“Start with the idea that you can’t repeal the laws of economics. Even if they are inconvenient.”

—Larry Summers
Why It Matters

Certain people and institutions play important roles in your life. For example, your parents, teachers, and friends are important. Government is an institution that also plays an important part in your life. It determines such things as when you can get a driver’s license, the amount of taxes you must pay, and when you will be able to vote.

Markets also have a major impact on your life. A market is any place where people come together to buy and sell goods or services. Markets determine what prices you pay for computers, cars, television sets, books, and clothes. Markets also determine what people earn as teachers, truck drivers, television and movie stars, baseball players, and nurses. How much money you earn in the future will depend on markets.

If you are interested in the prices you pay for the goods and services you buy, or in why some people earn higher salaries than others, then you will be interested in learning how markets work. The first step is to learn about demand, the subject of this chapter.

Shopping for a more powerful computer and the latest software program can be fun. Whether or not these shoppers decide to make a purchase will depend on their willingness and ability to buy, conditions you will learn more about in this chapter.
The following events occurred one day in June.

9:03 A.M. Sam is a student at a technical college in New York City. He is currently working on one of the computers in the school library. He’s not doing any research right now; instead, he’s online checking the prices of various stocks. He recently inherited some money and is thinking of investing it in the stock market. He checks the share price of various stocks: Georgia Pacific, General Motors, Microsoft, and Dell. He is thinking about buying 100 shares of Dell, current price $39.35. He is about to place his order online with his online broker, when he has second thoughts. A friend of his told him that the price of tech stocks, including Dell, would probably be going down this week. Maybe, Sam thinks, I should wait until later to buy this stock.

- What does the (expected) future price of a share of stock have to do with buying stock today?

10:41 A.M. A U.S. senator is in his office talking with his staff. He is concerned about teenage smoking in America. He wonders whether he, as a U.S. senator, can do anything to reduce the amount of teenage smoking. One member of his staff says that the federal government should increase the tax on a pack of cigarettes. “That way,” he says, “a lot of these kids will stop smoking.” “How so?” asks the senator. “The tax will push up the overall price of cigarettes,” the staffer says, “and that will lead to teens buying fewer cigarettes.” Another staffer enters the conversation. “I am not so sure many teens will stop smoking,” she says. “If they are really hooked on cigarettes, I think they may keep on buying just as many cigarettes, even at the higher price.”

- Will higher taxes on cigarettes cut down on the number of packs of cigarettes teens purchase? Will higher taxes cut down on the amount of money teens spend on cigarettes?

11:35 P.M. Evan is sitting up in bed reading a magazine. He turns the page of the magazine and looks at an ad about a hotel in Dallas. Under the name of the hotel are the words “The greatest hotel in the world.” Evan reads the magazine for a few more minutes, then turns out the light in his bedroom, and goes to sleep.

- What is the purpose of the Dallas hotel calling itself “the greatest hotel in the world”?
What Is Demand?

A market is any place where people come together to buy and sell goods or services. Economists often say a market has two sides: a buying side and a selling side. In economics, the buying side is referred to as demand, and the selling side is referred to as supply. In this chapter, you will learn about demand; in the next chapter, you will learn about supply.

The word demand has a specific meaning in economics. It refers to the willingness and ability of buyers to purchase different quantities of a good at different prices during a specific time period. Willingness to purchase a good refers to a person’s want or desire for the good. Having the ability to purchase a good means having the money to pay for the good. Both willingness and ability to purchase must be present for demand to exist. It is important for you to remember that if either one of these conditions is absent, there is no demand.

EXAMPLE: Cruz doesn’t have the $34,000 needed to buy a particular car. If she did have the money, though, she says that she certainly would buy the car. Notice that Cruz has the willingness (she wants the car), but not the ability (not enough money) to buy the car. Under these circumstances (willingness, but not ability, to buy), Cruz does not have a demand for the car.

What Does the Law of Demand “Say”?

Suppose the average price of a compact disc rises from $10 to $15. Will customers want to buy more or fewer compact discs at the higher price? Most people would say that customers would buy fewer CDs.

Now suppose the average price of a compact disc falls from $10 to $5. Will customers want to buy more or fewer compact discs at the lower price? Most people would say more.
If you answered the questions the way most people would, you instinctively understand the law of demand. This law says that as the price of a good increases, the quantity demanded of the good decreases. The law of demand also says that as the price of a good decreases, the quantity demanded of the good increases. In other words, price and quantity demanded move in opposite directions. This relationship (you have probably heard it referred to as an inverse relationship in your math classes) can be shown in symbols:

\[ \text{Law of Demand} \]
\[ \text{If } P \uparrow \text{ then } Q_d \downarrow \]
\[ \text{If } P \downarrow \text{ then } Q_d \uparrow \]

(where \( P \) = price and \( Q_d \) = quantity demanded)

If you were reading closely, you probably noticed two words that sound alike: demand and quantity demanded. Don’t make the mistake of thinking they mean the same thing. Demand, as you learned earlier, refers to both the willingness and ability of buyers to purchase a good or service. For example, if an economist said that Karen had a demand for popcorn, you would know that Karen has both the willingness and ability to purchase popcorn.

Quantity demanded is a new and different concept. It refers to the number of units of a good purchased at a specific price. For example, suppose the price of popcorn is $5 a bag, and Karen buys two bags. In this case two bags of popcorn is the quantity demanded of popcorn at $5 a bag. As you work your way through this chapter, you will see why it is important to know the difference between demand and quantity demanded.

Why Do Price and Quantity Demanded Move in Opposite Directions?

The law of demand says that as price rises, quantity demanded falls, and that as price falls, quantity demanded rises. Why? According to economists, it is because of the law of diminishing marginal utility, which states that as a person consumes additional units of a good, eventually the utility or satisfaction gained from each additional unit of the good decreases. For example, you may receive more utility (satisfaction) from eating your first hamburger at lunch than your second and, if you continue, more utility from your second hamburger than your third.

What does this have to do with the law of demand? Economists state that the more utility you receive from a unit of a good, the higher price you are willing to pay for it; and the less utility you receive from a unit of a good, the lower price you are willing to pay for it. According to the law of diminishing marginal utility, individuals eventually obtain less utility from additional units of a good (such as hamburgers), so it follows that they will buy larger quantities of a good only at lower prices. And this is what the law of demand states.

“The main reason economists believe so strongly in the law of demand is that it is so plausible, even to noneconomists.”

— David R. Henderson

Harry Potter and the Order of the Phoenix was in great demand hours after its release in Russia in early 2004. Do these people have both willingness and ability to purchase?
The Law of Demand in Numbers and Pictures

The law of demand can be represented both in numbers and pictures. Look at Exhibit 4-1(a), which has a “Price” column and a “Quantity demanded” column. Notice that as the prices fall (from $4 to $3 to $2 to $1), the quantity demanded rises (from 1 to 2 to 3 to 4). Do you see that price and quantity demanded are moving in opposite directions? The economic term for this type of numerical chart showing the law of demand is demand schedule.

Now let’s see how you would illustrate the law of demand in picture form. The simple way is to plot the numbers from a demand schedule in a graph. Look at Exhibit 4-1(b), which shows how the combinations of price and quantity demanded...
in Exhibit 4-1(a) are plotted. The first combination (a price of $4 and a quantity demanded of 1) is labeled as point A. The second price and quantity demanded combination ($3 and a quantity demanded of 2) is labeled B. The same process continues for points C and D. If we connect all four points, from A to D, we have a line that slopes downward from left to right. This line, called a demand curve, is the graphic representation of the law of demand.

You might be wondering why we use the word curve when, as you can see in Exhibit 4-1(b), we ended up drawing a straight line to represent demand. The answer has to do with the standard practice in economics, which is to call the graphic representation of the relationship between price and quantity demanded a demand curve, whether it is a curve or a straight line.

_A Student Asks_

**QUESTION:** I've seen a car, a radio, and a diamond ring in the real world, but I've never seen a demand curve in real life. (I have seen one in this textbook, though.) Do demand curves exist in the real world?

**ANSWER:** If you go outside and look up into the sky, you’re not going to see a demand curve. If you look under your bed or in the school auditorium, you won’t see a demand curve, which doesn’t mean that demand curves don’t exist in the real world. (You also can’t see a virus with the naked eye, but that doesn’t mean viruses don’t exist.)

The data (numbers) that make up a demand curve—combinations of price and quantity demanded—do exist in the real world. When people (in the real world) buy more of a good (such as a can of soda or a new pair of jeans) at a lower price than at a higher price, they are expressing the law of demand, which is graphically portrayed as a demand curve (in a textbook). So what do you think? Do demand curves exist in the real world?

**Individual Demand Curves and Market Demand Curves**

An individual demand curve and a market demand curve are different. An individual demand curve is what it sounds like: the demand curve that represents an individual’s demand. For example, Harry’s demand curve represents Harry’s (and only Harry’s) demand for, say, DVDs. A market demand curve is simply the sum of all the different individual demand curves added together.
Suppose that the whole world has only three buyers of DVDs: Harry, Sally, and Elizabeth. At a price of $10 per DVD, quantity demanded is 2 for Harry, 1 for Sally, and 3 for Elizabeth. As a result, the market demand curve would include a point representing a price of $10 per DVD and a market quantity demanded of 6 DVDs (2 + 1 + 3).

To see this graphically, look at Exhibit 4-2. In panels (a) through (c) you see the individual demand curves for Harry, Sally, and Elizabeth. The market demand curve, shown in part (d), is simply the sum of the individual demand curves. Stated differently, we know that at a price of $10 per DVD, the quantity demanded of DVDs is 2 for Harry, 1 for Sally, and 3 for Elizabeth. It follows that all three buyers together would like to buy 6 DVDs at a price of $10 per DVD. This point is identified on the market demand curve in part (d).

**Example:** Suppose that the whole world has only three buyers of DVDs: Harry, Sally, and Elizabeth. At a price of $10 per DVD, quantity demanded is 2 for Harry, 1 for Sally, and 3 for Elizabeth. As a result, the market demand curve would include a point representing a price of $10 per DVD and a market quantity demanded of 6 DVDs (2 + 1 + 3).

To see this graphically, look at Exhibit 4-2. In panels (a) through (c) you see the individual demand curves for Harry, Sally, and Elizabeth, respectively. (To keep things simple, we identify only one point on the demand curve for each person.) Now look at panel (d). Here you can see the market demand curve (for all buyers—Harry, Sally and Elizabeth—of DVDs). Notice that the point we identify on the market demand curve simply represents the quantity demanded of all three buyers together if the price of a DVD is $10.

**Defining Terms**

1. Define:
   a. demand
   b. quantity demanded
   c. market
   d. demand schedule
   e. demand curve
   f. law of demand
2. Use the terms demand and quantity demanded correctly in a sentence about concert tickets.

**Reviewing Facts and Concepts**

3. State the law of demand.
4. Give an example of a demand schedule.

**Critical Thinking**

5. Yesterday the price of a good was $10, and the quantity demanded was 100 units. Today the price of the good is $12, and the quantity demanded is 87 units. Did quantity demanded fall because the price increased, or did the price rise because quantity demanded fell?

6. What does the law of diminishing marginal utility have to do with the law of demand?

7. Assume that the law of demand applies to criminal activity. What might community leaders do to reduce the number of crimes committed in the community?
When Demand Changes, the Curve Shifts

Demand can go up, and it can go down. For example, the demand for orange juice can rise or fall. The demand for CDs can rise or fall. Every time the demand changes for a good, any good, the demand curve for that good shifts. By shift we mean that it moves; it moves either to the right or to the left.

For example, if the demand for orange juice increases, the demand curve for orange juice shifts to the right. If the demand for orange juice decreases, the demand curve for orange juice shifts to the left.

We can understand shifts in demand curves better with the aid of Exhibit 4-3. Look at the curve labeled D_1 in Exhibit 4-3. Suppose this demand curve represents the original and current demand for orange juice. Notice that the quantity demanded at a price of $1 is 400 quarts of orange juice. Now suppose that the demand for orange juice increases. For whatever reason, people want to buy more orange juice. This increase in demand is shown by the demand curve D_1 shifting to the right and becoming D_2.

Focus Questions
- What does it mean when a demand curve shifts to the right?
- What does it mean when a demand curve shifts to the left?
- What is a normal good? An inferior good? A neutral good?
- What factors can change demand?
- What factor can change quantity demanded?

Key Terms
- normal good
- inferior good
- neutral good
- substitute
- complement

EXHIBIT 4-3
Shifts in a Demand Curve

Moving from D_1 (original demand curve) to D_2 represents a rightward shift in the demand curve. Demand has increased. Moving from D_1 to D_3 represents a leftward shift in the demand curve. Demand has decreased.
What does it mean for a demand curve to shift to the right? The answer is easy if you again look at Exhibit 4-3, focusing on the horizontal axis and the numbers on it, along the bottom of the graph. What is the quantity demanded on curve D₂ at the price of $1? The answer is 600 quarts of orange juice. In other words, an increase in demand (or a shift rightward in the demand curve) is the same thing as saying, “Buyers want to buy more of a good at each and every price.” In our example, buyers want to buy more quarts of orange juice at $1.

How would we graphically represent a decrease in demand? In Exhibit 4-3, again let’s suppose that D₁ is our original and current demand curve. A decrease in demand would then be represented as a shift leftward in the demand curve from D₁ to D₃. A decrease in demand means that buyers want to buy less of the good at each and every price. Specifically, if we look at the price $1, we see that buyers once wanted to buy 400 quarts of orange juice at $1 a quart, but now they want to buy only 200 quarts at $1 a quart.

**A Student Asks**

**QUESTION:** Is saying that demand has increased for a good the same as saying that buyers are buying more of the good?

**ANSWER:** Yes, but with one important qualification. Buyers are buying more of the good at the same price at which they earlier bought less. For example, suppose that on Monday buyers bought 100 units of a good at $3 per unit. Then on Tuesday they bought 150 units of the same good at $3 per unit. An economist would say that demand for the good increased between Monday and Tuesday because the buyers bought more at the same price. If the good’s price changed, the economist would describe the situation differently. The economist would say that the quantity demanded changed, rather than any change in demand.

### What Factors Cause Demand Curves to Shift?

Demand curves do not shift to the right or left without cause. They shift because of changes in demand, which can result from changes in several factors. These factors include income, buyer preferences, prices of related goods, number of buyers, and future price.

**Income**

As their income changes, people may buy more or less of a particular good. You might think that if income goes up, demand will go up, and if income goes down, demand will go down. This relationship is not necessarily the case, however. Much of what happens depends on what goods are involved.

If a person’s income and demand change in the same direction (both go up, or both go down), then the good is called a **normal good**. For example, if Robert’s income rises and he buys more CDs, then CDs are a normal good for Robert. If, however, income and demand go in different directions (one goes up, while the other goes down), the good is called an **inferior good**. If a person buys the same amount of the good when income changes, the good is called a **neutral good**.

**Example:** On the average, each month Simon bought and consumed five hot dogs, one steak, and one tube of toothpaste when he was a college student earning $100 a week. Now that he has graduated from college, and is earning $700 a week, he buys two hot dogs, three steaks, and one tube of toothpaste a month. During this time, prices have been stable, meaning no changes in prices. So, for Simon, hot dogs are an inferior good (he buys less as his income rises), steak is a normal good (he buys more as his income rises), and toothpaste is a neutral good (he buys the same amount as his income rises).

If you’re wondering if a good can be a normal good for one person and an inferior good for another person, the answer is yes. People, not economists, decide whether a good is normal or inferior for them. If Bob’s income goes up and he buys fewer potato chips, then potato chips are an inferior good.
for Bob. If Georgia’s income goes up and she buys more potato chips, then potato chips are a normal good for Georgia.

Preferences

People’s preferences affect how much of a good they buy. A change in preferences in favor of a good shifts the demand curve to the right. A change in preferences away from a good shifts the demand curve to the left.

**Example:** People begin to favor (prefer) small, gas-efficient cars more than they did in the past. As a result, the demand curve for small, gas-efficient cars shifts rightward. At the same time, people may begin to favor several new brands of computers and stop buying Dell computers, which had been the most popular computer for several years. As a result, the demand curve for Dell computers shifts leftward.

Prices of Related Goods

Demand for goods is affected by the prices of related goods. The two types of related goods are substitutes and complements.

When two goods are **substitutes**, the demand for one good moves in the same direction as the price of the other good. In other words, if the price for a good, say peanuts, goes up, the demand for that good’s substitutes, say pretzels, will also go up. For many people coffee is a substitute for tea. Thus, if the price of coffee increases, the demand for tea increases as people substitute tea for the higher-priced coffee.

**Example:** Jessica is in the supermarket looking at the soft drinks. She usually buys a six-pack of Coke a week. She notices that the price of Coke has risen from what it was last week. So, instead of buying a six-pack of Coke, she buys a six-pack of Pepsi. For Jessica, Coke and Pepsi are substitutes, which means that as the price of Coke goes up, so does Jessica’s demand for Pepsi.

Two goods are **complements** if they are consumed together. For example, tennis rackets and tennis balls are used together to play tennis. With complementary goods, the demand for one moves in the opposite direction as the price of the other. As the price of tennis rackets rises, for example, the demand for tennis balls falls. Other examples of complements (or complementary goods) include cars and tires, lightbulbs and lamps, and golf clubs and golf balls.

Number of Buyers

The demand for a good in a particular market area is related to the number of buyers in the area. The more buyers, the higher the demand; the fewer buyers, the lower the demand. The number of buyers may increase because of a higher birthrate, increased immigration, or the migration of people from one region of the country to another. Factors such as a higher death rate or the migration of people can also cause the number of buyers to decrease.

Future Price

Buyers who expect the price of a good to be higher in the future may buy the good now, thus increasing the current demand for the good. Buyers who expect the price of a good to be lower in the future may wait until the future to buy the good, thus decreasing the current demand for the good.

**Example:** Suppose Brandon is willing and able to buy a house (demand exists), but he thinks the price of houses on average will be lower next month. As a result, Brandon is likely to hold off on making a purchase, which has the effect of decreasing current demand.
What Factor Causes a Change in Quantity Demanded?

We identified the factors (income, preferences, etc.) that can cause demand to change, but what factor can cause a change in quantity demanded? Only one: price. For example, the only thing that can cause customers to change their quantity demanded of orange juice is a change in the price of orange juice; the only thing that can cause a change in the quantity demanded of pencils is a change in the price of pencils.

As we stated earlier, a change in demand is represented as a shift in the demand curve. The curve moves either right or left. See Exhibit 4-4(a). So how do we represent a change in quantity demanded? When quantity demanded changes, the curve doesn’t
move right or left. Instead, the only movement is to a different point along a given demand curve, which stays in the same place on the graph. See Exhibit 4-4(b).

**EXAMPLE:** Ian notices that the price of bananas has fallen; as a result, he goes from buying three bananas a week to buying five bananas a week. An economist would say that Ian’s quantity demanded of bananas has increased (from three to five) as a result of the price of bananas falling.

**EXAMPLE:** The price of a book was $10 in July and Jeff bought three. The price was $10 in August and Jeff bought four. Economists would say that Jeff’s demand for books increased between July and August.

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**Defining Terms**
1. Define:
   a. normal good
   b. inferior good
   c. substitute
   d. neutral good
   e. complement

**Reviewing Facts and Concepts**
2. Explain what it means if demand increases.
3. Jerry, a comedian, started out doing stand-up comedy and went on to perform on a popular hit television series. As he went from stand-up comedian to TV star, his income increased substantially. During this time, he bought more cars (specifically, Porsches) to add to his collection. For Jerry, what kind of good are Porsches?

**Critical Thinking**
4. Identify a good that is a substitute for one good and a complement for another. (Hint: A Coca-Cola may be a substitute for a Pepsi and a complement for a hamburger.)

**Applying Economic Concepts**
5. In recent years the price of a computer has fallen. What effect is this price change likely to have on the demand for software? Explain your answer.
6. Graph the following:
   a. an increase in demand
   b. a decrease in demand
You just learned that buyers’ expectations about future prices can affect current demand. If computer buyers think computer prices will be higher next year, they might buy their computers now (at the lower price) instead of next year (at the higher price). Buyers who think computer prices will be lower next year, might hold off buying this year, thinking they will get a lower price next year.

The Tulip Example

Similar thinking has been affecting prices and demand for hundreds of years. In the 1600s in Holland, for example, a tulip craze became so frenzied that some people sold their businesses and family jewels just to buy a few tulip bulbs. Why would people behave in this way? The answer has to do with what these people thought the future price of tulips would be. They believed that if they bought tulips today at a relatively lower price, they could sell the tulips at a higher price in the future.

Don’t Forget Beanie Babies

Now think back to 1998. In that year, many people in the United States were buying Beanie Babies (a small stuffed animal). They believed that Beanie Babies would become collectors’ items, and that the future price of Beanie Babies would be higher than the current price. They thought that if they bought Beanie Babies in 1998, they could turn around and sell those Beanie Babies at a higher price in 1999, or 2000, or in some later year.

Then Came the Internet Bubble

One more example: Internet stocks in the late 1990s. Everyone seemed to be saying that the prices were going to be higher next week or next month and so you ought to buy the stocks as soon as possible. Even though many experts said the stocks were overpriced, people kept buying, thinking that the prices would continue to climb. Many people borrowed money to buy the stocks.

And What About Real Estate Prices?

Well, Beanie Babies, tulips, and many Internet stocks all crashed in price. Beanie Babies that once sold for $100 were selling for $5; tulips that sold for hundreds of thousands of dollars ended up selling for (the equivalent of) a few pennies; and Internet stock prices in some cases went from $400 a share to a few cents a share.

Do you think real estate prices might be similar to these examples? During the period from 2001 to 2005 in many places around the country, all you heard was how home prices were destined—yes, destined—to just keep on rising. It was as if some law—let’s call it the law of antigravity—kept pulling prices up, much like the real law of gravity pulls things down. In southern California, especially coastal southern California, it was not uncommon to hear people say, “There is no way...”
Chapter 4 Demand

that houses near the coast are going to go down in price. After all, there's only so much coast to go around.” At the time, many people were buying houses not to live in, but to speculate on. In other words, they bought a house in 2003 because they were “certain” they could sell the house in 2004 for a higher price.

Many of these people did just that. Of course, many of the people who bought Beanie Babies, tulips, and Internet stocks did the same thing: they bought low and sold high. Not everybody was so fortunate. In all three crazes—Beanie Babies, tulips, and Internet stocks—some people bought at high prices and ended up selling at low prices.

Will it be the same with houses? It very well could be. It’s happened before, and no economic law says it won’t happen again.

One Last Point

Consider George. George watches as the price of houses skyrockets. He also notices that house prices are rising much more rapidly than house rents. Based on the discrepancy between the rate of change in house rents and the rate of change in house prices, he is quite sure that sometime in the future house prices will decline (perhaps very quickly).

What George doesn’t know is when house prices will start to decline. Will the price decline begin next week, next month, next year, or five years from now? It is much harder to predict the timing of an event than it is to predict the event. (The doctor can tell the pregnant woman that she is going to have a baby, but be unsure of the day and time. The weather forecaster is fairly sure that it will rain in the next 24 hours, but he’s not sure if the rain will start at 7:08 a.m. or at 9:32 a.m.)

My Personal Economics Action Plan

Here are some points you may want to consider and some guidelines you might want to put into practice:

✔ 1. When someone says that “price has nowhere to go but up,” you might want to recall what happened to the price of Beanie Babies, tulips, and Internet stocks. Many things that sound too good to be true are just that.

Before making a major financial decision, I will talk to some experts and do some research to make sure that my decision is based on facts, not “hype.”

✔ 2. Don’t jump to the conclusion that just because you can predict that an event will occur, you can predict when the event will occur. Remember that no one, not even the leading experts in a particular field, can know with certainty when an economic event will occur.

Can economists predict when real estate prices will rise or fall?
What Is Elasticity of Demand?

Suppose Jimmy loves chewing gum, so much so that he buys as many as four or five packs a week. One day he notices that the price of his favorite gum has gone up a quarter. Jimmy will probably now buy less chewing gum. But how much less?

This question about Jimmy’s gum buying is the kind of question that you will learn how to answer as you study our next economic concept, elasticity of demand. Elasticity of demand deals with the relationship between price and quantity demanded. It is a way of measuring the impact that a price change has on the number of units of a good people buy. In some cases a small price change causes a major change in the number of units of a good people buy. In other cases, a small price change causes little change in how many units of a good people buy.

Elastic Demand

Economists have created a way to measure these relationships between price and quantity demanded. They compare the percentage change in quantity demanded of a good to the percentage change in the price of that good. In mathematical terms, here is what elasticity of demand looks like:

\[
\text{Elasticity of demand} = \frac{\text{Percentage change in quantity demanded}}{\text{Percentage change in price}}
\]

In the equation, the numerator is percentage change in quantity demanded, and the denominator is percentage change in price. Elastic demand exists when the quantity demanded (the numerator) changes by a greater percentage than price (the denominator). For example, suppose the quantity demanded of lightbulbs falls by 15 percent as the price of lightbulbs increases by 10 percent. An economist would say that because the numerator (15%) is greater than the denominator (10%), the demand for lightbulbs is elastic. Another way that an economist might say it is that elasticity of demand is greater than 1, because if you divide 15 percent by 10 percent, you get 1.5, which is greater than 1.
Inelastic Demand

Inelastic demand exists when the quantity demanded changes by a smaller percentage than price—that is, when the numerator changes by less than the denominator. Suppose the quantity demanded of salt falls by 5 percent as the price of salt rises by 10 percent. In this case the numerator (5%) is less than the denominator (10%), so the demand for salt is inelastic. An economist could say that elasticity of demand is less than 1 (if you divide 5% by 10% you get 0.5, which is less than 1).

Unit-elastic Demand

Finally, unit-elastic demand exists when the quantity demanded changes by the same percentage as price—that is, when the numerator changes by the same percentage as the denominator. For example, suppose the quantity demanded of picture frames decreases by 10 percent as the price of picture frames rises by 10 percent. The numerator (10%) is equal to the denominator (10%), so the demand for picture frames is unit elastic. According to an economist, elasticity of demand would be equal to 1 (10% divided by 10% equals 1).

When elasticity of demand is greater than 1, we say that demand is elastic. When it is less than 1, we say that demand is inelastic. And finally, when it is equal to 1, we say that demand is unit-elastic. See Exhibit 4-5.

Elastic or Inelastic?

So, you’re probably wondering what products are elastic and which ones are inelastic? One economics study identified oysters, restaurant meals, and automobiles as goods with elastic demand. For these goods, price changes have a strong impact on how much customers will buy. In the same study, coffee, gasoline (for your car), physicians’ services, and legal services were identified as goods with inelastic demand. For these products a change in price had less impact on how much customers will buy.

Example: A university raises its tuition by 10 percent. As a result, the number of students applying to the university falls by 2 percent. In this situation, we would say that the demand for education at this particular university is inelastic. Why? Because the percentage change in quantity demanded (2%) is less than the percentage change in price (10%). ♦

What Determines Elasticity of Demand?

The demand for some goods (coffee, gasoline at the local gas station, physicians’ services) is inelastic, while the demand for other goods (oysters, restaurant meals, and cars) is elastic. Why is the demand for some goods inelastic, while the demand for other goods is elastic? Four factors affect the elasticity of demand: (1) the number of substitutes available, (2) whether something is a luxury or a necessity, (3) the percentage of income spent on the good, and (4) time.

Number of Substitutes

Let’s look at two goods: heart medicine and soft drinks. Heart medicine has relatively few substitutes; many people must have it to stay well. Even if the price of heart medicine went up by 50, 100, or 150 percent, the quantity that people demanded probably would not fall by much. Is the demand for heart medicine more likely to be elastic or inelastic? The answer is inelastic. Do you see the reasoning here? The fewer substitutes for a good, the less likely the quantity demanded will change much if the price rises.
In contrast, a particular soft drink (say Sprite) has many substitutes (Fresca, Mountain Dew, etc.). Therefore, if the price of Sprite rises, we would expect the quantity demanded to fall greatly, because people have many other soft drinks they can choose. Is the demand for a particular soft drink more likely to be elastic or inelastic? The answer is elastic, because the more substitutes there are for a good, the more likely people will buy a lot fewer of the item if the price rises.

Luxuries Versus Necessities

Luxury goods (luxuries) are goods that people feel they do not need to survive. For example, a $70,000 car would be a luxury good for most people. Necessary goods (necessities), in contrast, are goods that people feel they need to survive. Heart medicine may be a necessity for some people. Food is a necessity for everyone.

Generally speaking, if the price of a necessity, such as food, increases, people cannot cut back much on the quantity demanded. (They need a certain amount of food to live.) However, if the price of a luxury good increases, people are more able to cut back on the quantity demanded. Between the two types of goods, luxuries and necessities, the demand for luxuries tends to be elastic; the demand for necessities is more likely to be inelastic.

Percentage of Income Spent on the Good

Claire has a monthly income of $2,000. Of this amount, she spends $10 on magazines and $400 on dinners at restaurants. In percentage terms, she spends one-half of 1 percent of her monthly income on magazines and 20 percent of her monthly income on dinners at restaurants. Suppose the price of magazines and the price of dinners at restaurants both double. What will Claire be more likely to cut back on, the number of magazines she buys or the number of dinners at restaurants?

She will probably reduce the number of dinners at restaurants, don’t you think? Claire will feel this price change more strongly because it affects a larger percentage of her income. She may shrug off a doubling in the price of magazines, on which she spends only one-half of 1 percent of her income, but she is less likely to shrug off a doubling in the price of dinners at restaurants, on which she spends 20 percent.

In short, buyers are more responsive to price changes for goods on which they spend a larger percentage of their income. In these cases, the demand is likely to be elastic. Whereas, the demand for goods on which consumers spend a small percentage of their income is more likely to be inelastic.

Time

As time passes, buyers have greater opportunities to change quantity demanded in response to a price change. If the price of electricity went up today and you knew about it, you probably would not change your consumption of electricity much today. By three months from today, though, you would probably have changed it more. As time passes, you have more chances to change your consumption by finding substitutes (natural gas), changing your lifestyle (buying more blankets and turning down the thermostat at night), and similar actions. The less time you have to respond to a price change in a good, the more likely it is that your demand for that good is going to be inelastic.
An Important Relationship Between Elasticity and Total Revenue

Demand is elastic for one good and inelastic for another good. Does it matter? As you just read, it can matter to you as an individual, and it definitely matters to the sellers of goods. In particular, it matters to a seller's total revenue (money sellers receive for selling their goods). To see how elasticity of demand relates to a business's total revenue, let's consider four cases in detail. The cases look at both elastic and inelastic goods and what happens to each when the price rises, and when the price falls.

• Case 1: Elastic Demand and a Price Increase
Javier currently sells 100 basketballs a week at a price of $20 each. His total revenue (price \times quantity) per week is $2,000. Suppose Javier raises the price of his basketballs to $22 each, a 10 percent increase in price. As a result, the quantity demanded falls from 100 to 75, a 25 percent reduction. The demand is elastic because the change in quantity demanded (25%) is greater than the change in price (10%). What happened to Javier's total revenue at the new price and quantity demanded? It is $1,650: the new price ($22) multiplied by the number of basketballs sold (75).

Notice that if demand is elastic, a price increase will lead to a decline in total revenue. Even though he raised the price, Javier’s total revenue went down, from $2,000 to $1,650. An important lesson here is that an increase in price does not always bring about an increase in total revenue.

Elastic demand + Price increase = Total revenue decrease

• Case 2: Elastic Demand and a Price Decrease
In case 2, as in case 1, demand is elastic. This time, however, Javier lowers the price of his basketballs from $20 to $18, a 10 percent reduction in price. We know that if price falls, quantity demanded will rise. Also, if demand is elastic, the percentage change in quantity demanded is greater than the percentage change in price. Suppose quantity demanded rises from 100 to 130, a 30 percent increase.

Total revenue at the new, lower price ($18) and higher quantity demanded (130) is $2,340. Thus, if demand is elastic and price is decreased, total revenue will increase.

Elastic demand + Price decrease = Total revenue increase

• Case 3: Inelastic Demand and a Price Increase
Now let's assume that the demand for basketballs is inelastic, rather than elastic, as it was in cases 1 and 2. Suppose Javier raises the price of his basketballs to $22 each, a 10 percent increase in price. If demand is inelastic, the percentage change in quantity demanded must fall by less than the percentage rise in price. Suppose the quantity demanded falls from 100 to 95, a 5 percent reduction.

Javier’s total revenue at the new price and quantity demanded is $2,090, which

The Bureau of Labor Statistics (BLS) is an agency within the U.S. Department of Labor. The agency collects data on prices in the economy. To see whether consumer prices are rising, falling, or remaining constant, go to the BLS Web site at www.emcp.net/prices. Once there, click on “Inflation & Consumer Spending.” Next, scroll down the page until you see “Consumer Price Index (CPI).” The CPI is a measure of the prices of the goods and services purchased by consumers. Have prices risen, fallen, or remained constant in the last month reported? If prices have risen or fallen, by what percentage have they risen or fallen?
is the new price ($22) multiplied by the number of basketballs sold (95). Notice that if demand is inelastic, a price increase will lead to an increase in total revenue. Javier’s total revenue went from $2,000 to $2,090 when he increased the price of basketballs from $20 to $22.

Inelastic demand + Price increase = Total revenue increase

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Case 4: Inelastic Demand and a Price Decrease
Demand is again inelastic, but Javier now lowers the price of his basketballs from $20 to $18, a 10 percent reduction in price. We know that if demand is inelastic, the percentage change in quantity demanded is less than the percentage change in price. Suppose quantity demanded rises from 100 to 105, a 5 percent increase. Total revenue at the new, lower price ($18) and higher quantity demanded (105) is $1,890. Thus, if demand is inelastic and price decreases, total revenue will decrease.

Inelastic demand + Price decrease = Total revenue decrease

See Exhibit 4-6 for a summary of the four types of relationships between elasticity and revenue.

QUESTION: Most people seem to think that if a seller raises the price, the seller’s total revenue will automatically rise. But it isn’t always true, is it?

ANSWER: No, it isn’t always true. If demand is inelastic (case 3), then a higher price will lead to a higher total revenue, but if demand is elastic (case 1), a higher price will lead to a lower total revenue.

Defining Terms
1. Define:
   a. elasticity of demand
   b. unit-elastic demand
   c. inelastic demand
   d. elastic demand

Reviewing Facts and Concepts
2. Does an increase in price necessarily bring about a higher total revenue?
3. The price of a good rises from $4 to $4.50, and as a result, total revenue falls from $400 to $350. Is the demand for the good elastic, inelastic, or unit-elastic?
4. Good A has 10 substitutes, and good B has 20 substitutes. The demand is more likely to be elastic for which good? Explain your answer.

Critical Thinking
5. How is the law of demand (a) similar to and (b) different from elasticity of demand?

Applying Economic Concepts
6. A hotel chain advertises its hotels as “The Best Hotels You Can Find Anywhere.” Does this ad have anything to do with elasticity of demand? If so, what?
Chapter Summary

Be sure you know and remember the following key points from the chapter sections.

Section 1
- Demand is the willingness and ability of buyers to purchase different quantities of a good at different prices during a specific time period.
- A market is any place where people come together to buy and sell goods and services. There are two sides to a market—demand and supply.
- The law of demand says that price and quantity demanded move in opposite directions.
- A demand curve graphically represents the law of demand.

Section 2
- An increase in demand for a good causes the demand curve to shift to the right.
- A decrease in demand causes a leftward shift in the demand curve.
- A change in demand may be caused by changes in income, people’s preferences, price of related goods, number of buyers, and future price expectations.
- A change in price is what causes quantity demanded to change.

Section 3
- Elasticity of demand deals with the relationship between price and quantity demanded.
- Demand is elastic when quantity demanded changes by a greater percentage than price.
- Demand is inelastic when quantity demanded changes by a smaller percentage than price.
- Elasticity of demand is affected by available substitutes, whether the good is a luxury or necessity, percentage of income spent on the good, and time.

Economics Vocabulary

To reinforce your knowledge of the key terms in this chapter, fill in the following blanks on a separate piece of paper with the appropriate word or phrase.

1. A(n) ______ is any place where people come together to buy and sell goods or services.
2. If, as income rises, demand for a good falls, then that good is a(n) ______ good.
3. According to the law of demand, as the price of a good rises, the ______ of the good falls.
4. According to the ______, price and quantity demanded are inversely related.
5. According to the ______, as a person consumes additional units of a good, eventually the utility gained from each additional unit of the good decreases.
6. Demand is ______ if the percentage change in quantity demanded is less than the percentage change in price.
7. A downward-sloping demand curve is the graphic representation of the ______.
8. For a(n) ______ good, the demand increases as income rises and falls as income falls.
9. If, as the price of good X rises, the demand for Y increases, then X and Y are ______.
10. When demand is ______, the percentage change in quantity demanded is the same as the percentage change in price.

Understanding the Main Ideas

Write answers to the following questions to review the main ideas in this chapter.

1. Margarine and butter are substitutes. What happens to the demand for margarine as the price of butter rises?
2. Explain what happens to the demand curve for apples as a consequence of each of the following.
   a. More people begin to prefer apples to oranges.
   b. The price of peaches rises (peaches are a substitute for apples).
   c. People’s income rises (apples are a normal good).
3. “Sellers always prefer higher to lower prices.” Do you agree or disagree? Explain your answer.

4. In each of the following, identify whether the demand is elastic, inelastic, or unit-elastic.
   a. The price of apples rises 10 percent as the quantity demanded of apples falls 20 percent.
   b. The price of cars falls 5 percent as the quantity demanded of cars rises 10 percent.
   c. The price of computers falls 10 percent as the quantity demanded of computers rises 10 percent.

5. State whether total revenue rises or falls in each of the following situations.
   a. Demand is elastic and price increases.
   b. Demand is inelastic and price decreases.
   c. Demand is elastic and price decreases.
   d. Demand is inelastic and price increases.

**Doing the Math**

Do the calculations necessary to solve the following problems.

1. If the percentage change in price is 12 percent and the percentage change in quantity demanded is 7 percent, what is the elasticity of demand equal to?

2. The price falls from $10 to $9.50, and the quantity demanded rises from 100 units to 110 units. What does total revenue equal at the lower price?

**Working with Graphs and Charts**

Use Exhibit 4-7 to answer questions 1 through 3. (P = Price and Qd = Quantity demanded)

4. In Exhibit 4-8, a downward-pointing arrow (↓) means a decrease, an upward-pointing arrow (↑) means an increase, and a bar (—) over a variable means the variable remains constant (unchanged). Fill in the blanks for parts (a) through (c).

**Solving Economic Problems**

Use your thinking skills and the information you learned in this chapter to find a solution to the following problem.

1. Application. Income in the economy is expected to grow over the next few years. You are thinking about buying stock in a company. Is it better to buy stock in a company that produces a normal, inferior, or neutral good? Explain your answer.