

INTRODUCTION TO ECONOMICS

Equilibrium: Where Supply Meets Demand^a



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Department of Economics

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^aBased on Ch. 4 of "*Principles of Economics*" by Betsey Stevenson & Justin Wolfers.

Chapter Objective “Equilibrium: Where Supply Meets Demand”

Analyze how supply and demand determine the equilibrium price and quantity.

Roadmap (1 of 3)

■ Understanding Markets

Survey the central role that markets play in our society, determining what is produced, how, by whom, and who gets it.

■ Equilibrium

Analyze how markets bring supply and demand into balance.

■ Predicting Market Changes

Assess the consequences of shifts in demand and supply and the ways that changes in prices and quantities reveal whether demand or supply changed.

Understanding Markets (1 of 2)

Survey the central role that markets play in our society, determining what is produced, how, by whom, and who gets it.

Understanding Markets (2 of 2)

A **market** is any setting that brings together potential buyers (demanders) and sellers (suppliers).



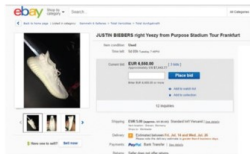
Curved Light USA/Alamy

Posted prices at a café



NetPhotos/Alamy

Online prices for a new TV



Justin's right shoe, selling at auction



Michael Nagle/Bloomberg/Getty Images

Floor of the New York Stock Exchange

Markets Are Everywhere.

- Market for votes
- Market for marriage
- Market for grades

The right **price** is determined in a market, based on **supply** and demand.

What Is a Market?

- A market is any setting that brings together potential buyers (“demanders”) and potential sellers (“suppliers”)
- You are an actor in markets.
 - Shopping: Demanding consumer goods
 - Working: Supplying labor
 - Getting repairs done: Buying skilled labor
 - Saving: Supplying credit
 - Borrowing: Demanding credit
 - Traveling: Supplying U.S. dollars and demanding foreign currency
 - In class: Demanding education
 - Helping fellow students: Supplying education

What Do Markets Do?

- Markets organize economic activity. They determine
 - **what** gets produced.
 - **how much** gets produced.
 - **who produces** it.
 - **who receives** it.
 - at what **price**.
- They bring potential buyers into contact with potential sellers.
- Market outcomes are determined by the forces of **supply** and **demand**.

Discussion Question 1

In what markets were you a **buyer** or **seller** before coming to class today?

Roadmap (2 of 3)

■ Understanding Markets

Survey the central role that markets play in our society, determining what is produced, how, by whom, and who gets it.

■ Equilibrium

Analyze how markets bring supply and demand into balance.

■ Predicting Market Changes

Assess the consequences of shifts in demand and supply and the ways that changes in prices and quantities reveal whether demand or supply changed.

Equilibrium (1 of 2)

Analyze how markets bring supply and demand into balance.

Equilibrium (2 of 2)

Equilibrium is the point at which there is no tendency for change.
(Opposing forces are in balance.)

Market Equilibrium

- **Equilibrium:** Quantity supplied equals quantity demanded.
- **Equilibrium price:** The price at which the market is in equilibrium.
- **Equilibrium quantity:** The quantity demanded and supplied at equilibrium.
In equilibrium, neither suppliers nor demanders have an incentive to change.

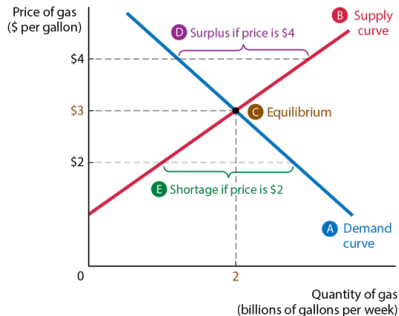
Figure 2: Supply and Demand (1 of 2)

The Market for Gas in the United States

Equilibrium occurs where the supply curve cuts the demand curve.

- A** A quantity of gas demanded at each price is listed in the table, and graphed as the downward-sloping demand curve.
- B** The quantity of gas supplied at each price is listed in the third column of the table, and graphed as the upward-sloping supply curve.
- C** Supply-equals-demand equilibrium occurs where the supply and demand curves meet. This yields an equilibrium price of \$3, and an equilibrium quantity of 2 billion gallons of gas is both supplied and demanded each week. There is no shortage or surplus in equilibrium.
- D** At any price higher than the equilibrium price, such as \$4, the quantity supplied exceeds the quantity demanded, yielding a surplus.
- E** At any price below the equilibrium price, such as \$2, the quantity demanded exceeds the quantity supplied, yielding a shortage.

Price	A Quantity demanded	B Quantity Supplied	Quantity supplied minus quantity demanded
\$4	1.6	2.5	D +0.9 (a surplus)
\$3	2.0	2.0	C Equilibrium: No shortage or surplus
\$2	2.4	1.5	E -0.9 (a shortage)



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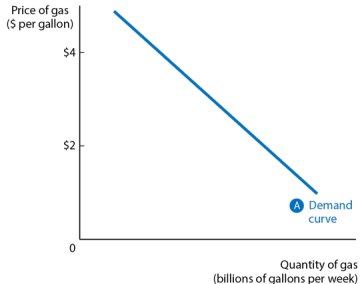
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\$2	2.4		



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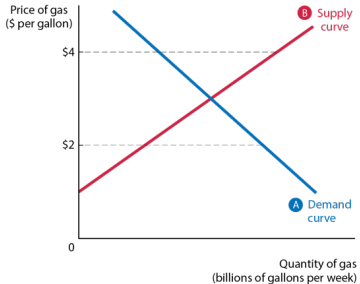
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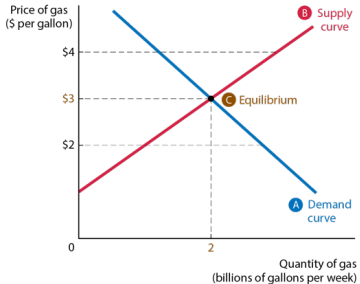
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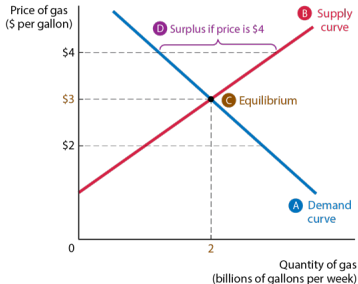
Figure 2: Supply and Demand – Step 4

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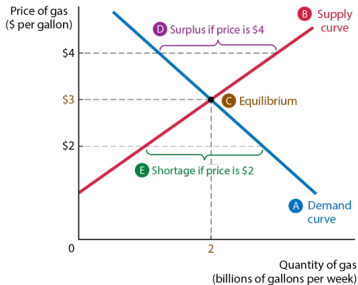
Figure 2: Supply and Demand – Step 5

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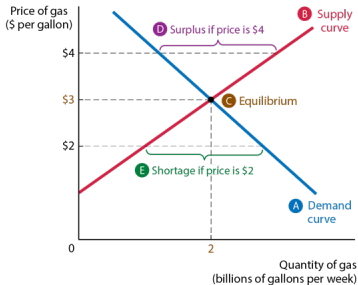
Figure 2: Supply and Demand (1 of 2)

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Everyday Economics: Why Are Diamonds Expensive and Water Cheap?

- How much do you pay for the following:
 - Tap water?
 - A bottle of spring water?
 - A pair of diamond earrings?
- **Prices** are determined by both supply and demand.
- Although water is essential for survival, there is plenty of water.
- But the supply of diamonds is scarce, and they are expensive to mine.

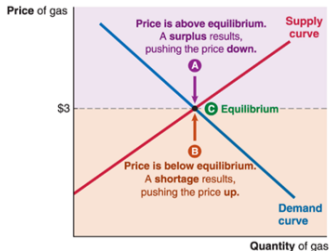


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Figure 3. How Markets Approach Equilibrium



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When price is above equilibrium price =>

Quantity supplied exceeds the quantity demanded, and a surplus results.

When price is below equilibrium price =>

Quantity supplied exceeds the quantity demanded, and a shortage results.

Discussion Question 2

Can you identify a market where you believe there's a surplus or shortage?

Practice Question 1

Which of the following scenarios depicts a market with a shortage of the good being purchased and sold?

1. 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.
2. Jordan goes to DSW to purchase new running shoes. Because the shoes are on sale, she buys the same pair for her sister.
3. Mia goes online to preorder a new phone but discovers that the phone was sold out an hour ago.
4. Austin goes to purchase concert tickets for himself and a friend. He gets a discount because there are still plenty of empty seats available.

Practice Question 1

Which of the following scenarios depicts a market with a shortage of the good being purchased and sold?

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3. Mia goes online to preorder a new phone but discovers that the phone was sold out an hour ago. **CORRECT**
4. Austin goes to purchase concert tickets for himself and a friend. He gets a discount because there are still plenty of empty seats available.

Roadmap (3 of 3)

1. Understanding Markets

Survey the central role that markets play in our society, determining what is produced, how, by whom, and who gets it.

2. Equilibrium

Analyze how markets bring supply and demand into balance.

3. Predicting Market Changes

Assess the consequences of shifts in demand and supply and the ways that changes in prices and quantities reveal whether demand or supply changed.

Predicting Market Changes

Assess the following:

- the consequences of shifts in demand and supply.
- the ways that changes in prices and quantities reveal whether demand or supply changed.

Factors That Shift Demand

- Income
- Preferences
- Price of complements and substitutes
- Expectations
- Congestion and network effects
- Type and number of buyers

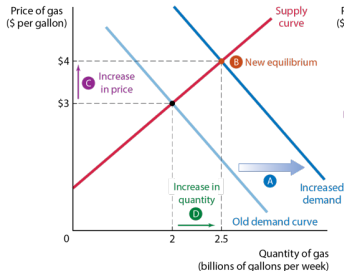
Remember: A change in the price will **not** cause a shift in demand!

Figure 4: Shifts in the Demand Curve (1 of 2)

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

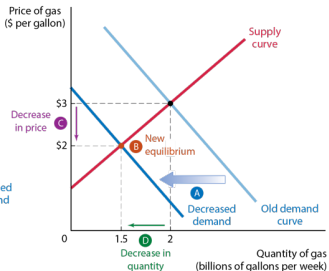
Panel A: An Increase in Demand

- A** An increase in demand causes the demand curve to shift right.
- B** This leads to a new supply-equals-demand equilibrium.
- C** Leading to an increase in the price.
- D** And an increase in quantity.



Panel B: A Decrease in Demand

- A** A decrease in demand causes the demand curve to shift left.
- B** This leads to a new supply-equals-demand equilibrium.
- C** Leading to a decrease in the price.
- D** And a decrease in quantity.



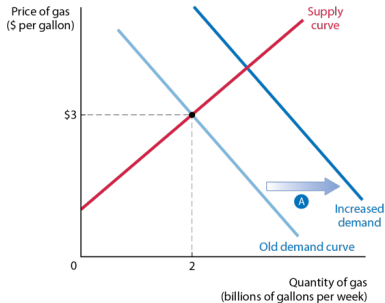
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Shifts in demand cause price and quantity to move in the same direction.

Panel A: An Increase in Demand

- Ⓐ An increase in demand causes the demand curve to shift right.



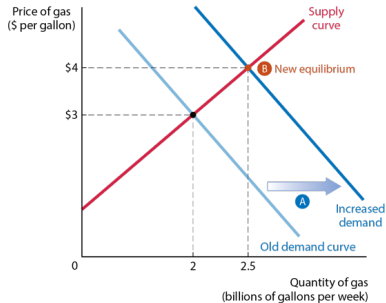
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Figure 4: Shifts in the Demand Curve – Step 2

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

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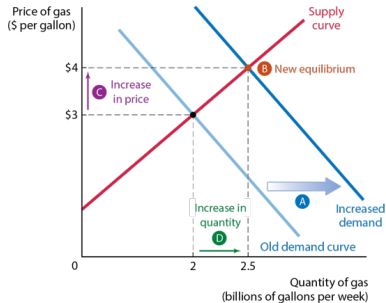
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Shifts in demand cause price and quantity to move in the same direction.

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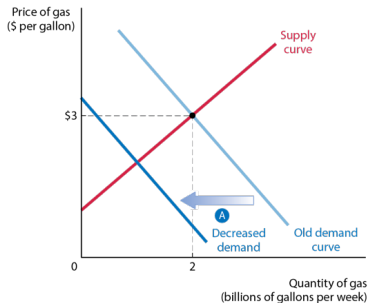
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Figure 4: Shifts in the Demand Curve – Step 4

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

Panel B: A Decrease in Demand

- A decrease in demand causes the demand curve to shift left.



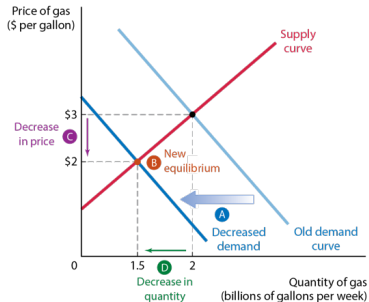
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Shifts in demand cause price and quantity to move in the same direction.

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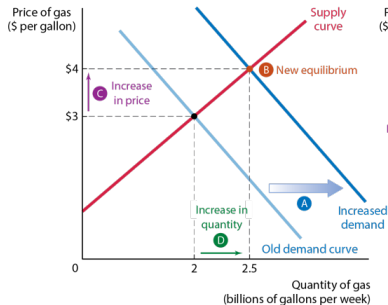
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Figure 4: Shifts in the Demand Curve (2 of 2)

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

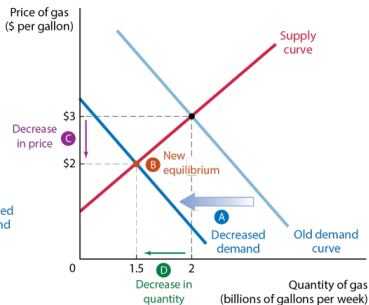
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- D** And an increase in quantity.



Panel B: A Decrease in Demand

- A** A decrease in demand causes the demand curve to shift left.
- B** This leads to a new supply-equals-demand equilibrium.
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- D** And a decrease in quantity.



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Factors That Shift Supply

- Input prices
- Productivity and technology
- Other opportunities and the prices of related outputs
- Expectations
- Type and number of sellers

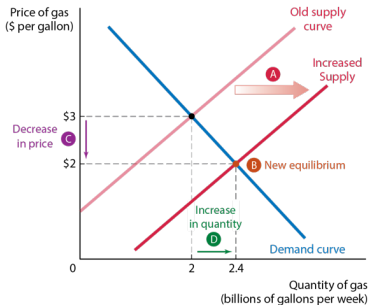
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Figure 5: Shifts in the Supply Curve (1 of 2)

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

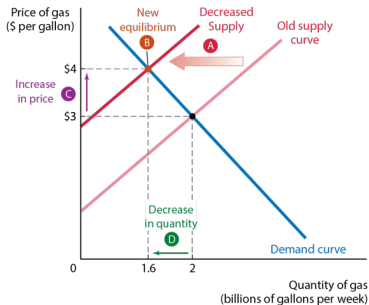
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- D** And a decrease in quantity.



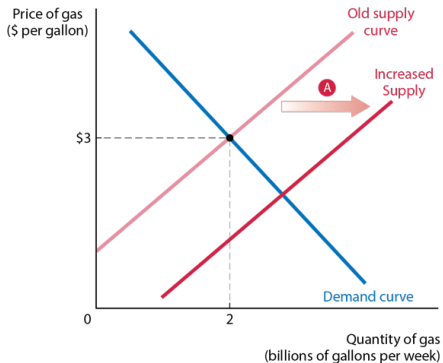
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Figure 5: Shifts in the Supply Curve – Step 1

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

Panel A: An Increase in Supply

- A** An **increase in supply** causes the demand curve to **shift right**.



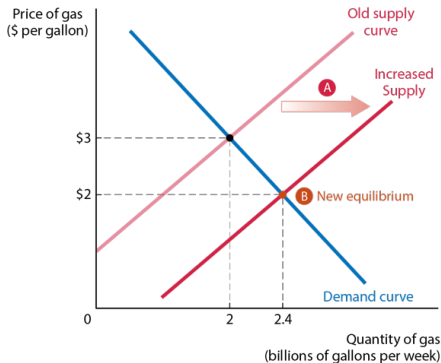
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Figure 5: Shifts in the Supply Curve – Step 2

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

Panel A: An Increase in Supply

- A An increase in supply causes the supply curve to shift right.
- B This leads to a new supply-equals-demand equilibrium.



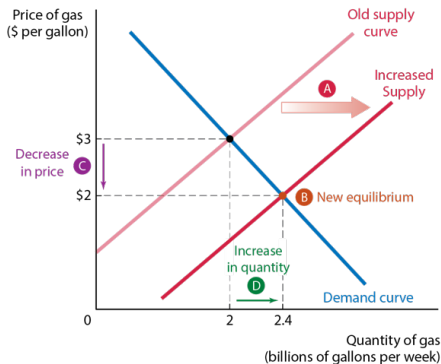
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- D And an **increase in quantity**.



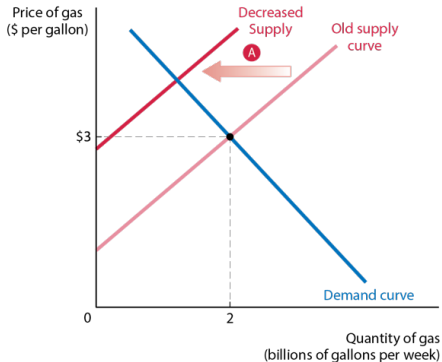
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Figure 5: Shifts in the Supply Curve – Step 4

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

Panel B: A Decrease in Supply

- A A decrease in supply causes the demand curve to shift left.



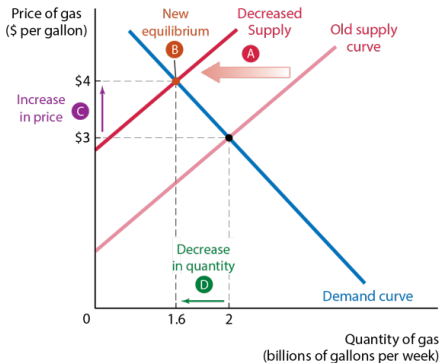
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Figure 5: Shifts in the Supply Curve – Step 5

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Panel B: A Decrease in Supply

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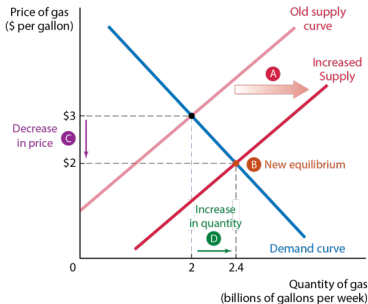
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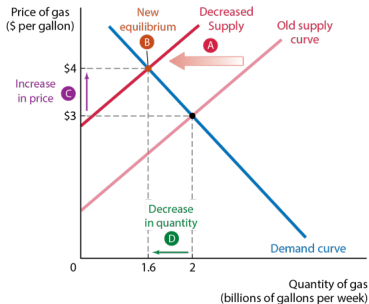
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- A** An **increase in supply** causes the supply curve to **shift right**.
- B** This leads to a new supply-equals-demand **equilibrium**.
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- D** And an **increase in quantity**.



Panel B: A Decrease in Supply

- A** A **decrease in supply** causes the supply curve to **shift left**.
- B** This leads to a new supply-equals-demand **equilibrium**.
- C** Leading to an **increase in the price**.
- D** And a **decrease in quantity**.



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Three-Step Recipe to Predict Market Outcomes

1. Is the supply curve or demand curve (or both) shifting?
2. Is it an increase, shifting the curve to the right? Or is it a decrease, shifting the curve to the left?
3. How will prices and quantities change in the new equilibrium?

Practice Question 2

Which of the following news headlines depicts the supply shifting to the right?

1. Connor owns a fast-food restaurant. Like other restaurants in town, he is reducing his staff by half because of the government-mandated increase in the minimum wage.
2. Jenny runs a law firm. She is hoping her workers can sort through twice the amount of legal documents in a day with the help of artificial intelligence that her firm is using.
3. Alexa will be purchasing more stocks because of a recent increase in her income.
4. Gabe just watched a TV show that said that eating more kale boosts brain power. He decides to increase her consumption of kale to five bunches a day.

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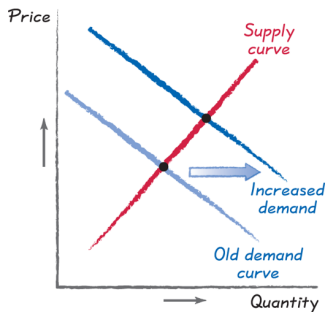
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Three-Step Recipe: Example 1

- A major retailer announces plans to install charging stations for electric cars in 400 parking spaces in 120 cities.
- Use the three-step recipe to determine how this will affect the demand for electric cars.

Three-Step Recipe: Example 1 Solution

1. Demand shifts because **buyers** of electric cars will have greater access to charging stations while running errands.
2. The increased convenience **increases** the demand for electric cars, shifting the demand curve to the right.
3. At the new equilibrium, **price and quantity both increase.**



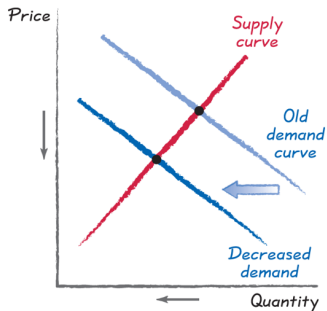
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Three-Step Recipe: Example 2

- Amazon announces that it is developing technology to deliver orders to customers within 30 minutes.
- Owners of local brick-and-mortar stores want to know how this will affect their companies' **sales**. (In other words, how will buyers respond?)

Three-Step Recipe: Example 2 Solution

1. A shift in **demand** occurs because people who normally buy from their local stores will start ordering from Amazon.
2. A **decrease** in demand for goods from local stores shifts the demand curve to the left.
3. The reduced demand will lead to a new equilibrium with both a **lower price and a lower quantity**.



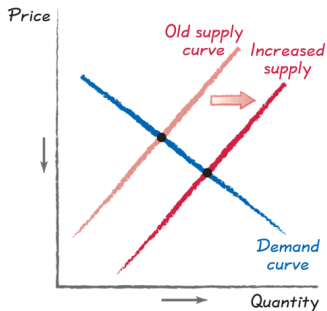
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Three-Step Recipe: Example 3

- The federal government announces a plan to fund research that will eventually lower the cost of the batteries used in hybrid cars.
- The head of the hybrid vehicle division at General Motors wants to know how these innovations will affect the hybrid-car market.

Three-Step Recipe: Example 2 Solution

1. There will be a shift in **supply** as new technologies affect the seller's marginal cost of producing each hybrid car.
2. An **increase in supply** will occur because cheaper batteries will reduce the cost of an important input.
3. An increased supply will lead to a new equilibrium with a **lower price and a larger quantity**.



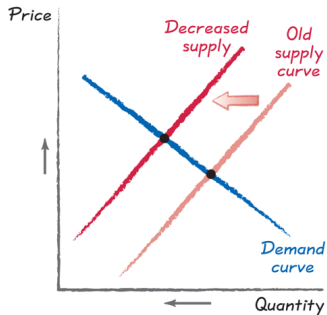
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The Three-Step Recipe: Example 4

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

Three-Step Recipe: Example 4 Solution

1. A shift in **supply** occurs because water is an input into almond farming, and the scarcity of the input will increase the seller's marginal cost of producing almonds.
2. A **decrease in supply** occurs because almonds will become more expensive to produce at any given price.
3. Decreased supply will lead to a new equilibrium with a **higher price and a smaller quantity**.



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Figure 6. Consequences of Shifts in Demand or Supply

	Effect on equilibrium quantity	Effect on equilibrium price	
Increase in demand (Example: The effect of Wall Street bonuses on designer clothing sales)	Rises	Rises	<i>Shifts in demand cause price and quantity to move in the same direction</i>
Decrease in demand (Example: The effect of increased violence in Mexico on tourism there)	Falls	Falls	
Increase in supply (Example: The effect of more efficient battery production on hybrid cars)	Rises	Falls	<i>Shifts in supply cause price and quantity to move in opposite directions</i>
Decrease in supply (Example: The effect of higher oil prices on the gasoline market)	Falls	Rises	

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When Both Supply and Demand Shift (part 1)

- What happens when both supply and demand shift at the same time?
- Here's an example from the **gasoline market**:
 - A few years ago, the U.S. economy entered a severe recession, and the price of crude oil rose sharply.
 - A recession reduced the incomes of gas consumers, so **demand shifted left**.
 - Higher oil prices raised costs for gasoline suppliers, so **supply shifted left**.
 - What's the impact of these shifts on the market for gasoline?

When Both Supply and Demand Shift (part 2)

- When supply and demand both shift, the conclusion will often be “it depends.”
- The change in supply might cause the price or quantity to move in one direction.
- The change in demand can cause it to move in the opposite direction.
- The total effect depends on which curve shifts the most.

Figure 7: Shifts in Supply and Demand (1 of 2)

When Both Supply and Demand Curves Shift

Analyze two cases: Case 1 A big demand shift with a small supply shift.

Case 2 A small supply shift with a big demand shift.

A A decrease in both supply and demand causes both curves to shift left.

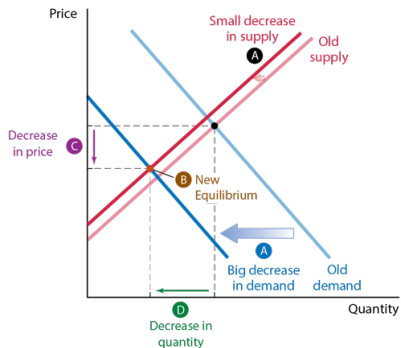
B This leads to a new supply-equals-demand equilibrium.

Implications depend on whether it's a big shift in supply and a small shift in demand, or a small shift in supply and a big shift in demand.

C The price could rise or fall: It falls in Case 1, but rises in Case 2.

D And a decrease in quantity occurs in either scenario.

Case 1: A Big Shift in Demand and a Small Shift in Supply



Case 2: A Small Shift in Demand and a Big Shift in Supply

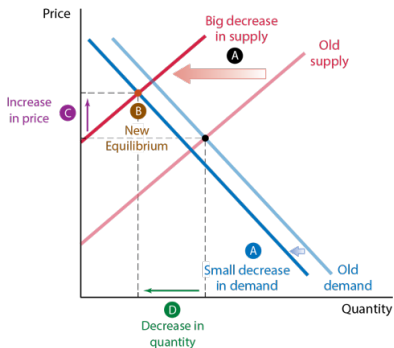


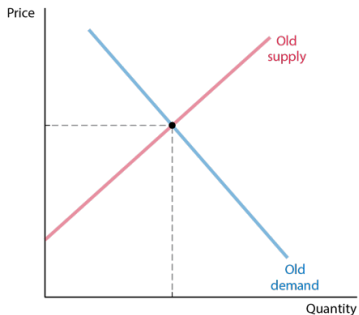
Figure 7: Shifts in Supply and Demand – Step 1

When Both Supply and Demand Curves Shift

Analyze two cases: Case 1 A big demand shift with a small supply shift.

Case 2 A small supply shift with a big demand shift.

Case 1: A Big Shift in Demand and a Small Shift in Supply



Case 2: A Small Shift in Demand and a Big Shift in Supply

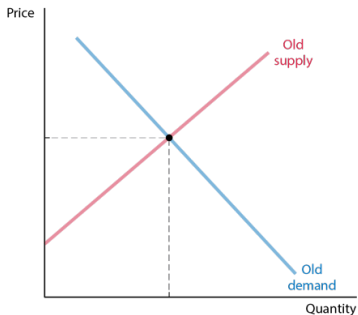


Figure 7: Shifts in Supply and Demand – Step 2

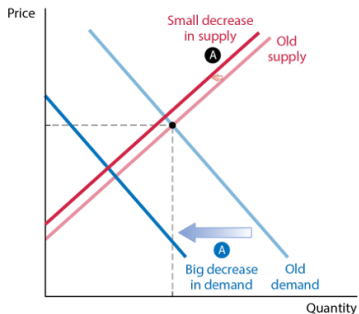
When Both Supply and Demand Curves Shift

Analyze two cases: Case 1 A big demand shift with a small supply shift.

Case 2 A small supply shift with a big demand shift.

- Ⓐ A decrease in both supply and demand causes both curves to shift left.

Case 1: A Big Shift in Demand and a Small Shift in Supply



Case 2: A Small Shift in Demand and a Big Shift in Supply

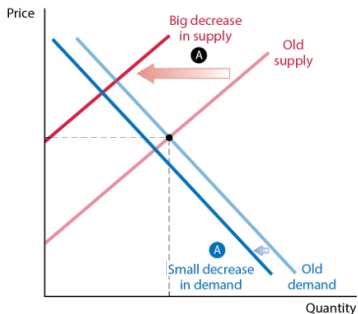


Figure 7: Shifts in Supply and Demand – Step 3

When Both Supply and Demand Curves Shift

Analyze two cases: Case 1 A big demand shift with a small supply shift.

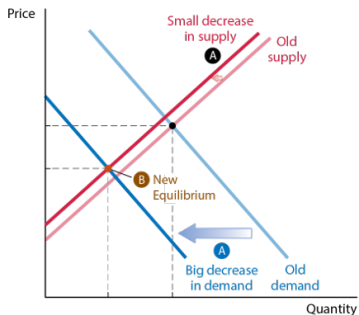
Case 2 A small supply shift with a big demand shift.

A A decrease in both supply and demand causes both curves to shift left.

B This leads to a new supply-equals-demand equilibrium.

Implications depend on whether it's a big shift in supply and a small shift in demand, or a small shift in supply and a big shift in demand.

Case 1: A Big Shift in Demand and a Small Shift in Supply



Case 2: A Small Shift in Demand and a Big Shift in Supply

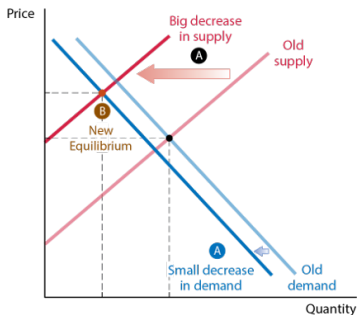


Figure 7: Shifts in Supply and Demand – Step 4

When Both Supply and Demand Curves Shift

Analyze two cases: Case 1 A big demand shift with a small supply shift.

Case 2 A small supply shift with a big demand shift.

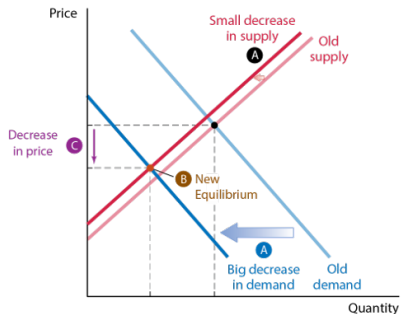
A A decrease in both supply and demand causes both curves to shift left.

B This leads to a new supply-equals-demand equilibrium.

Implications depend on whether it's a big shift in supply and a small shift in demand, or a small shift in supply and a big shift in demand.

C The price could rise or fall: It falls in Case 1, but rises in Case 2.

Case 1: A Big Shift in Demand and a Small Shift in Supply



Case 2: A Small Shift in Demand and a Big Shift in Supply

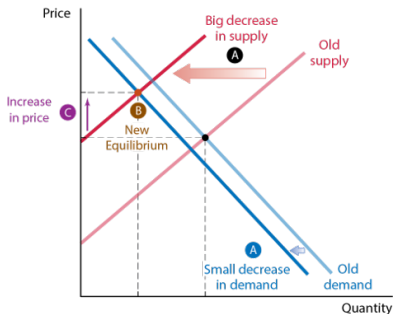


Figure 7: Shifts in Supply and Demand – Step 5

When Both Supply and Demand Curves Shift

Analyze two cases: Case 1 A big demand shift with a small supply shift.

Case 2 A small supply shift with a big demand shift.

A A decrease in both supply and demand causes both curves to shift left.

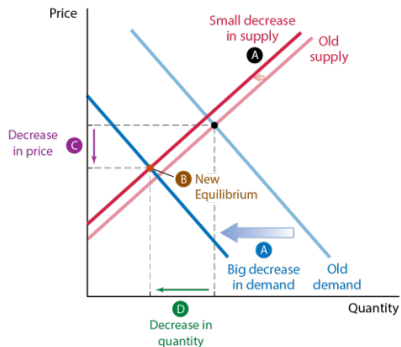
B This leads to a new supply-equals-demand equilibrium.

Implications depend on whether it's a big shift in supply and a small shift in demand, or a small shift in supply and a big shift in demand.

C The price could rise or fall: It falls in Case 1, but rises in Case 2.

D And a decrease in quantity occurs in either scenario.

Case 1: A Big Shift in Demand and a Small Shift in Supply



Case 2: A Small Shift in Demand and a Big Shift in Supply

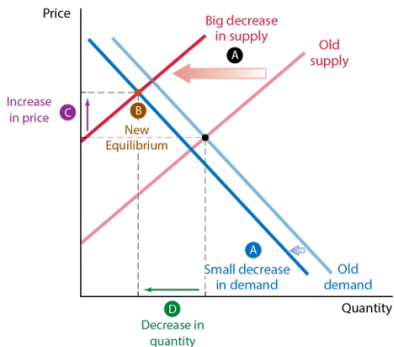


Figure 7: Shifts in Supply and Demand (2 of 2)

When Both Supply and Demand Curves Shift

Analyze two cases: Case 1 A big demand shift with a small supply shift.

Case 2 A small supply shift with a big demand shift.

A A decrease in both supply and demand causes both curves to shift left.

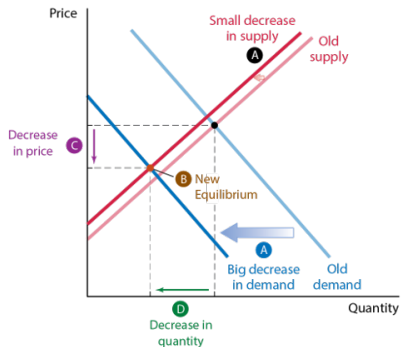
B This leads to a new supply-equals-demand equilibrium.

Implications depend on whether it's a big shift in supply and a small shift in demand, or a small shift in supply and a big shift in demand.

C The price could rise or fall: It falls in Case 1, but rises in Case 2.

D And a decrease in quantity occurs in either scenario.

Case 1: A Big Shift in Demand and a Small Shift in Supply



Case 2: A Small Shift in Demand and a Big Shift in Supply

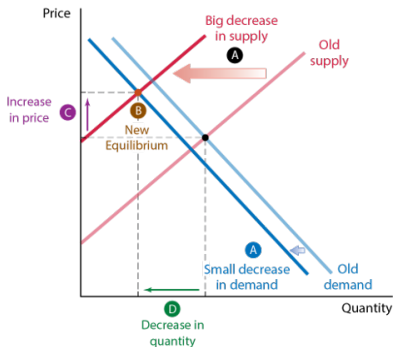


Figure 8. When Both Supply and Demand Curves Shift

	<i>Morning</i>	<i>Evening</i>	Total effect (<i>Morning</i> + <i>Evening</i>)	
	Effect of demand shock	Effect of supply shock	Effect on equilibrium price	Effect on equilibrium quantity
Increase in demand and increase in supply	↑P, ↑Q	↓P, ↑Q	It depends (↑P + ↓P)	Rises (↑Q + ↑Q)
Increase in demand and decrease in supply	↑P, ↑Q	↑P, ↓Q	Rises (↑P + ↑P)	It depends (↑Q + ↓Q)
Decrease in demand and increase in supply	↓P, ↓Q	↓P, ↑Q	Falls (↓P + ↓P)	It depends (↓Q + ↑Q)
Decrease in demand and decrease in supply	↓P, ↓Q	↑P, ↓Q	It depends (↓P + ↑P)	Falls (↓Q + ↓Q)

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Interpreting Market Data

Remember **two key rules**:

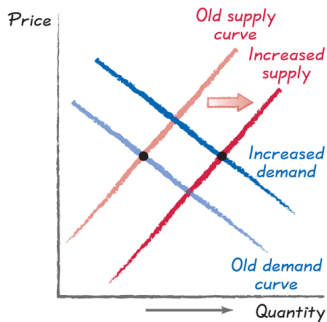
1. If prices and quantities move in the **same** direction, then the **demand curve** has definitely shifted. (It's possible that supply may have also shifted.)
2. If prices and quantities move in **opposite** directions, then the **supply** curve has definitely shifted. (It's possible that demand may have also shifted.)

Interpreting the Data: Market for Houses (1 of 2)

- Every summer, the quantity of houses sold rises dramatically, but the price of housing doesn't change much.
- **What do these price and quantity changes tell us?**

Interpreting the Data: Market for Houses (2 of 2)

- **Demand for housing increases** because buyers prefer to move in the summer.
- **Supply also increases** because many people trying to buy a new house are also trying to sell their old house.
- Consequently, **both supply and demand increase** in the summer.



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Key Takeaways

- Markets play a central role in society.
- Equilibrium is achieved when supply and demand are equal.
- The effects of changing market conditions can be evaluated by asking these questions:
 - Which curve shifted?
 - Was it an increase or a decrease?
 - What are the implications for prices and quantities?
- Market data can be interpreted to reveal whether supply or demand shifted.