply curve: sum of individual supply curves horizontally**
  - To find the total quantity supplied at any price, we add the individual quantities (on the horizontal axis)

## EXAMPLE 2C: Market vs. individual supply

Suppose Starbucks and Peet's Coffee 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           |

# EXAMPLE 2D: Market supply curve of muffins



| $P$    | $Q^s$<br>(Market) |
|--------|-------------------|
| \$0.00 | 0                 |
| 1.00   | 5                 |
| 2.00   | 10                |
| 3.00   | 15                |
| 4.00   | 20                |
| 5.00   | 25                |
| 6.00   | 30                |

... increases the quantity of muffins supplied.

# Shifts in the Supply Curve – 1

- The supply curve
  - Shows how price affects quantity supplied, other things being equal
- These “other things” are non-price determinants of supply
  - Things that determine producers’ supply for a good, other than the good’s price
- Changes in them shift the **S** curve

# Shifts in the Supply Curve – 2

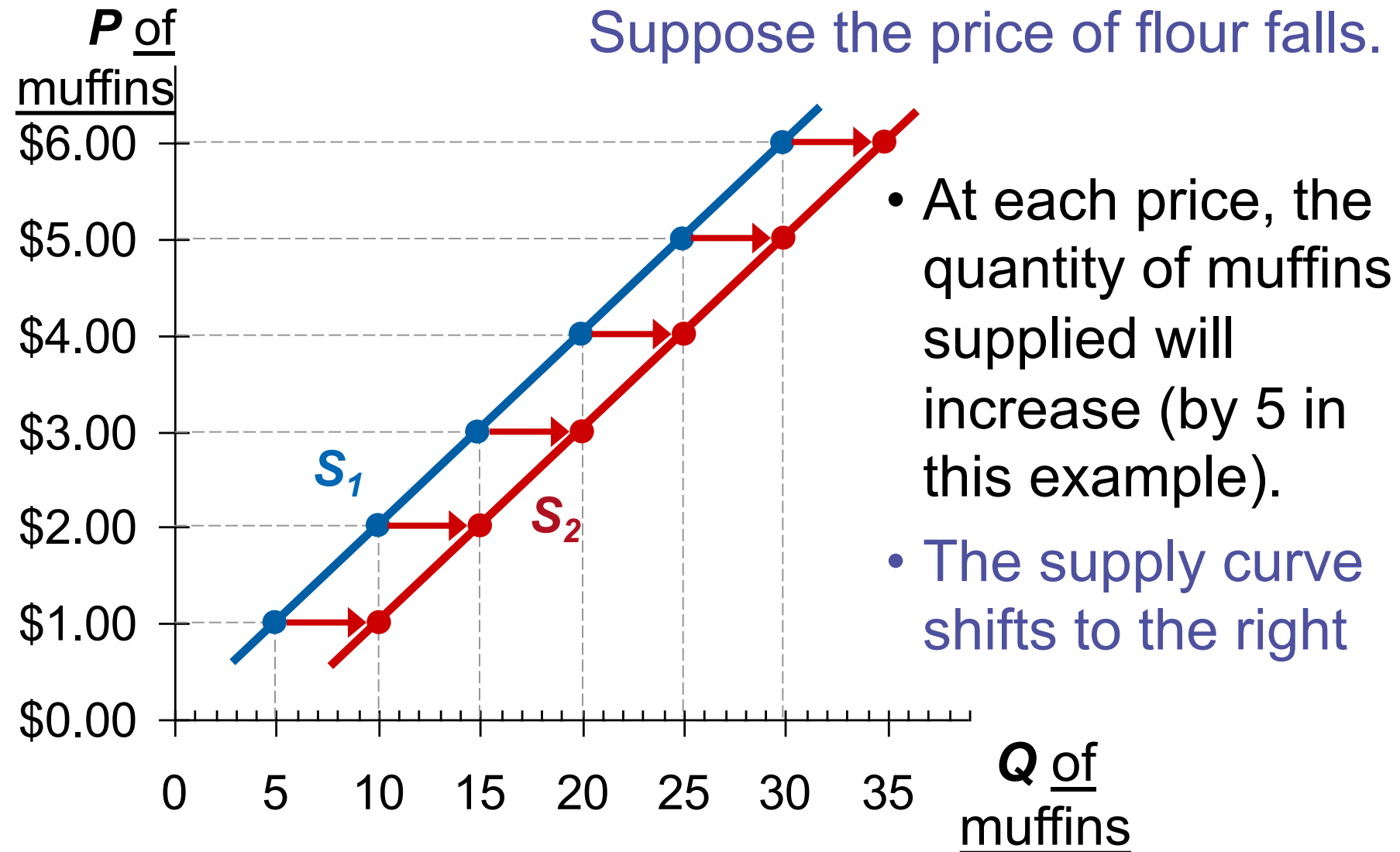
- Shifts in the supply curve are caused by changes in:
  - Input prices
  - Technology
  - Number of sellers
  - Expectations about the future



# Changes in Input Prices

- Examples of input prices
  - Wages, ingredients, prices of raw materials
- A fall in input prices
  - Makes production more profitable at each output price (reduces production costs)
  - Firms supply a larger quantity at each price: the supply curve shifts to the right
  - Supply is negatively related to prices of inputs

## EXAMPLE 2E: Changes in input prices



# Changes in 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 (decrease in production costs)
  - Shifts the supply curve to the right

# Changes in Number of Sellers

- An increase in the number of sellers
  - Increases the quantity supplied at each price
  - Shifts the supply curve to the right
- A decrease in the number of sellers
  - Decreases the quantity supplied at each price
  - Shifts the supply curve to the left

# Expectations about Future

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

# Shift vs. Movement Along the Supply

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

# 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                      |

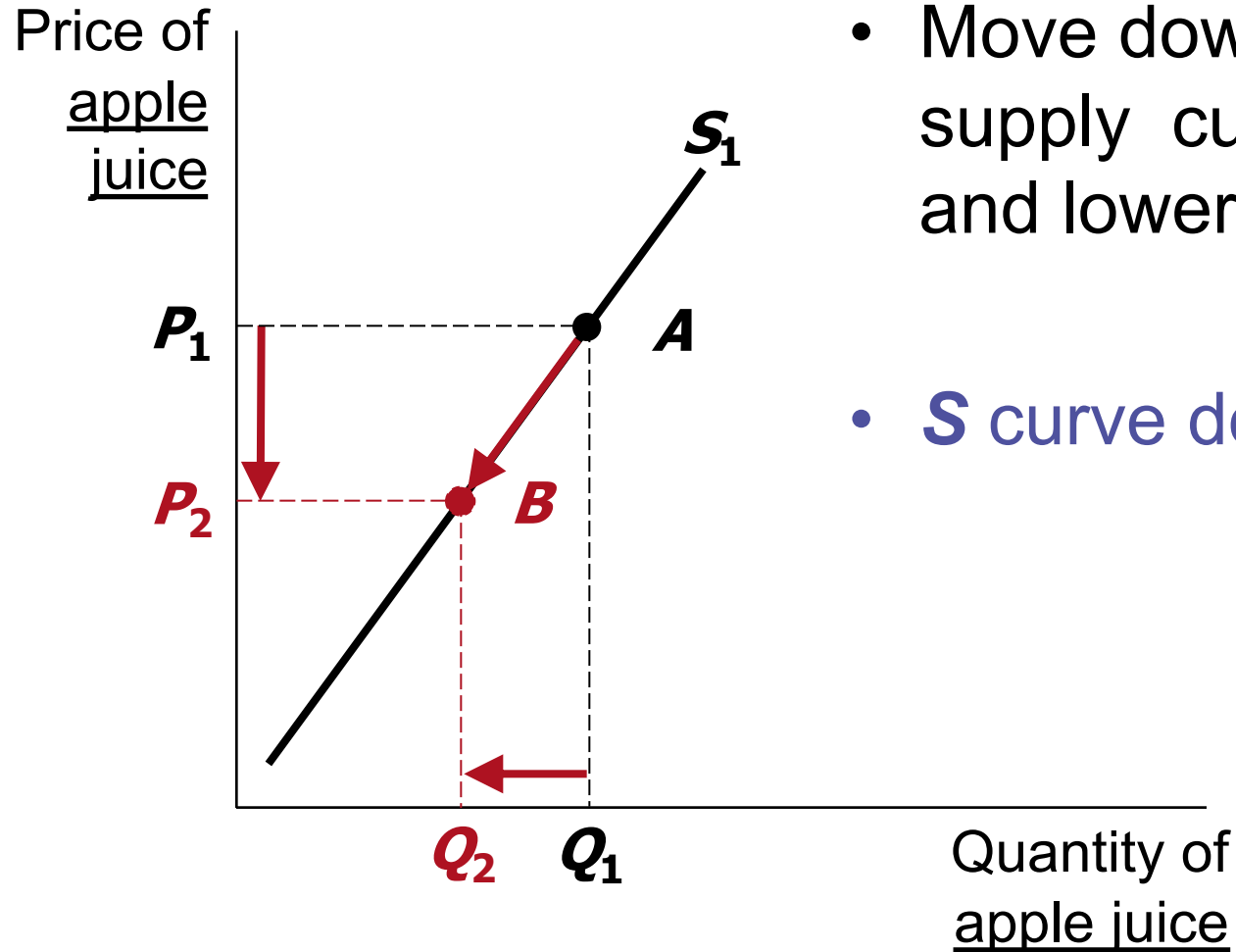
## Active Learning 2: The supply curve

Draw a supply curve for apple juice,  $S_1$ , and choose a point  $A$  ( $P_1$ ,  $Q_1$ ) on the supply curve. What happens to it in each of the following scenarios? Why?

- A. Grocery stores cut the price of apple juice.
- B. A technological advance allows apple juice to be produced at lower cost.
- C. Grocery stores cut the price of orange juice.

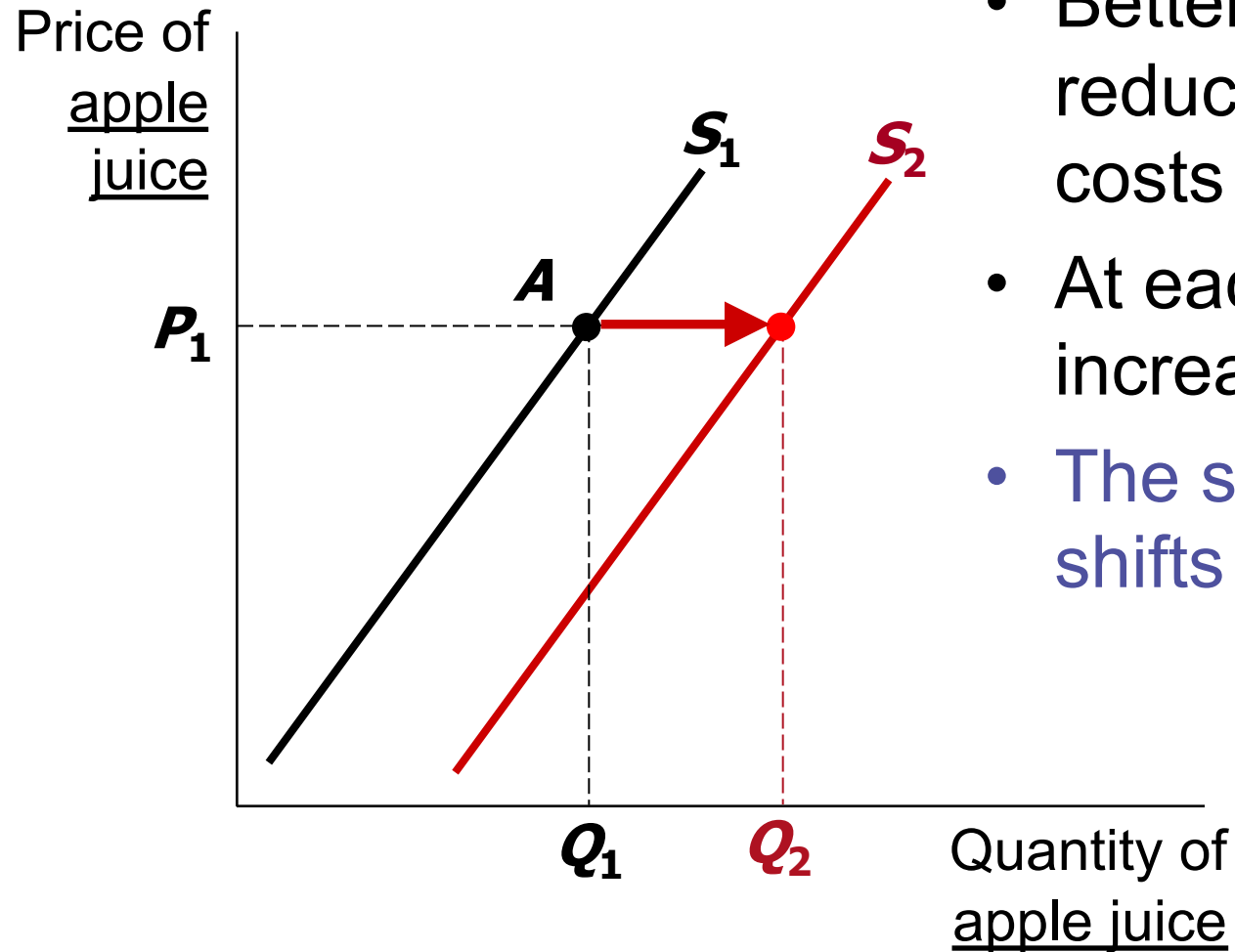


## Active Learning 2A: Decrease in $P$ of apple juice



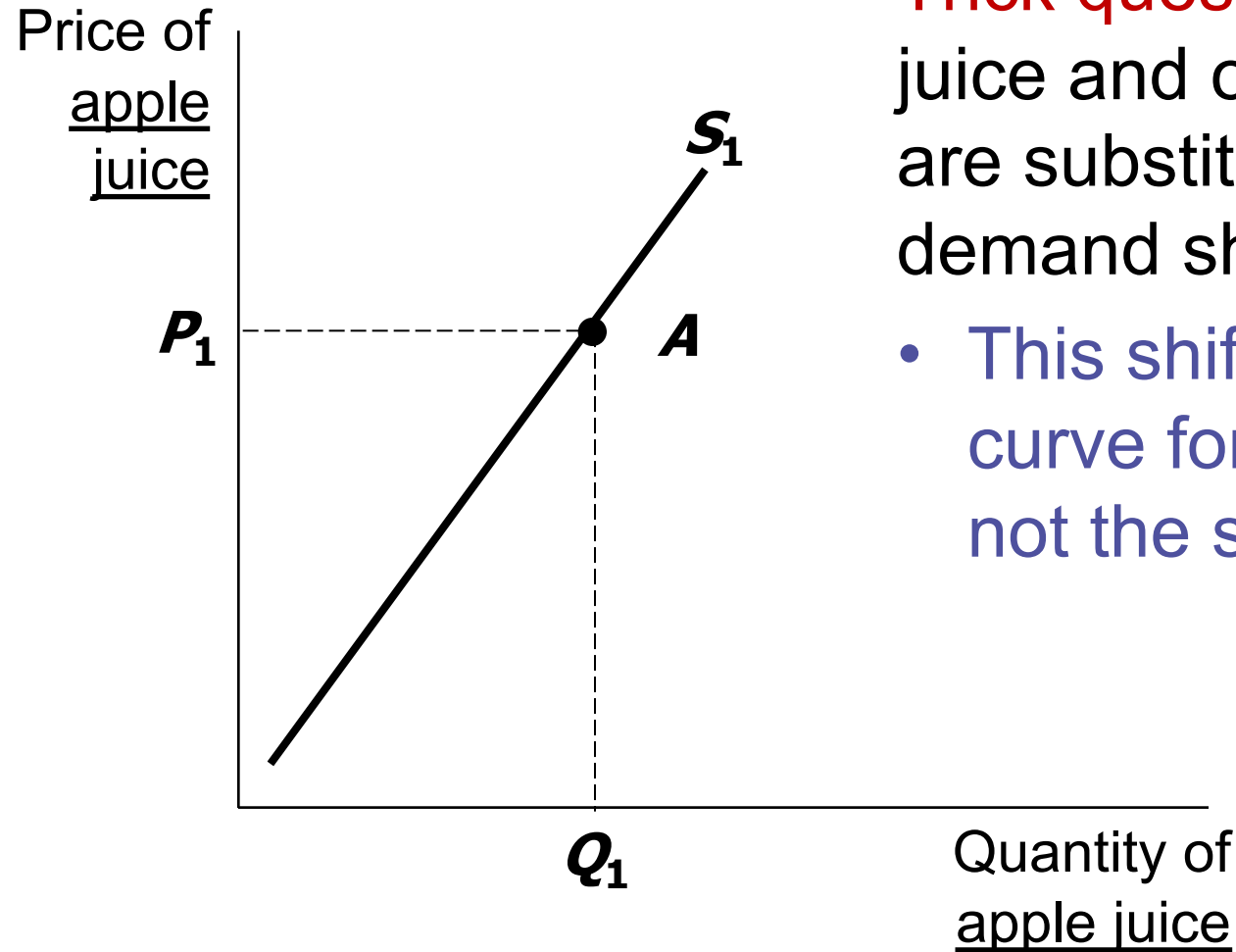
- Move down along the supply curve to a lower  $P$  and lower  $Q$ .
- $S$  curve does not shift.

## Active Learning 2B: Technological advance



- Better technology reduces production costs
- At each price,  $Q_s$  increases.
- The supply curve shifts to the right

## Active Learning 2C: Decrease in P of orange juice



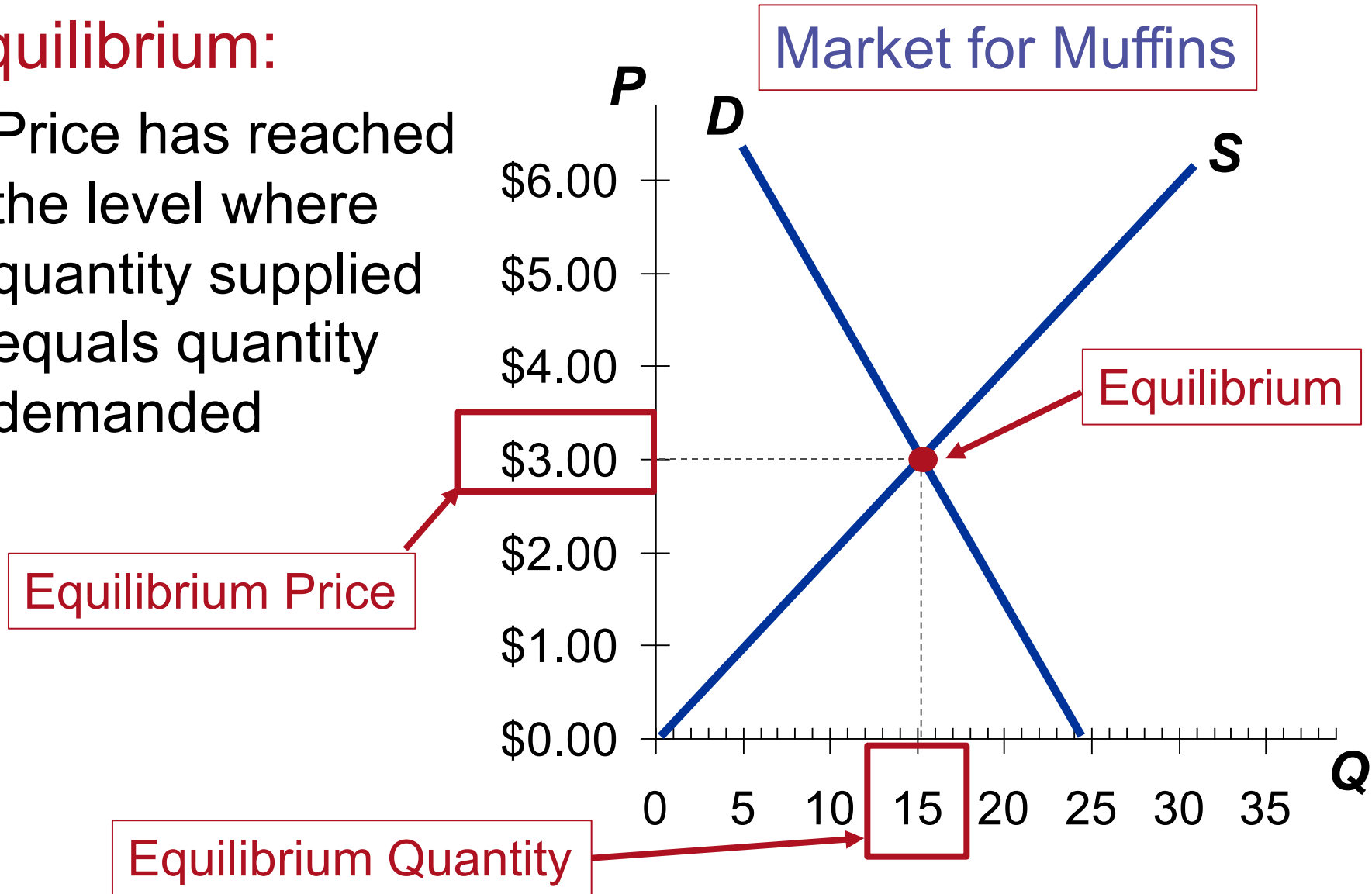
**Trick question!** Apple juice and orange juice are substitutes (a demand shifter)

- This shifts the demand curve for apple juice, not the supply curve.

# Supply and demand together – 1

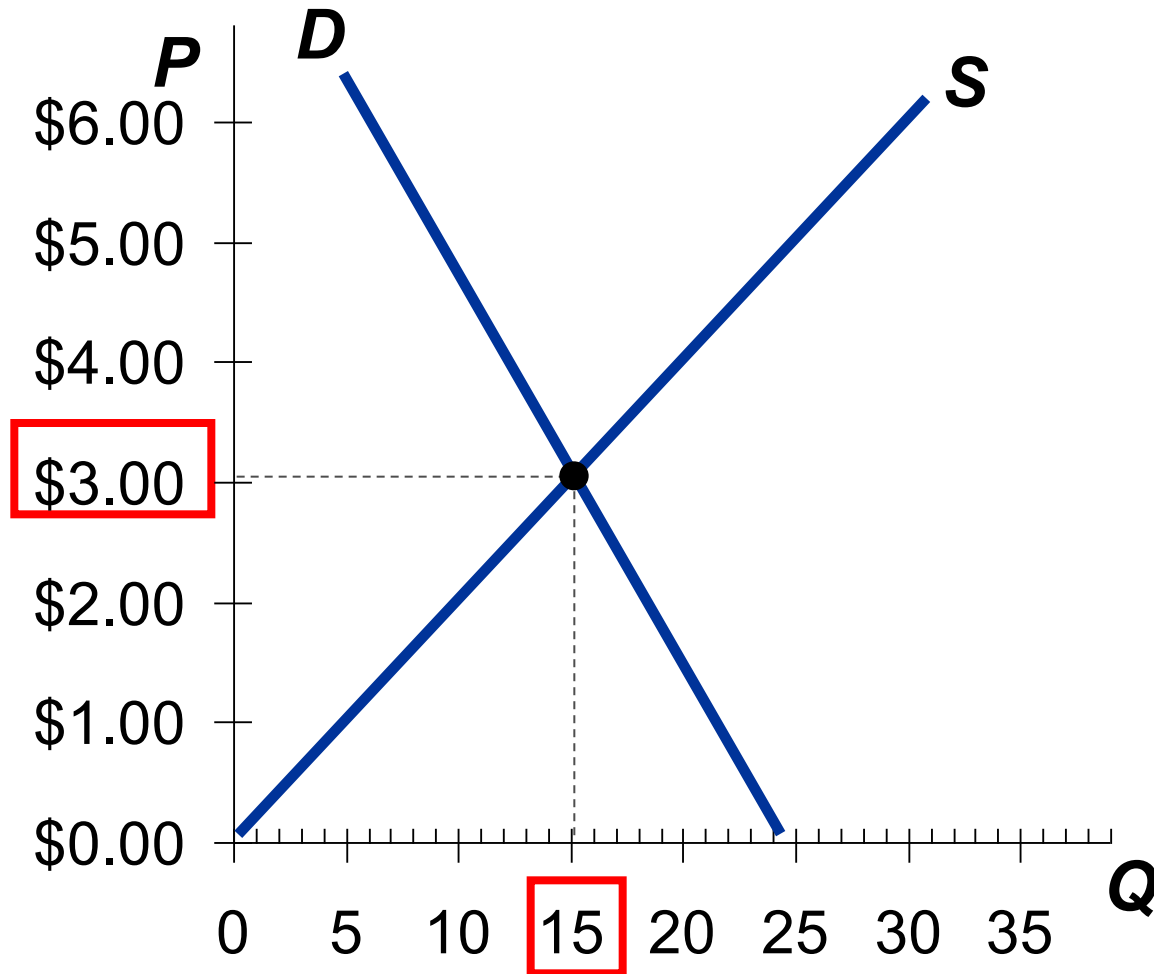
## Equilibrium:

- Price has reached the level where quantity supplied equals quantity demanded



## Supply and demand together – 2

Equilibrium price: price where  $Q^S = Q^D = \text{equilibrium } Q$

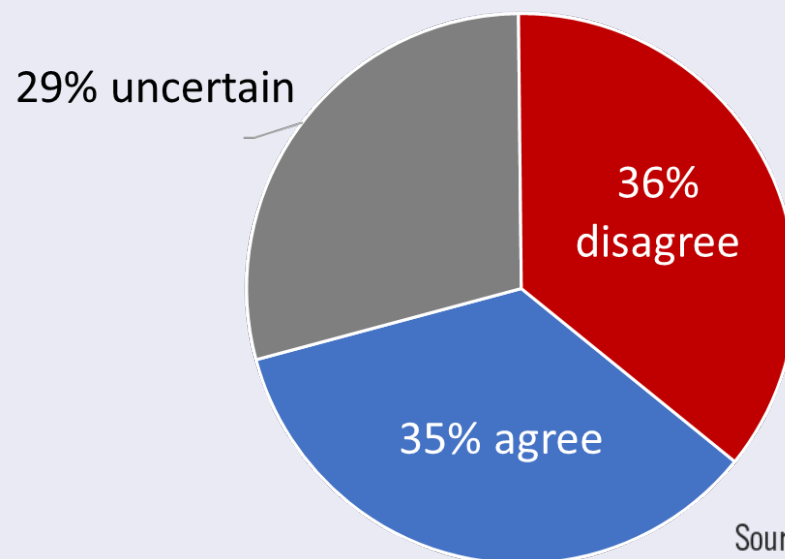


| $P$      | $Q^D$     | $Q^S$     |
|----------|-----------|-----------|
| \$0      | 24        | 0         |
| 1        | 21        | 5         |
| 2        | 18        | 10        |
| <b>3</b> | <b>15</b> | <b>15</b> |
| 4        | 12        | 20        |
| 5        | 9         | 25        |
| 6        | 6         | 30        |

## Price Gouging

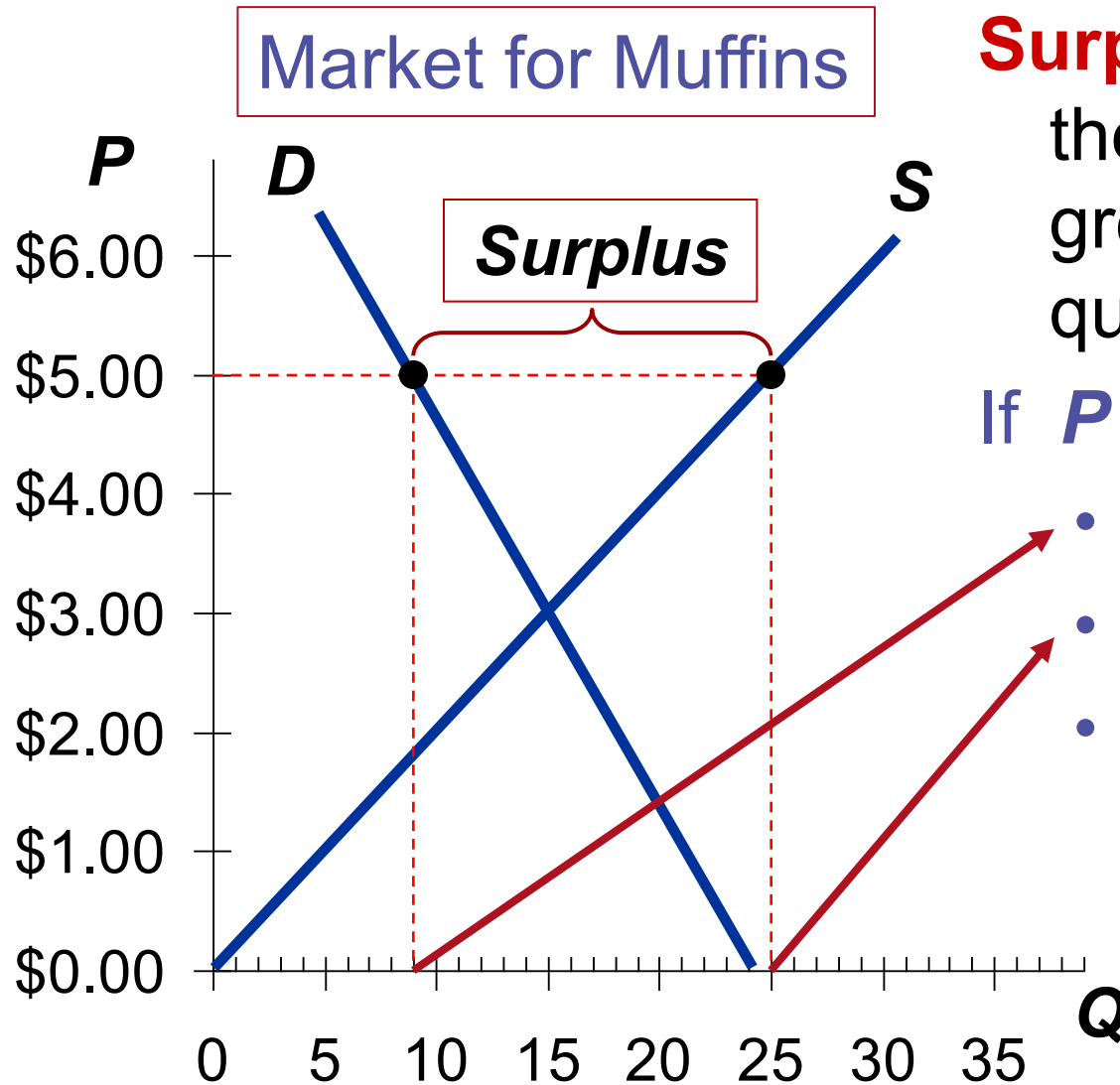
*“Laws to prevent high prices for essential goods in short supply in a crisis would raise social welfare.”*

What do economists say?



Source: IGM Economic Experts Panel, May 26, 2020.

# Markets not in equilibrium: **surplus** – 1

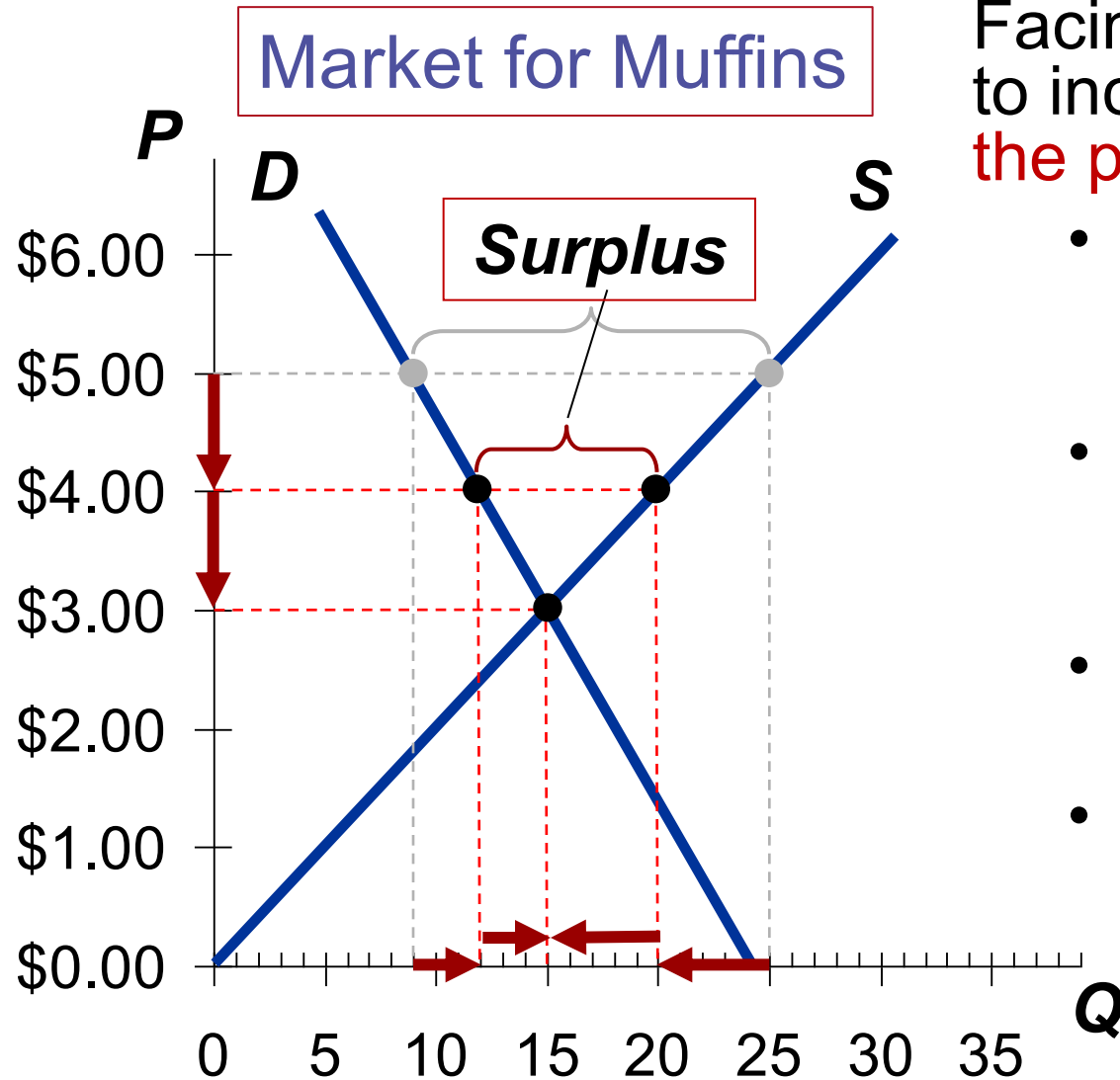


**Surplus** (excess supply):  
the quantity supplied is  
greater than the  
quantity demanded

If  $P = \$5$ ,

- then  $Q^D = 9$  muffins
- and  $Q^S = 25$  muffins,
- Resulting in a surplus  
of  $25 - 9 = 16$  muffins

## Markets not in equilibrium: **surplus** – 2

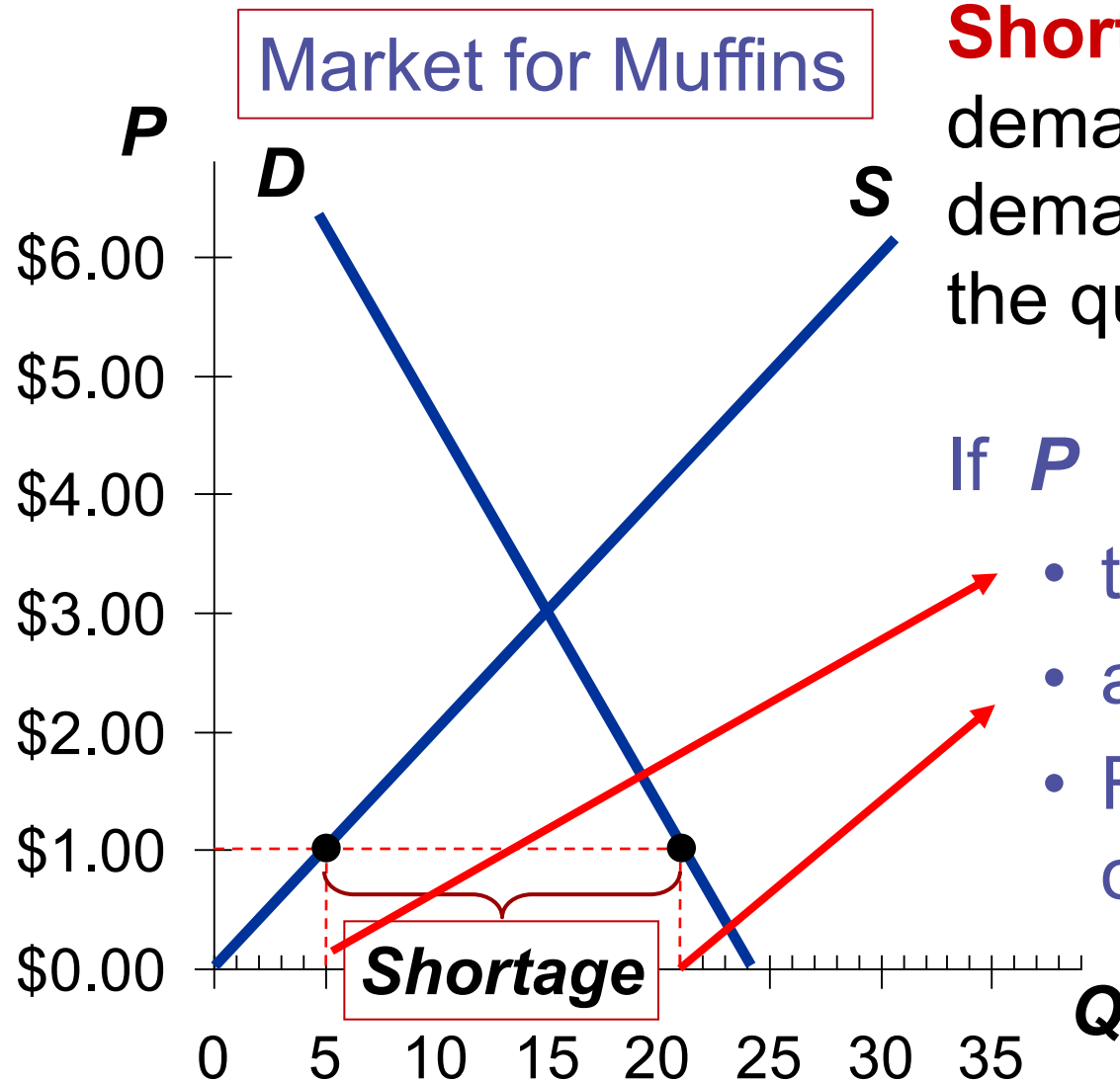


Facing a surplus, sellers try to increase sales by **cutting the price**:

- This causes  $Q^D$  to rise (move downward along D curve)
- and  $Q^S$  to fall (move downward along S curve)...
- ...which reduces the surplus.
- And so on... **until market reaches equilibrium.**



# Markets not in equilibrium: **shortage** – 1

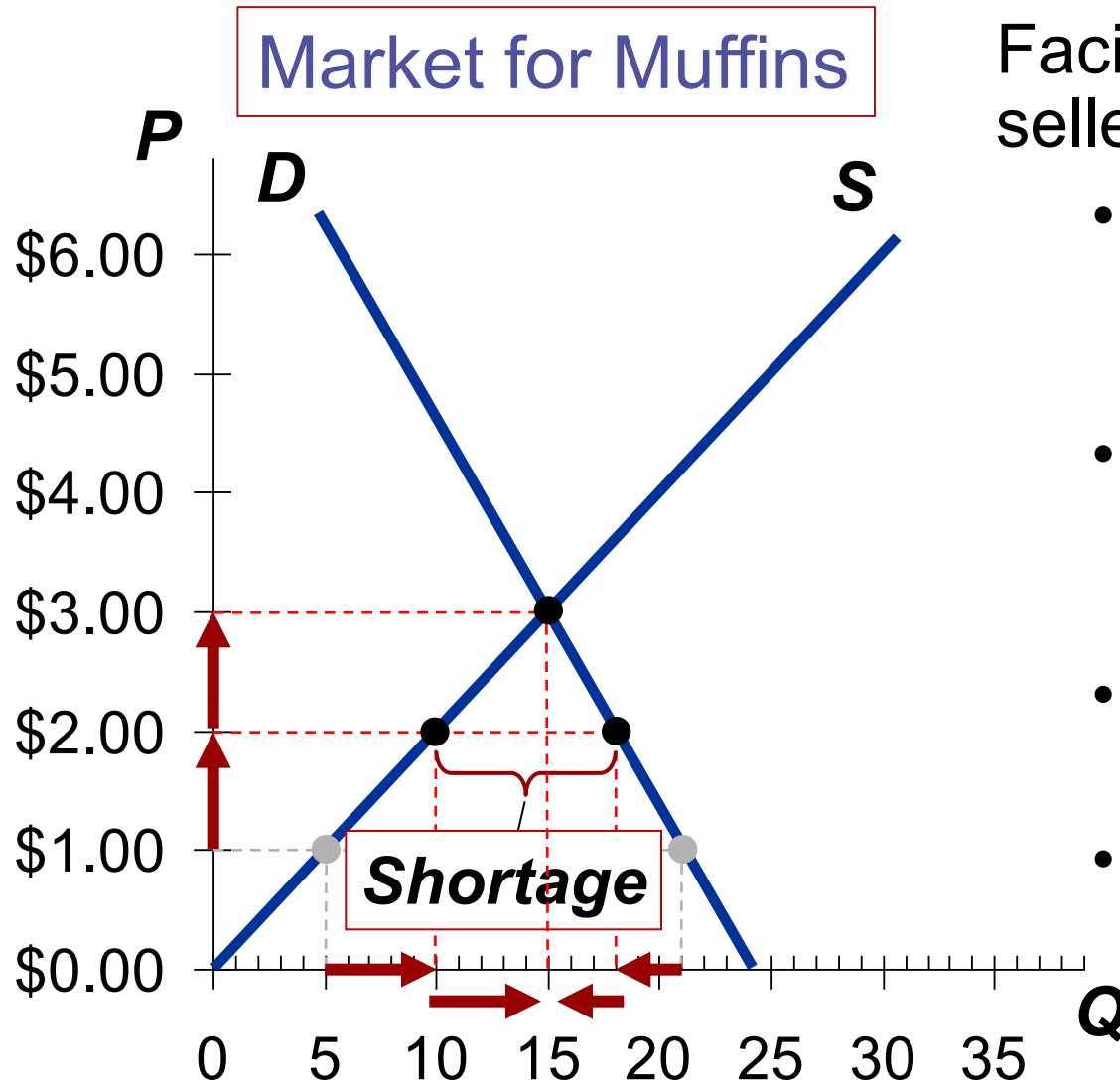


**Shortage** (excess demand): the quantity demanded is greater than the quantity supplied

If  $P = \$1$ ,

- then  $Q^S = 5$  muffins
- and  $Q^D = 21$  muffins
- Resulting in a shortage of  $21 - 5 = 16$  muffins

## Markets not in equilibrium: **shortage** – 2

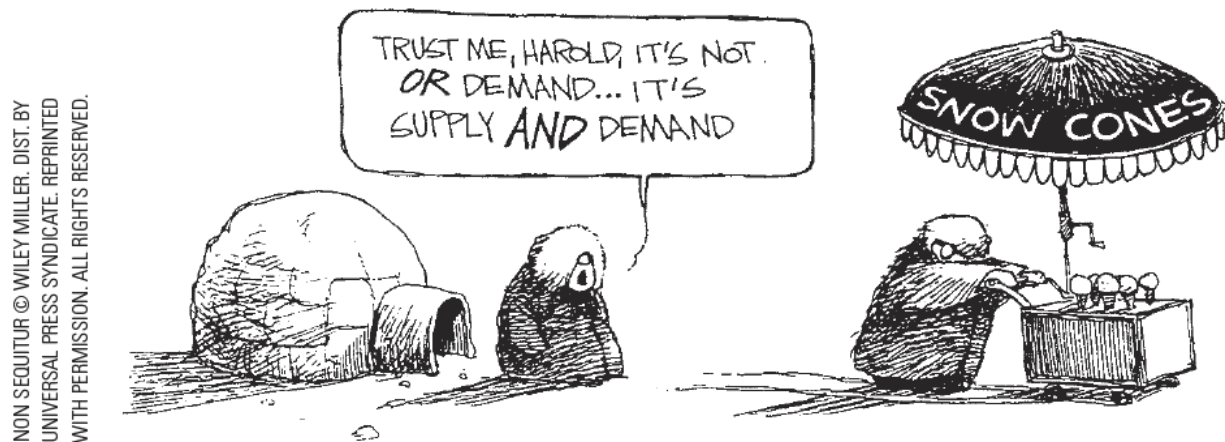


Facing a shortage,  
sellers **raise the price**,

- Causing  $Q^D$  to fall (move upward along D curve)
- and  $Q^S$  to rise (move upward along S curve),
- ...which reduces the shortage.
- And so on... **until market reaches equilibrium**

# The Law of Supply and Demand

- The law of supply and demand:
  - The price of any good adjusts to bring the quantity supplied and the quantity demanded of that good into balance.
- Once the market reaches equilibrium
  - There is no further upward or downward pressure on the price.

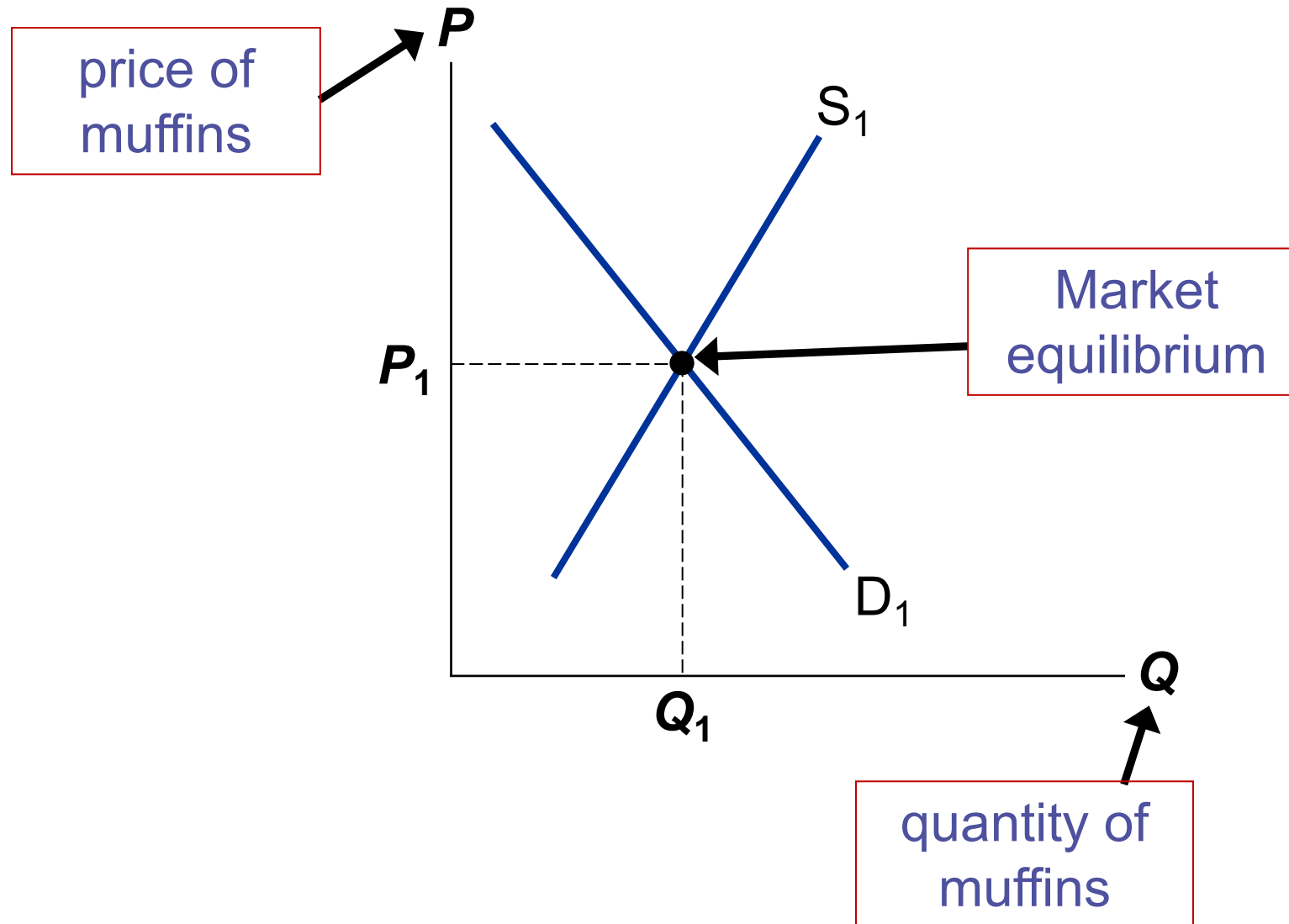


# Supply and Demand Together

## 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(s) 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 3: The market for muffins



## EXAMPLE 3A: A shift in demand

**EVENT A:** Increase in the price of doughnuts.

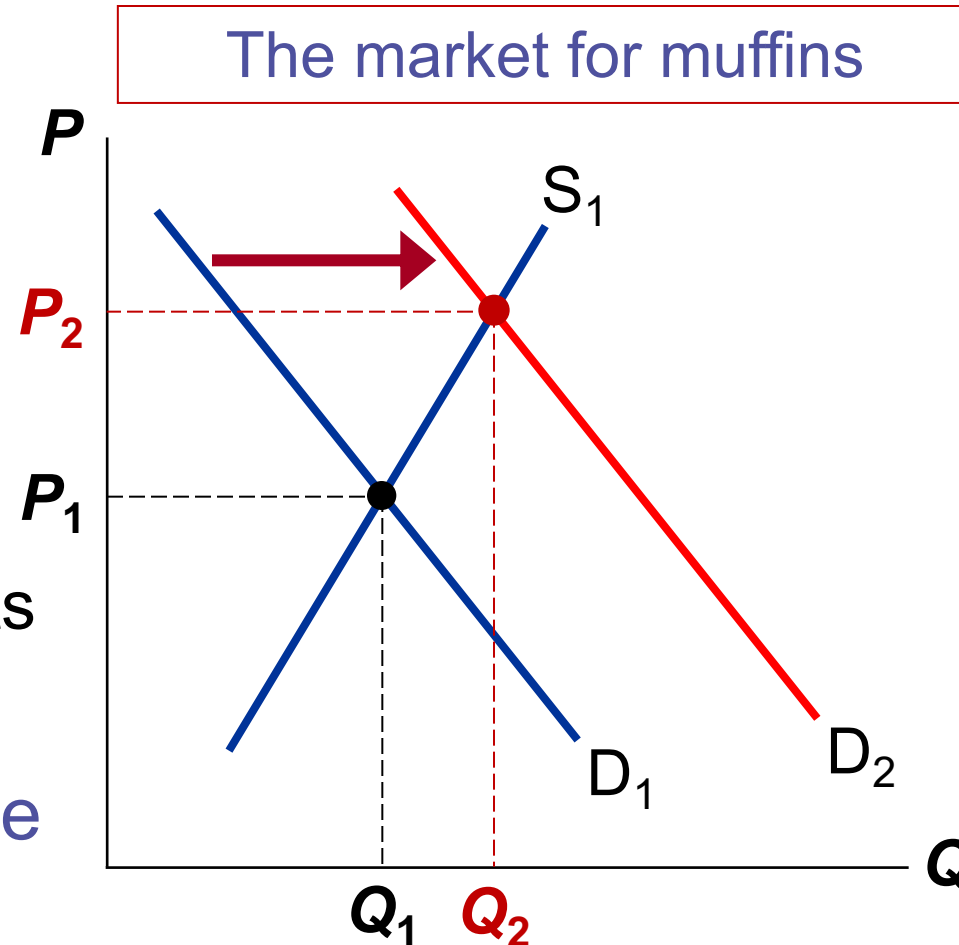
**STEP 1:** *D* curve shifts

- muffins and doughnuts are substitutes.

**STEP 2:** *D* shifts right

- Consumers will buy fewer expensive doughnuts and switch to muffins.

**STEP 3:** Increase in price and quantity of muffins.



## EXAMPLE 3B: A shift in supply

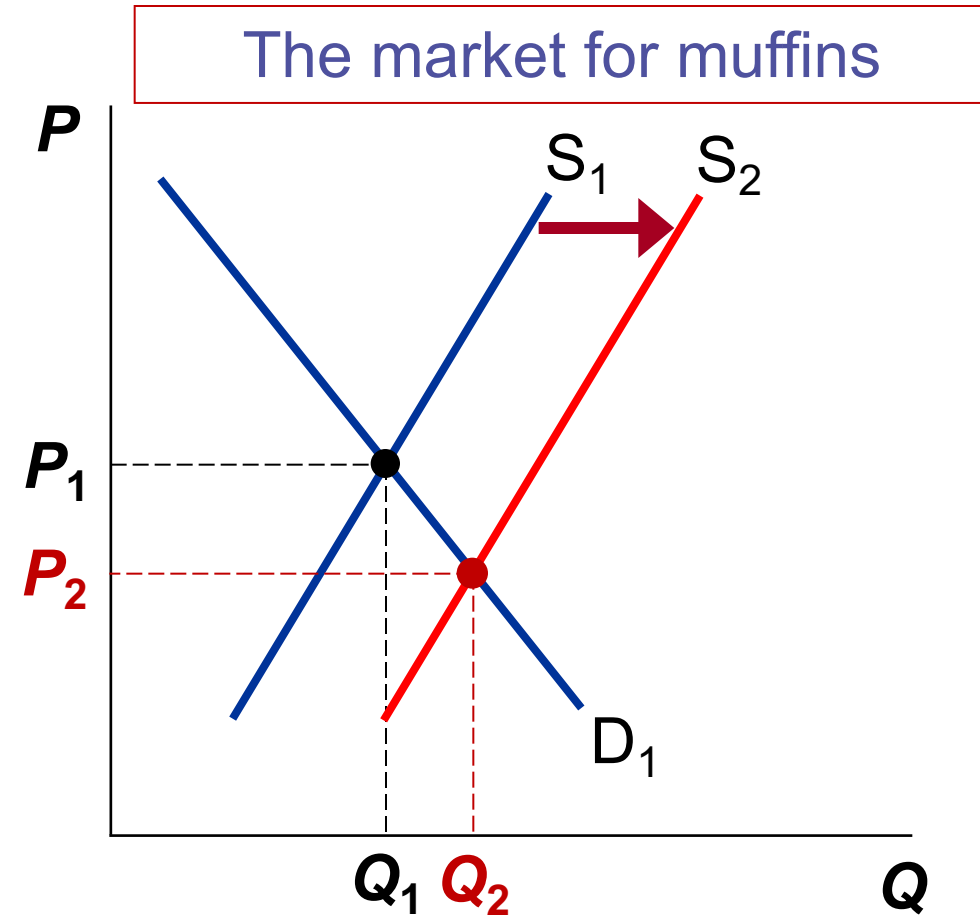
**EVENT B:** New technology of producing muffins.

**STEP 1:** **S** curve shifts

- because new technology reduces production costs

**STEP 2:** **S** shifts right

- because lower production cost makes production more profitable at any given price.



**STEP 3:** Decrease in price and increase in quantity

## EXAMPLE 3C: A shift in both $S$ and $D - 1$

**EVENTS:** Price of doughnuts rises **AND** new technology reduces production costs.

**STEP 1:** Both curves shift.  $P$

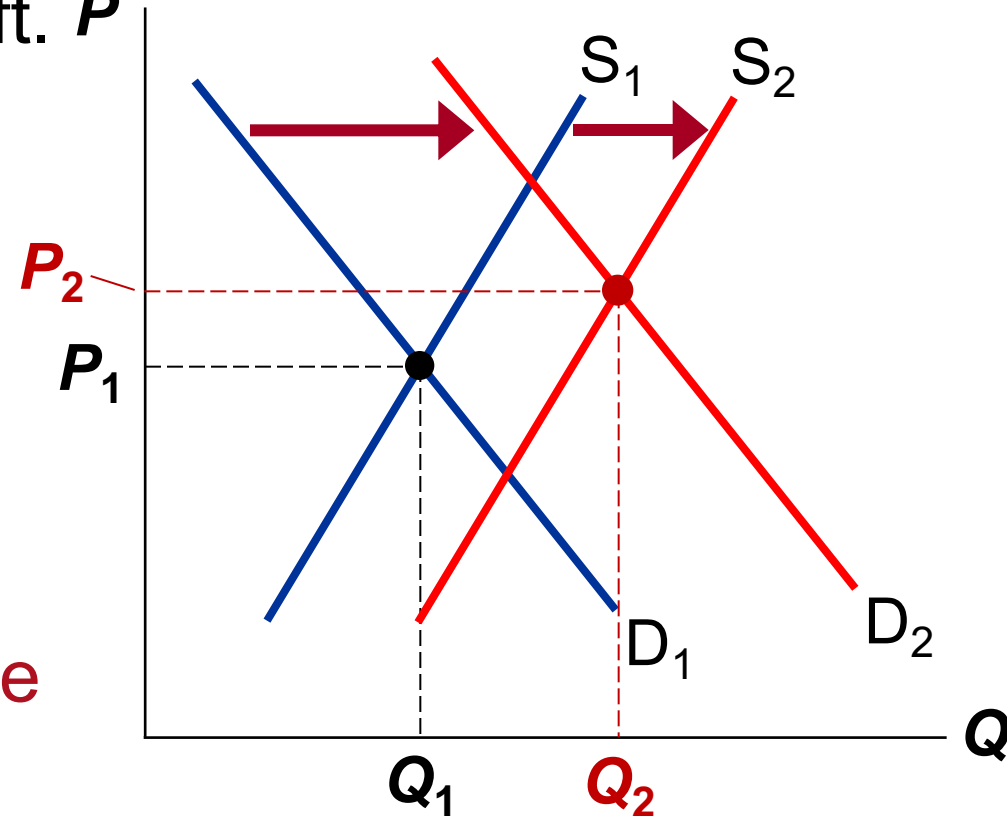
**STEP 2:** Both shift  
to the right.

**STEP 3:**

$Q$  rises but the effect  
on  $P$  is ambiguous:

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

The market for muffins



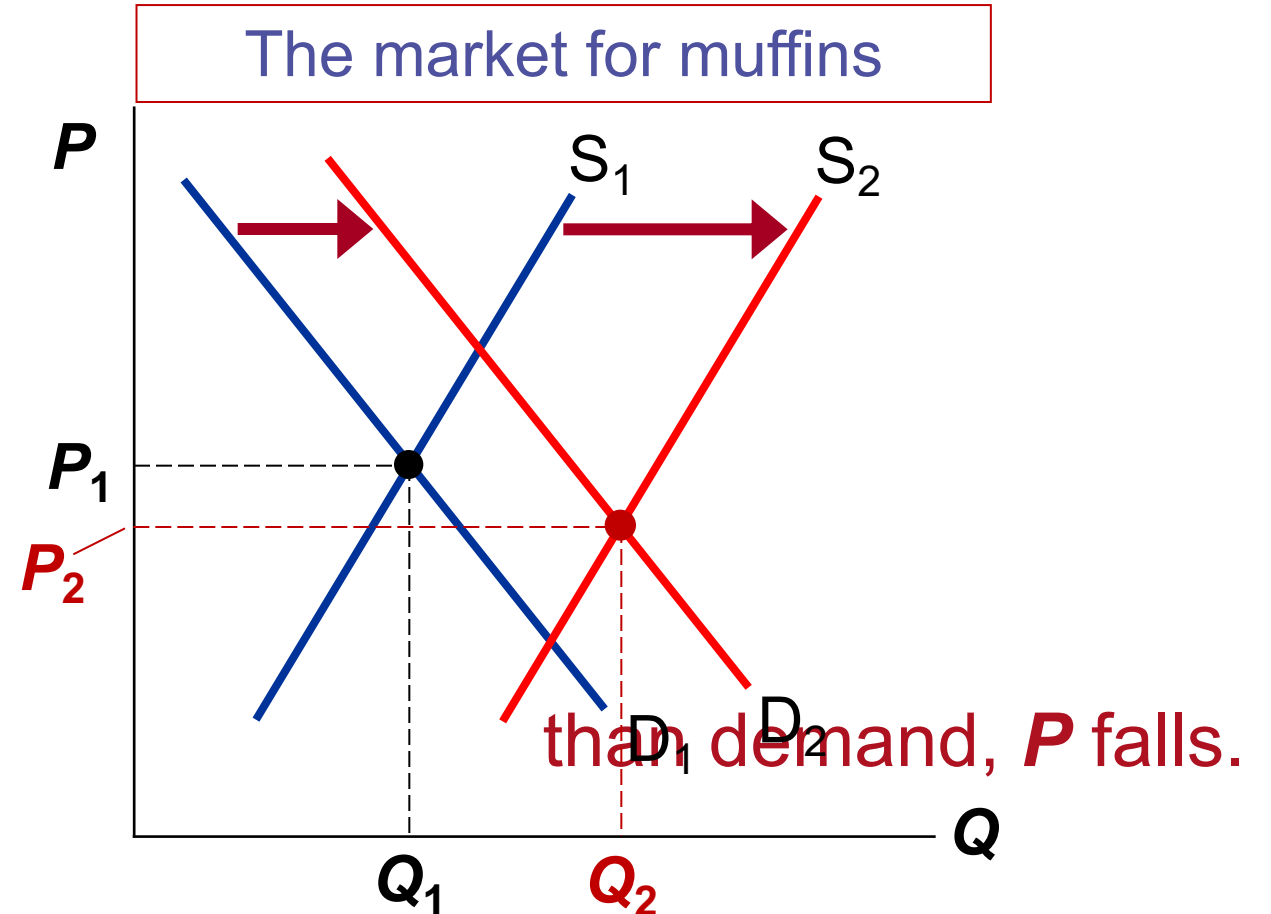


## EXAMPLE 3C: A Shift in Both $S$ and $D$ – 2

**EVENTS:** Price of doughnuts rises **AND** new technology reduces production costs

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

If supply increases more



# 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

## 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 orange juice.

**Event A:** A fall in the price of apple juice

**Event B:** The price of oranges declines because of an abundant orange crop.

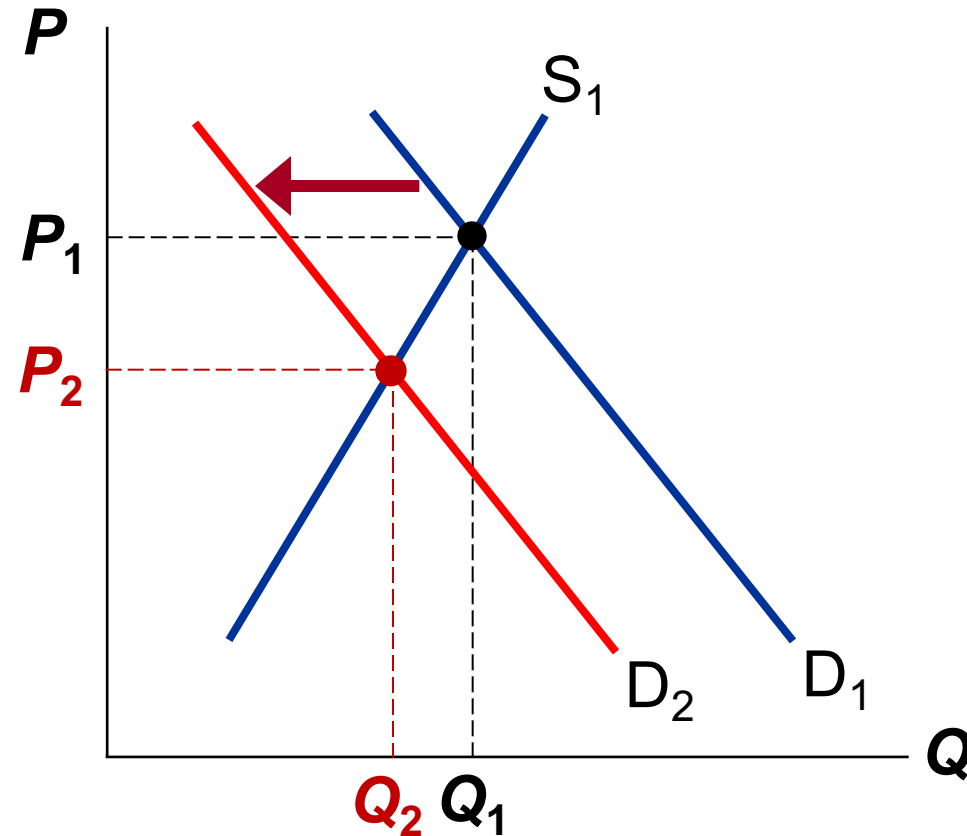
**Event C:** Events A and B both occur simultaneously.

# Active Learning 3A: A fall in price of apple juice

## STEPS:

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

### The market for orange juice

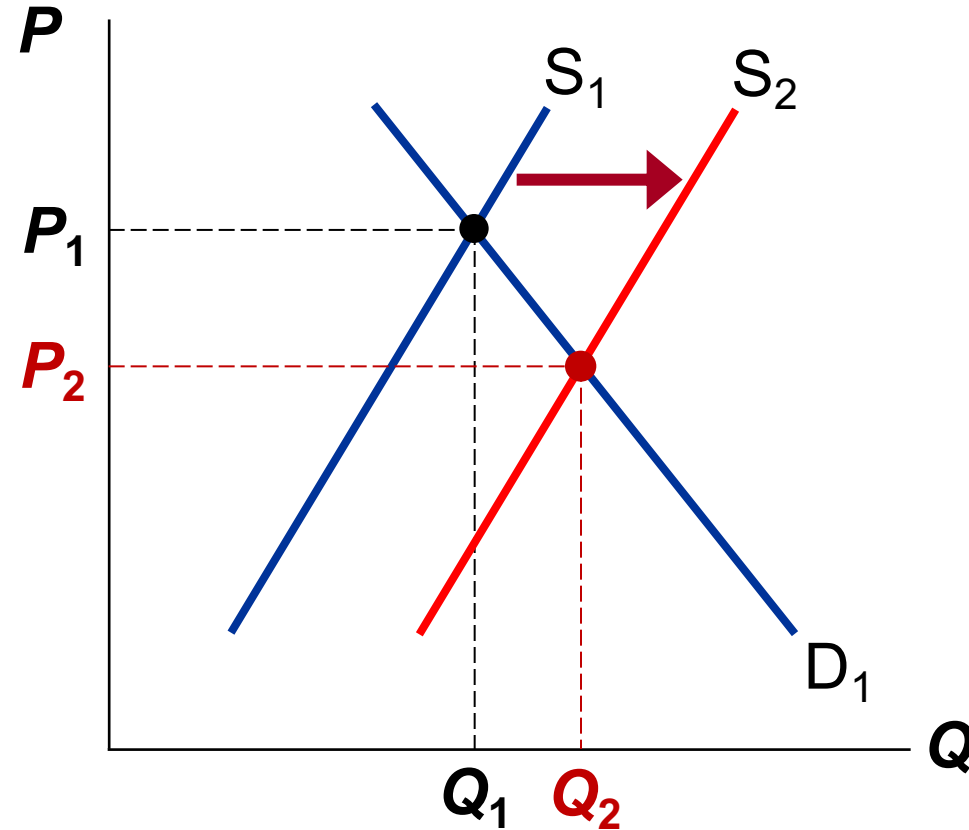


# Active Learning 3B: Fall in the price of oranges

## STEPS:

1. **S** curve shifts
2. **S** curve shifts right
3. **P** falls, **Q** rises

### The market for orange juice

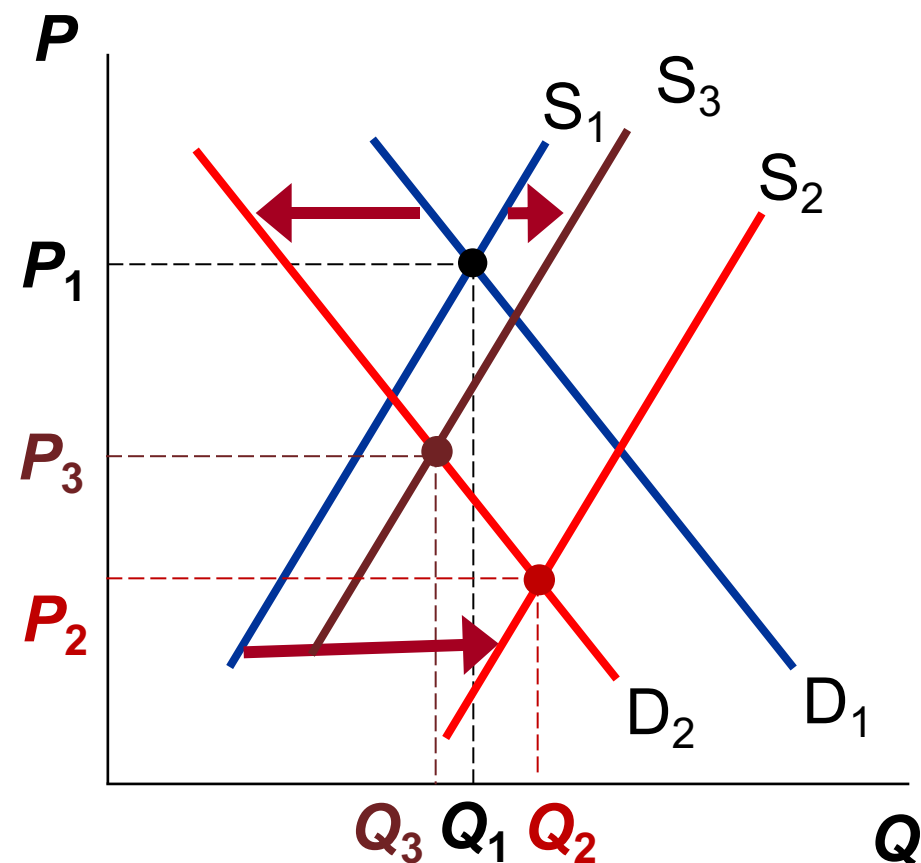


# Active Learning 3C: Events A and B together

## 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**.

## The market for orange juice



# What happens to $P$ and $Q$ When $S$ or $D$ Shifts?

|                       | No Change in Supply  | An Increase in Supply     | A Decrease in Supply      |
|-----------------------|----------------------|---------------------------|---------------------------|
| No Change in Demand   | $P$ same<br>$Q$ same | $P$ down<br>$Q$ up        | $P$ up<br>$Q$ down        |
| An Increase in Demand | $P$ up<br>$Q$ up     | $P$ ambiguous<br>$Q$ up   | $P$ up<br>$Q$ ambiguous   |
| A Decrease in Demand  | $P$ down<br>$Q$ down | $P$ down<br>$Q$ ambiguous | $P$ ambiguous<br>$Q$ down |



## THINK-PAIR-SHARE

You are watching a national news broadcast. It is reported that a typhoon is heading for the Washington coast and that it will likely destroy much of this year's apple crop. Your roommate says, "This is not going to affect me, I don't eat apples, I only drink pineapple smoothies."

- A. As an eager economics student, what's your response going to be? Explain.
- B. What other markets will be impacted by the destroyed apple crop? How?



# CHAPTER IN A NUTSHELL

- Economists use the model of supply and demand to analyze competitive markets.
  - Many buyers and sellers, all are price takers
- The demand curve for a good shows how the quantity 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

# CHAPTER IN A NUTSHELL

- The supply curve for a good shows how the quantity 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 represents the market equilibrium.
  - At the equilibrium price, quantity demanded = quantity supplied

# CHAPTER IN A NUTSHELL

- The behavior of buyers and sellers naturally drives markets toward 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.

# CHAPTER IN A NUTSHELL

- To analyze how any event influences the equilibrium price and quantity in a market, use a supply-and demand diagram and follow these three steps.
  1. Decide if the event shifts the supply curve or the demand curve (or both).
  2. Decide in which direction the curve(s) shifts.
  3. Compare the new equilibrium with the initial one.

# CHAPTER IN A NUTSHELL

- In market economies, prices are the signals that guide decisions and allocate scarce resources.
  - The price ensures that supply and demand are in balance.
  - The equilibrium price determines how much buyers choose to consume and how much sellers choose to produce.