After studying this chapter, you will be able to:

- Describe a competitive market and think about a price as an opportunity cost
- Explain the influences on demand
- Explain the influences on supply
- Explain how demand and supply determine prices and quantities bought and sold
- Use the demand and supply model to make predictions about changes in prices and quantities

3 DEMAND AND SUPPLY

What makes the price of oil double and the price of gasoline almost double in just one year? Will these prices keep on rising? Are the oil companies taking advantage of people? This chapter enables you to answer these and similar questions about prices—prices that rise, prices that fall, and prices that fluctuate.

You already know that economics is about the choices people make to cope with scarcity and how those choices respond to incentives. Prices act as incentives. You're going to see how people respond to prices and how prices get determined by demand and supply. The demand and supply model that you study in this chapter is the main tool of economics. It helps us to answer the big economic question: What, how, and for whom goods and services are produced?

At the end of the chapter, in *Reading Between the Lines*, we'll apply the model to the market for coffee and explain why its price increased sharply in 2010 and why it was expected to rise again.

Markets and Prices

When you need a new pair of running shoes, want a bagel and a latte, plan to upgrade your cell phone, or need to fly home for Thanksgiving, you must find a place where people sell those items or offer those services. The place in which you find them is a *market.* You learned in Chapter 2 (p. 42) that a market is any arrangement that enables buyers and sellers to get information and to do business with each other.

A market has two sides: buyers and sellers. There are markets for *goods* such as apples and hiking boots, for *services* such as haircuts and tennis lessons, for *factors of production* such as computer programmers and earthmovers, and for other manufactured *inputs* such as memory chips and auto parts. There are also markets for money such as Japanese yen and for financial securities such as Yahoo! stock. Only our imagination limits what can be traded in markets.

Some markets are physical places where buyers and sellers meet and where an auctioneer or a broker helps to determine the prices. Examples of this type of market are the New York Stock Exchange and the wholesale fish, meat, and produce markets.

Some markets are groups of people spread around the world who never meet and know little about each other but are connected through the Internet or by telephone and fax. Examples are the e-commerce markets and the currency markets.

But most markets are unorganized collections of buyers and sellers. You do most of your trading in this type of market. An example is the market for basketball shoes. The buyers in this $3 billion-a-year market are the 45 million Americans who play basketball (or who want to make a fashion statement). The sellers are the tens of thousands of retail sports equipment and footwear stores. Each buyer can visit several different stores, and each seller knows that the buyer has a choice of stores.

Markets vary in the intensity of competition that buyers and sellers face. In this chapter, we're going to study a **competitive market**—a market that has many buyers and many sellers, so no single buyer or seller can influence the price.

Producers offer items for sale only if the price is high enough to cover their opportunity cost. And consumers respond to changing opportunity cost by seeking cheaper alternatives to expensive items.

We are going to study how people respond to *prices* and the forces that determine prices. But to pursue these tasks, we need to understand the relationship between a price and an opportunity cost.

In everyday life, the *price* of an object is the number of dollars that must be given up in exchange for it. Economists refer to this price as the **money price**.

The *opportunity cost* of an action is the highest-valued alternative forgone. If, when you buy a cup of coffee, the highest-valued thing you forgo is some gum, then the opportunity cost of the coffee is the *quantity* of gum forgone. We can calculate the quantity of gum forgone from the money prices of the coffee and the gum.

If the money price of coffee is $1 a cup and the money price of gum is 50¢ a pack, then the opportunity cost of one cup of coffee is two packs of gum. To calculate this opportunity cost, we divide the price of a cup of coffee by the price of a pack of gum and find the *ratio* of one price to the other. The ratio of one price to another is called a **relative price**, and a *relative price is an opportunity cost.*

We can express the relative price of coffee in terms of gum or any other good. The normal way of expressing a relative price is in terms of a "basket" of all goods and services. To calculate this relative price, we divide the money price of a good by the money price of a "basket" of all goods (called a *price index*). The resulting relative price tells us the opportunity cost of the good in terms of how much of the "basket" we must give up to buy it.

The demand and supply model that we are about to study determines *relative prices,* and the word "price" means *relative* price. When we predict that a price will fall, we do not mean that its *money* price will fall—although it might. We mean that its *relative* price will fall. That is, its price will fall *relative* to the average price of other goods and services.

REVIEW QUIZ

1. What is the distinction between a money price and a relative price?
2. Explain why a relative price is an opportunity cost.
3. Think of examples of goods whose relative price has risen or fallen by a large amount.

You can work these questions in Study Plan 3.1 and get instant feedback. myeconlab

Let's begin our study of demand and supply, starting with demand.

Demand

If you demand something, then you

1. Want it,
2. Can afford it, and
3. Plan to buy it.

Wants are the unlimited desires or wishes that people have for goods and services. How many times have you thought that you would like something "if only you could afford it" or "if it weren't so expensive"? Scarcity guarantees that many—perhaps most—of our wants will never be satisfied. Demand reflects a decision about which wants to satisfy.

The **quantity demanded** of a good or service is the amount that consumers plan to buy during a given time period at a particular price. The quantity demanded is not necessarily the same as the quantity actually bought. Sometimes the quantity demanded exceeds the amount of goods available, so the quantity bought is less than the quantity demanded.

The quantity demanded is measured as an amount per unit of time. For example, suppose that you buy one cup of coffee a day. The quantity of coffee that you demand can be expressed as 1 cup per day, 7 cups per week, or 365 cups per year.

Many factors influence buying plans, and one of them is the price. We look first at the relationship between the quantity demanded of a good and its price. To study this relationship, we keep all other influences on buying plans the same and we ask: How, other things remaining the same, does the quantity demanded of a good change as its price changes?

The law of demand provides the answer.

The Law of Demand

The **law of demand** states

> Other things remaining the same, the higher the price of a good, the smaller is the quantity demanded; and the lower the price of a good, the greater is the quantity demanded.

Why does a higher price reduce the quantity demanded? For two reasons:

- Substitution effect
- Income effect

Substitution Effect When the price of a good rises, other things remaining the same, its *relative* price—its opportunity cost—rises. Although each good is unique, it has *substitutes*—other goods that can be used in its place. As the opportunity cost of a good rises, the incentive to economize on its use and switch to a substitute becomes stronger.

Income Effect When a price rises, other things remaining the same, the price rises *relative* to income. Faced with a higher price and an unchanged income, people cannot afford to buy all the things they previously bought. They must decrease the quantities demanded of at least some goods and services. Normally, the good whose price has increased will be one of the goods that people buy less of.

To see the substitution effect and the income effect at work, think about the effects of a change in the price of an energy bar. Several different goods are substitutes for an energy bar. For example, an energy drink could be consumed instead of an energy bar.

Suppose that an energy bar initially sells for $3 and then its price falls to $1.50. People now substitute energy bars for energy drinks—the substitution effect. And with a budget that now has some slack from the lower price of an energy bar, people buy even more energy bars—the income effect. The quantity of energy bars demanded increases for these two reasons.

Now suppose that an energy bar initially sells for $3 and then the price doubles to $6. People now buy fewer energy bars and more energy drinks—the substitution effect. And faced with a tighter budget, people buy even fewer energy bars—the income effect. The quantity of energy bars demanded decreases for these two reasons.

Demand Curve and Demand Schedule

You are now about to study one of the two most used curves in economics: the demand curve. You are also going to encounter one of the most critical distinctions: the distinction between *demand* and *quantity demanded.*

The term **demand** refers to the entire relationship between the price of a good and the quantity demanded of that good. Demand is illustrated by the demand curve and the demand schedule. The term *quantity demanded* refers to a point on a demand curve—the quantity demanded at a particular price.

Figure 3.1 shows the demand curve for energy bars. A **demand curve** shows the relationship between the quantity demanded of a good and its price when all other influences on consumers' planned purchases remain the same.

The table in Fig. 3.1 is the demand schedule for energy bars. A *demand schedule* lists the quantities demanded at each price when all the other influences on consumers' planned purchases remain the same. For example, if the price of a bar is 50¢, the quantity demanded is 22 million a week. If the price is $2.50, the quantity demanded is 5 million a week. The other rows of the table show the quantities demanded at prices of $1.00, $1.50, and $2.00.

We graph the demand schedule as a demand curve with the quantity demanded on the *x*-axis and the price on the *y*-axis. The points on the demand curve labeled *A* through *E* correspond to the rows of the demand schedule. For example, point *A* on the graph shows a quantity demanded of 22 million energy bars a week at a price of 50¢ a bar.

Willingness and Ability to Pay Another way of looking at the demand curve is as a willingness-and-ability-to-pay curve. The willingness and ability to pay is a measure of *marginal benefit.*

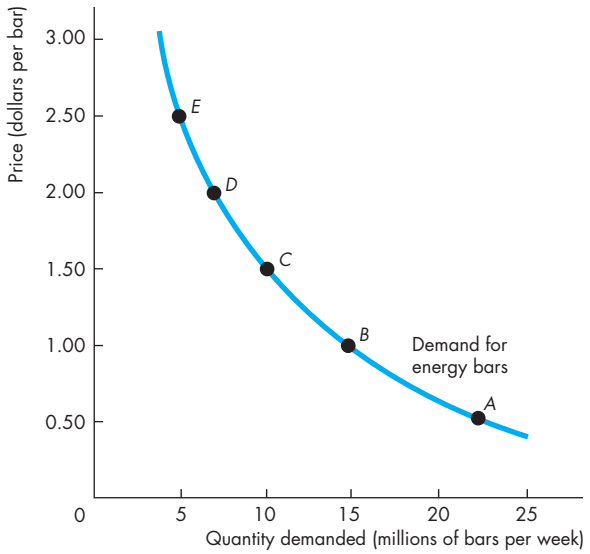
If a small quantity is available, the highest price that someone is willing and able to pay for one more unit is high. But as the quantity available increases, the marginal benefit of each additional unit falls and the highest price that someone is willing and able to pay also falls along the demand curve.

In Fig. 3.1, if only 5 million energy bars are available each week, the highest price that someone is willing to pay for the 5 millionth bar is $2.50. But if 22 million energy bars are available each week, someone is willing to pay 50¢ for the last bar bought.

A Change in Demand

When any factor that influences buying plans changes, other than the price of the good, there is a **change in demand**. Figure 3.2 illustrates an increase in demand. When demand increases, the demand curve shifts rightward and the quantity demanded at each price is greater. For example, at $2.50 a bar, the quantity demanded on the original (blue) demand curve is 5 million energy bars a week. On the new (red) demand curve, at $2.50 a bar, the quantity demanded is 15 million bars a week. Look closely at the numbers in the table and check that the quantity demanded at each price is greater.

FIGURE 3.1 The Demand Curve



	Price (dollars per bar)	Quantity demanded (millions of bars per week)
A	0.50	22
B	1.00	15
C	1.50	10
D	2.00	7
E	2.50	5

The table shows a demand schedule for energy bars. At a price of 50¢ a bar, 22 million bars a week are demanded; at a price of $1.50 a bar, 10 million bars a week are demanded. The demand curve shows the relationship between quantity demanded and price, other things remaining the same. The demand curve slopes downward: As the price falls, the quantity demanded increases.

The demand curve can be read in two ways. For a given price, the demand curve tells us the quantity that people plan to buy. For example, at a price of $1.50 a bar, people plan to buy 10 million bars a week. For a given quantity, the demand curve tells us the maximum price that consumers are willing and able to pay for the last bar available. For example, the maximum price that consumers will pay for the 15 millionth bar is $1.00.

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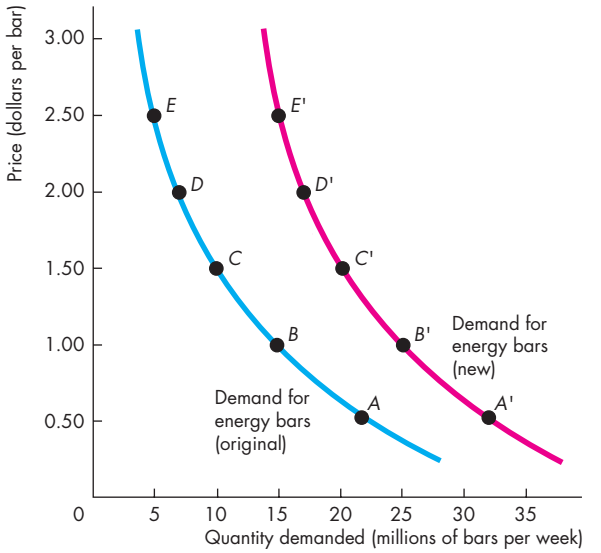
FIGURE 3.2 An Increase in Demand



	Original demand schedule Original income			New demand schedule New higher income	
	Price (dollars per bar)	Quantity demanded (millions of bars per week)		Price (dollars per bar)	Quantity demanded (millions of bars per week)
A	0.50	22	*A'*	0.50	32
B	1.00	15	*B'*	1.00	25
C	1.50	10	*C'*	1.50	20
D	2.00	7	*D'*	2.00	17
E	2.50	5	*E'*	2.50	15

A change in any influence on buying plans other than the price of the good itself results in a new demand schedule and a shift of the demand curve. A change in income changes the demand for energy bars. At a price of $1.50 a bar, 10 million bars a week are demanded at the original income (row *C* of the table) and 20 million bars a week are demanded at the new higher income (row *C'*). A rise in income increases the demand for energy bars. The demand curve shifts *rightward*, as shown by the shift arrow and the resulting red curve.

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Six main factors bring changes in demand. They are changes in

- The prices of related goods
- Expected future prices
- Income
- Expected future income and credit
- Population
- Preferences

Prices of Related Goods The quantity of energy bars that consumers plan to buy depends in part on the prices of substitutes for energy bars. A **substitute** is a good that can be used in place of another good. For example, a bus ride is a substitute for a train ride; a hamburger is a substitute for a hot dog; and an energy drink is a substitute for an energy bar. If the price of a substitute for an energy bar rises, people buy less of the substitute and more energy bars. For example, if the price of an energy drink rises, people buy fewer energy drinks and more energy bars. The demand for energy bars increases.

The quantity of energy bars that people plan to buy also depends on the prices of complements with energy bars. A **complement** is a good that is used in conjunction with another good. Hamburgers and fries are complements, and so are energy bars and exercise. If the price of an hour at the gym falls, people buy more gym time *and more* energy bars.

Expected Future Prices If the expected future price of a good rises and if the good can be stored, the opportunity cost of obtaining the good for future use is lower today than it will be in the future when people expect the price to be higher. So people retime their purchases—they substitute over time. They buy more of the good now before its price is expected to rise (and less afterward), so the demand for the good today increases.

For example, suppose that a Florida frost damages the season's orange crop. You expect the price of orange juice to rise, so you fill your freezer with enough frozen juice to get you through the next six months. Your current demand for frozen orange juice has increased, and your future demand has decreased.

Similarly, if the expected future price of a good falls, the opportunity cost of buying the good today is high relative to what it is expected to be in the future. So again, people retime their purchases. They buy less of the good now before its price is expected