

Principles of Economics, 10e

Chapter 4: The Market Forces of Supply and Demand

Chapter Objectives (1 of 3)

By the end of this chapter, you should be able to:

- Given a scenario, determine if a market is competitive.
- Construct a demand curve using a given demand schedule.
- Describe the relationship between price and quantity demanded using the law of demand.
- Determine if a given scenario will cause a movement along or a shift of a good's demand curve.
- Explain how a change in a demand determinant impacts a good's demand curve.

Chapter Objectives (2 of 3)

- Determine market demand using information about individuals' demand.
- Determine if a given scenario will cause a movement along or a shift of a good's supply curve.
- Explain how the price of a good impacts the demand for its complements and substitutes.
- Construct a supply curve using a given supply schedule.
- Describe the relationship between price and quantity supplied using the law of supply.
- Explain how a change in a supply determinant impacts a good's supply curve.

Chapter Objectives (3 of 3)

- Determine market supply using information about individual firms' supply.
- Determine the equilibrium price and quantity using the supply and demand model.
- Explain how simultaneous changes in demand and supply impact market equilibrium.
- Explain how changes in demand impact market equilibrium.
- Explain how changes in supply impact market equilibrium.
- Explain how price changes eliminate a surplus or shortage.

4-1

Markets and Competition

Supply and Demand

- **Supply** and **demand**
 - Words economists use most often
 - Forces that make market economies
 - Refer to the behavior of people as they interact in *competitive* markets
- **Goods**: things that people want to use or consume. *Positive price*
- **Bads**: things that people don't want, and might be willing to *pay to not have*, e.g., garbage, pollution, etc. *Negative price*

What Is a Market?

- **Market***
 - A group of buyers and sellers of a particular good or service
- Buyers as a group
 - Determine the demand for the product
- Sellers as a group
 - Determine the supply of the product

*Words accompanied by an asterisk are key terms from the chapter.

What Is Competition?

- **Competitive market***
 - Market in which there are many buyers and many sellers
 - Each has a negligible impact on market price
- Price and quantity sold are determined by all buyers and sellers as they interact in the marketplace

*Words accompanied by an asterisk are key terms from the chapter.

Perfectly Competitive Market

- Goods offered for sale are all exactly the same
- Buyers and sellers are numerous
 - No single buyer or seller has any influence over the market price
 - Must accept the price the market determines (price takers)
- At the market price
 - Buyers (sellers) can buy (sell) all they want
- E.g., wheat markets

Other Markets

- Monopoly
 - The only seller in the market
 - Sets the price
- Other Markets
 - Between perfect competition and monopoly

4-2

Demand

Law of Demand

- **Law of demand***
 - (For **ordinary goods**:) Other things being equal, when the price of a good rises, the quantity demanded falls, and when the price falls, the quantity demanded rises
- **Quantity demanded***
 - Amount of a good that buyers are *willing and able* to purchase

*Words accompanied by an asterisk are key terms from the chapter.

Individual Demand

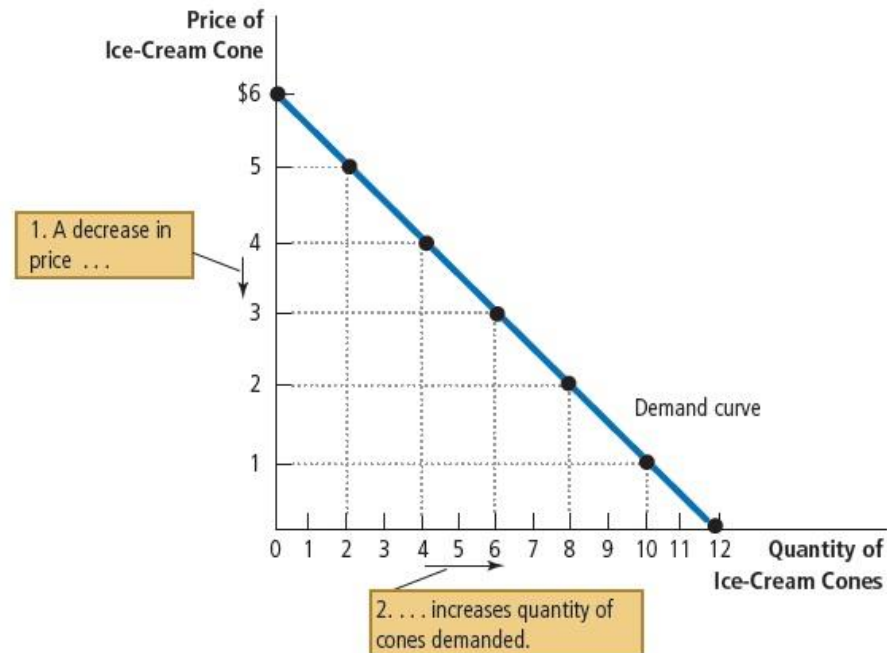
- Individual demand
 - An individual's demand for a product
- **Demand schedule***
 - A table that shows the relationship between the price of a good and the quantity demanded
- **Demand curve***
 - A graph of the relationship between the price of a good and the quantity demanded

*Words accompanied by an asterisk are key terms from the chapter.

Figure 1 Catherine's Demand Schedule and Demand Curve

The demand schedule is a table that shows the quantity demanded at each price. The demand curve, which graphs this schedule, illustrates how the quantity demanded changes as the price varies. Because a lower price increases the quantity demanded, the demand curve slopes downward.

Price of Ice-Cream Cone	Quantity of Cones Demanded
\$0	12 cones
1	10
2	8
3	6
4	4
5	2
6	0



Market Demand

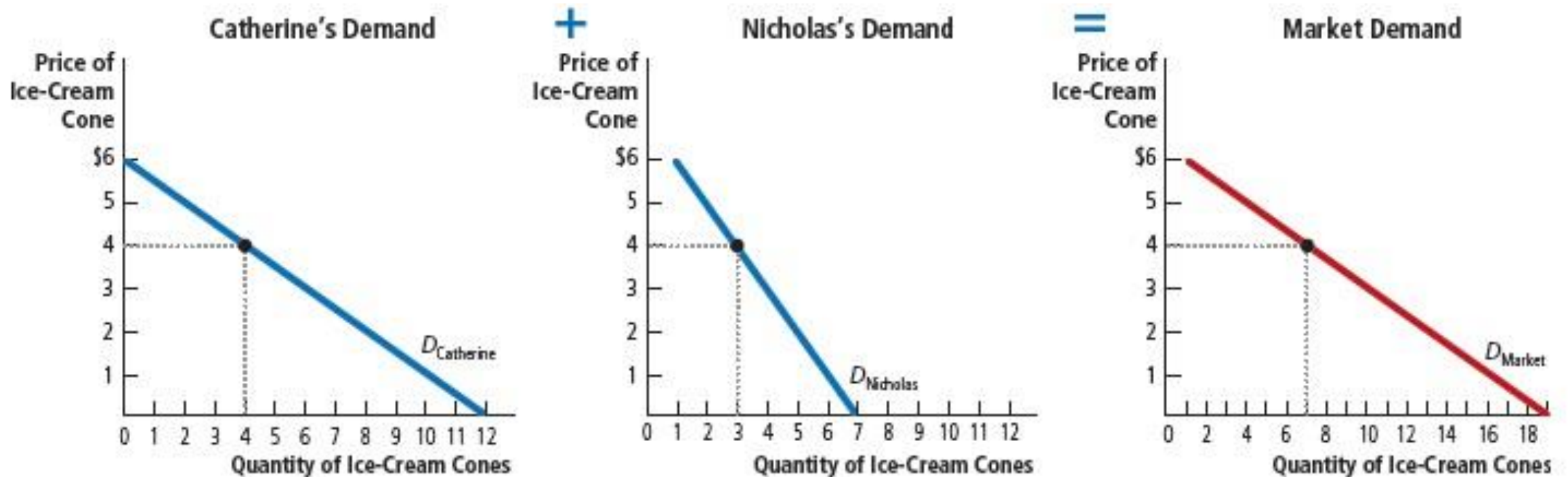
- Market demand
 - The sum of all the individual demands for a particular good or service
- Market demand curve
 - Shows how the total quantity demanded of a good varies as its price changes, holding constant all the other factors that affect consumer purchases

Figure 2 Market Demand as the Sum of Individual Demands (1 of 2)

The quantity demanded in a market is the sum of the quantities demanded by all the buyers at each price. Thus, the market demand curve is found by adding the individual demand curves horizontally. At a price of \$4, Catherine demands 4 ice-cream cones, and Nicholas demands 3, so the quantity demanded in the market at this price is 7 cones.

Price of Ice-Cream Cone	Catherine		Nicholas		Market
\$0	12	+	7	=	19 cones
1	10		6		16
2	8		5		13
3	6		4		10
4	4		3		7
5	2		2		4
6	0		1		1

Figure 2 Market Demand as the Sum of Individual Demands (2 of 2)

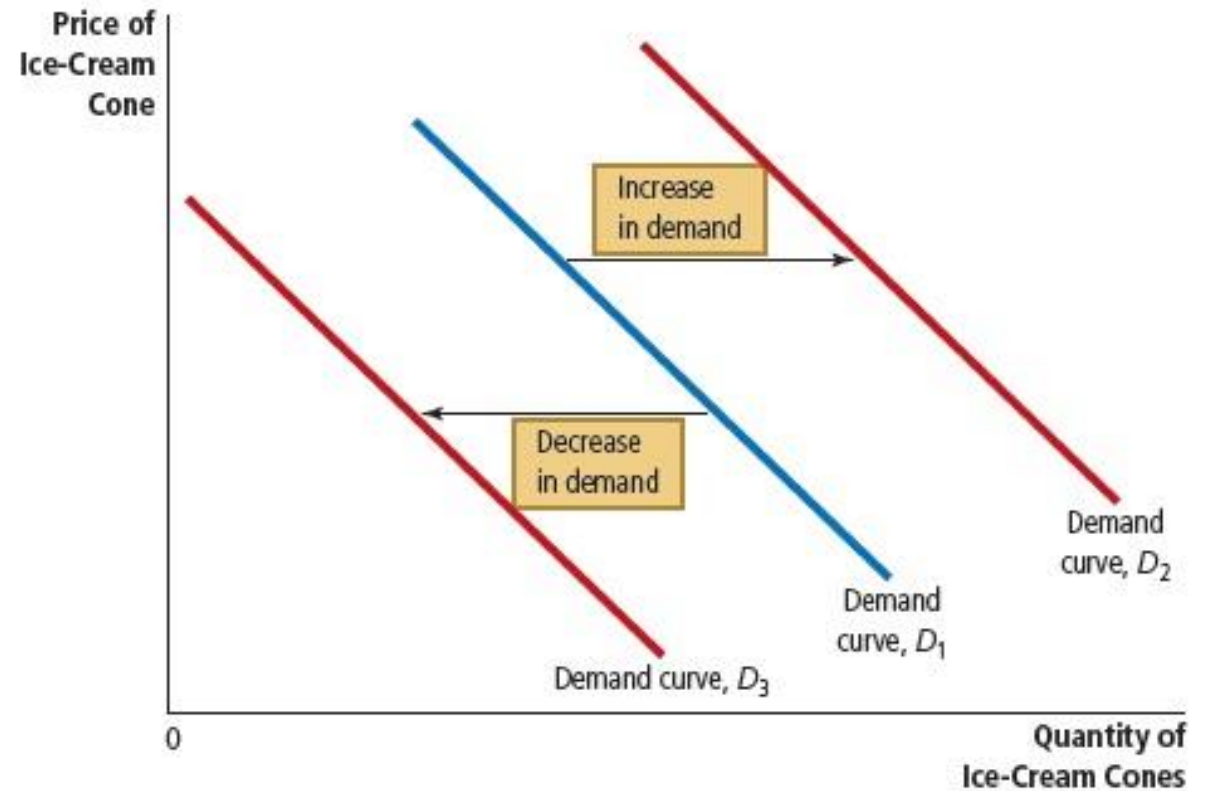


Shifts in the Demand Curve

- Market demand curve
 - Holds other things constant
 - Does not need to be stable over time
- Demand curve shifts
 - Change that increases quantity buyers want to purchase at any price shifts demand curve to the right
 - Change that decreases quantity buyers want to purchase at any price shifts demand curve to the left

Figure 3 Shifts in the Demand Curve

- A change that increases the quantity that buyers want to purchase at any price shifts the demand curve to the right.
- A change that decreases the quantity that buyers want to purchase at any price shifts the demand curve to the left.



Variables That Influence Buyers (1 of 4)

- Income
 - **Normal good***
 - An increase in income leads to an increase in demand
 - **Inferior good***
 - An increase in income leads to a decrease in demand
 - E.g., fast food, bus rides
- *Words accompanied by an asterisk are key terms from the chapter.

Variables That Influence Buyers (2 of 4)

- Prices of related goods
 - **Substitutes***
 - Pairs of goods that are used in place of each other
 - Increase in the price of one leads to an increase in the demand for the other
 - E.g., frozen yogurt and ice cream, movie tickets and video streaming services

*Words accompanied by an asterisk are key terms from the chapter.

Variables That Influence Buyers (3 of 4)

- Prices of related goods
 - **Complements***
 - Pairs of goods that are used together
 - Increase in the price of one leads to a decrease in the demand for the other
 - E.g., electricity and air conditioners, computers and software

*Words accompanied by an asterisk are key terms from the chapter.

Variables That Influence Buyers (4 of 4)

- Tastes
 - Unique, affected by historical and psychological forces
- Expectations
 - Future changes in income
 - Future changes in prices
- Number of buyers
 - Market demand depends on how many buyers there are in the market

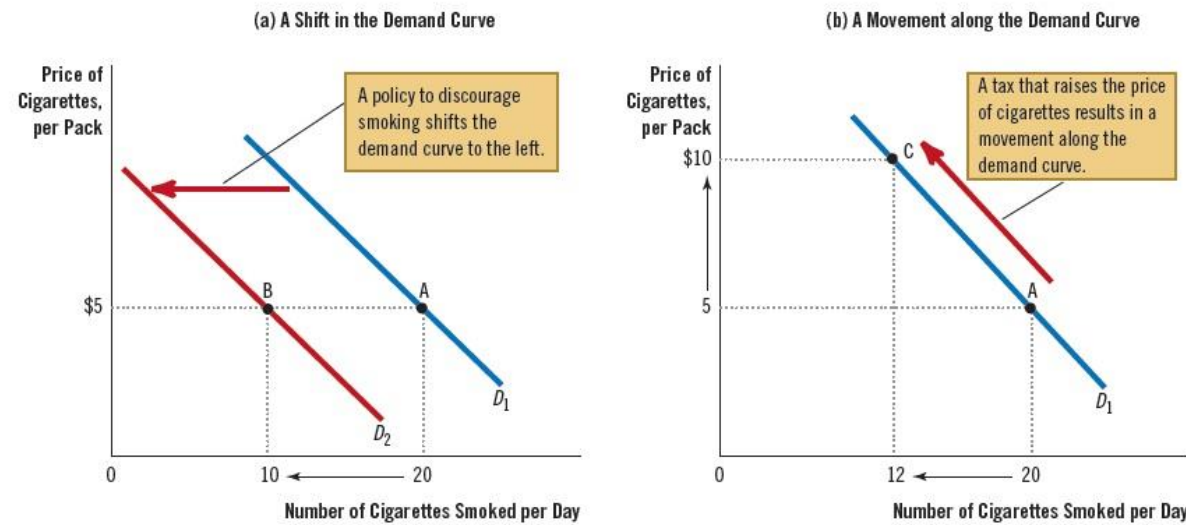
Table 1 Variables That Influence Buyers

- This table lists the variables that affect how much of any good consumers choose to buy.
- Notice the special role that the price of the good plays: A change in that price represents a movement along the demand curve, while a change in one of the other variables shifts the curve.

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

Figure 4 Shifts in the Demand Curve versus Movements along the Demand Curve

When warnings on cigarette packages persuade smokers to smoke less, the demand curve for cigarettes shifts to the left. In panel (a), the curve shifts from D_1 to D_2 . At a price of \$5 per pack, the quantity demanded falls from 20 to 10 cigarettes per day, as reflected by the shift from point A to point B. By contrast, when a tax raises the price of cigarettes, the demand curve does not shift. Instead, there is a movement to a different point on the demand curve. In panel (b), when the price rises from \$5 to \$10, the quantity demanded falls from 20 to 12 cigarettes per day, as reflected by the movement from point A to point C.

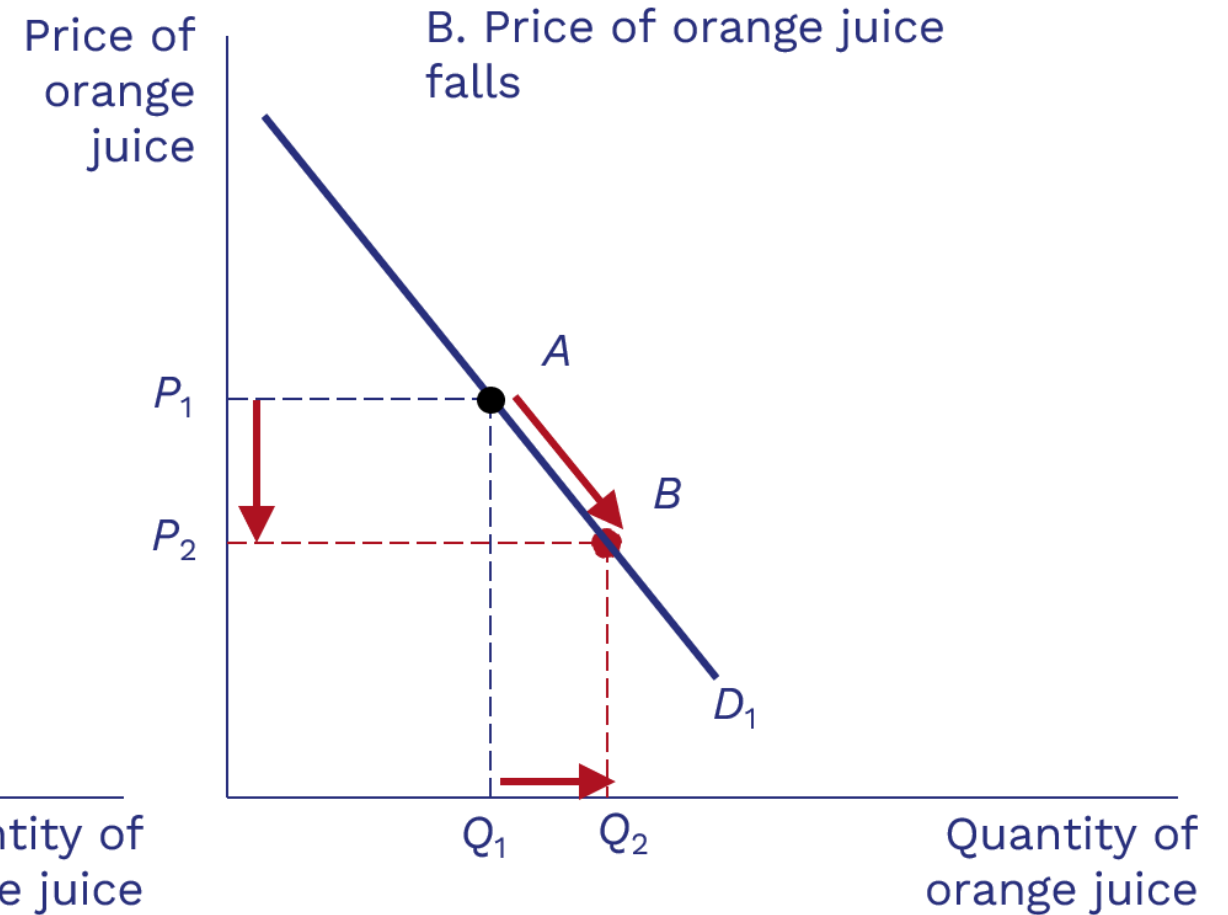
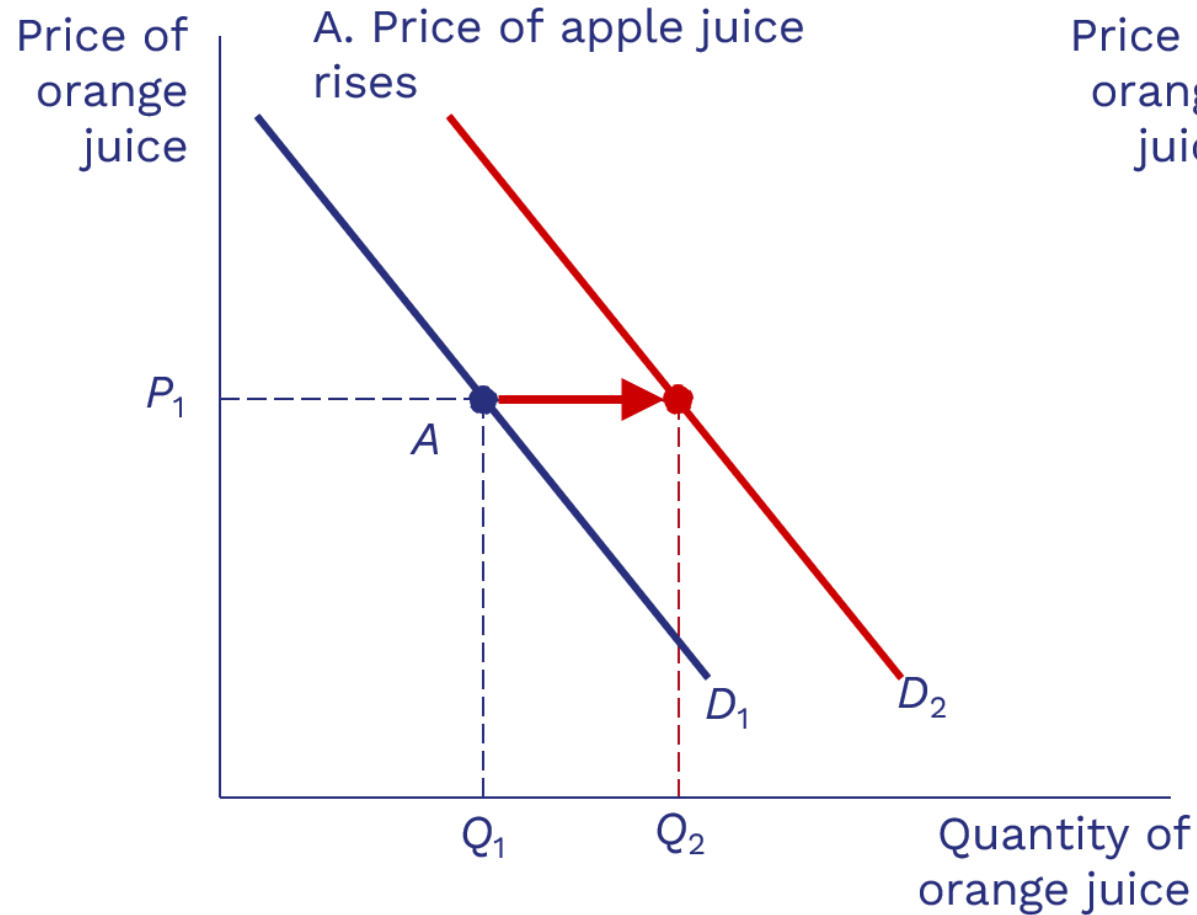


Active Learning 1: The Demand Curve, D

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 these following scenarios? Why?

- A. Price of apple juice rises
- B. Price of orange juice falls

Active Learning 1: Answers



Exceptions to Law of Demand

- Giffen goods and Veblen goods are nonordinary goods that defy standard supply and demand conventions.
- **Giffen goods:** so strongly an *inferior good* that the contrary income effect more than offsets the substitution effect
 - Very rare, limited evidence.
 - Jensen and Miller (AER 2008) conducted a field experiment in Hunan by giving randomly selected households vouchers to subsidize *rice* purchase and found strong evidence that many poor households exhibited Giffen behavior.
- **Veblen goods:** Premium, luxury goods whose prices are seen as an indicator of quality or status
 - E.g., celebrity-endorsed perfumes or fine wines

4-3

Supply

Law of Supply

- **Law of supply***
 - Other things being equal, when the price of a good rises, the quantity supplied also rises, and when the price falls, the quantity supplied falls as well
- **Quantity supplied***
 - Amount of a good that sellers are willing and able to sell

*Words accompanied by an asterisk are key terms from the chapter.

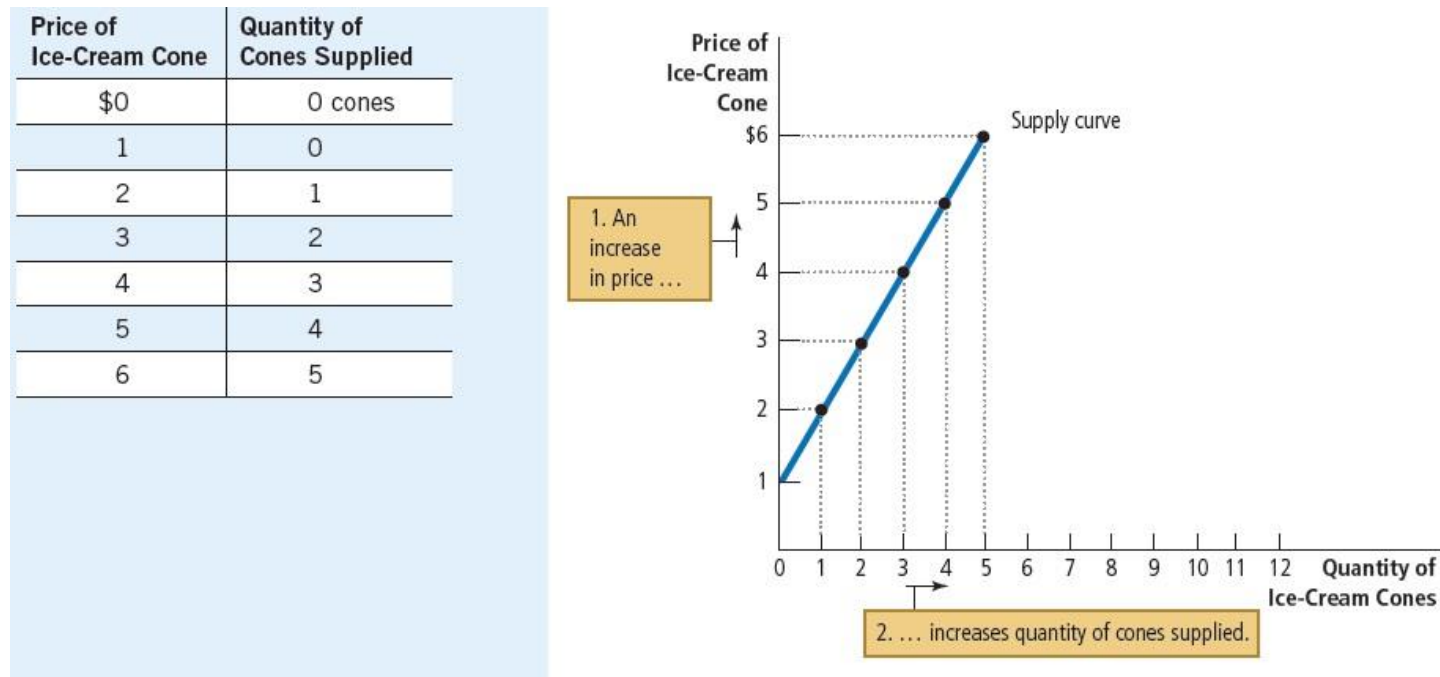
Individual Supply

- Individual supply
 - A seller's supply for a product
- **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

*Words accompanied by an asterisk are key terms from the chapter.

Figure 5 Ben's Supply Schedule and Supply Curve

The supply schedule is a table that shows the quantity supplied at each price. The supply curve, which graphs the supply schedule, illustrates how the quantity supplied changes as a good's price varies. Because a higher price increases the quantity supplied, the supply curve slopes upward.



Market Supply

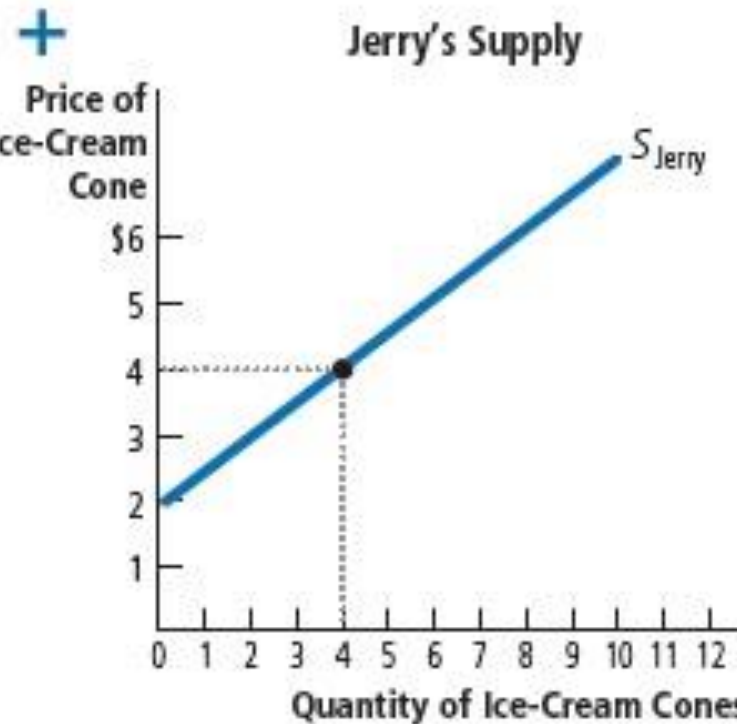
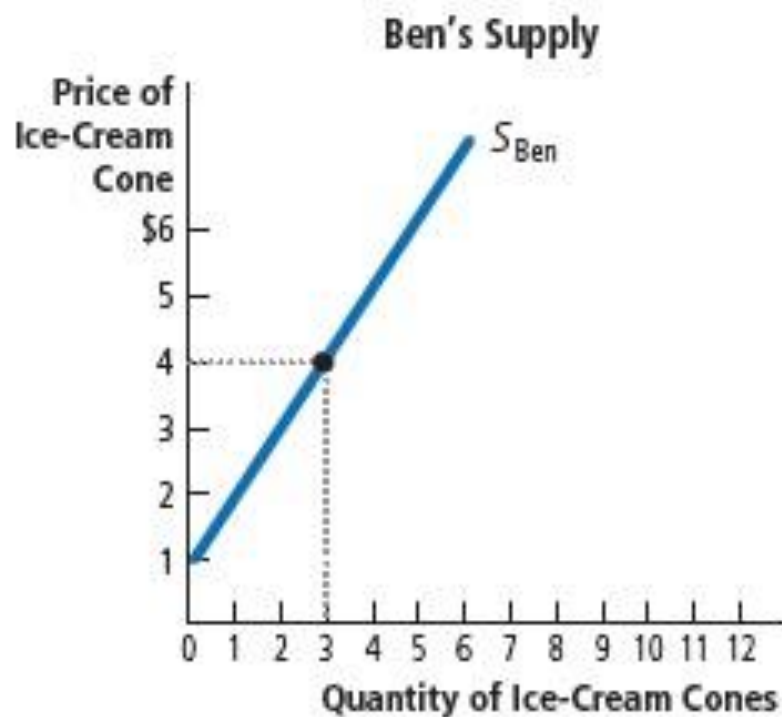
- Market supply
 - The sum of the supplies of all sellers
- Market supply curve
 - Shows how the total quantity supplied varies as the price varies, holding constant all other factors that influence producers' decisions about how much to sell

Figure 6 Market Supply as the Sum of Individual Supplies (1 of 2)

The quantity supplied in a market is the total quantity supplied by all sellers at each price. You can build the market supply curve by adding the individual supply curves horizontally. At a price of \$4, Ben supplies 3 ice-cream cones and Jerry supplies 4 ice-cream cones, so the total quantity supplied at the price of \$4 is 7 cones.

Price of Ice-Cream Cone	Ben		Jerry		Market
\$0	0	+	0	=	0 cones
1	0		0		0
2	1		0		1
3	2		2		4
4	3		4		7
5	4		6		10
6	5		8		13

Figure 6 Market Supply as the Sum of Individual Supplies (2 of 2)

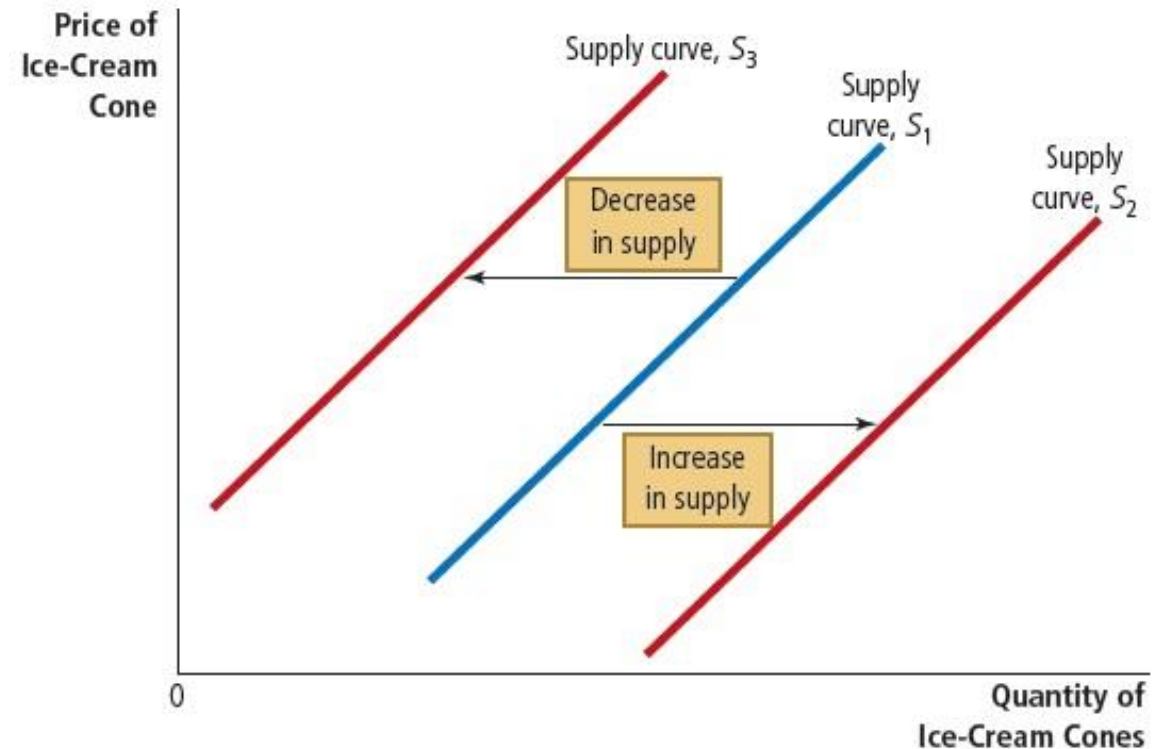


Shifts in the Supply Curve

- Market supply curve
 - Holds other things constant
 - Does not need to be stable over time
- Supply curve shifts
 - Change that increases quantity sellers want to sell at any price shifts supply curve to the right
 - Change that decreases quantity sellers want to sell at any price shifts supply curve to the left

Figure 7 Shifts in the Supply Curve

- A change that raises the quantity that sellers want to produce at any price shifts the supply curve to the right.
- A change that lowers the quantity that sellers want to produce at any price shifts the supply curve to the left.



Variables That Influence Sellers (1 of 2)

- Input prices
 - The supply of a good moves in the opposite direction of the prices of inputs
- Technology
 - Technology for turning inputs into output
 - Advances in technology increase the supply

Variables That Influence Sellers (2 of 2)

- Expectations
 - Future changes in prices
- Number of sellers
 - Market supply depends on how many sellers there are in the market

Table 2 Variables That Influence Sellers

- This table lists the variables that affect how much of any good producers choose to sell.
- Notice the special role that the price of the good plays: A change in that price represents a movement along the supply curve, while a change in one of the other variables shifts the curve.

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

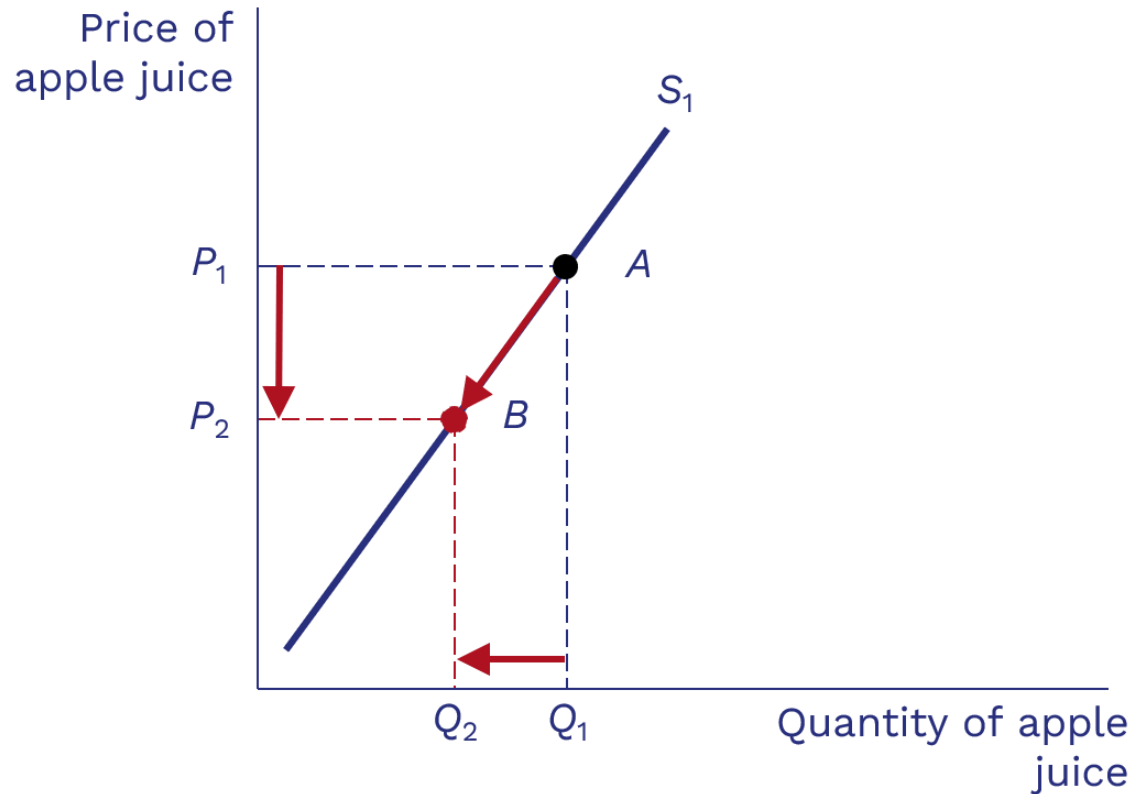
Active Learning 2: The Supply Curve, S

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?

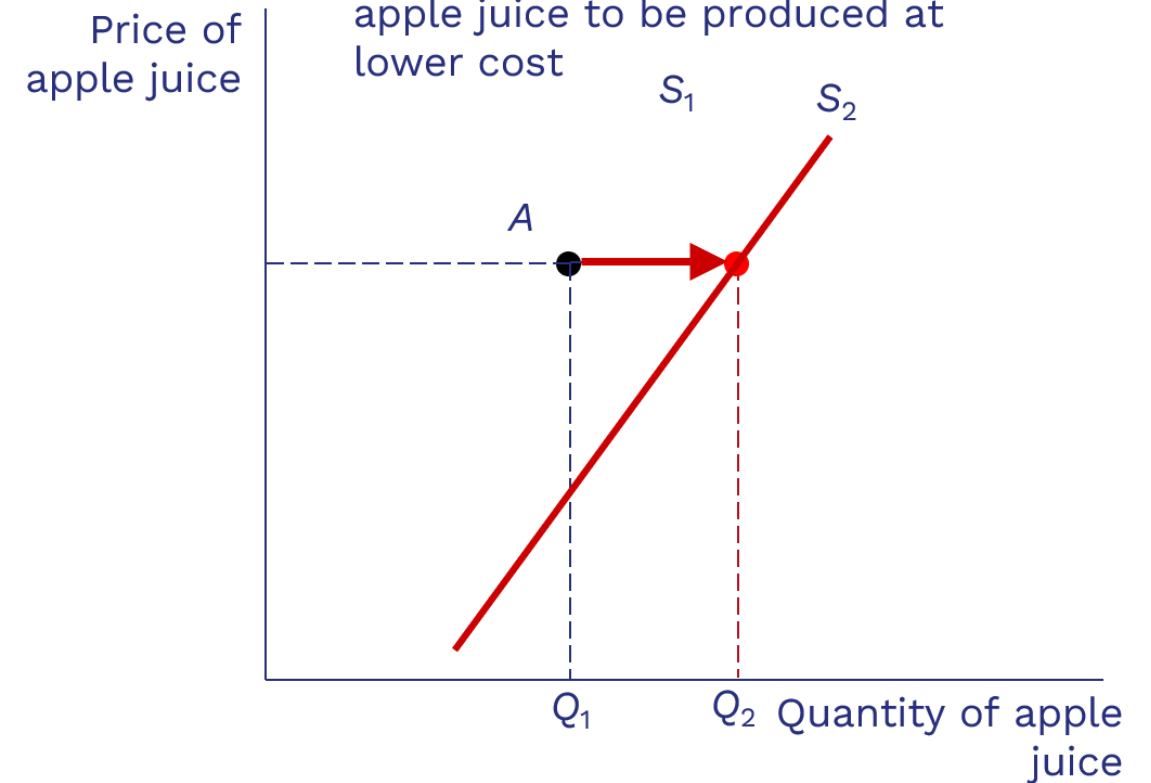
- A. Grocery stores cut the price of apple juice
- B. A technological advance allows apple juice to be produced at lower cost

Active Learning 2: Answers

A. Grocery stores cut the price of apple juice



B. A technological advance allows apple juice to be produced at lower cost



4-4

Supply and Demand Together

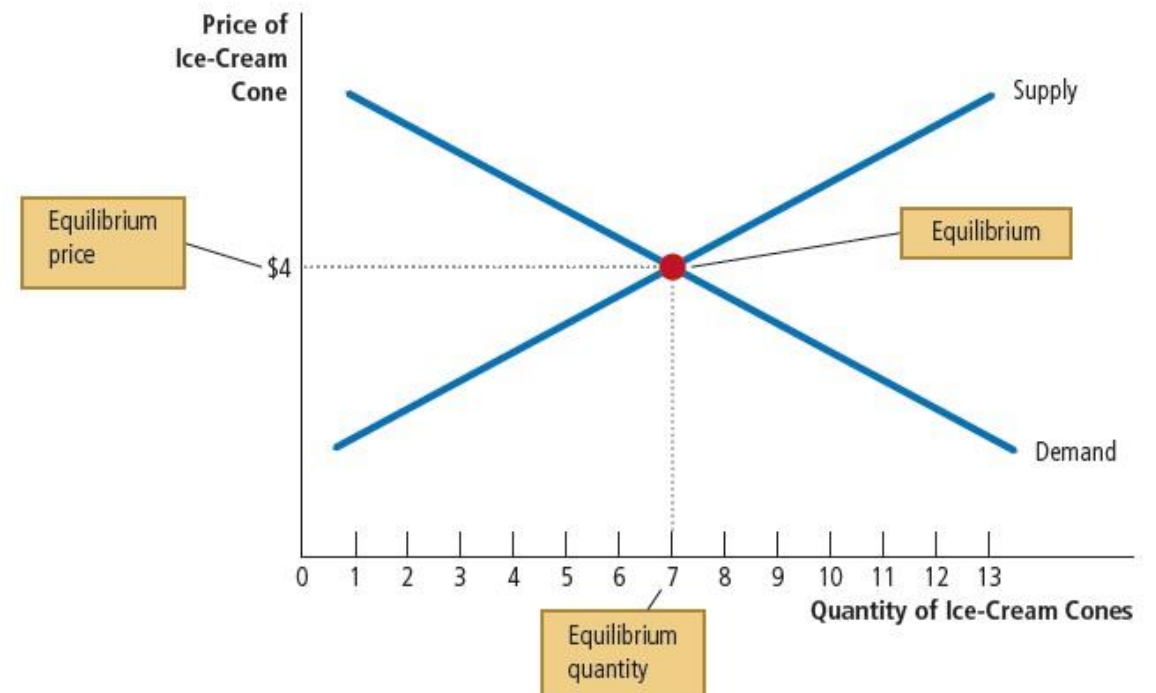
Equilibrium

- **Equilibrium***
 - Quantity of the good that buyers are willing and able to buy exactly balances quantity that sellers are willing and able to sell
- **Equilibrium price***
 - Balances the quantity supplied and quantity demanded
- **Equilibrium quantity***
 - Quantity supplied and quantity demanded at the equilibrium price

*Words accompanied by an asterisk are key terms from the chapter.

Figure 8 The Equilibrium of Supply and Demand

- The market's equilibrium is where the supply and demand curves intersect.
- At the equilibrium price, the quantity supplied equals the quantity demanded.
- Here, the equilibrium price is \$4.
- At this price, 7 ice-cream cones are supplied, and 7 are demanded.



Surplus

- **Surplus***
 - Quantity supplied is greater than quantity demanded
- Sellers respond by cutting prices
 - Increase quantity demanded and decrease quantity supplied
 - Changes represent movements along the supply and demand curves
 - Prices continue to fall until the market reaches the equilibrium

*Words accompanied by an asterisk are key terms from the chapter.

Shortage

- **Shortage***
 - Quantity demanded is greater than quantity supplied
- Sellers can raise prices without losing sales
 - Decrease quantity demanded and increase quantity supplied
 - Changes represent movements along the supply and demand curves
 - Prices continue to fall until the market reaches the equilibrium

*Words accompanied by an asterisk are key terms from the chapter.

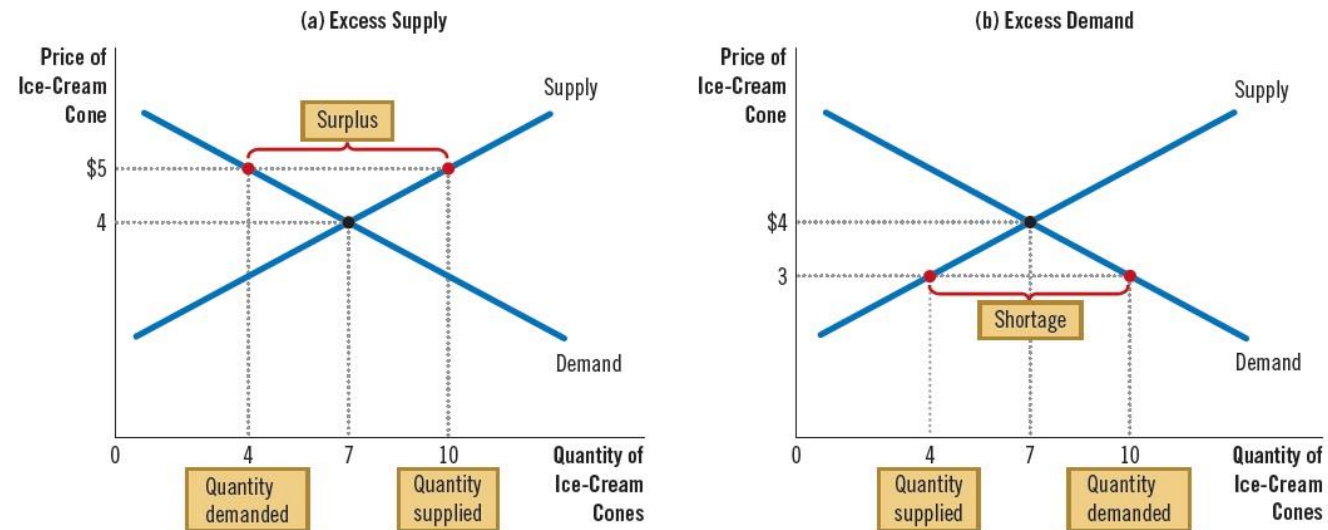
Law of Supply and Demand

- **Law of supply and demand***
 - Claim that the price of any good adjusts to bring the quantity supplied and the quantity demanded of that good into balance
- In well-functioning markets, surpluses and shortages are only temporary because prices quickly move toward their equilibrium levels

*Words accompanied by an asterisk are key terms from the chapter.

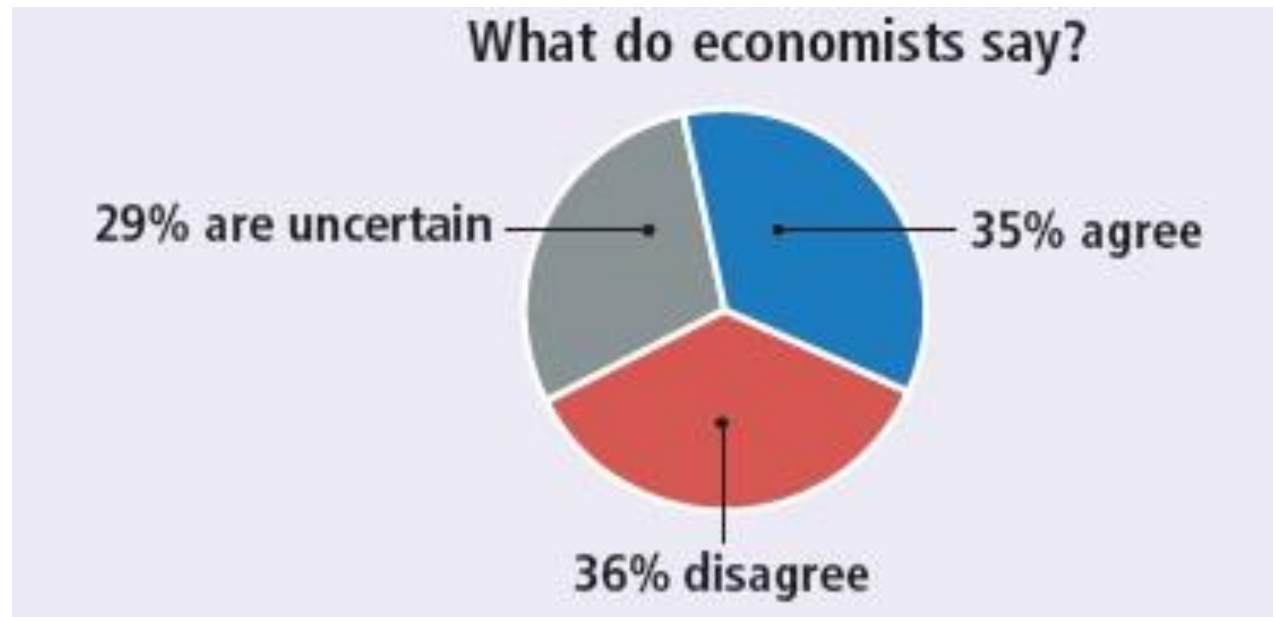
Figure 9 Markets Not in Equilibrium

In panel (a), there is a surplus. Because the market price of \$5 is above the equilibrium price, the quantity supplied (10 cones) exceeds the quantity demanded (4 cones). Producers try to increase sales by cutting the price, moving it toward its equilibrium level. In panel (b), there is a shortage. Because the market price of \$3 is below the equilibrium price, the quantity demanded (10 cones) exceeds the quantity supplied (4 cones). With too many buyers chasing too few goods, producers raise the price. In both cases, the price adjustment moves the market toward the equilibrium of supply and demand.



Ask the Experts: Price Gouging

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



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

Table 3 Three Steps for Analyzing Changes in Equilibrium

1. Decide if the event shifts the supply or demand curve (or perhaps both).

2. Decide in which direction the curve shifts.

3. Use a supply-and-demand diagram to see how the shift changes the equilibrium price and quantity.

Shifts in Curves versus Movements along Them

Change in supply

- A shift in the supply curve

Change in demand

- A shift in the demand curve

Change in the quantity supplied

- A movement along a fixed supply curve

Change in the quantity demanded

- A movement along a fixed demand curve

Figure 10 How an Increase in Demand Affects the Equilibrium

- An event that raises the quantity demanded at any price shifts the demand curve to the right.
- The equilibrium price and quantity both rise.
- Here, an abnormally hot summer causes buyers to demand more ice cream.
- The demand curve shifts from D_1 to D_2 , causing the equilibrium price to increase from \$4 to \$5 and the equilibrium quantity to increase from 7 to 10 cones.

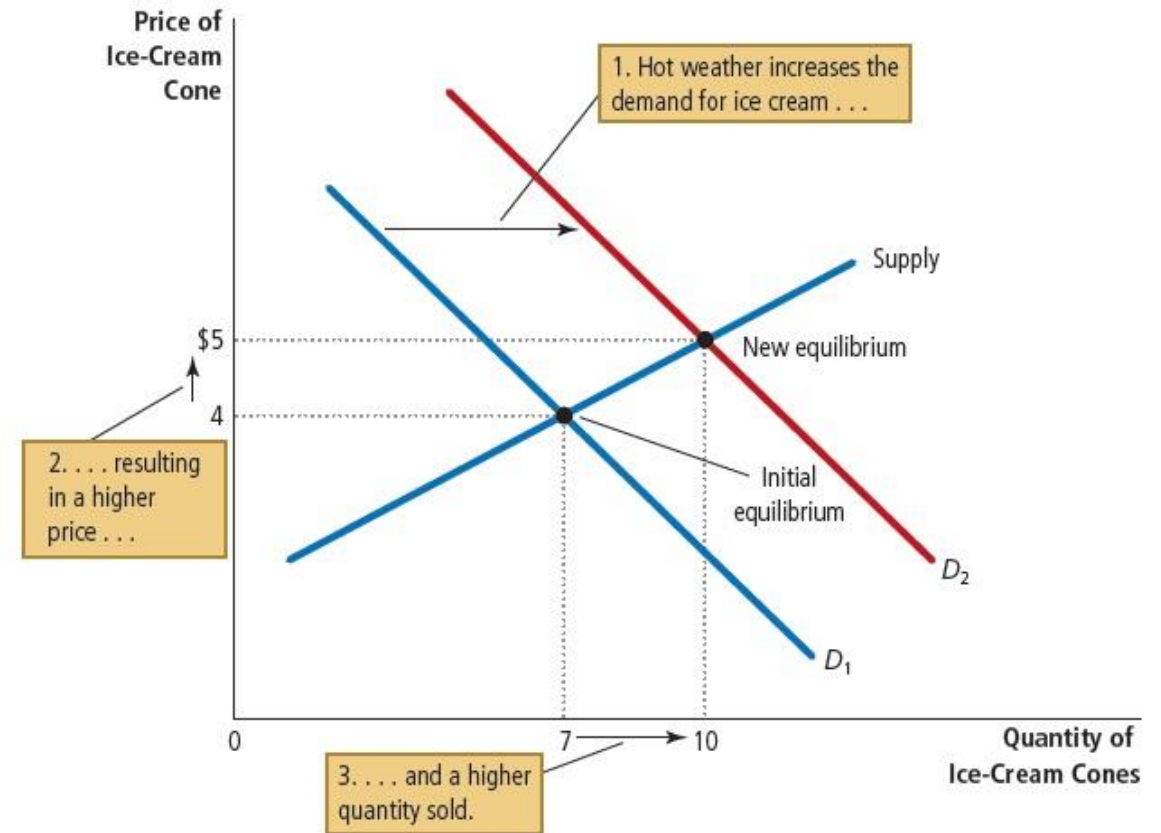


Figure 11 How a Decrease in Supply Affects the Equilibrium

- An event that reduces the quantity supplied at any price shifts the supply curve to the left.
- The equilibrium price rises, and the equilibrium quantity falls.
- Here, an increase in the price of sugar (an input) causes sellers to supply less ice cream.
- The supply curve shifts from S_1 to S_2 , causing the equilibrium price of ice cream to rise from \$4 to \$5 and the equilibrium quantity to fall from 7 to 4 cones.

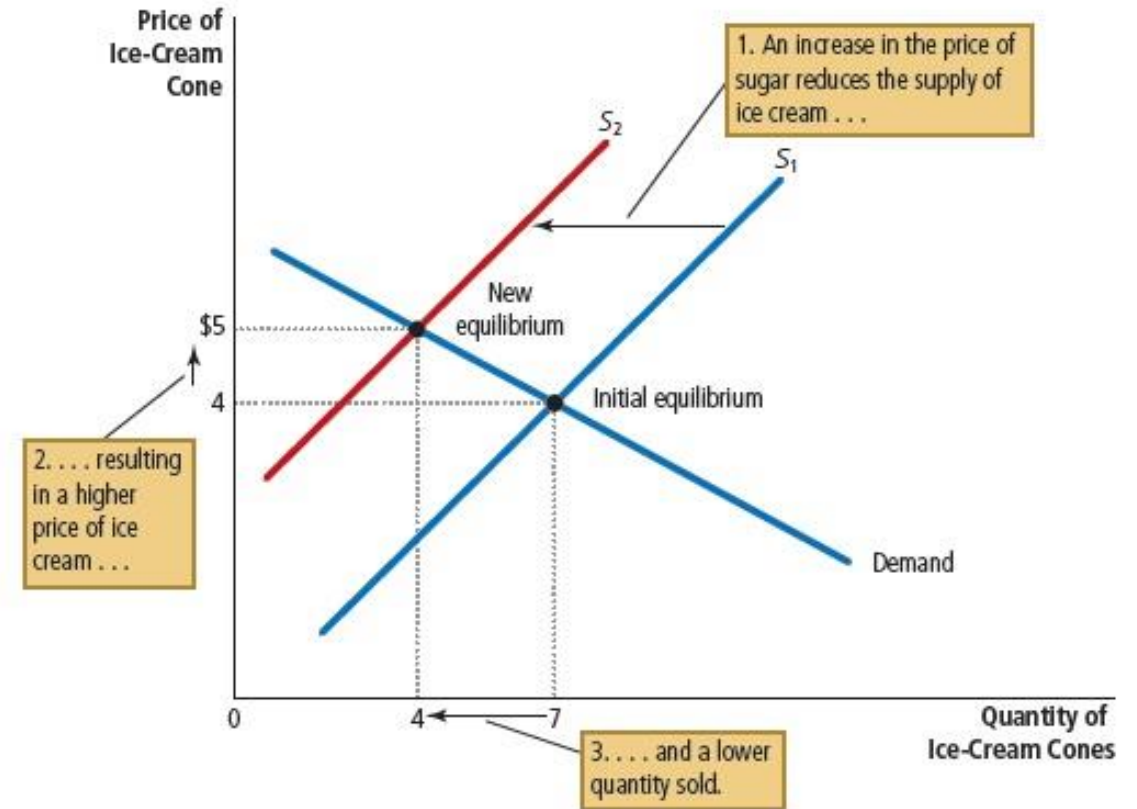
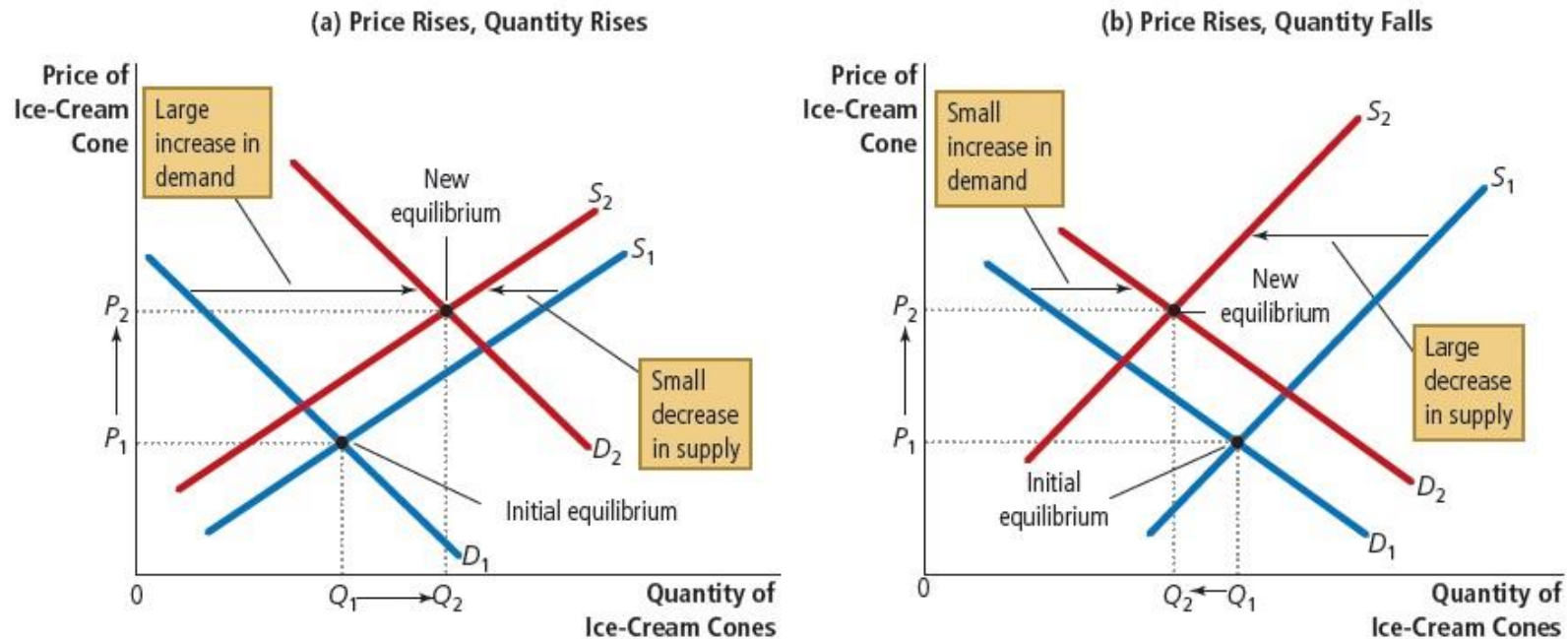


Figure 12 A Shift in Both Supply and Demand

A simultaneous increase in demand and decrease in supply yields two possible outcomes. In panel (a), the equilibrium price rises from P_1 to P_2 , and the equilibrium quantity rises from Q_1 to Q_2 . In panel (b), the equilibrium price again rises from P_1 to P_2 , but the equilibrium quantity falls from Q_1 to Q_2 .



Active Learning 3: Shifts in Supply and Demand

Use the three-step method to analyze the effects of these events on the equilibrium price and quantity of orange juice

- There is a fall in the price of apple juice
- The price of oranges declines because of an abundant orange crop
- Both events occur simultaneously

Active Learning 3: Answers

- There is a fall in the price of apple juice
- The price of oranges declines because of an abundant orange crop
- Both events occur simultaneously
- Steps:
 1. Both curves shift
 2. D shifts left, S shifts right
 3. P falls, effect on Q is ambiguous

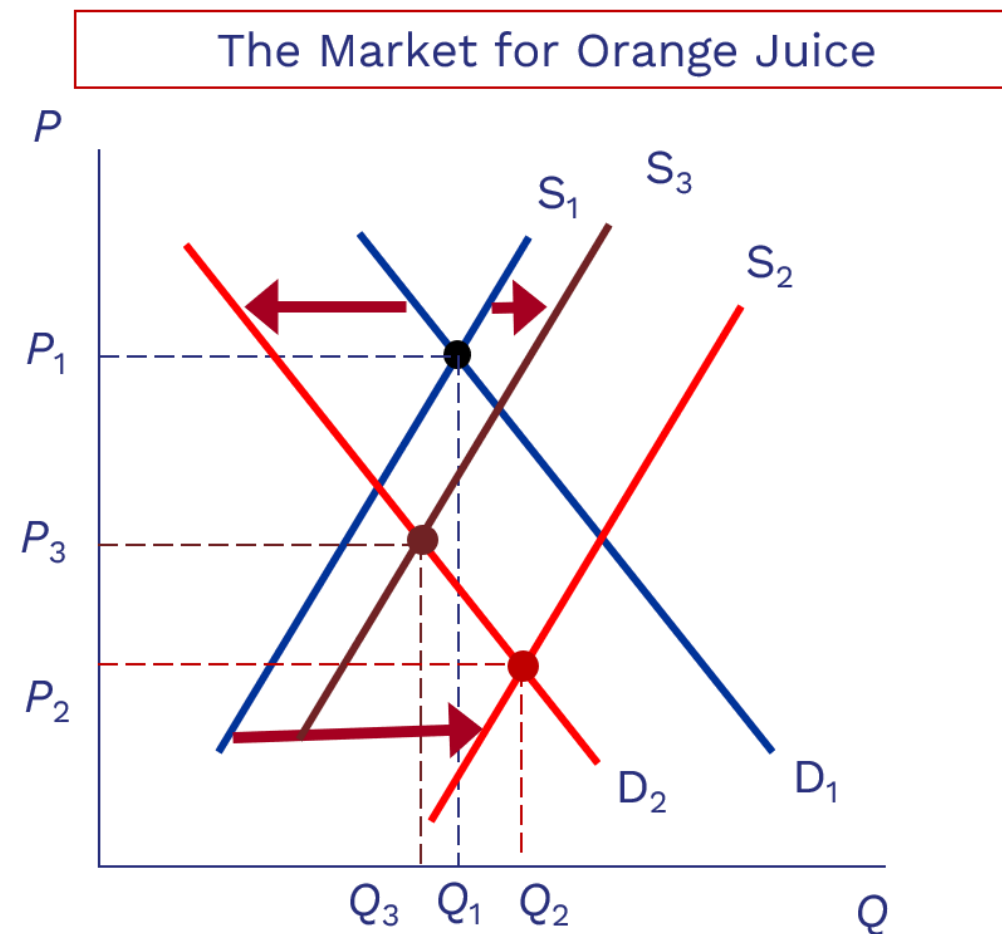


Table 4 What Happens to Price and Quantity When Supply or Demand Shifts?

As a quick quiz, make sure you can explain at least a few of the entries in this table using a supply-and-demand diagram.

	No Change in Supply	An Increase in Supply	A Decrease in Supply
No Change in Demand	P same Q same	P down Q up	P up Q down
An Increase in Demand	P up Q up	P ambiguous Q up	P up Q ambiguous
A Decrease in Demand	P down Q down	P down Q ambiguous	P ambiguous Q down

4-5

Conclusion: How Prices Allocate Resources

Conclusion

- In market economies, prices are the signals that guide decisions and allocate scarce resources
- For every good in the economy, 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

Think-Pair-Share Activity

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?

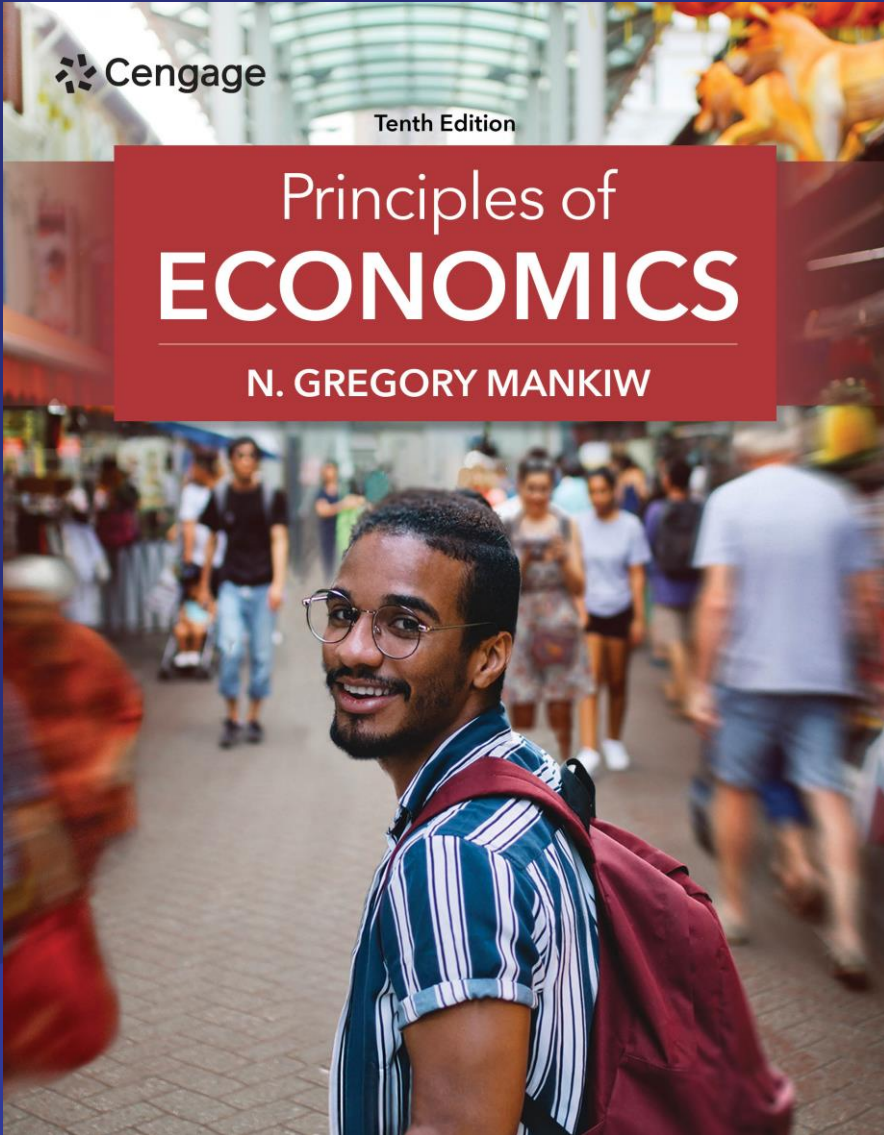
Self-Assessment

- What is the role of prices in market economies?
- Can you think of prices that do not adjust? For example, entrance fees to a national park in the summer?

Summary

Click the link to review the objectives for this presentation.

[Link to Objectives](#)



Principles of Economics, 10e

Chapter 5: Elasticity and Its Application

Chapter Objectives (1 of 3)

By the end of this chapter, you should be able to:

- Calculate price elasticity of demand in a given scenario.
- Identify regions of the demand curve as elastic, inelastic, or unit elastic using price elasticity of demand.
- List the factors that influence price elasticity of demand.
- Describe the relationship between price elasticity of demand and the slope of a demand curve.
- Explain how changes in supply impact market equilibrium.

Chapter Objectives (2 of 3)

- Analyze the relationship between price elasticity of demand and total revenue.
- Calculate income elasticity of demand in a given scenario.
- Determine whether a good is inferior or normal using income elasticity of demand.
- Calculate cross-price elasticity of demand in a given scenario.
- Determine if two goods are complements or substitutes using cross-price elasticity of demand.
- Calculate price elasticity of supply in a given scenario.
- List the factors that influence price elasticity of supply.

Chapter Objectives (3 of 3)

- Identify regions of the supply curve as elastic, inelastic, or unit elastic using price elasticity of supply.
- Explain how changes in demand impact market equilibrium.

5-1

The Elasticity of Demand

The Price Elasticity of Demand

- **Elasticity***
 - Measure of the responsiveness of quantity demanded or quantity supplied to a change in one of its determinants
- **Price elasticity of demand***
 - Measures how much the quantity demanded responds to a change in the price

*Words accompanied by an asterisk are key terms from the chapter.

Elastic and Inelastic Demand

- Elastic demand
 - Quantity demanded responds substantially to price changes
- Inelastic demand
 - Quantity demanded responds only slightly to price changes

Determinants of Price Elasticity of Demand (1 of 2)

- Availability of close substitutes
 - Elastic demand: Goods with close substitutes
 - Inelastic demand: Goods with no close substitute
- **Necessities** and **luxuries**
 - Elastic demand: Luxuries
 - Inelastic demand: Necessities

Determinants of Price Elasticity of Demand

(2 of 2)

- Defining the market broadly or narrowly
 - Elastic demand: Narrowly defined markets, e.g., vanilla ice cream
 - Inelastic demand: Broadly defined markets, e.g., food
- Time horizon
 - More elastic demand: Longer time horizons
 - Less elastic demand: Shorter time horizons

Computing the Price Elasticity of Demand

- Computing the price elasticity of demand
 - Percentage change in quantity demanded divided by percentage change in price
 - Change in quantity typically has the *opposite* sign as change in price
 - Use *absolute value* (drop the minus sign)

$$\text{Price elasticity of demand} = \left| \frac{\text{Percentage change in quantity demanded}}{\text{Percentage change in price}} \right|$$

The Midpoint Method

- The standard procedure for calculating a percentage change is to divide the change by the initial level
 - The elasticity from point A to point B would be different from the elasticity from point B to point A
- **Better way:** The midpoint method divides the change by the *midpoint* (or average) of the initial and final levels

$$\text{Price elasticity of demand} = \left| \frac{(Q_2 - Q_1) / [(Q_2 + Q_1) / 2]}{(P_2 - P_1) / [(P_2 + P_1) / 2]} \right|$$

Active Learning 1: Calculate an Elasticity

Use the following information to calculate the price elasticity of demand for iPhones:

- $P = \$400$, $Q_d = 10,600$
- $P = \$600$, $Q_d = 8,400$

- A. Use the midpoint method to calculate percentage change in price
- B. Use the midpoint method to calculate percentage change in quantity
- C. Calculate the price elasticity of demand

Active Learning 1: Answers

Using the midpoint method to calculate percentage changes:

A. % change in $P = [(\$600 - \$400)/\$500] \times 100 = 40\%$

B. % change in $Q_d = [(8,400 - 10,600)/9,500] \times 100 = -23.16\%$

C. Price elasticity of demand

$$= \% \text{ change in } Q_d / \% \text{ change in } P$$

$$= 23.16/40 = 0.58 \text{ (ignoring the minus sign)}$$

The Variety of Demand Curves (1 of 2)

- Demand is elastic
 - Price elasticity of demand > 1
- Demand is inelastic
 - Price elasticity of demand < 1
- Demand has unit elasticity
 - Price elasticity of demand $= 1$

The Variety of Demand Curves (2 of 2)

- Demand is perfectly inelastic
 - Price elasticity of demand = 0
 - Demand curve is vertical
- Demand is perfectly elastic
 - Price elasticity of demand = infinity
 - Demand curve is horizontal

Figure 1 The Price Elasticity of Demand (1 of 2)

- The price elasticity of demand determines whether the demand curve is steep or flat.
- Note that all percentage changes are calculated using the midpoint method.

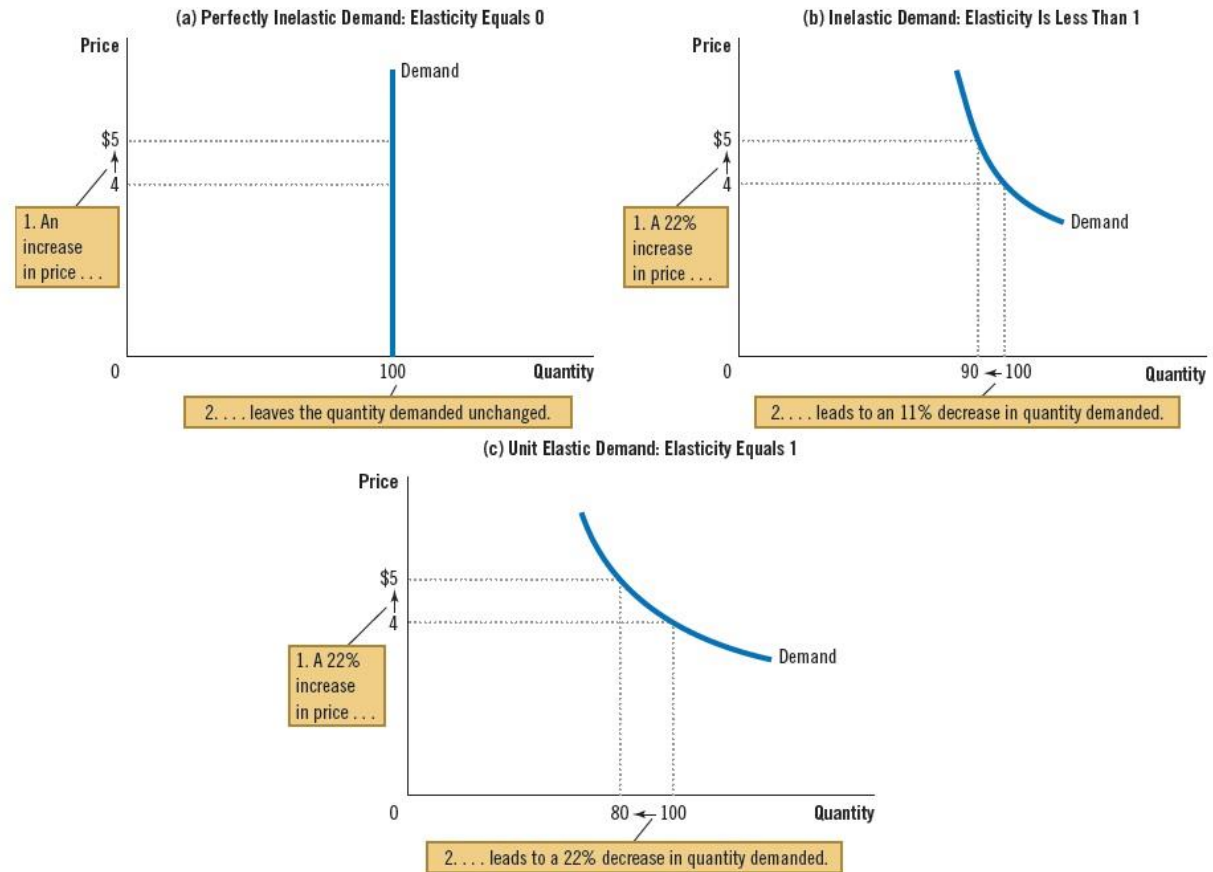
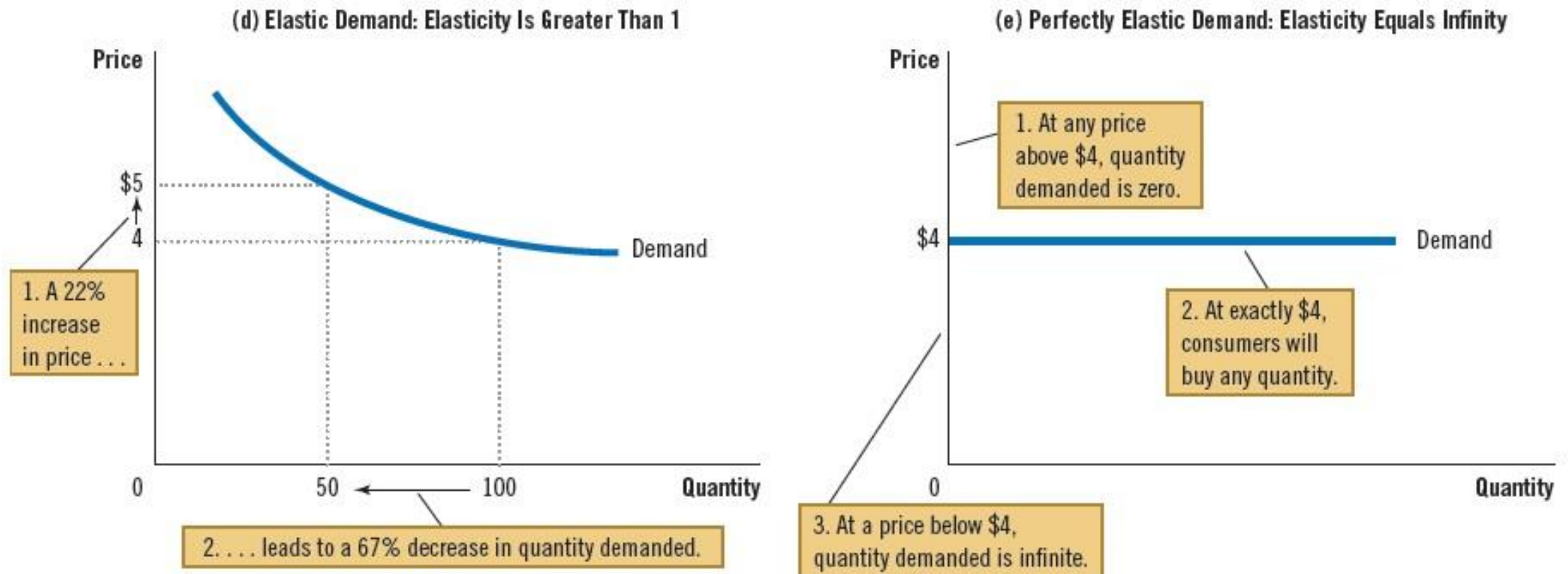


Figure 1 The Price Elasticity of Demand (2 of 2)



Elasticities in the Real World

- Economists collect market data and apply statistical techniques (*Econometrics*) to estimate the price elasticity of demand
- Statistical techniques used to obtain them require some assumptions about the world
- Price elasticity of demand need not be the same at all points on a demand curve

Eggs	0.1	↑	Very inelastic (quantity demanded responds little to price changes)
Healthcare	0.2		
Cigarettes	0.4		
Rice	0.5		
Housing	0.7		
Beef	1.6	↓	Very elastic (quantity demanded responds strongly to price changes)
Peanut Butter	1.7		
Restaurant Meals	2.3		
Cheerios	3.7		
Mountain Dew	4.4		

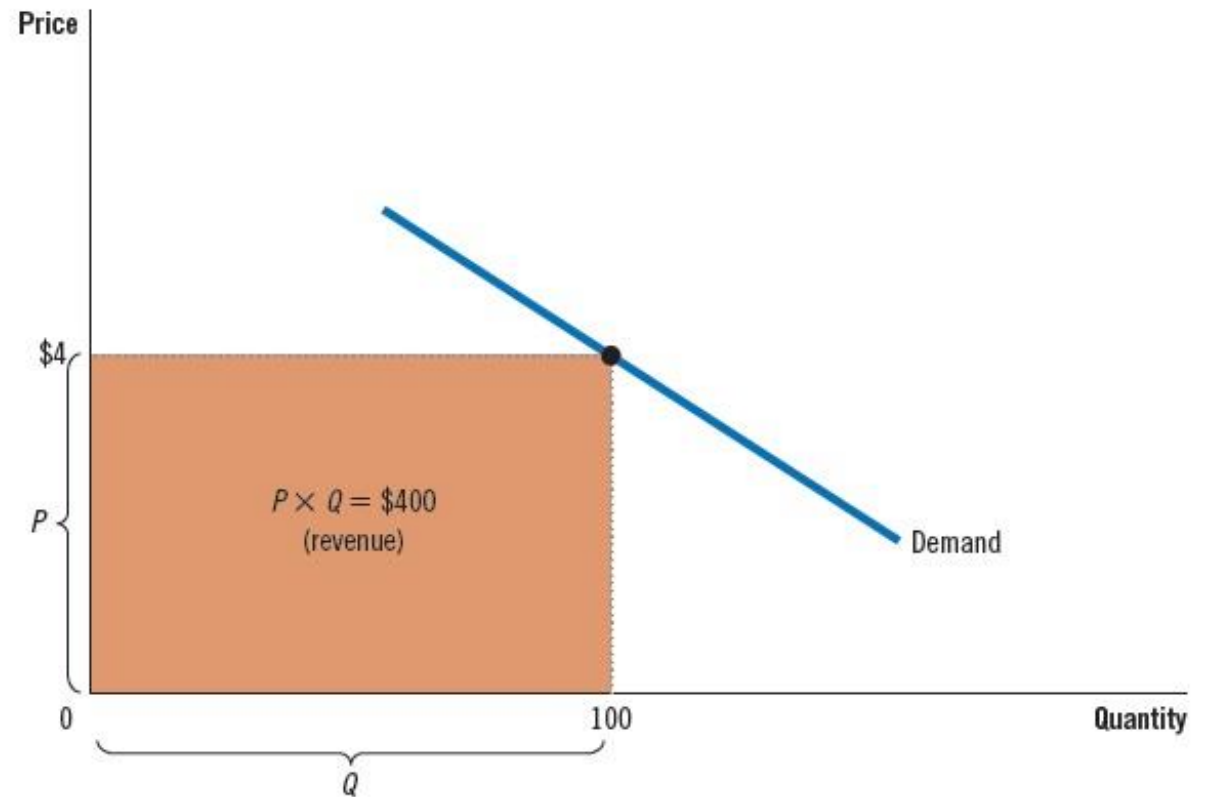
Total Revenue

- **Total revenue***
 - Amount paid by buyers and received by sellers of a good
 - Price of the good times the quantity sold ($P \times Q$)

*Words accompanied by an asterisk are key terms from the chapter.

Figure 2 Total Revenue

- The area of the box under the demand curve, $P \times Q$, equals the total amount paid by buyers as well as the total revenue received by sellers.
- Here, at a price of \$4, the quantity demanded is 100, and total revenue is \$400.



Total Revenue and the Price Elasticity of Demand

- *Elastic* demand
 - Price and total revenue move in *opposite* directions
- *Inelastic* demand
 - Price and total revenue move in the *same* direction
- *Unit elastic* demand
 - When price changes, total revenue remains *constant*

Figure 3 How Total Revenue Changes When Price Changes (1 of 2)

- The impact of a price change on total revenue (price times quantity) depends on the elasticity of demand.
- In panel (a), the demand curve is inelastic.
- A price increase leads to a proportionately smaller decrease in quantity demanded, so total revenue increases.
- Here, the price increases from \$4 to \$5, and the quantity demanded falls from 100 to 90. Total revenue rises from \$400 to \$450.

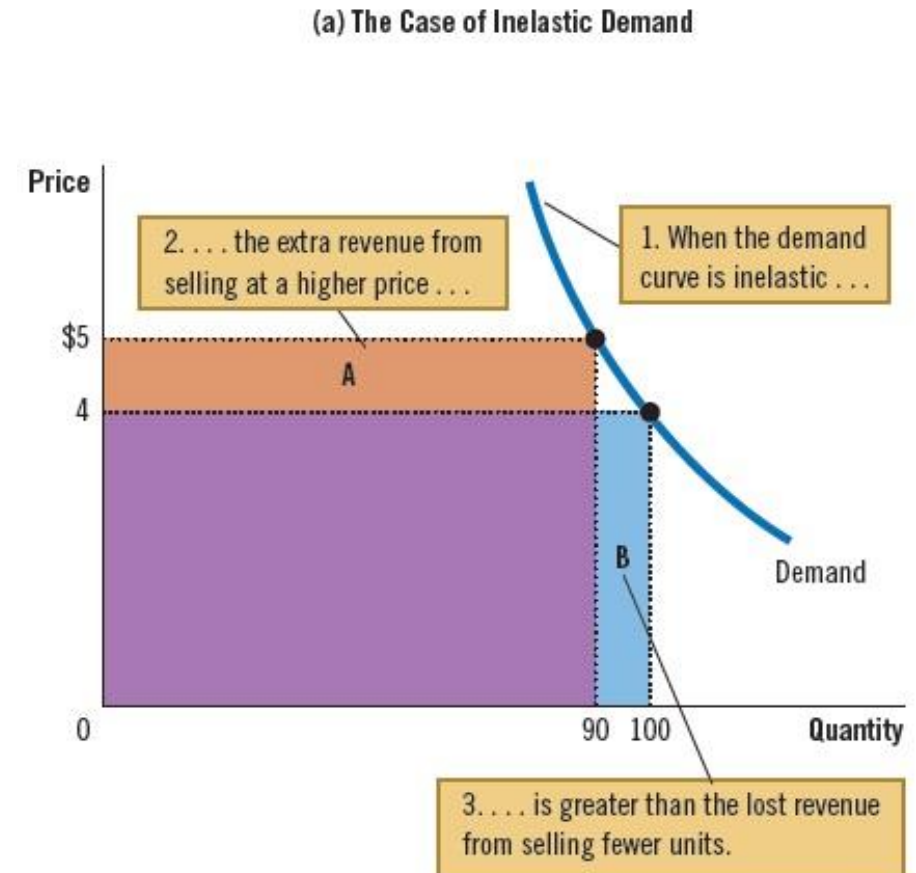
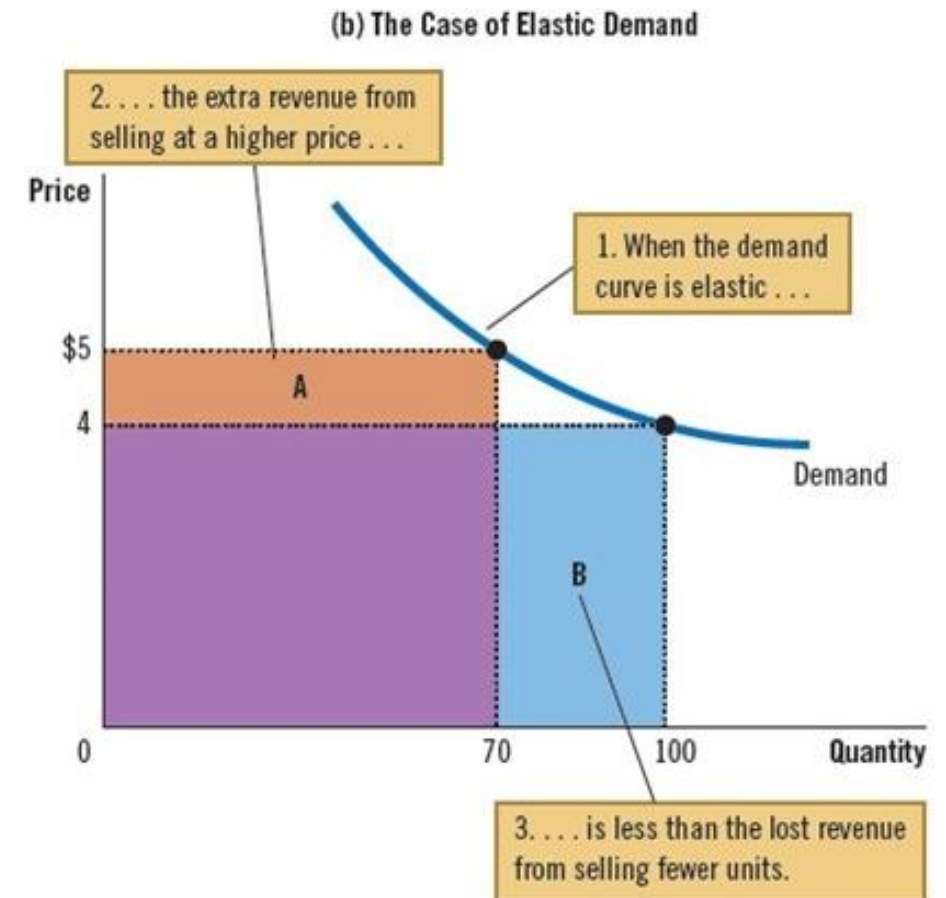


Figure 3 How Total Revenue Changes When Price Changes (2 of 2)

- The impact of a price change on total revenue (price times quantity) depends on the elasticity of demand.
- In panel (b), the demand curve is elastic.
- A price increase leads to a proportionately larger decrease in quantity demanded, so total revenue decreases.
- Here, the price increases from \$4 to \$5, and the quantity demanded falls from 100 to 70. Total revenue falls from \$400 to \$350.



Elasticity and Total Revenue along a Linear Demand Curve

- If demand curve is linear, it has a *constant slope*
 - Slope is defined as “Rise over run”
 - Ratio of the change in price (“rise”) to the change in quantity (“run”)
- Elasticity changes
 - Elastic demand: Points with high price and low quantity
 - Inelastic demand: Points with low price and high quantity
 - Unit elastic demand: The *midpoint*

Figure 4 Elasticity along a Linear Demand Curve (1 of 2)

- The slope of a linear demand curve is constant, but its elasticity is not.
- The price elasticity of demand is calculated using the demand schedule and the midpoint method.
- At points with a low price and high quantity, the demand curve is inelastic.
- At points with a high price and low quantity, it is elastic.

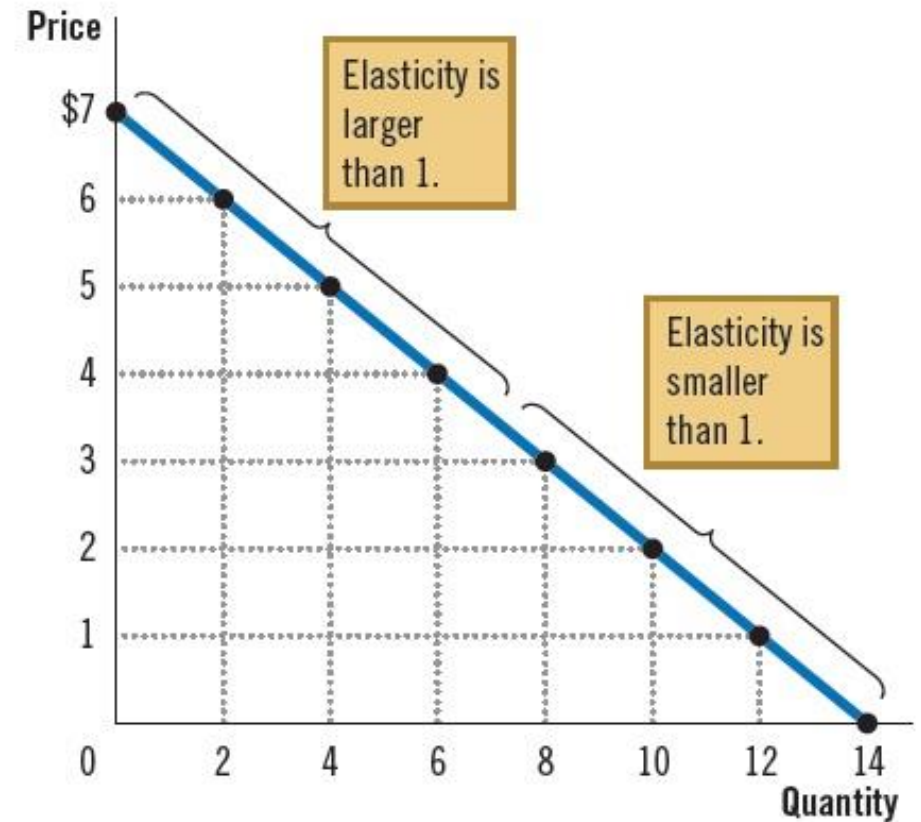


Figure 4 Elasticity along a Linear Demand Curve (2 of 2)

Price	Quantity	Total Revenue (Price × Quantity)	Percentage Change in Price	Percentage Change in Quantity	Elasticity between the two prices	Description
\$7	0	\$0				
6	2	12	15	200	13.0	Elastic
5	4	20	18	67	3.7	Elastic
4	6	24	22	40	1.8	Elastic
3	8	24	29	29	1.0	Unit elastic
2	10	20	40	22	0.6	Inelastic
1	12	12	67	18	0.3	Inelastic
0	14	0	200	15	0.1	Inelastic

Active Learning 2: Elasticity and Total Revenue

- A. Pharmacies raise the price of insulin by 10%. Does total expenditure on insulin rise or fall?
- B. As a result of a fare war, the price of a luxury cruise falls 20%. Does luxury cruise companies' total revenue rise or fall?

Active Learning 2: Answers

A. Expenditure = Total Revenue = $P \times Q$

- Insulin is a necessity
- Since demand for insulin is inelastic, Q will fall less than 10%, so expenditure rises

B. Revenue = $P \times Q$

- The fall in P reduces revenue, but Q increases, which increases revenue
- Since demand is elastic, Q will increase more than 20%, so revenue rises

The Income Elasticity of Demand

- **Income elasticity of demand***

- A measure of how much the quantity demanded of a good responds to a change in consumers' income
 - **Normal goods** have a *positive* income elasticity
 - **Inferior goods** have a *negative* income elasticity

$$\text{Income elasticity of demand} = \frac{\text{Percentage change in quantity demanded}}{\text{Percentage change in income}}$$

*Words accompanied by an asterisk are key terms from the chapter.

The Cross-Price Elasticity of Demand

- **Cross-price elasticity of demand***

- A measure of how much the quantity demanded of one good responds to a change in the price of another good
 - **Substitutes** have a *positive* cross-price elasticity
 - **Complements** have a *negative* cross-price elasticity

$$\text{Cross-price elasticity of demand} = \frac{\text{Percentage change in quantity demanded of good one}}{\text{Percentage change in the price of good two}}$$

*Words accompanied by an asterisk are key terms from the chapter.

5-2

The Elasticity of Supply

The Price Elasticity of Supply

- **Price elasticity of supply***
 - Measures how much the quantity supplied of a good responds to a change in the price of that good

*Words accompanied by an asterisk are key terms from the chapter.

Elastic and Inelastic Supply

- Elastic supply
 - Quantity supplied responds substantially to price changes
- Inelastic supply
 - Quantity supplied responds only slightly to price changes

Determinants of Price Elasticity of Supply

- Depends on the flexibility of sellers to change the amount they produce
- Short run
 - Quantity supplied is not very responsive to changes in price
- Long run
 - Quantity supplied responds substantially to price changes

Computing the Price Elasticity of Supply

- Computing the price elasticity of demand
 - Percentage change in quantity supplied divided by percentage change in price
 - Use midpoint method

$$\text{Price elasticity of supply} = \frac{\text{Percentage change in quantity supplied}}{\text{Percentage change in price}}$$

The Variety of Supply Curves (1 of 2)

- Supply is elastic
 - Price elasticity of supply > 1
- Supply is inelastic
 - Price elasticity of supply < 1
- Supply has unit elasticity
 - Price elasticity of supply $= 1$

The Variety of Supply Curves (2 of 2)

- Supply is perfectly inelastic
 - Price elasticity of supply = 0
 - Supply curve is vertical
- Supply is perfectly elastic
 - Price elasticity of supply = infinity
 - Supply curve is horizontal

Figure 5 The Price Elasticity of Supply (1 of 3)

The price elasticity of supply determines whether the supply curve is steep or flat. Note that all percentage changes are calculated using the midpoint method.

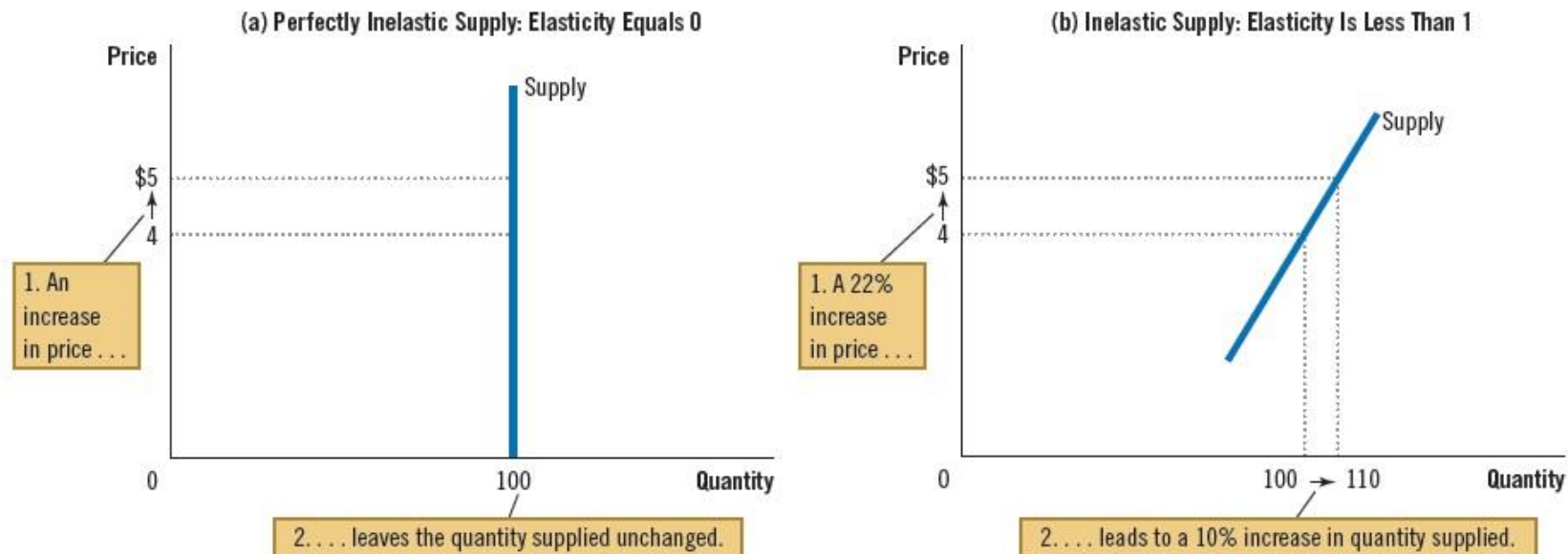


Figure 5 The Price Elasticity of Supply (2 of 3)

The price elasticity of supply determines whether the supply curve is steep or flat. Note that all percentage changes are calculated using the midpoint method.

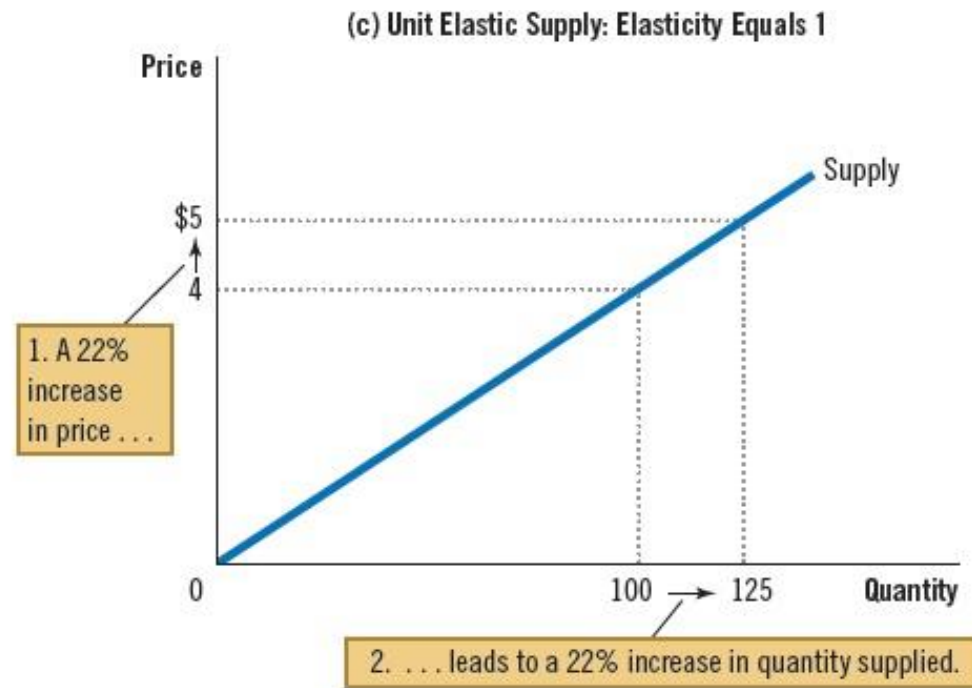


Figure 5 The Price Elasticity of Supply (3 of 3)

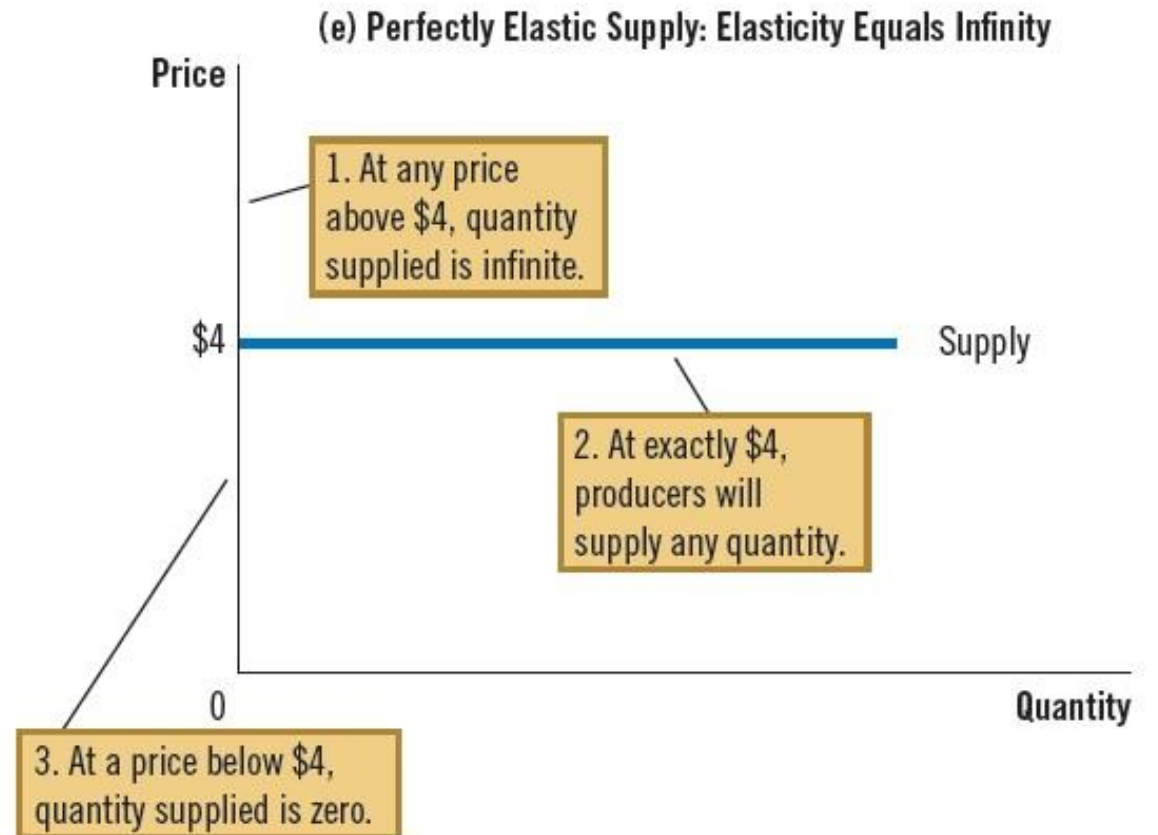
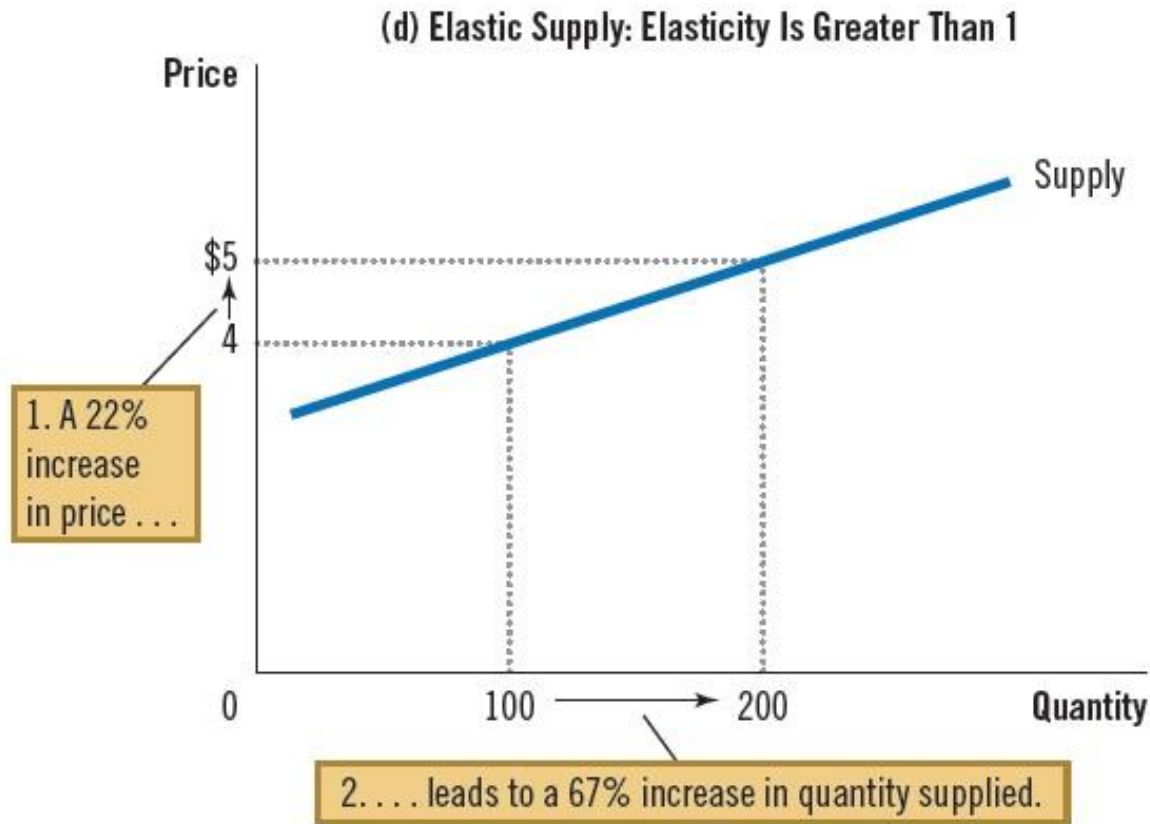
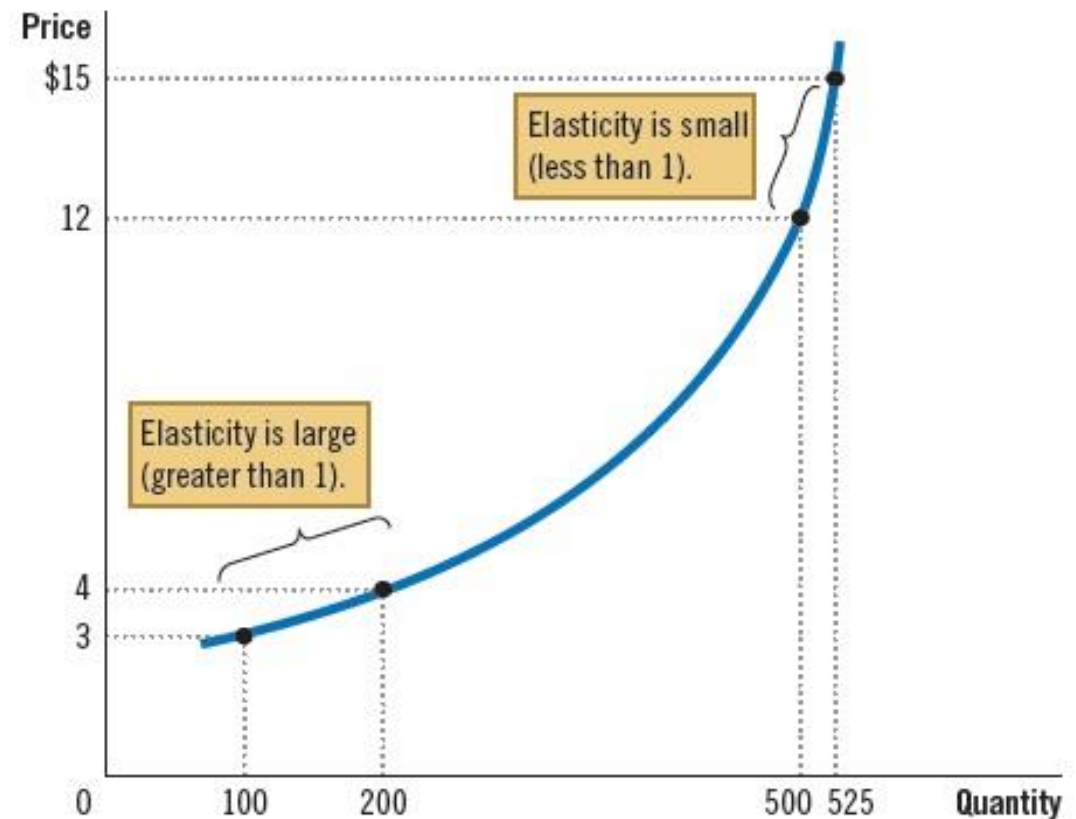


Figure 6 How the Price Elasticity of Supply Can Vary

- Because firms often have a maximum capacity for production, the elasticity of supply may be very high (low) at low (high) levels of quantity supplied.
- Here, an increase in the price from \$3 to \$4 increases the quantity supplied from 100 to 200. Because the 67% increase in quantity supplied (calculated with the midpoint method) is larger than the 29% increase in price, the supply curve in this range is elastic.
- By contrast, when the price rises from \$12 to \$15, the quantity supplied rises only from 500 to 525. Because the 5 percent increase in quantity supplied is smaller than the 22% increase in price, the supply curve in this range is inelastic.



5-3

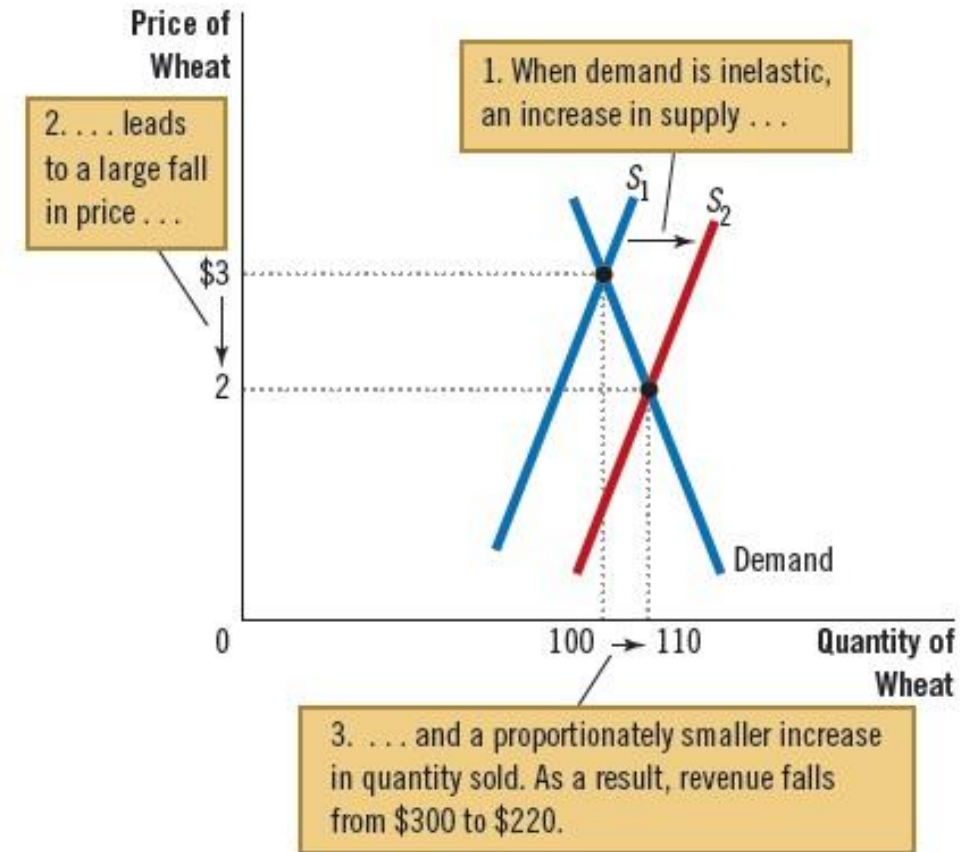
Three Applications of Supply, Demand, and Elasticity

Can Good News for Farming Be Bad News for Farmers?

- New hybrid of wheat increases production per acre by 20%
 - Supply curve shifts to the right
 - Higher quantity and lower price
 - Demand is inelastic: Total revenue falls
- Paradox of public policy
 - Induce farmers not to plant crops

Figure 7 A Supply Increase in the Market for Wheat

- When a technological advance increases the wheat supply from S_1 to S_2 , the price falls.
- Because the demand for wheat is inelastic, the increase in quantity from 100 to 110 is proportionately smaller than the decrease in the price from \$3 to \$2.
- As a result, farmers' total revenue falls from \$300 ($\3×100) to \$220 ($\2×110).

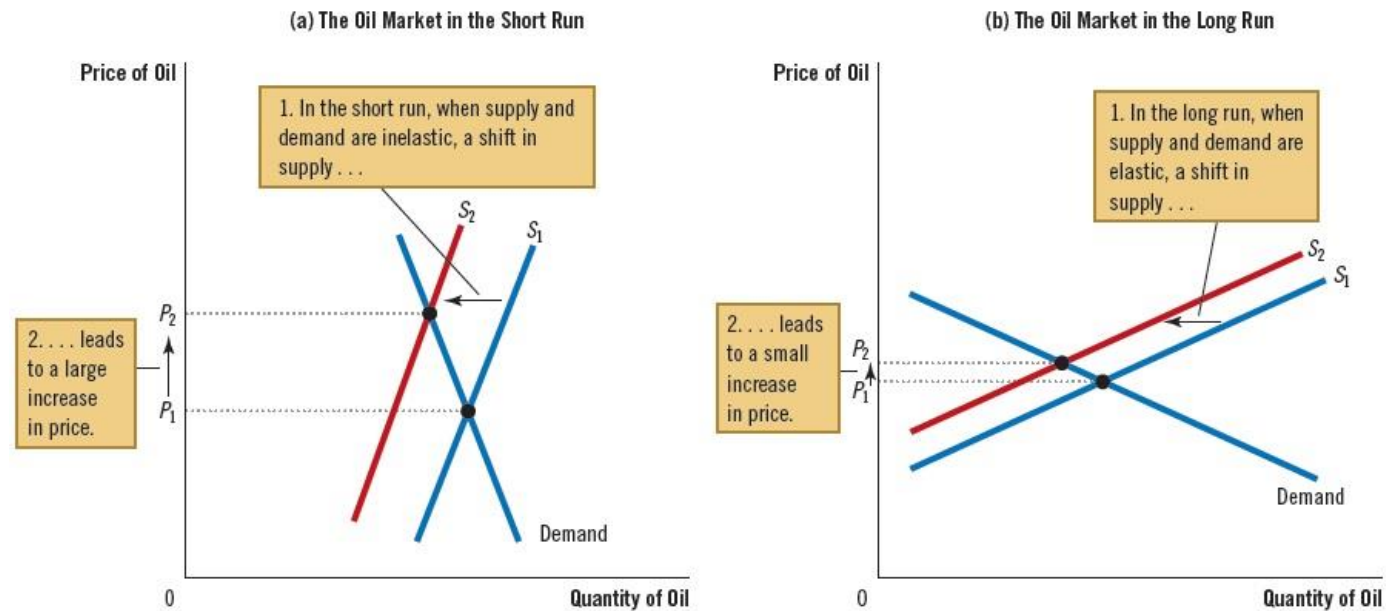


Why Has OPEC Failed to Keep the Price of Oil High?

- Increase in prices: 1973–1974, 1971–1981
- Short-run: Supply and demand are inelastic
 - Decrease in supply: Large increase in price
- Long-run: Supply and demand are elastic
 - Decrease in supply: Small increase in price

Figure 8 A Reduction in Supply in the World Market for Oil

When the supply of oil falls, the response depends on the time horizon. In the short run, supply and demand are relatively inelastic, as in panel (a). The shift in the supply curve from S_1 to S_2 leads to a substantial price increase. In the long run, however, supply and demand are relatively elastic, as in panel (b). In this case, the same size shift in the supply curve (S_1 to S_2) causes a smaller price increase.



Does Drug Interdiction Increase or Decrease Drug-Related Crime? (1 of 2)

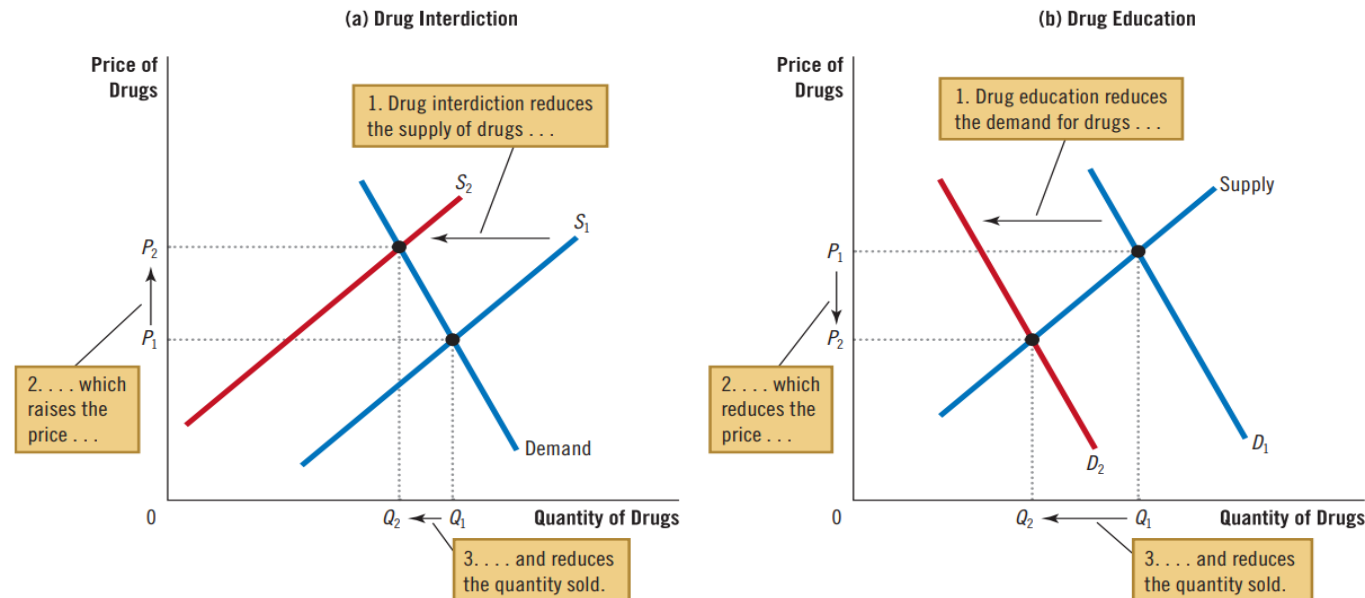
- Increase the number of federal agents devoted to the war on drugs
 - Supply curve shifts left
 - Lower quantity and higher price
 - Demand is inelastic: Total revenue rises

Does Drug Interdiction Increase or Decrease Drug-Related Crime? (2 of 2)

- Drug interdiction would increase drug-related crime in the short run but decrease it in the long run
 - Demand is probably inelastic over short periods because higher prices do not substantially affect drug use by addicts
 - Demand may be more elastic over longer periods because higher prices would discourage experimentation and lead to fewer drug addicts

Figure 9 Policies to Reduce the Use of Illegal Drugs

Drug interdiction reduces the supply of drugs from S_1 to S_2 , as in panel (a). If the demand for drugs is inelastic, then the total amount paid by drug users rises, even as the amount of drug use falls. By contrast, drug education reduces the demand for drugs from D_1 to D_2 , as in panel (b). Because both price and quantity fall, the amount paid by drug users falls.



5-4

Conclusion

Conclusion

- The tools of supply and demand are useful for analyzing the events and policies that shape the economy

Think-Pair-Share Activity

In order to reduce teen smoking, the government places a \$2 per pack tax on cigarettes. After one month, the quantity demanded of cigarettes has been reduced only slightly. Discuss the following:

- A. What conclusion can you draw about the one-month demand for cigarettes?
- B. Caleb suggests that the cigarette industry should get together and raise the price of cigarettes further to increase total revenue
- C. Keisha suggests that only your firm should raise the price of your cigarettes to increase total revenue

Self-Assessment

- What is the relationship between price and quantity demanded for inelastic demand and for elastic demand?
- A storm destroys half the oranges crop. Is this event more likely to hurt orange growers if the demand for oranges is very elastic or very inelastic? Explain.

Summary

Click the link to review the objectives for this presentation.

[Link to Objectives](#)