

# CHAPTER 3

## Demand, Supply and Market Equilibrium

*PowerPoint Presentation Prepared by:  
Adian McFarlane, King's University College at  
Western University*

Edit: Rashed Ahmed

Seventeenth Canadian Edition

## MICROECONOMICS



McCONNELL FLYNN BRUE BARBIERO ESLAMI

## LEARNING OBJECTIVES

**LO3.1** Characterize and give examples of markets.

**LO3.2** Describe demand and explain how it can change.

**LO3.3** Describe supply and explain how it can change.

**LO3.4** Explain how supply and demand interact to determine market equilibrium.

**LO3.5** Explain how changes in supply and demand affect equilibrium prices and quantities.

**LO3.6** Define government-set prices and explain how they can cause surpluses and shortages.

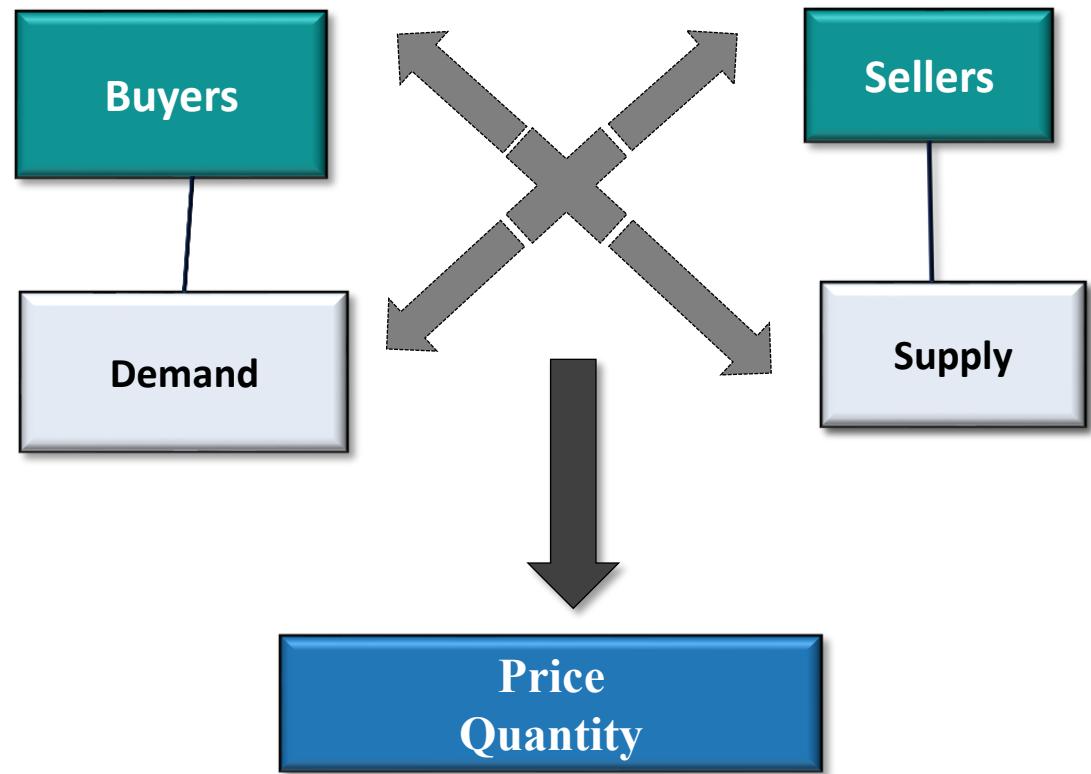
# INTRODUCTION

- The supply and demand model is regarded as the most significant contribution of economics, essential for understanding how markets function.
- It provides insights into the operation of markets, which are crucial for the production and consumption of goods and services.
- This model is the primary tool for explaining and analyzing economic decision-making processes.
- The chapter outlines the mechanics of the model and how it determines market prices and quantities.

## 3.1 MARKETS

### Interaction between buyers and sellers

- Markets may be:
  - Local, National, & International
- Price is determined through buyer-seller interactions in voluntary trade, setting the price and quantity exchanged.
- Competitive markets: large numbers of buyers and sellers acting independently.

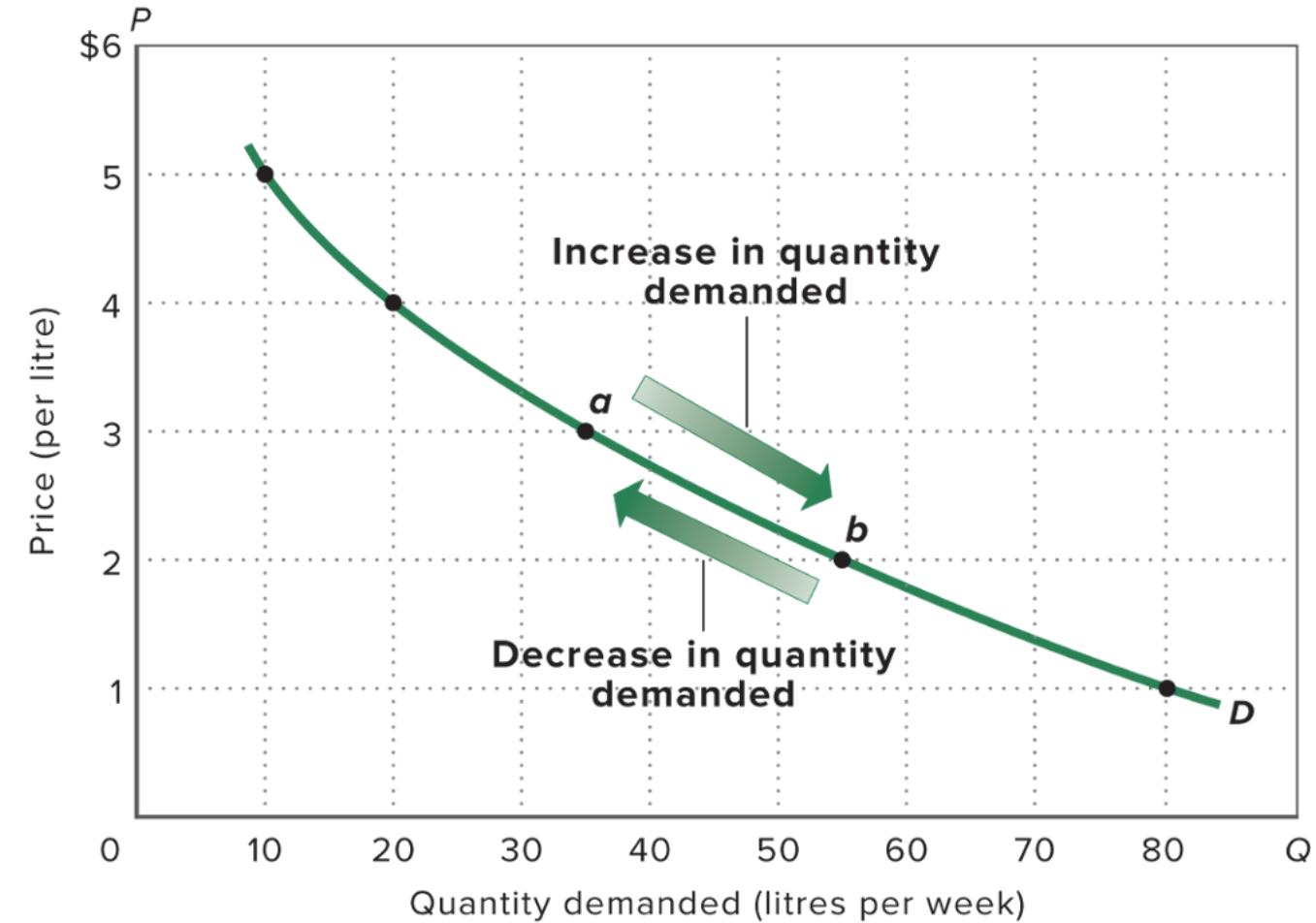


## 3.2 DEMAND 1/8

- A schedule or curve that shows the various amounts of a product that consumers are willing and able to purchase at each of a series of possible prices during specified periods.
- Demand Schedule (table) or Demand Curve (graph)
  - Plots the amount consumers are willing and able to purchase at a given price:
    - During a specified period with other things equal.
- Individual demand and Market demand

# FIGURE 3-1 An Individual Buyer's Demand for Gasoline

Price per litre	Quantity demanded (litres per week)
\$5	10
\$4	20
\$3	35
\$2	55
\$1	80



## 3.2 DEMAND 2/8

- Demand reflects willingness and the ability to purchase; willingness alone is insufficient in the market.
- Figure 3-1 shows how different gasoline prices affect the quantity a consumer is willing and able to buy.
- Demand must be expressed with reference to a specific time period to be meaningful.
- The actual market price of gasoline depends on the interaction of demand and supply.

### Law of Demand

- All else equal, as price decreases, the quantity demanded increases, and as price increases, the quantity demanded decreases, showing an inverse relationship between price and demand.
- The other-things-equal assumption is crucial; factors like the prices of competing products must remain constant to assess the demand for a specific product accurately.

### Law of Demand

- The inverse relationship is due to common sense, diminishing marginal utility, and the idea that higher prices deter purchases while lower prices encourage them.
- Income and Substitution Effects: A lower price increases purchasing power (income effect) and makes the product more attractive than others (substitution effect), leading to higher demand.

### The Demand Curve

- The inverse relationship between price and quantity demanded is shown in Figure 3-2.
- Quantity demanded on the horizontal axis and price on the vertical axis.
- The downward slope reflects the law of demand.
- The demand curve is the marginal benefit curve.

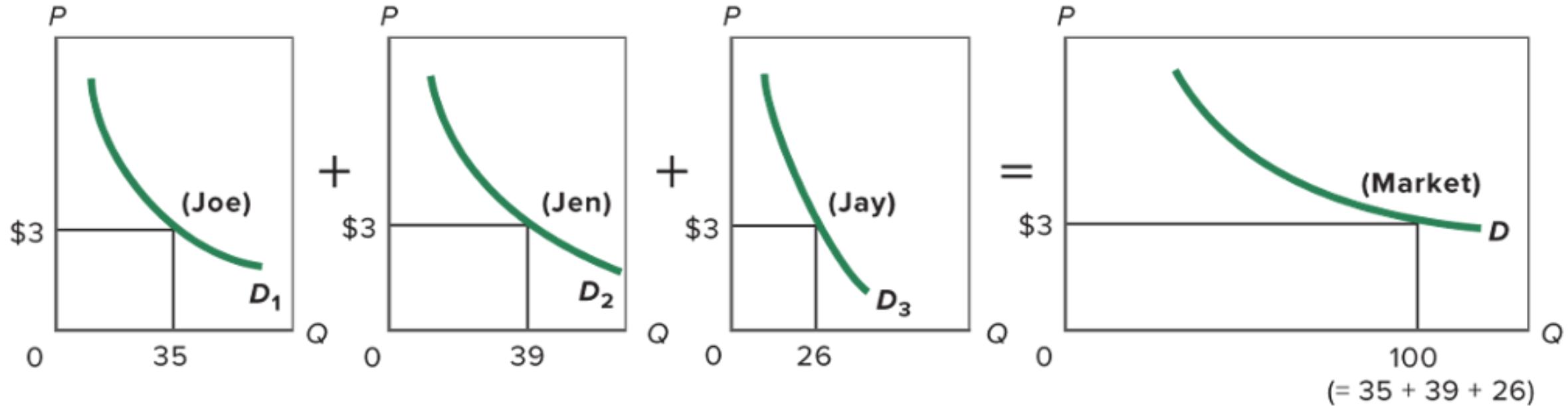
## FIGURE 3-2 Market Demand for Gasoline, Three Buyers 1/2

The horizontal summation of the individual demand curves

Price per litre	<u>Quantity Demanded</u>			Total Quantity demanded per week
	Joe	Jen	Jay	
\$5	10	+ 12	+ 8	= 30
4	20	+ 23	+ 17	= 60
3	35	+ 39	+ 26	= 100
2	55	+ 60	+ 39	= 154
1	80	+ 87	+ 54	= 221

## FIGURE 3-2 Market Demand for Gasoline, Three Buyers 2/2

For example, at \$3, the three individual curves yield a total quantity demanded of 100 litres ( $=35+39+26$ ).



### Determinants of Demand

1. Change in consumer tastes and preferences
2. Change in the number of buyers
3. Change in income
  - **Normal goods**
  - **Inferior goods**

### Determinants of Demand

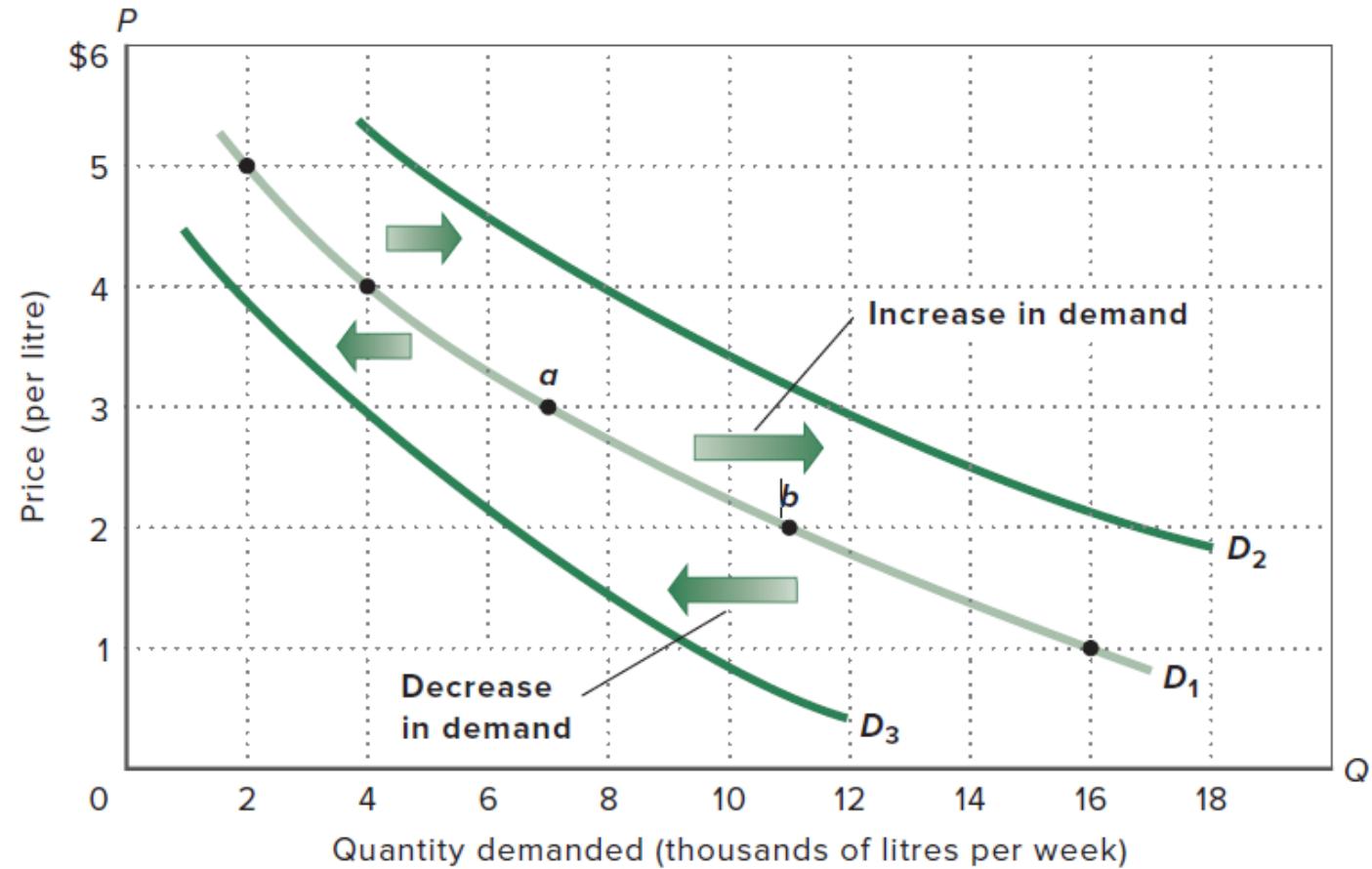
4. Change in prices of related goods
  - Complementary good
  - Substitute good
5. Change in consumers' expectations
  - Future prices
  - Future income

## FIGURE 3-3 Changes in the Demand for Gasoline 1/2

MARKET DEMAND FOR GASOLINE, 200 BUYERS, $D_1$	
(1)	(2)
Price per litre	Total quantity demanded per week
\$5	2,000
4	4,000
3	7,000
2	11,000
1	16,000

## FIGURE 3-3 Changes in the Demand for Gasoline 2/2

- Changes in demand happen when key factors change, shifting the demand curve right (increase) or left (decrease).
- An increase shifts the demand curve right, while a decrease shifts it left.
- Quantity demanded changes with price, shown as movement along a fixed demand curve (e.g., **a** to **b**), not a shift.



## Table 3-1 Determinants of Demand Curve Shifts 1/3

Determinant	Examples
Change in buyer tastes	<ul style="list-style-type: none"><li>■ Physical fitness rises in popularity;</li><li>■ increasing the demand for jogging shoes and bicycles;</li><li>■ smartphone popularity rises, reducing the demand for desktop and laptop computers;</li><li>■ vegetarianism increases in popularity, raising the demand for non-meat “impossible” burgers.</li></ul>

## Table 3-1 Determinants of Demand Curve Shifts 1/3

Determinant	Examples
Change in the number of buyers	<ul style="list-style-type: none"><li>■ A decline in the birth rate reduces the demand for children's toys;</li><li>■ an additional 600 million people on WhatsApp makes it a more attractive communications network;</li><li>■ the migration of Newfoundlanders to Ontario increases the demand for housing in Toronto</li></ul>

## Table 3-1 Determinants of Demand Curve Shifts 2/3

Determinant	Examples
Change in income	<ul style="list-style-type: none"><li>▪ A rise in incomes increases the demand for such normal goods as restaurant meals, sports tickets, and smartphones,</li><li>▪ while reducing the demand for such inferior goods as turnips, bus passes, and inexpensive wine.</li></ul>
Change in the prices of related goods	<ul style="list-style-type: none"><li>▪ A reduction in airfares reduces the demand for train transportation (substitute goods);</li><li>▪ a decline in the price of printers increases the demand for ink cartridges (complementary goods).</li></ul>

## Table 3-1 Determinants of Demand Curve Shifts 3/3

Determinant	Examples
Change in consumer expectations	<ul style="list-style-type: none"><li>▪ Inclement weather in South America creates an expectation of higher future coffee bean prices, increasing today's demand for coffee beans;</li><li>▪ the expectation that other consumers will rush to buy toilet paper next week as a hurricane approaches causes many consumers to increase their purchases of toilet paper this week.</li></ul>

### Changes in Quantity Demanded

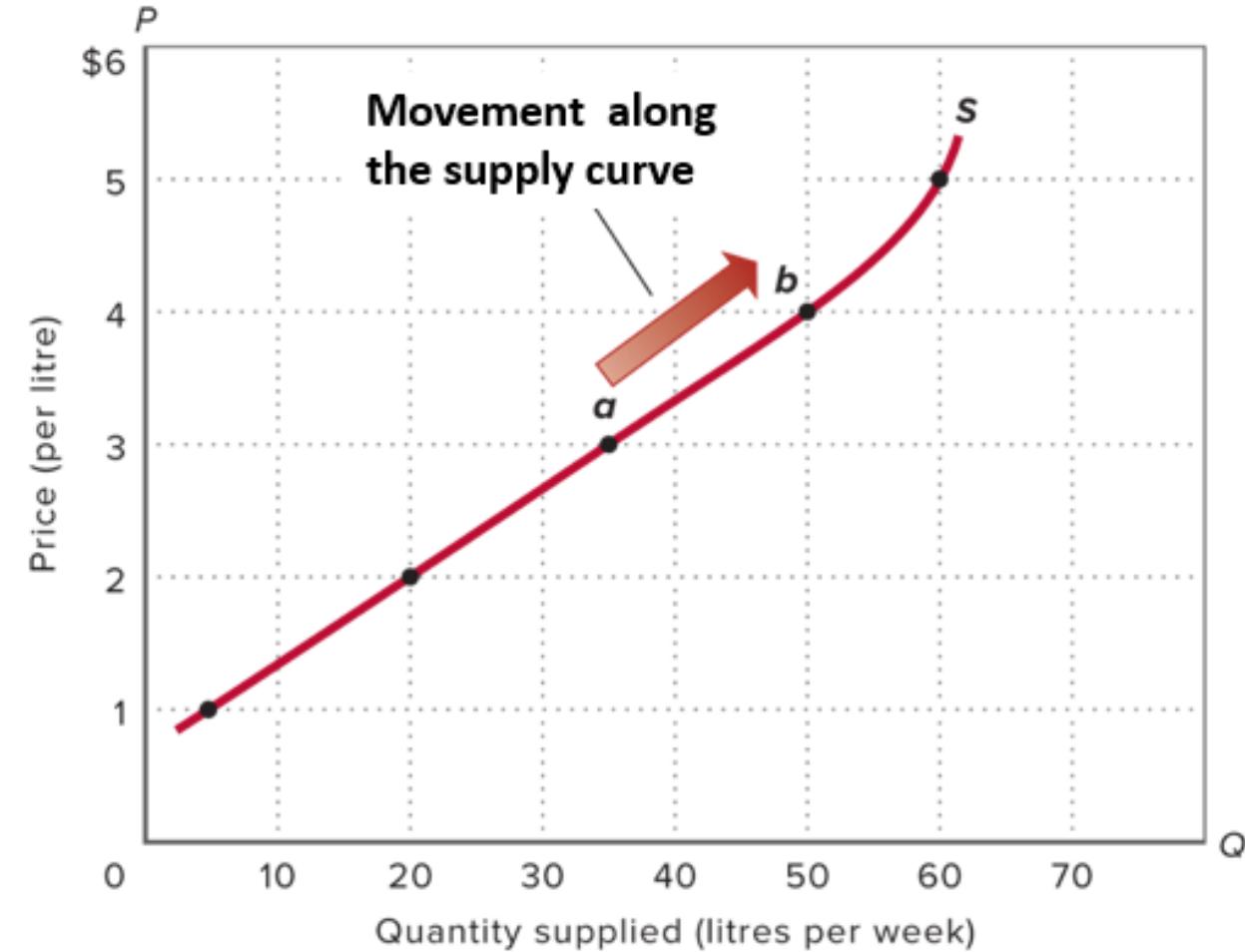
- A change in demand shifts the entire curve, while a change in quantity demanded moves along the curve due to price changes.
- Demand increases shift the curve right; decreases shift it left, driven by changes in demand factors.
- Price changes move the quantity demanded along the curve without altering the curve itself.

### 3.3 SUPPLY 1/5

- A schedule or curve that shows the various amounts of a product that producers are willing and able to make available for sale at each of a series of possible prices during a specified period of time.
- Individual supply
- Market supply

## FIGURE 3-4 An Individual Producer's Supply of Gasoline

Price per litre	Quantity supplied (litres per week)
\$5	60
4	50
3	35
2	20
1	5



### Law of supply

- As prices rise, the quantity supplied increases; as prices fall, the quantity supplied decreases.
- Higher prices encourage producers to supply more due to increased revenue and cost coverage.
- Marginal Costs: Rising production leads to higher marginal costs, requiring higher prices to justify additional output.

## Market Supply

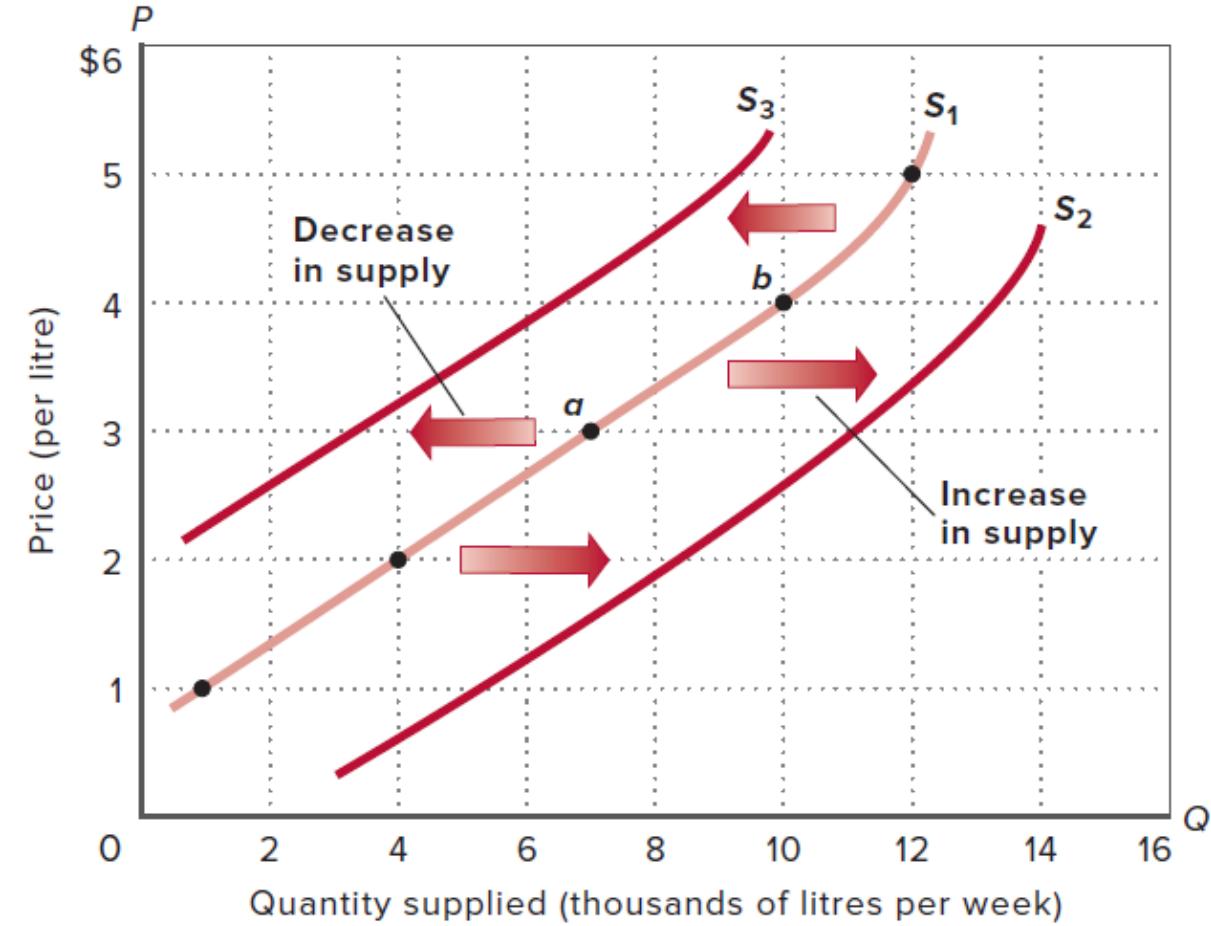
- Market supply is obtained by summing the quantities supplied by each producer at each price, horizontally adding their supply curves.
- The table 3-5 illustrates the market supply for 200 identical producers, each following the supply schedule in Figure 3-4.

## Table 3-5 Changes in the Supply of Gasoline 1/2

MARKET SUPPLY OF GASOLINE, 200 PRODUCERS, $S_1$	
(1)	(2)
Price per litre	Total quantity supplied per week
\$ 5	12,000
4	10,000
3	7,000
2	4,000
1	1,000

## FIGURE 3-5 Changes in the Supply of Gasoline 2/2

- Changes in supply determinants cause the supply curve to shift; an increase shifts it right, and a decrease shifts it left.
- A rightward shift indicates an increase in supply, while a leftward shift indicates a decrease.
- A change in quantity supplied results from a price change and is shown as movement along the supply curve, as in from **a** to **b**, on  $S_1$ .



## Determinants of supply

1. A change in factor prices
2. A change in technology
3. A change in taxes and subsidies
4. A change in prices of other goods
5. A change in producer expectations
6. A change in the number of sellers

## Table 3-2 Determinants of Supply Curve Shifts 1/3

Determinant	Examples
Change in factor prices	<ul style="list-style-type: none"><li>■ A decrease in the price of microchips increases the supply of computers;</li><li>■ an increase in the price of crude oil reduces the supply of gasoline.</li></ul>
Change in technology	<ul style="list-style-type: none"><li>■ The development of lower-cost space-launch technology increases the supply of satellite broadband;</li><li>■ improvements in artificial intelligence increase the supply of customer-service chatbots.</li></ul>

## Table 3-2 Determinants of Supply Curve Shifts 2/3

Determinant	Examples
Change in taxes and subsidies	<ul style="list-style-type: none"><li>An increase in the sales tax on cigarettes reduces the supply of cigarettes;</li><li>a decline in subsidies to colleges and universities reduces the supply of higher education;</li><li>tax credits (subsidies) for childcare increase the number of daycare centers;</li><li>a tax on indoor tanning reduces the number of tanning salons.</li></ul>

## Table 3-2 Determinants of Supply Curve Shifts 2/3

Determinant	Examples
Change in prices of other goods	<ul style="list-style-type: none"><li>An increase in the price of cucumbers decreases the supply of watermelons;</li><li>an increase in the price of alcohol-based hand sanitizers causes a decrease in the supply of gin.</li></ul>

## Table 3-2 Determinants of Supply Curve Shifts 3/3

Determinant	Examples
Change in producer expectations	<ul style="list-style-type: none"><li>An expectation of a substantial rise in future lumber prices decreases the supply of logs today;</li><li>the belief that gasoline prices will fall next year increases the supply of oil this year.</li></ul>
Change in number of suppliers	<ul style="list-style-type: none"><li>An increase in the number of tattoo parlours increases the supply of tattoos;</li><li>the formation of women's professional basketball leagues increases the supply of women's professional basketball games.</li></ul>

## Supply Shifters and Shift in Supply Curve

- E.g., A change in factor prices

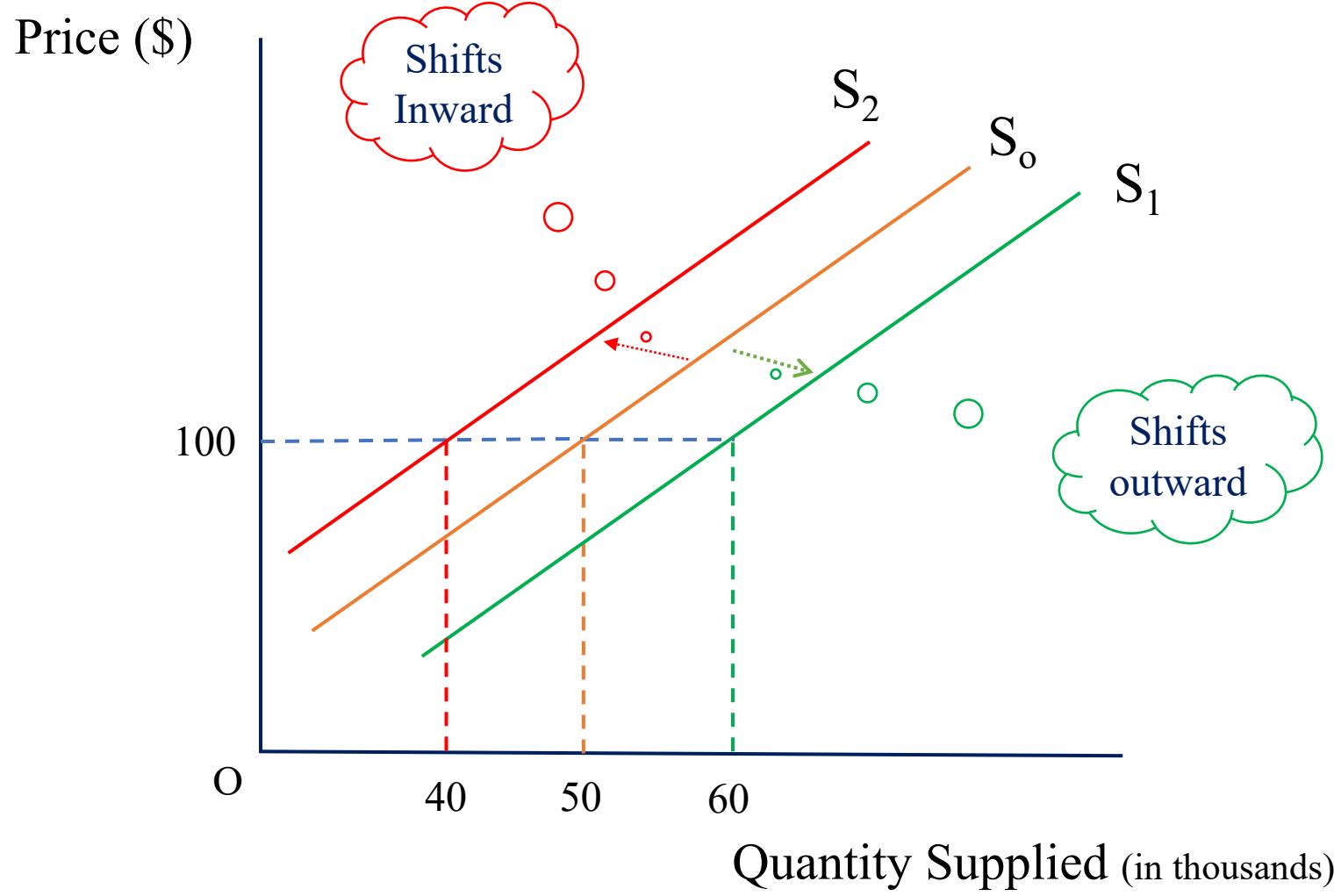


Figure: Shift in Supply Curve

# Supply Shifters and Shift in Supply Curve

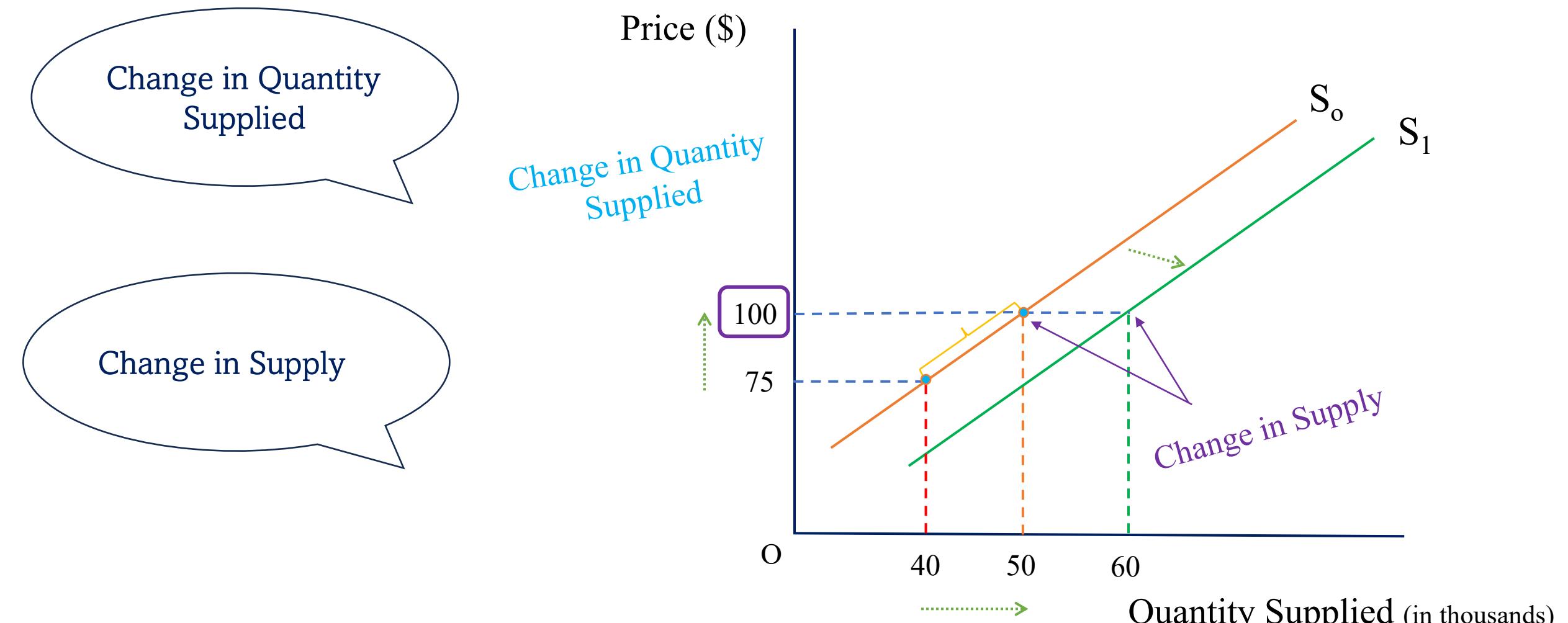


Figure: Shift in Supply Curve

### Changes in Quantity Supplied

- A change in supply shifts the entire curve due to changing determinants, while a change in quantity supplied is movement along the curve due to price changes.
- Supply increases shift the curve right, decreases shift it left, reflecting changes in the supply schedule.
- Price changes cause movement along the supply curve, altering the quantity supplied but not the overall supply schedule.

## 3.4 MARKET EQUILIBRIUM 1/5

- The interaction of demand and supply determines the price and quantity of gasoline.
- The table in Figure 3-6 combines supply data from Figure 3-5 and demand data from Figure 3-3.
- In this competitive market, neither buyers nor sellers can control the price independently.

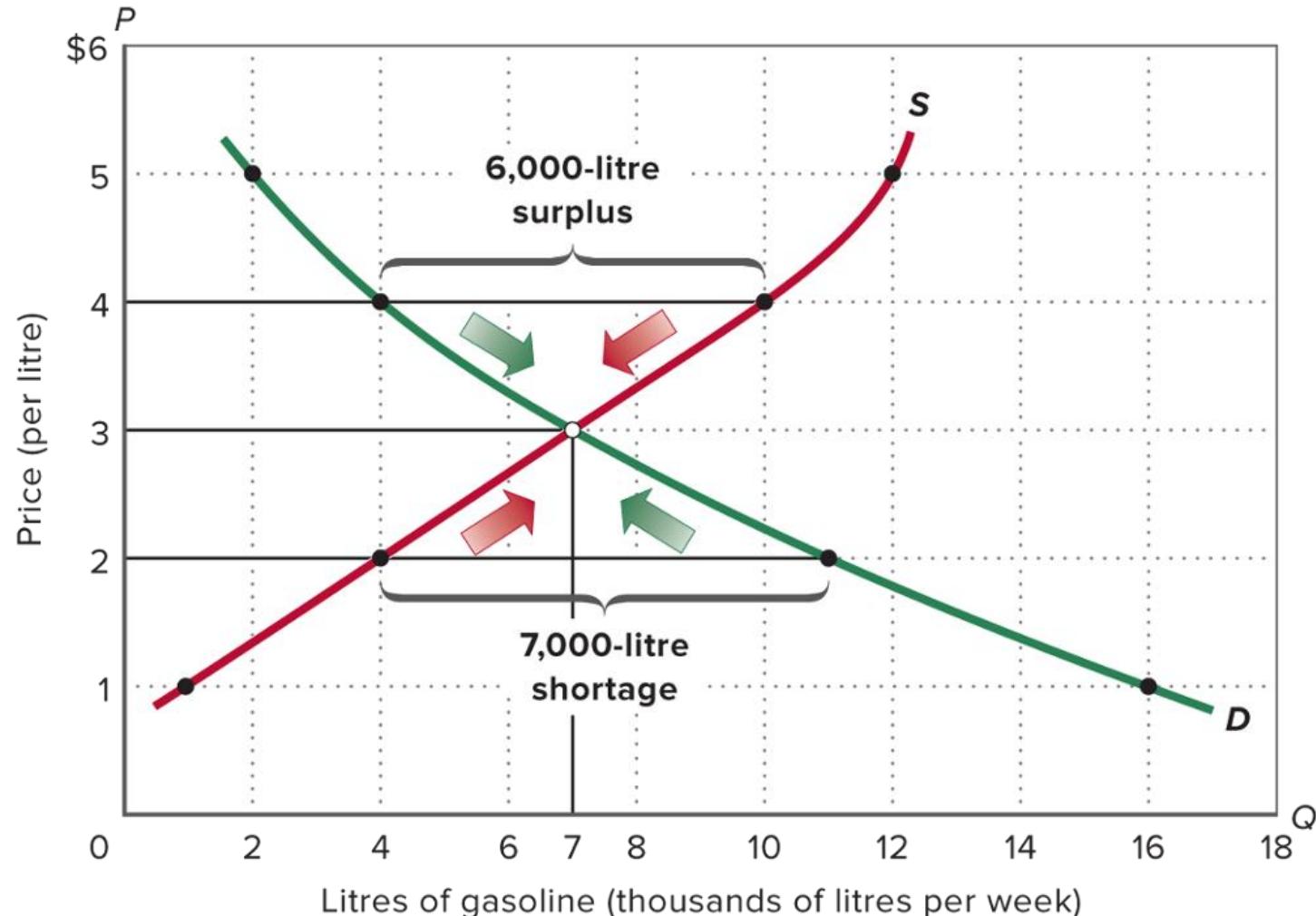
## 3.4 MARKET EQUILIBRIUM 2/5

### Equilibrium Price and Quantity

- The equilibrium price is where quantity demanded equals quantity supplied, matching the intentions of buyers and sellers.
- At \$3 per litre and 7,000 litres, the market is in balance, with no shortage or surplus, making 7,000 litres the equilibrium quantity.
- The equilibrium price is shown where the supply and demand curves intersect in Figure 3-6, indicating a balanced market.

## FIGURE 3-6 Equilibrium Price and Quantity 1/2

- The supply and demand curves intersection sets the equilibrium price at \$3 and quantity at 7,000 litres.
- Prices below equilibrium cause shortages, raising prices until equilibrium is restored.
- Prices above equilibrium create surpluses, lowering prices until the market reaches equilibrium.



## FIGURE 3-6 Equilibrium Price and Quantity 2/2

(1) Total quantity supplied per week	(2) Price per litre	(3) Total quantity demanded per week	(4) Surplus (+) or shortage (-)
12,000	\$5	2,000	+10,000↓
10,000	4	4,000	+6,000↓
7,000	3	7,000	0
4,000	2	11,000	-7,000↑
1,000	1	16,000	-15,000↑

### Rationing Function of Prices

- The ability of the forces of supply and demand to establish a price at which selling and buying decisions are consistent.
  - At the \$3 equilibrium price, there's neither surplus nor shortage, ensuring the market clears efficiently.
  - Only buyers and sellers willing to transact at \$3 participate, while others are excluded, ensuring market efficiency.

## 3.4 MARKET EQUILIBRIUM 4/5

### Efficient Allocation

- Competitive markets ration goods to consumers and allocate resources efficiently, ensuring production at the lowest cost.
- **Productive Efficiency:** Competition forces producers to use optimal technology and resources, minimizing costs and maximizing the availability of resources for other goods.

## 3.4 MARKET EQUILIBRIUM 5/5

### Efficient Allocation

- **Allocative Efficiency:** Markets ensure resources are used to produce goods and services most valued by society, reflecting societal preferences. Competitive markets allocate resources efficiently across various sectors, avoiding over-concentration in any product or service.

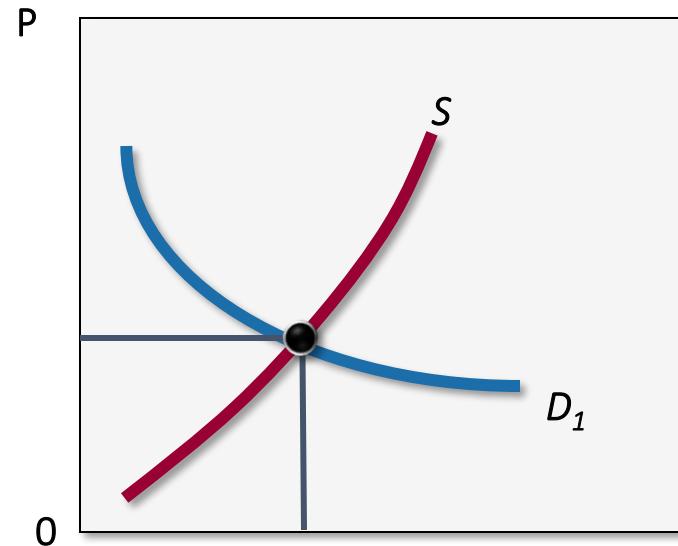
## 3.5 CHANGES IN SUPPLY, DEMAND AND EQUILIBRIUM 1/5

### Changes in Demand

- If the supply of a good is constant and its demand increases,
  - equilibrium price increases, and equilibrium quantity increases.
- If the supply of a good is constant and its demand decreases,
  - equilibrium price decreases, and equilibrium quantity decreases.

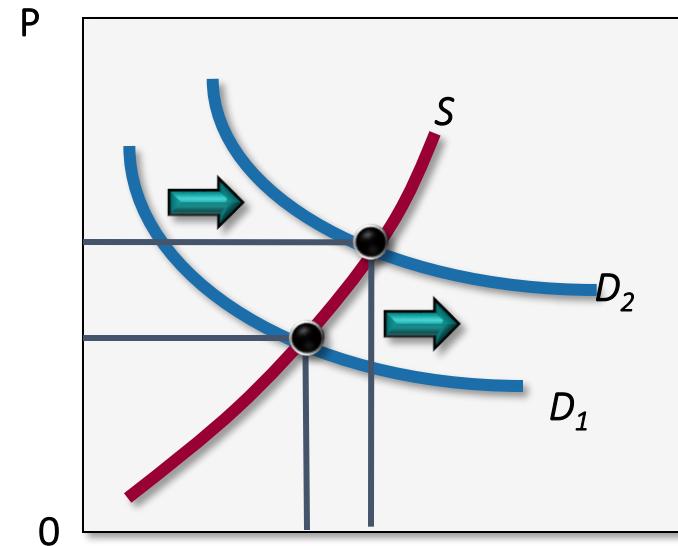
## FIGURE 3-7 Changes in Demand and Supply, and the Effects on Price and Quantity 1/12

(a) Increase in demand



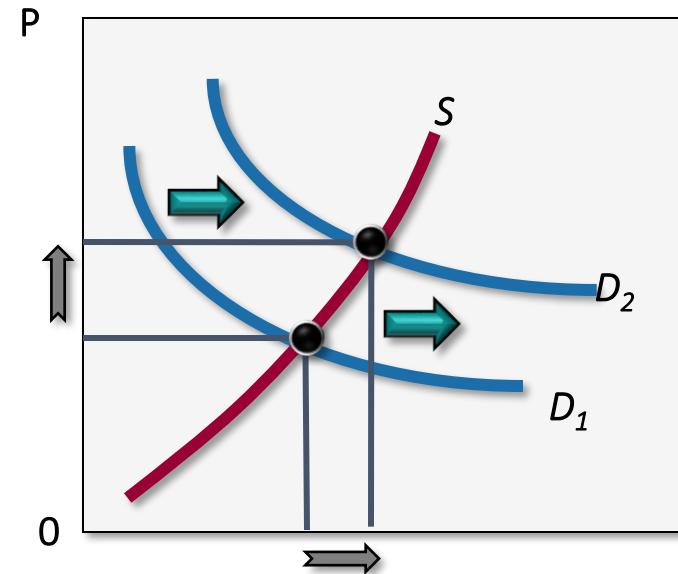
## FIGURE 3-7 Changes in Demand and Supply, and the Effects on Price and Quantity 2/12

(a) Increase in demand



## FIGURE 3-7 Changes in Demand and Supply, and the Effects on Price and Quantity 3/12

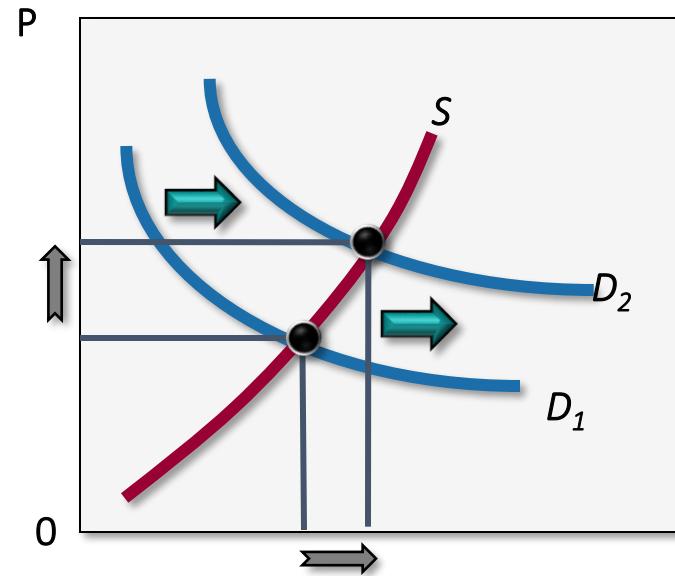
(a) Increase in demand



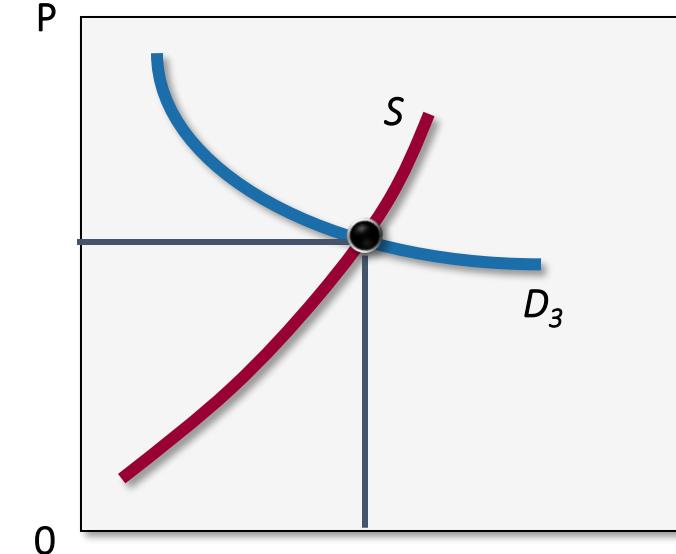
D increase:  
 $P \uparrow, Q \uparrow$

## FIGURE 3-7 Changes in Demand and Supply, and the Effects on Price and Quantity 4/12

(a) Increase in demand



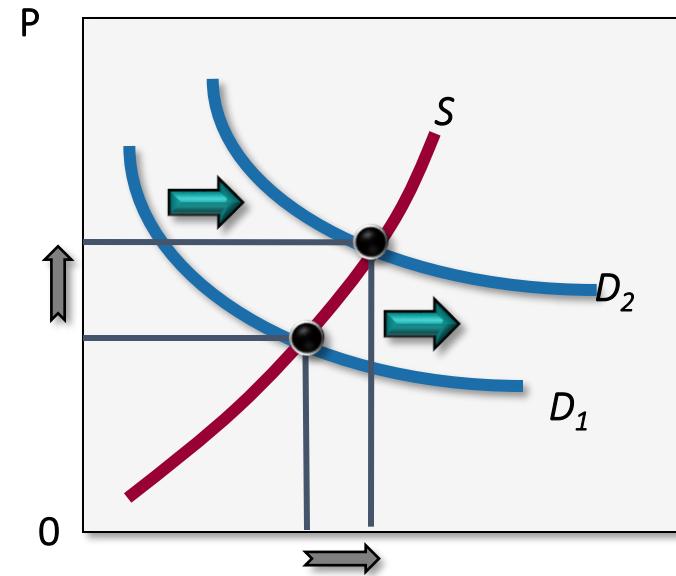
(b) Decrease in demand



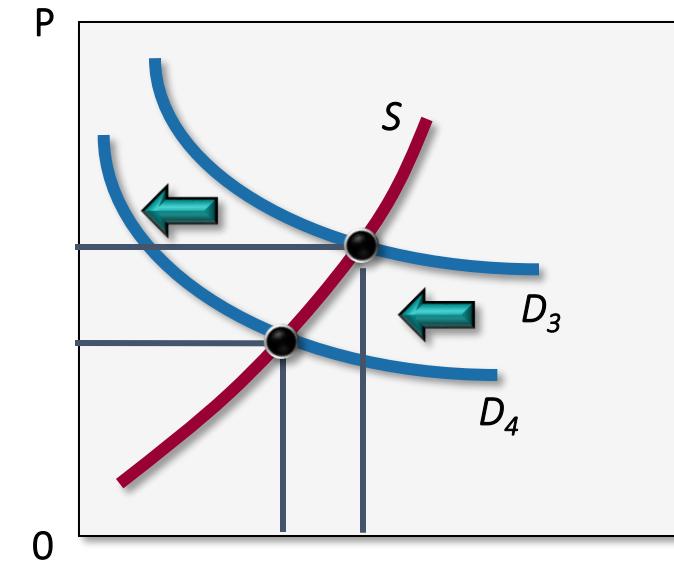
D increase:  
 $P \uparrow, Q \uparrow$

## FIGURE 3-7 Changes in Demand and Supply, and the Effects on Price and Quantity 5/12

(a) Increase in demand



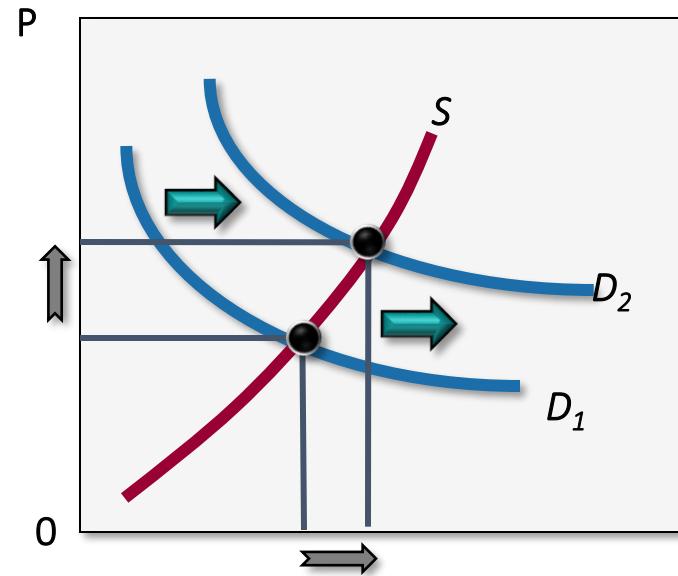
(b) Decrease in demand



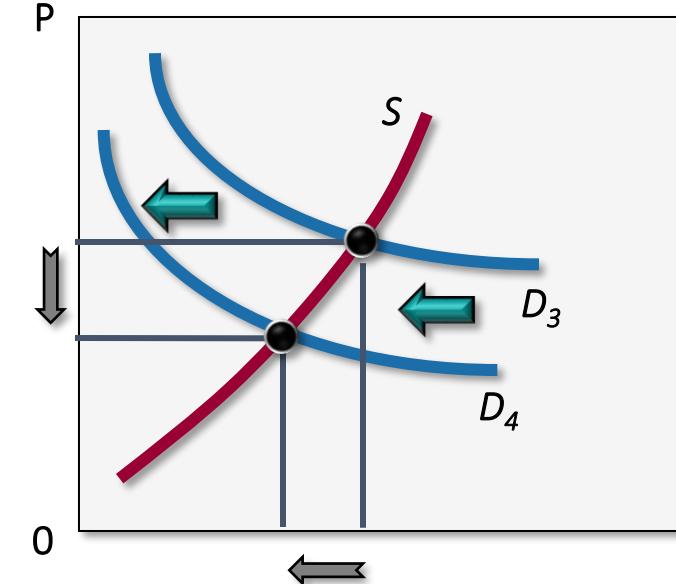
D increase:  
 $P \uparrow, Q \uparrow$

## FIGURE 3-7 Changes in Demand and Supply, and the Effects on Price and Quantity 6/12

(a) Increase in demand



(b) Decrease in demand



D increase:  
 $P \uparrow, Q \uparrow$

D decrease:  
 $P \downarrow, Q \downarrow$

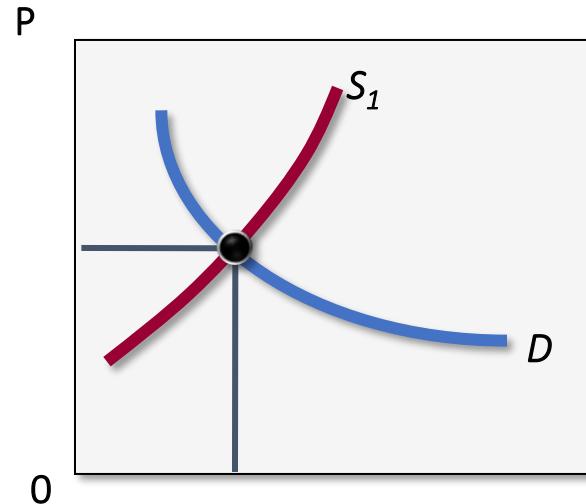
## 3.5 CHANGES IN SUPPLY, DEMAND AND EQUILIBRIUM 2/5

### Changes in Supply

- If the demand for a good is constant and its supply increases,
  - equilibrium price falls, and equilibrium quantity rises.
- If the demand for a good is constant and its supply decreases,
  - equilibrium price rises, and equilibrium quantity falls.

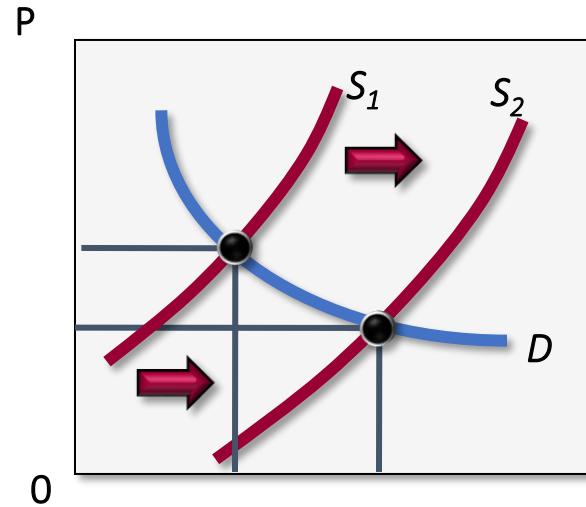
## FIGURE 3-7 Changes in Demand and Supply, and the Effects on Price and Quantity 7/12

(c) Increase in supply



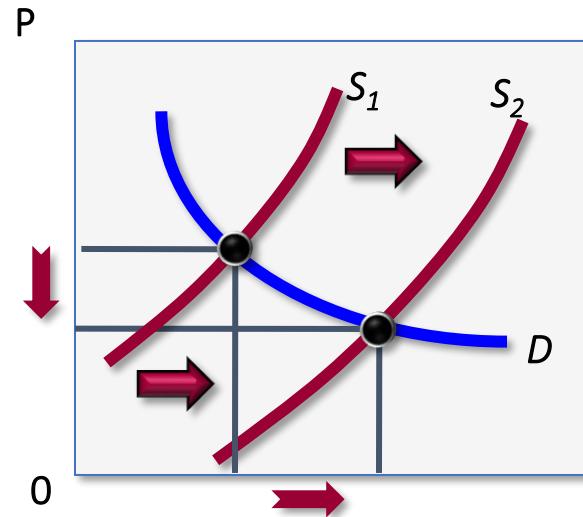
## FIGURE 3-7 Changes in Demand and Supply, and the Effects on Price and Quantity 8/12

(c) Increase in supply



## FIGURE 3-7 Changes in Demand and Supply, and the Effects on Price and Quantity 9/12

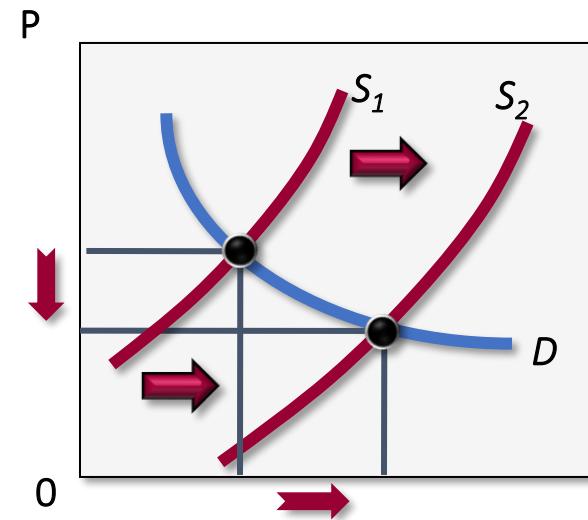
(c) Increase in supply



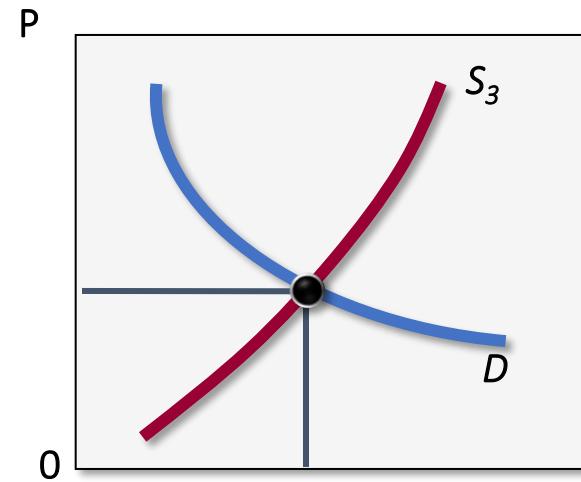
S increase:  
 $P \downarrow, Q \uparrow$

## FIGURE 3-7 Changes in Demand and Supply, and the Effects on Price and Quantity 10/12

(c) Increase in supply



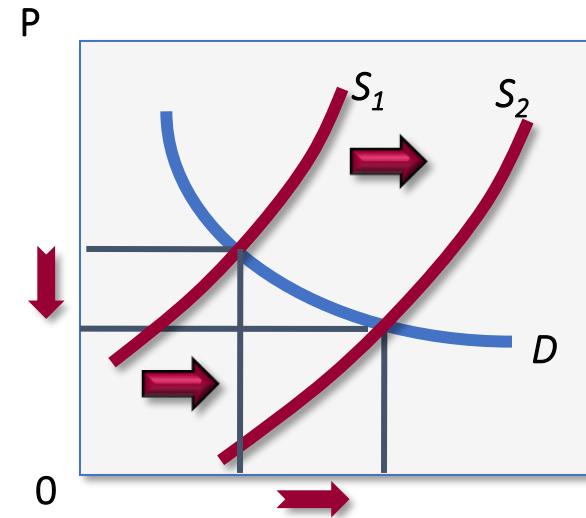
(d) Decrease in supply



S increase:  
 $P \downarrow, Q \uparrow$

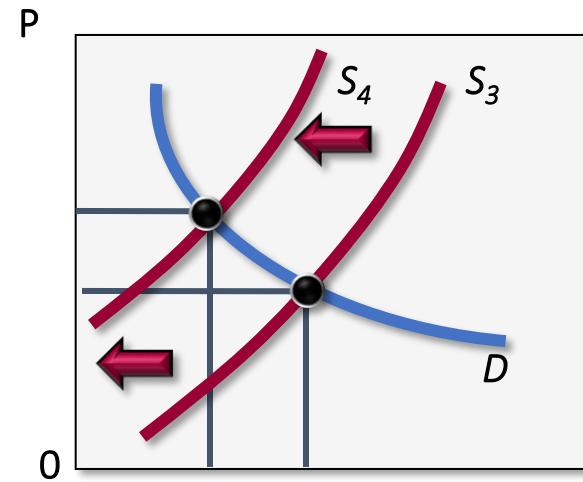
## FIGURE 3-7 Changes in Demand and Supply, and the Effects on Price and Quantity 11/12

(c) Increase in supply



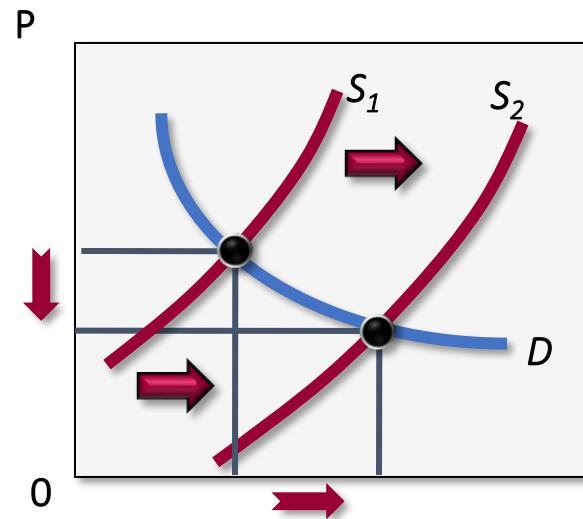
S increase:  
 $P \downarrow, Q \uparrow$

(d) Decrease in supply



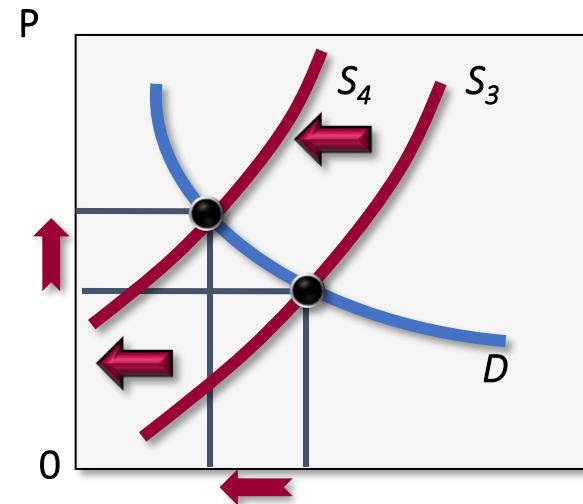
## FIGURE 3-7 Changes in Demand and Supply, and the Effects on Price and Quantity 12/12

(c) Increase in supply



S increase:  
 $P \downarrow, Q \uparrow$

(d) Decrease in supply



S decrease:  
 $P \uparrow, Q \downarrow$

### Complex cases

- When supply and demand change, the effect is a combination of the individual effects.
- Keep in mind that each effect on the demand and supply curves has to be considered independently.

### Complex cases

- **Supply Increase, Demand Decrease:** Price drops; quantity depends on which change is stronger—supply increase raises quantity, demand decrease lowers it.
- **Supply Decrease, Demand Increase:** Price rises; quantity depends on which change is stronger—supply decrease lowers quantity, demand increase raises it.

### Complex cases

- **Both Supply and Demand Increase:** Price depends on the stronger change—supply increase lowers price, demand increase raises it. Quantity will increase.
- **Both Supply and Demand Decrease:** Price depends on which decrease is larger—supply decrease raises the price, and demand decrease lowers it. Quantity will decrease.

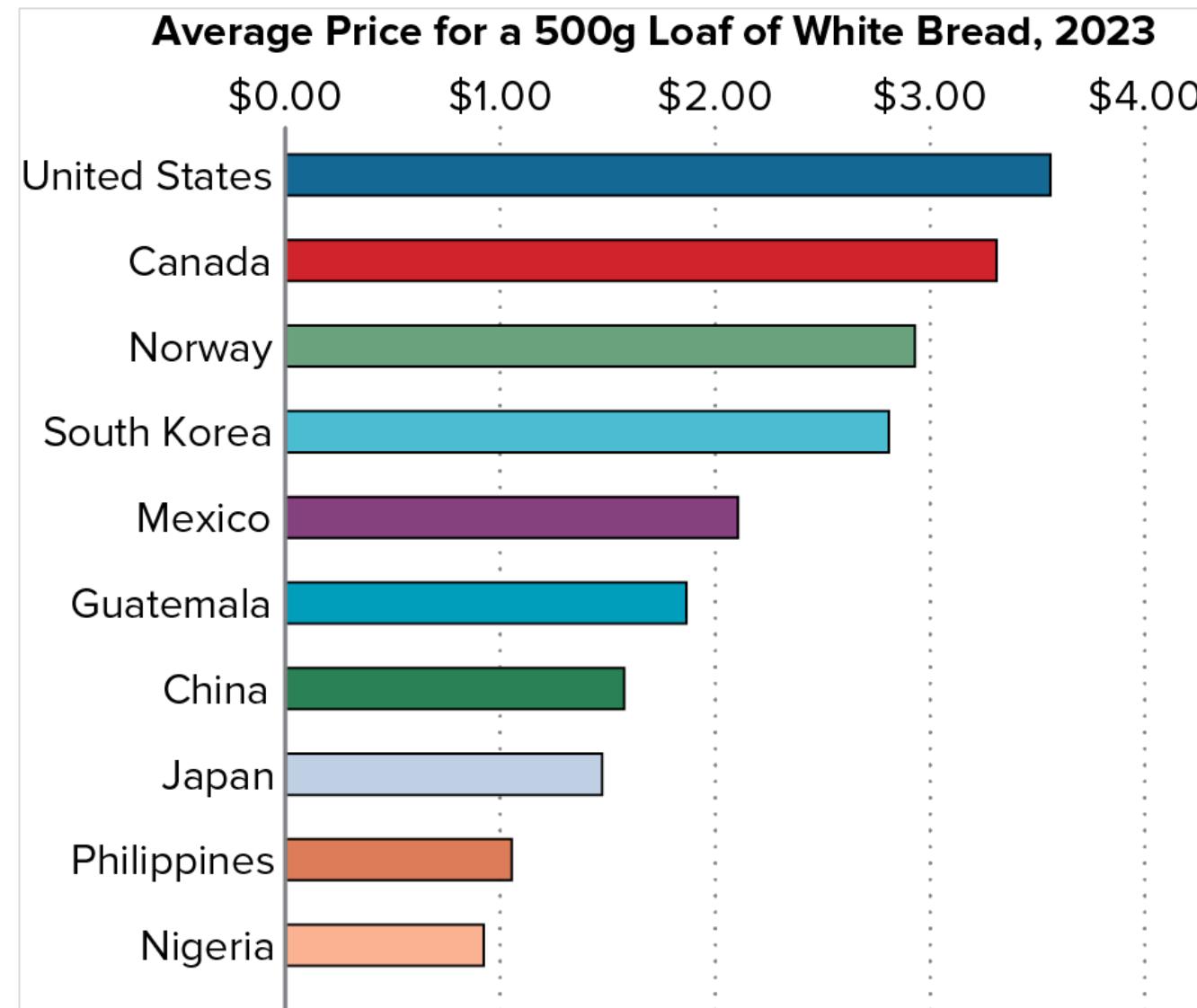
### Table 3-3 Effects of Changes in Both Supply and Demand

Change in Supply	Change in Demand	Effect on Equilibrium Price	Effect on Equilibrium Quantity
1. Increase	Decrease	Decrease	Indeterminate
2. Decrease	Increase	Increase	Indeterminate
3. Increase	Increase	Indeterminate	Increase
4. Decrease	Decrease	Indeterminate	Decrease

## GLOBAL PERSPECTIVE 3.1

### Average Price of a Loaf of White Bread, Selected Nations, 2023

- The market equilibrium price of a 500-gram loaf of white bread differs substantially across countries, reflecting local differences in supply and demand and government interventions such as subsidies and price ceilings.



### **3.6 APPLICATION: GOVERNMENT-SET PRICES 1/7**

- Most market prices freely adjust to equilibrium levels, regardless of how high or low they are.
- Governments may intervene if they believe market prices are unfair to buyers or sellers, imposing legal limits.
- This raises the question of whether setting such price controls is beneficial.

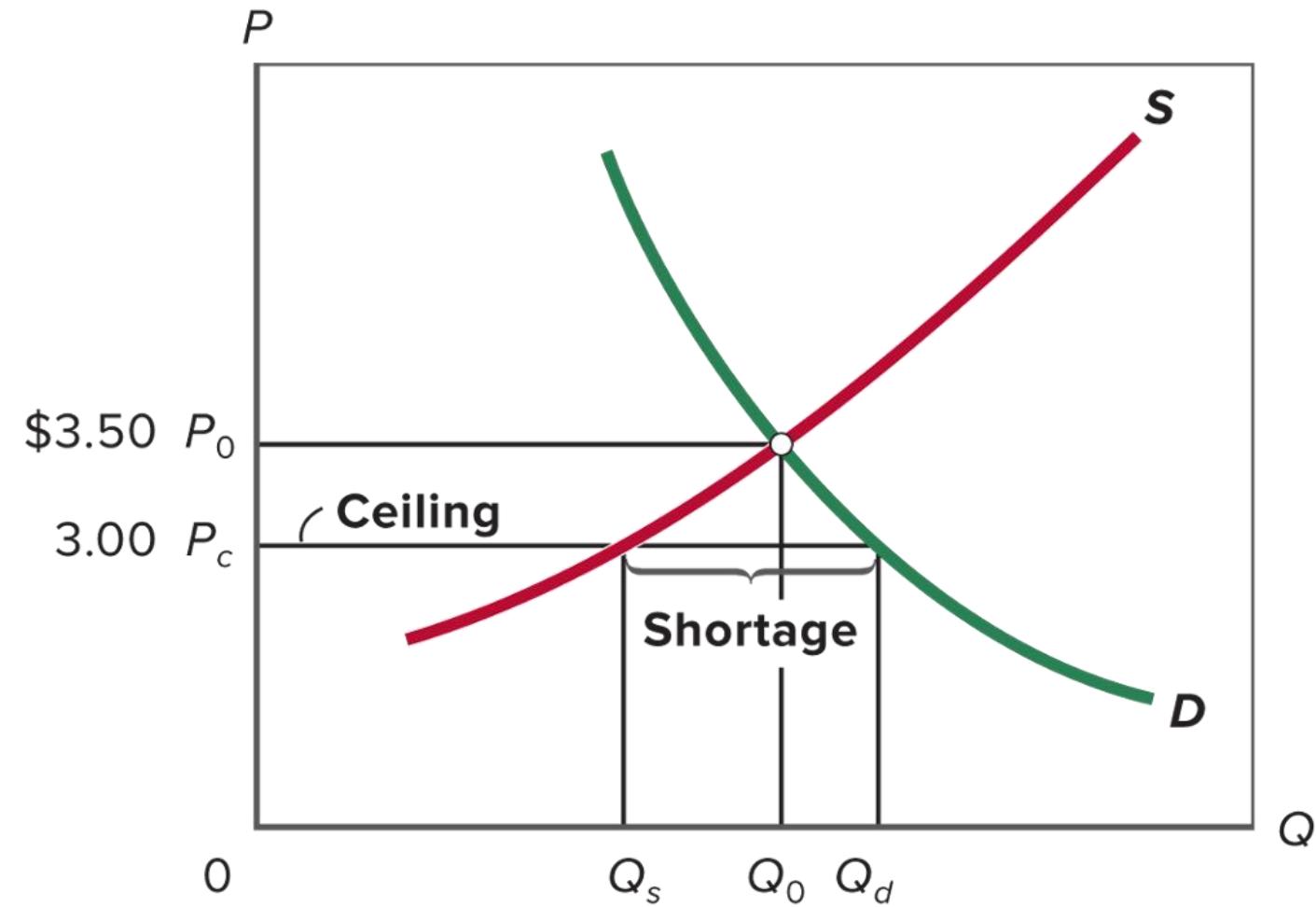
## 3.6 APPLICATION: GOVERNMENT-SET PRICES 2/7

### Price Ceilings

- The maximum legal price a seller can charge for a product or service, with prices above it being illegal.
- They are intended to make essential goods or services affordable for consumers, often below the equilibrium price.
- Common examples include rent controls and usury laws, which cap rent prices and interest rates, respectively.

## FIGURE 3-8 A Price Ceiling Results in A Shortage

- A price ceiling is a maximum legal price such as  $P_c$ .
- When the ceiling price is below the equilibrium price, a persistent product shortage results.
- Here, that shortage is shown by the horizontal distance between  $Q_d$  and  $Q_s$ .



### Price Ceilings

- **Rationing Problem:** The government must decide how to fairly distribute limited supplies, like gasoline, during shortages, possibly using ration coupons.
- **Black Market Issues:** Price ceilings can create black markets and counterfeit coupons, with goods sold illegally above the set price

## 3.6 APPLICATION: GOVERNMENT-SET PRICES 4/7

### Price Ceilings

- Rent Controls
  - Reduce rental housing supply as landlords exit the market or neglect maintenance, despite aiming to make housing affordable.
  - Distort markets, often worsening housing shortages, leading many cities to abandon these policies.

## 3.6 APPLICATION: GOVERNMENT-SET PRICES 5/7

### Price Floors

- A price floor is a government-set minimum price, making prices below it illegal.
- They are set above equilibrium to ensure adequate income for certain producers or resource suppliers.
- Common examples of price floors include agricultural price supports and minimum wage laws.

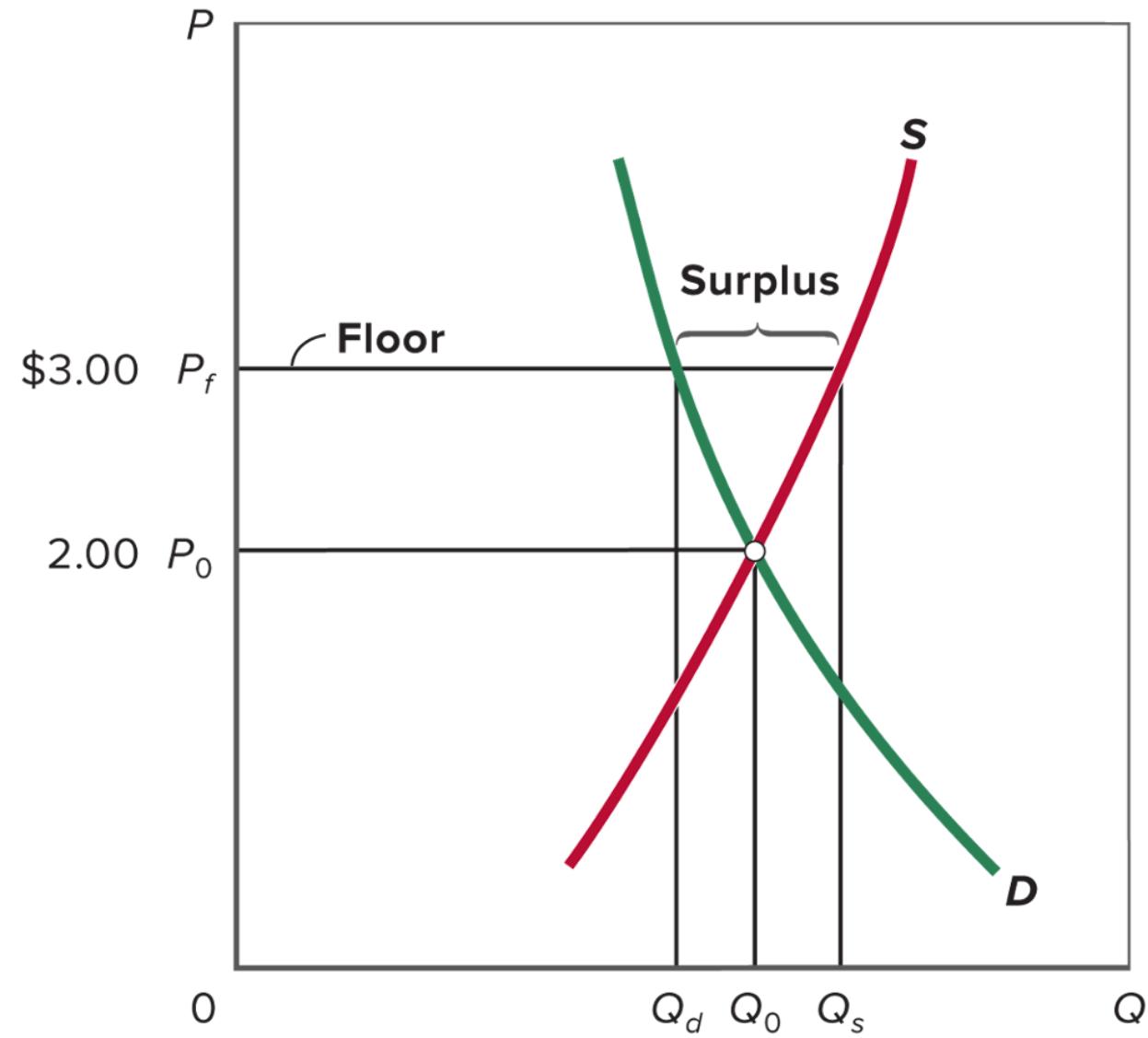
## 3.6 APPLICATION: GOVERNMENT-SET PRICES 6/7

### Price Floors on Wheat

- Refer to Figure 3-9. Setting a price floor at \$3 per bushel creates a surplus as the quantity supplied exceeds the quantity demanded.
- Farmers produce more wheat than buyers are willing to purchase at the higher price.
- The price floor disrupts the free market's ability to ration resources effectively, similar to a price ceiling.

## FIGURE 3-9 A Price Floor Results in a Surplus

- A price floor is a minimum legal price, such as  $P_f$ .
- When the price floor is above the equilibrium price, a persistent product surplus results.
- Here, that surplus is shown by the horizontal distance between  $Q_s$  and  $Q_d$ .



### Price Floors: Final Remarks

- Price floors, like one on wheat, lead to overproduction, diverting resources from more valuable goods and disrupting allocative efficiency.
- Price floors result in higher consumer prices, increased taxes, and environmental harm, ultimately leading to poor economic outcomes despite good intentions.

## Pandemic Prices

- Dramatic Shifts in Supply and Demand Explain Much of the Economics of the COVID-19 Pandemic, Including Shortages of Consumer Goods and Vacillating Prices for Housing and Used Cars.
- The COVID-19 pandemic led to severe lockdowns starting in March 2020, disrupting economies significantly, with effects lasting into 2023.



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### Pandemic Prices

- Panic buying led to empty shelves as demand surged, causing significant shortages.
- Sharp drop in stock prices due to economic fears, but the market later rebounded.
- Travel restrictions cut rental car demand, but supply chain issues raised used car prices as new car production slowed.
- Remote work boosted suburban and rural home demand, lowered urban prices, and labour shortages pushed wages up.

## CHAPTER SUMMARY 1/2

- Markets connect buyers and sellers, ranging from local to global, physical to online, with competitive markets featuring many participants.
- Markets involve demand, supply, price, and quantity, with prices set by buyer-seller interactions.
- Demand shows buyer willingness at various prices; lower prices increase the quantity demanded, forming a downward-sloping curve.
- Changes in factors like consumer preferences shift the demand curve; price changes move along the curve.

## CHAPTER SUMMARY 2/2

- Supply shows producer willingness at various prices; higher prices increase the quantity supplied, forming an upward-sloping curve.
- Changes in factors like production costs shift the supply curve; price changes move along the curve.
- Equilibrium is where supply and demand curves intersect, ensuring efficient resource allocation.
- Price ceilings cause shortages, and price floors cause surpluses, disrupting market equilibrium.