For those who need a cappuccino, mocha latte, or Frappuccino to get through the day, coffee drinking can become an expensive habit. And on October 6, 2006, the habit got a little more expensive. On that day, Starbucks raised its drink prices for the first time in six years. The average price of coffee beverages at the world’s leading chain of coffee-houses rose about 11 cents per cup.

Starbucks had kept its prices unchanged for six years. So what compelled them to finally raise their prices in the fall of 2006? Mainly the fact that the cost of a major ingredient—coffee beans—had gone up significantly. In fact, coffee bean prices doubled between 2002 and 2006.

Who decided to raise the prices of coffee beans? Nobody: prices went up because of events outside anyone’s control. Specifically, the main cause of rising bean prices was a significant decrease in the supply of coffee beans from the world’s two leading coffee exporters: Brazil and Vietnam. In Brazil, the decrease in supply was a delayed reaction to low prices earlier in the decade, which led coffee growers to cut back on planting. In Vietnam, the problem was weather: a prolonged drought sharply reduced coffee harvests.

And a lower supply of coffee beans from Vietnam or Brazil inevitably translates into a higher price of coffee on Main Street. It’s just a matter of supply and demand.

What do we mean by that? Many people use “supply and demand” as a sort of catchphrase to mean “the laws of the marketplace at work.” To economists, however, the concept of supply and demand has a precise meaning: it is a model of how a market behaves.

In this section, we lay out the pieces that make up the supply and demand model, put them together, and show how this model can be used to understand how many—but not all—markets behave.
What a competitive market is and how it is described by the supply and demand model

What the demand curve is

The difference between movements along the demand curve and changes in demand

The factors that shift the demand curve

Supply and Demand: A Model of a Competitive Market

Coffee bean sellers and coffee bean buyers constitute a market—a group of producers and consumers who exchange a good or service for payment. In this section, we’ll focus on a particular type of market known as a competitive market. Roughly, a competitive market is a market in which there are many buyers and sellers of the same good or service. More precisely, the key feature of a competitive market is that no individual’s actions have a noticeable effect on the price at which the good or service is sold. It’s important to understand, however, that this is not an accurate description of every market. For example, it’s not an accurate description of the market for cola beverages. That’s because in the market for cola beverages, Coca-Cola and Pepsi account for such a large proportion of total sales that they are able to influence the price at which cola beverages are bought and sold. But it is an accurate description of the market for coffee beans. The global marketplace for coffee beans is so huge that even a coffee retailer as large as Starbucks accounts for only a tiny fraction of transactions, making it unable to influence the price at which coffee beans are bought and sold.

It’s a little hard to explain why competitive markets are different from other markets until we’ve seen how a competitive market works. For now, let’s just say that it’s easier to model competitive markets than other markets. When taking an exam, it’s always a good strategy to begin by answering the easier questions. In this book, we’re going to do the same thing. So we will start with competitive markets.

When a market is competitive, its behavior is well described by the supply and demand model. Because many markets are competitive, the supply and demand model is a very useful one indeed.
There are five key elements in this model:

- The demand curve
- The supply curve
- The set of factors that cause the demand curve to shift and the set of factors that cause the supply curve to shift
- The market equilibrium, which includes the equilibrium price and equilibrium quantity
- The way the market equilibrium changes when the supply curve or demand curve shifts

To explain the supply and demand model, we will examine each of these elements in turn. In this module we begin with demand.

The Demand Curve

How many pounds of coffee beans do consumers around the world want to buy in a given year? You might at first think that we can answer this question by multiplying the number of cups of coffee drunk around the world each day by the weight of the coffee beans it takes to brew a cup, and then multiplying by 365. But that’s not enough to answer the question because how many pounds of coffee beans consumers want to buy—and therefore how much coffee people want to drink—depends on the price of coffee beans. When the price of coffee rises, as it did in 2006, some people drink less, perhaps switching completely to other caffeinated beverages, such as tea or Coca-Cola. (Yes, there are people who drink Coke in the morning.) In general, the quantity of coffee beans, or of any good or service that people want to buy (taking “want” to mean they are willing and able to buy it), depends on the price. The higher the price, the less of the good or service people want to purchase; alternatively, the lower the price, the more they want to purchase.

So the answer to the question “How many pounds of coffee beans do consumers want to buy?” depends on the price of coffee beans. If you don’t yet know what the price will be, you can start by making a table of how many pounds of coffee beans people would want to buy at a number of different prices. Such a table is known as a demand schedule. This, in turn, can be used to draw a demand curve, which is one of the key elements of the supply and demand model.

The Demand Schedule and the Demand Curve

A demand schedule is a table showing how much of a good or service consumers will want to buy at different prices. On the right side of Figure 5.1 on the next page, we show a hypothetical demand schedule for coffee beans. It’s hypothetical in that it doesn’t use actual data on the world demand for coffee beans and it assumes that all coffee beans are of equal quality (with our apologies to coffee connoisseurs). According to the table, if coffee beans cost $1 a pound, consumers around the world will want to purchase 10 billion pounds of coffee beans over the course of a year. If the price is $1.25 a pound, they will want to buy only 8.9 billion pounds; if the price is only $0.75 a pound, they will want to buy 11.5 billion pounds; and so on. So the higher the price, the fewer pounds of coffee beans consumers will want to purchase. In other words, as the price rises, the quantity demanded of coffee beans—the actual amount consumers are willing to buy at some specific price—falls.

The graph in Figure 5.1 is a visual representation of the information in the table. The vertical axis shows the price of a pound of coffee beans and the horizontal axis shows the quantity of coffee beans. Each point on the graph corresponds to one of the entries in the table. The curve that connects these points is a demand curve. A demand curve is a graphical representation of the demand schedule, another way of showing the relationship between the quantity demanded and the price.

Note that the demand curve shown in Figure 5.1 slopes downward. This reflects the general proposition that a higher price reduces the quantity demanded. For example, some people who drink two cups of coffee a day when beans are $1 per pound will cut down to...
one cup when beans are $2 per pound. Similarly, some who drink one cup when beans are $1 a pound will drink tea instead if the price doubles to $2 per pound and so on. In the real world, demand curves almost always slope downward. (The exceptions are so rare that for practical purposes we can ignore them.) Generally, the proposition that a higher price for a good, all other things being equal, leads people to demand a smaller quantity of that good is so reliable that economists are willing to call it a “law”—the law of demand.

### Shifts of the Demand Curve

Even though coffee prices were a lot higher in 2006 than they had been in 2002, total world consumption of coffee was higher in 2006. How can we reconcile this fact with the law of demand, which says that a higher price reduces the quantity demanded, all other things being equal?

The answer lies in the crucial phrase all other things being equal. In this case, all other things weren’t equal: the world had changed between 2002 and 2006, in ways that increased the quantity of coffee demanded at any given price. For one thing, the world’s population, and therefore the number of potential coffee drinkers, increased. In addition, the growing popularity of different types of coffee beverages, like lattes and cappuccinos, led to an increase in the quantity demanded at any given price. Figure 5.2 illustrates this phenomenon using the demand schedule and demand curve for coffee beans. (As before, the numbers in Figure 5.2 are hypothetical.)

The table in Figure 5.2 shows two demand schedules. The first is a demand schedule for 2002, the same one shown in Figure 5.1. The second is a demand schedule for 2006.
It differs from the 2002 demand schedule due to factors such as a larger population and the greater popularity of lattes, factors that led to an increase in the quantity of coffee beans demanded at any given price. So at each price, the 2006 schedule shows a larger quantity demanded than the 2002 schedule. For example, the quantity of coffee beans consumers wanted to buy at a price of $1 per pound increased from 10 billion to 12 billion pounds per year, the quantity demanded at $1.25 per pound went from 8.9 billion to 10.7 billion pounds, and so on.

What is clear from this example is that the changes that occurred between 2002 and 2006 generated a new demand schedule, one in which the quantity demanded was greater at any given price than in the original demand schedule. The two curves in Figure 5.2 show the same information graphically. As you can see, the demand schedule for 2006 corresponds to a new demand curve, $D_2$, that is to the right of the demand curve for 2002, $D_1$. This change in demand shows the increase in the quantity demanded at any given price, represented by the shift in position of the original demand curve, $D_1$, to its new location at $D_2$.

It’s crucial to make the distinction between such changes in demand and movements along the demand curve, changes in the quantity demanded of a good that result from a change in that good’s price. Figure 5.3 on the next page illustrates the difference.

The movement from point $A$ to point $B$ is a movement along the demand curve: the quantity demanded rises due to a fall in price as you move down $D_1$. Here, a fall in the price of coffee beans from $1.50 to $1 per pound generates a rise in the quantity demanded from 8.1 billion to 10 billion pounds per year. But the quantity demanded can also rise when the price is unchanged if there is an increase in demand—a rightward shift of the demand curve. This is illustrated in Figure 5.3 by the shift of the demand curve from $D_1$ to $D_2$. Holding the price constant at $1.50 a pound, the quantity demanded rises from 8.1 billion pounds at point $A$ on $D_1$ to 9.7 billion pounds at point $C$ on $D_2$.

### Figure 5.2 An Increase in Demand

<table>
<thead>
<tr>
<th>Price of coffee beans (per pound)</th>
<th>Quantity of coffee beans demanded (billions of pounds)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>in 2002</td>
</tr>
<tr>
<td>$2.00</td>
<td>7.1</td>
</tr>
<tr>
<td>$1.75</td>
<td>7.5</td>
</tr>
<tr>
<td>$1.50</td>
<td>8.1</td>
</tr>
<tr>
<td>$1.25</td>
<td>8.9</td>
</tr>
<tr>
<td>$1.00</td>
<td>10.0</td>
</tr>
<tr>
<td>$0.75</td>
<td>11.5</td>
</tr>
<tr>
<td>$0.50</td>
<td>14.2</td>
</tr>
</tbody>
</table>

### An Increase in Demand

An increase in the population and other factors generate an increase in demand—a rise in the quantity demanded at any given price. This is represented by the two demand schedules—one showing demand in 2002, before the rise in population, the other showing demand in 2006, after the rise in population—and their corresponding demand curves. The increase in demand shifts the demand curve to the right.
When economists talk about a “change in demand,” saying “the demand for X increased” or “the demand for Y decreased,” they mean that the demand curve for X or Y shifted—not that the quantity demanded rose or fell because of a change in the price.

**Understanding Shifts of the Demand Curve**

Figure 5.4 illustrates the two basic ways in which demand curves can shift. When economists talk about an “increase in demand,” they mean a rightward shift of the demand curve: at any given price, consumers demand a larger quantity of the good or service than...
before. This is shown by the rightward shift of the original demand curve $D_1$ to $D_2$. And when economists talk about a “decrease in demand,” they mean a leftward shift of the demand curve: at any given price, consumers demand a smaller quantity of the good or service than before. This is shown in Figure 5.4 by the leftward shift of the original demand curve $D_1$ to $D_3$.

What caused the demand curve for coffee beans to shift? We have already mentioned two reasons: changes in population and a change in the popularity of coffee beverages. If you think about it, you can come up with other things that would be likely to shift the demand curve for coffee beans. For example, suppose that the price of tea rises. This will induce some people who previously drank tea to drink coffee instead, increasing the demand for coffee beans.

Economists believe that there are five principal factors that shift the demand curve for a good or service:

- Changes in the prices of related goods or services
- Changes in income
- Changes in tastes
- Changes in expectations
- Changes in the number of consumers

Although this is not an exhaustive list, it contains the five most important factors that can shift demand curves. So when we say that the quantity of a good or service demanded falls as its price rises, all other things being equal, we are in fact stating that the factors that shift demand are remaining unchanged. Let’s now explore, in more detail, how those factors shift the demand curve.

**Changes in the Prices of Related Goods or Services** While there’s nothing quite like a good cup of coffee to start your day, a cup or two of strong tea isn’t a bad alternative. Tea is what economists call a substitute for coffee. A pair of goods are substitutes if a rise in the price of one good (coffee) makes consumers more willing to buy the other good (tea). Substitutes are usually goods that in some way serve a similar function: concerts and theater plays, muffins and doughnuts, train rides and air flights. A rise in the price of the alternative good induces some consumers to purchase the original good instead of it, shifting demand for the original good to the right.

But sometimes a fall in the price of one good makes consumers more willing to buy another good. Such pairs of goods are known as complements. Complements are usually goods that in some sense are consumed together: computers and software, cappuccinos and croissants, cars and gasoline. Because consumers like to consume a good and its complement together, a change in the price of one of the goods will affect the demand for its complement. In particular, when the price of one good rises, the demand for its complement decreases, shifting the demand curve for the complement to the left. So the October 2006 rise in Starbucks’s cappuccino prices is likely to have precipitated a leftward shift of the demand curve for croissants, as people consumed fewer cappuccinos and croissants. Likewise, when the price of one good falls, the quantity demanded of its complement rises, shifting the demand curve for the complement to the right. This means that if, for some reason, the price of cappuccinos falls, we should see a rightward shift of the demand curve for croissants as people consume more cappuccinos and croissants.

**Changes in Income** When individuals have more income, they are normally more likely to purchase a good at any given price. For example, if a family’s income rises, it is more likely to take that summer trip to Disney World—and therefore also more likely to buy plane tickets. So a rise in consumer incomes will cause the demand curves for most goods to shift to the right.

Why do we say “most goods,” not “all goods”? Most goods are normal goods—the demand for them increases when consumer income rises. However, the demand for...
some products falls when income rises. Goods for which demand decreases when income rises are known as **inferior goods**. Usually an inferior good is one that is considered less desirable than more expensive alternatives—such as a bus ride versus a taxi ride. When they can afford to, people stop buying an inferior good and switch their consumption to the preferred, more expensive alternative. So when a good is inferior, a rise in income shifts the demand curve to the left. And, not surprisingly, a fall in income shifts the demand curve to the right.

One example of the distinction between normal and inferior goods that has drawn considerable attention in the business press is the difference between so-called casual-dining restaurants such as Applebee’s and Olive Garden and fast-food chains such as McDonald’s and KFC. When their incomes rise, Americans tend to eat out more at casual-dining restaurants. However, some of this increased dining out comes at the expense of fast-food venues—to some extent, people visit McDonald’s less once they can afford to move upscale. So casual dining is a normal good, while fast-food appears to be an inferior good.

**Changes in Tastes** Why do people want what they want? Fortunately, we don’t need to answer that question—we just need to acknowledge that people have certain preferences, or tastes, that determine what they choose to consume and that these tastes can change. Economists usually lump together changes in demand due to fads, beliefs, cultural shifts, and so on under the heading of changes in tastes, or preferences.

For example, once upon a time men wore hats. Up until around World War II, a respectable man wasn’t fully dressed unless he wore a dignified hat along with his suit. But the returning GIs adopted a more informal style, perhaps due to the rigors of the war. And President Eisenhower, who had been supreme commander of Allied Forces before becoming president, often went hatless. After World War II, it was clear that the demand curve for hats had shifted leftward, reflecting a decrease in the demand for hats.

We’ve already mentioned one way in which changing tastes played a role in the increase in the demand for coffee beans from 2002 to 2006: the increase in the popularity of coffee beverages such as lattes and cappuccinos. In addition, there was another route by which changing tastes increased worldwide demand for coffee beans: the switch by consumers in traditionally tea-drinking countries to coffee. “In 1999,” reported Roast magazine, “the ratio of Russian tea drinkers to coffee drinkers was five to one. In 2005, the ratio is roughly two to one.”

Economists have little to say about the forces that influence consumers’ tastes. (Marketers and advertisers, however, have plenty to say about them!) However, a change in tastes has a predictable impact on demand. When tastes change in favor of a good, more people want to buy it at any given price, so the demand curve shifts to the right. When tastes change against a good, fewer people want to buy it at any given price, so the demand curve shifts to the left.

**Changes in Expectations** When consumers have some choice about when to make a purchase, current demand for a good is often affected by expectations about its future price. For example, savvy shoppers often wait for seasonal sales—say, buying next year’s holiday gifts during the post-holiday markdowns. In this case, expectations of a future drop in price lead to a decrease in demand today. Alternatively, expectations of a future rise in price are likely to cause an increase in demand today. For example, savvy shoppers, knowing that Starbucks was going to increase the price of its coffee
beans on October 6, 2006, would stock up on Starbucks coffee beans before that date.

Expected changes in future income can also lead to changes in demand: if you expect your income to rise in the future, you will typically borrow today and increase your demand for certain goods; and if you expect your income to fall in the future, you are likely to save today and reduce your demand for some goods.

Changes in the Number of Consumers As we’ve already noted, one of the reasons for rising coffee demand between 2002 and 2006 was a growing world population. Because of population growth, overall demand for coffee would have risen even if each individual coffee-drinker’s demand for coffee had remained unchanged.

Let’s introduce a new concept: the individual demand curve, which shows the relationship between quantity demanded and price for an individual consumer. For example, suppose that Darla is a consumer of coffee beans and that panel (a) of Figure 5.5 shows how many pounds of coffee beans she will buy per year at any given price per pound. Then $D_{Darla}$ is Darla’s individual demand curve.

![Figure 5.5](image)

**Figure 5.5 Individual Demand Curves and the Market Demand Curve**

Darla and Dino are the only two consumers of coffee beans in the market. Panel (a) shows Darla’s individual demand curve: the number of pounds of coffee beans she will buy per year at any given price. Panel (b) shows Dino’s individual demand curve. Given that Darla and Dino are the only two consumers, the market demand curve, which shows the quantity of coffee demanded by all consumers at any given price, is shown in panel (c). The market demand curve is the horizontal sum of the individual demand curves of all consumers. In this case, at any given price, the quantity demanded by the market is the sum of the quantities demanded by Darla and Dino.

The market demand curve shows how the combined quantity demanded by all consumers depends on the market price of that good. (Most of the time, when economists refer to the demand curve, they mean the market demand curve.) The market demand curve is the horizontal sum of the individual demand curves of all consumers in that market. To see what we mean by the term horizontal sum, assume for a moment that there are only two consumers of coffee, Darla and Dino. Dino’s individual demand curve, $D_{Dino}$, is shown in panel (b). Panel (c) shows the market demand curve. At any given price, the quantity demanded by the market is the sum of the quantities demanded by Darla and Dino. For example, at a price of $2 per pound, Darla demands
20 pounds of coffee beans per year and Dino demands 10 pounds per year. So the quantity demanded by the market is 30 pounds per year.

Clearly, the quantity demanded by the market at any given price is larger with Dino present than it would be if Darla were the only consumer. The quantity demanded at any given price would be even larger if we added a third consumer, then a fourth, and so on. So an increase in the number of consumers leads to an increase in demand.

For an overview of the factors that shift demand, see Table 5.1.

<table>
<thead>
<tr>
<th>Factors That Shift Demand</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Changes in the prices of related goods or services</strong></td>
</tr>
<tr>
<td>If $A$ and $B$ are substitutes \ldots \ldots and the price of $B$ rises, \ldots \ldots demand for $A$ increases (shifts to the right).</td>
</tr>
<tr>
<td>\ldots and the price of $B$ falls, \ldots \ldots demand for $A$ decreases (shifts to the left).</td>
</tr>
<tr>
<td>If $A$ and $B$ are complements \ldots \ldots and the price of $B$ rises, \ldots \ldots demand for $A$ decreases.</td>
</tr>
<tr>
<td>\ldots and the price of $B$ falls, \ldots \ldots demand for $A$ increases.</td>
</tr>
<tr>
<td><strong>Changes in income</strong></td>
</tr>
<tr>
<td>If $A$ is a normal good \ldots \ldots and income rises, \ldots demand for $A$ increases.</td>
</tr>
<tr>
<td>\ldots and income falls, \ldots demand for $A$ decreases.</td>
</tr>
<tr>
<td>If $A$ is an inferior good \ldots \ldots and income rises, \ldots demand for $A$ decreases.</td>
</tr>
<tr>
<td>\ldots and income falls, \ldots demand for $A$ increases.</td>
</tr>
<tr>
<td><strong>Changes in tastes</strong></td>
</tr>
<tr>
<td>If tastes change in favor of $A$, \ldots \ldots demand for $A$ increases.</td>
</tr>
<tr>
<td>If tastes change against $A$, \ldots \ldots demand for $A$ decreases.</td>
</tr>
<tr>
<td><strong>Changes in expectations</strong></td>
</tr>
<tr>
<td>If the price of $A$ is expected to rise in the future, \ldots \ldots demand for $A$ increases today.</td>
</tr>
<tr>
<td>If the price of $A$ is expected to fall in the future, \ldots \ldots demand for $A$ decreases today.</td>
</tr>
<tr>
<td>If $A$ is a normal good \ldots \ldots and income is expected to rise in the future, \ldots demand for $A$ may increase today.</td>
</tr>
<tr>
<td>\ldots and income is expected to fall in the future, \ldots demand for $A$ may decrease today.</td>
</tr>
<tr>
<td>If $A$ is an inferior good \ldots \ldots and income is expected to rise in the future, \ldots demand for $A$ may decrease today.</td>
</tr>
<tr>
<td>\ldots and income is expected to fall in the future, \ldots demand for $A$ may increase today.</td>
</tr>
<tr>
<td><strong>Changes in the number of consumers</strong></td>
</tr>
<tr>
<td>If the number of consumers of $A$ rises, \ldots \ldots market demand for $A$ increases.</td>
</tr>
<tr>
<td>If the number of consumers of $A$ falls, \ldots \ldots market demand for $A$ decreases.</td>
</tr>
</tbody>
</table>
Supply and Demand: Introduction and Demand

proach: reducing congestion by raising the price of driving. So it was a shock when, in 2003, London imposed a “congestion charge” on all cars entering the city center during business hours—currently £8 (about $13) for drivers who pay on the same day they travel.

Compliance is monitored with automatic cameras that photograph license plates. People can either pay the charge in advance or pay it by midnight of the day they have driven. If they pay on the day after they have driven, the charge increases to £10 (about $16). And if they don’t pay and are caught, a fine of £120 (about $192) is imposed for each transgression. (A full description of the rules can be found at www.cclondon.com.)

Not surprisingly, the result of the new policy confirms the law of demand: three years after the charge was put in place, traffic in central London was about 10 percent lower than before the charge. In February 2007, the British government doubled the area of London covered by the congestion charge, and it suggested that it might institute congestion charging across the country by 2015. Several American and European municipalities, having seen the success of London’s congestion charge, have said that they are seriously considering adopting a congestion charge as well.

Module 5 Review

Check Your Understanding

1. Explain whether each of the following events represents (i) a change in demand (a shift of the demand curve) or (ii) a movement along the demand curve (a change in the quantity demanded).
   a. A store owner finds that customers are willing to pay more for umbrellas on rainy days.
   b. When XYZ Telecom, a long-distance telephone service provider, offered reduced rates on weekends, its volume of weekend calling increased sharply.
   c. People buy more long-stem roses the week of Valentine’s Day, even though the prices are higher than at other times during the year.
   d. A sharp rise in the price of gasoline leads many commuters to join carpools in order to reduce their gasoline purchases.

Multiple-Choice Questions

1. Which of the following would increase demand for a normal good? A decrease in
   a. price.
   b. income.
   c. the price of a substitute.
   d. consumer taste for a good.
   e. the price of a complement.

2. A decrease in the price of butter would most likely decrease the demand for
   a. margarine.
   b. bagels.
   c. jelly.
   d. milk.
   e. syrup.
3. If an increase in income leads to a decrease in demand, the good is
   a. a complement.
   b. a substitute.
   c. inferior.
   d. abnormal.
   e. normal.
4. Which of the following will occur if consumers expect the price of a good to fall in the coming months?
   a. The quantity demanded will rise today.
   b. The quantity demanded will remain the same today.
   c. Demand will increase today.
   d. Demand will decrease today.
   e. No change will occur today.
5. Which of the following will increase the demand for disposable diapers?
   a. a new “baby boom”
   b. concern over the environmental effect of landfills
   c. a decrease in the price of cloth diapers
   d. a move toward earlier potty training of children
   e. a decrease in the price of disposable diapers

**Critical-Thinking Question**

Draw a correctly labeled graph showing the demand for apples. On your graph, illustrate what happens to the demand for apples if a new report from the Surgeon General finds that an apple a day really does keep the doctor away.