Chapter 4

Equilibrium: Where Supply Meets Demand

1. Understanding Markets

What are markets, and how are they organized?

2. Equilibrium

Supply equals Demand
Shortage and Surplus

3. Predicting Market Changes

Shifting demand and supply

Chapter 4 (1 of 4)

Exploring how markets help organize society

Examples of the markets all around us

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How do we organize society such that we can determine...

What goods get **produced?**

Who will produce these goods and **how** will they do it?

How will you **allocate** these goods? In other words, **who gets what?**

Organization Options

Planned Economy: **Centralized** decisions are made about what is produced, how, by whom, and who gets what.

Market Economy: Each **individual** makes their own production and consumption decisions,

When you buy a cup of coffee, you are a buyer (**demander**) in the coffee market.

If you are shopping on Etsy and decide to buy something, then you are a **demander** in the hand-made crafts market.

If you book a room on Airbnb, then you are a **demander** in the online rental lodging market.

Market:

A setting that brings together potential buyers and sellers.

If you own a coffee shop, then you are a producer (**seller**) in the coffee market.

If you have an Etsy shop, then you are a producer who **supplies** their product in the hand-made crafts market.

If you list your apartment on Airbnb, you are a **supplier** in the online rental lodging market.

Markets are all around us!

Taking a more expansive view, we even see markets form in settings in which money does not actually get exchanged.

The Marriage Market

If you are dating with the intention of marriage, then you are participating in the marriage market. You are considering what this person offers in terms of personality, finance, etc.,

Some countries formalize the marriage market by creating a literal marketplace in which people seeking life partners can advertise and/or “shop” the available options. For example, China has marriage markets in many cities:

https://www.youtube.com/watch?v=Vxs__FsgGdc

Chapter 4 (2 of 4)

Defining and visualizing the market equilibrium

Understanding shortage and surplus scenarios

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Key Definitions:

Equilibrium: The point at which there is **no tendency for change**. A market is in equilibrium when the quantity supplied **equals** the quantity demanded.

Equilibrium Quantity: The **quantity** demanded and supplied in equilibrium.

Equilibrium Price: The **price** at which the market is in equilibrium.

Diving into the Definition

In equilibrium:

- **Every seller** who wants to sell an item **can find a buyer.**
- **Every buyer** who wants to buy an item **can find a seller**.

This **balance** between the two sides of the market is why there is no tendency for the market price to change

The Market Equilibrium

At the market **equilibrium,** supply and demand are in balance, such that there is no *surplus* or *shortage*.

There is a **shortage** in the market if the quantity demanded **exceeds** the quantity supplied.

There is a **surplus** in the market if the quantity demanded

Example: The Market for Gas in the United States

Price	Quantity Demanded	Quantity Supplied
$2	2.4	1.5
$3	2.0	2.0
$4	1.6	2.5

Note: All quantities are billions of gallons per week.

Market Equilibrium: When the price is $3, then the quantity demanded equals the quantity supplied.

Shortage: At **$2** the quantity demanded **exceeds** the quantity supplied: **2.4 > 1.5**. Consumers are **unable to buy** as much as they want — the market is short 0.9 billion gallons.

Surplus: At **$4** the quantity demanded is **less** than the quantity supplied: **1.6 < 2.5**. Sellers are **unable to sell** as much as they want — there are 0.9 billion gallons leftover (i.e., not

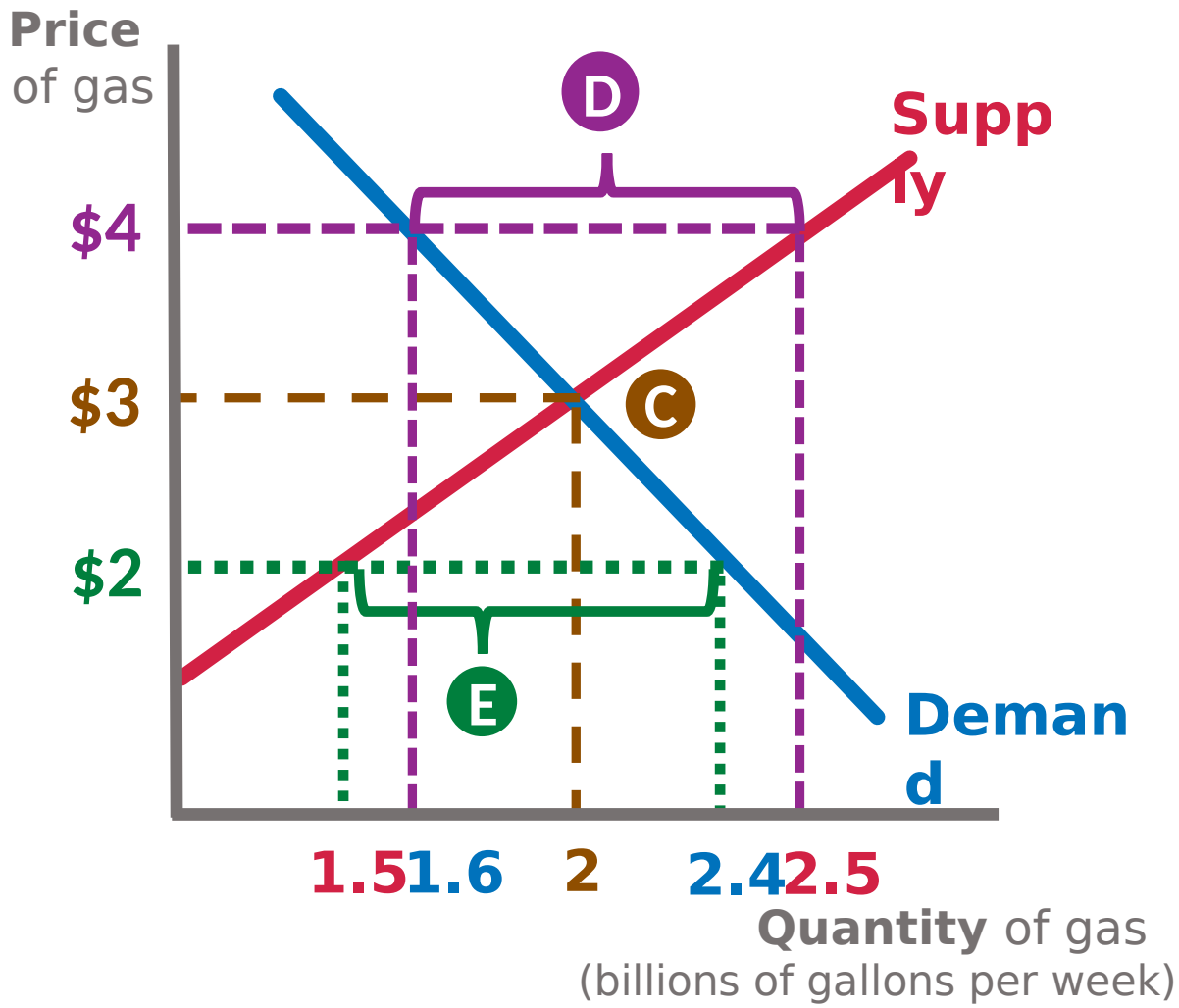
Visualizing the Market Equilibrium

C The supply-equals-demand **equilibrium** occurs where the supply and demand curves meet.

D There is a **surplus** at **$4** because the quantity supplied exceeds the quantity demanded.

- At **$4**, consumers are only willing to buy **1.6** billon gallons of gas per week.
- Suppliers are willing to sell **2.5** billion gallons per week.
- There is a **surplus of 0.9** gallons per week.

E There is a **shortage** at **$2** because the quantity demanded

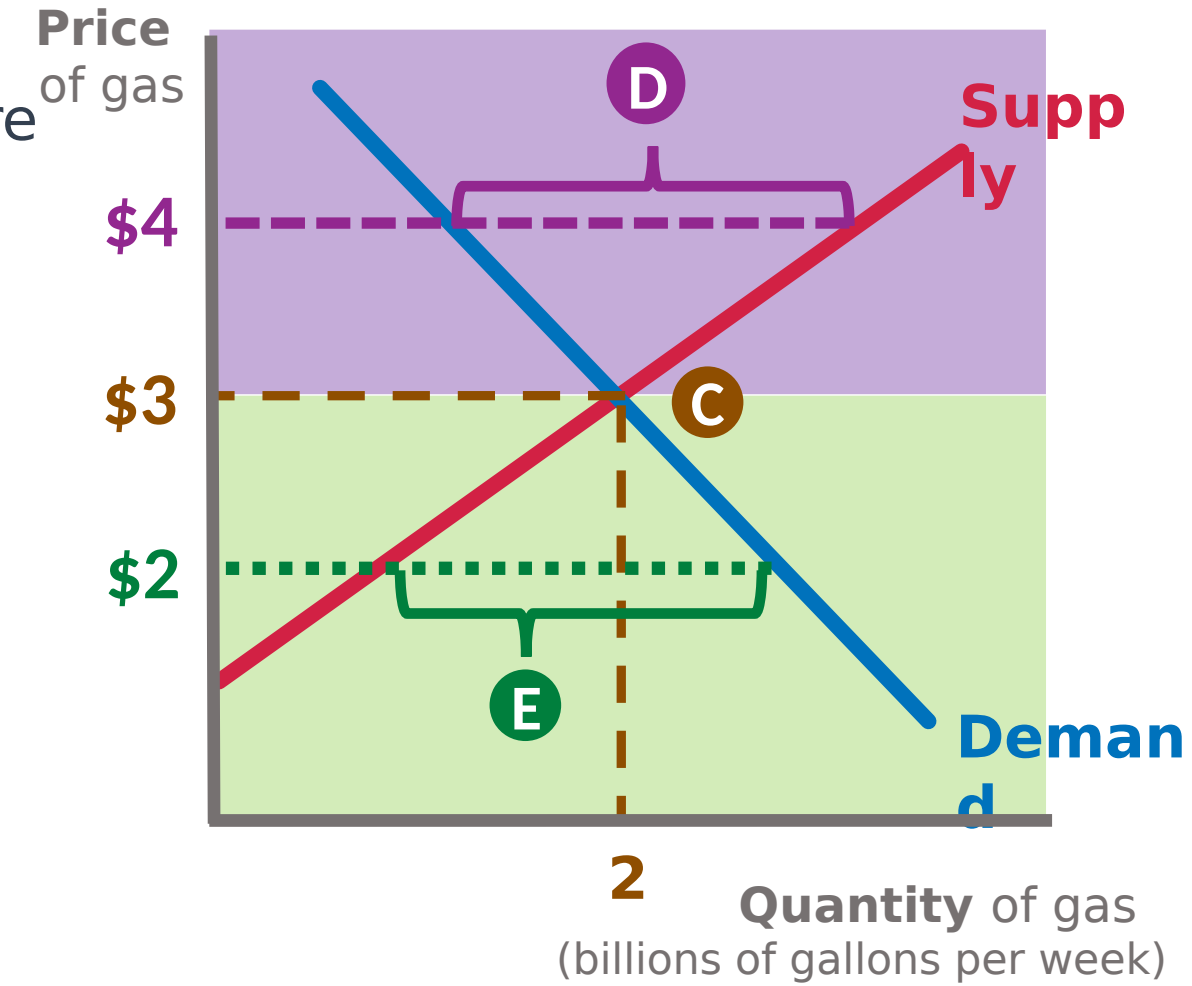


Examining Surplus and Shortage

C At the supply-equals-demand **equilibrium**, there is no shortage or surplus.

D There is a **SURPLUS** whenever the price is **ABOVE** the equilibrium price. The higher the price is above the equilibrium price, the larger the surplus.

E There is a **SHORTAGE** whenever the price is **BELOW** the equilibrium price. The lower the price is below the equilibrium price,



A Shortage Pushes the Price Up

The Supplier's Perspective

- At a **price of $2** you totally sell out of gas.
- Raising the price to $2.10 you still sell out of gas.
- Raising the price to $2.50 you still sell all your gas.

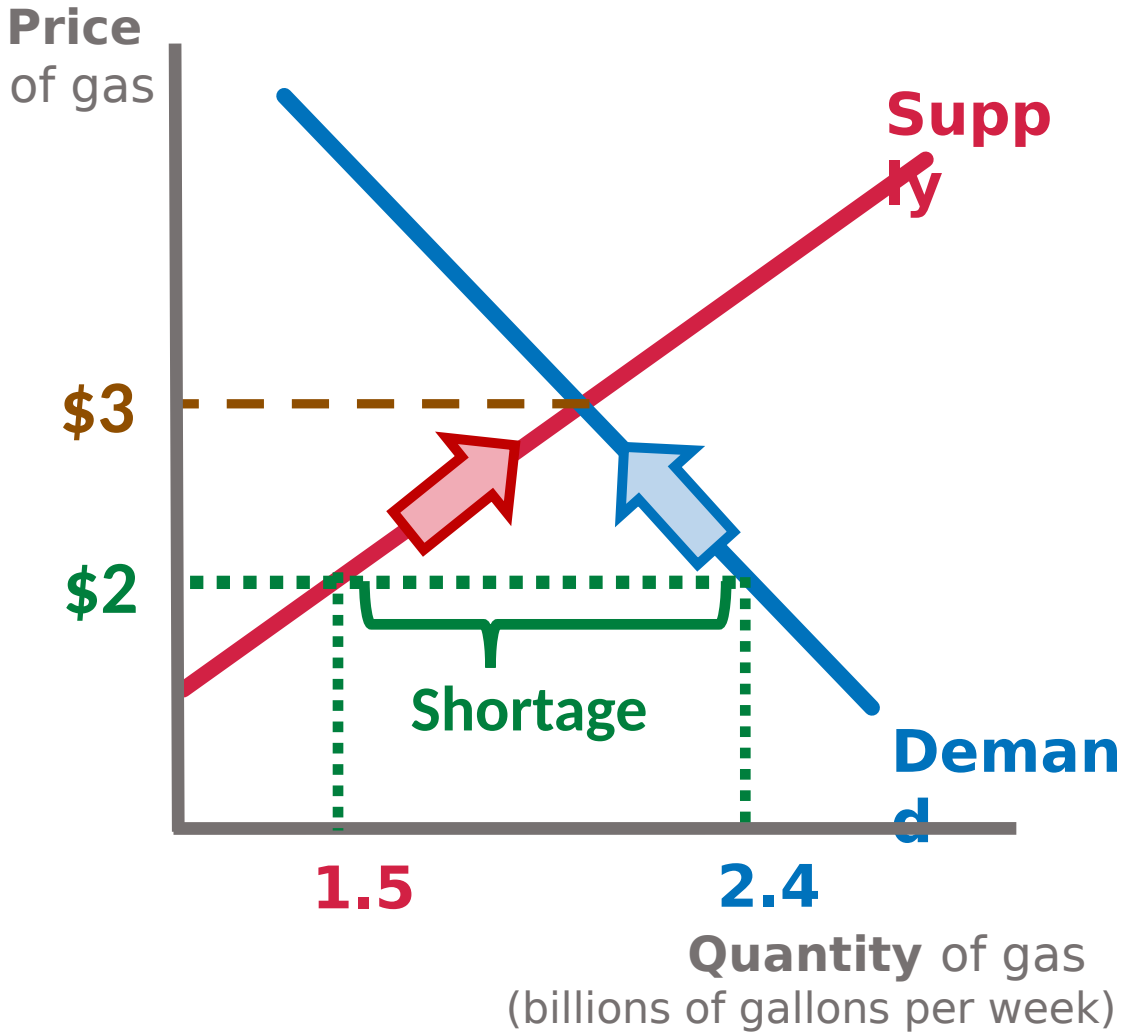
You can keep **raising your price** and sell all your gas (more profit for you!) as long as the **shortage** persists.

The Demander's Perspective

- At a **price of $2** you worry the gas station will sell out of gas before you get the amount you want.
- You offer to pay 10 cents above the current price in order to ensure you get all the gas you want.

Consumers continue to **push the price**

When the price of gas is BELOW the equilibrium price level, there are too many people chasing too little gas, leading to a **shortage**: **Qd** > **Qs**



A Surplus Pushes the Price Down

The story:

At the **current $4 price**, suppliers have 0.9 billon gallons of unsold gas.

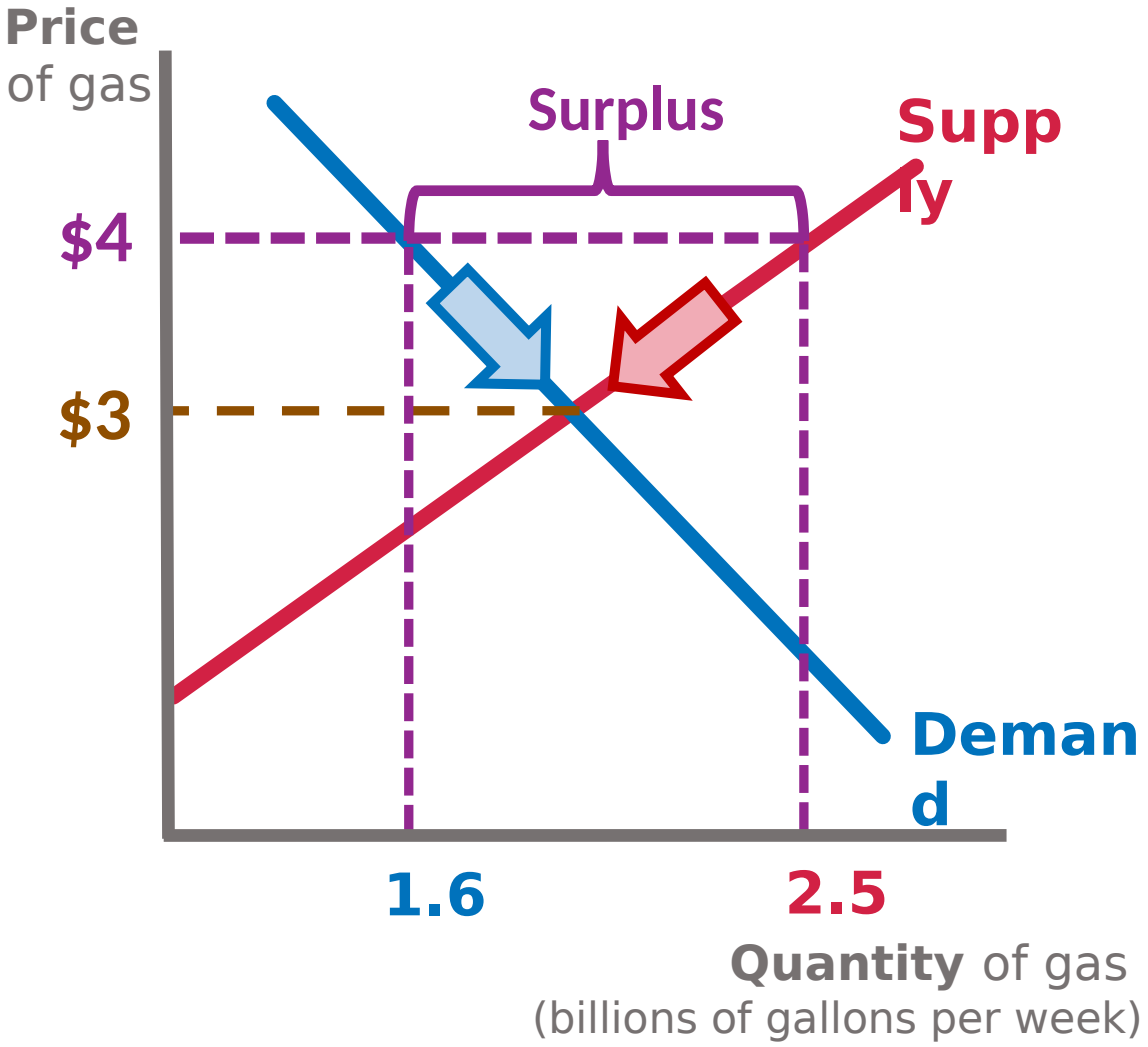
Gas station owners want to sell these units and know they can attract more customers if they lower the price.

The falling price has two effects:

- As the price falls, the **quantity demanded** rises (**law of demand**).
- As the price falls, the **quantity supplied** falls (**law of supply**).

The price of gas continues to **fall until the surplus is eliminated** and the market forces are in balance at the market equilibrium.

When the price of gas is ABOVE the equilibrium price level, not enough people want to buy the gas being sold, leading to a **surplus**: **Qd** < **Qs**



Concept Check: Surplus versus Shortage

Which of the following scenarios depicts a market with a shortage?

a. Cody owns a bakery. At the end of the day, he still has more than a dozen blueberry muffins left, so he donates them to a local food pantry.

b. Jordan goes to Target to purchase new shoes. Because the shoes are on sale, she buys a second pair for her sister.

c. Mia goes online to preorder a new phone but discovers that the phone sold out an hour ago.

d. Austin goes to purchase concert tickets for himself and a friend. He gets a discount because there are still plenty of seats available.

Discussion Question

Can you think of examples from your life in which you experienced a shortage or surplus?

Key take-aways: Equilibrium

Equilibrium: When **quantity supplied** **equals** **quantity demanded**

- Graphically, where the supply and demand curves cross
- At equilibrium, there is **no tendency for change**.

Shortage: When **quantity demanded** **exceeds** **quantity supplied**

- Graphically, whenever **price is below** the equilibrium price
- A shortage pushes the price up.

Surplus: When **quantity demanded** **is less than** **quantity supplied**

- Graphically, whenever **price is above** the equilibrium price
- A surplus pushes the price down.

Chapter 4 (3 of 4)

Visualizing and analyzing…

- **Shifts in Demand**
- **Shifts in Supply**
- **Shifts in BOTH curves**

1. Understanding Markets

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Shortage and Surplus

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Predicting Market Change: ~~Shifts in Demand~~

The market demand curve **summarizes people's current buying plans**, but if those plans change, then the market demand curve will shift.

If the market **demand curve shifts**, then the market moves to a **new equilibrium**.

Let's examine the market

Recall

Demand Shifters

1. **Income (normal & inferior)**
2. **Preferences**
3. **Prices of complements and substitutes**
4. **Expectations about the future**
5. **Congestion and network effects**
6. **The type and number of**

An Increase in Demand

Because **demand** increased, at the original **$3** price there is now a **shortage**.

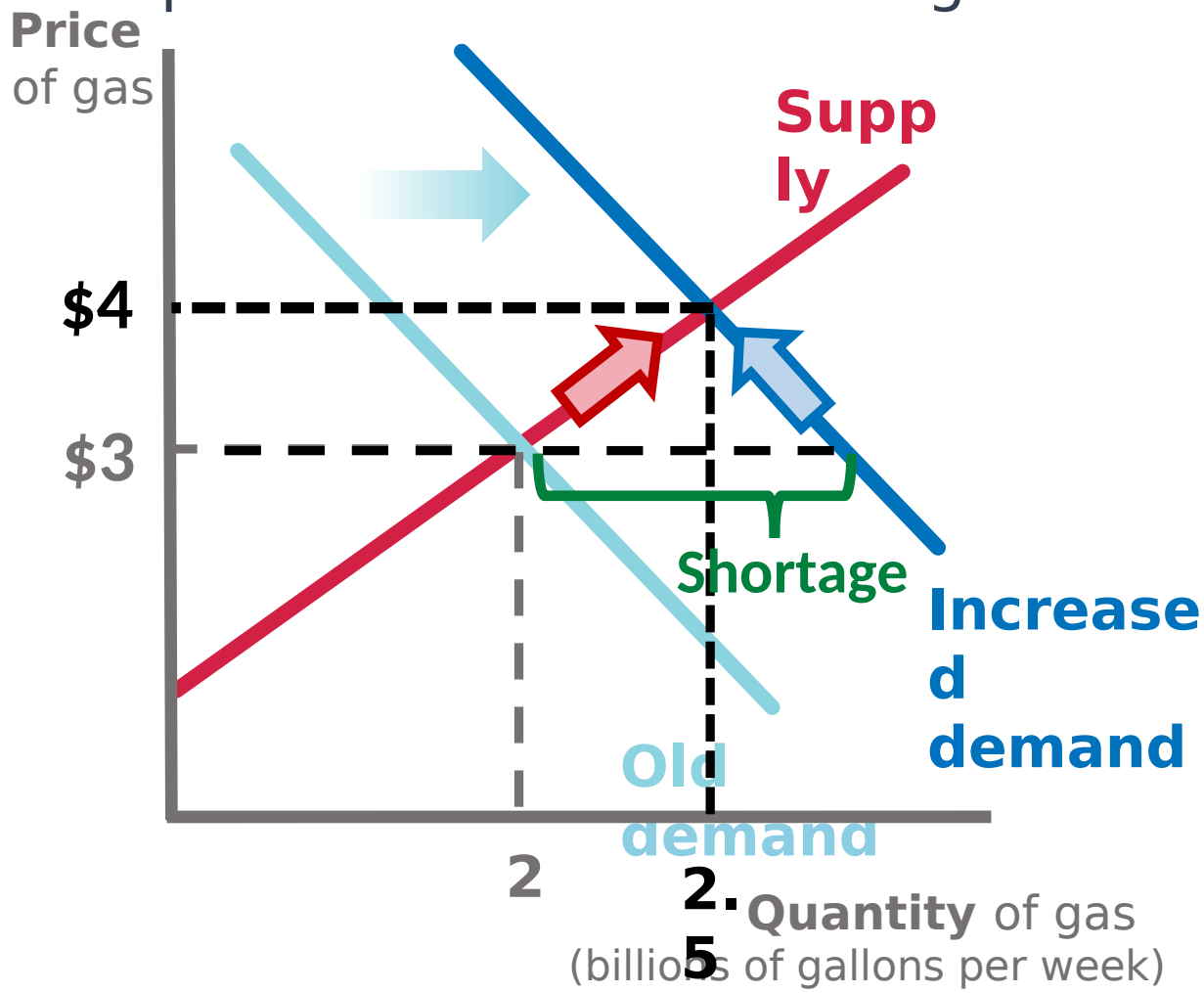
This **shortage** kick-starts the adjustment process that **pushes the price up**.

As the price rises, the quantity supplied rises, and the quantity demanded falls.

The price stops rising when it hits **$4**, the point at which Qd **equals** Qs once again.

Summary:

An increase in **demand** causes the **demand** curve to shift right. Let's analyze the impact of this market change.



A Decrease in Demand

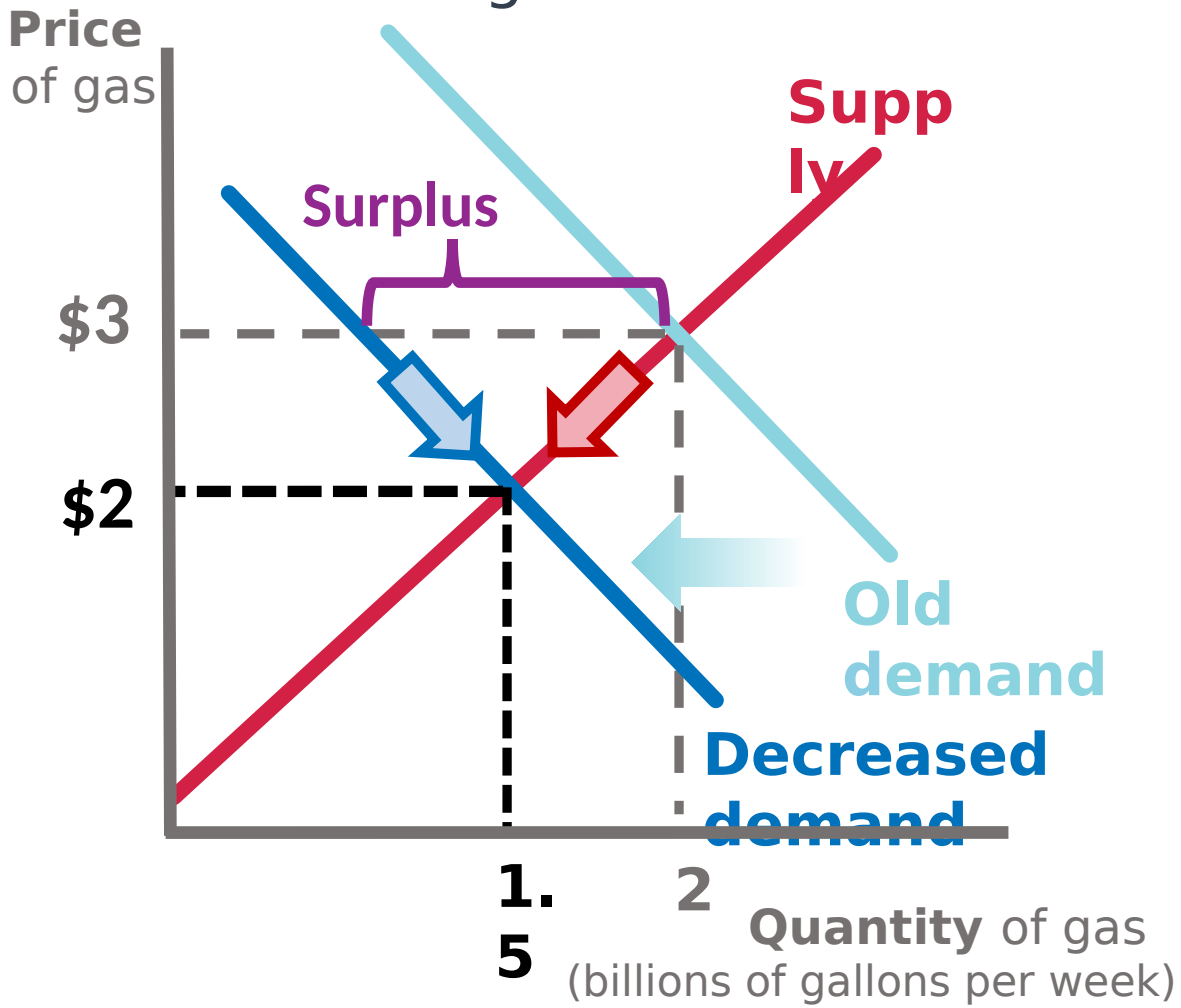
Because **demand** decreased, at the original $3 price there is now a **surplus**.

This **surplus** kick-starts the adjustment process that **pushes the price down**.

As the price falls, the quantity supplied falls, and the quantity demanded rises.

The price stops falling when it hits $2, the point at which Qd **equals** Qs once again.

A decrease in **demand** causes the **demand** curve to shift left. Let's analyze the impact of this market change.



Predicting Market Change: Shifts in Supply

The market supply curve **summarizes the current selling plans**, but if those plans change, then the supply curve will shift.

If the market **supply curve shifts**, then the market moves to a **new equilibrium**.

Let's examine the market adjustment process and the

Recall

Supply Shifters

1. **Input prices**
2. **Productivity and technology**
3. **Other opportunities and the prices of related outputs**
4. **Expectations about the future**
5. **The type and number of sellers**

An Increase in Supply

Because **supply** increased, at the original **$3** price there is now a **surplus**.

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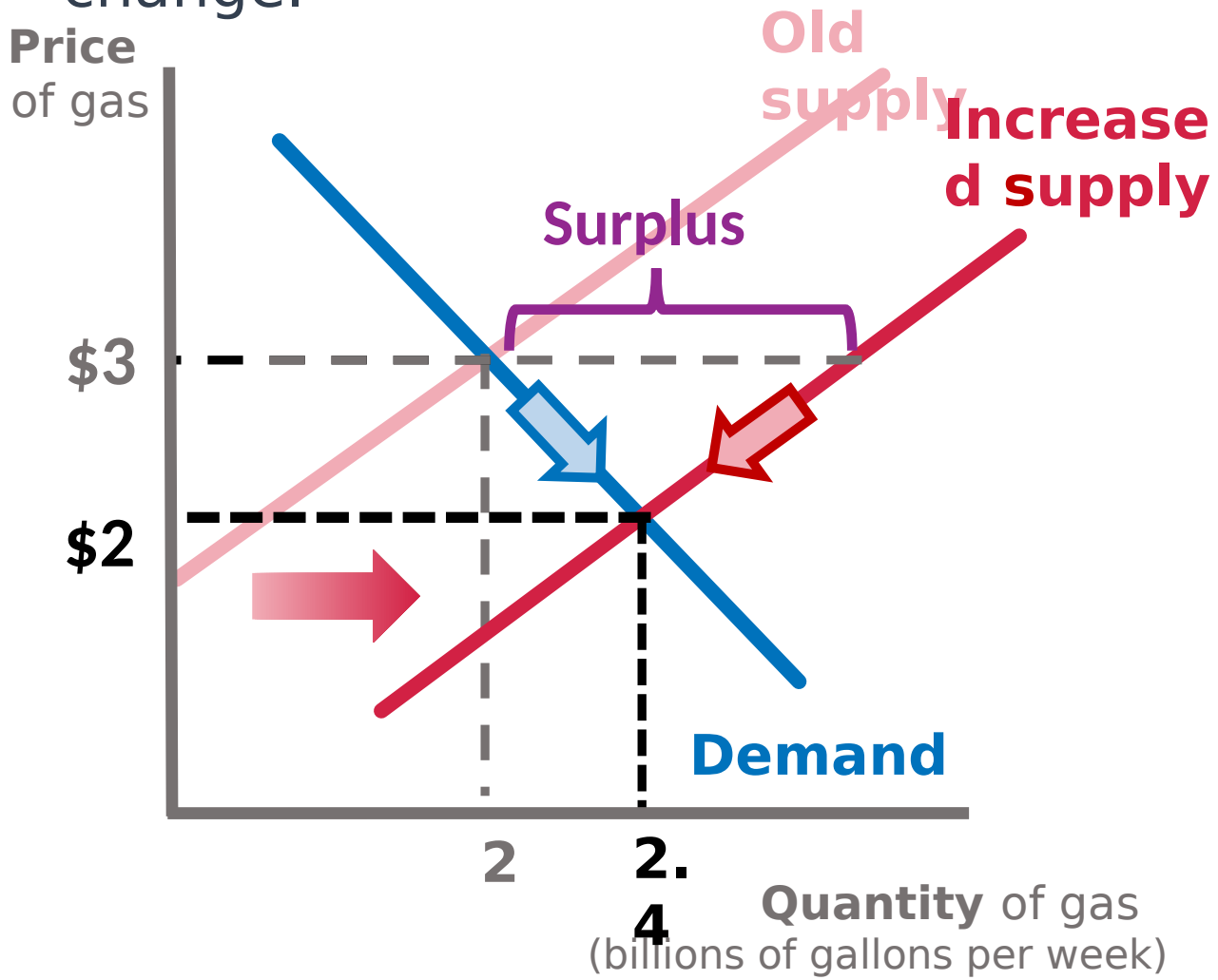

A Decrease in Supply

Because **supply** decreased, at the original **$3** price there is now a **shortage**.

This **shortage** kick-starts the adjustment process that **pushes the price up**.

As the price rises, the quantity supplied rises, and the quantity demanded falls.

The price stops rising when it hits $4, the point at which Qd **equals** Qs once again.

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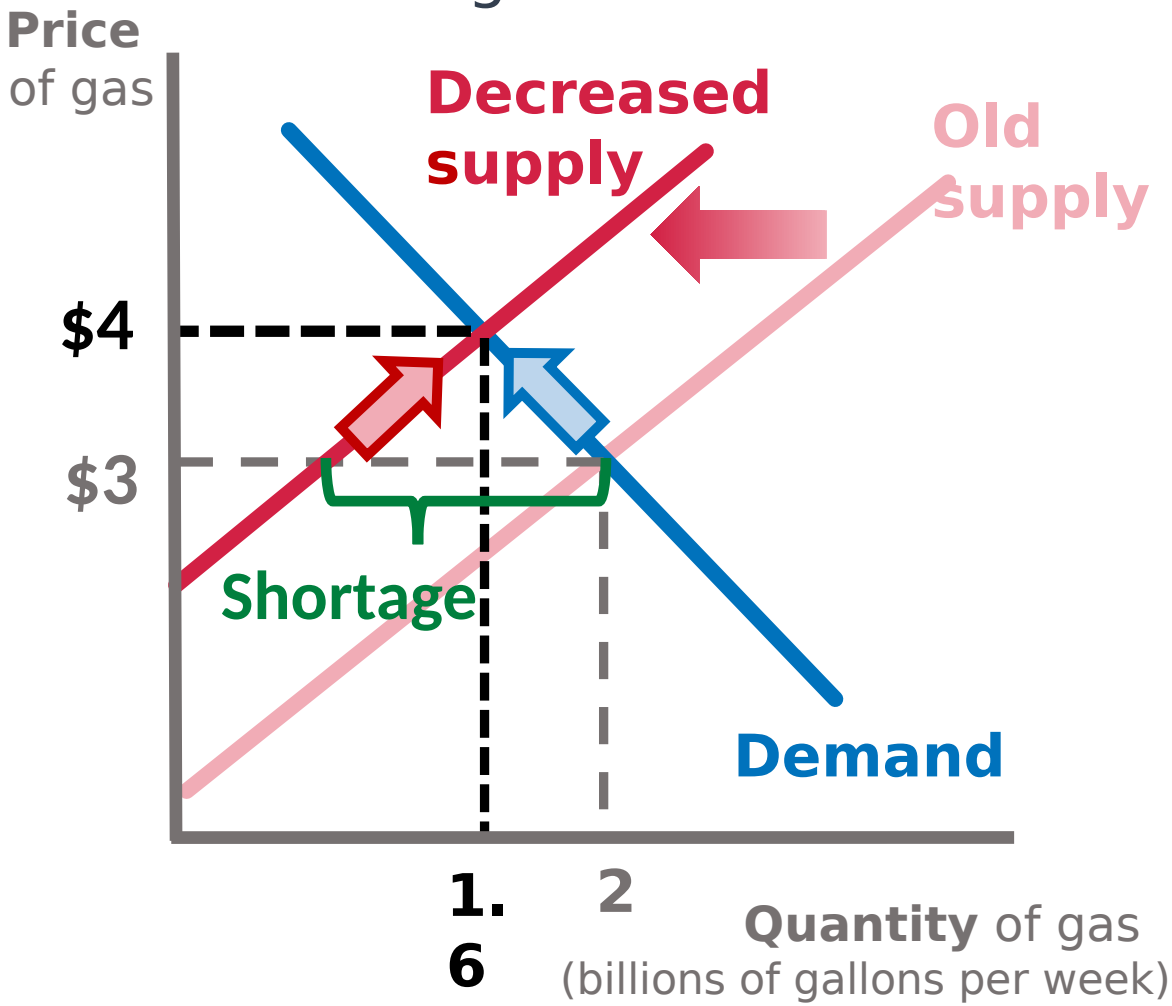


Summary:

Predicting Market Outcomes

Let's **apply** the supply-and-demand framework we have just learned to help **predict** real-world market outcomes.

1. Is the **supply or demand** curve shifting (or both)?

2. Is that shift an **increase**, shifting the curve to the right? Or is it a **decrease**, shifting the curve to the left?

3. How will **prices and quantity** change in the

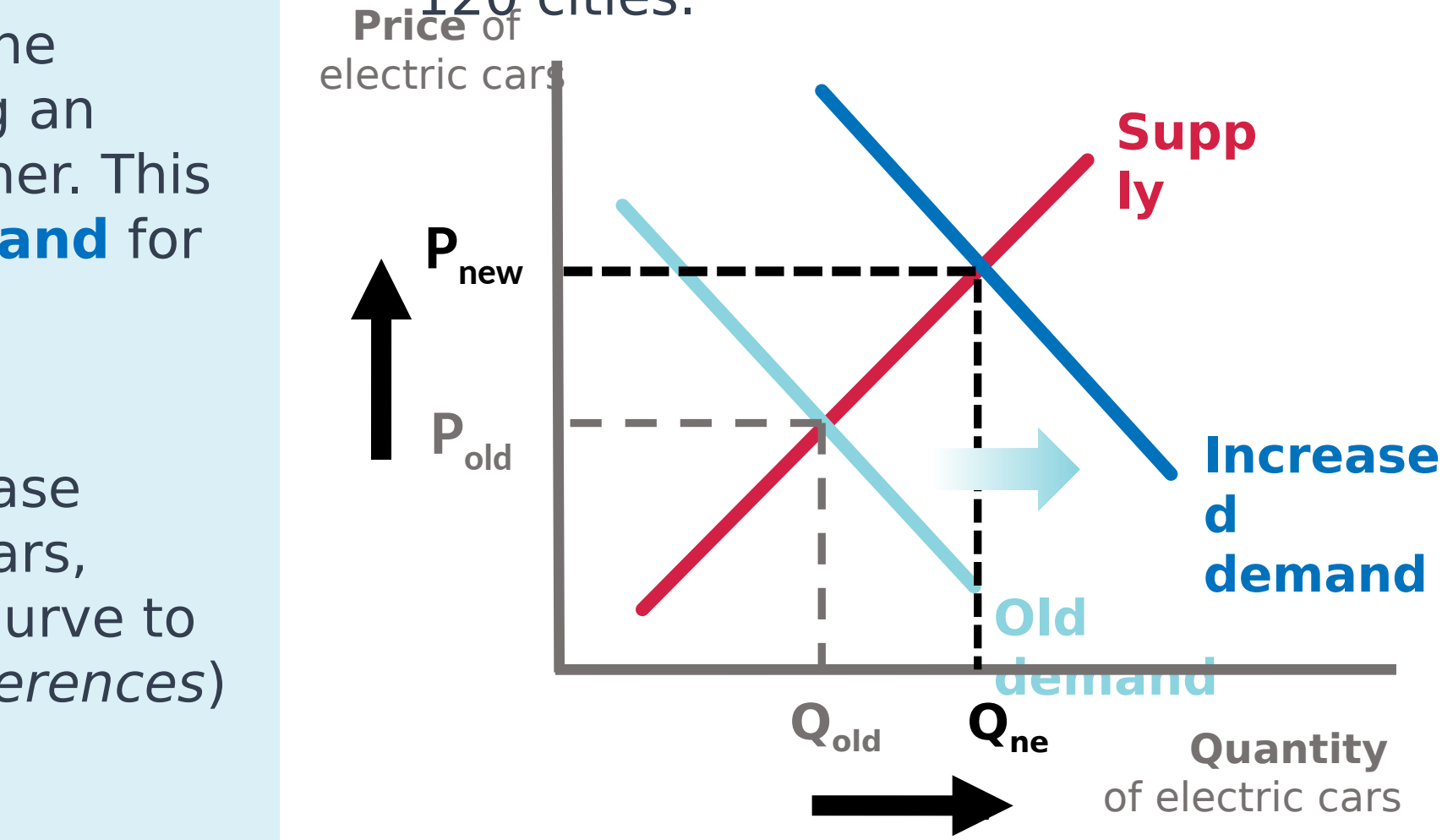
Example 1

Step 1: Buyers of electric cars will have greater access to charging stations, so the convenience of owning an electric car will be higher. This impacts people's **demand** for electric cars.

Step 2: Increased convenience will increase **demand** for electric cars, shifting the **demand** curve to the right. (shifter: *preferences*)

Step 3: At the new equilibrium, we will have an

Scenario: A major retailer announces plans to install charging stations for electric cars in 400 parking spaces in 120 cities.



Example 2

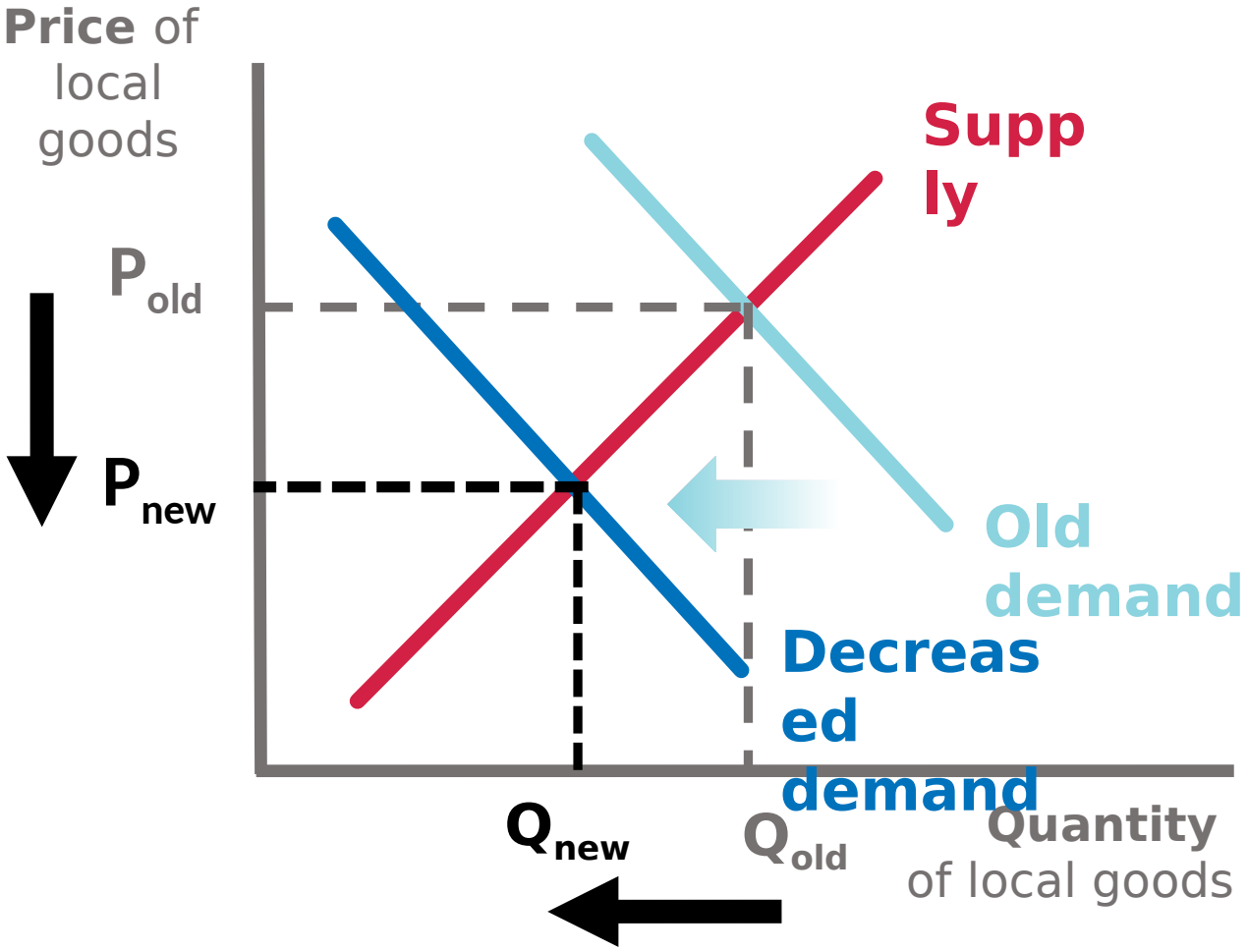
Step 1: People who buy from local stores will have a close substitute for buying goods quickly. This impacts the customers' **demand** for local goods.

Step 2: Customers are now less likely to buy from local stores, shifting the **demand** curve to the left.

(shifter: *preferences*)

Step 3: At the new equilibrium, we will have a **decrease in both** prices and

Scenario: Amazon announces it is developing technology to deliver orders within 30 minutes. Owners of local stores wonder how their sales will be affected.



Example 3

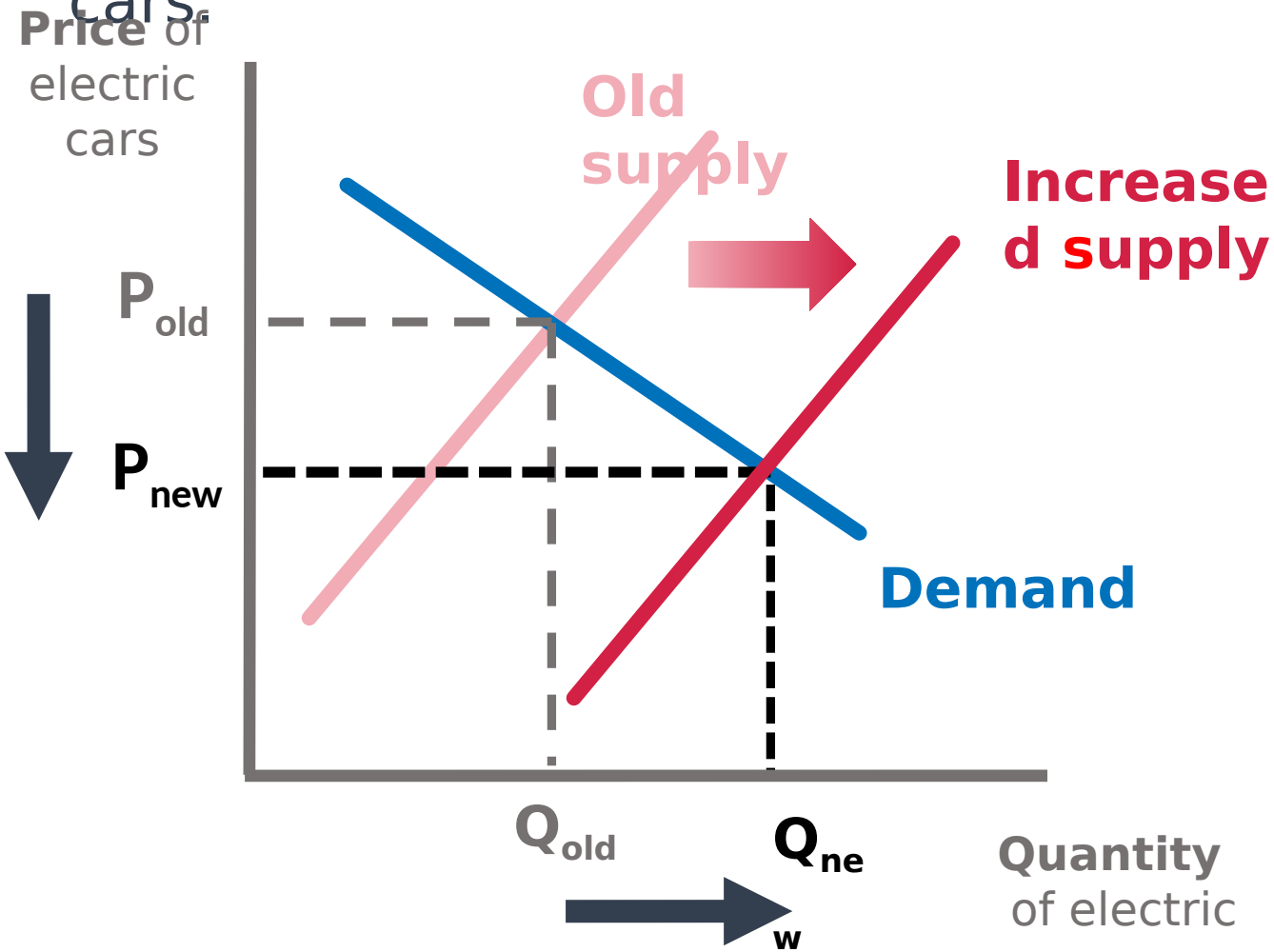
Step 1: The new technology will affect the seller's marginal cost of producing each electric car. This impacts the **supply** of electric cars.

Step 2: Cheaper batteries reduce the cost of production. Lower marginal costs lead to an increase in **supply**, shifting the **supply** curve to the right.

(shifter: *input prices*)

Step 3: At the new equilibrium, we will have a

Scenario: The federal government announces plans to fund research that will lower the cost of batteries used in electric cars.



Example 4

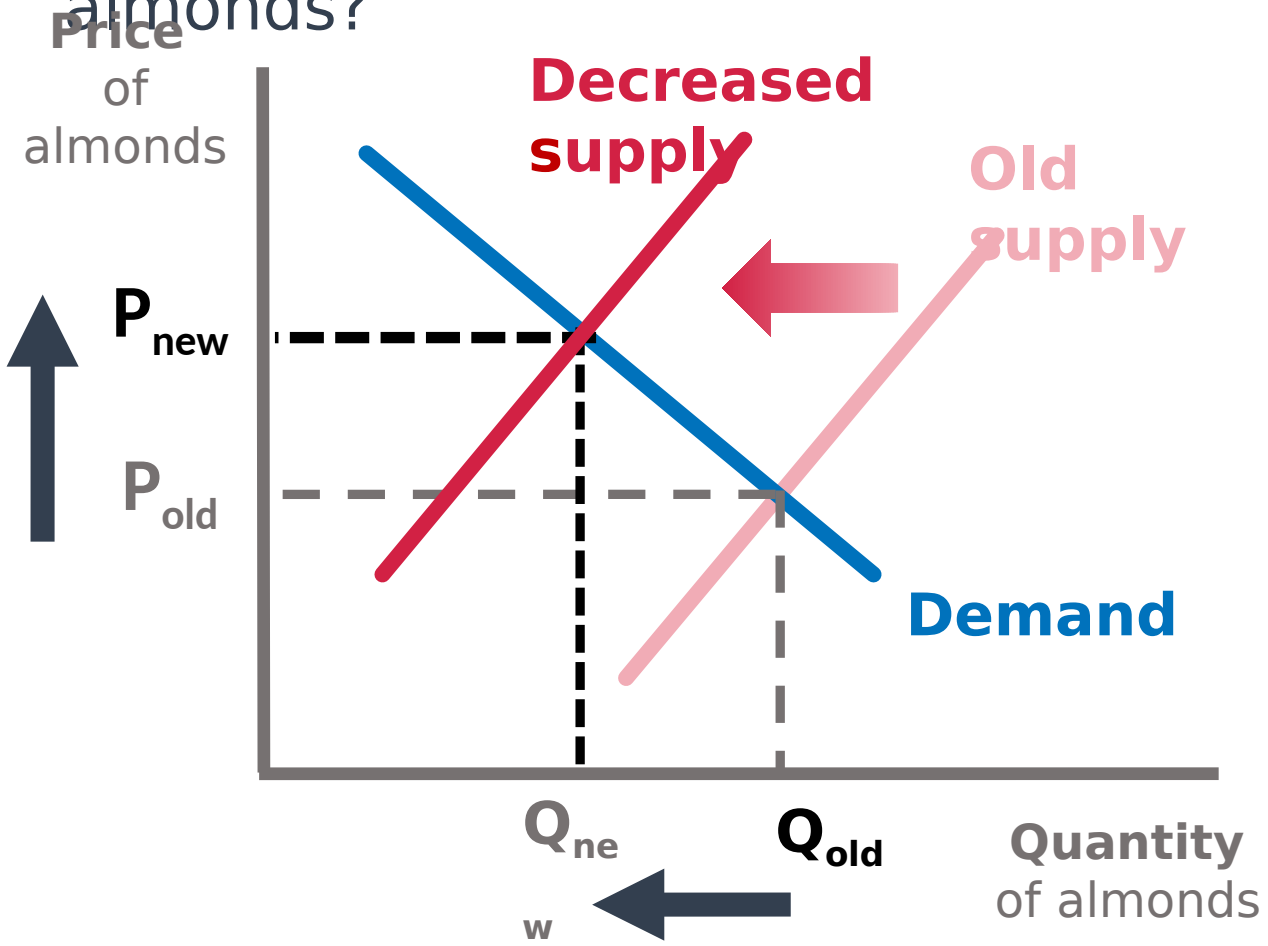
Step 1: The drought will affect the farmers' marginal cost of producing almonds. This impacts the almond **supply** curve.

Step 2: The water shortage increases the farmers' marginal costs of production, leading to a decrease in **supply**. The **supply** curve shifts to the left.

(shifter: *input prices*)

Step 3: At the new equilibrium, we will have **higher almond prices** and a

Scenario: Due to a drought in California, farmers face rising water costs. Almond farming is a water-intensive process. How will the drought affect the market for almonds?



Recap: Predicting Market Outcomes

	Effect on Equilibrium **Quantity**	Effect on Equilibrium **Price**
Ex. 1 Increase in **Demand**	Rises	Rises
Ex. 2 Decrease in **Demand**	Falls	Falls
Ex. 3 Increase in **Supply**	Rises	Falls
Ex. 4 Decrease in **Supply**	Falls	Rises

Shifts in **demand** cause price and quantity to move in the **same** direction

Shifts in **supply** cause price and quantity to move in **opposite** directions

When *BOTH* Supply and Demand Shift

The impact of the two shifts on equilibrium price and quantity may be ambiguous, such that your conclusion about the new equilibrium may be, **“It depends”** — it depends on which curve shifted the most.

Let’s work through some examples!

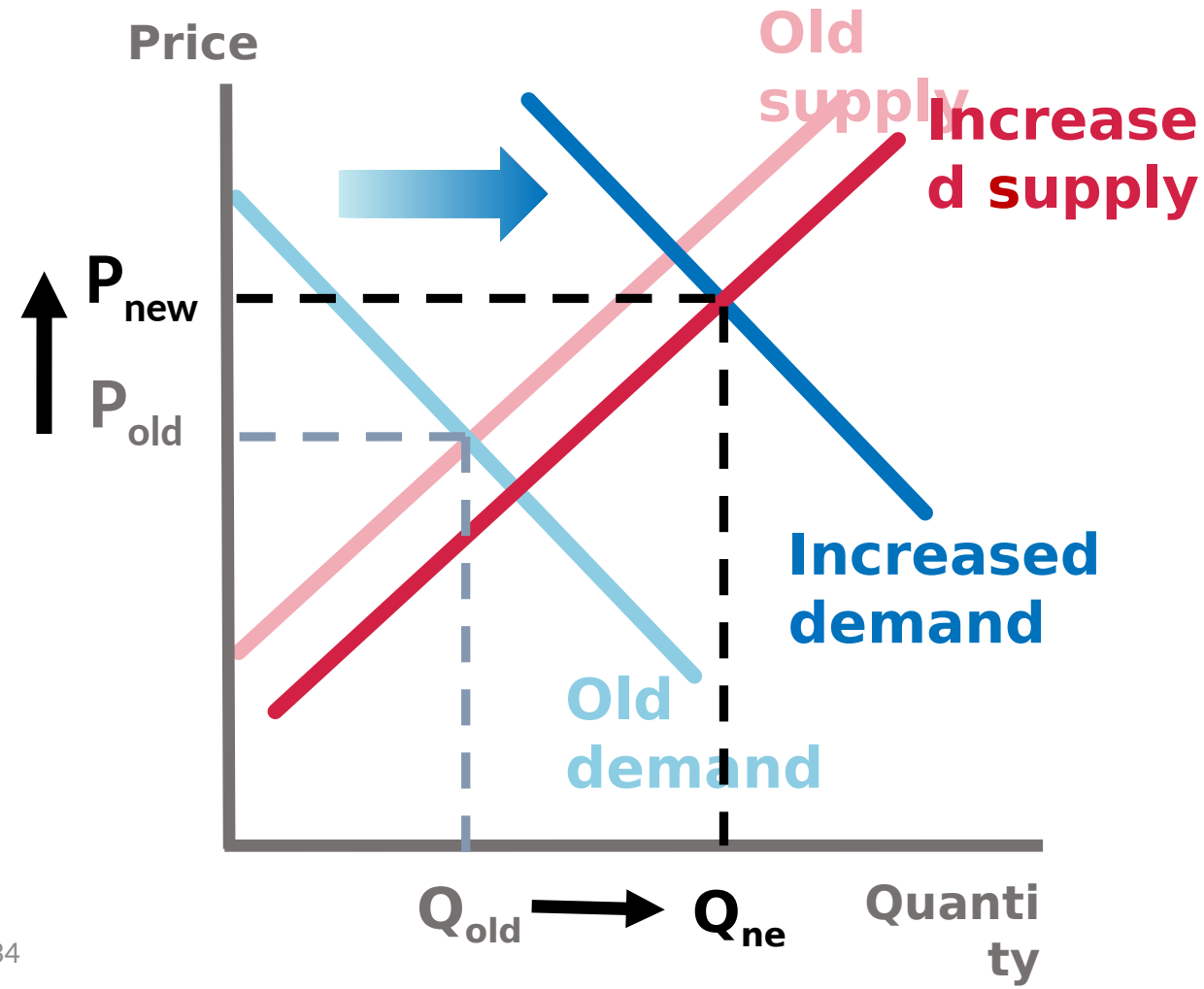
When *both* curves shift (1 of 5)

	Total effect: Effect on equilibrium price	Total effect: Effect on equilibrium Quantity
1. Increase in demand and increase in supply		
2. Increase in demand and decrease in supply		
3. Decrease in demand and increase in supply		
4. Decrease in demand and decrease in supply		

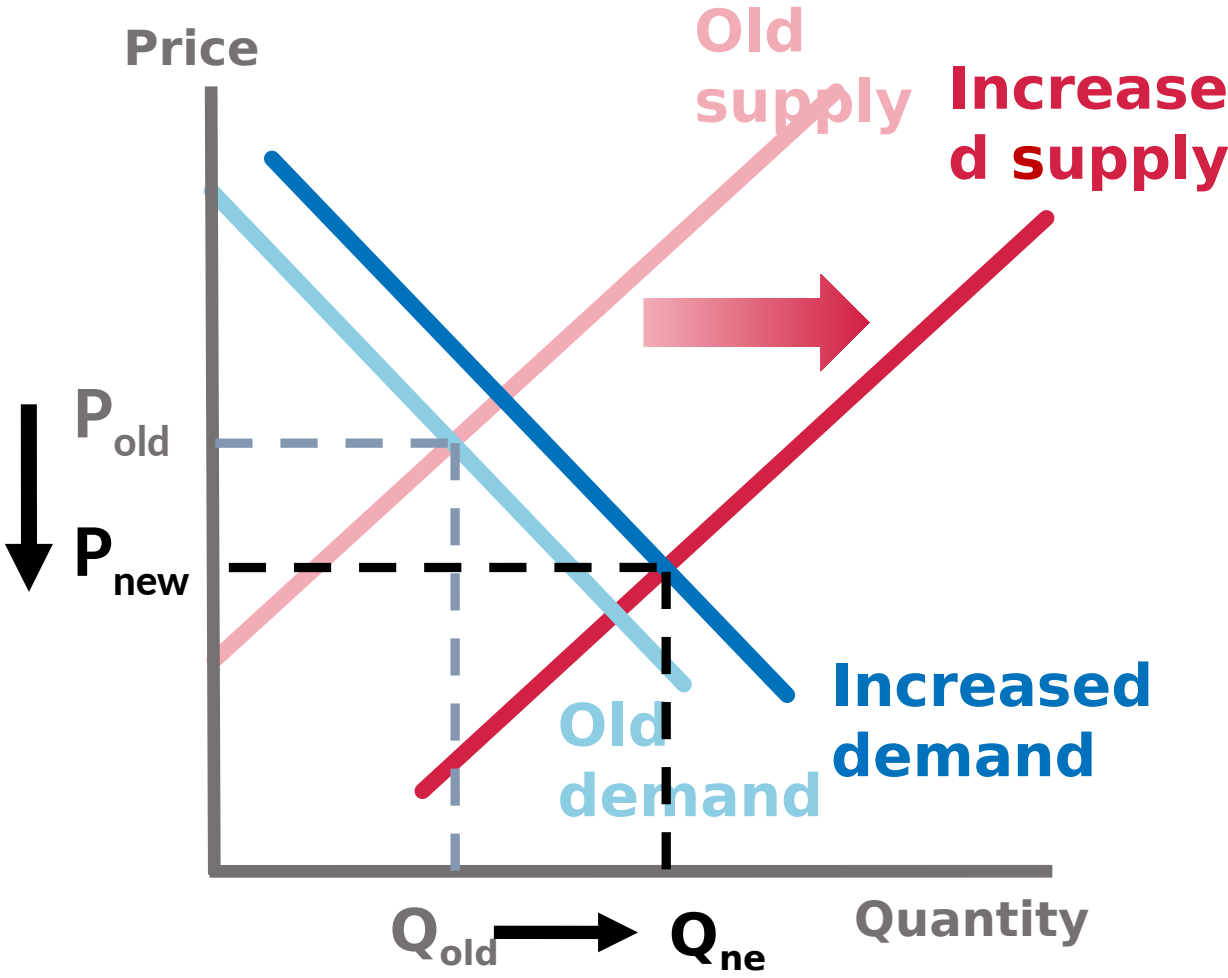
Let's go case-by-case and fill out the details for the four scenarios

1. Increase in Both Supply and Demand

Demand shift is big, and supply



Supply shift is big, and demand

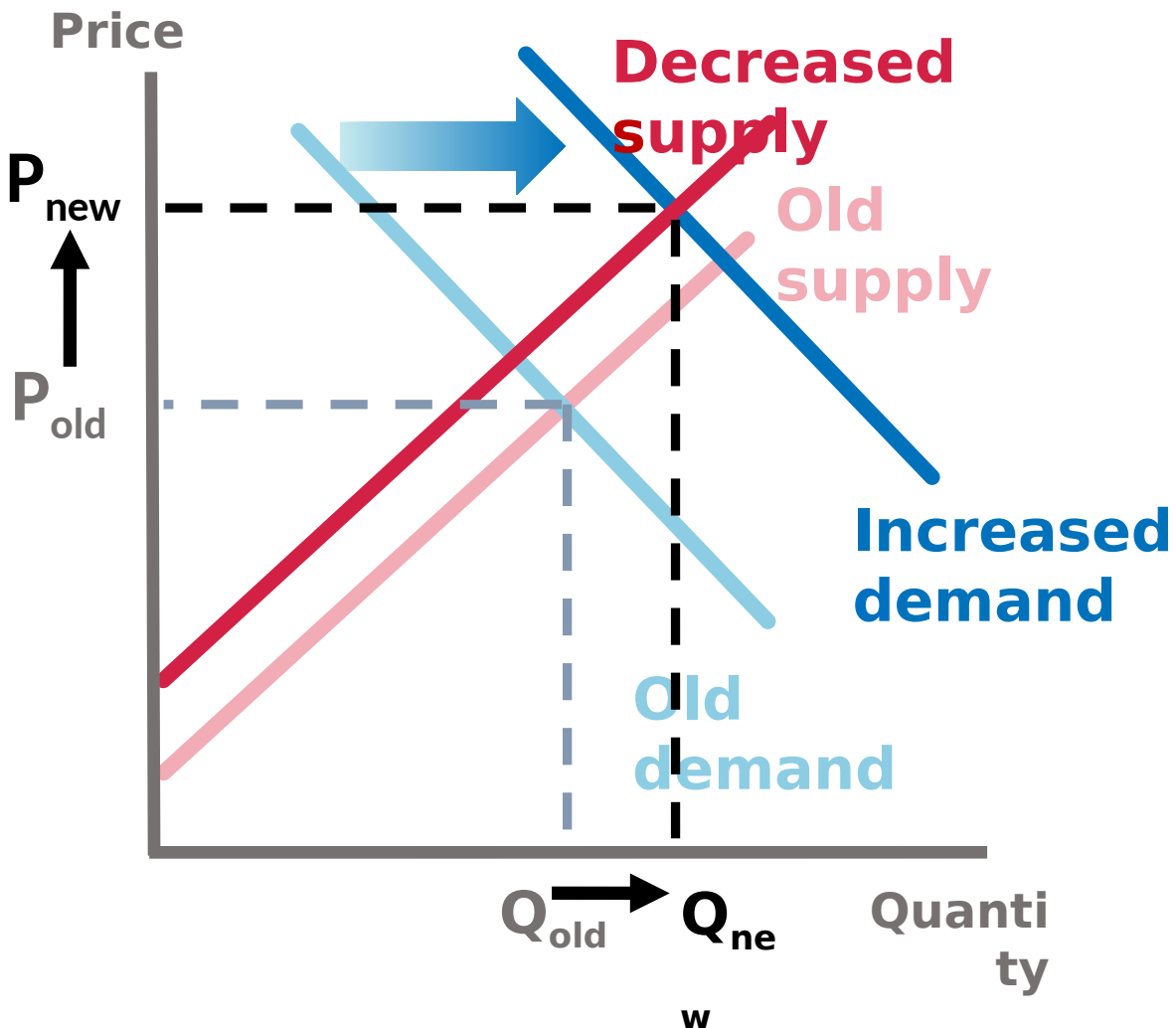


When *both* curves shift (2 of 5)

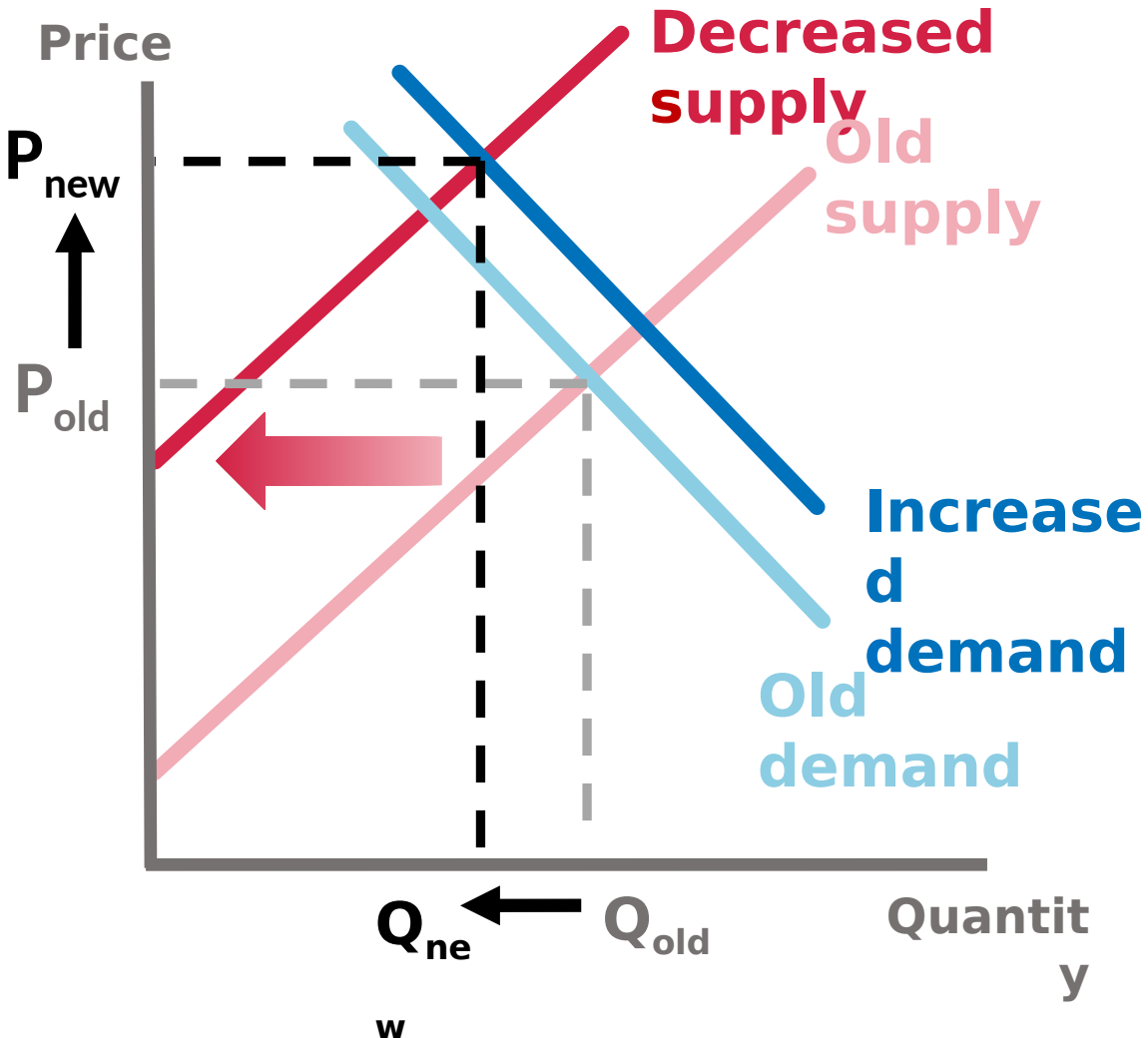
	Total effect: Effect on equilibrium price	**Total effect: Effect on equilibrium Quantity**
1. Increase in demand and increase in supply	It depends (↑P + ↓P)	Rises (↑Q + ↑Q)
2. Increase in demand and decrease in supply		
3. Decrease in demand and increase in supply		
4. Decrease in demand and decrease in supply		

2. Increase in Demand and Decrease in Supply

Demand shift is big, and supply



Supply shift is big, and demand

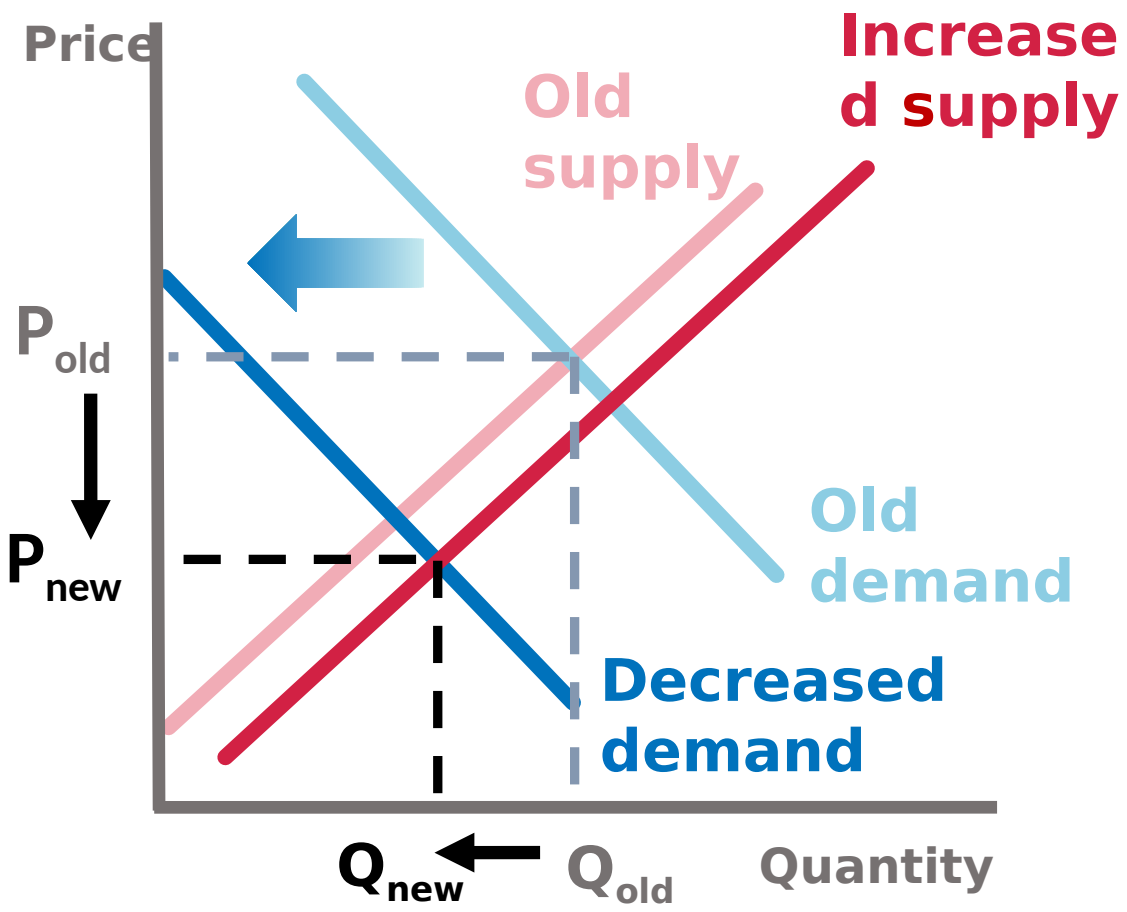


When *both* curves shift (3 of 5)

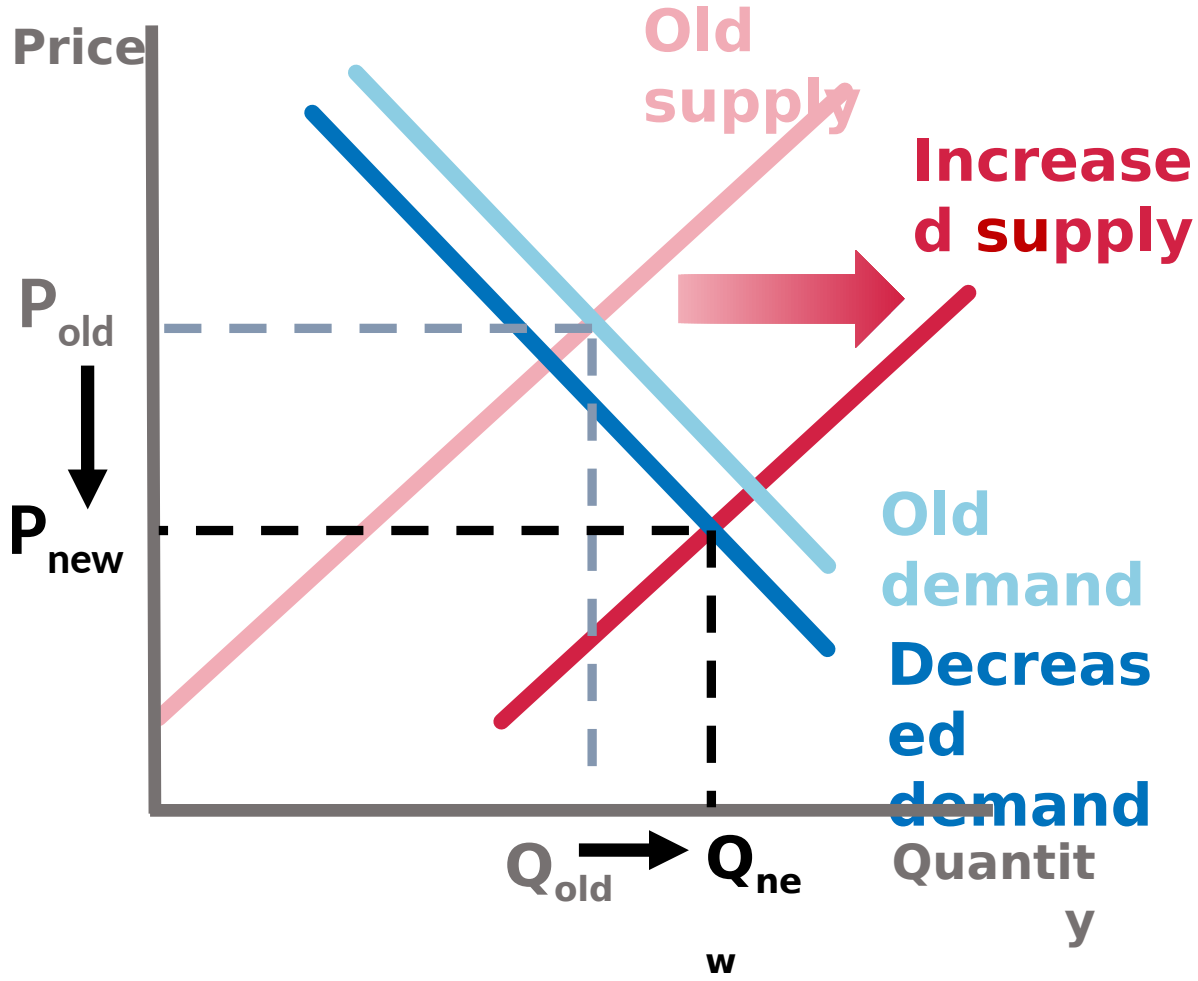
	Total effect: Effect on equilibrium price	Total effect: Effect on equilibrium Quantity
1. Increase in demand and increase in supply	It depends (↑P + ↓P)	Rises (↑Q + ↑Q)
2. Increase in demand and decrease in supply	Rises (↑P + ↑P)	It depends (↑Q + ↓Q)
3. Decrease in demand and increase in supply		
4. Decrease in demand and decrease in supply		

3. Decrease in Demand and Increase in Supply

Demand shift is big, and supply



Supply shift is big, and demand

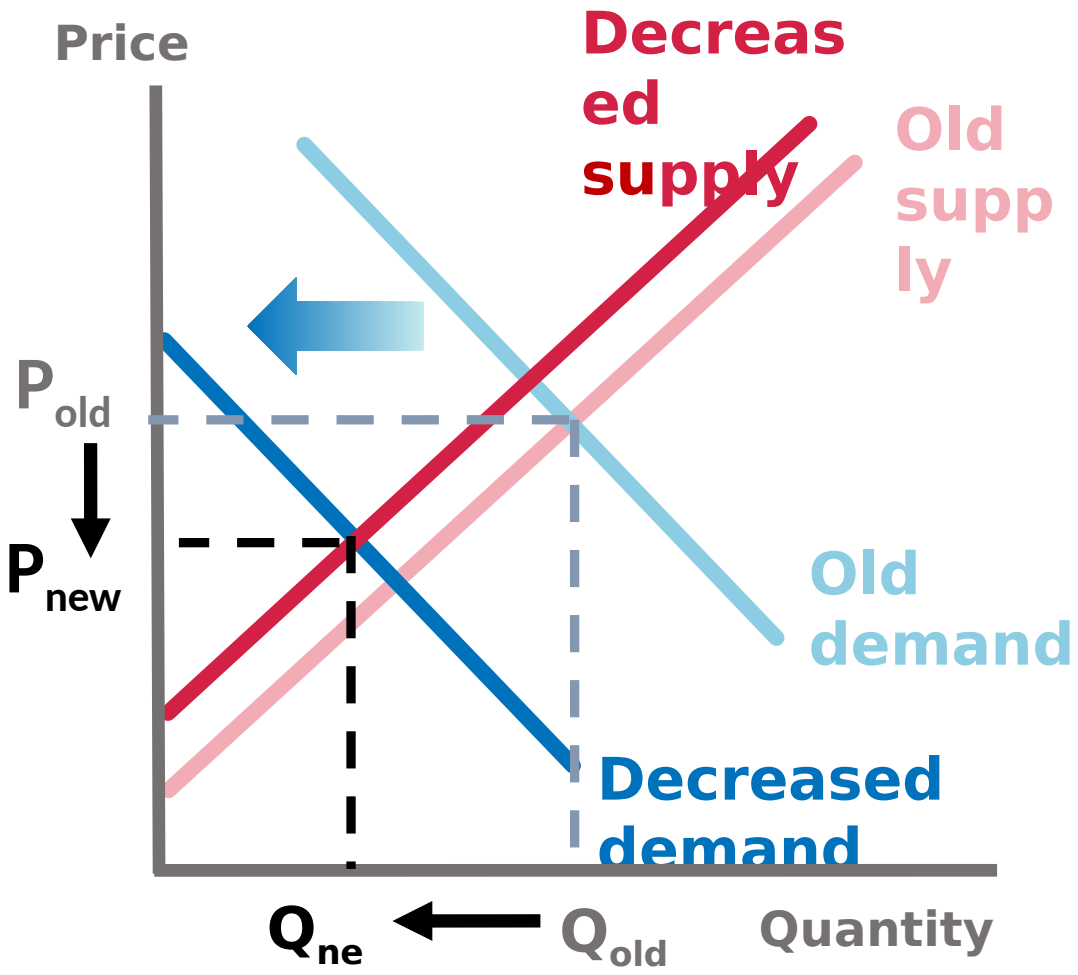


When *both* curves shift (4 of 5)

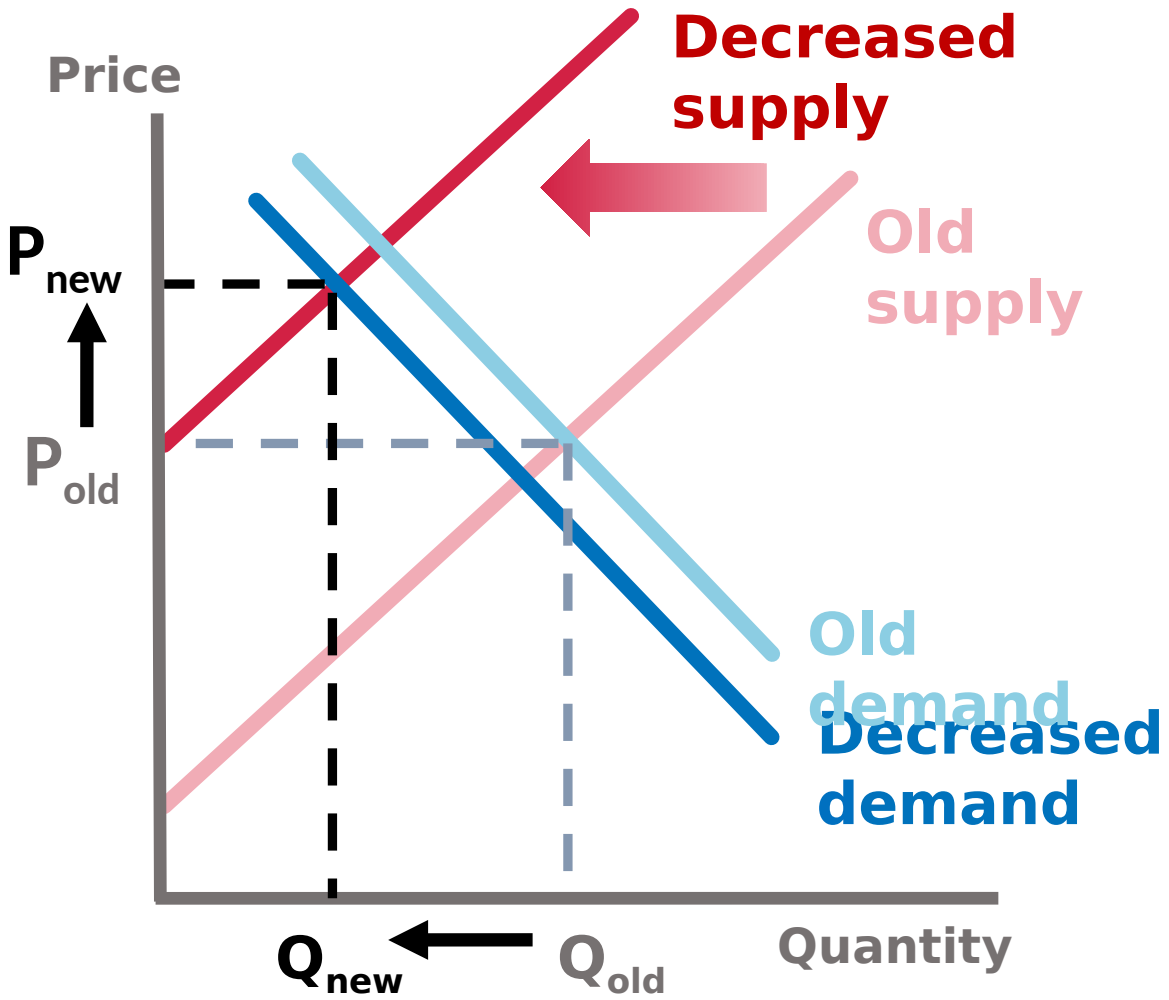
	Total effect: Effect on equilibrium price	Total effect: Effect on equilibrium Quantity
1. Increase in demand and increase in supply	It depends (↑P + ↓P)	Rises (↑Q + ↑Q)
2. Increase in demand and decrease in supply	Rises (↑P + ↑P)	It depends (↑Q + ↓Q)
3. Decrease in demand and increase in supply	Falls (↓P + ↓P)	It depends (↓Q + ↑Q)
4. Decrease in demand and decrease in supply		

4. Decrease in Both Demand and Supply

Demand shift is big, and supply



Supply shift is big, and demand



When *both* curves shift (5 of 5)

	Total effect: Effect on equilibrium price	Total effect: Effect on equilibrium Quantity
1. Increase in demand and increase in supply	It depends (↑P + ↓P)	Rises (↑Q + ↑Q)
2. Increase in demand and decrease in supply	Rises (↑P + ↑P)	It depends (↑Q + ↓Q)
3. Decrease in demand and increase in supply	Falls (↓P + ↓P)	It depends (↓Q + ↑Q)
4. Decrease in demand and decrease in supply	It depends (↓P + ↑P)	Falls (↓Q + ↓Q)

Interpreting Market Data (1 of 3)

The supply and demand framework can be used to...

- **predict** market outcomes when market conditions change
- **diagnose** market outcomes you see in the news or happening around you

Let's focus on the supply and demand framework as

Tips

Rule 1

If prices and quantities move in the **same direction**, then the **demand** curve has definitely shifted.

- (It's possible that the supply curve may also have shifted.)

Rule 2

If price and quantities move in **opposite directions**, then the **supply** curve has definitely shifted.

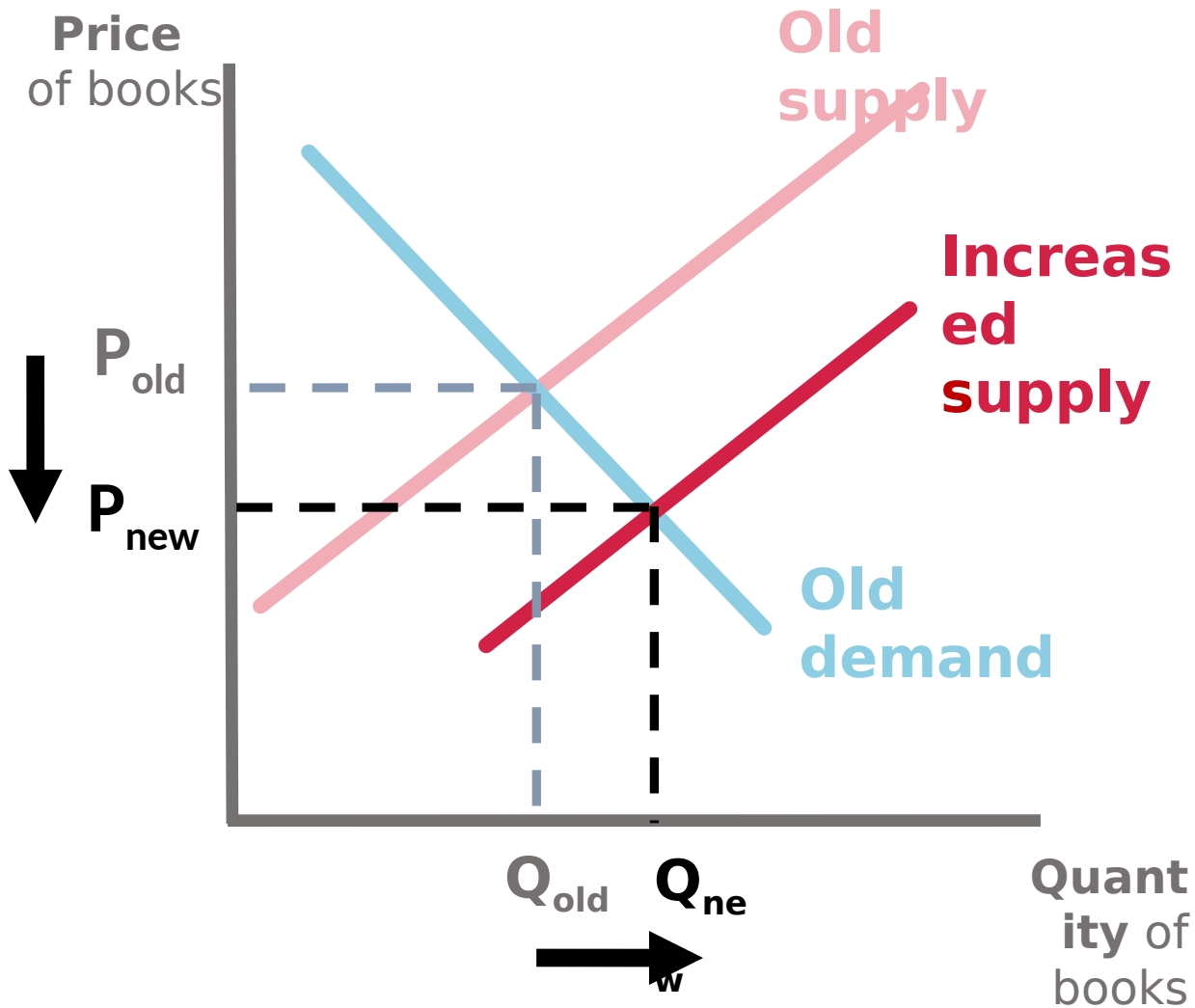
- (It's possible that the demand curve may also have shifted.)

Interpreting Market Data (2 of 3)

Scenario 1: The proliferation of electronic book readers (the Kindle) led to a rise in the quantity of books sold while the average price of a book fell.

Question: What do these changes in quantity and price tell us about how e-books changed the publishing market?

Answer: Because price and quantity moved in **opposite** directions, the **supply** curve



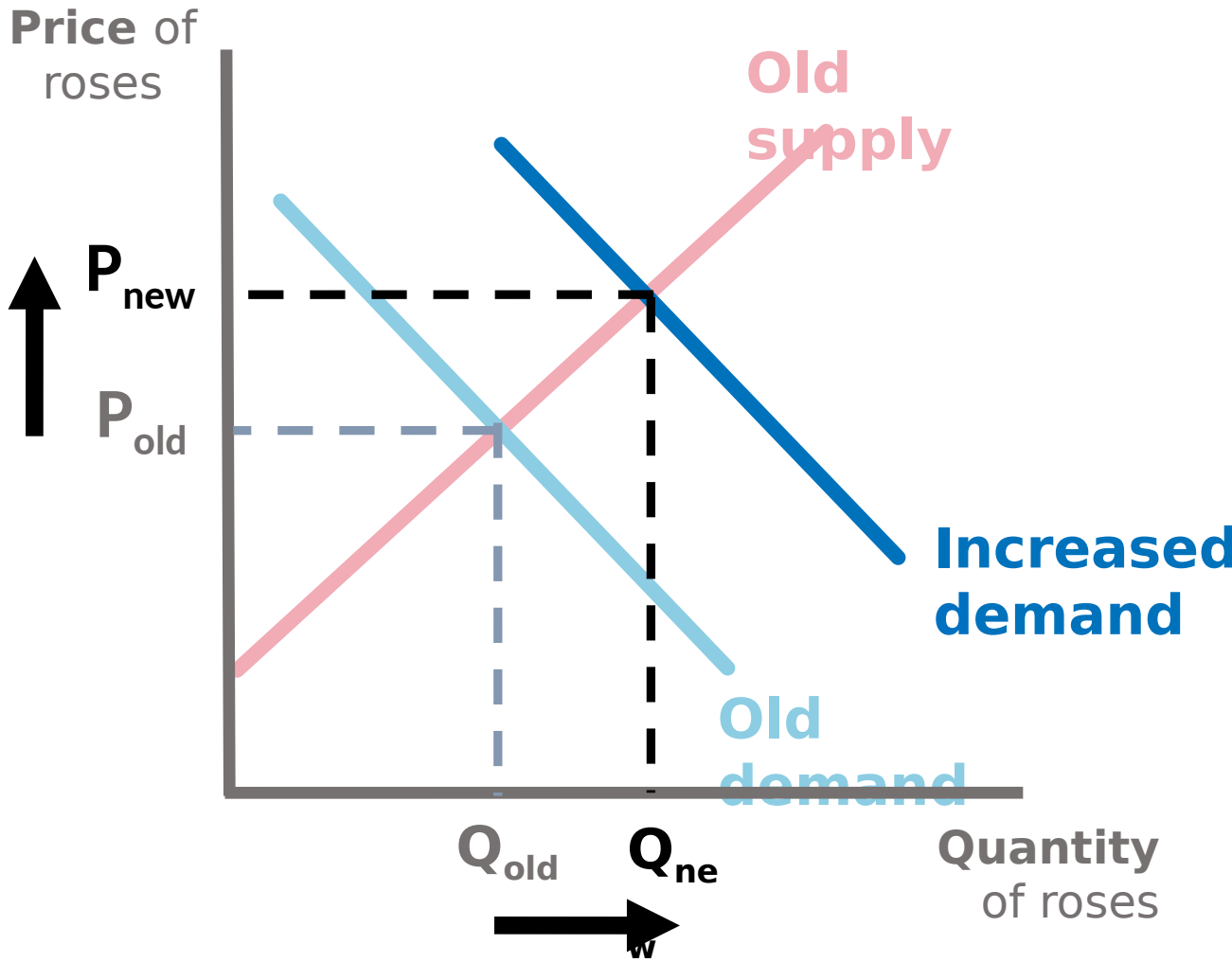
Interpreting Market Data (3 of 3)

Scenario 2:

On Valentine's Day the price of roses rises, as does the quantity sold.

Question: What do these changes in quantity and price tell us about the rose market on Valentine's Day?

Answer: Because price and quantity moved in **same** directions, the **demand** curve must have **increased**.



Key take-aways: Predicting market change

Demand: Six factors can shift the demand curve ("price" is not one of them)

- **Increased demand:** increase in **both** equilibrium price and quantity
- **Decreased demand:** decrease in **both** equilibrium price and quantity

Supply: Five factors can shift the supply curve ("price" is not one of them)

- **Increased supply:** increase in price and decrease in quantity
- **Decreased supply:** decrease in price and increase in quantity

When **BOTH supply** and **demand** shift:

- Impact on equilibrium may be **ambiguous.**
- **It depends** on which curve shifted the most.

Chapter 4 take-aways

Markets are **all around us**!

Equilibrium is where the **curves cross**.

The supply-and-demand framework helps **predict** and **diagnose** price and quantity adjustments

1. Understanding Markets

What are markets, and how are they organized?

2. Equilibrium

Supply equals Demand
Shortage and Surplus

3. Predicting Market Changes

Shifting demand and supply